

Product Market Competition and Information Content in Earnings Announcements

Song Xue*

Fisher School of Accounting, University of Florida

This draft: September 2009

ABSTRACT

This study examines the relation between product market competition and the information content in quarterly earnings announcements. Extant theory offers conflicting predictions on this issue. Competition alleviates agency problem and thus encourages informative earnings announcements. On the other hand, firms facing intense competition reduce the information content in the earnings announcement due to proprietary costs concerns. Using a sample of 89830 firm-year observations over the period 1988-2007, I find evidence that the degree of competition is positively associated with the information content in the earnings announcements. To capture the degree of product market competition, this study uses a new measure and shows that it complements the widely used Herfindahl-Hirschman Index measure. In addition, I find the information content in earnings announcements might be substantially higher than that reported by Ball and Shivakumar (2008). Overall, the evidence shows a positive relationship between competition and earnings announcement informativeness, but the preliminary results are weak probably due to measurement errors.

*334 Gerson Hall. Phone: (352)273-0228. E-mail: song.xue@cba.ufl.edu.

1 Introduction

This study attempts to answer the question: how is the relative information content in the earnings announcements affected by the degree of product market competition? Or more specifically, are firms that operate in highly competitive market tend to have more informative earnings announcements? Prior studies document that product market competition appears to reduce the agency problem and better align managers' and shareholders' interests Griffith (2001). Thus, one would predict that earnings announcements of firms in high competition industries are generally more informative, as managers attempt to convey more faithful information to the investors.

However, opposite prediction following another causal link is also plausible. Proprietary costs concerns have been identified to be affecting firm's disclosure practice (Verrecchia, 2001). Disclosing proprietary information to the public including current and potential competitors is detrimental to the firm's profitability. In more competitive industries, proprietary costs are generally higher due to larger number of competitors and high degree of homogeneity within the industry Hayes and Lundholm (1996). Managers in these industries therefore have stronger incentive to withhold proprietary information, leading to less informative earnings reports.

Given the conflicting predictions, my study attempts to test empirically the relation between product market competition and earnings announcement informativeness. My proxy of the earnings announcement informativeness is based on Ball and Shivakumar (2008, BS2008 hereafter) abnormal R^2 measure. BS2008 propose that the estimated R^2 from regressing annual stock returns on four quarterly earnings announcement window returns captures the relative information content in the earnings announcements. Under the null hypothesis that the information content in earnings announcement is insignificant, adjusted R^2 of the above regression will not be different from $12/252=4.8\%$, or the number of total earnings announcement event window days (4 quarters \times 3 days per quarter) divided by total number of trading days in one year. The difference between estimated R^2 and the benchmark 4.8% quantifies the new information contained in the quarterly earnings announcements. BS2008 report the average difference to be about 2% for sample

period 1972-2006, suggesting a modest but not overwhelming amount of new information is contained in earnings announcement. This study replicates their regressions for period 1988-2007, and obtains adjusted R^2 s generally larger than that reported in BS2008. This result suggest that the earnings announcements may convey substantial new information to the market.

To characterize the product market competition, I devise the aggregated market share change (AMSC) measure and compare it with another widely used market concentration based competition measure, or Herfindahl-Hirschman Index (HHI). AMSC captures the market share variation across time in a certain industry. Market share distribution among constituent firms of high AMSC industry varies greatly year by year, signaling high competition within the industry. HHI is a widely used measure in many previous studies on product market competition (e.g. Gaspar and Massa 2006), calculated as the sum of squared market shares of firms in an industry. High HHI indicates a concentrated industry where incumbent firms extract higher economic rent, implying low competition. HHI is chosen as a benchmark measure since it is also based on market shares. The Spearman rank correlation of HHI and AMSC is significantly negative, consistent with the prediction. Moreover, Pearson correlations suggest that AMSC is positively correlated with the percentage of loss-reporting firms in an industry, and negatively correlated with typical firm size of an industry.

I find weak evidence that the earnings announcement informativeness is positively correlated with the product market competition. This result only holds when both AMSC and its ranking serve as competition proxies, but not each of them alone or HHI. The evidence is consistent with the argument that intense product market competition motivates management to disclose more information through earnings announcement than through other channels. As the BS2008 abnormal R^2 measure captures the *relative* informativeness, an alternative interpretation is that managers in highly competitive industries are reluctant to release information voluntarily, so the mandated earnings reports are relatively more important information sources to the market.

This study contributes in several ways. First, I explore the possibility of using the BS2008 abnormal R^2 as a measure of relative information content in events (earnings an-

nouncement in this particular study, but can be extended to other events such as management forecast). Second, I devise the AMSC measure, which describes the market share distribution change within the industry, to capture the product market competition. Evidence indicates that the measure complement existing measures in characterizing the degree of product market competition. Third, this study tests the association between competition and relative informativeness of quarterly earnings management and obtains some preliminary evidence.

The next section briefly summarizes related prior research and develops the hypothesis. Research design is described in section 3, followed by section 4 that presents and analyzes the empirical results. Implications, limitations, and potential extensions are discussed in the last section.

2 Background

2.1 Information Content in Earnings Announcements

Firms that have access to public capital markets are mandated by SEC to disclose their financial status every quarter. Mandatory disclosure would be redundant if the market is without imperfections and optimal level of information will be provided by fund-seeking firms to the investors. One such market imperfection that results in disclosure regulation is that accounting information is paid by existing shareholders but free ridden by prospective investors, leading to underproduction of information in the economy (Watts and Zimmerman, 1986; Beaver, 1998). They also suggest an alternative explanation that the regulator's primary objective of disclosure regulation may lie elsewhere than to provide substantial new information to *all* investors. For example, regulators may be more concerned about the welfare of unsophisticated investors, and help to reduce the gap between sophisticated and unsophisticated investors by disclosure regulations.

Vast literatures have attempted to capture the informativeness of the earnings announcements since the seminal work of Beaver (1968), in which he shows that both the trading volume and return volatility peak at the time of earnings announcements. Atiase (1985) find the security price revaluation in earnings report periods is significantly

higher than other periods and is inversely related to the firms' market capitalization. Bamber (1986) measures the information content of annual earnings announcements by unexpected trading volume, and find evidence that it is positively correlated with the magnitude of unexpected earnings. Positive accounting theory has examined how the management's accounting choices and accrual estimates are affected by contracting and political considerations. Empirical findings indicate that firms' financial reporting choices are under the influence of bond covenants, leverage, compensation contracts, and taxes (Fields et al. 2001). Meanwhile, some researchers (e.g. Watts and Zimmerman 1990; Smith and Watts 1992; Skinner 1993) argue that a firm's optimal contracting relations and financial reporting choices are simultaneously determined by the nature of the firm and therefore should be viewed as endogenous.

Although evidence shows the informativeness of earnings announcement, much fewer studies have been done to identify the factors that affects this informativeness, largely due to the lack of measure of information content in earnings announcements. BS2008 propose a measure to quantify the information content in the four quarterly earnings announcements *relative to* the full information that is available to the market throughout the year. The measure is the R^2 value from the regression of securities' calendar-year buy-and-hold returns on the buy-and-hold returns of the four quarterly earnings announcements "event windows". They find that the quarterly earnings announcement on average is associated with 1% or 2% of total information, implying that the earnings announcement contains "modest but not overwhelming" incremental information, consistent with their prediction.

With the BS2008 measure, it becomes viable to quantitatively study the factors that affect the informativeness of earnings announcements relative to the total information available to the market. These factors affect the quality of financial reports and hence the informativeness of earnings announcements as perceived by the investors. Accrual-based accounting allows management to have considerable freedom in reporting earnings to more accurately reflect the financial situation of the firm. However, managers as risk-averse agent have their own interests, which may conflict with faithfully reporting to the principal, or the owners of the firm. In this case, managers may exert their discretion in financial reporting and distort the earnings number, eroding the informativeness of earnings report

(e.g. Sloan 1996; Collins and Hribar 2000). For example, Bergstresser and Philippon (2006) report that firms whose CEOs have large proportion of their compensation in stock and option holdings are more likely to manipulate the earnings through discretionary accruals. Furthermore, earnings manipulation may occur to reduce political costs. Extraordinary successful firms that hoard large quantity of cash reduce their reported earnings in current period by delaying revenue recognition and accelerate depreciation to avoid public attention as well as regulatory investigation (DeGeorge et al., 1999). In addition, firms also avoid disclosing detailed information in the earnings announcements that is desired by the market when the firms feel such information will be used by their competitors and damage their competitive edge. Hayes and Lundholm (1996) model managers' segment reporting choices in the presence of capital market and rivals. In the model, the firms report only aggregate data to prevent competitors from identifying the more lucrative segment when the future returns on two segment diverge. Skinner (1994) also suggests that firms voluntarily disclose bad news to deter potential competitors from entering the market.

Relative informativeness of earnings announcements is also affected by the relative amount of pre-disclosure information, provided to the market in the form of analyst's reports and earnings guidance. Shores (1990) documents that the market reactions to annual earnings announcements are negatively associated with the amount of interim information, surrogated by firm size, analyst coverage, interim voluntary and regulatory disclosures, etc. Francis et al. (2002) investigate whether the availability of analyst reports reduces the usefulness of earnings announcements, and find little evidence that the analyst reports preempt the information content in earnings announcements. In a subsequent study, Chen et al. (2006) find the timing of analyst reports relative to the earnings announcements affects whether the relationship between the two is substitutive or complementary.

2.2 Product Market Competition and Its Relation to Earnings Announcement Informativeness

Prior theoretical research on product market competition primarily focus on its role in alleviating agency problem. Machlup (1967) argues that there is no scope for manage-

rial slack in a market characterized by perfect competition, because all ineffective firms are promptly driven out of the market. On the other hand, Jensen and Meckling (1976) argue that the degree of competition has no effect on agency costs. Because the managerial slack only benefits the manager rather than the owner of the firm, the owner of a monopoly has the same level of incentive to reduce agency costs as the owner of a competitive firm. Schmidt (1997) criticizes the validity of Jensen and Meckling's assumption that the incentive schemes of the owners in monopoly and competitive firms are exactly the same. Griffith (2001) shows evidence that increases in product market competition are associated with increases in productivity, especially for firms with potentially substantial agency problems. Competition appears to reduce the agency problem and better align managers' and shareholders' interests, and hence improve the informativeness of the earnings announcements. On the other hand, managers in competitive industries may be more active in other communication channels such as management forecast, and thus erode the *relative* informativeness of earnings announcements.

Firms face proprietary costs when they disclose more information than the required level in the earnings announcements. Disclosing proprietary information to existing and potential investors helps the firm to lower the cost of capital, but exposing valuable strategic information to the competitors is detrimental to the firm's long-term profitability. In more competitive industries, proprietary costs are generally higher, because (1) larger number of current and potential competitors can benefit from the informative disclosure; (2) firms take advantage of competitors' proprietary information more easily due to higher homogeneity within a competitive industry. Therefore, product market competition generally reduce the information content in earnings announcements. In Hayes and Lundholm (1996) model, firms will only report aggregated earnings of two segments when the profitability of the two is considerably dissimilar in the presence of rivals who may benefit from detailed segment reporting.

Product market competition also affects the informativeness of earnings announcements through various other channels. Dhaliwal et al. (2008) find evidence that the intensity of product market competition is positively associated with accounting conservatism. Givoly and Hayn (2000) find evidence that conservatism is associated with volatility of

earnings announcements. Lev and Sougiannis (1996); Lev and Zarowin (1999) document that the value-relevance of financial reporting is declining. They suggest the reason is that tangible-based GAAP fails to properly value the intangible assets and investments in these assets, especially R&D activities that generate long-term benefit but are required to be expensed in current period. Aghion et al. (2005) report and model an inverted-U shape relationship between firm innovation and product market competition.

2.3 *Summary and Hypothesis*

Public firms are required to disclose their financial status to the capital markets. Information content in their earnings announcements is affected by many factors. Managers may disclose more private information in earnings announcements than the required level to reduce the firm's cost of capital. Alternatively, they may prefer to communicate with the market through voluntary disclosure to reduce the legal liability associated with mandatory disclosure. In firms with substantial agency problem, managers may distort the reported earnings for their self-interest, reducing the informativeness of earnings announcements.

Product market competition affects the information content of earnings announcements through various channels. Intense competition eliminates inefficient firms from the market promptly, deterring managers from self-serving behaviors. As the managers' and shareholders' interests are better aligned in the presence of competition, the earnings announcements are expected to be more informative. On the other hand, disclosing proprietary information to the competitors is detrimental to the firm's long-term profits. Due to proprietary costs concern, firms may be reluctant to make informative earnings announcements when managers feel pressure from high degree of competition.

With a spectrum of mixed evidence, whether product market competition increases or decreases the information content in the earnings announcement remains an empirical issue. This study hypothesizes that high degree of product market competition generally increases the earnings announcement informativeness and expect to find positive association between the two.

3 Research Design

3.1 Measuring the Product Market Competition

Aggregated Market Share Change Measure

Nickell (1996) uses lagged market share to measure the market power, and notes that it is worth using the change in market share as a time-series measure of changes driven by competition. Lev and Zarowin (1999) use the average of the change in firms' revenue ranking in an industry to measure the industry change that they attribute to innovation and competition. In this study, I calculate the aggregated market share change (AMSC) variable to proxy for the product market competition in industry k at year t . The variable is defined as:

$$AMSC_{k,t} = \sqrt{\sum_{i=\text{all firms in } k} (\text{Market Share}_{i,t} - \text{Market Share}_{i,t-1})^2} \quad (1)$$

Or the Euclidean distance between two vectors of time $t - 1$ and t :

$$D^{t-1} = (S_1^{t-1}, S_2^{t-1}, \dots, S_i^{t-1}) \text{ and } D^t = (S_1^t, S_2^t, \dots, S_i^t) \quad (2)$$

Where the i^{th} element S_i of D^t (D^{t-1}) is the market share of firm i at the end of period t ($t - 1$).¹ The market share of firm i in industry k is defined as

$$\text{Market Share}_{i,t} = \frac{\text{Sales}_{i,t}}{\sum_{j=\text{all firms in } k} \text{Sales}_{j,t}} \quad (3)$$

Or the firm's sales scaled by the its residing industry's total sales.

Herfindahl-Hirschman Index

Recent studies have used Herfindahl-Hirschman Index (HHI) from the U.S. Census of Manufacturers to proxy for product market competition. The U.S. Census estimate the HHI by adding the squares of the individual market shares of the fifty largest firms in each industry, and all firms in one industry when the industry contains less than fifty firms.

¹the market share of firm i is set to zero for periods when firm i does not exist or the data are not available.

Low HHI values suggest the market is shared among many competing firms of similar size, while high values suggest the market are dominated by a few large firms.

HHI from the U.S. Census is superior to HHI computed from Compustat data in that Compustat includes only public firms' data while U.S. Census surveys include both public and private firms. Moreover, the U.S. Census includes all manufacturing firms as firms are required by law to respond to the surveys. The drawback of U.S. Census HHI is that the index is only available for manufacturing industries (SIC codes 2011-3990, or NAICS codes 311111-339999), and only update every five years. Following previous studies (e.g. Grullon and Michaely 2007; Akdoğan and MacKay 2006), the same HHI is used for five subsequent years before the next census.

3.2 *Capturing the Information Content*

BS2008 propose a straight forward way to quantify the information contents in the four quarterly earnings announcements relative to the full information that is available to the market throughout the year. The measure is the adjusted R^2 value from the regression of securities' calendar-year buy-and-hold returns on the buy-and-hold returns of the four quarterly earnings announcements "event windows", or the following regression:

$$R_i(annual) = a_0 + a_1R_i(window1) + a_2R_i(window2) + a_3R_i(window2) + a_4R_i(window2) + \varepsilon_i \quad (4)$$

The adjusted R^2 from above regression measures how much of the annual return volatility is accounted by the four earnings announcement events. If the daily returns are independent-identically distributed across time, the information content in each day would be the same. Hence the expected value of the R^2 should be 4.8% (12/252), or information contents in four 3-day windows divided by total annual information. The *abnormal* R^2 , the measure of information content in four quarterly earnings announcement, is thus the adjusted R^2 from estimating above regression.

3.3 *Sample and Variables*

The sample consists of firm-years that satisfy two criteria: (1) four quarterly earnings announcement dates are all available on Compustat; (2) daily return data are available for at least 200 trading days (out of about 250 of a year; BS2008 sample requires 240) on CRSP. The earnings announcement event window is the three trading days centering the announcement date (day -1 to day 1, with day 0 being the announcement day or the first trading day after announcement day if announcement occurs at non-trading day). To reduced the impact of extreme value, the sample is winsorized at 1% on each end for annual and quarterly returns. Deletion of a quarter will cause the deletion of the corresponding firm-year. The sample period is from 1988 to 2007. I calculate adjusted R^2 for each 4-digit NAICS industry and 5-year period with no less than 10 firm-level observations as the measure of industrial average information content in the earnings announcements made by the firms of the industry during the 5-years period. The data are pooled at 5-year basis to match the HHI data gathered by U.S. Economic Census quinquennially.

3.4 *Competition Variables*

Herfindahl-Hirschman Index. HHI is obtained from U.S. Economic Census that is conducted every five years for manufacturing firms. The last four census occur in 1987, 1992, 1997, and 2002. The HHI data of these four years are used for the five subsequent years (e.g. 1987 data are used for period 1988-1992). HHIs of year 1987 and 1992 are calculated by Standard Industry Classification (SIC) system. For consistency with 1997 and 2002 data, they are converted to North American Industry Classification System (NAICS).

Aggregated Market Share Change. AMSC is calculated from Compustat annual sales data for each 4-digit NAICS industry by Eqn.1. Industry-year with less than 5 firms are excluded from the sample. Annual results are then averaged across each five-year period to obtain comparable measure to HHI.

3.5 Control Variables

Firm size. Earnings announcements of small firms are long perceived to be more informative than that of their larger counterparts (Atiase, 1985). I take the natural log of total assets of all the firms, and use the industry median as the measure of typical firm size in that industry, as the distribution of firm size in an industry is usually very skewed. Hence the variable proxies for the typical firm size in industry k is defined as:

$$SIZE_{k,t} = \text{median}_{k,t} (\ln (\text{Total Assets}_{i,t})) \quad (5)$$

The $SIZE$ variable is predicted to be negatively correlated with abnormal R^2 .

Growth opportunities. A growing firm or industry has incentives to increase the informativeness of its earnings announcements to induce investors. Prior finance literature (e.g. Lang et al. 1996) suggests using *Tobin's Q* as the proxy for growth opportunity. The variable is defined as the ratio of the firm's market value to the replacement cost of its physical assets. Following Loderer and Martin (1997), I use the equation below to calculate a simplified Tobin's Q:

$$Q_{i,t} = (MVE_{i,t} + STD_{i,t} + LTD_{i,t})/TA_{i,t} \quad (6)$$

Where MVE is the market value of equity, STD (LTD) is the book value of short-term (long-term) debt, and TA is the book value of total assets.

I use industry average Tobin's Q as the proxy for industry growth. The sample is winsorized at 1% level at each end. Tobin's Q is predicted to be positively correlated with abnormal R^2 .

Leverage. I use debt-to-equity ratio (D/E ratio) to control for leverage. D/E ratio for a firm is calculated as total liabilities divided by total shareholder's equity. The sample is winsorized at 1% on each end. Firm-level D/E ratio is averaged across industry and then across five years to obtain industry level measure for each 5-year period.

Probability of loss. Firms that report losses in earnings announcements may stimulate greater market reaction than firms that report gains. Skinner (1994) document that the

stock price response to bad news disclosure is larger than that to good news disclosure, suggesting investors believe that the losses are more informative than gains. Burgstahler and Dichev (1997) present evidence that the proportion of firms that report small losses are significantly lower than the proportion of firms that report small gains, suggesting management's above normal earnings management activity to avoid losses. Therefore, announcing losses may reveal more problems about the firm than manipulating the earnings figure to hide the problems. I use the dummy variable %LOSS to control for the effect of a loss earnings announcement. The variable %LOSS for industry k is defined as:

$$\%LOSS_{k,t} = \frac{\text{number of loss-reporting firms in industry } k \text{ and year } t}{\text{total number of firms in industry } k \text{ and year } t} \quad (7)$$

Similarly, an industry-year is included only when it has more than 10 firm-level observations. *LOSS* is averaged over 5 years for each quinquennial period.

Hence the main regression of the paper is

$$\begin{aligned} \text{Abnormal } R_{k,t}^2 = & \alpha + \beta \text{Competition}_{k,t} + \gamma_1 \text{LEV}_{k,t} + \\ & \gamma_2 \text{LOSS}(\%)_{k,t} + \gamma_3 \text{Q}_{k,t} + \gamma_4 \text{SIZE}_{k,t} + \varepsilon \end{aligned} \quad (8)$$

Where competition measure takes HHI or AMSC, or their rankings, or the combination of them.

4 Results and Discussion

4.1 Replicating BS2008

Table 1 presents the summary statistics of the calendar year returns and each of the four quarterly earnings announcement 3-day windows. The mean annual buy-and-hold returns is 19.1% for the whole sample, and over 20% for all four 5-year period except 1998-2002. The mean announcement 3-day window returns are 0.4% on average, or 39% on annualized basis, consistent with abnormal returns during announcement periods. The median returns during announcement windows are not significantly different from zero.

[Insert Table 1 about here]

Table 2 reports replication of BS2008's main regression results for a slightly different sample period. Number of firm-year observations in this study is fewer than in BS2008 for year 1988-2001, and more than in BS2008 for 2002-2006. Year 2007 is not in BS2008 sample. The abnormal R^2 is generally decreasing over the period 1988-2001 and increasing afterwards, probably due to Regulation FD and Sarbanes-Oxley Act. While the estimated abnormal R^2 in this study is highly correlated with BS2008 results (Pearson correlation = 0.94), the BS2008 results are constantly smaller. The average abnormal R^2 is 11.2%, more than double the 5.9% reported in BS2008. BS2008 argue that the 1.1% in exceeding the benchmark abnormal R^2 4.8% quantifies the new information contained in earnings announcements and thus conclude the earnings announcements provide at best modest amount of new information to the market. In addition, BS2008 report 8 out of 19 years with abnormal R^2 not exceeding the benchmark R^2 , implying earnings announcements made in these years are generally not informative. The average abnormal R^2 estimated in this paper is 11.2%, or 6.4% higher than benchmark. Moreover, only for one year out of 20 years sample period the R^2 drops below 4.8%. These results seem to provide stronger evidence than that of BS2008 to support the claim that earnings announcements provide substantial new information to the market.

[Insert Table 2 about here]

4.2 *Reconcile With BS2008*

The deviations from BS2008 appears to stem from the difference in sample selection and data processing. First of all, BS2008 require a firm-year have at least 240 trading days to be included in the sample while I relax this criteria to 200 days. This relaxation is likely to extend the sample to some extreme observations and some smaller firms. BS2008 report that extreme observations and smaller firms tend to incur upward-bias to the estimated abnormal R^2 . Secondly, I assign the earnings announcements occurs in certain year into four quarters by the fiscal quarters they are reporting, while BS2008 do so by the calendar quarters the actual reports occur. Assuming the last quarter earnings announcement contains substantially different amount of new information, method in BS2008 may erase this difference and result in lower R^2 . Lastly, BS2008 appear to use calendar days rather than

trading days in calculating 3-day window returns, which may also result in lower R^2 .

4.3 *Descriptive Statistics and Correlation Matrix*

Table 3 presents the summary statistics of the variables used in regression analysis for each of the four 5-year periods. Herfindahl-Hirschman Index is declining for the last 15 years, indicating less concentrated industries and higher competition. The AMSC metric depicts a somewhat different trend. It gradually rises for the 15 years from 1988 to 2002, implying increasing competition, but drops dramatically in the last quinquennial period 2003-2007.

[Insert Table 3 about here]

Table 4 presents the correlation coefficients between the regression variables. Abnormal R^2 seems to be only correlated with $LOSS(\%)$ and $SIZE$, but not with either of the two competition measures. The Spearman rank correlation between AMSC and HHI is negatively significant for the whole sample period and three of the four quinquennial periods, consistent with the theory.

[Insert Table 4 about here]

4.4 *Regression Results and Discussion*

Table 5 reports the OLS regression results of model 8. The only significant result is obtained when using both AMSC and AMSC ranking to measure competition. This model also yields the highest adjusted R^2 . The abnormal R^2 is positively associated with AMSC, suggesting that high competition is associated with high relative informativeness of earnings announcement. This result is consistent with the agency theory argument that managers make more informative earnings announcements to the market when facing high degree of competition. The alternative explanation is that the managers in highly competitive industries reduce the overall disclosure level, but information content in mandatory disclosures(i.e. quarterly earnings announcements) declines less, as minimum level of disclosure is required by law. However, this evidence is weakened by the negatively significant coefficient on AMSC ranking, which suggests opposite correlation. Therefore, the interpretation remains ambiguous. In addition, the abnormal R^2 seems to be negatively associated

with the percentage of firms in the industry that are reporting loss, and positively associated with the typical size of firms in the industry. Tobin's Q seems to have no significant association with abnormal R^2 .

[insert Table 5 about here]

5 Concluding Remarks

The abnormal R^2 devised by Ball and Shivakumar (2008) has many desirable properties. It is a price based measure thus does not rely on particular earnings numbers. By allowing the regression coefficients to be greater than one, it does not require market efficiency assumption. The measure is readily available for measuring informativeness of other events. As indicated in this study, this measure may be sensitive to the sample construction.

This study introduces the AMSC measure to proxy for product market competition. While capturing some intuitive aspects of product market competition, the measure is subject to several limitations. First of all, the simple calculation of AMSC used in this study neglects business cycle variation across industries. Some industries have longer operating horizons than others (for example, airplane manufacturing versus retailing). Consequently, these industries exhibit less annual market share variation for the same competition level. Secondly, Compustat data used to calculate AMSC include only public firms. Measurement error would be significant if private firms' market share in one industry is substantial.

Relative informativeness in earnings announcements is affected by management's discretion as well as other exogeneous factors. Product market competition affects many of these factors, sometimes even in opposite directions. This study reports some preliminary results on the relationship between competition and information content in earnings announcements, but the evidence is at best ambiguous. More accurate measure, or a set of measures for competition should be incorporated in future studies. Furthermore, as the competition is to large extent exogeneous, identifying the theoretical causal links is also the key to future research.

References

- Aghion, P., Bloom, N., Blundell, R., Griffith, R., Howitt, P., 2005. Competition and Innovation: An Inverted-U Relationship. *Quarterly Journal of Economics* 120 (2), 701–728.
- Akdoğan, E., MacKay, P., 2006. Investment and Competition. *Journal of Financial and Quantitative Analysis* 43, 299–330.
- Atiase, R., 1985. Predisclosure information, firm capitalization, and security price behavior around earnings announcements. *Journal of Accounting Research*, 21–36.
- Ball, R., Shivakumar, L., 2008. How Much New Information Is There in Earnings? *Journal of Accounting Research* 46 (5), 975–1016.
- Bamber, L., 1986. The information content of annual earnings releases: A trading volume approach. *Journal of Accounting Research*, 40–56.
- Beaver, W. H., 1968. The information content of annual earnings announcements. *Journal of Accounting Research* 6, 67–92.
- Beaver, W. H., 1998. *Financial reporting : an accounting revolution*. Prentice Hall, Upper Saddle River, N.J.
- Bergstresser, D., Philippon, T., 2006. CEO incentives and earnings management. *Journal of Financial Economics* 80 (3), 511–529.
- Burgstahler, D., Dichev, I., 1997. Earnings management to avoid earnings decreases and losses. *Journal of accounting and economics* 24 (1), 99–126.
- Chen, X., Cheng, Q., Lo, K., 2006. Are Analyst Research and Corporate Disclosures Complements or Substitutes? SSRN eLibrary.
- Collins, D., Hribar, P., 2000. Earnings-based and accrual-based market anomalies: one effect or two? *Journal of Accounting and Economics* 29 (1), 101–123.
- DeGeorge, F., Patel, J., Zeckhauser, R., 1999. Earnings Management to Exceed Thresholds. *The Journal of Business* 72 (1), 1–33.
- Dhaliwal, D. S., Huang, S. X., Khurana, I., Pereira, R., 2008. Product Market Competition and Accounting Conservatism. SSRN eLibrary.
- Fields, T., Lys, T., Vincent, L., 2001. Empirical research on accounting choice. *Journal of Accounting and Economics* 31 (1-3), 255–307.
- Francis, J., Schipper, K., Vincent, L., 2002. Earnings announcements and competing information. *Journal of Accounting and Economics* 33 (3), 313–342.
- Gaspar, J., Massa, M., 2006. Idiosyncratic Volatility and Product Market Competition*. *The Journal of Business* 79 (6), 3125–3152.
- Givoly, D., Hayn, C., 2000. The changing time-series properties of earnings, cash flows and accruals: Has financial reporting become more conservative? *Journal of Accounting and Economics* 29 (3), 287–320.
- Griffith, R., 2001. Product market competition, efficiency and agency costs: an empirical analysis. Institute for Fiscal Studies.
- Grullon, G., Michaely, R., 2007. Corporate Payout Policy and Product Market Competition. SSRN eLibrary.
- Hayes, R., Lundholm, R., 1996. Segment Reporting to the Capital Market in the Presence of a Competitor. *Journal of Accounting Research*, 261–279.
- Jensen, M. C., Meckling, W. H., 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* 3 (4), 305 – 360.
- Lang, L., Ofek, E., Stulz, R., 1996. Leverage, investment, and firm growth. *Journal of financial*

- Economics 40 (1), 3–29.
- Lev, B., Sougiannis, T., 1996. The capitalization, amortization, and value-relevance of R&D. *Journal of Accounting and Economics* 21 (1), 107–138.
- Lev, B., Zarowin, P., 1999. The boundaries of financial reporting and how to extend them. *Journal of Accounting Research* 37 (2), 353–385.
- Loderer, C., Martin, K., 1997. Executive stock ownership and performance Tracking faint traces. *Journal of Financial Economics* 45 (2), 223–255.
- Machlup, F., 1967. Theories of the firm: marginalist, behavioral, managerial. *The American Economic Review*, 1–33.
- Nickell, S. J., 1996. Competition and corporate performance. *The Journal of Political Economy* 104 (4), 724–746.
- Schmidt, K. M., 1997. Managerial incentives and product market competition. *The Review of Economic Studies* 64 (2), 191–213.
- Shores, D., 1990. The association between interim information and security returns surrounding earnings announcements. *Journal of Accounting Research*, 164–181.
- Skinner, D., 1993. The investment opportunity set and accounting procedure choice: Preliminary evidence. *Journal of Accounting and Economics* 16 (4), 407–445.
- Skinner, D. J., 1994. Why firms voluntarily disclose bad news. *Journal of Accounting Research* 32 (1), 38–60.
- Sloan, R., 1996. Do Stock Prices Fully Reflect Information in Accruals and Cash Flows about Future Earnings?(Digest Summary). *Accounting Review* 71 (3), 289–315.
- Smith, C. W., Watts, R. L., 1992. The investment opportunity set and corporate financing, dividend, and compensation policies. *Journal of Financial Economics* 32 (3), 263 – 292.
- Verrecchia, R., 2001. Essays on disclosure. *Journal of Accounting and Economics* 32 (1-3), 97–180.
- Watts, R., Zimmerman, J., 1990. Positive accounting theory: a ten year perspective. *Accounting Review*, 131–156.
- Watts, R. L., Zimmerman, J. L., 1986. *Positive accounting theory*. Prentice-Hall, Englewood Cliffs, N.J.

Table 1: Summary statistics for calendar-year returns and four quarterly earnings announcement 3-day window returns

		No. of Obs.	Mean	Median	Skewness
Calendar-year returns	1988-2007	13326	0.191	0.074	9.717
	1988-1992	4830	0.212	0.104	16.279
	1993-1997	7541	0.219	0.128	5.022
	1998-2002	8555	0.096	-0.063	8.963
	2003-2007	6827	0.261	0.130	8.850
Quarter 1 earnings announcement window returns	1988-2007	13326	0.008	0.000	3.207
	1988-1992	4830	0.005	0.000	2.760
	1993-1997	7541	0.008	0.000	1.496
	1998-2002	8555	0.014	0.004	2.779
	2003-2007	6827	0.003	0.000	5.001
Quarter 2 earnings announcement window returns	1988-2007	13326	0.001	0.000	4.750
	1988-1992	4830	0.003	0.000	2.273
	1993-1997	7541	0.006	0.000	14.864
	1998-2002	8555	-0.002	0.000	1.942
	2003-2007	6827	-0.001	-0.000	0.868
Quarter 3 earnings announcement window returns	1988-2007	13326	0.003	0.000	2.640
	1988-1992	4830	0.002	0.000	5.575
	1993-1997	7541	0.000	0.000	1.400
	1998-2002	8555	0.010	0.000	2.028
	2003-2007	6827	0.000	-0.000	2.633
Quarter 4 earnings announcement window returns	1988-2007	13326	0.005	0.000	2.328
	1988-1992	4830	0.009	0.000	2.884
	1993-1997	7541	0.006	0.000	2.714
	1998-2002	8555	0.005	0.000	1.469
	2003-2007	6827	0.002	0.000	3.305

Table 2: Annual regressions of calendar year returns on the four announcement window returns.

Year	Quarter 1	Quarter 2	Quarter 3	Quarter 4	No. of Obs.	Abnormal R^2 (%)	BS2008 Results	
							No. of Obs.	Abnormal R^2 (%)
1988	1.032	1.160	1.442	1.456	2679	13.0	3277	7.6
1989	1.328	1.474	1.065	1.002	2783	10.6	3385	6.5
1990	0.644	0.662	0.951	0.718	2752	10.3	3393	2.9
1991	2.090	1.192	2.565	1.359	2910	14.9	3515	7.9
1992	1.050	1.650	1.402	1.256	3206	10.5	3772	7.3
1993	1.005	1.685	1.504	1.015	3591	11.1	4076	6.7
1994	0.945	0.866	1.017	0.963	4043	10.0	4537	4.5
1995	1.420	0.688	1.631	1.470	4441	6.9	5042	1.9
1996	1.348	0.924	1.159	0.973	4842	8.2	5395	4.5
1997	0.876	0.945	1.258	1.096	5213	9.2	5644	4.8
1998	0.866	0.829	0.680	1.107	5535	7.0	5840	1.1
1999	1.262	1.941	1.650	1.655	5304	3.8	5528	-1.1
2000	0.912	1.114	0.749	0.718	5934	8.7	6140	5.1
2001	0.778	1.458	0.728	1.122	5764	6.2	5868	1.6
2002	1.228	0.656	0.451	1.005	5491	11.2	5484	8.8
2003	3.408	1.787	2.103	1.786	5238	13.3	5100	6.6
2004	1.113	1.247	1.206	1.299	5075	14.9	4953	9.7
2005	1.343	1.435	1.203	1.214	5064	18.7	4890	13.9
2006	1.058	1.135	1.099	1.134	5048	16.5	4822	11.7
2007	1.511	1.234	1.135	1.082	4917	18.1	-	-
1988-1992 mean:					2866.0	11.9	3468.4	6.4
1993-1997 mean:					4426.0	9.1	4938.8	4.5
1998-2002 mean:					5605.6	7.4	5772.0	3.1
2003-2007 mean:					5068.4	16.3	4941.3	10.5
1988-2007 mean:					4491.5	11.2	4771.6	5.9

Table 3: Descriptive statistics for information content measure (R^2), competition measures, and control variables.

	# obs.	mean	std. dev.	skewness	Q1	median	Q3
Year 1988-1992							
Abnormal R^2 (%)	216	18.072	31.518	-1.813	5.573	15.068	28.881
HHI	95	641.638	355.159	0.866	366.8	554.833	851
AMSC(%)	122	18.539	15.354	1.969	7.674	13.668	25.612
SIZE	240	5.011	1.227	0.605	4.215	4.864	5.682
Tobin's Q	241	1.243	0.465	1.597	0.916	1.102	1.463
LEV	240	1.984	1.413	4.058	1.214	1.638	2.316
LOSS(%)	539	22.649	14.003	0.722	11.765	21.429	30.864
Year 1993-1997							
Abnormal R^2 (%)	240	14.832	31.205	-1.818	4.879	13.458	27.051
HHI	96	695.051	420.674	1.683	424.4	650.643	862.75
AMSC(%)	149	19.614	13.301	1.819	10.099	16.401	25.203
SIZE	265	5.172	1.177	0.251	4.431	5.084	5.842
Tobin's Q	265	1.516	0.666	1.973	1.109	1.385	1.709
LEV	266	1.808	1.112	3.019	1.132	1.583	2.216
LOSS(%)	576	22.889	15.664	0.879	11.111	20.000	30.769
Year 1998-2002							
Abnormal R^2 (%)	259	13.625	26.452	-0.020	2.466	9.553	23.358
HHI	84	410.815	364.816	1.037	133.2	291.7	621.4
AMSC(%)	164	22.46	15.005	1.342	11.833	17.326	31.28
SIZE	306	5.653	1.269	-0.377	4.888	5.573	6.569
Tobin's Q	307	1.274	0.614	2.561	0.906	1.128	1.486
LEV	304	1.990	1.352	4.036	1.210	1.772	2.328
LOSS(%)	564	30.676	19.505	0.681	16.667	28.103	41.667
Year 2003-2007							
Abnormal R^2 (%)	239	24.064	32.190	-3.365	10.022	21.741	39.729
HHI	84	337.318	276.372	1.042	103.75	285.45	461.85
AMSC(%)	120	15.133	15.94	3.792	6.481	10.375	19.095
SIZE	265	6.192	1.329	-0.204	5.338	6.229	7.054
Tobin's Q	266	1.538	0.599	1.200	1.148	1.441	1.810
LEV	263	1.763	1.200	2.768	1.004	1.500	2.140
LOSS(%)	488	24.864	16.590	0.839	12.500	22.222	34.783

Table 4: Correlation Table

Panel A: Pearson Correlation Coefficient Matrix

	abnormal R^2	AMSC(%)	HHI	LEV	LOSS(%)	Tobin's Q	SIZE
AMSC(%)	0.006 (0.887)	—					
HHI	0.032 (0.652)	-0.057 (0.393)	—				
LEV	-0.049 (0.272)	0.024 (0.566)	0.069 (0.197)	—			
LOSS(%)	-0.101 (0.024)	0.343 (0.000)	-0.010 (0.891)	-0.114 (0.011)	—		
Tobin's Q	0.005 (0.912)	-0.007 (0.864)	0.163 (0.002)	-0.315 (0.000)	0.306 (0.000)	—	
SIZE	0.084 (0.062)	-0.183 (0.000)	0.127 (0.017)	0.267 (0.000)	-0.275 (0.000)	-0.131 (0.000)	—

P-values are in paratheses.

Panel B: Spearman Rank Correlation of Competition Measures (HHI and AMSC)

	No. of Obs.	Coef.	P-value
1988-2007	228	-0.175	(0.008)
1988-1992	56	-0.249	(0.064)
1993-1997	67	-0.149	(0.228)
1998-2002	60	-0.232	(0.075)
2003-2007	45	-0.400	(0.006)

Table 5: OLS Regression Results

	Dependent Variable: Abnormal R^2								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
AMSC	0.093 (1.47)		0.376*** (3.01)				0.089 (0.70)		0.446 (1.50)
AMSC rank		-0.000 (-0.04)	-0.028*** (-2.62)					0.000 (0.05)	-0.029 (-1.33)
HHI				0.000 (0.14)		0.004 (0.48)	0.001 (0.16)		0.004 (0.44)
HHI rank					-0.001 (-0.05)	-0.015 (-0.46)		-0.001 (-0.04)	-0.016 (-0.51)
LEV	-1.278* (-1.78)	-1.215* (-1.68)	-1.172 (-1.63)	-1.652 (-0.52)	-1.554 (-0.49)	-1.810 (-0.56)	-1.896 (-0.59)	-1.573 (-0.49)	-1.744 (-0.54)
LOSS	-0.139** (-2.36)	-0.109* (-1.88)	-0.145** (-2.47)	-0.077 (-0.72)	-0.079 (-0.74)	-0.086 (-0.79)	-0.084 (-0.78)	-0.080 (-0.73)	-0.087 (-0.79)
Tobin's Q	2.003 (1.02)	1.703 (0.86)	1.372 (0.70)	3.805 (0.99)	4.003 (1.04)	3.953 (1.02)	4.197 (1.08)	4.041 (1.02)	3.390 (0.85)
SIZE	1.811** (2.40)	1.643** (2.14)	1.427* (1.87)	2.291* (1.85)	2.299* (1.85)	2.282* (1.84)	2.520* (1.96)	2.315* (1.79)	2.317* (1.79)
N	493	493	493	204	204	204	204	204	204
adj. R^2	0.019	0.014	0.030	0.004	0.004	-0.000	0.001	-0.001	0.001

t statistics in parentheses.

* $p < .1$, ** $p < .05$, *** $p < .01$.