

THREE ESSAYS ON SEGMENT REPORTING

BY

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Qian Wang

Submitted to the School of Business and the Faculty of the Graduate
School of the University of Kansas in partial fulfillment of
the requirements for the degree of Doctor of Philosophy

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7/20/09

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....	ii
TABLE OF CONTENTS.....	iii
INTRODUCTION	1

STUDY ONE: THE SEC COMMENT LETTER PROCESS AND SEGMENT DISCLOSURE DEFICIENCIES

ABSTRACT.....	3
1.1 Introduction.....	4
1.2 Background and Related Literature	11
1.3 The SEC Comment Letters on Segment Disclosure.....	15
1.3.1 Background of the SEC Comment Letter Process	15
1.3.2 The SEC Comment Letters Related to Segment Disclosure	16
1.4 Hypotheses Development and Research Design.....	18
1.4.1 Proprietary Costs of Segment Disclosure.....	18
1.4.2 Agency Costs of Segment Disclosure	21
1.4.3 Valuation Benefit of Segment Disclosure	23
1.4.4 The Research Model.....	24
1.5 Sample and Results	26
1.5.1 Sample.....	26
1.5.2 Logistic Regression Results	28
1.5.3 The Improvement of Segment Disclosure and Analyst Forecasts after Revisions.....	32
1.6 Conclusions.....	35
REFERENCES	38
APPENDIX: An Example of SEC Comment Letters and Companies' Response Letters.....	43
Table 1.1 Descriptive Statistics for Comment Letters on Segment Disclosure	49
Table 1.2 Sample Selection Process	50
Table 1.3 Comparison of Companies with Segment Disclosure Deficiencies and Companies without Segment Disclosure Deficiencies	51
Table 1.4 Pearson Correlations.....	53
Table 1.5 Logistic Regression of the Impact of Management Incentives on Segment Disclosure Deficiencies.....	54
Table 1.6 The Improvement of Segment Disclosure and Analyst Forecast After Revision	56

STUDY TWO: STRATEGIC REVELATION OF DIFFERENCES IN SEGMENT EARNINGS GROWTH

ABSTRACT	57
2.1 Introduction	58
2.2 Related Literature and Hypotheses Development.....	64
2.2.1 Proprietary Costs of Revealing Segment Information	64
2.2.2 Agency Costs of Revealing Segment Information	67
2.2.3 Financing Incentives for Revealing Segment Information.....	68
2.2.4 Effects of GAAP Segment Disclosure Regime	70
2.3 Variables, Models and Sample	71
2.3.1 Proprietary Costs	72
2.3.2 Agency Costs.....	74
2.3.3 Financing Incentives	76
2.3.4 GAAP Segment Disclosure Regime	76
2.3.5 Control Variables	77
2.3.6 Models.....	79
2.3.7 Sample and Data.....	79
2.4 Primary Results.....	80
2.5 Additional Analyses.....	87
2.5.1 Controlling for the Impact of Cross-Segment Differences in Profit Rates	87
2.5.3 Alternative Measure of Dependent Variable.....	90
2.5.4 The Impact of FAS 131 on the Association Between Management Motives and Cross-Segment Growth Variability.	90
2.5.5 Robust Tests of Standard Errors.....	91
2.5.6 Controlling for Industry Effects	92
2.6 Conclusions.....	92
REFERENCES	95
Table 2.1 Variable Definitions.....	99
Table 2.2 Sample Selection Process	101
Table 2.3 Descriptive Statistics.....	102
Table 2.4 Univariate Analysis.....	103
Table 2.5 Correlations.....	104
Table 2.6 The Association of High versus Low Proprietary Costs, Agency Costs, and Financing Benefits, with Revealed Cross-Segment Differences in Earnings Growth Rates.....	105
Table 2.7 Determinants of Cross-Segment Earnings Growth Variability	106
Table 2.8 Determinants of Cross-Segment Earnings Growth Variability for Differing Levels of Cross-Segment Profit Rate Variability.....	107
Table 2.9 Determinants of Cross-Segment Sales Growth Variability	108

**STUDY THREE: STUFFING THE SEGMENT SAUSAGE: CAUSES
AND CONSEQUENCES OF INCOMPLETE ALLOCATION OF
CORPORATE INCOME TO SEGMENT UNDER FAS 131**

ABSTRACT.....	109
3.1 Introduction.....	110
3.1.1 Causes of Incomplete Allocation	113
3.1.2 Consequences of Incomplete Allocation.....	115
3.2 Background.....	120
3.2.1 FAS 131 Segment Income Disclosure Requirements	120
3.2.2 The FAS 131 Gap Controversy	122
3.3 Hypotheses and Models	124
3.3.1 Hypotheses and Test Variables Related to Causes of Gaps	124
3.3.2 Hypotheses and Test Variables Related to Consequences of Gaps	131
3.3.3 Models.....	133
3.3.3.1 Models for tests of H1 and H2.....	133
3.3.3.2 Models for tests of H3.....	135
3.3.3.3 Models for tests of H4.....	136
3.4 Results.....	137
3.5 Conclusions.....	142
REFERENCES	145
Table 3.1 Sample Selection and Distribution	148
Table 3.2 Univariate Tests of Differences between Zero GAP and Non-zero GAP Samples	149
Table 3.3 Logistic Regression of Factors Associated with GAPDUM and ABSGAP	150
Table 3.4 Tests of Persistence of Summed Segment Earnings and Corporate Earnings	151
Table 3.5 Tests of Informativeness of Summed Segment Earnings, Corporate Earnings, and Gaps	152

THREE ESSAYS ON SEGMENT REPORTING

INTRODUCTION

Segment information is vital, essential, fundamental, indispensable, and integral in the process of projecting companies' performance (AIMR, 1993). The purpose of this dissertation is to investigate the causes and consequences of segment information disclosed in compliance with a controversial provision of SFAS No. 131, *Disclosures about Segments of an Enterprise and Related Information* (FASB 1997). Contributing to mandatory disclosure and segment disclosure literature, this dissertation consists of three studies, exploring the management motives to disclose or withhold segment information, and the impact of segment disclosure quality on analyst information environment and market beliefs.

Study one investigates the SEC comment letters, and companies' response letters related to segment disclosure, issued by and submitted to the SEC from August 1, 2004 to July 31, 2007. It documents the nature of the segment disclosure deficiencies in compliance with SFAS No. 131, and investigates characteristics of companies having deficiencies. This study also provides evidence on the effectiveness of SEC comment letter process in improving company segment disclosure quality.

Study two examines the interplay of managers' motives to conceal versus reveal cross-segment variability in earnings growth. The primary factors hypothesized to influence managements' disclosure decisions are the proprietary costs of revealing

information to competitors, the agency cost incentives to conceal information from shareholders, and the benefits of revealing price-relevant information to the capital markets. This study also tests whether SFAS No. 131 improved segment reporting by generating greater cross-segment variability in disclosed earnings growth rates.

Focusing on the provision of SFAS No. 131 allowing companies to measure segment earnings differently than is required for the consolidated reporting entity, study three investigates the causes and consequences of the gap between aggregated segment earnings and consolidated corporate-level earnings (Gap). It provides evidence that the Gap reflects the inherent difficulty of allocating certain expenses or costs to various segments, and managers' unwillingness to use GAAP measures for segment earnings. Furthermore, the study is the first to find that the sum of segment earnings is more persistent, and is more informative in terms of its association with stock returns, than are corporate-level earnings.

**STUDY ONE:
THE SEC COMMENT LETTER PROCESS AND
SEGMENT DISCLOSURE DEFICIENCIES**

ABSTRACT

For the purpose of improving transparency of information, the SEC now publicly releases comment letters that are sent to registrants questioning their financial disclosure. This paper investigates the SEC comment letters, and companies' response letters related to segment disclosure, issued by and submitted to the SEC from August 1, 2004 to July 31, 2007. I document the nature of the segment disclosure deficiencies and investigate characteristics of companies having deficiencies. The results are consistent with expectations that segment disclosure deficiencies are positively associated with proxies for proprietary costs and agency costs, and are negatively associated with a proxy for the need for external financing. In further analysis I find that disclosure deficiencies related to aggregation of segments are more likely to be intentional than other deficiencies. This paper also provides evidence that the SEC comment letter process helps companies to improve segment disclosure quality, resulting in enhanced analyst forecast accuracy and decreased forecast dispersion.

Key Words: Segment disclosure, SFAS 131, SEC comment letters, proprietary cost

1.1 Introduction

Financial analysts and investors view segment information as vital, essential, fundamental, indispensable, and integral in the process of projecting companies' performance (AIMR, 1993). However, the quality of segment information provided by management has not been satisfactory to investors and regulators. A survey released by the Association for Investment Management and Research (AIMR, 2000) states that 86 percent of the investment professionals surveyed rated segment information 'high' for importance, whereas only 38 percent of the survey participants gave high marks for the quality of current segment information. The SEC staff has also expressed concern about companies' poor compliance with the segment disclosure standard (e.g. SFAS 131¹). For example, on March 2, 2001, Robert Bayless, the chief accountant of SEC, in the Division of Corporation Finance, said that "our patience with deficient segment disclosure has been exhausted," and warned companies to comply with SFAS 131 (SEC, 2001). Prior research on segment information mostly focuses on the number of segments companies disclosed before SFAS 131, and on the effects of SFAS 131 adoption on numbers of segments disclosed. This study employs a sample of SEC staff comment letters questioning the adequacy of companies' compliance with SFAS 131, to document the SEC's perspective on disclosure deficiencies in all types of segment information, and to examine company characteristics associated with non-compliance. This study also

¹ Statement of Financial Accounting Standards No. 131, *Disclosures about Segments of an Enterprise and Related Information*, (FASB 1997) became effective for financial statements for periods beginning after December 15, 1997.

provides evidence that the SEC staff comment letter process helps to improve segment disclosure quality and enhances the analysts' information environment.

Prior disclosure literature suggests that companies have various disincentives and incentives to disclose accounting information (Field et al. 2001; Healy and Palepu 2001). The disincentives to reveal more disaggregated information arise from the proprietary cost of providing information to competitors (Verrecchia 1983; Harris 1998; Ettredge et al. 2006), and the cost to agents (managers) of providing information to shareholders (Shleifer and Vishny 1989; Berger and Hann 2007). The incentives to disclose more segment information include the threat of regulation enforcement and the benefits of reducing information asymmetry between investors and management (Diamond and Verrecchia 1991; Graham et al. 2005).

A major challenge to researchers has been how to accurately measure the manipulation of accounting information or the disclosure quality (Healy and Palepu 2001). Prior studies of segment disclosure (Street et al 2001; Berger and Hann 2007; Botosan and Stanford 2005) focus on the level at which segments are disaggregated, and identify the previously "hidden" segments when a company changed its segment reporting from the disclosure requirements of SFAS 14 to the new disclosure requirements of SFAS 131.² In this literature, companies that increased the numbers of their segments when adopting SFAS 131 are considered to have had lower segment disclosure quality than other companies under SFAS 14. One of the advantages of this

² Statement of Financial Standards No. 14, *Financial Reporting for Segments of a Business Enterprise*, (FASB 1976) was effective for financial statements for fiscal years beginning after December 15, 1976. It was superseded by SFAS 131.

paper is its use of a sample of companies whose SFAS 131 segment disclosures have been declared inadequate by the SEC.

Each year the SEC staff review companies' filings (e.g. Form 10-K, 10-Q and 8-K among others) and send comment letters to companies whose filings exhibit disclosure deficiencies. In response, a company must provide an appropriate explanation and additional information to support its current disclosure. Otherwise, the company must revise its current filings, or agree to different disclosure practices in future filings, based on the SEC staff's request. The goal of the SEC comment letter process is to assist companies in their compliance with the applicable disclosure requirements and to enhance the overall disclosure in their filings. I gather 1,392 SEC comment letters that are related to segment disclosure, and that were filed in the SEC's EDGAR system from August 1, 2004 to July 31, 2007, to identify companies with segment disclosure deficiencies. I use them to test the effect of companies' characteristics and related managers' motives on segment disclosure quality. In order to accurately identify companies with segment disclosure deficiencies, I carefully study SEC comment letters and companies' response letters to eliminate companies that reach an agreement with the SEC staff on keeping their current segment disclosure. Only companies that revised their filings or promised to revise future filings after receipt of the SEC comment letters are classified as having segment disclosure deficiencies.

The common deficiencies addressed in these letters include companies' improperly aggregating their operating segments, failure to provide adequate product

or service information, certain required information (segment revenue and profit) disclosed appropriately, and other measurement and reconciliation issues. Among all types of disclosure deficiencies, the problem of identifying or disaggregating reportable segments generates the largest proportion of comment letters. About 50 percent of released comment letters question whether a company discloses an adequate number of segments to be in compliance with SFAS 131. This result indicates that although prior studies consistently observe an improvement in disaggregation of segments after the implementation of SFAS 131, managers continue to engage in discretionary disclosure of reportable segments. This suggests that SFAS 131 allows managers to exercise considerable subjective judgment and evaluation when defining segments.

The results indicate that companies with segment disclosure deficiencies are associated with high proprietary costs, high agency costs, and a low tendency to raise external capital in the future. Additional analysis indicates that hypothesized managerial motives to conceal segment information are most strongly associated with disclosure deficiencies of segment identification or aggregation. Other types of disclosure deficiencies are explained primarily by variables proxying for business complexity. These results suggest that problems of segment identification or aggregation are more likely to be intentional and other types of deficiencies are more likely to be unintentional.

By comparing the number of segments and analysts' forecast characteristics before companies' receipt of SEC comment letters and after responding to SEC

comment letters, this paper also provides evidence that the SEC review process improves companies' segment disclosure quality and analysts' information environment. Specifically, after receipt of SEC comment letters the number of test companies' reportable segments increases and analyst earnings forecast accuracy and dispersion improve, compared with companies that didn't receive SEC comment letters.

This paper contributes to the existing literature in at least three ways. First, prior disclosure literature mainly focuses on voluntary disclosure rather than mandatory disclosure due to the lack of measures of mandatory disclosure quality. This paper is among a few studies to investigate compliance with mandatory disclosure requirements (Schwartz and Soo 1995; Miller and Skinner 1998; Ettredge et al. 2006). Using SEC staff comment letters to identify companies with inadequate segment disclosure provides a direct measure of companies' segment disclosure compliance. The SEC staff consists of individuals with industry, financial and legal expertise. They review analyst's reports, interviews by management with the press, and other public information to evaluate whether segment disclosures in companies' financial statements comply with SFAS 131 guidelines. Therefore, the segment disclosure deficiencies identified by SEC comment letters reflect expert judgments about segment reporting compliance.

Second, most prior literature (Harris 1998; Berger and Hann 2007; Botosan and Stanford 2005) focuses on a single measure of segment disclosure quality, aggregation of operating segments. However, segment disclosures include many

important information items such as product or service information, how segment revenue and profit are measured, the reconciliation of segment income to corporate income, and geographic information. The SEC staff comment letters identify departures from required segment information in all areas of segment disclosure and thus provide a multidimensional view of segment disclosure quality.

Third, this paper is the first to document companies' non-compliance with the segment disclosure requirements of SFAS 131. Prior literature focuses on comparing the quality of disclosure under SFAS 14 with that under SFAS 131. The studies generally conclude that SFAS 131 improves disclosure of segment information. For example, numbers of segments increase, more disaggregated segment data are provided, and the cross-segment variances in profitability are more pronounced (Street et al. 2000; Herrmann and Thomas 2000; Berger and Hann 2003; Ettredge et al. 2005; Botosan and Stanford 2005). However, some evidence suggests that many companies do not comply with SFAS 131.³ Managers have strong incentives to manipulate internal segment information used in performance evaluation. SFAS 131 arguably provides leeway for the use of management discretion. For example SFAS 131 allows use of non-GAAP segment income measurement methods, and does not specify what expenses should be included in segment income. Managers might sometimes cross the line into unacceptable reporting when taking advantage of such flexibility. This paper summarizes problems in compliance with SFAS 131 that are

³ Due to the inconsistent compliance with SFAS 131, the FASB issued "*Segment Information: Guidance on Applying Statement 131*" in December 1998, and the EITF issued EITF 04-10, "*Determining Whether to Aggregate Operating Segments That Do Not Meet the Quantitative Thresholds*" in 2004.

detected by the SEC, and investigates the association of non-compliance with proxies for managers' segment reporting incentives.

Fourth, this paper provides evidence that certain disclosure deficiencies are more closely associated with managers' motives than others, which helps to differentiate intentional noncompliance and accidental noncompliance. Specifically, I find that deficiencies related to identification and aggregation of segments are more likely to be intentional since these deficiencies are more strongly associated with proxies for proprietary costs and agency costs. On the other hand, other deficiencies have weak associations with proxies for proprietary costs and agency costs, but have significant association with proxies for business complexity, suggesting these deficiencies are more likely to be unintentional.

Finally, the study examines the effects of the SEC comment letter process. To improve quality and transparency in financial reporting, the Sarbanes-Oxley Act of 2002 (SOX) Section 408 required the SEC to enhance its review of companies' filings. Segment disclosure is one significant focus of the SEC staff reviews,⁴ and the SEC devotes considerable resources to evaluating whether the companies' segment disclosures are in compliance with SFAS 131. It is important to know whether the review process has effectively improved segment information. This paper examines changes in disclosed numbers of segments and changes in analyst forecast accuracy and dispersion after companies make the requested revisions in their filings. The results indicate that for companies revising their disclosures based on the SEC staff's

⁴ *Current Accounting and Disclosure Issues in the Division of Corporate Finance*, November 30, 2006. See <http://www.sec.gov/divisions/corpfin/cfacctdisclosureissues.pdf>.

request, the number of segments increases; analyst forecast accuracy increases; and forecast dispersion decreases (all changes are significant). In particular, the number of segments increases by one segment on average for companies that revised their disclosure after receiving letters from the SEC questioning their identification of segments.

The remainder of the paper is organized as follows: section 2 discusses previous research in segment disclosure. Section 3 describes the background of the SEC comment letter process. Section 4 develops hypotheses and research models, section 5 presents sample selection process and results, and section 6 concludes.

1.2 Background and Related Literature

In June 1997 the Financial Accounting Standard Board (FASB) issued SFAS 131, *Disclosures about Segments of an Enterprise and Related Information* to replace the former standard, SFAS 14, *Financial Reporting for Segments of a Business Enterprise*. Under SFAS 14, companies were required to classify line-of-business segment information using the *industry approach*, which defines segments based on an operation's industry classification. The industry approach was widely criticized because it allowed managers of diversified companies to report all operations "as being in a single, very broadly defined industry segment" (SFAS 131, paragraph 58). SFAS 131 was a response to financial analysts' complaints that SFAS 14 allowed too much flexibility in defining reportable segments. The new standard uses the *management approach* that requires public companies to define reportable segments

as those reviewed by the chief operating decision maker to make decisions internally, allocate resources to segments, and evaluate segment performance. The FASB expected the new standard to induce disclosure of more segments and to result in higher levels of disaggregation. SFAS 131 also requires that a company report a measure of segment profit or loss, certain specific revenue and expense items and segment assets. It requires reconciliation of total segment revenues, profit or loss, and assets to corresponding amounts in the consolidated financial statements. It requires companies to report information about the revenue derived from products or services, about the countries in which the company earns revenues and holds assets, and about major customers. However, FAS 131 does not require a company to report information that is not prepared for internal use if reporting it would be impracticable.

The disclosure literature assumes that in an imperfect capital market, managers have superior information to outsiders (Verrecchia 1983). Managers balance the need to communicate their superior knowledge of the firm's performance to investors, against their desire to manage reported performance for contracting reasons (Healy and Palepu 2001). Therefore, managers have motives both to disclose information and to withhold information. The forces favoring disclosure of more information include capital market incentives to reduce information asymmetry between managers and investors (Barry and Brown 1985; Merton 1987; Graham et al. 2005), and to reduce litigation costs (Skinner 1994). The forces to conceal information include proprietary costs, which reflect concern that some disclosures might jeopardize the firm's competitive position in product markets (Verrecchia 2001;

Dye 2001), and agency costs which represent managers' tendency to avoid unwanted scrutiny from bondholders and stockholders (Nagar et al. 2003; Graham et al. 2005).

In the disclosure literature, a number of studies focus on companies' levels of segment disaggregation. For example, Hayes and Lundholm (1996) and Arya et al. (2008) provide analytical models of managers' discretionary decisions on segment reporting (disaggregation) when facing the cost and benefit of disclosing more information to the market in the presence of competitors. Harris (1998) studies a sample of segment disclosures under SFAS 14 and finds that operations in less competitive industries are less likely to be reported as industry segments. Botosan and Harris (2000) find that companies are more likely to voluntarily include segment information in interim financial reports following declines in market liquidity and analyst forecast accuracy. Botosan and Stanford (2005) use retroactive disclosures required by SFAS 131 to identify a sample of companies that previously reported as single-segment companies, and that initiated segment disclosure under SFAS 131. Their results show that the new segments (previously not disclosed under SFAS 14) are more profitable and operate in less competitive industries. Ettredge et al. (2006) focus on multi-segment companies and use cross-segment variability in profitability as a measure of operating diversity. They find that companies that disclose lower cross-segment differences in profitability tend to earn high excess profits, operate in less competitive industries, and have less demand for external capital in the future. Finally, Berger and Hann (2007) argue that detailed segment information could reveal companies' excessive diversification strategy and transfers of resources across

segments. Their results indicate that companies' disclosure of new segments, when adopting SFAS 131, is associated with lower abnormal profit, especially for companies that exhibit high company-level agency costs. The implication is that, prior to SFAS 131, companies having greater agency costs suppressed information about segments with poor performance.

Another stream of literature on segment reporting investigates whether the quality of disaggregated information affects investors' beliefs and market risk assessments. These studies examine the change in investors' information environments when companies switch from one segment reporting regime to another segment reporting regime, and find that more disaggregated information improves analysts' earnings forecasts, increases firms' valuations and enhances the market's ability to predict future earnings (Kinney 1971; Collins 1976; Tse 1989; Baldwin 1984; Swaminathan 1991; Ettredge et al. 2005; Berger and Hann 2003; Botosan and Stanford 2005). This line of research builds on the accounting disclosure literature that establishes a positive association between disclosure quality and the pricing of earnings (e.g. Lang and Lundholm 1996; Healy, Hutton and Palepu 1999). These studies find that improved disclosure quality lowers the cost for investors of gathering and processing private information (Diamond 1985), and reduces the information asymmetry between investors and managers (Barry and Brown 1995; Easley and O'Hara 2004).

This paper is related to both research streams. Focusing on companies with segment disclosure non-compliance, I investigate the association between managers'

motives and segment disclosure deficiencies. I also study the impact of improved segment information quality on analysts' forecast characteristics.

1.3 The SEC Comment Letters on Segment Disclosure

1.3.1 Background of the SEC Comment Letter Process

Each year the Division of Corporation Finance and Investment Management of the SEC reviews companies' filings, and sends comment letters to companies that they believe need to improve or enhance their filings. As stated in each comment letter, the purpose of the SEC comment letter review process is to assist companies in their compliance with the applicable disclosure requirements and to enhance the overall disclosure in companies' filings.

The SEC reviews virtually every type of filing including Form S-1, 8-K, 10-K and 10-Q. When the SEC staff finds a company that is not in compliance with filing requirements, or that has disclosed information that needs to be improved, they send a comment letter to the company. The letter typically asks for supporting documentation and explanation for the disclosure in question, and provides suggestions for improved compliance. The SEC staff review of a filing may involve several rounds of comments from the staff and a number of responses from the filer. The review process is complete when the company provides satisfactory explanations or agrees to make the SEC staff's requested changes.

Prior to May 2005, the SEC released staff comment letters and responses to these comment letters only to people who requested the information under the

Freedom of Information Act. In order to expand the transparency of the comment process, and to make this information available to a broader audience, starting in May 2005 the SEC began publicly releasing, through the EDGAR filing system, the staff comment letters as well as company response letters made after August 1, 2004.

1.3.2 The SEC Comment Letters Related to Segment Disclosure

As the SEC stated in a report (SEC 2006), one significant focus of staff reviews is whether registrants have complied completely with all the disclosure requirements of SFAS 131. I collect all comment letters and response letters related to segment disclosure that are filed from August 1, 2004 to July 31, 2007. I use a three-year period because SOX Section 408(c) requires the SEC staff to review companies' filings at least once every three years. A three-year sample period provides assurance that all companies' 10-K filings have been reviewed by the SEC staff. Thus, I assume that the financial reports of companies that didn't receive any comment letters from the SEC were reviewed by the SEC staff and their segment disclosures were considered to be in compliance with SFAS 131. The Appendix presents examples of SEC comment letters and the corresponding response letters for one registrant. The sample contains 1,392 comment letters that were sent to 533 companies. These letters address all areas of segment disclosure, including identification or aggregation of operating segments, information about geographic areas, information about products and services, and other compliance issues.

Panel A of table 1 summarizes the frequency of segment disclosure problems. Since a company may receive comment letters addressing more than one issue, the total percentage sums to more than one hundred. The data show that inadequate disclosures related to identification or aggregation of operating segments is a major problem identified by the SEC staff. Forty-nine percent of the sample (263 companies) received comment letters in which the SEC staff challenges the disclosed reportable segments. The concerns related to this issue include whether the disclosed operating segments are consistent with the segments reviewed by the chief operating decision maker to evaluate performance and allocate resources, and whether the aggregation of segments meets the aggregation criteria in SFAS 131. Nineteen percent of the problems relate to the disclosure of product and service information. Sixteen percent of the problems involve the measurement of revenue, profit, or assets. Fourteen percent of sample companies received comment letters questioning the disclosure of geographic information. Thirteen percent of the sample were queried about segment information discussed in Management Discussion and Analysis (MD&A). Eleven percent received letters challenging information about segment profit, loss, or assets. Nine percent relate to the reconciliation of summed segment income to corporate income. Other areas of segment disclosure addressed in comment letters include interim segment information, restatement of previous financial reports, information about major customers, and general segment information.

Panel B of table 1 provides the industry distribution of sample companies that received comment letters.⁵ Technology companies constitute the largest proportion of sample companies (27%), followed by manufacturing companies (26%), wholesale and retail companies (14%), services companies (9%) and Finance, insurance and real estate companies (8%). Companies in other industries provide the remaining 15% of the sample.

Panel C of table 1 reports the numbers of segments reported before receipt of comment letters from the SEC. The table shows both numbers of operating segments and geographic segments. There are 221 companies that initially reported one operating segment and 312 companies that reported multiple operating segments. In terms of geographic segments, 118 companies didn't report any geographic segments, 151 companies reported one geographic segment, and 264 companies reported more than one geographic segment.

1.4 Hypotheses Development and Research Design

1.4.1 Proprietary Costs of Segment Disclosure

Prior literature and anecdotal evidence suggest that managers have incentives to withhold segment information from their competitors on the grounds that detailed disaggregated information enables competitors to determine companies' strategic directions, most profitable operations or areas, and cost information. For example

⁵ Industry groupings are based on SIC codes as follows: Agricultural, mining & construction = 0-1999; Manufacturing = 2000-3999 (excluding SIC codes counted in Technology); Technology = 3570-3579 and 7370-7379; Transportation = 4000-4799; Communications = 4800-4899; Utilities = 4900-4999; Wholesale and Retail = 5000-5999; Services = 7000-8999 (excluding SIC codes counted in Technology). Finance, insurance & real estate = 6000-6999. Other = 9999.

Ball Corp., in its response letter to the SEC staff, dated January 25, 2006, stated its concerns about disclosing more information to its competitors:

“We have two primary competitors for our North American packaging segment in North America. One is an SEC registrant that aggregates as one reporting segment two of the same lines of business discussed herein, as well as other packaging businesses. The other competitor is not a public filer. Therefore, it is of considerable interest to us that our North American packaging business lines not be disadvantaged by disclosing separate reporting segments. More segregated reporting may result in the disclosure of confidential pricing strategies to our competition, particularly for certain multi-product arrangements, which could, in turn, raise other concerns.”

The existence of proprietary costs of revealing more segment information to competitors can result in segment disclosure deficiencies such as inappropriate aggregation of operating segments, omission of product and service information, and omission of geographic information. Therefore, the first hypothesis is related to the effect of proprietary costs on segment disclosure compliance. I expect that companies with higher proprietary costs are more likely to be associated with segment disclosure non-compliance. Note that evidence supporting this hypothesis will suggest that segment disclosure non-compliance is likely to be intentional.

I use three proxies to capture proprietary costs: industry-adjusted return on assets (ADJROA), Herfindahl Index (HERF) and capital intensity (CAPINTN). Companies having higher abnormal profits face greater threats from current and potential competitors and are more likely to protect information from them.⁶ Detailed

⁶ For example, Apple refuses to disclose the profit on iPod products separately from its computer products. It breaks out the businesses only by geographic regions, but not by product line. In response to the request of financial analysts, Apple’s finance chief, Peter Oppenheimer, stated that “. . . Our competitors would just love to know what our specific gross margins are . . . and we just don’t want to help them.” (Greenberg 2006).

costs, expenses and profit information for each operating segment and product or service can be used by their competitors to undermine companies' competitive advantage. Therefore, I expect that companies with higher abnormal profitability are more likely to have segment disclosure deficiencies. The industry adjusted abnormal profitability (ADJROA) is calculated as a company's return on assets (ROA), minus the industry median ROA. The industry median ROA is computed as the median of ROAs of all companies that operate in the same two-digit SIC industry as the company.

Prior studies document that competition intensity also affects managers' incentives to disclose segment information (Harris 1998; Ettredge et al. 2006; Berger and Hann 2007). Companies operating in highly competitive industries earn less abnormal profit relative to their peers, which gives them fewer incentives to protect their information. In contrast, companies operating in highly concentrated industries, in the presence of a few strong competitors, have a greater tendency to protect information from their competitors. I use a Herfindahl Index (HERF) to measure the level of concentration in an industry.⁷ It is calculated as follows:

$$HHI_j = \sum_{i=1}^n \left(\frac{sales_{ij}}{Sales_j} \right)^2 \quad (1)$$

where $sales_{ij}$ is company i 's sales (including single-segment companies and multi-segment companies) in industry j , as defined by two-digit SIC codes. $Sales_j$ is the sum of sales for all companies in industry j . n is the number of companies in industry j .

⁷ Prior literature also uses a four-firm concentration ratio to measure the industry concentration (Harris 1998; Ettredge et al. 2006). The results are similar when I replace the Herfindahl Index with a four-firm concentration ratio.

Higher values of HERF represent higher concentration. Therefore, I expect a positive association between HERF and segment disclosure deficiencies.

I also include capital intensity (CAPINTN) as a measure of barrier to entry into a line of business, which is an inverse measure of proprietary costs. High costs to enter or operate in an industry deter potential competitors and mitigate the competitive threat (Piotroski 2003; DeFond and Huang 2003; Hou and Robinson 2006). CAPINTN is measured at the industry level and equals the median of companies' capital intensity within a two-digit SIC industry. A company's capital intensity is calculated as net property, plant and equipment, scaled by total assets. I expect that CAPINTN is negatively associated with segment disclosure deficiencies.

1.4.2 Agency Costs of Segment Disclosure

Prior literature suggests that multi-segment companies trade at a discount compared to single-segment companies (Lang and Stulz 1994; Berger and Ofek 1995) because the diversification creates an internal capital market and enables the managers to allocate resources among segments. High quality segment information increases the precision of publicly available information about management's investment and operating decisions, and mitigates the managers' opportunities to invest in assets that destroy shareholder value (Kanodia and Lee 1998; Healy and Palepu 2001). Focusing on geographic segment information, Hope and Thomas (2008) find that many companies stopped disclosing geographic area earnings when adopting SFAS 131 because SFAS 131 does not require such disclosure. Companies that

stopped disclosing geographic area earnings subsequently experienced a greater expansion of foreign sales accompanied by lower foreign profit margins, compared to companies that continued to disclose geographic earnings information. Hope and Thomas conclude that management has incentives to reduce the monitoring usefulness of segment information in order to engage in self-benefitting activities such as ‘empire building’. Therefore, I expect companies with high agency costs are more likely to be associated with segment disclosure deficiencies. Again, I stress that evidence supporting this hypothesis will suggest that some disclosure deficiencies are intentional.

Two proxies are used to measure agency costs: discretionary accruals (ACCRUAL) and free cash flows (FREECF). Discretionary accruals have been widely used in the accounting literature as a measure of company-level earnings management. Higher levels of discretionary accruals suggest greater extent of management manipulation of accounting data. Francis et al. (2005) find that firms with good accruals quality have more voluntary disclosures in their annual reports than firms with poor accruals quality. Companies with high discretionary accruals arguably are subject to high levels of agency costs (DeFond 1992; Francis et al. 1999). The ACCRUAL variable is calculated as performance-adjusted current discretionary accruals, using a portfolio approach similar to Ashbaugh et al. (2003). I expect that ACCRUAL is positively associated with segment disclosure deficiencies.

The second proxy for agency costs is free cash flow (FREECF). Free cash flows allow managers to finance projects earning low returns which might not be

funded by the equity or bond markets (Jensen 1986). A high level of free cash flow suggests high agency costs. Therefore, I expect a positive association between FREECF and segment disclosure deficiencies. FREECF is computed as operating cash flow minus cash dividends and capital expenditures.

1.4.3 Valuation Benefit of Segment Disclosure

Prior literature provides evidence that disaggregated information improves analysts' earnings forecasts, increases firms' equity valuations and enhances the market's ability to predict future earnings (Kinney 1971; Collins 1976; Tse 1989; Baldwin 1984; Swaminathan 1991; Ettredge et al. 2005; Berger and Hann 2003; Botosan and Stanford 2005). Companies that are more concerned about current valuation tend to disclose more information to the market. As such, companies planning to raise capital from the external market have incentives to disclose more information to investors in pursuit of a lower cost of capital. Gibbins et al. (1990) find, based on interviews, that the frequency with which firms issue securities influences their disclosure policies. Frankel et al. (1995) indicate that companies in need of external financing issue more management forecasts voluntarily. Ettredge et al. (2006) find that companies that raise capital in the subsequent year are associated with disclosure of larger cross-segment differences in profitability. Therefore, I expect companies relying more on external financing are negatively associated with segment disclosure deficiencies.

I use EXFIN to measure external equity financing and debt financing activities in the subsequent year. Equity financing equals the proceeds of sales of common stock and preferred stock, less purchases of common stock and preferred stock, and cash dividends, scaled by total assets. Debt financing equals long-term debt issuance, subtracting long-term debt reduction and change in current debt.

1.4.4 The Research Model

This paper investigates the impact of managers' motives on compliance with segment disclosure requirements. I use a dichotomous variable, SEGDEF, to capture the existence of segment disclosure deficiencies. It equals one if a company has at least one deficiency in its segment disclosure, zero otherwise.⁸ Section 5 will discuss how I identify companies with segment disclosure deficiencies from the SEC staff comment letters.

Several variables are included in the model to control for other factors that could be associated with segment disclosure deficiencies. Large companies have more resources and greater flexibility in their disclosures. Ettredge et al. (2006) find that size is negatively associated with disclosure of cross-segment variability in profits. However, prior literature also suggests large companies have higher disclosure quality because larger companies are subject to greater scrutiny by regulators and investors (Skinner 1994), including investors' private information

⁸ I also test the determinants of sub-sets of segment disclosure deficiencies: companies with deficiencies in segment identification or aggregation, and companies with deficiencies other than segment identification or aggregation.

acquisition (King, Pownall and Waymire 1990). Lang and Lundholm (1993) find a positive association between company size and analysts' ratings of companies' disclosure quality. Therefore, I do not specify the sign of the coefficient on size. Size (LNAT) is calculated as the natural logarithm of total assets.

Companies engaging in mergers or acquisitions, or experiencing restructuring activities, are more likely to need to change their operating or geographic segments. If a company's segment disclosures do not reflect the company's structural changes in a timely fashion, deficiencies in segment reporting will occur. I use variables MERGER and RSTRUCT to capture the existence of merger or acquisition, and restructuring activities, in the prior two years, respectively. Therefore, dichotomous variables MERGER and RSTRUCT are expected to be positively associated with segment disclosure deficiencies. I also include the number of two-digit SIC industries in which a company's segments operate (NSSIC) as a control variable. As the number of industries increases, a company's operational complexity increases, which increases the difficulty of complying with segment disclosure requirements. So, I expect NSSIC to be positively associated with segment disclosure deficiencies. Segment disclosure deficiencies associated with structural changes (MERGER and RSTRUCT) or operational complexity (NSSIC) are more likely to be accidental than those associated with managers' incentives to disclose.

Given that some proxies for agency costs, proxies for proprietary costs, and proxies for valuation benefits may be correlated, I test the effects of proprietary costs,

agency costs, and valuation benefits on segment disclosure deficiencies separately and jointly. The models are as follows:

Model (1) Proprietary costs plus controls:

$$\text{SEGDEF} = \beta_0 + \beta_1 \text{ADJROA} + \beta_2 \text{HERF} + \beta_3 \text{CAPINTN} + \beta_4 \text{LNAT} + \beta_5 \text{MERGER} + \beta_6 \text{RSTRUCT} + \beta_7 \text{NSSIC};$$

Model (2) Agency costs plus controls:

$$\text{SEGDEF} = \beta_0 + \beta_1 \text{ACCRUAL} + \beta_2 \text{FREECF} + \beta_3 \text{LNAT} + \beta_4 \text{MERGER} + \beta_5 \text{RSTRUCT} + \beta_6 \text{NSSIC};$$

Model (3) Valuation benefits plus controls:

$$\text{SEGDEF} = \beta_0 + \beta_1 \text{EXFIN} + \beta_2 \text{LNAT} + \beta_3 \text{MERGER} + \beta_4 \text{RSTRUCT} + \beta_5 \text{NSSIC};$$

Model (4) Full model:

$$\text{SEGDEF} = \beta_0 + \beta_1 \text{ADJROA} + \beta_2 \text{HERF} + \beta_3 \text{CAPINTN} + \beta_4 \text{ACCRUAL} + \beta_5 \text{FREECF} + \beta_6 \text{EXFIN} + \beta_7 \text{LNAT} + \beta_8 \text{MERGER} + \beta_9 \text{RSTRUCT} + \beta_{10} \text{NSSIC}.$$

1.5 Sample and Results

1.5.1 Sample

I collect all SEC staff comment letters addressing companies' segment disclosure problems from the EDGAR system that were filed before July 31, 2007.

There are 1,392 comment letters that were sent to 533 companies. One of the outcomes of the SEC staff review process is that the SEC staff is satisfied with companies' current disclosures, i.e. the companies' explanations and additional information are persuasive. Since I am interested in companies with segment disclosure deficiencies, I delete from the test sample 201 companies whose initial filings ultimately were accepted by the SEC as not deficient. Ninety-seven companies are deleted due to no response letters available.⁹ Finally, I delete 24 companies with missing financial data. The remaining 211 test companies have segment disclosure deficiencies. Among the 211 companies that revised their segment disclosures, there are 52 companies that revised their disclosed reportable segments based on the SEC staff's requests, while the remainder revised their filings to include more information about other required disclosures such as major products or services information, geographic information, reconciliation items, etc. I obtain a sample of 7,380 'clean' companies from Compustat that didn't receive any SEC comment letters during the three-year sample period, and for which financial data are available. The control sample includes both single-segment companies and multi-segment companies because both types are subject to comply with FAS 131. FAS 131 requires a company to report not only operating segments but other important information such as information about products or services, major customers, and geographic segments. In the control sample of 7,380 companies, 4,159 companies are single-operating-segment companies, of which 1,649 disclose more than one geographic segment. Use

⁹ The response letters are not publicly released if companies request a rule 83 confidential treatment.

of ‘clean’ single-operating-segment companies as a control sample also is appropriate because the test sample of 533 companies includes 221 that initially disclosed as single-operating-segment companies (see Panel C of Table 1). The final sample size is 7,591. See table 2 for a description of the sample selection process.

1.5.2 Logistic Regression Results

Table 3 provides univariate analysis of the variables proxying for management’s incentives regarding segment disclosure compliance, and control variables. I compare the test and control variables’ means for companies with segment disclosure deficiencies versus those without segment disclosure deficiencies. As expected, companies having segment disclosure deficiencies earn higher abnormal profits, operate in more concentrated industries, and have lower capital intensity relative to ‘clean’ companies. Companies with segment disclosure deficiencies also have more free cash flow. However, the difference in accrual quality between deficient companies and clean companies is not significant. Compared with ‘clean’ companies, deficient companies have less need for external financing, as expected. Therefore, the results of univariate analysis generally are consistent with my expectations that companies with higher proprietary costs, higher agency costs, and lower valuation benefits are more likely to have segment disclosure deficiencies. In addition, companies with segment deficiencies are larger, operate in more industries, and are more likely to engage in merger, acquisition, and restructuring activities in the previous two years.

Table 4 reports Pearson correlations. The correlations of SEGDEF with other variables have implications that are similar to the univariate results. For example, SEGDEF is significantly positively associated with ADJROA, HERF, FREETCF, LNAT, MERGE, RSTRUCT and NSSIC, and is negatively associated with EXFIN. Its correlations with CAPINTN and ACCRUAL are not significant. In addition, the correlations between ADJROA, HERF and CAPINTN are small, indicating that the three proxies for proprietary costs capture different aspects of that construct. ACCRUAL and FREETCF are negatively correlated with one another but the coefficient is small. However, some correlations between proxies for different constructs (proprietary costs, agency costs and valuation benefits) are highly correlated. The correlation between ADJROA and FREETCF is 0.880 (p-value = 0.000). The correlation between ADJROA and EXFIN equals -0.797 (p-value=0.000). The correlation between FREETCF and EXFIN is -0.877 (p-value = 0.000). The correlations among these three variables are reasonable since companies with higher abnormal profits are likely to have more cash and do not need to rely on external financing. However the high correlations suggest potential multi-collinearity problems if proxies for all constructs are included in a model at the same time. Thus, I first test each construct separately, and then test the three constructs jointly in one model.

Panel A of table 5 presents the results of four logistic regressions. The dependent variable is SEGDEF, which equals one if companies responded to the SEC staff and agreed to make requested changes or promised to alter segment disclosures

in their future filings. SEGDEF equals zero if companies didn't receive any comment letters from the SEC. Model (1) examines the effect of proprietary costs on segment disclosure deficiencies. The results show that companies with segment disclosure deficiencies have higher abnormal profitability, and operate in industries with higher concentration. A proxy for barrier to entry (CAPINTN) is negatively associated with SEGDEF, as expected, but the coefficient is not statistically significant. As expected, deficient disclosure is positively associated with restructuring activities and with complexity (number of industries). However, the coefficient of size (LNAT) is negative, suggesting that after controlling for business complexity, larger companies have better segment disclosure. This supports a scenario in which larger companies face greater scrutiny and higher litigation risk, leading to fuller, more compliant disclosure. In addition, larger companies arguably can afford to spend more on SEC filing compliance.

Model (2) tests the effect of agency costs. The relation between ACCRUAL and the dependent variable is positive but not significant. FREECF is positively and significantly associated with segment disclosure deficiencies (p-value = 0.001), which is consistent with the expectation that managers having access to excess cash that enables 'empire building' are more likely to conceal segment information. The coefficients of control variables are similar to those in model (1).

Model (3) tests the effect of valuation benefits. EXFIN is significantly associated with the dependent variable in the predicted direction (p-value = 0.004).

This supports the expectation that companies with a greater need for future external financing disclose more segment information to the market.

In model (4), proxies for proprietary costs, agency costs and valuation benefits are included in one model. The coefficients of ADJROA and HERF are significant with the expected sign. FREECF and EXFIN are no longer significant. This result is probably due to the high correlations among FREECF, EXFIN and ADJROA.

Another possible explanation is that proprietary costs dominate the effects of agency costs and valuation benefits. The control variable results are similar to those for models (1) – (3).

Since the failure to disaggregate reportable segments can be viewed as the most severe segment disclosure deficiency from a user's perspective, I investigate determinants of these deficiencies separately. In Panel B of table 5 I use only test companies that revised or promised to revise their future disclosure on numbers of reportable segments as a test sample, and all 'clean' companies as control sample, to test model (1) through model (4). There are 52 such test companies and 7,380 control companies. The results for test variables are largely similar to the results reported in Panel A of table 5. Note, however, that two control variables, LNAT and NSSIC, generally lose their explanatory power. These results suggest that deficiencies other than failure to disaggregate segments are less likely to be intentional. That is, other types of deficiencies are less likely to be explained by variables proxying for managers' incentives, and more likely to be explained by control variables.

To test this implication I replicate the models in Table 5, panel B, using the sample of 159 companies that had deficiencies other than aggregation, plus control companies. The results (untabulated) show that the significances of test variables are generally reduced. For instance, in model (1) the coefficient of HERF is not significant (p-value = 0.227). In model (4), ADJROA is marginally associated with the dependent variable (p-value = 0.098), and none of the coefficients of the other proxies for managers' incentives is significant. In contrast, the coefficients of control variables proxying for size, restructuring activities and complexity are highly significant in all four models. Taken together, these results, along with the results in panel B of table 5, suggest that segment disclosure deficiencies related to segment disaggregation are more likely to be intentional, and are affected by managers' incentives. Other segment disclosure deficiencies, such as the omission of profit or loss information and measurement methods of segment income, are more likely to be unintentional.

1.5.3 The Improvement of Segment Disclosure and Analyst Forecasts after Revisions

The SEC staff has devoted considerable efforts and resources to reviewing companies' filings for the purpose of improving companies' disclosure quality and enhancing the information environment of investors. It is important to know whether the SEC's comment letter process is effective. Therefore, in this section I focus on companies with segment disclosure deficiencies, and test whether companies' reported numbers of segments increase, and whether analyst forecasts of companies' earnings are improved, after receipt of and response to SEC comment letters.

In panel A of table 6, I compare the numbers of test companies' reported segments before the receipt of SEC comment letters and after responding to SEC comment letters. I conduct the test for two samples: all 211 test companies that have various kinds of segment deficiencies, including identification or aggregation of segments, and 52 companies that have problems in identification of segments or aggregation of segments. The results show that for the 211 companies, the mean number of operating segments (NSEG_OPR) increases from 2.799 to 2.947, and the number of geographic segments (NSEG_GEO) increases from 2.822 to 2.873. The differences, although small, are significant (p-value = 0.012 and 0.049, respectively). When using the sample of 52 companies, the mean number of operating segments increases from 1.935 to 3.051 (p-value = 0.001), and the number of geographic segments increases from 2.342 to 2.521, although the latter increase is not significant (p-value = 0.500). The result indicates that the SEC staff comment letter process increases the disaggregation of reportable segments by one segment, on average, for companies identified by the SEC as having segment identification or aggregation deficiencies.

Panel B of table 6 presents changes in analysts' earnings forecast accuracy (ChgFCSTACC) and forecast dispersion (ChgFCSTDISP) from the year before companies' receipt of SEC comment letters to the year after receipt of SEC comment letters, for disclosure deficiency companies. The changes in analysts' forecast characteristics for the control sample are calculated as the average yearly change of analysts' forecast characteristics for the three-year period. Analyst forecast accuracy

proxies for the precision of investor beliefs (Schipper 1991) and analyst forecast dispersion measures analyst disagreement about companies' future performance (Barron et al. 1998). Analyst forecast data are obtained from I/B/E/S. I use analysts' annual earnings forecasts in the fourth month of companies' fiscal years to ensure the forecasts are made shortly after prior years' 10-Ks are filed. Among 211 companies with segment disclosure deficiencies, there are 86 test companies with analysts' earnings forecast data available. There are 4,327 'clean' companies with forecast data available. Analyst forecast accuracy (FCSTACC) is calculated as the absolute difference between actual earnings realization for a year and median forecasts for that year, multiplied by minus one, and scaled by closing stock price as of that year. The analysts' forecast dispersion (FCSTDISP) for a company is defined as the standard deviation of the analysts' earnings forecasts. ChgFCSTACC equals FCSTACC of the year after receipt of the SEC comment letters minus FCSTACC of the year before receipt of the SEC comment letters. ChgFCSTDISP equals FCSTDISP of the year after receipt of the SEC comment letters minus FCSTDISP of the year before receipt of the SEC comment letters. The results in panel B of table 6 show that analysts' forecast accuracy increases by 0.172 on average for disclosure deficiency companies (SEGDEF = 1), and by 0.000 for clean companies (SEGDEF = 0). The difference is significant with p-value = 0.000. The analysts' forecast dispersion decreases by -0.028 for disclosure deficiency companies, and increases by 0.015 for clean companies. The difference is significant with p-value = 0.001. Therefore, the results suggest that revised disclosures resulting from the SEC comment letter process

improve segment disclosure quality in general and segment disaggregation in particular, which in turn enhances the investors' information environment by allowing more accurate and less dispersed forecasts.

1.6 Conclusions

This paper draws upon the novel database of SEC comment letters to identify companies that failed to fully comply with SFAS 131 requirements, and tests the explanatory power of managers' incentives and control variables on occurrence of non-compliance with segment disclosure requirements. I collect 1,329 SEC comment letters that were sent to 533 companies, filed from August 1, 2004 to July 31, 2007. The deficiencies in segment disclosure addressed in these letters include all aspects of segment disclosure, such as identification or aggregation of segments, products or service information, geographic information, and measurement and reconciliation issues. Among all types of deficiencies, the problem of identification or aggregation of segments contributes the largest proportion (about 50 percent). I also carefully study companies' response letters and identify 211 companies that revised their current segment disclosures or promised to alter their future disclosures. By their actions, such companies effectively admitted that their prior segment disclosures were deficient. I use these companies as a test sample and include companies that did not receive any comment letters during the sample period as a control sample.

The managers' motives hypothesized to be associated with segment disclosure deficiencies include proprietary costs of revealing segment information to competitors, agency costs of revealing segment information to shareholders, and the benefit of revealing information to investors. The results indicate that segment disclosure deficiencies are positively related to abnormal profits and to industry concentration, which provides support for the hypothesis about proprietary costs. Segment disclosure deficiencies are positively associated with companies' free cash flow, which is consistent with the agency cost assertion. Companies with segment disclosure deficiencies are less likely to raise capital externally, which supports the hypothesis about a benefit of segment disclosure. Additional analysis reveals that hypothesized managerial motives for segment non-disclosure are most strongly associated with problems of segment identification and aggregation. Other types of disclosure deficiencies are explained primarily by control variables, suggesting that these types of deficiency are more likely to be accidental, rather than resulting from managers' incentives to non-disclose.

This paper also provides evidence that the SEC comment letter process improves segment disclosure quality and enhances analyst forecast quality. I find that companies whose segment identification or aggregations are questioned, increase the numbers of their reported operating segments by one segment on average after making the SEC staff requested changes in their financial reports. Also, after

companies respond to SEC comment letters, analyst forecast accuracy increases and forecast dispersion decreases compared to companies that did not receive any SEC comment letters. These results provide evidence of the value of the SEC's review of companies' filings.

REFERENCES

- AIMR. 1993. Financial reporting in the 1990s and beyond. The Association for Investment Management and Research.
- AIMR. 2000. AIMR corporate disclosure survey. The Association for Investment Management and Research.
<http://www.cfainstitute.org/aboutus/press/survey/pdf/corpdiscsurv.pdf>
- Arya, A., H. Frimor and B. Mittendorf. 2008. Discretionary disclosures of Proprietary information in a multi-segment firm. *Working paper*. Ohio State University.
- Ashbaugh, H., R. LaFond, and B. W. Mayhew. 2003. Do nonaudit services compromise auditor independence? Further evidence. *The Accounting Review* 78 (3): 611-639.
- Baldwin, B. 1984. Segment earnings disclosure and the ability of security analysts to forecast earnings per share. *The Accounting Review* 59 (3): 376-389.
- Barron, O., O. Kim, S. Lim, and D. Stevens. 1998. Using analysts' forecasts to measure properties of analysts' information environment. *The Accounting Review* 73 (4): 421-433.
- Barry, C. and S. Brown. 1985. Differential information and security market equilibrium. *Journal of Financial and Quantitative Analysis* 20 (4): 407-422.
- Berger, P.G. and R. Hann. 2003. The impact of SFAS No. 131 on information and monitoring. *Journal of Accounting Research* 41 (2): 163-223.
- Berger, P.G. and R. Hann. 2007. Segment profitability and the proprietary and agency costs of disclosure. *The Accounting Review* 82 (4): 869-906.
- Berger, P.G. and E. Ofek. 1995. Diversification's effect on firm value. *Journal of Financial Economics* 37(1): 39-65.
- Botosan, C.A. and M.S. Harris. 2000. Motivations for a change in disclosure frequency and its consequences: an examination of voluntary quarterly segment disclosures. *Journal of Accounting Research* 38 (2): 329-353.
- _____ and M. Stanford. 2005. Managers' motives to withhold segment disclosures and the effect of SFAS No. 131 on analysts' information environment. *The Accounting Review* 80 (3): 751-771.

- Collins, D. 1976. Predicting earnings with sub-entity data: some further evidence. *Journal of Accounting Research* 14 (1): 163-177.
- DeFond, M. 1992. The association between changes in client firm agency costs and auditor switching. *Auditing: A Journal of Practice & Theory* 11 (1): 16-31.
- Defond, M. and M. Hung. 2003. An empirical analysis of analysts' cash flow forecasts. *Journal of Accounting Economics* 35 (1): 73-100.
- Diamond, D.W. 1985. Optimal release of information by firms. *Journal of Finance* 40 (4): 1071-1094.
- Diamond, D. and R. Verrecchia. 1991. Disclosure, liquidity and the cost of capital. *The Journal of Accounting and Economics* 6 (1): 3-39.
- Dye, R. 2001. Commentary on essays on disclosure. *Journal of Accounting and Economics* 32 (1-3): 181-235.
- Easley, D. and M. O'Hara. 2004. Information and the cost of capital. *Journal of Finance* 59 (4): 1553-1583.
- Ettredge, M., S.Y. Kwon, D. Smith and M. Stone. 2006. The effect of SFAS No. 131 on the cross-segment variability of profits reported by multiple segment firms. *Review of Accounting Studies* 11 (1): 91-117.
- Ettredge, M., S.Y. Kwon, D. Smith, and P. Zarowin. 2005. The impact of SFAS No. 131 business segment data on the market's ability to anticipate future earnings. *The Accounting Review* 80 (3): 773-804.
- Fields, T., T. Lys and L. Vincent. 2001. Empirical research on accounting choice. *Journal of Accounting and Economics* 31 (1-3): 255-307.
- Financial Accounting Standards Board (FASB). 1976. *Statement of Financial Accounting Standards No. 14: Financial Reporting for Segments of a Business Enterprise*, Norwalk, CT.: FASB.
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1997. *Statement of Financial Accounting Standards No. 131: Disclosures about Segments of an Enterprise and Related Information*. Norwalk, CT.: FASB.
- Francis, J., E. Maydew and H.C. Sparks. 1999. The role of Big 6 auditors in the credible reporting of accruals. *Auditing: A Journal of Practice and Theory* 18 (2): 17-34.

- Francis, J., D. Nanda and P. Olsson. 2005. Voluntary disclosure, information quality, and costs of capital. *Working Paper*. Duke University.
- Frankel, R., M. McNichols and P. Wilson. 1995. Discretionary disclosure and external financing. *The Accounting Review* 70 (1): 135-150.
- Gibbins, M., A. Richardson and J. Waterhouse. 1990. The management of corporate financial disclosures: opportunism, ritualism, policies, and processes. *Journal of Accounting Research* 28 (1): 121-143.
- Graham, J.R., C.H. Harvey and S. Rajgopal. 2005. The economic implications of corporate financial reporting. *Journal of Accounting and Economics* 40 (1-3): 3-73.
- Greenberg, H. 2006. Marketwatch weekend investor: Apple's financial statements Leave much clarity to be desired. *The Wall Street Journal*, (June 24): B4.
- Harris, M. S. 1998. The association between competition and managers' business segment reporting decisions. *Journal of Accounting Research* 36 (1): 111-128.
- Hayes, R. and R. Lundholm. 1996. Segment reporting to the capital market in the presence of a competitor. *Journal of Accounting Research* 34 (2): 261-279.
- Healy, P., A. Hutton and K. Palepu. 1999. Stock performance and intermediation changes surrounding sustained increases in disclosure. *Contemporary Accounting Research* 16 (3): 485-520.
- Healy, P. M. and K. G. Palepu. 2001. Information asymmetry, corporate disclosure, and the capital markets: a review of the empirical disclosure literature. *Journal of Accounting and Economics* 31 (1-3): 405-440.
- Herrmann, D. and W. Thomas. 2002. An analysis of segment disclosures under SFAS No. 131 and SFAS No. 14 (3). *Accounting Horizons* 14: 287-302.
- Hope, O. and W.B. Thomas. 2008. Managerial empire building and firm disclosure. *Journal of Accounting Research* 46 (3): 591-636.
- Hou, K. and D.T. Robinson. 2006. Industry concentration and average stock returns. *Journal of Finance* 61 (4): 1927-1956.
- Jensen, M. C. 1986. Agency cost of free cash flow, corporate finance, and takeovers. *American Economic Review* 76 (2): 323-329.

- Kanodia, C and D. Lee. 1998. Investment and disclosure: the disciplinary role of periodic performance reports. *Journal of Accounting Research* 36 (1): 33-55.
- King, R., G. Pownall and G. Waymire. 1990. Expectations adjustments via timely management forecasts: review, synthesis, and suggestions for future research. *Journal of Accounting Literature* 9: 113- 144.
- Kinney, W. 1971. Predicting earnings: entity versus subentity data. *Journal of Accounting Research* 9 (1): 127-136.
- Lang, M. and R. Lundholm. 1993. Cross-sectional determinants of analyst ratings of corporate disclosures. *Journal of Accounting Research* 31 (2): 246-271.
- Lang, L.H.P. and R. M. Stulz. 1994. Tobin's q, corporate diversification, and firm performance. *Journal of Political Economy* 102 (6): 1248-1280.
- Merton, R.C. 1987. A simple model of capital market equilibrium with incomplete information. *Journal of Finance* 42 (3): 483-510.
- Miller G.S. and D.J. Skinner. 1998. Determinants of the valuation allowance for deferred tax assets under SFAS No. 109. *The Accounting Review* 73 (2): 213-233.
- Nagar, V., D.J. Nanda and P. Wysocki. 2003. Discretionary disclosure and stock-based incentives. *Journal of Accounting and Economics* 34 (1-3): 283-309.
- Piotroski, J. 2003. Segment reporting fineness and the precision of investor beliefs. *Working Paper*, University of Chicago.
- Schipper, K. 1991. Analysts forecasts. *Accounting Horizons* 5 (4): 105-121.
- Schwartz, K.B. and B.S. Soo. 1996. Evidence of regulatory noncompliance with SEC disclosure rules on auditor changes. *The Accounting Review* 71 (4): 555-572.
- Securities Exchange Commission. 2001. Speech by SEC staff: financial reporting issues in 2001. <http://www.sec.gov/news/speech/spch464.htm>
- Securities Exchange Commission. 2006. Current Accounting and Disclosure Issues in the Division of Corporate Finance. <http://www.sec.gov/divisions/corpfin/cfacctdisclosureissues.pdf>
- Shleifer A. and R.W. Vishny. 1989. Management entrenchment: the case of manager-specific investments. *Journal of Financial Economics* 25 (1): 123-139.

- Skinner, D.J. 1994. Why firms voluntarily disclose bad news. *Journal of Accounting Research* 32 (1): 38-60.
- Street, D., N. Nichols, and S. Gray. 2000. Segment disclosures under SFAS No. 131: has business segment reporting improved? *Accounting Horizons* 14 (3), 259-285.
- Swaminathan, S. 1991. The impact of SEC mandated segment data on price variability and divergence of beliefs. *The Accounting Review* 66 (1): 23-41.
- Tse, S. 1989. Attributes of industry, industry segment and firm specific information in security valuation. *Contemporary Accounting Research* 5 (2): 592-614.
- Verrecchia, R.E. 1983. Discretionary disclosure. *Journal of Accounting and Economics* 5 (1): 179-194.
- Verrecchia, R.E. 2001. Essays on disclosure. *Journal of Accounting and Economics* 32 (1-3): 97-180.

APPENDIX: An Example of SEC Comment Letters and Companies' Response Letters

SEC Comment letter - round 1

December 22, 2005

Mr. Paul G. Driscoll
Vice President and Chief Financial Officer
Acme United Corporation
60 Round Hill Road
Fairfield, CT 06824

RE: Acme United Corporation
Form 10-K for Fiscal Year Ended December 31, 2004
Filed March 18, 2005
Form 10-Q for the Quarterly Period Ended September 30, 2005
Filed November 14, 2005
File No. 001-07698

Dear Mr. Driscoll:

We have limited our review to only your financial statements and related disclosures and do not intend to expand our review to other portions of your document. If you disagree with a comment, we will consider your explanation as to why our comment is inapplicable or a revision is unnecessary. Please be as detailed as necessary in your explanation. In some of our comments, we may ask you to provide us with supplemental information so we may better understand your disclosure. After reviewing this information, we may or may not raise additional comments.

Please understand that the purpose of our review process is to assist you in your compliance with the applicable disclosure requirements and to enhance the overall disclosure in your filing. We look forward to working with you in these respects. We welcome any questions you may have about our comments or on any other aspect of our review. Feel free to call us at the telephone numbers listed at the end of this letter.

Item 1. Business, page 2

1. We note your disclosure of the three major customers. In future filings, please provide the complete financial statement footnote disclosure required by paragraph 39 of SFAS No. 131.

2. We note that you have separate businesses in the United States, Germany, Canada, and Hong Kong. Your income tax disclosures suggest that the German operations are

consistently less profitable than the domestic operations. The disclosures in Note 10 reflect varying revenue growth rates. It is not clear how you determined that there is only one reportable segment as contemplated by SFAS 131. Please provide us with copies of the relevant financial reports reviewed by your chief operating decision maker - see paragraph 10 of SFAS.

Company's Response letter - round 1

January 31, 2006

Nili Shah, Accounting Branch Chief
Securities and Exchange Commission
Washington, D.C. 20549-0404
RE: Acme United Corporation

Dear Ms. Shah:

This letter is in response to your December 22, 2005 comment letter relating to our Form 10-K for the year ended December 31, 2004 and our Form 10-Q for the quarter ended September 30, 2005.

Our Response:

1. Paragraph 39 of SFAS 131 requires a registrant to disclose in a footnote to the financial statements, information about the extent of its reliance on its major customers. Paragraph 39 also requires the registrant to disclose revenue from a single external customer which meets or exceeds a 10% threshold of total enterprise revenue. After further review of the disclosure in our Form 10-K for the year ended December 31, 2004, we note that we have met the requirement disclosing revenue from our top three customers. Staples, Inc., Office Max, and United Stationers represented an aggregate of 43%, 46% and 46% of total revenue for the fiscal years ended 2004, 2003 and 2002, respectively. We also note the need for further disclosure required by paragraph 39 and in future filings, starting with our Form 10-K for fiscal year end December 31, 2005, we will disclose the percentage of total revenue for each customer that meets or exceeds the 10% threshold in addition to the aggregate percentage of all customers that meet or exceed the 10% threshold.

2. The objective and basic principles of SFAS 131 are to provide information about the different types of business activities and economic environments in which an enterprise is engaged in order to give users of the financial statements a better understanding of the Company's performance, assess its prospects for the future and make informed judgments about the company. Our principal products are scissors, shears, rulers, first aid kits, and related products which are sold primarily to wholesale, contract and retail stationery distributors, office supply super stores, school supply

distributors, drug store retailers and mass market retailers. Although we have operations in the United States, Canada, Europe and Hong Kong, our products, processes, types of customers, distribution methods and regulatory issues are similar across all geographic locations.

In the mid 1990's, the Company made a strategic business decision to restructure operations by transferring manufacturing to lower cost third party factories. The North American businesses transferred production to lower cost third party factories in the mid to late 1990's. The European operations did not transfer manufacturing until the end of 2003. The gross margins for the European operations are similar to North America. The gross margins for North America averaged 45% for the nine months ended September 30, 2005 and the gross margins for Europe averaged 37% for the same period. Management considers these gross margins as indicative of similar economic characteristics. The level of SG&A expenses in Europe for that same period were higher as a percentage of sales than in the United States and Canada largely because the restructuring resulted in declines in revenue, a trend which has been reversed. As a result, the European operations were less profitable than those in North America however; they continue to make progress towards profitability. The European operations lost \$1.1 million in 2003 and \$470,000 in 2004. The 2005 loss is expected to amount to approximately \$300,000 and as the sales volume continues to increase, we expect the European operations to be close to breakeven in 2006.

Revenue growth rates for the United States, Canada and Europe for the nine months ended September 30, 2005 were 21%, 13% and 22%, respectively.

Acme United Corporation's operations are managed by one group. Operating results are reviewed and evaluated by senior management on a regular basis. Strategic planning is based on one segment.

The Chief Operating Decision Maker assesses the Company's performance by regularly reviewing the operating results as a single segment and reviews financial information presented on a consolidated basis, accompanied by disaggregated information by geographic region.

Based on those facts, the information reviewed by the Chief Operating Decision Maker and the aggregation criteria outlined in paragraph 17 of SFAS 131, we have determined that under the criteria of paragraph 17 of SFAS 131 we have one reportable operating segment. Geographic data is reported in Note 10 of our 2004 Form 10-K in accordance with the requirements of SFAS 131. Management assesses its SFAS 131 disclosures each year and if the principles of aggregation do not apply in the future, the Company's disclosure will be modified.

You have requested that we provide to you certain financial reports reviewed by our CODM. In response to this request, we are providing to you, pursuant to Rule 83, under separate cover a hard copy of each of the following confidential financial reports, together with the appropriate confidentiality request.

SEC Comment letter - round 2

February 13, 2006

Mr. Paul G. Driscoll, CFO
Acme United Corporation
60 Round Hill Road
Fairfield, CT 06824

RE: Acme United Corporation File No. 001-07698
December 31, 2004 Form 10-K filed March 18, 2005

Dear Mr. Driscoll:

We have reviewed your responses to our December 22, 2005 letter and have the following comment. ...

Paragraph 10 of SFAS No. 131 defines an operating segment as a component of an enterprise with discrete financial information that is regularly reviewed by the chief operating decision maker. Based on your responses, it appears that you have four operating segments. Paragraph 17 of SFAS No. 131 precludes the aggregation of operating segments that do not have similar economic characteristics.

In this regard, we note that the U.S. segment has significantly higher gross margins and operating margins than the other three segments in all periods presented. The Canadian segment has significantly higher operating margins than the European segment in all periods presented. The European segment has generated net losses in all periods presented, whereas the other three segments have generated income. Therefore, it does not appear that these segments have exhibited similar long-term financial performance or that they have similar economic characteristics. Given the quantitative thresholds outlined in paragraph 18 of SFAS No. 131, it appears there are 3 reportable segments requiring the disclosures prescribed by SFAS 131. Also it appears your Asian segment may not be aggregated with any of the three reportable segments due to the material differences in economic characteristics. Please provide the complete SFAS 131 disclosures in future filings.

Company's Response letter - round 2

March 10, 2006

Nili Shah, Accounting Branch Chief
Securities and Exchange Commission
Washington, D.C. 20549-0404
RE: Acme United Corporation

Dear Ms. Shah:

We have reviewed your response to our letter dated January 31, 2006 as it relates to SFAS 131 and segment reporting. It has been the Company's position that although we have operations located in various countries throughout the world, the operations and products of each segment are so similar, that all operating segments should be aggregated into one reportable segment. However, after reviewing your comments and suggestions, we have determined to make disclosure which includes three reportable segments based on geographic location. The reportable segments are: 1) United States, 2) Canada and 3) Europe. The United States includes the results of our operating unit in Asia.

Acme United (Asia Pacific) Limited is involved in sourcing, quality control and sales activities. The sourcing and quality control activities are service functions primarily for the U.S. business. The sales activity is related to direct import sales primarily to U.S. customers. These activities are an integral part of the Company's U.S. operations. The Company's management and the Chief Operating Decision Maker view the activities of Asia Pacific as an extension of the U.S. operations and therefore view the results of these two operating segments on a consolidated basis. Based on these facts we feel that it is appropriate to aggregate the United States and Asian operating segments into one reportable segment.

These modifications will be reflected in the Form 10-K to be filed for the year ended December 31, 2005.

SEC Comment letter - round3

March 17, 2006

Mr. Paul G. Driscoll
Vice President and Chief Financial Officer
Acme United Corporation
60 Round Hill Road
Fairfield, CT 06824

RE: Acme United Corporation

Form 10-K for Fiscal Year Ended December 31, 2004
Filed March 18, 2005
File No. 001-07698

Dear Mr. Driscoll:

We have completed our review of your Form 10-K and have no further comments at this time.

Table 1.1 Descriptive Statistics for Comment Letters on Segment Disclosure

<i>Panel A. Frequency of segment disclosure issues</i>				
<u>Issues</u>	<u>N</u>	<u>Percent</u>		
Identification and aggregation of segments	263	49.34%		
Product and service	102	19.14%		
Measurement	85	15.94%		
Geographic information	74	13.88%		
Management discussion and analysis (MD&A)	71	13.45%		
Information about profit or loss and assets	61	11.44%		
Reconciliation	49	9.19%		
General information	35	6.57%		
Major customers	16	3.00%		
Interim period information	9	1.69%		
Restatement of previous report	4	0.75%		
Total number of companies receiving letters	533			

<i>Panel B. Industry Distribution</i>				
<u>Industry</u>	<u>N</u>	<u>Percent</u>		
Technology	144	27.02%		
Manufacturing	141	26.45%		
Wholesale and Retail	73	13.70%		
Services	49	9.19%		
Finance, insurance & real estate	45	8.44%		
Utilities	32	6.00%		
Agricultural, mining & construction	20	3.75%		
Transportation	16	3.00%		
Communication	11	2.06%		

<i>Panel C. Number of Segments</i>				
<u># segments</u>	<u>Operating segments</u>		<u>Geographic segments</u>	
	<u>N</u>	<u>Percent</u>	<u>N</u>	<u>Percent</u>
0	-	-	118	22.14%
1	221	41.46%	151	28.33%
2	57	10.69%	105	19.70%
3	111	20.83%	51	9.57%
4	73	13.70%	36	6.75%
5	49	9.19%	36	6.75%
6	13	2.44%	15	2.81%
7	4	0.75%	7	1.31%
8+	5	0.94%	14	2.63%
Total	533	100%	533	100%

Table 1.2 Sample Selection Process

<i>Sample</i>	<i>Observations</i>
Companies that received segment comment letters	533
Subtract:	
Companies with no response letter available	97
Companies that retained current disclosure (no deficiencies)	201
Companies with missing financial data	24
Test sample	211
Add:	
All companies in the Compustat that didn't receive any segment comment letters during the three-year sample period (2004-2006) with required financial data available	7,380
Final Sample	7,591

Table 1.3 Comparison of Companies with Segment Disclosure Deficiencies and Companies without Segment Disclosure Deficiencies

<i>Variable</i>	<i>SEGDEF =1</i> N = 211	<i>SEGDEF =0</i> N = 7,380	<i>Difference</i> t-test
	<u>Mean</u>	<u>Mean</u>	<u>P-value</u>
ADJROA	-0.037	-0.443	0.000***
HERF	0.063	0.056	0.034**
CAPINTN	0.228	0.250	0.062*
ACCRUAL	0.014	0.035	0.392
FREECF	-0.032	-0.221	0.000***
EXFIN	0.048	0.183	0.000***
LNAT	5.773	4.939	0.007***
MERGE	0.303	0.243	0.005***
RSTRUCT	0.351	0.153	0.000***
NSSIC	1.275	1.136	0.000***

P-values are one-tailed. ***, ** and * represent significant level at 0.01, 0.05 and 0.1 respectively. All the variables for test companies are calculated as defined below for the year in which their filings have deficiencies. All the variables for control companies are calculated as the average of the variables as defined below for the three-year period (2004-2006).

Where:

- SEGDEF = 1 if a company received an SEC comment letter and revised its current disclosure or promised to alter future disclosure; 0 if company didn't receive a SEC comment letter.
- ADJROA = A company's return on assets (ROA) minus the median ROA of all companies operating in the company's primary two-digit SIC industry. ROA equals income before extraordinary items (Compustat #18) divided by year-end total assets (Compustat #6).
- HERF = Herfindahl Index. See equation (1) and accompanying text for the definition.
- CAPINTN = Median capital intensity of all companies operating in the company's primary two-digit SIC industry. The capital intensity of a company is computed as net PP&E (Compustat #8) divided by total assets (Compustat #6).
- ACCRUAL = Performance adjusted current discretionary accruals using a portfolio method (sometimes known as PADCA). We estimate annual parameters for companies in each two-digit SIC industry using the following equation:

$$CA_{it} = \alpha_0 + \beta_1 [1/TA_{it-1}] + \beta_2 [\Delta REV_{it}] + \varepsilon_{it}$$

The current discretionary accruals are calculated as:

$$DCA_{it} = CA_{it} - \{a_0 + b_1 [1/TA_{it-1}] + b_2 [\Delta REV_{it} - \Delta AR_{it}]\},$$

where the lower-case letters represent the estimated parameters from the prior equation.

Current accruals CA_{it} is net income before extraordinary items (Compustat

data item # 123) plus depreciation and amortization (# 125) minus operating cash flows (# 308), scaled by beginning of year total assets; ΔRev_{it} = net sales (Compustat #12) in year t less net sales in year t-1 scaled by the beginning of the year total assets; ΔAR_{it} = accounts receivable (Compustat #2) in year t less accounts receivable in year t-1, scaled by beginning of year total assets. In order to obtain PADCA, I partition firms within each two-digit SIC code into deciles based on their year t-1's return on assets (ROA_{it-1}), and obtain median value of DCA for each ROA portfolio: $PADCA_{it} = DCA_{it} - \text{median } DCA_t$ of matching portfolio. ROA_{it-1} is income before extraordinary items (Compustat # 18) scaled by total assets for firm i in year t-1.

- FREECF = Operating net cash flow (Compustat #308) minus cash dividend (Compustat #127) and minus capital expenditures (Compustat #128).
- EXFIN = The sum of external equity financing and debt financing in the subsequent year, scaled by total assets (#6). Equity financing equals sales of common stocks and preferred stocks (#108) minus purchase of common stocks and preferred stocks (#115) and minus cash dividend (#127); debt financing equals long-term debt issuance (#111) minus long-term debt reduction (#114) minus change in current debt (#301).
- LNAT = Natural logarithm of total assets (Compustat #6).
- MERGE = 1 if company experienced merger or acquisition (AFTNT #1) in year t-1 or year t-2; 0 otherwise.
- RSTRUCT = 1 if company experienced restructuring activities in year t (e.g. if any one of Compustat #376, #377, #378 or #379 is not coded as a missing value); 0 otherwise.
- NSSIC = Number of two-digit SIC industries in which a company operates.

Table 1.4 Pearson Correlations

<i>Variable</i>	SEGDEF	ADJROA	HERF	CAPINTN	ACCRUAL	FREECF	EXFIN	LNAT	MERGE	RSTRUCT	NSSIC
SEGDEF		0.042 (0.000)	0.021 (0.068)	-0.015 (0.203)	-0.002 (0.864)	0.044 (0.000)	-0.043 (0.000)	0.048 (0.000)	0.029 (0.012)	0.116 (0.000)	0.052 (0.000)
ADJROA			-0.020 (0.077)	0.085 (0.000)	0.066 (0.000)	0.880 (0.000)	-0.797 (0.000)	0.532 (0.000)	0.054 (0.000)	0.120 (0.000)	0.084 (0.000)
HERF				0.071 (0.000)	0.014 (0.213)	-0.020 (0.076)	-0.022 (0.057)	-0.027 (0.019)	-0.007 (0.531)	-0.018 (0.112)	0.070 (0.000)
CAPINTN					-0.010 (0.377)	0.088 (0.000)	-0.111 (0.000)	0.253 (0.000)	-0.100 (0.000)	-0.070 (0.000)	0.054 (0.000)
ACCRUAL						-0.020 (0.081)	-0.018 (0.108)	-0.079 (0.000)	-0.056 (0.000)	-0.020 (0.084)	-0.018 (0.117)
FREECF							-0.877 (0.000)	0.557 (0.000)	0.088 (0.000)	0.135 (0.000)	0.097 (0.000)
EXFIN								-0.531 (0.000)	-0.049 (0.000)	-0.156 (0.000)	-0.113 (0.000)
LNAT									0.163 (0.000)	0.298 (0.000)	0.275 (0.000)
MERGE										0.131 (0.000)	0.062 (0.000)
RSTRUCT											0.141 (0.000)
NSSIC											

P-values are two-tailed and are presented in parentheses. See table 3 for variable definitions.

Table 1.5 Logistic Regression of the Impact of Management Incentives on Segment Disclosure Deficiencies

Panel A. Test sample consists of all types of segment disclosure deficiencies

	<i>Proprietary Costs</i>			<i>Agency Costs</i>			<i>Valuation Benefits</i>			<i>Full Model</i>		
	<i>Coeff.</i>	<i>Chi-sq.</i>	<i>p-value</i>	<i>Coeff.</i>	<i>Chi-sq.</i>	<i>p-value</i>	<i>Coeff.</i>	<i>Chi-sq.</i>	<i>p-value</i>	<i>Coeff.</i>	<i>Chi-sq.</i>	<i>p-value</i>
	<i>Model (1)</i>			<i>Model (2)</i>			<i>Model (3)</i>			<i>Model (4)</i>		
Intercept	-4.085	330.729	0.000	-4.061	361.374	0.000	-4.150	387.603	0.000	-4.081	306.029	0.000
ADJROA	0.849	9.241	0.001							0.812	4.517	0.017
HERF	2.350	3.676	0.028							2.373	3.740	0.027
CAPINTN	-0.296	0.760	0.192							-0.279	0.667	0.207
ACCRUAL				0.001	0.000	0.493				-0.018	0.070	0.396
FREECF				1.060	9.374	0.001				0.234	0.178	0.336
EXFIN							-0.905	7.258	0.004	0.196	0.139	0.355
LNAT	-0.057	2.465	0.058	-0.052	2.341	0.063	-0.033	1.009	0.158	-0.059	2.580	0.054
MERGE	0.210	1.085	0.149	0.195	0.959	0.164	0.254	1.628	0.101	0.196	0.928	0.168
RSTRUCT	1.762	65.553	0.000	1.748	66.918	0.000	1.710	63.770	0.000	1.771	65.331	0.000
NSSIC	0.323	7.082	0.004	0.338	7.821	0.003	0.313	6.716	0.005	0.327	7.229	0.004
N = 7,591												
Model Chi-sq.		116.040			106.442			100.507			116.367	
Pseudo R-sq.		0.015			0.014			0.013			0.015	

P-values are one-tailed. See table 3 for variable definitions.

Table 1.5 Logistic Regression of the Impact of Management Incentives on Segment Disclosure Deficiencies (continued)

Panel B. Test sample consists of disclosure deficiencies related to segment identification or aggregation

	Proprietary Costs			Agency Costs			Valuation Benefits			Full Model		
	<u>Model (1)</u>			<u>Model (2)</u>			<u>Model (3)</u>			<u>Model (4)</u>		
	<u>Coeff.</u>	<u>Chi-sq.</u>	<u>p-value</u>	<u>Coeff.</u>	<u>Chi-sq.</u>	<u>p-value</u>	<u>Coeff.</u>	<u>Chi-sq.</u>	<u>p-value</u>	<u>Coeff.</u>	<u>Chi-sq.</u>	<u>p-value</u>
Intercept	-5.503	139.339	0.000	-5.623	147.084	0.000	-5.623	152.248	0.000	-5.635	131.568	0.000
ADJROA	1.788	4.021	0.022							2.328	5.461	0.010
HERF	4.903	4.796	0.014							4.822	4.649	0.016
CAPINTN	-0.918	1.445	0.115							-0.943	1.537	0.108
ACCRUAL				0.011	0.007	0.467				-0.046	0.098	0.377
FREECF				0.784	4.796	0.014				0.763	1.146	0.142
EXFIN							-0.980	1.642	0.100	0.396	0.161	0.344
LNAT	-0.038	0.253	0.307	-0.015	0.042	0.419	-0.009	0.019	0.445	-0.019	0.063	0.401
MERGE	-0.092	0.041	0.420	-0.051	0.013	0.455	0.008	0.000	0.493	-0.091	0.040	0.421
RSTRUCT	1.551	10.095	0.001	1.528	10.175	0.001	1.486	9.595	0.001	1.580	10.236	0.001
NSSIC	0.229	0.724	0.197	0.272	1.000	0.159	0.254	0.870	0.176	0.223	0.684	0.204
N=7,432												
Model Chi-sq.		116.040			106.442			100.507			116.367	
Pseudo R-sq.		0.015			0.014			0.013			0.015	

P-values are one-tailed. See table 3 for variable definitions.

Table 1.6 The Improvement of Segment Disclosure and Analyst Forecast After Revision

Panel A. Changes in number of segments

	<i>Pre-letter</i>			<i>Post-letter</i>			<i>Difference p-value</i>
	<u>Mean</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Min</u>	<u>Max</u>	
<i>Companies with all types of segment disclosure deficiencies</i>							
NSEG_OPR	2.799	1.000	8.000	2.947	1.000	8.000	0.012
NSEG_GEO	2.822	1.000	13.000	2.873	1.000	15.000	0.049
N = 211							
<i>Companies with deficiencies in identification/aggregation segments</i>							
NSEG_OPR	1.935	1.000	6.000	23.051	1.000	8.000	0.001
NSEG_GEO	2.342	1.000	7.000	2.521	1.000	9.000	0.500
N = 52							

Panel B. Changes in analyst forecast characteristics

	<i>SEGDEF = 1</i>			<i>SEGDEF = 0</i>			<i>Difference p-value</i>
	N = 86			N = 4327			
	<u>Mean</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Min</u>	<u>Max</u>	
ChgFCSTAC							
C	0.172	-0.116	0.313	0.000	-0.264	0.268	0.000
ChgFCSTDIS							
P	-0.028	-0.725	0.183	0.015	-0.716	0.943	0.001

P-values are one-tailed.

Where:

- NSEG_OPR = Number of disclosed operating segments.
- NSEG_GEO = Number of disclosed geographic segments.
- ChgFCSTACC = Analysts' forecast accuracy in the year after receipt of the SEC comment letters minus analyst forecast accuracy in year before receipt of the SEC comment letters for companies with SEGDEF =1. For companies with SEGDEF =0, it equals to the average change of analysts' forecast accuracy from year t-1 to year t in the period of year 2004 to year 2007. Analyst forecast accuracy is calculated as the absolute difference of actual earnings realization for the forecasted year and median forecasts for the forecasted year, multiplied by minus one, and scaled by closing stock price for the forecasted year.
- ChgFCSTDISP = Analysts' forecast dispersion in the year after receipt of the SEC comment letters minus analyst forecast dispersion in year before receipt of the SEC comment letters for companies with SEGDEF =1. For companies with SEGDEF =0, it equals to the average change of analysts' forecast dispersion from year t-1 to year t in the period of year 2004 to year 2007. The analysts' forecast dispersion is defined as the standard deviation of the analysts' earnings forecasts.

See table 3 for other variables' definitions.

**STUDY TWO:
STRATEGIC REVELATION OF DIFFERENCES IN SEGMENT
EARNINGS GROWTH**

ABSTRACT

Information about differences across segments in earnings growth prospects is important to investors, to managers, and to competing companies. This study investigates the interplay of managers' motives to conceal versus reveal cross-segment differences in earnings growth rates in multi-segment firms. We find that proxies for proprietary costs of segment information disclosure are negatively associated with revealed growth differences, suggesting that managers tend to conceal this information from their companies' competitors. Conversely, managers whose companies are protected by a barrier to entry (higher capital intensity) reveal greater cross-segment differences. Two measures of agency costs are negatively associated with revelation of cross-segment variability in earnings growth. This suggests that managers of companies exhibiting high agency costs suppress information about differences in segment growth in order to engage in "empire building" and other activities that investors would disapprove. We find that firms with greater reliance on external financing reveal more variable growth information, arguably because investors and lenders desire such information. Finally, we find that SFAS No. 131 improved the quality of segment information by requiring or allowing revelation of greater cross-segment differences in earnings growth.

Key Words Segment disclosure; proprietary costs; agency costs; SFAS No. 131; earnings growth; revenue growth; external financing

2.1 Introduction

Current segment earnings, and segment earnings growth, arguably are the most important accounting-based metrics for evaluating a segment's performance and prospects. Differences across segments in both profitability and earnings growth rates are important in valuing multi-segment firms. Intuitively, it makes a difference to investors whether a company's most profitable segments are expected to grow or to decline. Disaggregated information about a company's segment earnings growth is useful to its competitors when they make strategic decisions, and also is useful to a company's shareholders and board members when evaluating managers. Information about segment earnings growth rates is most useful when the rates differ substantially across segments.¹⁰ Despite the importance of segment earnings growth information, no research has been conducted to explore the determinants of cross-segment earnings growth variability revealed by managers of multi-segment companies.¹¹

This study posits that managers of multi-segment companies intervene strategically to conceal inherent differences between their segments' earnings growth rates. By "strategic" intervention we mean that managers suppress differences in earnings growth rates for their own benefit. Such intervention arguably protects their companies (and thus their own jobs) from competition, and shields their own self-

¹⁰ If a company's segments' earnings grow at the same rate, then each segment is essentially a miniature version of the company as a whole, at least with respect to this characteristic. Published research, discussed below, supports the importance of cross-segment differences in earnings growth.

¹¹ We use the terms "differences" and "variability" interchangeably when referring to heterogeneity in cross-segment earnings growth rates. We employ dependent variables consistent with both terms: range of growth rates (maximum minus minimum) captures "differences", and standard deviation of growth rates captures "variability". Results are similar for both types of dependent variable.

interested activities from unwelcome scrutiny by shareholders.¹² We also hypothesize that managers have competing incentives to reveal inherent differences in segment growth rates to capital providers. By “inherent” differences we mean differences in segment growth rates that companies would report absent managers’ manipulation.

Assume that the inherent (un-manipulated) year-to-year earnings growth rate of a company’s fastest-growing segment is “ X_f .” The inherent year-to-year earnings growth rate of a company’s slowest-growing segment is “ X_s .” The range of the company’s inherent segment growth rates then is $(X_f - X_s)$. If the company’s managers strategically conceal differences in earnings growth rates across segments, then the observed range, based on reported segment data, will be smaller than $(X_f - X_s)$. The greater the incentives favoring concealment, the smaller will be the observed range, in comparison with the (unobserved) inherent range. In contrast, the need for external financing provides incentives to reveal differences up to the full range of $(X_f - X_s)$. The implication that we test is that observed ranges in segment earnings growth rates should be negatively associated with proxies for managers’ strategic incentives to conceal, and positively associated with incentives to reveal. The relative strength of the incentives to conceal versus reveal will determine the extent to which a company’s segment data reflect inherent cross-segment differences in growth. We argue that incentives to conceal arise primarily from proprietary costs and agency costs. Incentives to reveal derive from capital market (financing) incentives.

¹² We note that protecting their companies from competitors also benefits undiversified shareholders. Diversified shareholders, however, will have invested both in a given company and in its competitors.

Proprietary costs influence management decisions on the revelation of segment profitability and earnings growth. Managers believe that a company's competitors can use information about the growth of its segments, together with other information, to make strategic decisions about which product markets to enter, diminishing the company's future profitability.¹³ Again, it is cross-segment differences in earnings growth that could provide useful information to competitors. If all segments' earnings are growing at the same rate as corporate earnings, disaggregated growth information is redundant. Therefore, managers in companies with higher proprietary costs (i.e. facing small numbers of powerful competitors) have incentives to conceal information about differences in segment growth.

Managers sometimes pursue their own objectives at the expense of shareholders, generating agency costs. In the segment context, managers might attempt to increase operations in low profit lines of business in order to diversify the operating risks to which they are subject, or to expand the total size of the companies they manage. This activity may not be in the best interest of shareholders or lenders. Such managers likely desire to conceal differences in earnings growth, sales growth, and asset growth across segments.

Segment earnings growth data affects stock prices and therefore cost of capital. The usefulness of segment earnings growth data to investors gives managers of multi-segment companies incentives to reveal cross-segment variability in earnings growth.

¹³ It is possible to question whether segment data are sufficiently detailed to be of real use to competitors. The answer to this question likely differs from segment to segment and from company to company. Our theory only requires that managers believe that competitors can use the data. There is evidence that many do hold this belief (Ettredge et al. 2002a).

These incentives should be greater for companies that are more reliant on external capital.¹⁴

Companies' adoptions of SFAS No. 131 (FAS 131) likely affected the revelation of cross-segment differences in earnings growth rates.¹⁵ FAS 131 is intended to enable financial statement users to better understand the performance of multi-segment companies. The standard requires disaggregation of segments having different economic characteristics and different prospects. By requiring some companies to redefine segments so as to achieve these goals, FAS 131 could have increased the cross-segment variability of reported earnings growth.

Our main analyses involve regressing firms' cross-segment earnings growth rate differences against the four constructs: proprietary costs, agency costs, financing incentives, and GAAP segment reporting regime (FAS 131 versus FAS 14). We find that proxies for proprietary costs (abnormal corporate profit levels and a concentration index) are negatively associated with growth variability, suggesting that managers tend to conceal information to avoid enabling their current or potential competitors to use this information to make strategic decisions. Conversely, we provide evidence that managers whose companies are protected by a barrier to entry (higher capital intensity, an inverse measure of proprietary costs) are willing to reveal more. Two measures of agency costs (free cash flows and discretionary accruals) are negatively associated with revelation of cross-segment differences in earnings growth.

¹⁴ There are additional, general incentives for greater disclosure that apply to companies raising funds externally (Frankel et al. 1995; Verrecchia 2001; Botosan 1997; Lang and Lundholm 2000).

¹⁵ FAS 131, *Disclosures about Segments of an Enterprise and Related Information* (FASB 1997), superseded the prior segment reporting standard, SFAS No. 14 (FASB 1976).

These results support our hypothesis that higher agency costs are associated with less reported growth variability, likely because managers desire to hide information from stakeholders about their self-interested activities. Third, we find that firms with greater capital market incentives (more reliance on external financing) reveal more variable growth information. This finding is consistent with the notion that, to reduce information asymmetry, managers of companies relying on external capital have incentives to reveal more value-relevant segment information to the market. Finally, we find that FAS 131 improved quality of segment information by requiring or allowing revelation of greater cross-segment variability in earnings growth.

Our main results still hold after controlling for cross-segment variability of profitability, industry membership, after correction for possible dependence between firm-year observations, and after using an alternative measure of cross-segment variability of earnings growth. Additional analyses find that cross-segment *sales* growth variability also can be explained by our proxies for incentives to conceal (or reveal) cross-segment *earnings* growth differences.

This study provides the following contributions to the segment reporting literature. This is the first study that explores the determinants of managerial revelation of cross-segment growth variability. Empirical results are highly consistent with our expectations. The results suggest that managers believe cross-segment differences in earnings growth rates are important to themselves, to competitors, and to suppliers of capital. Second, the study adds to a growing literature on managers' use of discretion in segment reporting and disclosures. Most such

studies, discussed below, focus on determinants of the numbers of segments that companies disclose. In contrast, this study is among a very few documenting that managers appear to manipulate properties of segment earnings data, and is the first to document managers' apparent incentives to conceal and reveal differences in segment earnings growth rates. The manipulation of segment-level earnings data has received little attention relative to company-wide earnings management. Third, unlike proprietary cost motives, agency cost motives to conceal segment information have received little attention, either in the segment reporting literature, or in the broader financial disclosure literature.¹⁶ Given the scarce empirical evidence published regarding the effect of agency costs upon managers' incentives to withhold segment information, this study provides valuable additional evidence on the issue by employing alternative proxies for agency costs, and by examining a different dependent variable – revelation of differences in segment earnings growth versus disclosure of previously hidden segments. In addition, our segment data are more recent than those employed in prior studies.¹⁷ Finally, this study contributes to the literature documenting the effects of FAS 131, by showing that adoption of FAS 131 coincides with disclosure of increased cross-segment differences in earnings growth rates.

¹⁶ To the best of our knowledge, the only segment reporting study that examines agency costs is Berger and Hann (2007). Focusing on the abnormal profitability of segments that are newly-disclosed upon the adoption of FAS 131, Berger and Hann (2007) employ a measure of companies' funding of capital expenditures made by less profitable segments as a proxy for agency costs. They find that such transfers are associated with segments that were hidden under FAS 14, and newly revealed under FAS 131.

¹⁷ Our data span 1991-2004, whereas Berger and Hann (2007) and several other studies focus on data surrounding adoption of FAS 131 in 1997-1998.

The remainder of the paper is organized as follows. Section 2 develops our hypotheses in the context of prior literature. Section 3 explains the models and variable specifications together with the sample and data. Section 4 discusses the primary results while section 5 provides additional analyses. Section 6 summarizes and concludes.

2.2 Related Literature and Hypotheses Development

2.2.1 Proprietary Costs of Revealing Segment Information

Prior to the passage of FAS 131, many managers opposed disclosure of more detailed (or qualitatively improved) segment information. Generally these complaints focused on the proprietary (competitive) costs of revealing more and better information about segment profits and segment growth if it would benefit powerful competitors. In its 1996 exposure draft that preceded FAS 131, the FASB (1996) proposed that companies report R&D expenditures, capital expenditures, and depreciation expense at the segment level. A number of managers vehemently protested these provisions, primarily because they would enable competitors to determine the reporting firms' strategic directions, or planned areas of growth.¹⁸

Probably due to such responses, the FASB dropped from FAS 131 the requirement to report segment-level R&D.¹⁹

¹⁸ Rohm and Haas Co. for example, said: "Disclosure of research and development expense, capital additions and depreciation [would tell] competitors which businesses are being expanded Armed with this information, competitors can ... adopt predatory pricing policies to attack businesses that are in expansion ..." (letter to FASB dated June 27, 1996). Managers of additional companies provided somewhat similar responses.

¹⁹ Capital expenditures and depreciation must be disclosed only if included in measures of segment assets and profit or loss reviewed by a chief operating decision maker (FASB 1997, paragraphs 27-28).

Prior research provides some evidence consistent with the existence of proprietary costs of disclosing greater numbers of segments. Hayes and Lundholm (1996) provide an analysis explaining managers' chosen level of aggregation when disclosing segments given the presence of competitors. Harris (1998) uses a pre-FAS 131 sample of multiple segment firms to estimate the relation between management's decision to report operations in a given industry as a segment and two measures of proprietary costs: a four-firm concentration ratio and a measure of the speed of profit adjustment. Her results show that operations in less competitive (high proprietary cost) industries are less likely to be reported as industry segments. Ettredge et al. (2002b) show that firms most likely to suffer competitive harm from more disaggregated segment disclosure experienced significant, negative abnormal returns on dates of FASB news releases prior to the issuance of FAS 131. Botosan and Stanford (2005) study segments that are newly revealed, under FAS 131, by former single segment companies, and find results consistent with Harris (1998). The newly revealed segments tend to operate in industries that are less competitive (with higher proprietary costs) than their companies' primary industries.

In contrast to the prior studies that focused on the proprietary costs of disclosing greater numbers of segments, one prior study focuses on the implications of proprietary costs for revelation of cross-segment differences in profitability (segment return on sales). Ettredge et al. (2006) find that two measures of proprietary costs are negatively associated with revealed cross-segment differences in segment profit rates, both before and after adoption of FAS 131.

Powerful competitors are likely to be interested in assessing a company's segment growth prospects so as to expand their own operations into growing markets. Under the provisions of FAS 131, and its predecessor FAS 14, the segment information available primarily consists of external sales revenues, assets, and operating income. Since earnings are of primary interest, competitors likely use a company's recent growth in segment earnings to infer near-term prospects for future growth. On the other hand, segment operating income is subject to manipulation via undisclosed expense allocations, so competitors might prefer to rely on disclosed growth in segment revenues.²⁰ As discussed previously, segment growth information is arguably most revealing and useful when it differs across segments. We investigate whether managers of companies facing powerful competitors appear to conceal cross-segment differences in both earnings growth and (as additional analysis) in sales growth.²¹ We employ two proxies for proprietary cost disincentives for segment growth revelation (abnormal profitability and a Herfindahl industry concentration index), and a third as an inverse proxy for proprietary costs (capital intensity). Our hypothesis, in alternative form, is:

²⁰ Managers have greater opportunity to manipulate segment earnings than segment revenues for several reasons. Whereas segment revenues must be disclosed, many operating expenses need not be. Undisclosed expenses can be allocated across segments so as to manipulate earnings. Under FAS 131 the methods employed to compute the various segment expenses need not be consistent with GAAP.

²¹ Alternatively, competitors might focus on recent growth in segment assets since respondents to the FASB's 1996 exposure draft asserted that revealing segment-level capital expenditures and depreciation can reveal firms' strategic intentions. Unfortunately, segment-level assets are less commonly reported than are segment earnings and revenues. We employ growth in segment assets to derive an alternative measure of disclosed cross-segment variability in growth. Our results using this variable are roughly similar to those reported but model R-squares are substantially lower, so we do not present those results.

H1: *Proxies for proprietary costs are negatively associated with cross-segment differences in reported earnings growth rates.*

The hypothesized sign of association is opposite (i.e. positive) for the inverse proxy, capital intensity.

2.2.2 Agency Costs of Revealing Segment Information

Managers arguably desire to engage in ‘empire building’ that benefits themselves to the detriment of investors. Excessive investment in pursuit of growth potentially provides managers with greater prestige, job security, and compensation (Jensen 1986). Investors and directors use financial accounting information to monitor managers and reduce agency costs (Bushman and Smith 2001; Healy and Palepu 2001). This provides managers of multi-segment firms with incentives to engage in ‘strategic’ reporting that limits the monitoring usefulness of segment information.²² Berger and Hann (2007) find that companies’ disclosure of ‘new’ segments, when adopting FAS 131, is associated with companies’ subsidization of capital expenditures made by previously concealed, poorly-performing segments, especially among companies that exhibit high firm-level agency costs. The implication is that, prior to FAS 131, companies having greater agency costs suppressed information about investments in less-profitable segments. Hope and Thomas (2008) find that firms that stop disclosing geographic area earnings, when adopting FAS 131, subsequently experience empire building in the form of greater

²² This will be the case if the benefits to managers of strategic revelation exceed the incremental agency costs they bear.

expansion of foreign sales accompanied by lower foreign profit margins, compared to companies that continue to disclose geographic area profits.²³ They argue that these results are consistent with an agency cost hypothesis.

We propose that managers who are likely engaged in empire building will be more reluctant to reveal segment-level differences in growth. Our proxy for opportunity to engage in empire building is a measure of free cash flow (Jensen 1986; Shleifer and Vishny 1997; Richardson 2006). We employ a second frequently used proxy for agency costs, abnormal accruals (DeFond 1992; Francis et al. 1999). Both variables should be negatively associated with revealed cross-segment differences in earnings growth. Our hypothesis is:

H2: Proxies for agency costs are negatively associated with cross-segment differences in reported earnings growth rates.

2.2.3 Financing Incentives for Revealing Segment Information

It is a commonplace of finance that corporate growth prospects affect stock prices (Penman 2007). Recent studies provide evidence that differences in segment-level growth prospects are important in valuing multi-segment firms. Chen and Zhang (2003) provide an analytical model of a two-segment firm. The model indicates that segment-level information about both profitability and growth is value-relevant, when profitability and/or growth rates differ across segments. For a multiple segment company, the value relevance of the segment disclosures increases when growth

²³ FAS 14 required multinational companies to disclose earnings by geographic area. FAS 131 eliminated this disclosure requirement for most companies.

across segments is variable (heterogeneous). The authors' empirical results are consistent with this analysis. Their study suggests that some companies can enhance their stock prices by disclosing information about diverse segment growth.²⁴

Hirshleifer and Teoh (2003) provide an analytical model of an N-segment firm, in a setting with both sophisticated and 'inattentive' investors, the latter of whom employ simplifying assumptions about firm growth, to decrease cognitive processing costs. They suggest that so long as the segments have unequal earnings growth rates, the market value of the firm is lower under aggregate reporting than under segment reporting. High-growth segments are 'hidden gems' whose high growth rates are implicitly underestimated. There are also 'skeleton-in-the-closet' segments whose low rates of growth are implicitly overestimated. Similar to Chen and Zhang (2003), they conclude that variability of growth rates, across segments, makes segment data value relevant. Their study suggests that the firm can increase its market value by disaggregating implicit segments so as to reveal divergent segment earnings growth rates.²⁵

We note that in both analytical models, it is the variability in growth rates across segments that provides useful information to investors. Segment earnings information is less useful (even superfluous) if growth rates are the same across segments. We also note that the potential opportunity to increase a company's stock

²⁴ As an empirical proxy for a segment's growth, Chen and Zhang employ median analysts' forecasts of annual earnings growth rates among single segment companies operating in the same three-digit SIC industry as the segment. Given that we study managers' segment reporting incentives, our measures of earnings growth are based on segment earnings data reported by managers.

²⁵ Hirshleifer and Teoh (2003) do not provide an empirical definition of segment earnings growth rate in their analytical study.

price, by revealing inherent variability in growth rates across segments, provides managers with one motive to reveal such variability. Neither Chan and Zhang (2003) nor Hirshleifer and Teoh (2003) investigate the possibility that managers have both the ability and incentives to reveal or conceal cross-segment differences in profitability or earnings growth rates. Our proxy for financing incentives to reveal is a measure of external financing requirements (Bradshaw et al. 2006). We expect that companies relying more on external financing reveal greater cross-segment differences in earnings growth. Our related hypothesis is:

H3: A proxy for financing incentives is positively associated with cross-segment differences in reported earnings growth.

2.2.4 Effects of GAAP Segment Disclosure Regime

FAS 131 requires disaggregation of segments having different economic characteristics and different prospects. Earnings growth is an important economic characteristic, and differences in growth arguably constitute different prospects. If managers of multi-segment companies who previously aggregated segments with dissimilar growth rates interpreted FAS 131 as prohibiting them from continuing to do so, implementation of FAS 131 would have increased the cross-segment variability of reported earnings growth. Prior literature provides evidence that FAS 131 increased the transparency of segment disclosure by increasing the number of segments disclosed (Berger and Hann 2003; Herrmann and Thomas 2000; Street et al.

2000), and increasing the cross-segment variability of segment profits (Ettredge et al. 2006). This reasoning provides our last hypothesis:

H4: Adoption of FAS 131 is associated with increased cross-segment differences in reported earnings growth.

We investigate this hypothesis by testing whether a dichotomous variable representing FAS 131 adoption has a positive, direct effect on disclosed segment growth variance.

2.3 Variables, Models and Sample

Table 1 provides variable definitions. Our primary dependent variable is a firm's cross-segment variability of reported earnings growth, *EGRWVAR*. This is calculated as a range: the highest segment earnings growth rate minus the lowest. Earnings growth rate is computed as the year-to-year change in a segment's operating income, scaled by net segment sales of the prior year. Given that *EGRWVAR* is bounded on the left at zero, and is highly skewed to the right, we use two alternative measures: *EGRWWARDUM* and *LNEGRWVAR*. *EGRWWARDUM* is a dichotomous variable, defined as 'one' if a firm's *EGRWVAR* is higher than the sample median, and defined as 'zero' otherwise. *LNEGRWVAR* is the natural logarithm of *EGRWVAR*.

Our test variables are proxies for proprietary costs, agency costs, financing incentives, and GAAP segment disclosure regime. In addition, we employ several control variables. Given that we explicitly view companies' segment-level

information as subject to manipulation, we rely to the extent possible on proxies that are not based on segment-level data.

-----Insert Table 1 Here-----

2.3.1 Proprietary Costs

Our proxies for proprietary costs include a firm's industry-adjusted abnormal profitability (ABNPRFT), Herfindahl Index (HHI), and industry median capital intensity (CAPINTEN).

Ettredge et al. (2006) find abnormal profits are negatively associated with reported differences in cross-segment profitability. We extend their results by investigating whether such firms also reveal less variance in segment earnings growth. Firms in industries with higher abnormal profits are more likely to protect their information from current and potential competitors. Revealing more growth variance could be harmful for these firms, since it provides competitors with information useful in assessing where profits are growing. Therefore, we expect a negative association between ABNPRFT and variability in disclosed segment earnings growth rates. We calculate a firm's abnormal profitability as a three-year average of corporate-level return on assets (ROA), minus the weighted average of industry ROAs across the N, 2-digit SIC industries in which the firm's segments operate. The weight for a particular industry is computed as the sales made by the segment most closely corresponding to that industry, divided by total sales of the firm. Industry ROA is calculated as the mean of three-year average ROAs in each 2-digit SIC code

industry. Industry ROAs are computed using only single-segment companies in each industry.

Firms operating in highly concentrated industries are more likely to conceal information from their potential or existing competitors (Harris 1998; Ettredge et al. 2006). In a highly competitive (un-concentrated) industry, market shares are equally distributed among a number of small producers who do not earn abnormal profits. There is no incentive for such companies to conceal growth information. In contrast, managers of firms operating in concentrated industries, and facing a small number of powerful competitors, are more reluctant to reveal detailed profitability and growth information. Concealing this information helps protect their most profitable and highest-growth operations. Our second measure proxying for proprietary costs incentives is a Herfindahl index (HHI), which is computed as follows:

$$HHI_j = \sum_{i=1}^n \left(\frac{sales_{ij}}{Sales_j} \right)^2 \quad (1)$$

where $sales_{ij}$ is company i 's sales (including single-segment companies and multi-segment companies) in industry j , as defined by two-digit SIC codes. $Sales_j$ is the sum of sales for all companies in industry j . n is the number of companies in industry j .

In addition to abnormal profits and industry concentration, barriers to entry also determine the threat of competitive attack.²⁶ High costs to enter a segment's line

²⁶ It is not unusual for managers to express concerns about low barriers to entry. For example, Huntsman Corporation includes following statement related to risk factors in its S-1 form, filed Nov. 24, 2004: "Moreover, certain of our businesses use technology that is widely available. Accordingly, barriers to entry, apart from capital availability, are low in certain product segments of our business, and the entrance of new competitors into the industry may reduce our ability to capture improving profit margins in circumstances where capacity utilization in the industry is increasing."

of business mitigate the threat posed by firms' potential competitors. We use capital intensity measured at the industry-level, CAPINTEN, as a proxy for the barrier to entry (Hou and Robinson 2005; DeFond and Hung 2003).²⁷ We define a company's capital intensity as the median capital intensity of all single-segment companies in the company's primary 2-digit SIC industry. The capital intensity of a single-segment company is calculated as corporate net property, plant and equipment, divided by total assets. Industry-level capital intensity is an inverse proxy for proprietary costs of disclosure. Therefore we expect a positive relation between CAPINTEN and cross-segment growth variability.

2.3.2 Agency Costs

We use two proxies for agency costs: free cash flow (FREECF) and earnings transparency (ACCRUAL). The free cash flow hypothesis, proposed by Jensen (1986), argues that managers in firms having larger free cash flows have an incentive to waste organizational resources on projects having negative net present values, rather than pay out the excess cash to shareholders through dividends or share repurchases (Lang et al. 1991; Chung et al. 2005). Cash retention and empire building are likely to be more pronounced in firms with higher FREECF, so we expect a negative association between FREECF and revelation of cross-segment growth

²⁷ Capital intensity sometimes is used as a proxy for financing needs (Leuz and Verrecchia 2000). In either case, as a proxy for barrier to entry or for financing needs, capital intensity should have a positive association with reported variance in segment earnings growth. Given that our models contain a more direct measure of external financing requirements, we view capital intensity primarily as a proxy for barrier to entry.

variability. FREECF is calculated as operating cash flow minus cash dividends, and minus capital expenditures.

Our second agency cost variable is abnormal accruals (ACCRUAL). Agency costs are higher when there is greater asymmetry of information between management and investors (Verrecchia 2001). The potential for earnings management opportunism is caused by the separation of management and ownership inherent in the corporate ownership structure. Abnormal accruals (or discretionary accruals) have been widely used as a measure of the extent of earnings management (DeAngelo et al. 1994; DeFond and Jiambalvo 1994; Klein 2002; Kothari et al. 2005). High abnormal accruals, arising from managers' attempts to conceal unsatisfying true performance, generate low transparency leading to greater agency costs. The presence of high abnormal accruals has been empirically observed in firms suffering from severe agency problems, such as firms committing financial statement fraud (Richardson et al. 2006), and firms with weaker board monitoring (Klein 2002). Francis et al. (1999) argue that accruals increase agency costs, increasing the demand for higher quality external monitoring by Big 6 auditors. Their empirical results are consistent with this theory. The ACCRUAL variable is measured as performance-adjusted current discretionary accruals, using a portfolio approach similar to Ashbaugh et al. (2003). See Table 1 for a detailed definition. As a proxy for agency problems, ACCRUAL is expected to be negatively associated with revelation of cross-segment differences in earnings growth.

2.3.3 Financing Incentives

Our proxy for financing incentives is the firm's reliance on external financing (EXTFIN). Competition for low-cost external financing provides incentives for firms to disclose value relevant information (Frankel et al. 1995). Prior studies indicate that disclosure of segment level growth information is useful in enhancing stock price and therefore in lowering cost of external capital (Hirshleifer and Teoh 2003; Chen and Zhang 2003). As a result, managers making greater use of external financing have incentives to disclose more information about segment growth. We expect a positive relation between EXTFIN and the dependent variable. We follow Bradshaw et al. (2006) by capturing both firms' external equity financing and debt financing activities. Equity financing equals the proceeds of sales of common stock and preferred stock, minus purchases of common stock and preferred stock, and minus cash dividends. Debt financing equals long-term debt issuance minus long-term debt reduction, and minus change in current debt.

2.3.4 GAAP Segment Disclosure Regime

FAS 131 appears to have generated a general increase in numbers of segments disclosed. Prior studies have interpreted the increase as evidence of improved segment disclosure.²⁸ This study extends the segment literature by investigating the effects of FAS 131 on revelation of cross-segment differences in earnings growth rates. Numerous companies became multiple segment reporters only after adopting

²⁸ Other, more qualitative, improvements to segment information required by FAS 131 are discussed in the Appendix to Ettredge et al. (2005).

FAS 131. Cross-segment differences in growth rates do not exist for such companies in the pre-131 era. Therefore we focus our analysis on firms that disclose multiple segments both pre- and post-131. Such companies constitute an important sample as they tend to be large, diverse, complex and successful (Ettredge et al. 2006). A dummy variable (FAS131) is used to proxy for the GAAP segment reporting regime: pre-FAS 131 or post-FAS 131. FAS131 equals ‘one’ if the fiscal year is 1998-2004, and equals ‘zero’ if the fiscal year is 1991-1997. FAS 131 was intended to improve segment reporting quality, so we expect that FAS131 as a stand-alone variable is positively related to cross-segment variability in growth.

2.3.5 Control Variables

We include the following control variables that should be associated with cross-segment earnings growth variability: size, measured as the natural log of total assets at the firm level (LNAT), number of segments disclosed (NSEG), presence of merger and acquisition activities during the year (MERGER), high corporate earnings growth (HIGRW), and inherent cross-segment variability of earnings growth (INHGRWVAR).

Larger companies have more ability to conceal the segment-level sources of their profitability. Ettredge et al. (2006) find that company size is negatively associated with cross-segment variability in profit rates. Based on this prior result we expect that cross-segment earnings growth variability is negatively associated with firm size. The range of a random variable normally increases with the number of underlying independent observations. Ettredge et al. (2006) also find that the number

of a company's segments is positively associated with cross-segment variability in profits, so we expect a positive coefficient for NSEGS. Merger and acquisition activities in a year could increase or decrease variability of segment earnings growth, depending on the correlation between the earnings growth rate of the new versus previously existing operations. Therefore we do not specify an expected sign for the MERGER coefficients. A company having unusually high corporate earnings growth likely has at least one segment characterized by high growth. Unless all its segments are growing at the same rate, this should increase variability in the dependent variable. Variable HIGRW is coded 'one' if company-level earnings growth exceeds the sample median, and 'zero' otherwise. We expect a positive coefficient for the HIGRW variable.

Ettredge et al. (2006) report a positive relation between inherent variance in profitability and reported variance in profitability. Similarly, we expect that inherent variance in earnings growth (INHGRWVAR) is positively associated with revealed differences in earnings growth rates. See Table 1 for a detailed description of INHGRWVAR. Although segment earnings growth rates should reflect the characteristics of the industries in which the segments operate, we do not expect this variable to explain most of the variance in the dependent variables. Revealed segment earnings growth rates should reflect additional, firm-specific factors. First, any particular segment's earnings growth is likely to differ from the mean growth of companies in its industry due to presence or absence of production efficiencies, management expertise, product differentiation, and other factors. Second, the nature

of any given segment's operations is likely to differ from those of the firms in its closest industry match, because companies do not always define their segments along industry lines.²⁹ Third, we argue in this study that segment earnings growth rate variance should also reflect managerial discretion, based on proprietary costs, agency costs, and financing incentives.

2.3.6 Models

The basic models to be estimated are:

EGRWVAR (*or* EGRWVARDUM *or* LNEGRWVAR)

$$\begin{aligned}
 &= a_0 + b_1\text{ABNPRFT} + b_2\text{HHI} + b_3\text{CAPINTEN} + b_4\text{FREECF} + b_5\text{ACCRUAL} \\
 &+ b_6\text{EXTFIN} + b_7\text{FAS131} + b_8\text{LNAT} + b_9\text{NSEG} + b_{10}\text{MERGER} + \\
 &b_{11}\text{HIGRW} + b_{12}\text{INHGRWVAR} + e.
 \end{aligned}
 \tag{2}$$

All variables are defined in Table 1. We use OLS to estimate model (2) when EGRWVAR and LNEGRVAR are dependent variable. We employ logistic regression when EGRWVARDUM is dependent variable.

-----Insert Table 1 Here-----

2.3.7 Sample and Data

The sample selection process begins with all companies having business segment information available in the *Compustat Segment Item Value File* over the period 1991-2004, which results in 107,785 company-year observations. To compute

²⁹ This is particularly true in the FAS 131 era. Whereas SFAS No. 14 (FAS 14, FASB 1976) required companies to define business segments that correspond to industries (the 'industry' approach), FAS 131 requires that segments be defined to represent responsibility centers (the 'management' approach).

cross-segment earnings growth variability, we require companies to have more than one segment. After deleting single segment firm-years, the sample has 31,151 firm-year observations. We also eliminate companies that lack necessary segment data, and required financial statement information, on *Compustat Industrial Annual File*. These procedures generate our final sample of 7,556 observations, of which 3,801 observations are in the pre-FAS 131 period and 3,755 observations are in the post-FAS 131 period. Table 2 describes our sample selection procedures.

-----Insert Table 2 Here-----

2.4 Primary Results

Table 3 presents descriptive statistics for our sample. All continuous variables are winsorized at the 1% and 99% levels. A comparison of the mean versus median values of EGRWVAR indicates that variable is highly skewed. Therefore we supplement it by using the dichotomous variable EGRWWARDUM and the natural logarithm transformation, LNSGRWVAR. Companies in our sample have three segments on average, and tend to be relatively large. They have positive mean and median levels of abnormal profitability, and hold substantial amounts of fixed assets (CAPINTEN). Their mean and median free cash flows, accruals, and external financing needs are close to zero, although there is substantial variability across firms. A minority of sample companies engages in merger and acquisition activity in a given year (median of MERGE equals zero).

-----Insert Table 3 Here-----

In panel A of Table 4, we compare our test variables and control variables for companies that reported low earnings growth variance and those that reported high earnings growth variance. As expected, companies that reported smaller differences in earnings growth have higher abnormal profit (ABNPRFT), operate in highly concentrated industries (HHI) and in industries with lower capital intensity (CAPINTEN). These companies also have more free cash flow (FREECF) and less need for external financing (EXTFIN). Low earnings growth variance is less likely in the post-FAS 131 period. However, companies that report low variances in growth have lower abnormal accruals (ACCRUAL), which is opposite to our expectation.³⁰ In general, the results of univariate analyses support our hypotheses H1 to H4. In addition, most of the control variable results agree with our predictions. Companies reporting low cross-segment variance in growth are larger (LNAT), disclose fewer segments (NSEG), and have lower inherent growth variance (INHGRWVAR). In panel B, we compare cross-segment growth variability and number of segments in the pre-FAS 131 and post-FAS 131 periods. The t-statistics and Chi-squares indicate that the mean and median differences (pre- versus post-131) are significant for EGRWVAR, EGRWVARDUM and LNEGRWVAR, suggesting that revealed growth variance increases after FAS 131. The results provide univariate support for H4. Consistent with several prior studies, the number of reported segments also increases in the post-FAS 131 era.

-----Insert Table 4 Here-----

³⁰ We note, however, that the differences in mean and median are less significant for variable ACCRUAL compared to other variables having significant differences.

Table 5 reports Pearson and Spearman correlations. EGRWVAR³¹ is positively related to industry capital intensity, abnormal accruals, external financing, adoption of FAS 131, number of segments, and inherent growth variance for both types of correlations. EGRWVAR is negatively related to abnormal profits, free cash flow, and firm size for both types of correlations. The association between EGRWVAR and HHI is significantly negative using Spearman correlation. MERGER is negative but only significant for Pearson correlation. HIGRW is not significant using both types of correlations. Overall, the correlations between EGRWVAR and the explanatory variables are significant and agree in sign with our expectations. One exception consists of the unexpected positive correlation between EGRWVAR and ACCRUAL. That exception could be due to lack of control for other factors such as firm size. The correlations of EGRWVAR with the test variables provide univariate support for several of our hypotheses. Correlations between pairs of explanatory variables generally are small. Regression diagnostics subsequently reveal no troublesome collinearity.

-----Insert Table 5 Here-----

In Table 6 we provide information about mean levels of the dependent variable, EGRWVAR, in each of eight portfolios of company-year observations. The eight portfolios represent the possible combinations of three constructs (proprietary costs, agency costs, financing incentives), each of which has two statuses (high and

³¹ The correlations of EGRWARDUM and LNEGRWVAR with other variables are similar to those of EGRWVAR, so those results are not tabulated.

low). To be included in one of the four portfolios having high proprietary costs, a company-year observation would have to have a higher level of ABNPRFT than the sample median, and a higher level of HHI than the sample median.³² To be included in one of the four portfolios having high agency costs, a company-year observation would have to have higher levels of free cash flow and abnormal accruals than the sample medians. To be included in one of the four portfolios having high financing incentives, a company-year observation would have to have a higher level of external financing needs than the sample median.

Each of the eight possible portfolios is filled with the company-year observations that match all three of that portfolio's characteristics. For example, all observations characterized by high proprietary costs, high agency costs, and high financing benefits, are assigned to the portfolio having those three characteristics. As Table 6 shows (see Actual levels) that is portfolio 3. This process of assigning observations to portfolios results in portfolios of differing sizes, ranging from 82 to 240 observations. Having formed portfolios, we compute the mean of EGRWVAR for each portfolio.³³ We sort the portfolios by mean EGRWVAR and number them accordingly. For example, the portfolio having the lowest mean EGRWVAR is defined as portfolio (1), and so on. Table 6 shows that portfolios (1) through (8) have

³² Capital intensity is not used to construct portfolios because it is an inverse proxy for proprietary costs, and because we already employ two positive proxies for that construct. Adding a third requirement for high proprietary cost portfolios (that firms must have a capital intensity level below sample median) would greatly reduce the sizes of these portfolios.

³³ The implication of results based on the median of EGRWVAR for each portfolio is the same as the those based on the mean of EGRWVAR.

means of EGRWVAR ranging from 0.253 to 0.596, and these means increase monotonically. This increase is forced by the ordering process.

The question of interest is: how do the characteristics of the low-numbered portfolios (i.e. numbers 1-3) compare to those of the high-numbered portfolios (i.e. numbers 6-8)? Consider the portfolio of firms having high proprietary costs, high agency costs, and low financing incentives. Given our hypotheses, we expect that portfolio to have the lowest level of mean EGRWVAR of the eight portfolios. In fact, it does (it is portfolio 1). Furthermore, we expect “nearby” portfolios (2) and (3) also will reflect combinations of high proprietary costs, high agency costs, and low financing incentives. This is the case, as each of these two portfolios reflects two out of the three expected criteria. We emphasize that it would not be possible for portfolios (2) and (3) to satisfy all three criteria, because only one portfolio can do that (i.e. portfolio 1). Therefore the low-numbered portfolio characteristics agree as well as possible with our expectations.

Consider the portfolio having low proprietary costs, low agency costs, and high financing incentives to reveal segment earnings growth differences. Given our hypotheses, we expect that portfolio to have the highest level of mean EGRWVAR of the eight portfolios and it does (it is portfolio 8). Furthermore, we expect “nearby” portfolios (6) and (7) also will reflect combinations of low proprietary costs, low agency costs, and high financing incentives. This is the case, as each of these two portfolios reflects two out of the three expected criteria. Again we emphasize that it would not be possible for portfolios (6) and (7) to satisfy all three criteria, because

only one portfolio can do that (i.e. portfolio 8). Therefore the high-numbered portfolio characteristics agree as well as possible with our expectations.

Portfolios (4) and (5) are “furthest” from the two endpoint portfolios. We expect portfolio (4)’s characteristics to be less similar to portfolio (1)’s characteristics, compared to portfolios (2) and (3). These expectations are satisfied. Portfolios (2) and (3) each exhibit two out of three of the portfolio (1) characteristics. However, portfolio (4) shares only one out of three characteristics (high proprietary costs). We expect portfolio (5)’s characteristics to be less similar to portfolio (8)’s characteristics, compared to portfolios (6) and (7). These expectations also are met. Portfolios (6) and (7) each exhibit two out of three of the portfolio (8) characteristics. However, portfolio (5) shares only one out of three characteristics (low agency costs).

To summarize, our portfolio analysis provides strong support to our hypotheses H1-H3, that is, greater segment earnings growth variability is associated with proxies for lower proprietary costs and lower agency costs, and associated with a proxy for higher external financing needs. These results do not require any assumptions about the functional form of the model relating our test variables to the dependent variable EGRWVAR. Our regression results, presented next, require such assumptions, but provide statistical tests of the hypotheses.

-----Insert Table 6 Here-----

Table 7 presents results for our primary tests. The dependent variables consist of EGRWVAR and its transformations, EGRWVARDUM and LNEGRWVAR. We employ three test variables to proxy for proprietary costs and barrier to entry:

abnormal profitability (ABNPRFT) and Herfindahl index (HHI), both of which are positively associated with proprietary costs, and capital intensity (CAPINTEN), which is negatively associated with proprietary costs. ABNPRFT has the expected negative sign and is highly significant in models one and three. As expected, the coefficient of HHI is significantly negative, and the coefficient of CAPINTEN is positive, in all three models.³⁴ The results provide support for H1. Firms having high abnormal profits and low barriers to entry reveal less growth variance. The next two variables proxy for agency costs (FREECF, ACCRUAL).³⁵ Both have the expected negative coefficients in all three result columns, and the coefficients are highly significant, providing strong support for H2. Variable EXTFIN proxies for capital market incentives to reveal differences in segment growth. It has positive coefficients as expected and is highly significant in all three regressions. These results support H3. Our final test variable, FAS131, represents the intercept shift from the pre-131 to the post-131 era. It is positive and significant as expected in the three regressions, which supports H4. This suggests that FAS 131 prompted companies to reveal greater cross-segment variability in growth rates. In summary Table 7 provides support for all four hypotheses.

³⁴ All t-statistics are corrected for heteroskedasticity using White (1980).

³⁵ We also experimented with an alternative performance-adjusted current discretionary accruals measure (REDCA), and our results still hold. To obtain REDCA, we estimate the parameters for the following equation by two-digit SIC and by year:

$$CA_{it} = \alpha_0 + \beta_1[1/TA_{it-1}] + \beta_2[\Delta REV_{it}] + \beta_3[ROA_{it-1}] + \varepsilon_{it}.$$

Then, REDCA is calculated using the estimated parameters as follows:

$$REDCA_{it} = CA_{it} - \{a_0 + b_1[1/TA_{it-1}] + b_2[\Delta REV_{it} - \Delta AR_{it}] + b_3[ROA_{it-1}]\}.$$

Variables are defined the same as those used for the PADCA calculations. See table 1 for details.

-----Insert Table 7 Here-----

We find a negative but generally insignificant association between merger activity (MERGER) and revealed variability. With the exception of MERGER, the control variables have significant coefficients with expected signs in all three regressions. Size (LNAT) is significantly negative in all regressions, which is consistent with the argument that larger firms have greater ability to develop allocation schemes that conceal differences in earnings growth across segments. Number of segments (NSEG) is consistently significant and positive. The positive association between NSEG and growth variability likely is due to the fact that the range of a random variable is expected to increase as the number of independent observations used to compute the range increases. Firms having high corporate growth (HIGRW) likely have greater earnings growth variance, especially when the higher growth rate is driven by one or a few particular segments. Consistent with our expectations, we observe positive signs for all HIGRW coefficients. Inherent variability in earnings growth (INHGRWVAR) is consistently significant and positive, suggesting that firms operating in industries having different cross-industry earnings growth rates reveal greater variability in earnings growth.

2.5 Additional Analyses

2.5.1 Controlling for the Impact of Cross-Segment Differences in Profit Rates

Ettredge et al. (2006) document that cross-segment differences in profitability rates are associated with companies' abnormal profits, industry concentration, and

need for external financing. In this section we attempt to ensure that the associations between our dependent variables and proxies for proprietary costs, agency costs, and financing incentives do not merely reflect the relation between these explanatory proxies and cross-segment differences in profitability. We employ two methods to control for the effect of cross-segment differences in profit rates, ROSVAR. We define ROSVAR as the range across segments (maximum minus minimum) of segment operating income divided by segment sales. The results from both methods indicate that our dependent variable is not simply a proxy for ROSVAR.

First, we sort our sample observations into three groups based on variability in profit rates (Low, Medium, and High ROSVAR). Then we estimate model (2) for each of the three sub-samples, using EGRWVAR as dependent variable. The results are reported in table 8. The significance levels of most explanatory variables are reduced compared to Table 7. This is expected given that variability of explanatory and dependent variables tend to be somewhat restricted in smaller sub-samples. Nevertheless, fairly strong results continue to be observed for variables ABNPRFT and HHI (supporting H1), for variables FREECF and ACCRUAL (supporting H2), and for FAS 131 (supporting H4). Variable CAPINTEN (for testing H1) and EXTFIN (for testing H3) generally are not significant.

-----Insert Table 8 Here-----

Our second approach is to replicate the Table 7 tests with ROSVAR included as a control variable in each regression. We prefer this approach since it does not reduce sample size or variance of the test variables in any regression. The un-

tabulated results indicate that all the test variables are significant with the expected signs, except that ABNPRFT is not significant when the dependent variable is EGRWVARDUM. Therefore, the additional tests generally exclude the possibility that our dependent variable capturing differences in segment earnings growth is a proxy for the segment profitability level differences employed by Ettredge et al. (2006).

2.5.2 Explaining Cross-Segment Variability in Sales Growth

Companies' segment disclosures typically include sales revenue and operating income, with little information provided about segment-level expenses. Therefore managers desiring to manipulate segment earnings, or earnings growth, arguably might do so through allocation of expenses among segments. In that case, disclosed segment sales data might reflect less manipulation than segment earnings data, which include undisclosed expense allocations. Alternatively, if managers view manipulation of segment revenues as low-risk, such manipulation could be reflected in cross-segment sales growth rates. In this section we investigate determinants of cross-segment differences in sales growth rates. The explanatory variables are the same as those employed in section 4 of this paper. We investigate whether proxies for incentives to conceal (reveal) cross-segment differences tend to have similar explanatory power with respect to sales growth variance as to earnings growth variance. The results in Table 9 indicate that the proxies for proprietary costs, agency costs and capital market incentives are also useful to explain cross-segment variability in sales growth (versus earnings growth), except that HHI is insignificant.

In general the t-statistics and adjusted R-squares in Table 9 are a little closer to zero than their comparables in Table 8. However, the Table 9 results suggest that, in general, the extent of revealed segment sales growth variance is influenced by the same factors that affect segment earnings growth variance.

-----Insert Table 9 Here-----

2.5.3 Alternative Measure of Dependent Variable

Instead of using the range of earnings growth rate, we also perform analyses using an alternative measure of cross-segment earnings growth variability, GRWTHDEV. This is essentially a sales-weighted standard deviation metric:

$$GRWTHDEV = \sum_{n=1}^i |Growth_i - \overline{Growth_i}| * Saleswt_i \quad (i \geq 2).$$

Saleswt is the proportion of total company sales contributed by segment *i*. Empirical results are qualitatively similar to those presented in Table 7.

2.5.4 The Impact of FAS 131 on the Association Between Management Motives and Cross-Segment Growth Variability.

FAS 131 was intended to improve segment reporting quality in general. We investigate whether the effects of proprietary costs, agency costs, and financing incentives, on companies' revealed cross-segment earnings growth variability, changed after the implementation of FAS 131. We do so by interacting the FAS 131 dichotomous variable with proxies for the above three constructs to test for shifts in

model slope coefficients from pre- to post-131 periods. None of the interaction terms are significant. Thus, although FAS 131 is associated with a positive shift in the intercept, it appears to have no effect on the association between the dependent variable and specific proxies for management motives to reveal or conceal earning growth variability.

2.5.5 Robust Tests of Standard Errors

Many companies contribute more than one annual observation to our sample. This raises the possibility of correlations among the residuals when data are pooled across years for estimation. We address this concern using two methods. First we use the Fama-Macbeth (1973) approach to estimate the standard errors of coefficients. The results are qualitatively the same as the results shown in Table 7, except that the coefficient of CAPINTEN is only marginally significant when the dependent variable is EGRWVAR. There is no difference from the Table 7 results when the dependent variable is EGRWARDUM or LNEGRWVAR. To control for the correlation of same-firm data pooled across years, we also employ cluster-robust standard errors. All the variables retain the same significance levels as in Table 7, except that the coefficient of ABNPRFT becomes only marginally significant, and the coefficient of CAPINTEN is insignificant, when the dependent variable is EGRWVAR. In addition, the coefficient of ABNPRFT is insignificant when the dependent variable is LNEGRWVAR. In summary, the use of robust standard errors provides results generally similar to those presented in Table 7.

2.5.6 Controlling for Industry Effects

Companies operating in different industries have different growth rates, face different intensities of competition, and are governed by various regulations, each of which can result in differing managerial incentives to disclose segment information. To capture possible industry-specific omitted factors that could influence managers' disclosure decisions, we include dummy variables in model (1) to proxy for companies' primary industry memberships.³⁶ The coefficients of our test variables remain essentially unchanged from those presented in Table 7, except that the coefficients of HHI are insignificant. This is understandable because HHI is an industry-specific measure and is largely determined by the intensity of competition in each industry. Overall, including industry dummy variables does not alter our results.

2.6 Conclusions

The objective of this study is to explore the determinants of managers' decisions to reveal or conceal cross-segment variability in earnings growth rates, both before and after implementation of FAS 131. We examine several factors that are expected to impact the disclosure of cross-segment growth variability: proxies for proprietary costs, agency costs, financing incentives, and GAAP segment disclosure regime (FAS 131 versus FAS 14). Proxies for proprietary costs include abnormal

³⁶ Industry groupings are based on SIC codes as follows: Agricultural, mining & construction = 0-1999; Manufacturing = 2000-3999 (excluding SIC codes counted in Technology); Technology = 3570-3579 and 7370-7379; Transportation = 4000-4799; Communications = 4800-4899; Utilities = 4900-4999; Wholesale and Retail = 5000-5999; Services = 7000-8999 (excluding SIC codes counted in Technology). Finance, insurance & real estate = 6000-6999. Other = 9999.

profitability, Herfindahl index, and capital intensity (an inverse proxy). Proxies employed for agency costs are free cash flows and earnings quality (abnormal accruals). The financing incentive variable examined captures the company's need for external financing.

Based upon observations of a large sample of multi-segment firms spanning the period 1991 to 2004, we find that firms with high proprietary costs are more likely to conceal information about cross-segment earnings growth differences, probably because managers believe that revealing growth variability could lead to more harmful competition for such firms. Specifically, we find that firms tend to disclose smaller cross-segment growth differences if they earn abnormally high profits. Less robust evidence indicates that companies operating in highly concentrated industries reveal smaller differences in growth rates. We also find that managers reveal larger differences if their companies enjoy barriers to entry provided by intensive capital investments. We argue that managers of firms with greater agency problems tend to engage in self-interested behavior such as empire-building. This makes them reluctant to reveal accurate information about segment earnings growth, since this could indicate inefficient allocation of organizational resources. We find that managers tend to disclose smaller segment earnings growth differences if their firms have more free cash flows. A proxy for less transparent corporate earnings, measured as abnormal accruals, also is negatively associated with the dependent variable. Our results indicate that financing incentives play a role in determining the revelation of segment growth differences. Specifically, companies employing more external financing

reveal larger growth differences across segments, possibly for the sake of reducing information asymmetry between management and investors, and thus reducing cost of external capital.

The FAS 131-related analyses indicate that firms disclose greater differences in cross-segment growth in the post-131 era compared to the pre-131 period. This suggests that adoption of FAS 131 has, at least to some extent, achieved the goal of enhancing segment disclosure transparency. In contrast to this direct effect of FAS 131 adoption, we find no evidence in additional analyses that FAS 131 has influenced revelation of segment growth differences indirectly, by mitigating the effects of proprietary costs or agency costs.

REFERENCES

- Ashbaugh, H., R. LaFond, and B. W. Mayhew. (2003). Do nonaudit services compromise auditor independence? Further evidence. *The Accounting Review* 78, 611-639.
- Berger, P.G. and R. Hann (2003). The impact of SFAS No. 131 on information and monitoring. *Journal of Accounting Research* 41, 163-223.
- Berger, P.G. and R. Hann (2007). Segment profitability and the proprietary and agency costs of disclosure. *The Accounting Review* 82, 869-906.
- Bradshaw, M. T., S. A. Richardson and R. G. Sloan (2006). The relation between corporate financing activities, analysts' forecasts and stock returns. *Journal of Accounting and Economics* 42, 53-85.
- Botosan, C. (1997). Disclosure level and the cost of equity capital. *The Accounting Review* 20, 323-349.
- _____ and M. Stanford (2005). Managers' motives to withhold segment disclosures and the effect of SFAS No. 131 on analysts' information environment. *The Accounting Review* 80, 751-771.
- Bushman, R.M. and A.J. Smith (2001). Financial accounting information and corporate governance. *Journal of Accounting and Economics* 32, 237-333.
- Chen, P.F. and G. Zhang (2003). Heterogeneous investment opportunities in multiple-segment firms and the incremental value relevance of segment accounting data. *The Accounting Review* 78, 397-428.
- Chung, R., M. Firth, and J.B. Kim (2005). FCF agency costs, earnings management, and investor monitoring. *Corporate Ownership & Control* 2 (4), 51-61.
- DeAngelo, H., L. DeAngelo, and D. J. Skinner (1994). Accounting choice in troubled companies. *Journal of Accounting and Economics* 17, 113-143.
- DeFond, M. L. (1992). The association between changes in client firm agency costs and auditor switching. *Auditing: A Journal of Practice & Theory* 11, 16-31.
- _____ and J. Jiambalvo (1994). Debt covenant violation and manipulation of accruals. *Journal of Accounting and Economics* 17, 145-176.
- _____ and M. Hung (2003). An empirical analysis of analysts' cash flow forecasts. *Journal of Accounting Economics* 35, 73-100.

- Ettredge, M., S.Y.Kwon and D. Smith (2002a). Competitive harm and companies' positions on SFAS No. 131. *Journal of Accounting Auditing and Finance* 17, 93-109.
- _____ (2002b). Security market effects associated with SFAS no. 131 reported business segments. *Review of Quantitative Finance and Accounting* 18, 323-344.
- Ettredge, M., S.Y. Kwon, D. Smith, and P. Zarowin (2005). The impact of SFAS No. 131 business segment data on the market's ability to anticipate future earnings. *The Accounting Review* 80, 773-804.
- Ettredge, M., S.Y. Kwon, D. Smith and M. Stone (2006). The effect of SFAS No. 131 on the cross-segment variability of profits reported by multiple segment firms. *Review of Accounting Studies* 11, 91-117.
- Fama, E. F. and J.D. MacBeth (1973). Risk, return and equilibrium – empirical tests. *The Journal of Political Economy* 81, 607-636.
- Financial Accounting Standards Board (FASB) (1976). *Statement of Financial Accounting Standards No. 14: Financial Reporting for Segments of a Business Enterprise*, Norwalk, CT: FASB.
- _____ (1996). Exposure Draft: *Proposed Statement of Financial Accounting Standards: Reporting Disaggregated Information about a Business Enterprise*, Financial Accounting Series, Norwalk, CT: FASB.
- _____ (1997). *Statement of Financial Accounting Standards No. 131: Disclosures about Segments of an Enterprise and Related Information*. Norwalk, CT: FASB.
- Francis, J., E. Maydew and H.C. Sparks (1999). The role of Big 6 auditors in the credible reporting of accruals. *Auditing: A Journal of Practice and Theory* 18 (2), 17-34.
- Frankel, R., M. McNichols and P. Wilson (1995). Discretionary disclosure and external financing. *The Accounting Review* 70, 135-150.
- Harris, M. S. (1998). The association between competition and managers' business segment reporting decisions. *Journal of Accounting Research* 36, 111-128.

- Hayes, R. and R. Lundholm (1996). Segment reporting to the capital market in the presence of a competitor. *Journal of Accounting Research* 34, 261-279.
- Healy, P. M. and K. G. Palepu (2001). Information asymmetry, corporate disclosure, and the capital markets: a review of the empirical disclosure literature. *Journal of Accounting and Economics* 31, 405-440.
- Herrmann, D. and W. Thomas (2002). An analysis of segment disclosures under SFAS No. 131 and SFAS No. 14. *Accounting Horizons* 14, 287-302.
- Hirshleifer, D. and S.H. Teoh (2003). Limited attention, information disclosure, and financial reporting. *Journal of Accounting and Economics* 36, 337-386.
- Hope, O. and W.B. Thomas (2008). Managerial empire building and firm disclosure. *Journal of Accounting Research*, 46, 591-626.
- Hou, K. and D.T. Robinson (2005). Industry concentration and average stock returns. *Journal of Finance* 61, 1927-1956.
- Jensen, M. C. (1986). Agency cost of free cash flow, corporate finance, and takeovers. *American Economic Review* 76, 323-329.
- Klein, A. (2002). Audit Committee, Board of director characteristics, and earnings management. *Journal of Accounting and Economics* 33, 375-400.
- Kothari, S.P., A.J. Leone and C. E. Wasley (2005). Performance matched discretionary accrual measures. *Journal of Accounting and Economics* 39, 163-197.
- Lang, H. P., R. M. Stulz, and R. A. Walkling (1991). A test of the free cash flow hypothesis: a case of bidder returns. *Journal of Financial Economics* 29, 315-335.
- Lang, M. and R. Lundholm (2000). Voluntary disclosure and equity offerings: reducing information asymmetry or hyping the stock? *Contemporary Accounting Research* 17, 623-662.
- Leuz, C. and R. Verrecchia (2000). The economic consequences of increased disclosure. *Journal of Accounting Research* 38 (supplement), 91-124
- Penman, S. H. (2007). *Financial Statement Analysis and Security Valuation*, 3rd Ed. New York: McGraw-Hill.

- Richardson, S. (2006). Over-investment of free cash flows. *Review of Accounting Studies* 11, 159-89.
- Shleifer, A. and R. Vishny (1997). A survey of corporate governance. *Journal of Finance* 52, 737-783.
- Street, D., N. Nichols, and S. Gray. (2000). Segment disclosures under SFAS No. 131: has business segment reporting improved? *Accounting Horizons* 14, 259-285.
- Verrecchia, R. (2001). Essays on disclosure. *Journal of Accounting and Economics* 32, 97-180.
- White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica* 48, 817-838.

Table 2.1 Variable Definitions

Variable	Definition
	<i>Dependent variables</i>
EGRWVAR	Cross-segment earnings growth variability. Earnings growth is the year-to-year change in a segment's operating profits, scaled by net segment sales for the prior year. Earnings growth variability is the range of earnings growth: earnings growth for the fastest growing segment minus earnings growth for the slowest growing segment. Segment level data are obtained from <i>Compustat Segment Item Value File</i> .
EGRWVARDUM	Equals 1 if EGRWVAR is larger than the sample median; 0 otherwise.
LNEGRWVAR	Equals the natural logarithm of EGRWVAR.
	<i>Proxies for proprietary costs of revelation</i>
ABNPRFT	Abnormal profitability. This equals a company's three-year average return on assets (avgROA) minus the weighted average of industry ROAs across the N industries within which it operates, over the same period. Company annual ROA equals income before extraordinary items (Compustat #18) divided by year-end total assets (Compustat #6). A 2-digit SIC industry's average ROA is calculated as the mean of avgROA for single segment firms in that industry. Each company's N industry average ROAs are weighted by the proportion of the company's segment revenues provided by those segments.
HHI	Herfindahl Index. See equation (1) and accompanying text for the definition.
CAPINTEN	Industry Capital intensity. Equals the median capital intensity of all single-segment companies operating in the company's primary 2-digit SIC industry. The capital intensity of a single-segment company is computed as net PP&E (Compustat #8) divided by year-end total assets (Compustat #6). This is an inverse measure of proprietary cost.
	<i>Proxies for agency costs of revelation</i>
FREECF	Free cash flow. This equals operating net cash flow (Compustat #308) minus cash dividend (Compustat #127) and minus capital expenditures (Compustat #128).
ACCRUAL	Discretionary accruals. These are performance adjusted current discretionary accruals using a portfolio method (sometimes known as PADCA). We estimate annual parameters for companies in each two-digit SIC industry using the following equation: $CA_{it} = \alpha_0 + \beta_1 [1/TA_{it-1}] + \beta_2 [\Delta REV_{it}] + \varepsilon_{it}$ The current discretionary accruals are calculated as: $DCA_{it} = CA_{it} - \{a_0 + b_1 [1/TA_{it-1}] + b_2 [\Delta REV_{it} - \Delta AR_{it}]\}$, where the lower-case letters represent the estimated parameters from the prior equation. Current accruals CA_{it} is net income before extraordinary items (Compustat data item # 123) plus depreciation and amortization (# 125) minus operating cash flows (# 308), scaled by beginning of year total assets; ΔRev_{it} = net sales (Compustat #12) in year t less net sales in year t-1 scaled by the beginning of the year total assets; ΔAR_{it} = accounts receivable (Compustat #2) in year t less accounts receivable in year t-1, scaled by beginning of year total assets; In order to obtain PADCA, we partition firms within each two-digit SIC code into deciles based on their year t-1's return on assets (ROA_{it-1}), and obtain median value of DCA for each ROA portfolio: $PADCA_{it} = DCA_{it} - \text{median } DCA_t \text{ of matching portfolio}$. ROA_{it-1} is income before extraordinary items (Compustat # 18) scaled by total assets for firm i in year t-1.

Table 2.1 Variable Definitions (Cont'd)

Variable	Definition
	<i>Proxies for financing incentives of revelation</i>
EXTFIN	External financing in subsequent two years. This equals the sum of external equity financing and debt financing, scaled by total assets (#6). Equity financing equals sales of common stocks and preferred stocks (#108) minus purchase of common stocks and preferred stocks (#115) and minus cash dividend (#127); debt financing equals long-term debt issuance (#111) minus long-term debt reduction (#114) minus change in current debt (#301).
	<i>Proxy for segment reporting regime</i>
FAS131	Equals 1, if company's fiscal year >1997; 0 otherwise.
	<i>Control variables</i>
LNAT	Equals the natural logarithm of total assets (Compustat #6).
NSEG	Number of segments disclosed by a company.
MERGER	Equals 1 if company experienced merger or acquisition (AFTNT #1) in year t-1; 0 otherwise.
HIGRW	High growth dummy. Equals 1 if company-level earnings growth is larger than median earnings growth of sample companies; 0 otherwise.
INHGRWVAR	Inherent cross-segment earnings growth variability. For each of a company's segments we compute the median earnings growth rate for the corresponding industry as specified by Compustat. The industry median growth rate for a segment is calculated by using all single-segment companies in the same two-digit SIC code industry as the segment. Then we compute the range of earnings growth: median earnings growth for the fastest growing industry minus median earnings growth for the slowest growing industry.

Table 2.2 Sample Selection Process

	Number of observations
Sample Selection	
Company-years with segment information available in the <i>Compustat Segment Item Value File</i> over the period 1991-2004	107,785
Less:	
company-years with single segments:	(76,634)
company-years lacking segment sales and other required data:	<u>(23,595)</u>
Final sample	<u>7,556</u>

Table 2.3 Descriptive Statistics

Variable	Mean	Median	Min	Max	Std Dev
EGRWVAR	0.336	0.098	0.002	2.557	0.614
EGRWVARDUM	0.491	0.000	0.000	1.000	0.500
LNEGRWVAR	-2.252	-2.320	-6.349	0.939	1.565
ABNPRFT	0.057	0.034	-0.801	0.547	0.125
HHI	0.066	0.045	0.008	0.430	0.066
CAPINTEN	0.304	0.228	0.000	0.830	0.217
FREECF	0.009	0.015	-0.362	0.220	0.085
ACCRUAL	-0.002	0.000	-0.670	0.604	0.074
EXTFIN	0.016	-0.011	-0.614	2.616	0.239
FAS131	0.497	0.000	0.000	1.000	0.500
LNAT	6.448	6.520	0.397	11.457	2.097
NSEG	3.070	3.000	2.000	10.000	1.205
MERGE	0.243	0.000	0.000	1.000	0.429
HIGRW	0.507	1.000	0.000	1.000	0.500
INHGRWVAR	0.019	0.010	0.000	0.144	0.026
N = 7556					

See Table 1 for variable definitions. Continuous variables are truncated at the 1% and 99% levels.

Table 2.4 Univariate Analysis

Panel A: Explanatory variables by level of EGRWVARDUM

Variable	EGRWVARDUM = 0		EGRWVARDUM = 1		Mean Difference	Median Difference
	Mean	Median	Mean	Median	t-stat.	Chi-sq.
ABNPRFT	0.065	0.038	0.049	0.029	5.580***	33.010***
HHI	0.067	0.047	0.065	0.044	0.930	4.903**
CAPINTEN	0.291	0.228	0.317	0.228	-5.300***	4.101**
FREECF	0.022	0.024	-0.004	0.007	13.660***	164.013***
ACCRUAL	-0.003	-0.002	0.000	0.000	-2.130**	10.353***
EXTFIN	-0.003	-0.019	0.035	-0.004	-6.910***	27.786***
FAS131	0.467	0.000	0.528	1.000	-5.270***	27.670***
LNAT	6.598	6.643	6.294	6.358	6.310***	32.957***
NSEG	2.755	2.000	3.397	3.000	-24.030***	557.216***
MERGE	0.249	0.000	0.236	0.000	1.310	1.724
HIGRW	0.502	1.000	0.512	1.000	-0.900	0.803
INHGRWVAR	0.014	0.007	0.023	0.013	-16.290***	244.934***

Panel B: Pre- versus Post-131 for EGRWVAR and NSEG

	Pre131 N = 3801		Post 131 N = 3755		Mean Difference	Median Difference
	Mean	Median	Mean	Median	t- stat.	Chi-sq.
	EGRWVAR	0.277	0.089	0.397	0.109	-8.55***
EGRWVARDUM	0.461	0.000	0.521	1.000	-5.27***	27.670***
LNEGRWVAR	-2.395	-2.422	-2.106	-2.214	8.06***	58.165***
NSEG	2.928	3.000	3.215	3.000	10.42***	98.795***

*, ** and *** represent significance levels of 0.10, 0.05 and 0.01, respectively. P-values are two-tailed. See Table 1 for variable definitions.

Table 2.5 Correlations

	EGRW VAR	ABNP RFT	HHI	CAP INTEN	FREE CF	ACCR UAL	EXT FIN	FAS I31	LNAT	NSEG	MERGE	HI GRW	INHGRW VAR
EGRWVAR		-0.092 (0.000)	-0.006 (0.601)	0.051 (0.000)	-0.193 (0.000)	0.027 (0.019)	0.080 (0.000)	0.098 (0.000)	-0.064 (0.000)	0.210 (0.000)	-0.020 (0.078)	-0.012 (0.294)	0.169 (0.000)
ABNPRFT	-0.078 (0.000)		-0.050 (0.000)	-0.117 (0.000)	0.267 (0.000)	0.013 (0.267)	-0.099 (0.000)	0.226 (0.000)	0.081 (0.000)	0.006 (0.581)	0.060 (0.000)	0.023 (0.043)	0.000 (0.994)
HHI	-0.032 (0.006)	-0.053 (0.000)		-0.039 (0.001)	-0.029 (0.012)	0.004 (0.759)	0.000 (0.965)	-0.073 (0.000)	-0.086 (0.000)	-0.025 (0.028)	0.024 (0.040)	-0.020 (0.083)	0.052 (0.000)
CAPINTEN	0.020 (0.079)	-0.132 (0.000)	-0.084 (0.000)		-0.201 (0.000)	-0.023 (0.046)	-0.001 (0.904)	-0.117 (0.000)	0.103 (0.000)	0.022 (0.051)	-0.142 (0.000)	-0.039 (0.001)	0.113 (0.000)
FREECF	-0.171 (0.000)	0.273 (0.000)	0.004 (0.703)	-0.233 (0.000)		-0.476 (0.000)	-0.176 (0.000)	0.096 (0.000)	0.152 (0.000)	-0.017 (0.137)	0.006 (0.578)	0.147 (0.000)	-0.079 (0.000)
ACCRUAL	0.041 (0.000)	-0.009 (0.457)	0.004 (0.755)	-0.012 (0.283)	-0.487 (0.000)		0.075 (0.000)	0.006 (0.620)	-0.075 (0.000)	0.003 (0.773)	-0.008 (0.497)	0.076 (0.000)	0.014 (0.210)
EXTFIN	0.073 (0.000)	-0.073 (0.000)	-0.003 (0.807)	-0.013 (0.261)	-0.135 (0.000)	0.052 (0.000)		-0.039 (0.001)	-0.165 (0.000)	-0.054 (0.000)	0.106 (0.000)	0.051 (0.000)	-0.008 (0.510)
FAS131	0.088 (0.000)	0.253 (0.000)	-0.091 (0.000)	-0.134 (0.000)	0.129 (0.000)	0.011 (0.326)	-0.013 (0.274)		0.084 (0.000)	0.119 (0.000)	0.099 (0.000)	-0.052 (0.000)	0.143 (0.000)
LNAT	-0.067 (0.000)	0.024 (0.036)	-0.170 (0.000)	0.110 (0.000)	0.095 (0.000)	-0.079 (0.000)	-0.127 (0.000)	0.080 (0.000)		0.378 (0.000)	0.045 (0.000)	0.000 (0.994)	0.106 (0.000)
NSEG	0.324 (0.000)	-0.006 (0.620)	-0.089 (0.000)	0.018 (0.113)	-0.049 (0.000)	0.004 (0.710)	-0.039 (0.001)	0.114 (0.000)	0.377 (0.000)		-0.003 (0.790)	-0.021 (0.063)	0.284 (0.000)
MERGER	-0.017 (0.136)	0.082 (0.000)	0.017 (0.134)	-0.142 (0.000)	0.029 (0.013)	-0.018 (0.125)	0.089 (0.000)	0.099 (0.000)	0.038 (0.001)	0.007 (0.545)		-0.004 (0.723)	-0.049 (0.000)
HIGRW	0.004 (0.712)	0.038 (0.001)	-0.009 (0.448)	-0.043 (0.000)	0.176 (0.000)	0.061 (0.000)	0.059 (0.000)	-0.032 (0.000)	0.004 (0.755)	-0.032 (0.005)	-0.004 (0.723)		-0.021 (0.062)
INHGRWVA R	0.217 (0.000)	0.005 (0.656)	0.108 (0.000)	0.049 (0.000)	-0.086 (0.000)	0.025 (0.030)	0.004 (0.735)	0.050 (0.000)	0.115 (0.000)	0.326 (0.000)	-0.039 (0.001)	-0.032 (0.006)	

Bottom triangle presents Spearman correlations and top triangle presents Pearson correlations.

P-values are two-tailed and in parenthesis.

See Table 1 for variable definitions.

Table 2.6 The Association of High versus Low Proprietary Costs, Agency Costs, and Financing Benefits, with Revealed Cross-Segment Differences in Earnings Growth Rates

Ordered Portfolio	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
No. of Observations	240	82	165	102	89	201	89	221
Portfolios are ordered based on mean EGRWVAR	0.253	0.286	0.304	0.337	0.358	0.414	0.440	0.596
Characteristics	Expected levels of characteristics of ordered portfolios^a							
Proprietary costs	High				Low			
Agency costs	High				Low			
Financing incentives	Low				High			
	Actual levels of characteristics of ordered portfolios^b							
Proprietary costs	High	Low	High	High	High	Low	Low	Low
Agency costs	High	High	High	Low	Low	Low	High	Low
Financing incentives	Low	Low	High	High	Low	Low	High	High

^a Given our hypotheses, we expect the portfolios having the lowest and highest means of EGRWVAR to have the characteristics shown in this panel below portfolios (1) and (8) respectively.

^b Actual levels of characteristics in the ordered portfolios are shown. Actual characteristic levels for each portfolio are determined as follows.

- Proprietary Cost = High, if ABNPRFT is larger than sample median and HHI is larger than sample median; low, if ABNPRFT is smaller than sample median and HHI is smaller than sample median.
- Agency Cost = High, if FREECF is larger than sample median and ACCRUAL is larger than sample median; low, if FREECF is smaller than sample median and ACCRUAL is smaller than sample median.
- Financing Incentives = High, if EXTFIN is larger than sample median; low, if EXTFIN is smaller than sample median.

Table 2.7 Determinants of Cross-Segment Earnings Growth Variability

Dependent Variable	Sign	EGRWVAR		EGRWVAR DUM		LNEGRWVAR	
		Coeff.	t-stat.	Coeff.	Chi-sq.	Coeff.	t-stat.
Intercept		0.135	4.714***	-0.944	75.847***	-3.028	-43.986***
ABNPRFT	-	-0.228	-3.244***	-0.389	2.980*	-0.371	-2.537**
HHI	-	-0.136	-1.366	-0.774	3.956**	-0.811	-3.283***
CAPINTEN	+	0.073	2.057**	0.322	6.789***	0.293	3.611***
FREECF	-	-1.394	-11.168***	-4.071	105.133***	-3.241	-12.739***
ACCRUAL	-	-0.696	-5.352***	-2.231	28.915***	-1.644	-5.965***
EXTFIN	+	0.109	3.282***	0.493	18.734***	0.297	4.508***
FAS131	+	0.131	9.090***	0.244	21.303***	0.259	7.520***
LNAT	-	-0.040	-10.610***	-0.208	225.791***	-0.141	-16.376***
NSEG	+	0.113	15.926***	0.611	524.697***	0.447	30.088***
MERGER	?	-0.025	-1.671*	-0.034	0.327	-0.034	-0.872
HIGRW	+	0.042	3.072***	0.216	17.449***	0.151	4.553***
INHGRWVAR	+	2.044	6.067***	9.965	76.082***	6.675	9.723***
N = 7556							
Adj. (or Pseudo) R ² =		0.060		0.195		0.123	

*, ** and *** represent significance levels of 0.10, 0.05 and 0.01, respectively. P-values are one-tailed except for the intercept.

T-statistics are corrected for heteroskedasticity using White (1980) method.

See Table 1 for variable definitions.

Table 2.8 Determinants of Cross-Segment Earnings Growth Variability for Differing Levels of Cross-Segment Profit Rate Variability

Level of ROSVAR		LOW ROSVAR		MEDIUM ROSVAR		HIGH ROSVAR	
Dependent variable		EGRWVAR		EGRWVAR		EGRWVAR	
	Sign						
		Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Intercept		0.117	7.968***	0.104	4.226***	0.711	9.541***
ABNPRFT	-	-0.050	-1.720*	-0.118	-2.183**	-0.283	-2.188**
HHI	-	-0.102	-2.331**	0.313	3.348***	-0.216	-0.797
CAPINTEN	+	-0.026	-1.444	0.033	1.213	0.023	0.298
FREECF	-	-0.284	-4.916***	-0.632	-7.253***	-1.282	-5.716***
ACCRUAL	-	-0.088	-1.460	-0.439	-4.727***	-0.487	-2.103**
EXTFIN	+	0.027	1.826*	0.024	1.013	0.107	1.546
FAS131	+	0.006	0.970	0.030	2.484**	0.185	5.074***
LNAT	-	-0.012	-6.789***	-0.019	-6.500***	-0.044	-5.029***
NSEG	+	0.016	3.887***	0.042	7.585***	0.054	3.799***
MERGER	?	0.004	0.649	0.029	2.210**	0.007	0.157
HIGRW	+	0.023	3.657***	0.036	3.104***	0.077	2.156**
INHGRWVAR	+	0.493	2.799***	0.563	2.249**	0.876	1.544
N =		2518		2519		2519	
Adj. R ² =		0.042		0.068		0.054	

*, ** and *** represent significance levels of 0.10, 0.05 and 0.01, respectively. P-values are one-tailed except for the intercept.

T-statistics are corrected for heteroskedasticity using White (1980) method.

See Table 1 for variable definitions.

The model is estimated using observations in each of three portfolios formed by sorting on ROSVAR. ROSVAR is cross-segment profit rate variability. Profit rate is segment operating earnings divided by segment sales (i.e. return on sales). Profit rate variability is the range of profit rates across segments (the most profitable segment ROS minus the least profitable segment ROS).

Table 2.9 Determinants of Cross-Segment Sales Growth Variability

Dependent Variable	Sign	SGRWVAR		SGRWVARDUM		LNSGRWVAR	
		Coeff.	t-stat.	Coeff.	Chi-sq.	Coeff.	t-stat.
Intercept		0.113	1.203	-1.378	168.981***	-2.272	-37.978***
ABNPRFT	-	-0.405	-2.071**	-0.778	12.099***	-0.445	-3.520***
HHI	-	-0.282	-0.894	0.046	0.015	-0.302	-1.393
CAPINTEN	+	0.443	3.929***	0.351	8.354***	0.207	2.979***
FREECF	-	-2.170	-5.801***	-3.718	94.905***	-2.181	-9.873***
ACCRUAL	-	-1.330	-2.845***	-1.546	15.078***	-1.153	-4.562***
EXTFIN	+	0.423	2.907***	0.646	29.949***	0.353	5.261***
FAS131	+	0.120	2.931***	0.360	47.547***	0.198	6.822***
LNAT	-	-0.085	-7.880***	-0.213	239.838***	-0.119	-15.773***
NSEG	+	0.236	11.803***	0.687	615.548***	0.408	30.922***
MERGER	?	0.162	3.201***	0.417	49.026***	0.244	6.998***
HIGRW	+	0.433	8.680***	0.634	138.195***	0.437	13.984***
INHGRWVAR	+	0.106	2.603***	0.256	24.400***	0.184	6.269***
N =7556							
Adj. (or Pseudo) R ² =		0.075		0.173		0.211	

SGRWVAR is cross-segment *sales* growth variability. Sales growth is the year-to-year percentage change in a segment's revenues. Sales growth variance is the annual range of sales growth: sales growth for the fastest growing segment minus sales growth for the slowest growing segment. GRWVARDUM equals 1 if SGRWVAR is larger than median; 0 otherwise. LNSGRWVAR equals the natural logarithm of SGRWVAR. HIGRW Equals 1, if company-level sales growth is larger than median sales growth of sample companies; 0 otherwise. INHGRWVAR captures cross-industry differences in earnings growth rates for the industries in which a company operates, according to Compustat. See Table 1 for a full definition of INHGRWVAR.

See Table 1 for other variable definitions.

*, ** and *** represent significance levels of 0.10, 0.05 and 0.01, respectively. P-values are one-tailed except for the intercept.

T-stats are corrected for heteroskedasticity using White (1980) method.

**STUDY THREE:
STUFFING THE SEGMENT SAUSAGE: CAUSES AND
CONSEQUENCES OF INCOMPLETE ALLOCATION OF
CORPORATE INCOME TO SEGMENT UNDER FAS 131**

ABSTRACT

Under a controversial provision of FAS 131, the sum of a company's segment earnings need not equal corporate net income, nor is it required to equal any corporate earnings sub-total, such as operating income (however defined). We refer to the difference between summed segment earnings and corporate-level income, when it exists, as the 'Gap'. Using a sample of 12,064 company-year observations provided by 3,357 multiple segment companies during the FAS 131 era of 1998-2006, this study examines the determinants of Gaps, and investigates whether summed segment earnings are more persistent and informative than corporate earnings when Gaps exist.

The results suggest that Gaps shield segment-level managers from risk (by excluding transitory income items from segment earnings), and from income items arising from decisions not made at the segment level. We also find evidence that companies facing high proprietary costs and agency costs tend to disclose more and larger Gaps. Specifically, we find that industry concentration and free cash flow have positive associations with the existence and the magnitudes of Gaps. With regard to the consequences of Gaps, our results show that summed segment income is more persistent, in terms of its association with future summed segment earnings, compared to the association of GAAP corporate earnings with future corporate earnings. Summed segment income also is more informative in terms of its association with concurrent stock returns than are corporate earnings. These results primarily are due to the existence of Gaps.

Key Words: Segments, FAS 131, income allocation, persistence, pro-forma income, proprietary costs, agency costs, discretionary disclosure, earnings response coefficient.

3.1 Introduction

This paper investigates segment reporting practices resulting from a controversial provision of SFAS No. 131, *Disclosures about Segments of an Enterprise and Related Information* ('FAS 131,' FASB 1997).³⁷ The provision allows companies to measure segment earnings differently than is required for the consolidated reporting entity. Thus, segment earnings can be similar to non-GAAP "street," "core," or "pro-forma" earnings, in that companies can *exclude* expenses (or revenues) typically recognized under generally accepted accounting principles, GAAP.³⁸ In addition, FAS 131 allows companies to *include* revenues and expenses in segment earnings that GAAP does not allow as elements of corporate net income.³⁹ Therefore the sum of segment earnings need not equal corporate net income, nor is it required to equal any corporate earnings sub-total, such as operating income (however defined). We refer to the difference between summed segment earnings and corporate-level income, when it exists, as incomplete allocation of corporate income, incomplete disaggregation of corporate income, or (more briefly) as the 'Gap'. This study examines the determinants of Gaps, and investigates whether summed segment earnings are more persistent and informative than corporate earnings when Gaps exist.

³⁷ In the FASB's new Accounting Standards Codification taxonomy, the FAS 131 requirements are found in Section 280: Segment Reporting. The FAS 131 provision is controversial, in our view, because the FASB adopted it despite substantially negative feedback about that provision from users, preparers, and auditors responding to an Exposure Draft (FASB 1996) that preceded the proposed new standard. We discuss this controversy in a subsequent section of the paper.

³⁸ It is important to understand that companies can use *segment* income recognition methods that are not allowed, under GAAP, as *corporate* income recognition methods. This is not a violation of GAAP. The SEC (2003b, 8) makes this clear: "Under FASB Statement 131, a company may determine segment profitability on a basis that differs from consolidated operating profit as defined by GAAP.."

³⁹ For example, FAS 131 allows segment earnings to be measured as 'economic value added,' which typically involves expensing the cost of equity capital employed.

Segment income arguably is the most important measure for which disclosure is mandated by FAS 131. The existence (if any) and magnitude of a Gap are integral to understanding how a company's corporate earnings are disaggregated across its segments.⁴⁰ The circumstances giving rise to Gaps therefore have important consequences for interpreting companies' segment earnings, and for the usefulness of segment earnings to investors and others. A substantial literature has investigated the causes and consequences of managers' decisions to disclose single versus multiple segments (Hayes and Lundholm, 1996; Harris, 1998; Botosan and Stanford, 2005; Berger and Hann, 2003, 2007). Following Ettredge et al. (2006), and Wang et al. (2009), we argue that the methods by which corporate earnings are allocated to segments are similar in importance to the decision to disclose multiple segments in the first place.

From a skeptical perspective, a business segment is a container that managers stuff with assets and earnings.⁴¹ Similar to a sausage, the quality of the resulting segment information depends in part on the nature of the stuffing process.⁴² Despite the importance of segment earnings information, no published research has explored why some multi-segment companies disaggregate their corporate earnings less completely than others, and how incomplete disaggregation (i.e. Gaps) affect the usefulness of segment earnings. This paper addresses those issues.

⁴⁰ Or, in an alternate view, how corporate income is 'built up' from the base of segment earnings.

⁴¹ We use the term "managers" to refer to corporate-level managers unless otherwise stated. Corporate-level managers (especially the CFO) specify the income recognition methods applied to segment-level earnings, and determine the existence and nature of Gaps.

⁴² The process by which earnings are allocated to segments under FAS 131 is not as arbitrary as our "sausage" simile suggests. However prior evidence (Ettredge et al. 2006, Wang et al. 2009) and our own (in this paper) indicates that allocation of earnings between segments reflects managers' self-interested behaviors to some extent.

Under the FAS 131 “management approach”, business segments disclosed by a multi-segment company are supposed to correspond to operating segments evident in the company’s internal organization. This enables managers to prepare segment earnings data using internal reports that are submitted to the “chief operating decision maker” for evaluating operating performance, and for making decisions (FAS 131, paragraphs 4-5). Requiring companies to define segments so that internal financial reports can be used as the basis for segment reporting is intended to minimize segment reporting costs, as well as to increase the usefulness of segment information (FAS 131, paragraph 91). In these circumstances a company’s aggregated segment earnings are produced by a reporting system that should impart fairly consistent characteristics to those earnings.

We define a dichotomous Gap variable, *GAPDUM*, as equal to one if a company exhibits a Gap, and equal to zero otherwise. We employ an alternative dependent variable, *ABSGAP*, equal to the absolute value of Gap, scaled by market value of equity.⁴³ Using a sample of 12,064 company-year observations provided by 3,357 multiple segment companies during the FAS 131 era of 1998-2006, we investigate several possible causes of segment income Gaps.⁴⁴ We also explore the consequences of incomplete allocation as it affects earnings persistence over one-year periods, and as it affects earnings informativeness (association with annual market-adjusted buy-and-hold returns). The explanatory variables include aggregated segment earnings (*AGGEARN*), corporate income

⁴³ We discuss the details of how we code variables *GAPDUM*, and *ABSGAP* in a subsequent section.

⁴⁴ Unlike most prior studies that employ FAS 131 data, this paper does not investigate differences between data reported under FAS 131 versus FAS 14 (the preceding standard guiding segment reporting).

(*CORPEARN*), and the Gap variable mentioned above.⁴⁵ In the remainder of this section we introduce the concepts underlying our investigations and briefly summarize our results and contributions. First we discuss causes, then consequences, of incomplete disaggregation (Gaps).

3.1.1 Causes of Incomplete Allocation

One of the FASB's primary stated reasons for allowing Gaps is the difficulty of allocating some expenses and revenues to segments (FAS 131, paragraph 84). Corporate income items can be difficult to allocate to segments, in part, because they represent transitory gains or losses for which segment-level managers are not responsible.⁴⁶ When segments reflect companies' internal organizations, and when segment earnings are derived from internal performance reports, Gaps are likely to arise among companies having material amounts of income items that are generated by corporate-level decisions, and that are transitory in nature.

We identify three proxies for activities giving rise to corporate income elements that are difficult to allocate to segments. The rationales for these variables are presented in a subsequent section. One consists of intangible assets divided by total assets, *INTANG*. The second consists of a dichotomous variable, *MERGE*, representing presence or absence of merger and acquisition activity during a year. The third consists of the absolute value of transitory special income

⁴⁵ We define variables *AGGEARN* and *CORPEARN* in a subsequent section.

⁴⁶ For example, the decision to purchase another company is a strategic decision that is made by corporate-level managers. If segment-level earnings tend to reflect persistent results for which segment-level managers are responsible, transitory expenses arising from acquisitions will not be pushed down to segments.

items, divided by total assets, *SPECIAL*. We regress the dependent variable, *GAPDUM*, and its alternative, against the three proxies for difficult allocations, plus additional test and control variables. Our results indicate that all three proxies for difficult allocations are significantly associated with dependent variables. These results are consistent with a benign explanation for segment earnings Gaps: managers allocate components of corporate income to segments only when the related activities are controlled by segment-level managers, and/or the income items are persistent.

The disclosure of segment earnings information can also be affected by managers' strategic revelation decisions. Prior studies suggest that managers have motives both to reveal and to conceal segment information. One of the forces favoring concealment of segment information is to avoid the proprietary costs of providing sensitive information to competitors (Hayes and Lundholm, 1996; Harris, 1998; Botosan and Stanford, 2005). We find that a proxy for competition intensity is significantly associated with *GAP* and *ABSGAP*. The results indicate that companies operating in industries characterized by smaller numbers of powerful competitors are more likely to exhibit Gaps, and those Gaps are larger. We interpret this as an attempt by managers to conceal inherent differences in profitability across segments by failing to allocate corporate income fully. This interpretation is consistent with results presented in Ettredge et al. (2006) and Wang et al. (2009).

Managers sometimes pursue their own objectives at the expense of shareholders, thus generating agency costs. In the segment context, managers might attempt to increase operations in low profit lines of business in order to

diversify the operating risks to which they are subject, or to expand the total size of the companies they manage (Hope and Thomas, 2008). Incomplete allocation arguably serves managers' interests by concealing sensitive information from shareholders. We regress the Gap-based dependent variables against one proxy for managers' ability to engage in empire-building: free cash flow, *FREECF*. We find this proxy for agency costs is positively associated with *ABSGAP*.

We also hypothesize that managers have incentives to *reveal* inherent earnings structure to capital providers. Incentives to reveal derive from capital market (financing) incentives of reducing cost of capital. We regress the Gap variables against a measure of companies' reliance on external financing, *EXTFIN*. However, the associations between *EXTFIN* and the dependent variables are not significant.

3.1.2 Consequences of Incomplete Allocation

We investigate the usefulness of aggregated segment earnings with and without the existence of Gaps, employing subsets of the total sample for which required data are available. Our guiding insight is that aggregated segment earnings share some characteristics with non-GAAP "street" or "pro-forma" versions of corporate earnings promulgated by managers.⁴⁷ In particular, as we argue above and demonstrate subsequently, aggregated segment earnings (similar to pro-forma earnings) often exclude expenses that managers deem to be non-recurring and/or for which segment-level managers are not responsible (i.e. non-

⁴⁷ We are not aware that any published research has previously noted this similarity.

core expenses).⁴⁸ As such, aggregated segment earnings potentially possess the virtues and vices often ascribed to pro-forma earnings.⁴⁹ Managers argue that removing transitory and non-cash components of income results in a clearer view of core earnings that will persist into future periods. Critics argue that managers exclude real costs of doing business from pro-forma earnings in order to portray their companies in the best possible light.

Clearly the usefulness of pro-forma earnings to investors and others hinges on whether they are intended to inform or mislead investors. The same is true for aggregated segment earnings. Our results discussed above indicate that managers have a variety of constraints and motives when deciding whether to allocate all of corporate income to segments. Incomplete allocation could generate aggregated segment earnings that are informative and useful if it arises because managers allocate to segments only income items that are persistent and for which segment-level managers are responsible. On the other hand, incomplete allocation could reduce usefulness of aggregated segment earnings if motivated by proprietary costs and agency costs. The net effect of managers' incentives on the usefulness and informativeness of segment earnings is therefore unclear on an *ex ante* basis, and is the subject of our investigation. Our criteria for usefulness and informativeness are borrowed from studies of companies' pro-forma corporate earnings (Bhattacharya et al., 2003; and Lougee and Marquardt, 2004). They consist of the year-to-year persistence of earnings, and the strength of association

⁴⁸ We note that regulations require *both* versions of earnings be reconciled to corporate-level GAAP income measures. We discuss the FAS 131 reconciliation requirement (FASB 1997, paragraph 32.b) in a subsequent section. The SEC (2003a, paragraph II.3.b) requires that a company disclosing a non-GAAP income measure, such as corporate EBITDA, reconcile the amount disclosed to the most directly comparable corporate GAAP income measure.

⁴⁹ Bhattacharya et al. (2003), and Lougee and Marquardt (2004), provide discussions of the benefits and drawbacks of pro-forma earnings.

between earnings and market-adjusted annual buy-and-hold stock returns. We compare the persistence and informativeness of aggregated segment earnings (*AGGEARN*), versus comparable corporate income (*CORPEARN*), controlling for the existence of any Gaps (i.e. cases in which *AGGEARN* does not equal *CORPEARN*).⁵⁰ We are not aware that any published paper has investigated these issues.

To investigate persistence, we regress *AGGEARN* for period $t+1$ against *AGGEARN* for period t and several control variables. We also regress *CORPEARN* for period $t+1$ against *CORPEARN* for period t and the same control variables, using the same sample. We find that, similar to pro-forma earnings, aggregated segment earnings are more persistent than corporate income. That is, the coefficient of *AGGEARN* $_t$ is significantly positive and is greater than the coefficient of *CORPEARN* $_t$. In addition, the explanatory power of the *AGGEARN* model significantly exceeds that of the *CORPEARN* model. These results suggest that investors should find segment information incrementally useful in valuing stocks, an issue that we investigate next.

We regress companies' market-adjusted buy-and-hold annual stock returns for period t , *BHAR*, against *AGGEARN* for period t and several control variables. We also regress *BHAR* against *CORPEARN* for period t and the same control variables, using the same sample. We find that the coefficient of *AGGEARN* $_t$ is significantly positive and is greater than the coefficient of *CORPEARN* $_t$. In addition, the explanatory power of the *AGGEARN* model significantly exceeds

⁵⁰ We discuss details of the computation of the dependent and explanatory variables used for these investigations in a subsequent section.

that of the *CORPEARN* model. Similar to pro-forma income, aggregated segment income is more strongly associated with market returns than is corporate income.

The results described above are obtained without distinguishing between companies that do versus don't have Gaps. About 22 per cent of the sample companies have aggregated segment earnings that equal corporate income. Thus our results can be viewed as understated relative to companies that do have Gaps. In additional analyses we further investigate the effect of Gaps on informativeness. We regress *BHAR* against *ABSGAP*. The latter variable is coded as non-zero only for companies having differences between *AGGEARN* and *CORPEARN*. The coefficient of *ABSGAP* is positive and significant, indicating that incomplete allocation results in aggregated earnings that are more informative.

This study provides the following contributions to the segment reporting literature. It is the first study to explore the determinants of managers' decisions regarding extent of allocation of corporate income to segments. Many multi-segment companies practice full allocation – that is, aggregated segment earnings equal corporate income. The results suggest that managers balance several criteria when designing the reporting systems that generate segment earnings numbers. Managers appear to shield segment earnings from large income items that are transitory in nature, and for which segment-level managers are not responsible. Managers are less likely to fully allocate corporate income to segments if their companies are members of concentrated industries. Managers provide less disaggregation of earnings if their companies have more free cash flow.

Second, the study adds to a growing literature on managers' use of discretion in segment reporting and disclosures. A number of studies, as

mentioned previously, focus on determinants of the numbers of segments that companies disclose. In contrast, this study is one of a few documenting that managers appear to use discretion with respect to properties of segment earnings data. Prior and concurrent studies suggest that managers have competing incentives to conceal and reveal differences across segments in profit rates and profit growth (Ettredge et al., 2006; Wang et al. 2009). This paper documents that some of the same incentives (proprietary costs, agency costs) appear to affect the extent of managers' allocation of corporate earnings to segments. The use of managerial discretion with respect to segment-level earnings has received little academic attention relative to corporate-level earnings management.

Third, this paper is the first to point out the similarities, for some companies, between aggregated segment earnings and “pro-forma” or “street” versions of earnings promulgated by managers. Similar to pro-forma earnings, aggregated earnings (especially those characterized by Gaps) are more persistent than corporate earnings, and are more strongly associated with concurrent long-window stock returns. These results demonstrate the usefulness to investors of aggregated segment earnings, especially when certain corporate income items are not pushed down to the segment level. Interestingly, aggregated segment earnings are more informative than corporate income. One interpretation is that managers use their discretion in allocating corporate income to segments, via the design of internal segment reporting systems, so as to (on average) provide information that is more useful to investors.

The remainder of the paper is organized as follows. Section 2 introduces the background and related provisions of FAS 131. Section 3 develops our

hypotheses in the context of prior literature, explains the models and variable specifications together with the sample and data. Section 4 discusses the results. Section 5 summarizes and concludes.

3.2 Background

3.2.1 FAS 131 Segment Income Disclosure Requirements

In June of 1997, the FASB issued SFAS No. 131, *Disclosures about Segments on Enterprise and Related Information*. The purpose of FAS 131 is to help users of financial statements better understand companies' performance, better assess prospects for future cash flows, and make more informed judgments about the entities as a whole. FAS 131 employs a "management approach" that requires companies to define business segments that correspond to the way the business is managed. The guiding concept for business segment information to be disclosed is that it should be the same as the information reviewed by a company's chief operating decision maker to evaluate segment performance and to decide how to allocate resources to segments.

The FAS 131 requirements for disclosing segment income are minimal. The standard states (paragraph 27): "An enterprise shall report a measure of profit or loss and total assets for each reportable segment." FAS 131 (paragraph 29) does not require a company to allocate revenues and expenses to a segment unless those revenues and expenses are included in internal reports used to evaluate segment performance. For example, a company need not allocate corporate interest expense to its segments for FAS 131 disclosure if internal segment income reports do not include allocated interest expense. As a consequence, multi-

segment companies report corporate earnings in accordance with GAAP, but typically report measures of earnings for their business segments that would not be in accordance with GAAP if applied to corporate income as a whole. Even if revenues and expenses are included in internal reports, only a subset of such revenues and expenses need be disclosed (paragraph 27, items a through j). As a result, many multi-segment companies provide segment earnings reports that are very brief. For example, it is common to see reports containing only two lines: segment revenues and segment profit or loss.

Based on our examination of numerous companies' segment reporting footnote data, segment profit or loss numbers most often are labeled as "operating profit". This term also is used in coding segment profit or loss in the Compustat Segment File. There is no official GAAP definition of operating income or operating profit. Standard & Poor's (2002) proposes a standard measure of corporate-level operating profit that it refers to as "core earnings". Standard & Poor's states (2002, 5): "Core Earnings focus on a company's ongoing operations. They should include all the revenues and costs associated with those operations and exclude revenues and costs that arise in other parts of the business." Items that reflect ongoing operations include employee compensation, costs of supplies and materials, and depreciation. Items specifically excluded from core earnings tend to be highly transitory (gains/losses of various types) and mostly derive from activities that are the responsibility of corporate-level rather than segment-level managers.

FAS 131 (paragraph 32.b) requires a company to provide a reconciliation of its reportable segments' measures of profit or loss to the company's

consolidated income before income taxes, extraordinary items, discontinued operations, and the cumulative effect of changes in accounting principles.⁵¹ We refer to differences between summed segment earnings and consolidated incomes as Gaps. If segment earnings tend to reflect an operating profit concept, we expect that the items excluded by Standard & Poor's, and mentioned above, are likely to appear in the Gap reconciliation schedules disclosed by multi-segment companies.

3.2.2 The FAS 131 Gap Controversy

The FASB's decision in FAS 131 to allow income Gaps has been controversial. The controversy is evident in letters sent to the FASB in response to its call for comments on an exposure draft, issued in 1996, that preceded FAS 131. In general, financial statement users opposed allowing companies to report non-GAAP segment income numbers (Ettredge et al. 2002). The Robert Morris Associates, an association of bank loan and credit officers (i.e. financial statement users) said, in a response letter to the FASB's exposure draft (dated May 20, 1996): "On the basis of costs versus benefits, there is substantial overall savings to be achieved if the allocation [of costs to segments] is done once by those who are in the best position to do it sensibly (management) rather than by dozens or more of individual analysts..." This group of users argued that if managers do not push corporate expenses down to segments, then financial statement users will attempt

⁵¹ Managers have some leeway in choosing the version of consolidated income to which segment earnings are reconciled. FAS 131 (paragraph 32.b) states: "however, if an enterprise allocates items such as income taxes and extraordinary items to segments, the enterprise may choose to reconcile the total of the segments' measures of profit or loss to consolidated income after those items."

to do so, but with less information. FASB member James Leisenring also opposed the Gap provision. In explaining his dissent, the FASB states (FAS 131, p. 16):

By not defining segment profit or loss, this Statement allows any measure of performance to be displayed as segment profit or loss as long as that measure is reviewed by the chief operating decision maker. Items of revenue and expense directly attributable to a given segment need not be included in the reported operating results of that segment ... As a consequence, an item that results directly from one segment's activities can be excluded from that segment's profit or loss.

The Gap provision of FAS 131 arguably provides managers with considerable freedom to design segment income reporting systems that will routinely conceal differences in profitability across segments. The FASB majority, however, stated (FAS 131, paragraph 89) that "it believes that many items of revenue or expense clearly relate to a particular segment and that it would be unlikely that the information used by management would omit those items."

Some of those opposed to the FAS 131 Gap provision nevertheless made statements suggesting that Gaps reflect legitimate internal reporting decisions rather than managerial manipulation. Price Waterhouse LLP (letter dated June 28, 1996) noted that "Frequently amounts are included in internal reporting systems to affect the behavior of managers to meet corporate objectives or concerns. For example, certain capital expenditures may be charged to expense for internal reporting purposes to encourage business units to minimize investments in long-term assets..." Anheuser-Busch stated (letter dated June 26, 1996): "Internal pricing practices and cost allocation procedures often reflect genuine internal corporate issues that are either proprietary or would be misleading for external financial reporting purpose..." [emphasis in original]. These arguments suggest

that Gaps could be beneficial in the sense that, although potentially confusing to users, they result from internal income measures that encourage segment-level managers to take actions that increase the value of the company as a whole.

3.3 Hypotheses and Models

In the foregoing sections we argue that managers are likely to consider a variety of factors when developing internal reports that will provide the basis for segment information that must be disclosed. In particular, the decision whether to fully allocate corporate income items to the various segments should reflect several specific influences. In this section we state these expectations as hypotheses and specify the variables and models used to test them.

3.3.1 Hypotheses and Test Variables Related to Causes of Gaps

Our first hypothesis (stated in alternate form) is:

H1: The existence and size of a Gap are associated with activities giving rise to corporate income items that are difficult to allocate.

In justifying Gaps allowed under FAS 131 the FASB argues (paragraph 84) that some GAAP principles are not intended to apply at the segment level. In addition there are no GAAP principles guiding allocations of joint costs. Therefore it is plausible that Gaps arise from activities generating corporate income items that are difficult to allocate. We attempt to gain a greater understanding of income items that are not allocated by considering the likely characteristics of segment income measures that are used to motivate and reward segment-level managers. We expect that segment-level earnings will be shielded from income items that are

purely transitory, and that are beyond the control of segment-level managers. Excluding transitory income items protects segment-level managers from risk. Excluding income items for which they are not responsible results in earnings that segment-level managers can view as fair measures of their own units' performance.⁵²

We argue that segment-level earnings are likely to resemble corporate-level "street", "core", or "pro-forma" earnings.⁵³ Prior literature (Bradshaw and Sloan 2002; Bhattacharya et al. 2003; Doyle et al. 2003; Lougee and Marquardt 2004) suggests that corporate-level managers tend to exclude certain items from their preferred, pro-forma measures of earnings. Income items commonly excluded are restructuring costs, the amortization of goodwill, and merger and acquisition costs, among others. We note that, consistent with our theory, these excluded items are transitory (restructuring costs) or arise from corporate-level decisions (mergers and acquisitions giving rise to goodwill). Standard & Poor's (2002) promotes a definition of corporate "core earnings" that excludes goodwill impairment charges, gains/losses from asset sales, pension gains, unrealized gains/losses from hedging activities, merger and acquisition expenses, litigation or insurance settlements and proceeds. We note that the excluded items tend to be highly transitory (gains/losses of various types) and mostly derive from activities that are the responsibility of corporate-level rather than segment-level managers.

⁵² We note that the FASB's examples of income items that are difficult to allocate (FAS 131, paragraph 84) tend to arise from decisions made at the corporate versus segment level (i.e. acquisition costs, costs of enterprise-wide employee benefit plans, costs of income taxes if consolidated tax returns are prepared).

⁵³ We speculate that pro-forma earnings often are generated by aggregating segment earnings that exclude these same items.

We operationalize the above concepts using three explanatory variables. The first is intangibles intensity (*INTANG*). Prior research (Francis and Schipper 1999; Lev and Zarowin 1999; Collins et al. 1997) indicates that earnings tend to be less informative for high-technology firms because these firms invest heavily in intangibles such as research and development, which can distort GAAP income. As a result, managers in companies with high intangibles intensity are more likely to promulgate pro forma income numbers than other firms (Lougee and Marquardt 2004). In addition, intangibles often arise as a result of decisions made at the corporate level rather than the segment level. We expect that companies with high intangibles intensity have a greater tendency to measure segment earnings differently than corporate GAAP income. We define *INTANG* as intangible assets (Compustat annual data item #33) scaled by total assets at the end of the fiscal year.

Our second test variable reflects merger and acquisition activities (*MERGE*). Companies engaged in merger or acquisition activities incur costs that are difficult to allocate to individual segments because they are not the responsibility of segment-level managers, and because these events are non-recurring in nature.⁵⁴ Therefore merger or acquisition activities are likely to give rise to Gaps. *MERGE* is coded one if a company experienced merger or acquisition activity in a year (i.e. Compustat AFTNT #1 is not missing), and is coded zero otherwise.

⁵⁴ The FASB (FAS 131, paragraph 84) asserts that acquisitions using the purchase method of accounting generate assets and liabilities that are difficult to allocate to segments. We expect that costs arising from such activity also are difficult to allocate.

Our third test variable consists of special or unusual income items (*SPECIAL*). Unusual items largely consist of asset write-offs, although some result in gains rather than losses. Special income items are transitory and may obscure the information contained in reported earnings numbers (Elliott and Hanna 1996). Bradshaw and Sloan (2002) document that analysts focus on earnings that exclude non-recurring items, and that stock price has a stronger association with these earnings numbers rather than the numbers reported under GAAP. Lougee and Marquardt (2004) show that the amount of special items is positively associated with managers' promulgation of pro forma earnings. In our context, we expect that segment earnings are likely measured to exclude special items, thus generating Gaps between corporate income and aggregated segment earnings. *SPECIAL* is defined as the absolute value of special items (Compustat annual data item #17), scaled by total assets at the end of fiscal year.

Our second hypothesis (stated in alternate form) is:

H2: The existence and size of a Gap are associated with managers' incentives to conceal or reveal differences in segment performance to competitors, shareholders, and other suppliers of external capital.

Prior research provides some evidence that managers of companies facing high proprietary costs tend to implement segment reporting standards in ways that conceal some segment information. Managers appear to believe that a company's competitors can use information about the profitability and growth of its segments, together with other information, to make strategic decisions about which product markets to enter, diminishing the company's future profitability. Most such studies focus on the ways in which companies are disaggregated into segments.

Harris (1998) uses a pre-FAS 131 sample of multiple segment firms to show that operations in less competitive (high proprietary cost) industries are less likely to be reported as industry segments. Botosan and Stanford (2005), and Berger and Hann (2007), study segments that are newly revealed, under FAS 131, by former single segment companies, and find results consistent with Harris (1998). The newly revealed segments tend to operate in industries that are less competitive (with higher proprietary costs) than their companies' primary industries. One prior study focuses on the implications of proprietary costs for revelation of cross-segment differences in profitability (segment return on sales). Ettredge et al. (2006) find that two measures of proprietary costs are negatively associated with revealed cross-segment differences in segment profit rates, both before and after adoption of FAS 131.

We expect that managers of companies operating in more highly concentrated industries will design segment reporting systems that reveal less about differences across segments in performance. In this scenario, managers design segment reporting systems that fail to allocate some elements of corporate income to segments, not because allocation is too difficult, but because allocation is too revealing. By excluding from segment earnings some income items that could easily be identified as resulting from the activities of specific segments, managers can conceal differences in segment performance.⁵⁵ We use the Herfindahl Index (*HERF*) to measure the level of concentration in an industry.

⁵⁵ Alternatively segment reporting systems allocate corporate income items to specific segments that do not reflect the performance of those segments. The impact of this approach on existence of Gaps is less clear. The tradeoff under both approaches is that such practices reduce the usefulness of segment earnings for internal reviews of segment performance.

Higher values of *HERF* represent higher industry concentration and greater proprietary costs. *HERF* is calculated as follows:

$$HERF_j = \sum_{i=1}^n \left(\frac{sales_{ij}}{Sales_j} \right)^2 \quad (1)$$

where $sales_{ij}$ is company i 's sales (including single-segment companies and multi-segment companies) in industry j , as defined by two-digit SIC codes. $Sales_j$ is the sum of sales for all companies in industry j . n is the number of companies in industry j . Higher levels of *HERF* represent greater proprietary costs. We expect *HERF* to be positively associated with existence of Gaps.

Managers arguably desire to engage in 'empire building' that benefits themselves to the detriment of investors. Excessive investment in pursuit of growth potentially provides managers with greater prestige, job security, and compensation (Jensen 1986). Investors and directors use financial accounting information to monitor managers and reduce agency costs (Bushman and Smith 2001; Healy and Palepu 2001). This provides managers of multi-segment firms with incentives to engage in 'strategic' reporting that limits the monitoring usefulness of segment information. Berger and Hann (2007) provide evidence that, prior to FAS 131, companies having greater agency costs suppressed information about investments in less-profitable segments. Hope and Thomas (2008) find that firms that stop disclosing geographic area earnings, when adopting FAS 131, subsequently experience empire building in the form of greater expansion of foreign sales accompanied by lower foreign profit margins. They argue that these results are consistent with an agency cost hypothesis.

Managers who are engaged in empire building will be more reluctant to reveal differences in profitability across segments. Again, by excluding from segment earnings some income items that could easily be identified as resulting from the activities of specific segments, managers can conceal differences in segment performance. Our proxy for opportunity to engage in empire building is a measure of free cash flow (Jensen 1986; Shleifer and Vishny 1997; Richardson 2006). Variable *FREECF* is defined as operating cash flow minus cash dividends and capital expenditures, scaled by total assets. We expect *FREECF* to be positively associated with Gaps.

Segment-level data are important in valuing multi-segment firms. Chen and Zhang (2003) provide an analytical model that indicates that segment-level information about both profitability and growth is value-relevant, when profitability and/or growth rates differ across segments. Hirshleifer and Teoh (2003) provide an analytical model indicating conditions under which the market value of a firm is lower if it discloses only one rather than multiple segments. The potential opportunity to increase a company's stock price, by revealing inherent variability in profitability and earnings growth rates across segments, provides managers with a motive to reveal such variability. Ettredge et al. (2006) show that companies having a greater need for external financing report greater variability in segment profit rates. Our proxy for financing incentives to reveal is a measure of external financing requirements (Bradshaw et al. 2006). Variable *EXTFIN* is equal to external equity financing plus debt financing in the subsequent year. Equity financing equals the proceeds of sales of common stock and preferred stock, less cash dividends. Debt financing equals long-term debt proceeds, less long-term

debt reduction and net change in current debt. We expect that greater external financing need is negatively associated with Gaps.

3.3.2 Hypotheses and Test Variables Related to Consequences of Gaps

Our third hypothesis (in alternate form) is:

H3: Aggregated segment earnings are more persistent than comparable corporate income.

We argue that aggregated segment earnings share some characteristics with pro-forma earnings. In particular, aggregated segment earnings appear to exclude many transitory income components, similar to pro-forma income. Given that aggregated segment earnings are built up from internal profit reports that already exclude transitory items, it seems quite possible that aggregated segment earnings provide a starting point for managers who are developing pro-forma earnings for disclosure.⁵⁶ At its best, pro-forma income represents management's view of sustainable performance. Bhattacharya et al. (2003) show that pro forma earnings are more permanent than GAAP operating earnings. We expect that aggregated earnings, similar to pro-forma income, will exhibit more persistence than GAAP continuing income. Persistence for *AGGEARN* is captured by the association between its value in year $t+1$ and its value in the prior year, t . Persistence for *CORPEARN* is measured similarly with respect to that variable.

Our final hypothesis (stated in alternate form) is:

⁵⁶ One major difference between aggregated earnings (given Gaps) and pro-forma corporate income, is that pro-forma income is more likely to include some persistent corporate-level income items that are difficult to allocate to segments (i.e. corporate overhead).

H4: Aggregated segment earnings are more strongly associated with concurrent stock returns than is comparable corporate income.

Prior literature documents that the value relevance of earnings decreases with increased reporting of losses, one-time or special items, and with the increased importance of unreported intangible assets (Collins et al., 1997; Lev and Zarowin, 1999). Research on pro-forma earnings suggests that they are generally more highly associated with abnormal stock returns than is GAAP operating income. Bradshaw and Sloan (2002) and Brown and Sivakumar (2003) find that I/B/E/S actual earnings are of higher quality than GAAP earnings in terms of predictive ability, value relevance, and information content. Bhattacharya et al. (2003) report evidence that investors view pro-forma earnings as more informative than GAAP earnings. Lougee and Marquardt (2004) show that investors find pro forma earnings to be more useful when GAAP earnings informativeness is low. If aggregated segment earnings are similar to pro-forma earnings, in that they are more persistent than GAAP earnings (i.e. if the data support H3), we expect aggregated segment earnings to be more strongly associated with concurrent stock returns.

To test H4 we use *AGGEARN* and *CORPEARN* to explain the following dependent variable. To compare the contemporaneous association of stock returns with consolidated corporate earnings and with aggregated segment earnings, we regress the earnings variables and controls on long-window buy-and-hold abnormal returns (*BHAR*).⁵⁷ *BHAR* is the one-year buy-and-hold return adjusted

⁵⁷ The results using one-year cumulative abnormal return are very similar to those of one-year buy-and-hold abnormal return.

for the CRSP value-weighted index over the period beginning three months following the end of fiscal year $t-1$ and ending three months after fiscal year t .

3.3.3 Models

3.3.3.1 Models for tests of H1 and H2

Before introducing the models for tests of H1 and H2 we define the Gap-related variables. *AGGEARN* for year t is the sum of a company's segment earnings numbers for that fiscal year, scaled by market value of equity at the beginning of the fiscal year.⁵⁸ As stated previously, examination of segment footnote data indicates that companies most often label their segment earnings as "operating profit or loss". FAS 131 (paragraph 32.b) generally requires companies to reconcile aggregated segment earnings to consolidated income before income taxes, extraordinary items, discontinued operations, and the cumulative effect of changes in accounting principles.⁵⁹ Compustat does not provide an earnings data item that exactly corresponds to this definition. We compare the amounts of

⁵⁸ When summing segment earnings, we exclude earnings from segments having names that include the following phrases: 'elimin', 'acquire', 'adjustment', 'restruct', 'acquisition', 'reconcil', 'corporate' and 'other'. Examination of numerous segment footnotes indicates that such segments are not operating business segments. Rather some companies use them as a way to provide the required reconciliation of segment earnings to corporate earnings. We compare the segment footnote data in numerous Form 10-K filings with data in the Compustat Segment File, and find that Compustat is inconsistent in treating segments having the above labels. For example, Compustat sometimes treats a 'corporate' segment similar to operating business segments, and sometimes does not. The same is true for segments having the other labels above. Thus, deleting these components has two advantages. First, it eliminates the coding inconsistency found in the Compustat Segment File. Second, it excludes income components from aggregate segment earnings that companies have not actually allocated to operating business segments.

⁵⁹ Under FAS 131, companies provide reconciliation schedules that indicate the items included in corporate income that have not been allocated to its segments. We choose not to derive our proxies for income items that are difficult to allocate from these schedules. One reason for this decision is that reading and interpreting thousands of such schedules requires too much effort relative to the benefit. The benefit is low because the schedules are not very comparable across companies due, for example, to differences in terminology. In addition, the result of such an exercise would be descriptive in nature. We prefer to investigate the explanatory power of variables chosen on an *ex ante* basis.

various Compustat annual earnings items to the amounts of consolidated income that a number of sample companies use in their reconciliation schedules. We find that the consolidated income amounts in reconciliation schedules correspond most closely to Compustat's "operating income after depreciation" (annual data item #178). We compute *CORPEARN* as this data item scaled by market value of equity at the beginning of the fiscal year. Variable *GAPDUM* is coded as one if *CORPEARN* does not equal *AGGEARN*, and as zero if the two are equal. Variable *GAPDUM* does not make use of information about the magnitudes of Gaps, so we employ a second variable, *ABSGAP*. *ABSGAP* equals the absolute value of *CORPEARN* minus *AGGEARN*.⁶⁰

To test H1 and H2, we use the following regressions:

$$\begin{aligned} \text{GAPDUM or ABSGAP} = & b_0 + b_1\text{INTANG} + b_2\text{MERGE} + b_3\text{SPECIAL} + \\ & b_4\text{HERF} + b_5\text{FREECF} + b_6\text{EXTFIN} + b_7\text{LNMV} + b_8\text{NSEG} + b_9\text{BTM} + \\ & b_{10}\text{LOSS} + b_{11}\text{LEV} + b_{12}\text{SGROWTH}. \end{aligned} \quad (2)$$

Variables *INTANG*, *MERGE*, and *SPECIAL* proxy for activities giving rise to corporate income items that are difficult to allocate to segments. Under H1 we expect all three variables to have positive coefficients using either dependent variable. *HERF* proxies for proprietary costs of revealing information; *FREECF* represents agency costs of revealing information; and *EXTFIN* proxies for external financing benefits of revealing information. Under H2 we expect the first two to have positive coefficients, and the third to have a negative coefficient.

⁶⁰ *ABSGAP* has the disadvantage of an awkward distribution for use with OLS: skewed to the right, and with a large cluster of observations at *ABSGAP* equal to zero. Therefore we retain *GAPDUM* as an alternative dependent variable, and use logit estimation with the resulting model.

We add control variables for other firm characteristics that are known to influence disclosure choices and that may be associated with *GAPDUM* and *ABSGAP*. Large and complex companies are likely to have more and larger income items that are difficult to allocate, and arguably have greater discretion to reveal or conceal segment information. We expect positive coefficients on the log of market capitalization (*LNMV*) and on the number of segments (*NSEG*). The book-to-market ratio (*BTM*) or its inverse is used in studies to proxy for various constructs including growth opportunities, conservative income recognition, and risk. We do not specify an expected sign for its coefficient. A dichotomous loss variable is coded as one if a company reports negative income for a year (*LOSS*) and zero otherwise. Managers of loss companies have a tendency to boost earnings by excluding more expenses or costs (Doyle et al. 2003). We expect *LOSS* to have a positive coefficient. The liability to asset ratio (*LEV*) represents financial leverage. We employ it without specifying an expected sign. Lastly, we control for companies' sales growth (*SGROWTH*), but do not have an expected sign.

3.3.3.2 Models for tests of H3

We next examine whether *AGGEARN* is more persistent than *CORPEARN*. We regress an earnings measure (*AGGEARN* or *CORPEARN*) for year *t* on the same earnings measure for the next fiscal year. A stronger cross-temporal association for *AGGEARN* than for *CORPEARN* would support H3, and suggest that aggregated segment earnings are more permanent than consolidated operating earnings. The model is:

$$AGGEARN_{t+1} \text{ or } CORPEARN_{t+1} = b_0 + b_1AGGEARN_t \text{ or } CORPEARN_t + b_2LOSS + b_3LNMV + b_4BTM + b_5SGROWTH. \quad (3)$$

We control for loss (*LOSS*), size (*LNMV*), growth opportunity (*BTM*) and growth rate (*SGROWTH*) based on prior literature on the factors influencing earnings persistence (Baginski et al., 1999; Lev, 1983). We expect *LOSS* in period *t* to be negatively associated with both measures of earnings in period *t+1*. Bathke et al. (1989) find a positive association between firm size and earnings autocorrelation. We expect *LNMV* is positively associated with dependent variable. We do not specify expected signs for *BTM* and *SGROWTH*.⁶¹

3.3.3.3 Models for tests of H4

The models for testing H4 are:

$$BHAR = b_0 + b_1AGGEARN \text{ or } CORPEARN + b_2LNMV + b_3BTM + b_4LEV. \quad (4)$$

We expect that *AGGEARN* has a higher association with *BHAR* than does *CORPEARN*. In addition, we control for several variables that are associated with stock returns based on previous studies of the determinants of the earnings response coefficients (ERCs). Results concerning the effect of firm size on ERCs are conflicting. Lipe (1990) finds size to be marginally significant. However, Easton and Zmijewski (1989) find firm size to be generally unimportant in determining ERCs. Collins and Kothari (1989) report that growth opportunities and firm risk affect ERCs. Therefore, we include *LNMV*, *BTM* and *LEV* as

⁶¹ Deleting control variables from the models does not change the results.

controls in the model without specifying expected signs of association.⁶² Control variables are defined the same way as they are in models (2) and/or (3).

3.4 Results

Our sample begins with 70,770 observations covered in Compustat Segment File from year 1998 to 2006. We delete 43,667 observations for single-segment companies, and 3,528 observations for companies operating in financial industries. To avoid coding errors, we also eliminate companies having consolidated sales revenues not equal to aggregated segment sales.⁶³ There are 12,064 observations with all financial data available, which constitute the sample for testing H1 and H2. Since H4 require stock return data, we obtain companies' stock return data from CRSP. The process reduces our sample size to 6,546. The detailed sample selection process is reported in Table 1, Panel A. Panel B of Table 1 presents the number of observations with *GAPDUM* equal to zero versus equal to one, by year. Approximately 78 percent of the sample companies have non-zero Gaps. The percentage tends to be fairly constant across years.

-----Insert Table 1 about here -----

Table 2 presents the univariate tests of differences in firm characteristics between companies with zero Gaps and companies with non-zero Gaps. We also divide companies with non-zero Gaps into two subgroups: companies with

⁶² Deleting control variables from the models does not change the results.

⁶³ We acknowledge that corporate sales and aggregated segment sales can legitimately differ under FAS 131. However, examination of segment data for a number of firms in our sample indicates that differences between GAAP sales and aggregated segment sales are frequently due to coding problems in the Compustat Segment File. We eliminate observations where differences occur to avoid erroneous measures of Gaps.

negative Gaps (*NEGGAP* = 1), meaning that corporate operating income (*CORPEARN*) is less than aggregated segment earnings, and companies with positive Gaps (*POSGAP* = 1), meaning that corporate operating income is larger than aggregated segment earnings.

The Table 2 comparisons of companies having *GAPDUM* equal to zero versus equal to one (see Difference tests for columns (a) – (b)) indicate that companies with Gaps (*GAPDUM* equal to one) have significantly more intangible assets (*INTANG*), are more likely to engage in merger or acquisition activities (*MERGE*), compared to companies having no Gaps. These univariate results support H1. However, the amounts of special items for two groups are not consistent with our expectation. Compared with companies with no Gaps, the Gap companies operate in more concentrated industries (*HERF*), have more free cash flow (*FREECF*) and have less demand for external financing (*EXTFIN*). These results support H2. Companies with Gaps are larger (*LNMV*), have more segments (*NSEG*), have lower book-to-market ratios (*BTM*), are more profitable (less *LOSS*), and have lower growth rates (*SGROWTH*). The difference in leverage (*LEV*) is not significant between two groups.

-----Insert Table 2 about here -----

The comparisons of companies having negative Gaps, or positive Gaps, with zero Gap companies, are similar to the comparisons between companies with versus without any Gaps (see the right-most two Differences columns in Table 2). The only difference is that companies with positive Gaps do not have greater amounts of special items, compared to companies having no Gaps. Given the similarities between companies having positive versus negative Gaps, we do not

preserve this distinction in subsequent analyses.⁶⁴ Instead we employ the *GAPDUM* variable, and use an additional variable capturing the absolute value of Gap, *ABSGAP*.

Table 3 reports the logistic regression results for factors explaining *GAPDUM* in columns under heading (a). This is one of our primary tests of H1 and H2. Consistent with H1, merger or acquisition activity, and the amount of special items, are positively associated with *GAPDUM*. Industry concentration is also positively associated with *GAPDUM*, which supports H2. However, intangible assets, free cash flow, and external financing needs are not significant in the regression. Among control variables, *GAPDUM* is positively associated with *LNMV*, *NSEG*, *BTM* and *LOSS*. It is negatively associated with *SGROWTH*.

As an alternative test of H1 and H2, we estimate the model under heading (b) using OLS, with *ABSGAP* as dependent variable. Consistent with H1, intangible assets and special income items are positively associated with *ABSGAP*. Industry concentration and free cash flow also are positively associated with *ABSGAP*, both of which support H2. Merger and acquisition activity loses significance, and external financing is again not significant. Results for control variables are similar to those in columns headed (a) with the following exceptions. Financial leverage gains significance, and sales growth loses significance. The coefficient of size (*LNMV*) remains significant but changes sign.⁶⁵

⁶⁴ Untabulated results show that *NEGGAP* has significant positive associations with *INTANG*, *MERGE*, *SPECIAL* and *HERF*, and a negative association with *EXTFIN*. *POSGAP* is positively associated with *MERGE*, *SPECIAL*, *HERF* and *FREECF*, but negatively associated with *INTANG* and *EXTFIN*.

⁶⁵ The combined results for *LNMV* tell the following story. Larger companies are more likely to have Gaps (result under (a)). The absolute value of those Gaps, relative to market capital, are smaller for larger companies (result under (b)).

In summary, the results in Table 3 support both H1 and H2. The strongest support is offered by variables that are significant in both models. Those results indicate that the existence and amounts of Gaps between corporate earnings and aggregated segment earnings are most strongly associated with special (unusual) income items, and with membership in highly concentrated industries. The evidence supporting the roles of intangible assets, and merger and acquisition activities, is not as strong.

-----Insert Table 3 about here -----

Table 4 presents the results of tests of H3, which asserts that *AGGEARN* is more persistent than *CORPEARN*. Panel A provides descriptive statistics for model variables. Panel B presents regression results. The left side of the table reports results bearing on the persistence of aggregated segment earnings. The dependent variable is *AGGEARN* of the subsequent fiscal year ($AGGEARN_{t+1}$). The right side of the table reports results bearing on the persistence of consolidated corporate earnings. The dependent variable is *CORPEARN* of the subsequent fiscal year ($CORPEARN_{t+1}$). Both regressions employ the same sample and the same control variables. Thus any differences between the two regressions are due to the relative strength of association between the lagged values of *AGGEARN* versus *CORPEARN*. The coefficient of *AGGEARN* is 0.522, which is greater than the coefficient of *CORPEARN*, 0.514. However, the difference between the two coefficients is insignificant (p-value =0.316). The adjusted R-squares for the *AGGEARN* and *CORPEARN* models are 0.392 and 0.388, respectively. The p-value of a Vuong test of difference in explanatory power (R-square) between the two models is 0.000. On balance the results

indicate that *AGGEARN* is more persistent than *CORPEARN*, providing some support for H3.⁶⁶ As for control variables, *LOSS* and *SGROWTH* are negatively associated with both dependent variables, and *LNMV* and *BTM* are positively associated with the dependent variables.

-----Insert Table 4 about here -----

Panel A of Table 5 presents the results of tests of informativeness of corporate GAAP earnings and aggregated segment earnings. The dependent variable in both models is market-adjusted buy-and-hold annual return (*BHAR*). The two models employ the same sample, and the same dependent and control variables. Any difference between models should reflect the differing explanatory power of the two test variables. The coefficient of *AGGEARN* under heading (a) is 0.777, and is larger than the coefficient of *CORPEARN*, 0.659, under heading (b). The difference between the two coefficients is significant with p-value 0.097. The model adjusted R-square with *AGGEARN* as test variable is 0.046, which also exceeds the adjusted R-square when *CORPEARN* is the test variable, 0.037. The Vuong test of the difference in explanatory power of the two models has a p-value of 0.009. The results support H4, indicating that the contemporary association between stock returns and aggregated segment earnings is stronger than the association between stock returns and consolidated corporate earnings.⁶⁷ For control variables, coefficients of *LNMV* and *BTM* are significant and negative, but the coefficient of *LEV* is not significant in either model.

⁶⁶ When interpreting the Table 4 results, keep in mind that *CORPEARN* equals *AGGEARN* for a large minority of the sample. If we estimate the models using only companies for which a Gap exists, the results indicate substantially greater persistence of *AGGEARN* than those shown in Table 4.

⁶⁷ As with Table 4, keep in mind that *CORPEARN* equals *AGGEARN* for a large minority of the sample. If we estimate the models using only companies for which a Gap exists, the results indicate substantially greater association of *AGGEARN* with stock returns than shown in Table 5.

-----Insert Table 5 about here -----

Panel B of Table 5 investigates whether Gaps *per se* have information content in a regression that does not include either *AGGEARN* or *CORPEARN*. We regress *BHAR* against *ABSGAP* and the control variables. Results indicate that the unsigned difference between *AGGEARN* and *CORPEARN* is positively and significantly associated with annual returns.

3.5 Conclusions

A controversial aspect of FAS 131 arises from its provision allowing companies to measure segment earnings differently than is required for the consolidated reporting entity. Opponents of this provision of FAS 131 argue that it provides managers with leeway to manipulate earnings information at the segment level by not allocating certain expenses or revenues to individual segments. However, proponents of this provision of FAS 131 believe that the allocation or non-allocation of expenses or revenues reflects legitimate internal reporting decisions and provides financial statement users with a fair view of segment performance. This study focuses on the difference between summed segment earnings and corporate-level earnings (i.e. the Gap), which results from different measurement methods for segment earnings versus corporate earnings. We examine the determinants of Gaps, and also investigate whether aggregated segment earnings are more persistent and informative compared to corporate earnings, given the existence of Gaps.

Using a sample of multi-segment companies, and data from 1998 to 2006, we find that approximately 78 percent of firm-year observations have Gaps.

Among all the observations with Gaps, about 73 percent of observations have summed segment earnings larger than comparable corporate earnings, indicating that most companies tends to incompletely allocate expenses or costs to segment earnings.

We hypothesize that the existence of a Gap is determined by two set of factors: the difficulty of allocating transitory items for which segment-level managers are not responsible, and management discretionary disclosure behaviors. As expected, we find that the existence and the magnitudes of Gaps are positively associated with proxies for income items that are difficult to allocate: the amounts of corporate intangibles, merger or acquisition activities, and special or unusual income items. These results suggest that segment-level earnings under FAS 131 shield segment-level managers from risk (transitory income items), and from income items arising from decisions not made at the segment level. We also find evidence that corporate-level managers facing high proprietary costs and agency costs tend to disclose more and larger Gaps. Specifically, we find that industry concentration and free cash flow have positive associations with the existence and the magnitudes of Gaps, consistent with the concerns of the opponents of FAS 131's Gap provision.

To investigate the consequences of Gaps, we investigate the persistence and informativeness of summed segment earnings relative to corporate earnings, given the existence of Gaps. We argue that aggregated segment-level earnings are likely to resemble corporate-level "street", "core", or "pro-forma" earnings that exclude certain transitory or non-recurring items. Prior literature finds that pro-forma earnings are more persistent and informative than GAAP earnings

(Bradshaw and Sloan 2002; Bhattacharya et al. 2003; Lougee and Marquardt 2004). Our results show that summed segment income is more persistent, in terms of its association with future summed segment earnings, compared to the association of GAAP corporate earnings with future corporate earnings. Summed segment earnings also are more informative in terms of its association with concurrent stock returns than are corporate earnings. These results primarily are due to the existence of Gaps.

This paper raises issues for future research. If aggregated segment earnings are derived from internal reporting systems, the existence and amounts of Gaps should not reflect short-term situational factors, such as whether the company's corporate income appears likely to fall short of analysts' forecasts in a particular quarter. Our data indicate that the per cent of companies utilizing complete allocation is fairly consistent from year to year in our sample period, averaging about 22 percent. However, these consistent percentages raise a question. When managers of such companies manipulate corporate-level income, in response to certain external pressures, do they push the discretionary components of earnings down to the segment level? If so, how is this accomplished? When managers of the 78 percent of companies exhibiting Gaps manipulate corporate-level income, do they push the discretionary components of earnings down to the segment level, or can the discretionary components be detected in the unallocated portion of corporate income? Before such questions can be addressed, researchers need a fundamental understanding of the causes and consequences of Gaps, which we attempt to provide in this paper.

REFERENCES

- Baginski, S. P., K. S. Lorek, B. L. Willinger and B.C. Branson. 1999. The relation between economic characteristics and alternative annual earnings persistence measures. *The Accounting Review* 74 (1): 105-120.
- Bathke, A. W., K. Lorek, and G. L. Willinger. 1989. Firm size and the predictive ability of quarterly earnings data. *The Accounting Review* 64 (1): 49-68.
- Berger, P. G. and R. Hann. 2003. The impact of SFAS No. 131 on information and monitoring. *Journal of Accounting Research* 41 (2): 163-223.
- Berger, P. G. and R. Hann. 2007. Segment profitability and the proprietary and agency costs of disclosure. *The Accounting Review* 82 (4): 869-906.
- Bhattacharya, N., E. Black, T. Christensen, and C. Larson. 2003. Assessing the relative informativeness and permanence of pro forma earnings and GAAP operating earnings. *Journal of Accounting and Economics* 36 (1-3): 285-319.
- Botosan, C.A. and M. Stanford. 2005. Managers' motives to withhold segment disclosures and the effect of SFAS No. 131 on analysts' information environment. *The Accounting Review* 80 (3): 751-771.
- Bradshaw, M., and R. Sloan. 2002. GAAP versus the street: An empirical assessment of two alternative definitions of earnings. *Journal of Accounting Research* 40 (1): 41-66.
- Bradshaw M.T., S.A. Richardson and R.G. Sloan. 2006. The relation between corporate financing activities, analysts' forecasts and stock returns. *Journal of Accounting and Economics* 42 (1-2): 53-85.
- Brown, L. and K. Sivakumar. 2003. Comparing the value relevance of two operating income measures. *Review of Accounting Studies* 8 (4): 561-572.
- Bushman, R.M. and A.J. Smith 2001. Financial accounting information and corporate governance. *Journal of Accounting and Economics* 32, 237-333.
- Chen, P.F. and G. Zhang 2003. Heterogeneous investment opportunities in multiple-segment firms and the incremental value relevance of segment accounting data. *The Accounting Review* 78, 397-428.
- Collins, D., and S. Kothari. 1989. An analysis of intertemporal and cross-sectional determinants of earnings response coefficients. *Journal of Accounting and Economics* 11 (3): 143-182.

- Collins, D., E. Maydew, and I. Weiss. 1997. Changes in the value-relevance of earnings and book values over the past forty years. *Journal of Accounting and Economics* 24 (1): 39-67.
- Doyle, J., R. Lundholm, and M. Soliman. 2003. The predictive value of expenses excluded from "pro forma" earnings. *Review of Accounting Studies* 8 (2-3): 145-174.
- Easton, P., and M. Zmijewski. 1989. Cross-sectional variation in the stock market response to accounting earnings announcements. *Journal of Accounting & Economics* 11 (July): 117-42.
- Elliott, J., and D. Hanna. 1996. Repeated accounting write-offs and the information content of earnings. *Journal of Accounting Research* 34 (supplement): 135-155.
- Ettredge, M., S.Y.Kwon and D. Smith. 2002. Competitive harm and companies' positions on SFAS No. 131. *Journal of Accounting Auditing and Finance* 17, 93-109.
- Ettredge, M., S.Y. Kwon, D. Smith and M. Stone. 2006. The effect of SFAS No. 131 on the cross-segment variability of profits reported by multiple segment firms. *Review of Accounting Studies* 11 (1): 91-117.
- Financial Accounting Standards Board (FASB). 1996. Exposure Draft: *Proposed Statement of Financial Accounting Standards: Reporting Disaggregated Information about a Business Enterprise*, Financial Accounting Series, Norwalk, CT: FASB.
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1997. *Statement of Financial Accounting Standards No. 131: Disclosures about Segments of an Enterprise and Related Information*. Norwalk, CT: FASB.
- Francis, J. and K. Schipper. 1999. Have financial statements lost their relevance? *Journal of Accounting Research* 37 (2): 319-352.
- Harris, M. S. 1998. The association between competition and managers' business segment reporting decisions. *Journal of Accounting Research* 36 (1): 111-128.
- Hayes, R. and R. Lundholm 1996. Segment reporting to the capital market in the presence of a competitor. *Journal of Accounting Research* 34, 261-279.
- Healy, P. M. and K. G. Palepu. 2001. Information asymmetry, corporate disclosure, and the capital markets: a review of the empirical disclosure literature. *Journal of Accounting and Economics* 31 (1-3): 405-440.

- Hirshleifer, D., and S. Teoh. 2003. Limited attention, financial reporting and disclosure. *Journal of Accounting and Economics* 36 (1-3): 337-386.
- Hope, O. and W.B. Thomas. 2008. Managerial empire building and firm disclosure. *Journal of Accounting Research* 46 (3): 591-636.
- Jensen, M. C. 1986. Agency cost of free cash flow, corporate finance, and takeovers. *American Economic Review* 76 (2): 323-329.
- Lev, B. 1983. Some economic determinants of time-series properties of earnings. *Journal of Accounting and Economics* 5 (2): 31-48.
- Lev, B., and P. Zarowin. 1999. The boundaries of financial reporting and how to extend them. *Journal of Accounting Research* 37 (2): 353-385.
- Lipe, R. 1990. The relation between stock returns and accounting earnings given alternative information. *The Accounting Review* 65 (1): 49-71.
- Lougee, B.A., and C.A. Marquardt. 2004. Earnings informativeness and strategic disclosure: an empirical examination of “pro forma” earnings. *The Accounting Review* 79 (3): 769-795.
- Richardson, S. 2006. Over-investment of free cash flows. *Review of Accounting Studies* 11, 159-89.
- Shleifer, A. and R. Vishny 1997. A survey of corporate governance. *Journal of Finance* 52, 737-783.
- Securities Exchange Commission. 2003a. Release No. 34-47226. Final Rule: Conditions for use of non-GAAP financial measures. <http://www.sec.gov/rules/final/33-8176.htm>.
- Securities Exchange Commission. 2003b. Frequently asked questions regarding the use of non-GAAP financial measures. <http://www.sec.gov/divisions/corpfin/faqs/nongaapfaq.htm> .
- Standard & Poor’s. 2002. *Measures of Corporate Earnings*. New York: Standard & Poor’s.
- Wang, Q., M. Ettredge, Y. Huang, and L. Sun. 2009. Strategic revelation of differences in segment earnings growth. Working paper, University of Kansas.

Table 3.1 Sample Selection and Distribution

Panel A. Sample Selection Process		Number of Observations								
Companies in Compustat Segment File from year 1998 to 2006		70,770								
Delete:										
Companies with single segment		(43,667)								
Companies operated in financial industry (SIC = 6000-6999)		(3,528)								
Companies having unequal consolidated sales and aggregation of segment sales		(3,807)								
Companies with missing financial variables		(7,704)								
Sample for H1 and H2		<u>12,064</u>								
Delete:										
Companies with missing price data in CRSP		(5,518)								
Sample for H3, H4 and H5		<u>6,546</u>								
Panel B. Sample by Year										
	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total
<i>GAPDUM</i> = 0	288 21%	389 26%	370 27%	312 24%	313 23%	292 23%	285 21%	247 19%	215 17%	2,711 22%
<i>GAPDUM</i> = 1	1,058 79%	1,088 74%	1,011 73%	1,001 76%	1,037 77%	966 77%	1,076 79%	1,079 81%	1,037 83%	9,353 78%

GAP = corporate-level operating income before depreciation minus the aggregated segment operating profit, scaled by total assets; *GAPDUM* = 1 if *GAP* is not equal to zero, 0 otherwise.

Table 3.2 Univariate Tests of Differences between Zero GAP and Non-zero GAP Samples

Variable	GAPDUM = 0		GAPDUM = 1		NEGGAP = 1		POSGAP = 1		Difference	
	(a) Mean	(b) Mean	(c) Mean	(d) Mean	(a) - (b) t-test	(c) - (d) t-test	(a) - (c) t-test	(b) - (d) t-test	(a) - (b) p-value	(c) - (d) p-value
N	2711	9353	6828	2525						
GAP	0.000	-0.043	-0.069	0.028	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
INTANG	0.129	0.160	0.168	0.140	0.000***	0.000***	0.000***	0.000***	0.000***	0.007***
MERGE	0.314	0.428	0.421	0.448	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
SPECIAL	0.025	0.022	0.020	0.028	0.031**	0.002***	0.002***	0.002***	0.031**	0.160
HERF	0.059	0.062	0.063	0.057	0.021**	0.001***	0.001***	0.001***	0.021**	0.044***
FREECF	-0.061	-0.015	-0.015	-0.015	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
EXTFIN	0.120	0.039	0.042	0.030	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
LNMV	4.621	6.299	6.230	6.485	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
NSEG	2.821	3.953	3.989	3.857	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
BTM	1.990	1.866	1.886	1.812	0.033*	0.008***	0.008***	0.008***	0.033*	0.020**
LOSS	0.368	0.275	0.271	0.285	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
LEV	0.561	0.553	0.555	0.548	0.231	0.314***	0.314***	0.231	0.231	0.202
SGROWTH	0.279	0.188	0.197	0.166	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***

NEGGAP = 1, if GAP is less than zero, 0 otherwise. POSGAP = 1, if GAP is larger than zero, 0 otherwise. INTANG = intangible assets, scaled by total assets. MERGE = 1, if the company experience merger or acquisition activities in the fiscal year, 0 otherwise. SPECIAL = absolute value of special items, scaled by total assets. HERF = Herfindahl Index, see equation (1) for definition. FREECF = operating cash flow minus cash dividends and capital expenditure, scaled by total assets. EXTFIN = external equity financing and debt financing activities in the subsequent fiscal year, scaled by total assets. Equity financing equals the proceeds of sales of common stock and preferred stock, less purchases of common stock and preferred stock and cash dividends. Debt financing equals long-term debt issuance, subtracting long-term debt reduction and change in current debt. LNMV = natural log of market value of equity. NSEG = number of operating segments. BTM = total assets divided by total market value of equity. LOSS = 1 if corporate-level operating income before extraordinary item is less than zero; 0 otherwise. LEV = total liability divided by total assets. SGROWTH = the change of sales from the previous fiscal year to current fiscal year, divided by the current sales.

P-values are one-tailed for variables with expected sign, and are two-tailed for variables with no expected sign. *, ** and *** represent the significance at 0.1, 0.05 and 0.01, respectively.

Table 3.3 Logistic Regression of Factors Associated with GAPDUM and ABSGAP

Dependent Variable = Variable	Expected Sign	GAPDUM (a)		ABSGAP (b)	
		Coeff.	p-value	Coeff.	p-value
Intercept		-2.287	0.000***	0.032	0.000***
<i>INTANG</i>	+	0.094	0.279	0.007	0.045**
<i>MERGE</i>	+	0.276	0.000***	0.001	0.265
<i>SPECIAL</i>	+	2.038	0.000***	0.061	0.000***
<i>HERF</i>	+	1.806	0.001***	0.030	0.020**
<i>FREECF</i>	+	-0.041	0.358	0.010	0.009***
<i>EXTFIN</i>	-	-0.053	0.105	0.000	0.482
<i>LNMV</i>	+	0.207	0.000***	-0.005	0.000***
<i>NSEG</i>	+	0.709	0.000***	0.005	0.000***
<i>BTM</i>	?	0.021	0.012**	0.001	0.001***
<i>LOSS</i>	+	0.160	0.007***	0.011	0.000***
<i>LEV</i>	?	0.032	0.296	0.010	0.006***
<i>SGROWTH</i>	?	-0.101	0.001***	0.000	0.377
N		12,064		12,064	
Model Chi-sq. p-value		0.000		0.000	
R-square		0.164		0.100	

The dependent variables for models (a) and (b) are *GAPDUM* and *ABSGAP*, respectively. See table 2 for variable definitions.

P-values are one-tailed for variables with expected sign, and two-tailed for variables with no expected sign. *, ** and *** represent the significance at 0.1, 0.05 and 0.01, respectively.

Standard errors are computed clustering observations by firm to mitigate the effect of cross-sectional correlation.

Table 3.4 Tests of Persistence of Summed Segment Earnings and Corporate Earnings

Panel A. Descriptive Statistics

<u>Variable</u>	<u>Mean</u>	<u>Median</u>	<u>1st Q</u>	<u>3rd Q</u>	<u>Std. Dev</u>
AGGEARN	0.113	0.104	0.048	0.168	0.167
CORPEARN	0.089	0.091	0.038	0.145	0.152
LNMV	6.443	6.487	4.955	7.936	2.100
BTM	1.586	1.111	0.653	1.869	1.787
LOSS	0.244	0.000	0.000	0.000	0.429
SGROWTH	0.160	0.087	-0.008	0.213	0.554
LEV	0.516	0.524	0.358	0.656	0.243

Panel B. Regression Results

DV = AGGEARN_{t+1}			DV = CORPEARN_{t+1}		
<u>Variable</u>	<u>Coeff.</u>	<u>p-value</u>	<u>Variable</u>	<u>Coeff.</u>	<u>p-value</u>
Intercept	0.011	0.257	Intercept	-0.006	0.548
AGGEARN _t b _{1a}	0.522	0.000***	CORPEARN _t b _{1b}	0.514	0.000***
LOSS	-0.035	0.000***	LOSS	-0.038	0.000***
LNMV	0.002	0.007***	LNMV	0.005	0.000***
BTM	0.021	0.000***	BTM	0.016	0.000***
SGROWTH	-0.010	0.002***	SGROWTH	-0.008	0.009***
Model F-stat. p-value		0.000***	Model F-stat. p-value		0.000***
R-square		0.392	R-square		0.388

Difference between models

Coefficient difference: b _{1a} vs. b _{1b}	F-test p-value	0.316
R-square difference	Vuong test p-value	0.000***

The left side of Panel B reports the persistence of aggregated segment earnings. *AGGEARN* = the summed segment operating profits, scaled by market value of equity at the beginning of the fiscal year. The dependent variable is *AGGEARN* of the subsequent fiscal year (or *AGGEARN_{t+1}*). The right side of Panel B reports the persistence of consolidated corporate earnings. *CORPEARN* = corporate-level operating income after depreciation, scaled by market value of equity at the beginning of the fiscal year. The dependent variable is *CORPEARN* of the subsequent fiscal year (or *CORPEARN_{t+1}*).

P-values are one-tailed for variables with expected sign, and are two-tailed otherwise. *, **, *** represent the significance at 0.1, 0.05 and 0.01, respectively.

Standard errors are computed clustering observations by firm to mitigate the effect of cross-sectional correlation.

Table 3.5 Tests of Informativeness of Summed Segment Earnings, Corporate Earnings, and Gaps

Panel A. AGGEARN vs. CORPEARN		DV = BHAR		DV = BHAR	
Variable		Coeff.	p-value	Coeff.	p-value
Intercept		0.396	0.000***	0.429	0.000***
AGGEARN	b _{1a}	0.777	0.000***		
CORPEARN	b _{1b}			0.659	0.000***
LNMV		-0.026	0.000***	-0.028	0.000***
BTM		-0.086	0.000***	-0.083	0.000***
LEV		-0.009	0.854	0.008	0.869
Model F-stat. p-value			0.000***		0.000***
R-square			0.046		0.037
Difference between models					
Coefficient difference: b _{1a} vs. b _{1b}			F-test p-value		0.097*
R-square difference			Vuong test p-value		0.009***
Panel B. ABSGAP					
Variable		DV = BHAR			
		Coeff.	p-value		
Intercept		0.317	0.000***		
ABSGAP		1.887	0.000***		
LNMV		-0.014	0.007***		
BTM		-0.081	0.000***		
LEV		0.030	0.283		
Model F-stat. p-value			0.000***		
R-square			0.034		

The dependent variable for both models is *BHAR*. *BHAR* = one-year buy-and-hold return, adjusted for CRSP value-weighted index over the period beginning three months following the end of fiscal year *t-1* and ending three months after fiscal year *t*. See Table 2 and Table 4 for other variables' definitions.

Standard errors are computed clustering observations by firm to mitigate the effect of cross-sectional correlation.

P-values are one-tailed for variables with expected sign, and are two-tailed otherwise. *, **, *** represent the significance at 0.1, 0.05 and 0.01, respectively.