

Do Reconciliations Of Segment Earnings Affect Stock Prices?

Dana Hollie, Louisiana State University, USA
Shaokun Carol Yu, Northern Illinois University, USA

ABSTRACT

While SFAS No. 131 is intended to increase the transparency of financial reporting using a “management approach,” it may reduce shareholders’ ability to interpret segment disclosures relative to the ‘industry approach’ employed under SFAS No.14. This study investigates whether segment reconciliation differences affect stock prices and whether abnormal returns can be earned using information about two components of earnings: aggregated segment earnings and segment earnings reconciliations. We compute reconciliations as the difference between firm-level consolidated earnings and aggregated segment-level earnings. Firms that report negative SERs have greater sales and profitability, greater return on equity, as well as more operating cash flows and firm growth. This suggests that firms that report aggregated segment earnings greater than firm-level consolidated earnings may be better off financially. Our findings show that mispricing does occur when firms report positive SERs by the market, underestimating the segment earnings reconciliation component of earnings persistence. Investors can also earn positive abnormal returns when investors take a long (short) position with the portfolio with the highest (lowest) absolute SERs. On the contrary, we find investors earn negative abnormal returns when firms report negative SERs. Collectively, this study provides evidence that mispricing occurs and that investors over/underestimate the importance and/or persistence of segment earnings reconciliations.

Keywords: SFAS No. 131; Segment Earnings Reconciliation; Segment Financial Reporting

INTRODUCTION

This study investigates whether the market accurately incorporates the pricing effects of the persistence of segment-related components of earnings: aggregated segment earnings and firm-to-segment reconcilable differences (SER). This study adds to the extant literature on the pricing of different components of earnings and the quality of financial reporting under the SFAS No. 131 segment-reporting regime. The results indicate that mispricing does occur, when firms report positive SERs, by the market underestimating SER persistence. For these same firms, investors can also earn positive abnormal returns. On the contrary, we find investors earn negative abnormal returns when firms report negative SERs. Collectively, this study provides evidence that mispricing occurs and that investors over/underestimate the importance of SERs.

In 1997, the Financial Accounting Standards Board (FASB) introduced SFAS No. 131, *Disclosures about Segments on Enterprise and Related Information* (hereafter referred to as SFAS No. 131). This standard was developed primarily to enable external users to view companies “through the eyes of management” by requiring firms to report segment financial information consistent with how the business is managed internally (a.k.a. the management approach). Therefore, the management approach may lead to reported segment-level earnings measures that differ from GAAP earnings measures. As a result, segment-level data in financial reports may not necessarily reconcile or exactly equate to the consolidated financial information provided at the firm level. In other words, the whole (firm-level) may not equal the sum of its parts (segment-level). We refer to the “sum of its parts” as the total aggregated segment-level earnings. Accordingly, we compute firm-segment differences as the difference between firm-level consolidated earnings and aggregated segment-level earnings from all identifiable segments. As a result, we decompose earnings into the following two components: aggregated segment earnings and firm-segment

reconcilable differences. Under the management approach, these SERs may arise from (1) differences in measuring performance management discretion at the segment-level versus the “traditional” GAAP operating earnings at the firm level, (2) unreportable segments, (3) unallocated costs and (4) unallocated revenue or gains. An illustration of the derivation of SERs is provided as Figure 1. SERs due to differences between management approach earnings measurements (i.e., internal accounting) and GAAP earnings measurements should provide additional information to investors beyond firm-level earnings, which increases information transparency and improves market valuation. SERs due to intentionally unreported segments and unallocated costs/revenues should increase information transparency and reduce market valuation.

The standard setters’ objectives were to increase comparability and transparency of the financial statements among firms. Many proponents of the standard, particularly analysts, anticipated that the management approach would increase transparency between internal and external observers, by better aligning internal and external financial reporting. This argument is consistent with agency cost theory, which posits that disclosures may be deficient in consequence to conflicts of interest between managers and shareholders (Jensen and Meckling 1976; Berger and Hann 2007). The requirements of SFAS No. 131 anticipate that managers will disclose information that might not otherwise be disclosed due to agency problems.

While the ‘management approach’ is intended to increase transparency, it potentially reduces the ability of shareholders and other users to interpret the disclosures. Opponents of the standard, primarily managers of the firms, have argued that the management approach is an “unstandard standard” because of the potential lack of consistency, comparability and reliability of segment-level information within and across firms (Reason, 2001). This argument is consistent with the proprietary cost hypothesis, in which, disclosures make public proprietary information and proprietary costs hinder disclosure (Verrecchia 1983; Hayes and Lundholm 1996). Prior research has shown that SFAS No. 131 imposes proprietary costs by requiring firms to disclose proprietary information (e.g., Botosan and Stanford, 2005). To mitigate increased proprietary costs, managers may utilize the ‘unstandard standard’ to protect the firm from this competitive disadvantage.

James J. Leisenring, a former member of the FASB, dissented from SFAS No. 131, as it relates to the measurement of reported segment performance. Although Leisenring supported the management approach for identifying reportable operating segments, he claimed that the ambiguity in outlining the proper measurement of segment earnings might lead to decreased comparability across firms. Several critics share this opinion. In fact, some refer to the ambiguity inherent in the standard, with respect to the identification of reportable segments and the appropriate measures of profitability to be presented, leading others to question whether the objectives of the standard could be reached (Reason, 2001).

Consequently, the Securities & Exchange Commission (SEC) continues to raise concerns about the implementation of the management approach as it continues to encounter cases of inappropriate applications of the standard (e.g.: SEC v. Richard Causey, 2004; Bayless, 2001; Turner, 1999). The SEC has expressed its intent to make segment disclosure requirements a central focus of SEC staff reviews. The SEC’s concerns regarding the current segment reporting practices suggest that the standard may not be as effective in reaching its proposed objectives as initially anticipated.

This study intends to shed additional light on this issue by examining segment-to-firm-level earnings reconciliations, since these reconciliations represent the aggregated segment performance, as indicated by Berger and Hann (2007).¹ As presented in Appendix A, Caterpillar, Inc. explicitly states, in its 1998 10-K, that its segment reporting under the management approach has limited usefulness to external readers of its financial statements. It discloses traditional GAAP-based financial results for all business lines in their MD&A. It does not provide details of the reconciliation between its firm-level and segment level measurements as required under SFAS No. 131.

¹ While segment reporting using the management approach is in accordance with GAAP, how a company chooses to report revenue, earnings, expenses and other financial data at the segment level may differ from the derivation of such components under GAAP. For example, a firm may choose to recognize sales at the time a sales agreement is made for segment reporting while GAAP, at the consolidated reporting level, does not allow this. This study’s reference to GAAP or non-GAAP is solely based on the derivation of earnings at the segment level.

Another example (not presented) is the use of the Economic Value Added (EVA) method by Briggs & Stratton to evaluate divisional performance and to assist in internal decision making (i.e., management approach). However, the firm reports its segment information using GAAP-based measurements rather than its EVA measurements of performance. There are many examples of these inconsistencies and variations in firms' segment reporting under the SFAS No. 131 segment-reporting regime. In contrast, Cooper Rubber & Tire Co. reports segment financial information that is consistent with both GAAP and how they manage the business internally. We primarily focus on examining SERs and mispricing under the current SFAS 131 segment-reporting regime since this is the regime that firms, investors, analysts and regulators are operating under at this time. However, we do provide a brief analysis and discussion, in the additional analysis section, on the pre- and post-SFAS No. 131 segment-reporting regimes.

This study adds to the extant literature by determining whether the market correctly incorporates the pricing effects of the persistence of aggregated segment earnings and SERs under SFAS No. 131. If the market fails to understand the time-series properties of aggregated segment earnings or SERs, then stock prices will systematically understate/overstate the value of the firm in a predictable manner. That is, if the market correctly perceives the persistence of SERs, then stock prices will move in a predictable manner in the subsequent year. Therefore, a trading strategy based on the SER component of earnings would prove beneficial.

Since SERs can be a positive or negative segment on the financial statement, it seems only natural to investigate them individually. Therefore, we investigate both positive and negative SERs throughout this paper. Our findings indicate that the market underestimates the SER component of earnings for firms that report positive SERs, giving rise to a positive relation between positive SERs and abnormal stock returns. The results suggest that stock prices do not accurately reflect the time-series properties of positive SERs. They also indicate that it is possible to make positive abnormal profits by following a trading strategy focused on positive SERs. In contrast, we find that the market incorporates aggregated segment earnings and SER components of earnings into stock prices appropriately when the firm reports negative SERs. On the contrary, the same trading strategy results in negative abnormal returns for firms that report negative SERs. Overall, our results suggest that market participants cannot adequately interpret the firm-to-segment reconciliations resulting from 'management approach' accounting information, thereby causing them to underestimate the significance of these reconciliations when firms report positive SERs. If financial reporting, via segment disclosure, becomes more transparent as predicted by the agency cost hypothesis, it is less likely that market mispricing would occur. However, if financial reporting becomes less transparent as predicted by the proprietary hypothesis, it is more likely that market mispricing would occur. Our empirical findings support the proprietary cost hypothesis.

As with any study in this area, conclusions cannot be made without investigating whether apparent abnormal returns are the result of the incorrect measurement or the control for underlying risk factors. We follow the tests in Thomas (2000) to help disentangle these two competing hypotheses. We estimate the relation between long-term stock returns and SERs. If SERs were a proxy for risk, then abnormal returns would persist beyond the subsequent year. A permanent shift in risk will be associated with higher returns in subsequent years. If the market does not fully understand the persistence of SERs, then abnormal returns should exist only in the immediate subsequent year and should not continue. It is less likely that mispricing could occur for several subsequent years, because the market will correct for its (incorrect) prior belief when earnings are realized above or below expectations in the subsequent year (Thomas, 2000). The results in this study show no relation between long-term stock returns and current SERs. Thus, the market appears to correct fully for its mispricing in the subsequent year so that abnormal returns do not persist for more than one year.

Additional analysis shows that mispricing does not occur, and investors did not earn abnormal returns under the SFAS No. 14 segment-reporting regime before SFAS No. 131 became effective. The remainder of this paper is organized as follows: Section 2 describes the related literature and research design; Section 3 presents the sample selection criteria and descriptive statistics; Section 4 discusses our empirical findings and Section 5 summarizes and concludes the paper.

RELATED LITERATURE AND RESEARCH DESIGN

Related Literature

In the case of mandated segment disclosure requirements, the leeway in segment reporting standards provides managers with a means to strategically disclose segment information (Nagarajan and Sridhar, 1996; Botosan and Harris, 2000). Nagarajan and Sridhar (1996) generated an analytical model indicating that similar mandates may induce firms to (1) reduce the value relevance of their disclosures and (2) fail to disclose some value-relevant information. Therefore, mandating segment disclosures could reduce the relevance of segment information, which could lessen a firm's transparency and actually impede the proposed benefits of SFAS No. 131.

The argument regarding the costs and benefits of SFAS No. 131 is still an ongoing issue in the academic literature. For example, prior research shows an increase in the number of reported segments post-SFAS No. 131 (e.g., Herrmann and Thomas, 2000; Street, et al., 2000; Ettredge, et al., 2000), and mixed evidence on the incremental information provided with segment disclosure under the SFAS No. 131 segment-reporting regime (e.g., Venkataraman, 2001; Berger and Hann, 2003; Botosan and Harris, 2005). While prior research on the effects of SFAS No. 14 has generally found that segment reporting provides an incremental benefit over firm-level earnings for the prediction of future earnings (e.g., Kinney, 1971; Collins, 1976; Chen and Zhang, 2003), little evidence exists on how segment disclosure, beyond firm-level data, affects market efficiency.

For example, Ettredge et al. (2006) assess whether SFAS No. 131 improved disclosure about the diversity of multiple segment firms' operations. They employ a different metric to assess the effect of SFAS No. 131 on disclosures of information about the diversity of operating income across segments using continuous multiple-segment reporters. Their scenario assumes managers did not use the flexibility inherent in the SFAS No. 131 management approach to transfer revenues and costs among segments so as to conceal differences in segment profitability. They find a post-SFAS No. 131 increase in cross-segment variability of segment profits, an increase in the association between reported and inherent cross-segment variability and an increase in association between reported variability and capital market incentives to disclose. They interpret their findings as evidence that SFAS No. 131 increased the transparency of segment profitability disclosures, and, as indicated, SFAS No. 131 allowed firms depending more on external financing to disclose more about differences in segment profitability. Our study differs from Ettredge et al. (2006) in that we examine the extent to which the variability in segment earnings (i.e., profit) measurement differs from segment-reporting regimes, as well as whether investors can adequately interpret the information in these segment earnings and their corresponding reconciliations.

If there is more flexibility inherent in SFAS No. 131, which allows the reporting of segment earnings measurements to be inconsistent with GAAP earnings measurements, we would expect SERs to be more significant in the post-SFAS No. 131 period. However, we do acknowledge that larger SERs do not necessarily equate to a change in a firm's overall transparency to investors. That said, a decrease in the absolute value of the SERs would indicate that aggregated segment earnings are more closely aligned with reported firm earnings post-SFAS No. 131.

Thomas (2000) and Hope et al. (2008) investigate the effects of SFAS No. 131 on the market's valuation of foreign earnings. Thomas (2000) finds that the market understates foreign earnings' persistence, which is consistent with market mispricing. Hope et al. (2008) find that investors' mispricing of foreign earnings lessens (and in fact disappears) subsequent to the adoption of SFAS No. 131. Our study differs from Thomas (2000) and Hope et al. (2008), in that they focus on foreign earnings, whereas we investigate the effects of SFAS No. 131 on the market's valuation of total aggregated segment earnings (which is incrementally important to firm valuation – Chen and Zhang, 2003) and the corresponding reconciliation of aggregated segment-to-firm-level earnings (i.e., SERs). Since the earnings measurements used for segment reporting may differ from earnings measurement at the firm level, focusing on the reconciliation from segment-to-firm-level earnings is essential to determine whether these reconciliations are important to firm valuation. Ultimately, it is still unclear ex ante whether SFAS No. 131 should improve earnings predictability, earnings quality or mitigate any segment-related mispricing. A number of studies have concluded that giving management discretion under GAAP deteriorates earnings quality and predictability (see literature review by Dechow and Skinner, 2000). In contrast, other studies have concluded that giving management discretion under GAAP improves earnings quality and predictability (e.g., Ewert and Wagenhofer, 2005; Dechow and Skinner, 2000).

Firm-Segment Reconcilable Difference

Firm-to-segment reconciliations (i.e., SERs) provide a reconciliation of the reported segment financial information disclosed by applying the management approach prescribed under the SFAS No. 131 reporting regime to the consolidated financial information reported by the firm. This reconciliation may include differences in earnings measurement—management approach earnings measurement at the segment level, segments that do not meet the reporting requirement threshold, unallocated costs or expenses and/or unallocated revenue or gains. Firms provide information about the earnings (both sales and expenses) measurement differences that exist between their aggregated segment earnings and consolidated earnings. These firms vary widely in the level of detail they provide for their segment disclosure in their annual report. Refer to Appendix A for an example of segment earnings disclosure and its corresponding reconciliation to consolidated firm earnings.

Two concurrent studies, Alfonso et. al (2010) and Ettredge and Wang (2010), examine the determinants of SERs. Ettredge and Wang (2010) examine the determinants of SERs (they refer to them as GAPs in their study) and investigate whether aggregated segment earnings are more persistent and informative than corporate (i.e., firm-level) earnings when SERs exist. Their results suggest that when SERs exist, the aggregated segment earnings are modestly more persistent than corporate earnings. This difference appears to be attributable to negative SERs. When negative SERs exist, the aggregated segment earnings are more informative (in terms of its association with concurrent stock returns) than corporate earnings. When positive SERs exist, summed segment income has a weaker association with concurrent stock returns than corporate earnings. Our study differs from Ettredge and Wang (2010) given that we focus on the persistence and mispricing of SERs.

Alfonso et al. (2010) provide evidence that SERs are value-relevant and that firm-segment reconcilable differences do matter to the capital markets. In addition, using a determinants model, they focus on managers' decisions to report SERs. They find that the reporting of SERs can be significantly influenced by agency costs. This study finds that larger firms and firms with higher leverage and higher ROA are more likely to report aggregated segment-level earnings less than firm-level earnings ($SER > 0$). Furthermore, this study finds that firms with a greater number of segments, greater accruals, a loss, greater aggregated segment profits and a Big N auditor are less likely to report $SER > 0$. Firms in which the agency cost motive dominates are twice as likely to report $SER > 0$ as are firms in which the agency cost motive does not dominate, which suggests that managers' segment reporting choice is partly driven by agency costs. Thus, consistent with the agency theory, we expect managers to conceal information from the shareholders, thereby decreasing firm transparency, increasing uncertainty about the firm and resulting in market mispricing for these firms. Alternatively, consistent with the proprietary cost hypothesis, we expect that managers will conceal information from competitors (Berger and Hann, 2003), thereby indirectly concealing information from investors. Our study contributes to prior research by being one of the early studies to examine SERs, and contributes to the understanding of segment disclosure practices by examining a unique setting in which management has discretion, based on how the firm is managed internally, to report segment information in a manner that may not be consistent with firm-level GAAP-reported earnings measurements. It further contributes to our understanding of market pricing as it relates to segment earnings under the SFAS No. 131 reporting regime.

Research Design

The primary focus of this paper is to test whether the market correctly prices firms' securities relative to the persistence of the aggregated segment and SER components of earnings. In order to evaluate whether mispricing occurs for the aggregated segment and SER components of earnings, we first examine the persistence of segment-based earnings by decomposing consolidated firm-level earnings into aggregated segment earnings and an SER component of earnings. As with earnings, both components are subject to different levels of measurement errors and non-recurring problems and, therefore, should persist differentially from overall firm-level earnings as well as have different valuation implications. Chen and Zhang (2003) show that aggregated weighted average segment earnings, which they refer to as divergence of profitability, are incrementally persistent to consolidated earnings about future firm consolidated earnings. They also show that the aggregated segment component is important for firm valuation. This study differs from Chen and Zhang (2003), which focused on the pre-SFAS No. 131 period, in that we focus on the SER component of earnings and whether it is informative beyond the aggregated segment earnings component subsequent to SFAS No. 131.

If the objective of SFAS No. 131 is successful in providing more useful (i.e., better earnings quality/predictability) information to investors, then ultimately we should find no (or less) mispricing. Accordingly, since SERs represent the reconcilable earnings differences between what is reported using the ‘management approach’ and what is reported using ‘GAAP’ for consolidated earnings, the reconcilable difference would be the information (i.e., differences in recognizing revenue, allocating costs, unreportable segments, intersegment transactions, etc.) that exists between the two accounting measurement approaches. Consistent with SFAS No. 131’s objective of making segment information more meaningful, we expect the SER component of earnings to be persistent and have no (or lower) mispricing. Given the findings in prior research (e.g., Chen and Zhang, 2003), the aggregated segment component should be positive and significant. It is important to note that our tests are focused primarily on SERs when they are not equal to zero, and we include aggregated segment earnings as an important within-firm control.

We use equation (1) to establish a benchmark for earnings persistence. Next, we determine whether the persistence of the SER component of earnings is incremental to the aggregated segment component of earnings. If these components are equally persistent, then the next period’s earnings can be depicted equally by the bivariate model in equation (1) as it can be by the multivariate model in equation (2).

$$\text{EARN}_{t+1} = \alpha_0 + \alpha_1 \text{EARN}_t + \varepsilon_{t+1} \quad (1)$$

$$\text{EARN}_{t+1} = \beta_0 + \beta_1 \text{AGSEG}_t + \beta_2 \text{SER}_t + \varepsilon_{t+1} \quad (2)$$

$$\text{BHRET}_{t+1} = \beta (\text{EARN}_{t+1} - \alpha_0 - \alpha_1^* \text{EARN}_t) + \varepsilon_{t+1} \quad (3)$$

$$\text{BHRET}_{t+1} = \beta (\text{EARN}_{t+1} - \alpha_0^* - \alpha_1^* \text{AGSEG}_t - \alpha_2^* \text{SER}_t) + \varepsilon_{t+1} \quad (4)$$

where EARN is earnings before interest and taxes (compustat #178) scaled by firm total assets (compustat #6); AGSEG is the sum of segment operating profits excluding all corporate, reconciliation and elimination segments scaled by firm total assets (compustat #6); SER_t is the firm-segment difference defined as EARN minus AGSEG. BHRET is the return accumulation period that begins four months after the end of the fiscal year, and size-adjusted returns are computed by measuring the buy-hold return in excess of the buy-hold return on a value-weighted portfolio of firms having similar market values.

The primary focus of this paper is to test whether the market correctly prices securities of firms with one or more reported segments relative to the persistence of aggregated segments and SER components of earnings.² Similar to Sloan (1996), Thomas (2000) and Hope et al. (2008), we use hedge portfolios to determine whether stock prices reflect the different properties of the SER component of earnings. In other words, we examine whether investors can earn abnormal profits by following a trading strategy of going long (short) in firms with the highest (lowest) SER.³

We use an alternative naïve expectation model, against which to test the null hypothesis of market efficiency. Therefore, to test the rational expectations hypotheses, we employ the framework developed by Mishkin (1983) using equations (1) and (3). Mishkin (1983) suggests that equation (3) provides an estimate of the market’s

² We include firms with one segment when segment earnings do not equal consolidated earnings reported. We do so to account for unreported segments (not required to be reported since it does not fall within the threshold established for reporting it), which is part of our segment earnings reconciliation.

³ One can test whether the market is efficient with respect to earnings forecasts even if there are omitted variables. However, one cannot test whether the market is efficient with respect to specific variables in the forecasting equation (e.g., SER) if the variables omitted from the forecasting equation are not (themselves) rationally priced and if they are also correlated with the variables of interest in the forecasting equation (e.g., SER). Based on the Mishkin Test (Mishkin, 1983), one can reject efficiency (at least with respect to the assumed equilibrium model of returns) even if the forecasting equation has omitted variables, but one cannot draw inferences about which accounting variable or variables are the source of the inefficiency. Given this and the findings in Kraft et al. (2007), we primarily focus our analysis in this study on hedge portfolio strategies similar to Thomas (2000) and Hope et al. (2008) to draw our conclusions with respect to market mispricing.

perceived time-series behavior of earnings. α_1^* in equation (3) is an estimate of the extent to which the market perceives earnings to persist in the future.

As discussed early in the paper, some argue that segment information reported under the SFAS No. 131 reporting regime is more useful, while others argue that segment reporting now lacks comparability and consistency and refer to it as the ‘unstandard standard’. To test whether investors fail to accurately distinguish between the aggregated segment and SER (i.e., segment reconciliation) components of earnings, we test equations (2) and (4). Earnings expectations are permitted to reflect the overall level of persistence in earnings performance, but are hypothesized not to reflect the differential degrees of persistence attributable to the aggregated segment and SER components of earnings. α_1^* in equation (4) is an estimate of the extent to which the market perceives aggregated segments component of earnings to persist in the future. α_2^* in equation (4) is an estimate of the extent to which the market perceives the SER component of earnings to persist in the future.

To test market efficiency, we compare coefficients ($\alpha_1 = \alpha_1^*$ and $\alpha_2 = \alpha_2^*$) from equations (2) and (4). This constraint assumes that stock prices correctly anticipate the average persistence of earnings performance. If the coefficients are not significantly different, then no mispricing occurs for these two components of earnings. The equality of the coefficients across equations is tested using the likelihood ratio statistic suggested by Mishkin (1983).

Kraft et al. (2007) indicate that it is important to include accounting variables while examining the rational pricing of earnings components in the Mishkin tests. Thus, we include variables used in Kraft et al. (2007) in equations (5)-(8).

$$EARN_{t+1} = \alpha_0 + \alpha_1 EARN_t + \sum \alpha_i CONTROL_i + \varepsilon_{t+1} \tag{5}$$

$$BHRET_{t+1} = \beta (EARN_{t+1} - \alpha_0 - \alpha_1^* EARN_t - \sum \alpha_i^* CONTROL_i) + \varepsilon_{t+1} \tag{6}$$

$$EARN_{t+1} = \alpha_0 + \alpha_1 AGSEG_t + \alpha_2 SER_t + \sum \alpha_i CONTROL_i + \varepsilon_{t+1} \tag{7}$$

$$BHRET_{t+1} = \beta (EARN_{t+1} - \alpha_0^* - \alpha_1^* AGSEG_t - \alpha_2^* SER_t - \sum \alpha_i^* CONTROL_i) + \varepsilon_{t+1} \tag{8}$$

where CONTROL represents the control variables: SALES, CHSALES, CAPEX and CHCAPEX. SALES is sales scaled by total assets (compustat #12/ compustat #6); CHSALES is the change in sales from t-1 to t scaled by assets ((compustat #12 – lag compustat #12)/ compustat #6); CAPEX is capital expenditures scaled by total assets (compustat #30/ compustat #6); CHCAPEX is the change in capital expenditures scaled by assets ((compustat #30 – lag compustat #30)/ compustat #6). Because we use the size-adjusted return as the dependent variable, we do not include the decile as an independent variable as in Kraft et al. (2007).

Additionally, to test whether there is market mispricing or a shifting of risk, the relation between current SERs and the aggregated segment component of earnings and one and two year-ahead stock returns is estimated. If the abnormal returns in year t+1 are the result of the market failing to understand how SERs in year t relates to total earnings in year t+1, then we should expect the market to correct fully for this mispricing when earnings in year t+1 are reported. If so, then abnormal returns should not persist beyond year t+1. If the abnormal returns are due to SERs being a measure of risk, then these returns are likely to persist beyond year t+1. We assume market mispricing is more likely to cause only a short-term relation with abnormal returns as in Thomas (2000). We use equations (9) and (10) to determine whether there is a mispricing or a shift or risk.

$$BHRET_{t+1} = \lambda_0 + \lambda_1 EARN_t + \varepsilon_{t+1} \tag{9}$$

$$BHRET_{t+1} = \mu_0 + \mu_1 AGSEG_t + \mu_2 SER_t + \varepsilon_{t+1} \tag{10}$$

$$BHRET_{t+2} = \lambda_0 + \lambda_1 EARN_t + \varepsilon_{t+1} \tag{11}$$

$$BHRET_{t+2} = \mu_0 + \mu_1 AGSEG_t + \mu_2 SER_t + \varepsilon_{t+1} \tag{12}$$

SAMPLE SELECTION AND DESCRIPTIVE STATISTICS

Our initial sample includes firms listed on Compustat's Annual Industrial, Research, and Full Coverage files and industry segment data, which are available on Compustat's industry segment file from 1998 to 2006. We require the observations from the segment files to only include the source year observations so that restatements of segment performance will not influence our results. The aggregated segment earnings (AGSEG) are defined as the sum of operating profit after depreciation (OPS) from all reported business segments scaled by total assets (compustat #6),

$$AGSEG = \sum_{i=1}^n OPS_i / TA \quad (13)$$

where n represents the number of reported business segments of the firm. We exclude observations when there is a footnote associated with OPS, since differences that exist between the data as reported by the company and the Compustat definition will be indicated by a footnote. The firm-level earnings (EARN) are defined as operating profit after depreciation from the annual Compustat file (compustat #178) scaled by total assets (compustat #6). The firm-segment reconcilable difference (SER) is the difference between EARN and AGSEG.

Following the extant literature, we exclude firms in the financial and 'other' industries based on the industry classification in Fama and French (1997) and firms that have data missing from the Compustat and CRSP databases. Firms must be covered in CRSP NYSE/AMEX capitalization deciles. We omit firms with mergers and acquisitions to allow appropriate comparisons. We also exclude observations where annual sales are less than 20 million dollars. Since SFAS No. 131 is effective for fiscal years beginning after December 15, 1997, we exclude Compustat observations in 1998 if the firm's fiscal year ends between June-November. We exclude observations with SER equal to zero since the focus of this study is on the reconciliations between segment-level and firm-level earnings (i.e., SERs). Our final sample selection criterion yields 649 unique firms and 1,717 firm-year observations.

Table 1 presents the sample descriptive statistics.⁴ To determine whether the fact that SERs are positive or negative plays a significant role, we perform our primary analysis based on the sign of the SER. We find that both negative and positive SERs exist and are significant. Panel A of Table 1 reports and compares the descriptive statistics for firms with SER>0 and SER<0. The mean of the positive (negative) SERs is significant with a mean of 0.020 and a t-value of 17.84 (mean = -0.028, t-value = -19.45). The two groups of firms do not differ significantly in terms of capital expenditures, total accruals, leverage and firm size. On the other hand, earnings, aggregated segment earnings, sales, return on equity, return on assets, operating cash flows and firm growth are significantly greater for negative SER firms. This suggests that firms that report aggregated segment earnings greater than firm-level consolidated earnings may be better off financially. Positive SER firms are generally larger and have more total accruals.

Panel B of Table 1 reports and compares the descriptive statistics for firms with SER=0 and SER≠0. The two groups of firms do not differ significantly in terms of aggregated segment earnings, return on equity, total accruals and firm leverage. Firms that report positive or negative SERs tend to have more capital expenditures and are larger in size. However, they are less profitable, have less earnings, operating cash flows, sales and firm growth than firms with no (i.e., zero) SERs reported. Hence, on average, it appears that firms reporting SERs not equal to zero may be a little less financially better off than firms with zero SERs reported.

⁴ We winsorize all variables at the one percent and ninety-nine percent levels before we provide the statistics. The mean of SER is different from the difference of the mean of EARN and the mean of AGSEG, because EARN, AGSEG and SER may not be winsorized at the same time for one observation.

Table 1
Descriptive Statistics

Panel A: Descriptive Statistics for Firms with SER<0 and SER>0

	SER>0					SER<0					SER>0 Minus SER<0	
	N	Mean	Median	std	t Value	N	Mean	Median	std	t Value	t-value	Probt
EARN	788	0.072	0.068	0.071	28.16	929	0.080	0.072	0.077	31.71	-2.27	0.024
AGSEG	788	0.052	0.055	0.084	17.33	929	0.110	0.096	0.089	37.91	-14	<.0001
SER	788	0.020	0.008	0.031	17.84	929	-0.028	-0.011	0.044	-19.45	26.27	<.0001
SALES	788	1.106	0.956	0.728	42.67	929	1.208	1.049	0.799	46.11	-2.77	0.006
CHSALES	788	0.015	0.021	0.192	2.2	929	0.038	0.044	0.222	5.15	-2.25	0.025
CAPEX	788	184.964	53.676	389.128	13.34	929	192.580	53.250	421.720	13.92	-0.39	0.697
CHCAPEX	788	-0.002	0.000	0.030	-1.52	929	0.000	0.000	0.033	0.11	-1.14	0.256
ROE	788	0.028	0.078	0.314	2.47	929	0.090	0.105	0.306	8.95	-4.15	<.0001
ROA	788	0.019	0.026	0.074	7.31	929	0.042	0.042	0.074	17.39	-6.5	<.0001
TACC	716	-0.008	-0.001	0.063	-3.24	872	-0.002	0.001	0.056	-1.15	-1.8	0.072
CFO	716	0.072	0.070	0.085	22.54	869	0.088	0.088	0.083	31.32	-3.9	<.0001
LEVERAGE	787	0.246	0.240	0.177	39.09	929	0.237	0.212	0.182	39.71	1.01	0.311
GROWTH	788	0.039	0.031	0.172	6.36	929	0.064	0.052	0.193	10.18	-2.89	0.004
LOGSIZE	788	7.160	7.100	1.728	116.33	929	7.004	7.074	1.748	122.15	1.85	0.065

Table 1 (Cont'd)
Descriptive Statistics

Panel B: Descriptive Statistics for Firms with SER=0 and SER≠0

	SER=0					SER≠0					SER=0 Minus SER≠0	
	N	Mean	Median	std	t Value	N	Mean	Median	std	t Value	t-value	Probt
EARN	2,291	0.086	0.081	0.100	41.17	1,717	0.076	0.070	0.074	42.35	3.76	0.0002
AGSEG	2,291	0.086	0.081	0.100	41.17	1,717	0.084	0.074	0.091	37.89	0.91	0.3638
SER	2,291	0.000	0.000	0.000	.	1,717	-0.006	0.000	0.046	-5.74	5.74	<.0001
SALES	2,291	1.231	1.061	0.893	65.96	1,717	1.161	1.009	0.768	62.63	2.64	0.0083
CHSALES	2,291	0.055	0.045	0.227	11.64	1,717	0.027	0.033	0.209	5.39	4.04	<.0001
CAPEX	2,291	153.247	25.376	360.537	20.34	1,717	189.085	53.600	406.987	19.25	-2.9	0.0038
CHCAPEX	2,291	0.001	0.001	0.057	0.81	1,717	-0.001	0.000	0.032	-0.88	1.16	0.246
ROE	2,291	0.071	0.107	0.410	8.25	1,717	0.061	0.091	0.311	8.17	0.81	0.4195
ROA	2,291	0.043	0.043	0.095	21.53	1,717	0.032	0.033	0.075	17.57	4.08	<.0001
TACC	2,145	-0.001	0.001	0.068	-0.58	1,588	-0.005	0.000	0.059	-3.12	1.81	0.07
CFO	2,143	0.090	0.089	0.105	39.68	1,585	0.081	0.081	0.084	38.11	3.11	0.0019
LEVERAGE	2,291	0.236	0.203	0.214	52.93	1,716	0.241	0.226	0.180	55.66	-0.8	0.4247
GROWTH	2,290	0.083	0.057	0.218	18.34	1,717	0.053	0.044	0.184	11.88	4.82	<.0001
LOGSIZE	2,291	6.332	6.299	1.736	174.53	1,717	7.076	7.091	1.740	168.52	-13.41	<.0001

The bolded t-statistics are significant at less than a <.01, .05, or .10 significance level. EARN is earnings before interest and taxes (compustat #178) scaled by firm total assets (compustat #6); AGSEG is the sum of segment operating profits excluding all corporate, reconciliation, and elimination segments scaled by firm total assets (compustat #6); SER is firm-segment difference defined as EARN minus AGSEG; SALES is sales scaled by total assets (compustat #12/ compustat #6); CHSALES is the change in sales from t-1 to t scaled by assets ((compustat #12 – lag compustat #12)/ compustat #6); CAPEX is capital expenditures scaled by total assets (compustat #30/ compustat #6); CHCAPEX is the change in capital expenditures scaled by assets ((compustat #30 – lag compustat #30)/ compustat #6); ROE is income before extraordinary items over average equity (compustat #18 /average compustat #216 at t and t-1); ROA is return on assets (compustat #18 / average compustat #6 at t and t-1); TACC is total accrual scaled by total assets (((compustat #4-LAG(compustat #4)) - (compustat #5-LAG(compustat #5)) - (compustat #1-LAG(compustat #1)) + (compustat #34 - LAG(compustat #34)) - compustat #14) / compustat #6); CFO is cash flow scaled by total assets ((compustat #18 – TACC) / compustat #6); LEVERAGE is leverage ratio defined as long-term debt over total assets (compustat #9 / compustat #6); GROWTH is firm’s sales growth ((compustat #12- average compustat #12 at t and t-1)/LAG compustat #12);LOGSIZE is log of total assets (log (compustat #6)).

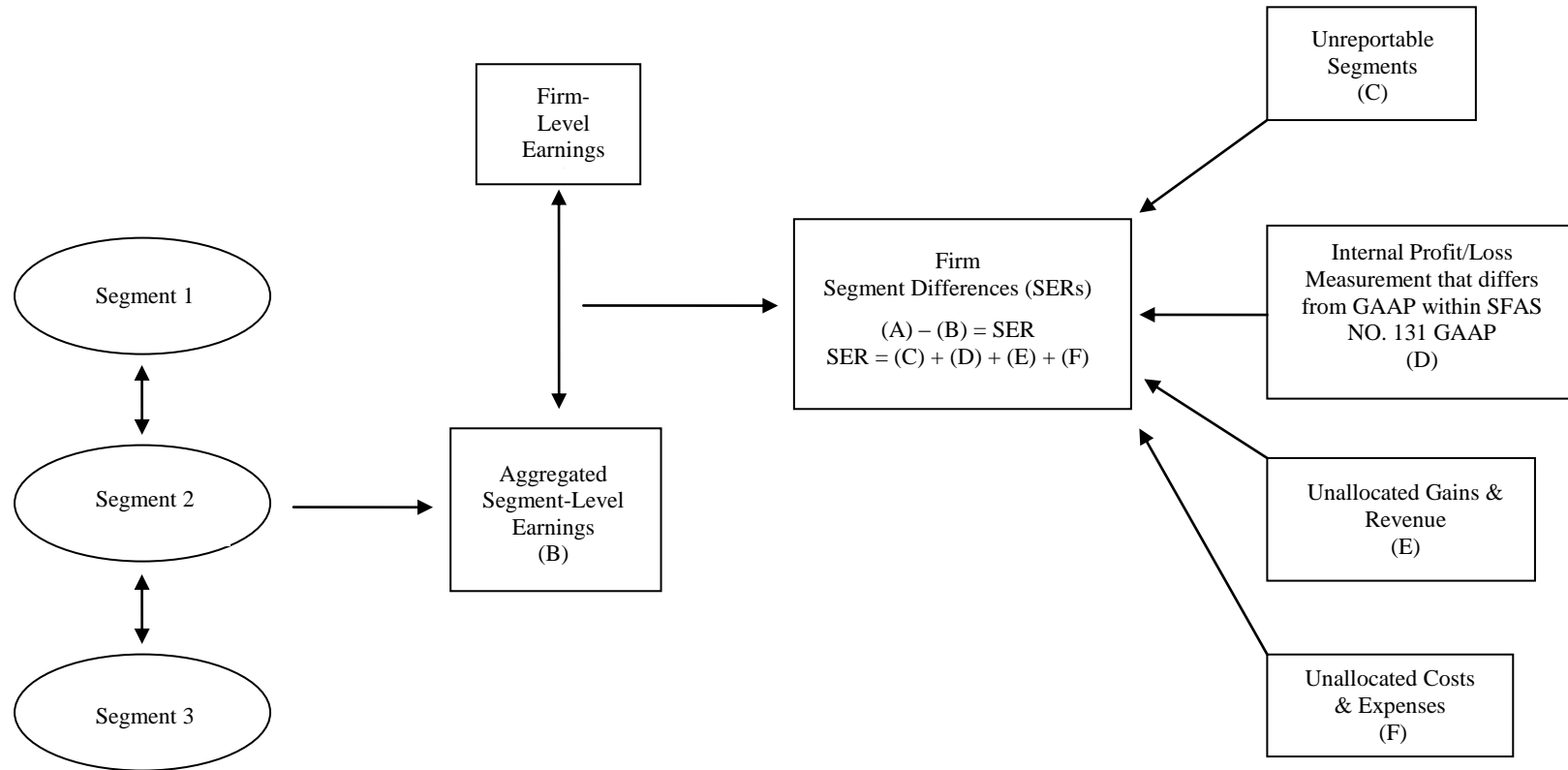
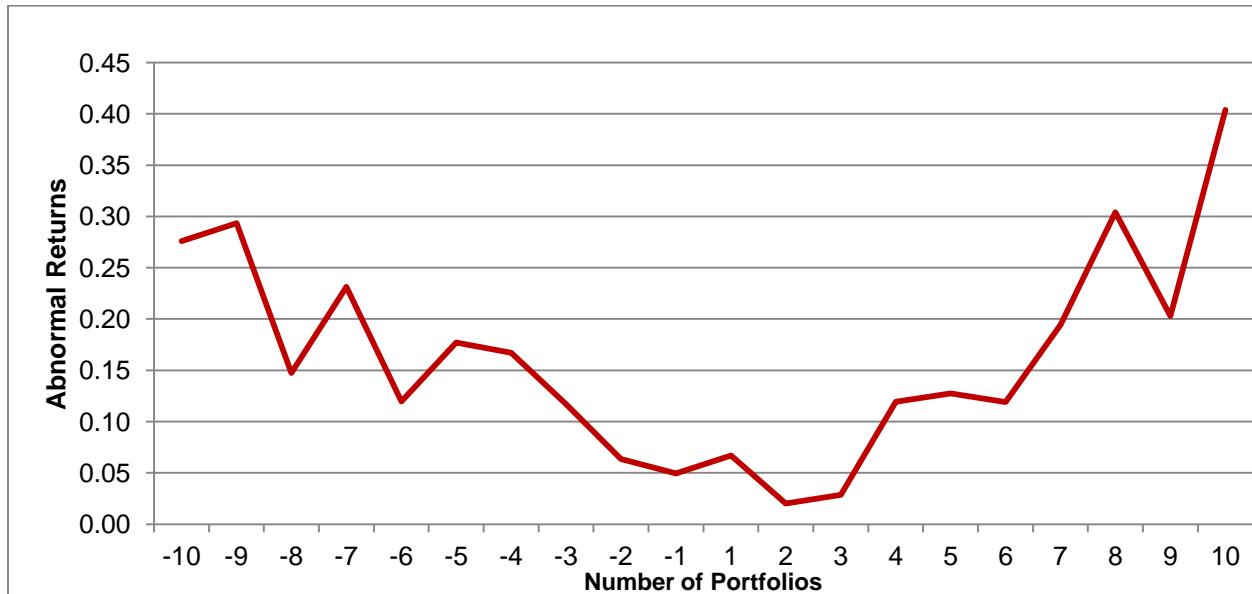


Figure 1
Illustration of Firm-Segment Reconcilable Differences



The y-axis are abnormal returns and the x-axis are the number of portfolios. SER is firm-segment difference defined as $EARN_t$ minus $AGSEG_t$. The size-adjusted returns (BHRET) are computed by taking the raw buy-old return, inclusive of dividends and liquidating distributions and subtracting the buy-hold return on a size matched, value-weighted portfolio of firms. The size portfolios are based on the market value of equity deciles of NYSE and AMEX firms. The decile rankings and decile returns are supplied by CRSP. The return accumulation period begins four months after the end of the fiscal year and size-adjusted returns are computed by measuring the buy-hold return in excess of the buy-hold return on a value-weighted portfolio of firms having similar market values.

Figure 2
Hedge Portfolio Abnormal Returns: SER<0 and SER>0

EMPIRICAL ANALYSIS

Table 2 reports results from the estimation of equations (1) and (2) to establish the persistence in earnings performance and a benchmark for earnings mispricing. Consistent with prior research (e.g., Sloan, 1996), we find a significantly positive coefficient of 0.911 (0.914) for current period earnings in firms with positive (negative) SERs. The results from the estimation of equation (2) show that both AGSEG and SERs are incrementally persistent in providing information about future earnings. As shown in Table 2, the AGSEG component coefficient of firms with positive SERs is significantly positive (coefficient = .863, p-value <.0001). The SER component is also significantly positive (coefficient = 1.178, p-value <.0001). These results indicate that both aggregated segment earnings and SERs have significant implications for future firm consolidated earnings. However, only when firms report positive SERs are AGSEG and SER differentially persistent (0.863 versus 1.178). The coefficient of SER for firms with SER>0 is significantly larger than that of AGSEG for firms with positive SERs (F-test = 38.15, p-value <.0001). Our results suggest that the SER component is more persistent than the AGSEG component for firms with positive SER. Although both the AGSEG and SER are persistent and significantly positive (coefficient=.873, p-value <.0001; coefficient=.844, p-value <.0001, respectively), the coefficient of the SER component is not significantly different from that of the AGSEG component for firms with negative SERs (F-test=.52, p-value=.470).

Table 2
Persistence of Earnings, Aggregated Earnings, and Firm-Segment Difference

$$\text{EARN}_{t+1} = \alpha_0 + \alpha_1 \text{EARN}_t + \varepsilon_{t+1} \tag{1}$$

$$\text{EARN}_{t+1} = \beta_0 + \beta_1 \text{AGSEG}_t + \beta_2 \text{SER}_t + \varepsilon_{t+1} \tag{2}$$

Variable	Equation (1)				Equation (2)			
	SER>0		SER<0		SER>0		SER<0	
	Estimate	Pr > t	Estimate	Pr > t	Estimate	Pr > t	Estimate	Pr > t
Intercept	0.554	0.0024	0.101	0.4352	0.231	0.2178	-0.282	0.0591
EARN	0.911	<.0001	0.914	<.0001				
AGSEG					0.863	<.0001	0.873	<.0001
SER					1.178	<.0001	0.844	<.0001
Obs.	788		929		788		929	
R-Square	0.785		0.791		0.785		0.765	
Adj R-Sq	0.784		0.79		0.784		0.765	
F Value: Equation	1432.58	<.0001	1751.23	<.0001	956.26	<.0001	1006.18	<.0001
F Value: AGSEG=SER					38.15	<.0001	0.52	0.4703

The bolded two-tailed p-values are significant at less than a <.01, .05, or .10 significance level. EARN is earnings before interest and taxes (compustat #178) scaled by firm total assets (compustat #6); AGSEG is the sum of segment operating profits excluding all corporate, reconciliation, and elimination segments scaled by firm total assets (compustat #6); SER is firm-segment difference defined as EARN_t minus AGSEG_t.

Table 3
Results of Market Efficiency Tests

$$\text{EARN}_{t+1} = \alpha_0 + \alpha_1 \text{EARN}_t + \varepsilon_{t+1} \tag{1}$$

$$\text{EARN}_{t+1} = \alpha_0 + \alpha_1 \text{AGSEG}_t + \alpha_2 \text{SER}_t + \varepsilon_{t+1} \tag{2}$$

$$\text{BHRET}_{t+1} = \beta (\text{EARN}_{t+1} - \alpha_0 - \alpha_1^* \text{EARN}_t) + \varepsilon_{t+1} \tag{3}$$

$$\text{BHRET}_{t+1} = \beta (\text{EARN}_{t+1} - \alpha_0^* - \alpha_1^* \text{AGSEG}_t - \alpha_2^* \text{SER}_t) + \varepsilon_{t+1} \tag{4}$$

Equation	Equations (1) and (2)		Equations (3) and (4)	
	SER>0	SER<0	SER>0	SER<0
α_1	0.911	0.914	0.863	0.873
α_1^*	0.847	0.822	0.929	0.734
α_2			1.178	0.844
α_2^*			-0.151	1.018
$\alpha_1=1$	26.18	29.66		
	<.0001	<.0001		
$\alpha_1=\alpha_1^*$	0.48	1.47	0.39	1.82
	0.489	0.225	0.533	0.178
$\alpha_2=\alpha_2^*$			19.61	0.37
			<.0001	0.543
$\alpha_1=\alpha_1^*, \alpha_2=\alpha_2^*$			20.73	4.88
			<.0001	0.087
Obs. Used	788	929	788	929

The bolded two-tailed p-values are significant at less than a <.01, .05, or .10 significance level. EARN = is earnings before interest and taxes (compustat #178) scaled by firm total assets (compustat #6); AGSEG = is the sum of segment operating profits excluding all corporate, reconciliation, and elimination segments scaled by firm total assets (compustat #6); SER = is firm-segment difference defined as EARN minus AGSEG. The size-adjusted returns (BHRET) are computed by taking the raw buy-old return, inclusive of dividends and liquidating distributions and subtracting the buy-hold return on a size matched, value-weighted portfolio of firms. The size portfolios are based on the market value of equity deciles of NYSE and AMEX firms. The return accumulation period begins four months after the end of the fiscal year and size-adjusted returns are computed by measuring the buy-hold return in excess of the buy-hold return on a value-weighted portfolio of firms having similar market values.

Table 3 reports the results for the estimations of equations (1)-(4). For firms with SER>0 (SER<0) in column 2 (3), the estimate of actual total earnings persistence (α_1) is .911 (.914), and the estimate of the market's perceived total earnings persistence is (α_1^*) is .847 (.822) in tests using equations (1) and (3). The difference in

actual earnings persistence (α_1) and the market’s perception of earnings persistence (α_1^*) is not significant (p-value=.489 as SER>0, p-value=.225 as SER<0, respectively). Thus, the market appears to incorporate this earnings information into stock prices appropriately. For firms with SER>0 (SER<0) in column 4 (5), the estimate of aggregated segment earnings persistence (α_1) is .863 (.873), and the estimate of the market’s perceived aggregated segment earnings persistence is (α_1^*) is .929 (.734) in tests using equations (2) and (4). The difference in aggregated segment earnings persistence (α_1) and the market’s perception of aggregate segment earnings persistence (α_1^*) is not significant (p-value=.533 as SER>0, p-value=.178 as SER<0, respectively). The estimate of SERs persistence (α_2) is 1.178 (.844), and the estimate of the market’s perceived SERs persistence is (α_2^*) is -.151 (1.018) for the SER>0 (SER<0) subset. For firms with SER>0, the difference in SER persistence (α_2) and the market’s perception of SER persistence (α_2^*) is significant (p-value=<.0001). In contrast, for firms with SER<0, the difference in SER persistence and the market’s perception of SER persistence is not significant (p-value=.543). These findings suggest that the market understands and incorporates aggregated segment earnings and SER components of earnings into stock prices appropriately when SER<0. However, when firms report SER>0, the results suggest that stock prices do not accurately reflect the time-series properties of SERs. Specifically, securities prices underestimate the extent to which the SERs persist, thereby causing stock prices to lag earnings.

Table 4
Results of Market Efficiency Tests – with Control Variables

$EARN_{t+1} = \alpha_0 + \alpha_1 EARN_t + \sum \alpha_i CONTROL_i + \varepsilon_{t+1}$ (5)				
$BHRET_{t+1} = \beta (EARN_{t+1} - \alpha_0 - \alpha_1^* EARN_t - \sum \alpha_i^* CONTROL_i) + \varepsilon_{t+1}$ (6)				
$EARN_{t+1} = \alpha_0 + \alpha_1 AGSEG_t + \alpha_2 SER_t + \sum \alpha_i CONTROL_i + \varepsilon_{t+1}$ (7)				
$BHRET_{t+1} = \beta (EARN_{t+1} - \alpha_0 - \alpha_1^* AGSEG_t - \alpha_2^* SER_t - \sum \alpha_i^* CONTROL_i) + \varepsilon_{t+1}$ (8)				
	Equations (5) and (6)		Equations (7) and (8)	
Equation	SER>0	SER<0	SER>0	SER<0
α_1	0.847	0.858	0.813	0.793
α_1^*	1.126	0.873	1.137	0.702
α_2			1.036	0.856
α_2^*			0.218	0.997
$\alpha_1=1$	44.22	40.86		
	<.0001	<.0001		
$\alpha_1=\alpha_1^*$	3.7	0.02	4.52	0.41
	0.055	0.889	0.033	0.521
$\alpha_2=\alpha_2^*$			4.34	0.23
			0.037	0.635
$\alpha_1=\alpha_1^*, \alpha_2=\alpha_2^*$			14.29	1.27
			0.001	0.530
Obs. Used	788	929	788	929

The bolded two-tailed p-values are significant at less than a <.01, .05, or .10 significance level. EARN = is earnings before interest and taxes (compustat #178) scaled by firm total assets (compustat #6); AGSEG = is the sum of segment operating profits excluding all corporate, reconciliation, and elimination segments scaled by firm total assets (compustat #6); SER = is firm-segment difference defined as EARN minus AGSEG. CONTROL represents the control variables: SALES, CHSALES, CAPEX, and CHCAPEX. SALES is sales scaled by total assets (compustat #12/ compustat #6); CHSALES is the change in sales from t-1 to t scaled by assets ((compustat #12 – lag compustat #12)/ compustat #6); CAPEX is capital expenditures scaled by total assets (compustat #30/ compustat #6); CHCAPEX is the change in capital expenditures scaled by assets ((compustat #30 – lag compustat #30)/ compustat #6). The size-adjusted returns (BHRET) are computed by taking the raw buy-old return, inclusive of dividends and liquidating distributions and subtracting the buy-hold return on a size matched, value-weighted portfolio of firms. The size portfolios are based on the market value of equity deciles of NYSE and AMEX firms. The return accumulation period begins four months after the end of the fiscal year and size-adjusted returns are computed by measuring the buy-hold return in excess of the buy-hold return on a value-weighted portfolio of firms having similar market values.

In Table 4, we report the results of equations (5)-(8), in which control variables are included in the original Mishkin test equations. The results differ somewhat from those reported in Table 3 with respect to the AGSEG component of earnings. Tables 3 and 4 both show that the market significantly underestimates the SER component when SER>0. This empirical finding again suggest that investors cannot properly interpret this management

approach to segment financial reporting when $SER > 0$. Therefore, potential opportunities may exist for market participants to earn abnormal profits as a result of this market mispricing. In contrast to Table 3, when the control variables are added to the equation, we find that the AGSEG component becomes positively significant. This indicates that both the aggregated segment (which is essentially ‘management approach accounting’) and SER components of earnings are both mispriced (i.e., underestimated). This finding further strengthens our conclusions from Table 3.

Table 5
Buy-Hold Returns of the Portfolios

Portfolio SER Ranking	SER>0 BHRET			SER<0 BHRET		
	N	Mean	t Value	N	Mean	t Value
1(Highest)	76	0.4039	4.24	91	0.0495	0.88
2	78	0.2030	2.4	93	0.0634	1.03
3	79	0.3040	3.27	93	0.1169	1.93
4	81	0.1946	2.66	93	0.1672	3.48
5	79	0.1190	1.91	92	0.1772	3.58
6	79	0.1276	2.13	96	0.1196	2.19
7	82	0.1194	2.14	94	0.2315	3.40
8	78	0.0285	0.63	92	0.1473	2.34
9	79	0.0201	0.48	94	0.2933	3.64
10 (Lowest)	77	0.0669	1.31	91	0.2759	2.87

The t-statistics are based on the time-series of the annual portfolio abnormal stock returns. SER is firm-segment difference defined as $EARN_t$ minus $AGSEG_t$. The size-adjusted returns (BHRET) are computed by taking the raw buy-old return, inclusive of dividends and liquidating distributions and subtracting the buy-hold return on a size matched, value-weighted portfolio of firms. The size portfolios are based on the market value of equity deciles of NYSE and AMEX firms. The decile rankings and decile returns are supplied by CRSP. The return accumulation period begins four months after the end of the fiscal year and size-adjusted returns are computed by measuring the buy-hold return in excess of the buy-hold return on a value-weighted portfolio of firms having similar market values. The hedge portfolio consists of a long position in the highest value SER portfolio and a short position in the lowest value SER portfolio. The bolded t-statistics are significant at less than a $<.01, .05$, or $.10$ significance level.

Table 5 provides statistics on the characteristics of the decile portfolios formed by ranking firms on the value of the SER component of earnings and reports the portfolio mean and median values for the buy-hold returns. Abnormal stock returns may be earned by exploiting an investor’s inability to distinguish correctly between the aggregated segment and SER components of earnings. The economic significance of deviations from market efficiency can be assessed by examining the returns of a trading strategy based on the magnitude of the SER component of earnings. Firms are ranked on the value of the SER component of earnings and assigned in equal numbers to ten portfolios each year. A separate abnormal return is then computed for each portfolio for the years in the sample, where the return cumulation period begins four months after the fiscal year in which SERs are measured. Abnormal returns are measured using size-adjusted returns. If the market fixates on aggregated segment earnings, then those firms experiencing the largest SERs are more likely to have undervalued stocks for firms with positive SERs (i.e., $SER > 0$). Table 5 reports the size-adjusted returns for the first year following portfolio formation. Portfolio abnormal returns increase from 6.69% for the lowest positive SER portfolio to 40.39% for the highest positive SER portfolio. Hence, the greater (i.e., more positive) the SER, the greater the abnormal returns. For firms with negative SERs (i.e., $SER < 0$), the hedge portfolio produces statistically positive and significant abnormal returns that decrease from 27.59% for the lowest SER portfolio to 4.95% for the highest SER portfolio. In contrast to firms with positive SERs, firms with negative SER experience decreasing abnormal returns as the value of the SER become more negative. Figure 2 provides an illustration of the portfolio stock returns. The market returns in most portfolios are significantly different from zero and positive. Figure 2 presents a continuum using all 20 portfolios (from most negative to most positive SERs) to reveal a U-shaped distribution of returns. The graph suggests that absolute SERs provide the best hedge profits. Although we cannot determine whether the increase in abnormal returns as SERs increase is a function of increased risk, good news, or a combination of both for these firms, we do find that there is no shifting of risk for these firms (see Table 7).

Table 6 reports the returns to a hedge portfolio, taking a long position in the highest value of the SER portfolio and an equally valued short position in the lowest value of the SER portfolio. For firms with positive SERs (i.e., SER>0), the returns to a hedge portfolio taking a long position in the highest portfolio and an equally valued short position in the lowest portfolio is 33.7% (t-value = 3.12, p-value = .0023). For firms with negative SERs (SER<0), the returns to a hedge portfolio taking a long position in the highest portfolio and an equally valued short position in the lowest portfolio is -22.6% (t-value = -2.03, p-value = .0438) for firms with negative SER. Our findings indicate that it is possible to make abnormal profits by following a trading strategy focused on the value of SERs. Specifically, we find an economically meaningful and statistically significant positive return to going long in firms in the top deciles of the value of SERs and going short in firms in the lowest deciles of the value of the SER component of earnings for firms with SER>0. Moreover, most of the abnormal returns come from the long position, not the short position. In contrast, for firms with SER<0, we find that the same trading strategy results in negative abnormal returns. This finding is mainly the result of the more significant abnormal returns occurring as negative SERs are decreasing (lowest portfolio) rather than increasing (highest portfolio). Overall, our results suggest that market participants cannot adequately interpret the firm-to-segment reconciliations resulting from ‘management approach’ accounting information, thereby causing them to underestimate the significance of these reconciliations (i.e., SERs).

Table 6
Buy-Hold Returns of the Portfolios

	Portfolio with Highest value of SER (Portfolio 1) minus Portfolio with Lowest value of SER (Portfolio 10)					
	SER>0			SER<0		
	mean	t-value	p-value	mean	t-value	p-value
BHRET	0.337	3.12	0.0023	-0.226	-2.03	0.0438
SER	0.099	23.69	<.0001	0.144	31.69	<.0001
EARN	-0.009	-0.65	0.5176	0.018	1.41	0.1616
AGSEG	-0.115	-7.79	<.0001	-0.145	-9.8	<.0001

The hedge portfolio consists of a long position in the highest value of SER and an offsetting short position in the lowest value of SER. BHRET is calculated as the return accumulation period begins four months after the end of the fiscal year and size-adjusted returns are computed by measuring the buy-hold return in excess of the buy-hold return on a value-weighted portfolio of firms having similar market values; EARN is earnings before interest and taxes (compustat #178) scaled by firm total assets (compustat #6); AGSEG is the sum of segment operating profits excluding all corporate, reconciliation, and elimination segments scaled by firm total assets (compustat #6); SER is firm-segment difference defined as EARN_t minus AGSEG_t. Portfolios are formed annually by assigning firms into deciles based on the magnitude of SERs in year *t*. The t-statistics are based on the time-series of the annual portfolio abnormal stock returns. The size-adjusted returns (BHRET) are computed by taking the raw buy-hold return, inclusive of dividends and liquidating distributions and subtracting the buy-hold return on a size matched, value-weighted portfolio of firms. The size portfolios are based on the market value of equity deciles of NYSE and AMEX firms. The decile rankings and decile returns are supplied by CRSP. The return accumulation period begins four months after the end of the fiscal year and size-adjusted returns are computed by measuring the buy-hold return in excess of the buy-hold return on a value-weighted portfolio of firms having similar market values. The bolded two-tailed p-values are significant at less than a <.01, .05, or .10 significance level.

Table 7 reports the results of equations (9)-(12): the mean coefficients of cross-sectional regressions of abnormal returns in years t+1 and t+2 on AGSEG and SER components of earnings at year t. If abnormal returns are due to SERs being a measure of risk, then these returns are likely to persist beyond year t+1. As shown, there is no significant relation between AGSEG_t and abnormal returns in either t+1 or t+2. When SER>0, the relation between SER_t and abnormal returns in year t+1 is significantly positive (coefficient = 2.051, p-value = .005). However, in year t+2, the relation is no longer significant, suggesting that the mispricing is not a shifting of risk. In contrast, when SER<0, the relation between SER_t and abnormal returns in years t+2 is not significant (coefficient = .868, p-value = .183). Hence, the evidence suggests that the market misprices the persistence of positive SERs in year t, but then corrects fully for this mispricing in year t+1. For SER<0, there is no statistically significant relation between

stock returns and AGSEG or SER. This suggests that there is no significant mispricing for negative SERs.⁵ Since the abnormal returns do not persist beyond year t+1, the segment reconciliation component of earnings does not appear to be a measure of risk.

Table 7
Future Buy-Hold Returns

Panel A: One-year Future buy-hold return

$$BHRET_{t+1} = \lambda_0 + \lambda_1 EARN_t + \varepsilon_{t+1} \tag{9}$$

$$BHRET_{t+1} = \mu_0 + \mu_1 AGSEG_t + \mu_2 SER_t + \varepsilon_{t+1} \tag{10}$$

Variable	SER>0				SER<0			
	Estimate	Pr > t	Estimate	Pr > t	Estimate	Pr > t	Estimate	Pr > t
Intercept	1.563	0.532	-0.063	0.980	-0.689	0.606	-1.568	0.290
EARN	0.142	0.612			-0.080	0.677		
AGSEG			-0.006	0.984			-0.188	0.330
SER			2.051	0.005			-0.927	0.077
Obs.	311		311		440		440	
R-Square	0.002		0.028		0.001		0.0081	
Adj R-Sq	-0.003		0.018		-0.003		0.0012	
F Value	0.41	0.6622	2.97	0.0322	0.28	0.756	1.18	0.316

Panel B: Two-year Future buy-hold return

$$BHRET_{t+2} = \lambda_0 + \lambda_1 EARN_t + \varepsilon_{t+1} \tag{11}$$

$$BHRET_{t+2} = \mu_0 + \mu_1 AGSEG_t + \mu_2 SER_t + \varepsilon_{t+1} \tag{12}$$

Variable	SER>0				SER<0			
	Estimate	Pr > t	Estimate	Pr > t	Estimate	Pr > t	Estimate	Pr > t
Intercept	0.495	0.825	-0.141	0.951	1.295	0.349	0.191	0.901
EARN	0.117	0.643			0.035	0.863		
AGSEG			0.047	0.857			0.095	0.636
SER			0.868	0.183			-0.488	0.369
Obs.	311		311		440		440	
R-Square	0.001		0.006		0.0023		0.0078	
Adj R-Sq	-0.005		-0.003		-0.0022		0.001	
F Value	0.16	0.8505	0.63	0.595	0.51	0.599	1.14	0.331

BHRET is calculated as the return accumulation period begins four months after the end of the fiscal year and size-adjusted returns are computed by measuring the buy-hold return in excess of the buy-hold return on a value-weighted portfolio of firms having similar market values; EARN is earnings before interest and taxes (compustat #178) scaled by firm total assets (compustat #6); AGSEG is the sum of segment operating profits excluding all corporate, reconciliation, and elimination segments scaled by firm total assets (compustat #6); SER is firm-segment difference defined as EARN minus AGSEG.

Additional Analysis

Although segment reporting under SFAS No. 14 is not the focus of this study, we perform some additional analysis to determine whether mispricing occurred prior to the adoption of SFAS No. 131. We conduct the same analysis for the pre- and post-SFAS131 period and find, in untabulated results, that the market underestimates the SER component in firms with SER>0, but not in firms with SER<0, in the pre-SFAS No. 131 period. This market mispricing occurs for the SER component of earnings under both segment-reporting regimes. However, no mispricing on the AGSEG component occurred prior to SFAS No. 131. The fact that the AGSEG component was not mispriced under the SFAS No. 14 segment-reporting regime, but mispriced under the SFAS No. 131 reporting regime, suggests there may have been no significant improvement (from a pricing standpoint) in the information environment leading to market inefficiency and potentially decreased transparency in segment reporting in the post-

⁵ When SER<0, the SER component has a p-value of 0.077. To the extent that some consider this p-value significant, then we would find significance in year t+1. But similar to the SER>0 firms, we find that the mispricing does not persist beyond t+1, suggesting that there is no significant shifting of risk occurring for these firms.

SFAS No. 131 period. This result is consistent with Botosan and Harris's (2005) findings that SFAS No. 131 resulted in greater overall uncertainty.

SUMMARY AND CONCLUSIONS

Prior research has shown that in certain contexts the market does not fully interpret the extent to which current earnings persist into future earnings. As a result, stock prices predictably do not represent the firm value. This study contributes to the research by examining whether investors can earn abnormal returns using public information about firms' aggregated segment earnings and their firm-segment reconcilable differences. Overall, our empirical findings show that SERs are generally incrementally persistent to the aggregated segments component of earnings.

Moreover, we find that stock prices generally fail to fully reflect the information contained in the SER component of current earnings when consolidated firm-level earnings are reported higher than aggregated segment earnings (i.e., $SER > 0$). This particular finding indicates that when firms report their aggregated segment earnings less than their firm earnings, the market does not fully reflect this information and thereby misprices the importance of this information (i.e., reconciliation). This may suggest that market participants cannot adequately interpret the information provided in the SER (which is essentially the reconciliation of aggregated segment earnings to firm earnings that is required as part of the management approach under the SFAS No. 131 segment-reporting regime), thereby causing them to misprice the importance of this component of earnings. One plausible explanation is that the reconciliation that is being provided by companies is not sufficient for the market to disentangle the differences that exist in the reporting between firm 'GAAP' earnings measurement and segment 'management approach' earnings measurement (Caterpillar, Inc. is a good example of this quandary), especially when firms report firm-segment differences greater than zero. Another plausible explanation is that the segment reconciliation amounts may consist of numbers that managers feel are less important. Firms reporting segment earnings less than consolidated earnings may have proprietary costs associated with more segment disclosure. For firms with negative SERs (i.e., $SER < 0$), we find that the market understands and incorporates aggregated segment earnings and SER components of earnings into stock prices appropriately.

Additionally, the results indicate that it is possible to make abnormal profits by following a trading strategy focused on positive SERs where we find significantly positive returns to going long in firms in the top deciles of the value of SERs and going short in firms in the lowest deciles of the value of the SER component of earnings. In contrast, for firms that report $SER < 0$, we find that the same trading strategy results in negative abnormal returns. Overall, our findings are consistent with the SEC's concern with regard to the proper reconciliation of segment information to the annually reported earnings. Our empirical findings, along with anecdotal findings, are also consistent with the critics that refer to SFAS No. 131 as the 'unstandard standard' and their inability to decipher segment earnings. Additional analysis also shows that the market does not misprice the aggregated segments or the negative SER components of earnings prior to the adoption of SFAS No. 131.

A limitation of this study is that the analyses in this study are not exhaustive, and there are other avenues to explore in understanding segment disclosure and segment-to-firm reconciliations (i.e., SER). It is also difficult to unequivocally determine whether mispricing is caused by investors' inability to understand non-GAAP measurements or the poor quality of segment information. Nonetheless, this study is the first to examine these reconciliations and further contributes to our understanding of segment disclosure practices by examining a unique setting in which management has discretion, based on how the firm is managed internally, to report segment information in a manner that may not be consistent with firm-level GAAP-reported earnings measurements.

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AUTHOR INFORMATION

Dana Hollie is an Assistant Professor of Accounting at Louisiana State University. She received a Bachelor of Science from Rochester Institute of Technology, an MBA from George Mason University and a PhD (Accounting) from Washington University in St. Louis. Dr. Hollie is also a CPA licensed to practice in Maryland. Her research interests include economic consequences of accounting regulation and disclosures, cash flow reclassifications, segment reporting, and Capital Markets. She has published in *Behavioral Research in Accounting*, *Journal of Accounting, Auditing, & Finance*, *Journal of Accounting and Public Policy*, *Journal of Forensic & Investigative Accounting*, *Journal of Portfolio Management*, and the *Review of Quantitative Finance & Accounting*. E-mail: danahollie@lsu.edu (Corresponding author)

Shaokun Carol Yu joined Northern Illinois University faculty in the Department of Accountancy in the Fall of 2007. She has a bachelor's degree from Jilin University in China, a master's degree in accountancy from the University of Houston. Her Ph.D. in accountancy was earned at the University of Houston as well. Dr. Yu is a Certified Public Accountant. Dr. Yu teaches Financial Reporting I, Intermediate Cost Management, and Financial Accounting Information. Her research interests include corporate governance, earnings management, and segment reporting. Dr. Yu, co-authored a research paper which received the American Accounting Association's Midwest Region 2008 Best Paper Award. Dr. Yu has published in the *Journal of Forensic Accounting*, *Strategic Finance*, *American Journal of Business Education*, and *Journal of International Management Studies*. E-mail: shaokunyu@niu.edu

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APPENDIX A

Caterpillar, Inc. An Excerpt Example of Reconcilable Differences between Firm-Level and Segment-Level Financial Information

We have developed an internal measurement system to evaluate performance and to drive continuous improvement. This measurement system, which is not based on generally accepted accounting principles (GAAP), is intended to motivate desired behavior of employees and drive performance. It is not intended to measure a division's contribution to enterprise results. The sales and cost information used for internal purposes varies significantly from our consolidated, externally-reported information resulting in substantial reconciling items. Each division has specific performance targets and is evaluated and compensated based on achieving those targets. Performance targets differ from division to division; therefore, meaningful comparisons cannot be made among the profit or service center divisions. It is the comparison of actual results to budgeted results that makes our internal reporting valuable to management. Consequently, we feel that the financial information required by Statement of Financial Accounting Standards No. 131 (SFAS 131) "Disclosures about Segments of an Enterprise and Related Information" has limited value for our external readers.

Due to Caterpillar's high level of integration and our concern that segment disclosures based on SFAS 131 requirements have limited value to external readers, we are continuing to disclose GAAP-based financial results for our three lines of business (Machinery, Engines, and Financial Products) in our Management's Discussion and Analysis beginning on page A-21.

Segment measurement and reconciliations

Please refer to Table V on Pages A-18 and A-19 for financial information regarding our segments. There are several accounting differences between our segment reporting and our GAAP-based external reporting. Our segments are measured on an accountable basis; therefore, only those items for which divisional management is directly responsible are included in the determination of segment profit/loss and assets. The following is a list of the more significant accounting differences:

. Generally, liabilities are managed at the corporate level and are not included in segment operations. Segment accountable assets generally include inventories, receivables, property, plant, and equipment.

. We account for intersegment transfers using a system of market-based prices. With minor exceptions, each of the profit centers either sells or purchases virtually all of its products to or from other profit centers within the company. Our high level of integration results in our internally reported sales being approximately doubles that of our consolidated, externally-reported sales.

- Segment inventories and cost of sales are valued using a current cost methodology.
- Timing differences occur between our internal reporting and our external reporting such as: postretirement benefit expenses and profit that is recognized on intersegment transfers.
- Interest expense is imputed (i.e., charged) to profit centers based on their level of accountable assets. This calculation takes into consideration the corporate debt to debt plus equity ratio and a weighted-average corporate interest rate.
- In general, foreign currency fluctuations are neutralized for segment reporting.
- Accountable profit is determined on a pre-tax basis.

Reconciling items are created based on accounting differences between segment reporting and our consolidated, external reporting. Please refer to Table V on Pages A-18 and A-19 for financial information regarding significant reconciling items. Most of our reconciling items are self-explanatory given the above explanations of accounting differences. However, for the reconciliation of profit, we have grouped the reconciling items as follows:

- . Corporate costs: Certain corporate costs are not charged to our segments. These costs are related to corporate requirements and strategies that are considered to be for the benefit of the entire organization.
- . Methodology differences: See previous discussion of significant accounting differences between segment reporting and consolidated, external reporting.
- . Methodology changes in segment reporting: Estimated restatements of prior periods to reflect changes in our internal-reporting methodology.