Research in Accounting Regulation 27 (2015) 1–13

Contents lists available at ScienceDirect

Research in Accounting Regulation

journal homepage: www.elsevier.com/locate/racreg

Regular Paper

Discretionary allocation of corporate income to segments

Qian Wang [a], Michael Ettredge [b,*]

[a] Iowa State University, USA
[b] University of Kansas, USA

ARTICLE INFO

Article history:
Available online 26 March 2015

JEL Codes:
M41

Keywords:
Segments
FAS 131
Proprietary costs
Agency costs
Mandatory disclosure
Earnings response coefficient

ABSTRACT

The SEC continues to view companies' segment disclosures, including segment earnings, as needing improvement. Under a controversial provision of FAS 131, the sum of a company's segment earnings need not equal corporate net income. We refer to the difference between summed segment earnings and corporate-level income, when it exists, as the Gap. This study examines why Gaps exist. We find that the existence and direction of Gaps appear to reflect both reporting decisions intended to better reflect segment operating results and reporting incentives to obscure differences in profitability across segments. Gaps created for the former reason are shown to provide useful information to investors. We also find that summed segment earnings are, on average, more useful than corporate earnings (i.e. more persistent, predictable and informative) when there are negative Gaps (aggregated segment earnings exceed comparable corporate earnings), but less useful, on average, when positive Gaps are observed. On balance the evidence suggests that the FASB's decision in FAS 131 to allow segment-related income Gaps was justified.

© 2015 Elsevier Ltd. All rights reserved.

Introduction

Segment reporting has long been of concern to U.S. regulators and investors. For example, segment reporting is one of the most common areas discussed in comment letters sent by the Securities and Exchange Commission (SEC) to companies with suspected disclosure deficiencies (Chasan, 2013). Firms' segment reporting practices have triggered SEC investigations.[1] Investors have raised questions about possible abuses of segment data.[2] We employ firms' segment reporting data to investigate a controversial aspect of Statement of Financial Accounting Standard No. 131 (FAS 131) guidance: the allocation of revenues and expenses to and among segments.[3]

FAS 131 allows companies to measure segment earnings differently than is required for the consolidated reporting entity. Thus, segment earnings can *exclude* expenses (or revenues) typically recognized under generally

* Corresponding author. Tel.: 785-864-7537; fax: 785-864-5328.
E-mail address: mettredge@ku.edu (M. Ettredge).

[1] For example, Trachtenberg (2013) reports that "The SEC also is looking into a former employee's allegations that Barnes & Noble had improperly allocated [certain expenses] between its Nook devices and ebooks business, and its consumer bookstore group in its earning reporting …" This is an investigation of alleged improper allocation of expenses across segments, because Barnes & Noble's "Nook devices and ebooks business" is housed in its Nook segment, and its "consumer bookstore group" is housed in its B&N Retail segment.

[2] For example, during Groupon's IPO process in 2011, investors questioned its initial filings that reported "adjusted consolidated segment operating income". That version of earnings excluded from the company's operating income several major expenses, including marketing and acquisition-related costs (De La Merced, 2011).

[3] *Disclosures about Segments of an Enterprise and Related Information* (FAS 131, Financial Accounting Standards Board (FASB), 1997). FAS 131 is presented under FASB codification Section 280: Segment Reporting.

http://dx.doi.org/10.1016/j.racreg.2015.03.001
1052-0457/© 2015 Elsevier Ltd. All rights reserved.

accepted accounting principles, GAAP.[4] In addition, FAS 131 allows companies to *include* revenues (or expenses) in segment earnings that GAAP does not allow as elements of corporate net income.[5] Therefore the sum of segment earnings need not equal corporate net income, nor is it required to equal any corporate earnings subtotal, 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, or as the Gap.

Opponents of the provisions of FAS 131 that enable Gaps argue that it provides managers with leeway to manipulate earnings information at the segment level. Proponents believe that the allocation or non-allocation of expenses or revenues reflects legitimate internal reporting decisions and can provide analysts and investors with a more meaningful view of segment performance. Absent evidence, it is not clear which of these views is correct, or whether both are true under certain conditions. Despite the controversy regarding non-GAAP segment earnings allowed under FAS 131, no published research has explored why some multi-segment companies disaggregate their corporate earnings less completely than others, and how incomplete allocation (i.e. Gaps) affects the usefulness of segment earnings. This paper addresses those issues.

A company's Gap equals comparable corporate earnings minus aggregated segment earnings.[6] A negative (positive) Gap exists when corporate earnings is less than (greater than) the sum of segment earnings. We define a dichotomous Gap variable as equal to 1 if a company exhibits a Gap, and equal to 0 otherwise. We also employ a variable consisting of the ranked absolute value of Gaps to measure the magnitude of Gaps. Using a sample of 20,594 company-year observations during 1998–2012, we investigate several factors that influence the magnitude of Gaps. Our results indicate that variables representing goodwill, other intangibles, merger and acquisition activity, and special income items, are significantly associated with the magnitude of Gaps. These results are consistent with a more positive view of Gaps – that firms appear to allocate components of corporate income to segments when the related activities are controlled by segment-level managers, and/or the income items persist. We find that companies operating in industries characterized by smaller numbers of powerful competitors and companies with inefficient cross-segment transfer of firm resources are likely to exhibit larger Gaps. We interpret these effects as attempts by managers to conceal information from their competitors and shareholders.

We also examine whether Gaps lead to more or less useful information for investors. The similarities between segment earnings with Gaps and *pro forma* versions of earnings, to be discussed later, suggest that the usefulness to investors of Gaps in aggregated segment earnings be assessed in the same way the usefulness of *pro forma* earnings have been assessed. Therefore we investigate the consequences of Gaps as they affect earnings persistence over 1-year periods, and as they affect earnings informativeness (association with annual market-adjusted buy-and-hold returns). We compare the persistence and informativeness for aggregated segment earnings and comparable corporate income.

We find different results for firms with negative Gaps versus positive Gaps. Aggregated segment earnings with negative Gaps resemble *pro forma* versions of income in which "transitory" or "non-core" expenses and losses are added back. Therefore we expect investors' responses to segment earnings with negative Gaps are similar to investors' responses to *pro forma* earnings. Our results generally agree with our expectations. We find that aggregated segment earnings characterized by negative Gaps are more persistent (predictable) than corporate income. In contrast, when firms have positive Gaps, corporate income tends to be more persistent than aggregated segment earnings. Result implications are similar when we test the association between earnings and concurrent stock returns. That is, for firms with negative Gaps, the association of returns with aggregated earnings is positive and significantly greater than the association with corporate income, and the explanatory power of aggregated earnings is significantly greater than that of corporate income. For firms with positive Gaps, the coefficient of corporate income is significantly greater than the coefficient of aggregated earnings. In summary, segment earnings are more persistent and informative than comparable corporate earnings when Gaps are negative, i.e. corporate expenses and losses that are likely transitory in nature are not pushed down to the segment level. On the other hand, when revenue and gains are not pushed down to the segment level, corporate earnings are more persistent and informative.

This study has implications for regulators and standard-setters, as well as contributing to the academic literature. Our findings address the debate related to allowing non-GAAP earnings to be reported at the segment level. Our results suggest that managers' allocation of revenue and expenses to segments under FAS 131 most often reflect legitimate reporting decisions. For example, activities that are not controlled by segment-level managers, or that are transitory in nature, are excluded from segment earnings. However, evidence also exists suggesting that managers appear to use FAS 131 discretion opportunistically to make segment profitability less transparent.

However, our results regarding the consequences of Gaps suggest that the benefits of allowing managerial discretion outweigh the costs in the sense that segment earnings with Gaps provide better information to investors, at least for the majority of firms with negative Gaps (72%). This should alleviate concerns regarding the presentation of segment earnings with Gaps to investors.

The remainder of the paper is organized as follows. Background section introduces the provisions of FAS 131 that

[4] 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 Securities Exchange Commission (2003, 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."

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

[6] The operational definitions of comparable corporate earnings and of aggregated segment earnings are introduced in a subsequent section.

apply to this study. Research issues and models section develops our research issues in the context of prior literature, and explains the models and variable specifications together with the sample and data. Result section discusses the results. The last section concludes.

Background

In June 1997, the FASB issued SFAS No. 131, *Disclosures about Segments on Enterprise and Related Information*. 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.

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–j). As a result, many multi-segment companies provide segment earnings reports that are very brief. It is common to see income reports containing only two lines: segment revenues and segment profit or loss.

Based on examination of numerous companies' segment reporting footnote data, segment profit or loss numbers most often are labeled as "operating profit" or "operating income". The term "operating profit" also designates a version of segment profit or loss available in the Compustat Segment File. There is no official GAAP definition of operating income or operating profit. 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.[7]

The Appendix to this paper provides selected segment information disclosed in Walt Disney Co.'s Form 10-K for the fiscal year ended October 3, 2009. The data selected include operating income by segment and the reconciliation of aggregated segment income to a measure of corporate income.[8] As stated previously, companies have some leeway in choosing the version of consolidated income to which segment earnings are reconciled. Disney chooses to reconcile aggregated segment operating income to corporate income from continuing operations before income taxes and minority (non-controlling) interests. For 2009, the aggregated segment operating income (which, after scaling, we refer to as *AGGEARN*) is $6672 million. Corporate income from continuing operations before income taxes and minority (non-controlling) interests is $5658 million. If we designate that version of corporate income as our variable which, after scaling, we refer to as *CORPEARN*, the unscaled Disney Gap for 2009 would be –$1014 million. Disney's negative Gap is largely explained by expenses and losses that are not pushed down to the segment level: corporate and unallocated shared expenses, restructuring and impairment charges, and net interest expense. Disney also has $342 million of other income (from investing transactions) that is not allocated to segments. In summary, Disney's disclosure is typical in that aggregated segment earnings exceed the corporate income numbers to which they are reconciled. The negative Gaps are largely explained by transitory income items (restructuring, impairment charges), and by income items for which segment level managers likely are not responsible (corporate and shared expenses, interest expense).

Research issues and models

The existence and the magnitude of Gaps

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. Corporate income items might not be allocated to segments, in part, because they represent transitory gains or losses for which segment-level managers are not responsible.[9] When segments reflect companies' internal organizations, and when segment earnings are derived from internal performance reports, Gaps are likely to arise in firm-years characterized by material amounts of income items that are generated by corporate-level decisions, and that often are transitory in nature. In addition there are no GAAP principles guiding allocations of joint costs. We refer to such income items for which segment level managers likely are not responsible as

[7] 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."

[8] Our research topic focuses on reconciliation of segment earnings to company earnings, and we present such information for Disney. However, GAAP has additional reconciliation requirements as follows, with guidance found in Accounting Standards Codification 280-10-50-30. Reportable segments' revenues should be reconciled to consolidated revenues. Reportable segments' total assets should be reconciled to consolidated total assets. Reportable segments' amounts for "every other significant item of information disclosed" should be reconciled to comparable corporate totals. For example, if a company chooses to disclose total liabilities for its reportable segments (in addition to total assets, as required), the company should reconcile total segments' liabilities to total corporate liabilities. In our experience, companies rarely present reconciliations of balance sheet amounts other than assets.

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

"non-responsible" items. We expect that segment-level earnings will be shielded from income items that are beyond the control of segment-level managers. We further expect that transitory income items will be excluded to protect segment-level managers from risk.[10]Based on prior literature, top managers appear to believe that transitory income items also should be excluded when developing *pro forma* earnings numbers. Therefore we rely to some extent on the literature studying *pro forma* earnings in our search for proxies for transitory earnings components.

We operationalize the concepts discussed earlier using four explanatory variables. The first two are goodwill (*GW*) and other intangibles (*OTHRINTAN*). Prior research (Collins, Maydew, & Weiss, 1997; Francis & Schipper, 1999; Lev & Zarowin, 1999) indicate 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. Managers in companies with high intangibles intensity are more likely to promulgate *pro forma* income numbers than other firms (Lougee & Marquardt, 2004). In addition, intangibles often arise as a result of decisions made at the corporate level rather than the segment level. We measure goodwill separately from other intangibles because of the change in accounting treatment for goodwill that occurred in our sample period. We expect that companies with more goodwill have a greater tendency to measure segment earnings differently than corporate GAAP income. We define *GW* as goodwill (Compustat annual data GDWL) scaled by total assets at the end of the fiscal year. We also expect that companies with more other intangibles are likely to report segment earnings differently than corporate income. *OTHRINTAN* is defined as intangibles (Compustat annual data INTAN) minus goodwill, scaled by total assets.

Our third test variable reflects merger and acquisition activities (*MERGE*). Companies engaged in merger or acquisition activities incur costs that arguably should not be allocated to individual segments because they are not the responsibility of segment-level managers, and these specific events are non-recurring in nature.[11]Therefore merger or acquisition activities are likely to be associated with larger Gaps. *MERGE* is coded 1 if a company experienced merger or acquisition activity in a year, and is coded 0 otherwise.

Our fourth test variable consists of special or unusual income items (*SPECIAL*). Unusual items largely consist of restructuring charges and asset write-offs, although some result in gains rather than losses. Weber, Nichols, Street, and Cereola (2013) showed that among S&P 100 companies the GAAP items most frequently excluded from *pro forma* earnings are restructuring charges, net gain/loss on the sale of tangible assets, and impairment charges. Special income items are transitory and may obscure the other information contained in reported earnings numbers (Elliott & Hanna, 1996). Bradshaw and Sloan (2002) documented that analysts focus on earnings that exclude non-recurring items, and that stock price has a stronger association with these earnings numbers than with the numbers reported under GAAP. Lougee and Marquardt (2004) showed that firms having larger amounts of special items are more likely to issue *pro forma* earnings. In our context, we expect that segment earnings are likely measured to exclude special items, thus generating larger Gaps between corporate income and aggregated segment earnings. *SPECIAL* is defined as the absolute value of special items (Compustat annual data SPI), scaled by total assets at the end of the fiscal year.

Prior research provides evidence that managers of companies facing high proprietary costs tend to implement segment reporting standards in ways that conceal some segment information (Bens, Berger, & Monahan, 2011; Berger & Hann, 2007; Botosan & Stanford, 2005; Ettredge, Kwon, Smith, & Stone, 2006; Harris, 1998).[12]Most such studies focus on the ways in which companies are disaggregated into segments. In our context, we expect that top managers of companies operating in more highly concentrated industries will adopt segment reporting practices that reveal less about performance differences across segments. Specifically, managers choose not to allocate some elements of corporate income to segments, not because segment level managers are not accountable for them, but because making such allocations would reveal valuable inter-segment profitability details. By excluding from segment earnings some income items that could be identified as resulting from the activities of specific segments, companies can conceal differences in segment performance.[13]We use the Herfindahl Index (*HERF*) to measure the level of concentration in an industry. 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*. We expect *HERF* to be positively associated with the magnitude of Gaps.

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 empire building-related agency costs (Bushman & Smith, 2001; Healy & Palepu, 2001). This provides top

[10] We acknowledge that these expectations are based on "common sense," and that prior literature does not provide a strong theory to support the expectations.

[11] 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.

[12] Top 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.

[13] 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.

managers of multi-segment firms with incentives to engage in strategic reporting that limits the monitoring usefulness of segment information.[14]Again, by excluding from segment earnings some income items that could be identified as resulting from the activities of specific segments, managers can conceal differences in segment performance. Our proxy for agency cost is a metric based on Berger and Hann (2007). *HTRANSFER* reflects the presence of inefficient resource transfer activities across segments. We first compute excess capital expenditures, i.e. the max of: [Capital expenditure – (operating profits + depreciation); 0] for each segment and for the company as a whole. We assign segment-level depreciation a value of 0 if it is missing. *TRANSFER* is computed as segment-level excess capital expenditure minus firm-level excess capital expenditure. *HTRANSFER* equals 'one' if at least one segment has positive *TRANSFER* and its return on sales (ROS) is less than the weighted average ROS of remaining segments in the firm.[15]Otherwise *HTRANSFER* is coded as 'zero'. Firms for which this variable is coded as 'one' have at least one underperforming segment that is receiving funds from other segments. We expect *HTRANSFER* to be positively associated with Gaps.

Market valuation of Gaps

We also investigate the usefulness to investors of aggregated segment earnings when Gaps are observed. Although we think this is of obvious interest given the controversy over FAS 131's provisions enabling firms to report non-GAAP segment earnings, our investigation also is motivated by parallels between provisions of FAS 131 and the SEC's Regulation G issued in 2003. Marques (2006) described how, in the period immediately preceding the SOX Act of 2002, the SEC became concerned that many firms were announcing non-GAAP versions of earnings, often called "*pro forma*" earnings. This commonly occurs in conjunction with earnings announcements. *Pro forma* versions of earnings often exclude some expenses as defined by GAAP so that *pro forma* earnings exceed GAAP income. In this respect *pro forma* earnings are similar to aggregated segment earnings that exceed comparable corporate earnings, i.e. those that exhibit negative Gaps. Regulation G requires firms issuing *pro forma* versions of earnings to reconcile those numbers to the amounts of the most directly comparable GAAP income measures.[16]This reconciliation requirement is similar to the requirement in FAS 131 (issued 6 years earlier) that aggregated segment income numbers be reconciled to the most comparable corporate income numbers. Regulation G can be interpreted as an SEC attempt to discourage firms from issuing *pro forma* earnings. If so, it succeeded: the regulation was accompanied by a reduction in the numbers of firms announcing *pro forma* earnings (Marques, 2006). However, FAS 131 enables multi-segment firms to disclose the equivalent of *pro forma* numbers within the annual report itself (i.e. in the segment footnote) rather than in a press release.

The parallels between (1) segment earnings with Gaps and *pro forma* versions of earnings, and (2) between FAS 131's required reconciliation and Regulation G's required reconciliation suggest that the usefulness to investors of Gaps in aggregated segment earnings be assessed in the same way the usefulness of *pro forma* earnings have been assessed. Therefore we investigate the consequences of Gaps as they affect earnings persistence over 1-year periods, and as they affect earnings informativeness (association with annual market-adjusted buy-and-hold returns). We compare the persistence and informativeness of aggregated segment earnings (*AGGEARN*), versus comparable corporate income (*CORPEARN*), using subsamples with Gaps.

Bhattacharya, Black, Christensen, and Larson (2003) showed that investors believe *pro forma* earnings are more permanent than GAAP operating earnings. Campbell and Lopez (2010) found that small cap firms are more likely to emphasize *pro forma* earnings in order to enhance the usefulness of information. We expect that aggregated earnings also will exhibit more persistence than GAAP corporate-level 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.

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 & Zarowin, 1999). Research suggests that *pro forma* earnings are generally more highly associated with abnormal stock returns than is GAAP operating income.[17]Therefore, we expect aggregated segment earnings to be more strongly associated with concurrent stock returns than GAAP earnings.

To compare the contemporaneous association of stock returns with consolidated corporate earnings and with aggregated segment earnings, *CORPEARN* and *AGGEARN*, we regress the earnings variables and controls on long-window buy-and-hold abnormal returns (*BHAR*). *BHAR* is the 1-year buy-and-hold return adjusted for the CRSP value-weighted index over the period beginning 3 months following the end of fiscal year $t-1$ and ending 3 months after fiscal year t.

[14] Berger and Hann (2007) provided evidence that, prior to FAS 131, companies having greater agency costs suppressed information about investments in less-profitable segments. Hope and Thomas (2008) found 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. Bens et al. (2011) found that higher agency costs are negatively associated with disclosure of individual pseudo-segments among companies that disclose multiple external segments, but not among those that disclose single external segments.

[15] Berger and Hann's (2007) metric *TRANSFER* does not capture whether the segment's ROS is less than the average ROS of the firm's other segments. Replacing our measure with Berger and Hann's measure in the models does not change our results.

[16] Regulation G applies to non-GAAP financial measures in general. However, we will focus on non-GAAP versions of earnings since these are most similar to non-GAAP segment earnings.

[17] Bradshaw and Sloan (2002) and Brown and Sivakumar (2003) found 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) reported evidence that investors view *pro forma* earnings as more informative than GAAP earnings.

Models for tests of the existence and the magnitude of Gaps

Before introducing the models for tests of the causes of Gaps, we formally define the earnings 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.[18] As stated previously, examination of segment footnote data indicates that companies most often label their segment earnings as "operating profit or loss".[19] 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.[20] Compustat does not provide a corporate earnings data item that exactly corresponds to this definition. We compare the amounts of various Compustat annual earnings items to the amounts of consolidated corporate income that a number of sample companies disclose in their reconciliation schedules. We find that the consolidated corporate income amounts in reconciliation schedules correspond most closely to Compustat's "operating income after depreciation" (annual data item OIADP). 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 1 if *CORPEARN* does not equal *AGGEARN*, and as 0 if the two are equal. Variable *GAPDUM* does not make use of information about the magnitudes of Gaps, so we employ another variable, *GAPABS*, in our main analyses. We compute the difference between corporate earnings and aggregated segment earnings, and scale the difference by market value of equity. We then take the absolute values of the scaled amounts, and rank them into quintiles to eliminate skewness.

To investigate the causes of Gaps, we use ordered logistic regression to estimate the following model.[21]

$$\begin{aligned} GAPABS = {} & b_0 + b_1 GW + b_2 OTHRINTAN + b_3 MERGE \\ & + b_4 SPECIAL + b_5 HERF + b_6 HTRANSFER \\ & + b_7 LNMV + b_8 NSEG + b_9 MTB + b_{10} LOSS \\ & + b_{11} LEV + b_{12} SGROWTH \end{aligned} \quad (2)$$

Variables *GW*, *OTHRINTAN*, *MERGE*, and *SPECIAL* proxy for activities giving rise to corporate income items that are difficult to allocate to segments (i.e. that are transitory or non-responsible). We expect all three variables to have positive coefficients. *HERF* proxies for the proprietary costs of revealing information to competitors. *HTRANSFER* represents agency costs of revealing information about inefficient allocation of resources to shareholders. We expect these two variables to have positive coefficients.

We add control variables for other firm characteristics that are known to influence disclosure choices and that may be associated with *GAPABS*. 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 market-to-book ratio (*MTB*) 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 1 if a company reports negative income for a year (*LOSS*) and 0 otherwise. Losses are inherently more transitory than gains since profits are required to attract and retain capital. 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. We control for companies' sales growth (*SGROWTH*), but do not have an expected sign. Lastly, we control for industry membership using dichotomous variables based on the 48 Fama-French industry classifications. For brevity we do not show these variables in model (2) or subsequent models; and we do not tabulate the estimated coefficients for the industry variables.

Models for tests of market valuation of Gaps

We next examine whether *AGGEARN* is more persistent than *CORPEARN*. We regress each earnings measure (*AGGEARN* and *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 suggest that aggregated segment earnings are more permanent than consolidated operating earnings. The model is:

$$\begin{aligned} & AGGEARN_{t+1} \text{ or } CORPEARN_{t+1} = b_0 + b_1 AGGEARN_t \text{ or} \\ & CORPEARN_t + b_2 LOSS + b_3 LNMV + b_4 MTB + b_5 SGROWTH \end{aligned} \quad (3)$$

[18] 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. Deleting these components eliminates the coding inconsistency found in the Compustat Segment File and excludes income components from aggregate segment earnings that companies have not actually allocated to operating business segments.

[19] Compustat classifies segment earnings disclosed by companies into six categories. They are: (1) operating income before depreciation; (2) operating income after depreciation; (3) income before extraordinary items; (4) net income; (5) pretax income; and (6) operating profit. Eighty-seven percent of sample companies disclose segment incomes that Compustat classifies as 'operating profit'. The availability of the other five measures for the initial sample varies from 49% to 53%.

[20] Under FAS 131, companies provide reconciliation schedules that indicate the items included in corporate income that have not been allocated to its segments. See the Appendix for an example. 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.

[21] Ordered Logit is used because *GAPABS* is ranked by quintile. Results are similar if the dependent variable is *GAPDUM*.

We control for loss (*LOSS*), size (*LNMV*), growth opportunity (*MTB*) and growth rate (*SGROWTH*) based on factors influencing earnings persistence in the prior literature (Baginski, Lorek, Willinger, & Branson, 1999; Lev, 1983). We expect *LOSS* in period t to be negatively associated with both measures of earnings in period $t+1$. Bathke, Lorek, and Willinger (1989) found a positive association between firm size and earnings autocorrelation. We expect *LNMV* is positively associated with the dependent variable. We do not specify expected signs for *MTB* and *SGROWTH*. Similar to model (2), dichotomous industry membership variables are added to model (3). Model (3) is estimated using only observations for which *CORPEARN* does not equal *AGGEARN*.

To investigate the associations of *AGGEARN* versus *CORPEARN* with contemporaneous returns, the model is:[22]

$$BHAR_t = b_0 + b_1 AGGEARN_t \text{ or } CORPEARN_t + b_2 AGGEARN_{t-1} \text{ or } CORPEARN_{t-1} + b_3 (AGGEARN_t \text{ or } CORPEARN_t) * Controls \quad (4)$$

Control variables consist of *LNMV*, *MTB*, and *SGROWTH*, which are defined earlier.

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).[23] Therefore, we include *LNMV*, *MTB* and *SGROWTH* as controls in the model without specifying expected signs of association. Industry variables are added to model (4) when estimated. Similar to model (3), model (4) is estimated using only observations for which *CORPEARN* does not equal *AGGEARN*.

Results

Our sample begins with 117,372 firm-year observations available in the Compustat Segment File from years 1998 to 2012. We delete 69,383 observations for single-segment companies, and 6113 observations for companies operating in financial industries. To avoid coding errors, we also eliminate 7038 company-years having consolidated sales revenues not equal to aggregated segment sales.[24] We eliminate 14,244 firm-years for which required data are missing for model variables. There are 20,594 firm-year observations with all financial data available, which constitute the sample for investigating causes of Gaps. Since investigating the informativeness of Gaps requires stock return data, we obtain companies' stock return data from CRSP. When testing consequences of Gaps, we focus on the sample firms with non-zero Gaps. These requirements reduce our sample size to 10,494 firm-years. The detailed sample selection process is reported in Table 1.

Table 1
Sample selection.

	Number of observations
Company-years in Compustat Segment File from year 1998 to 2012	117,372
Delete:	
Company-years with a single segment	(69,383)
Company-years contributed by firms in the financial industries (SIC = 6000–6999)	(6113)
Company-years having consolidated sales not equal to aggregated segment sales	(7038)
Company-years with missing financial variables	(14,244)
Sample for investigating causes of Gaps	20,594
Delete:	
Company-years with missing price data in CRSP	(8313)
Company-years with zero Gap	(1787)
Sample investigating consequences of Gaps	10,494

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 negative Gaps, where corporate operating income (*CORPEARN*) is less than aggregated segment earnings, and companies with positive Gaps, where corporate operating income is larger than aggregated segment earnings.

Table 2 comparisons of companies (firm-years) having *GAPDUM* equal to 0 versus equal to 1 (see Difference tests for columns (a)–(b)) indicate that companies with Gaps (*GAPDUM* equal to 1) have significantly more goodwill (*GW*), more other intangibles (*OTHRINTAN*) and are more likely to engage in merger or acquisition activities (*MERGE*), have more special items (*SPECIAL*), compared to companies having no Gaps. The univariate results largely support the importance of difficult-to-allocate and transitory income items in explaining Gaps. Compared with companies having no Gaps, the Gap companies operate in more concentrated industries (*HERF*), and are more likely to have inefficient cross-segment transfers of funds (*HTRANSFER*). These results suggest the importance of proprietary costs and agency costs in explaining Gaps. Companies with Gaps are larger (*LNMV*), have more segments (*NSEG*), are more profitable (less *LOSS*), have higher financial leverage (*LEV*), and have lower sales growth rates (*SGROWTH*) and lower market-to-book ratio (*MTB*).

The comparisons of companies having negative Gaps with zero Gap companies (see Difference column for (a)–(c)) are similar to the comparisons between companies with versus without any Gaps, except for no difference in special items and market-to-book ratio. The comparison of companies having positive Gaps with zero Gap companies (see Difference column for (a)–(d)) are similar to the comparisons between companies with versus without any Gaps. Compared to companies having positive Gaps, companies having negative Gaps have more goodwill, have less special items, and have more inefficient transfers of internal

[22] To facilitate comparison of coefficients across equations, we standardize all variables in model (4) (Bhattacharya et al., 2003, 304). We transform the distribution of each variable so that its mean is 0 and its standard deviation is 1.

[23] Results concerning the effect of firm size on ERCs are conflicting. Lipe (1990) found size to be marginally significant. However, Easton and Zmijewski (1989) found firm size to be generally unimportant in determining ERCs. Collins and Kothari (1989) reported that growth opportunities and firm risk affect ERCs.

[24] 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. Including these firms does not change the results qualitatively.

Table 2
Univariate tests of differences in variable means between zero Gap and non-zero Gap samples.

	GAPDUM = 0	GAPDUM = 1	Negative Gap	Positive Gap	Difference			
	(a)	(b)	(c)	(d)	(a)–(b)	(a)–(c)	(a)–(d)	(c)–(d)
N	3587	17,007	12,282	4725	t-Test	t-Test	t-Test	t-Test
Variable	Mean	Mean	Mean	Mean	p-Value	p-Value	p-Value	p-Value
GW	0.094	0.135	0.138	0.125	0.000***	0.000***	0.000***	0.000***
OTHRINTAN	0.038	0.049	0.049	0.050	0.000***	0.000***	0.000***	0.821
MERGE	0.279	0.388	0.387	0.389	0.000***	0.000***	0.000***	0.821
SPECIAL	0.021	0.028	0.021	0.045	0.000***	0.699	0.000***	0.000***
HERF	0.062	0.068	0.068	0.067	0.000***	0.000***	0.000***	0.152
HTRANSFER	0.460	0.775	0.770	0.789	0.000***	0.000***	0.000***	0.009***
LNMV	4.597	6.174	6.173	6.176	0.000***	0.000***	0.000***	0.946
NSEG	2.823	3.982	4.024	3.873	0.000***	0.000***	0.000***	0.000***
MTB	2.415	2.315	2.356	2.208	0.047**	0.255	0.000***	0.000***
LOSS	0.335	0.211	0.205	0.227	0.000***	0.000***	0.000***	0.002***
LEV	0.510	0.558	0.553	0.571	0.000***	0.000***	0.000***	0.000***
SGROWTH	0.145	0.110	0.117	0.092	0.000***	0.000***	0.000***	0.000***

GAPDUM = 1 if Compustat's corporate-level "operating income after depreciation" does not equal the aggregated segment operating profit; 0 otherwise. A Negative Gap exists if corporate operating income after depreciation (Compustat's annual data item OIADP) is less than summed segment earnings. A Positive Gap exists if corporate operating income after depreciation is greater than summed segment earnings.
GW = goodwill, scaled by total assets, OTHRINTAN = intangible assets minus goodwill, scaled by total assets. MERGE = 1, if the company experiences 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. HTRANSFER = a proxy for inefficient cross-segment funds transfers. See the text for definition. LNMV = natural log of market value of equity. NSEG = number of operating segments. MTB = total market value of equity divided by book value of equity. LOSS = 1 if corporate-level operating income after depreciation 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 previous sales.
*, ** and *** represent significance at the 0.1, 0.05 and 0.01 levels, respectively.

resources. Companies having negative Gaps also have more segments, have higher market-to-book ratio and sales growth, are more profitable and have lower leverage. The somewhat different results for negative Gap companies versus positive Gap companies, (c)–(d), suggest additional analysis is warranted based on directions of Gaps. Intuitively, a negative Gap represents a situation in which expenses or losses included in comparable corporate income are not fully allocated to segments, while a positive Gap represents one in which revenues or gains are not fully allocated to segments. Therefore, in some of the following analyses, we conduct tests separately for the two subsamples as well as for the sample as a whole.

In untabulated results, *GAPABS* is positively correlated with *GW*, *OTHERINT*, *MERGE*, *SPECIAL*, *HTRANSFER*, *LNMV*, *NSEG*, *LOSS*, *LEV* and *SGROWTH*. Correlation signs generally are consistent with expectations. Correlations among explanatory variables are modest in magnitude although often significantly different from zero. Subsequent investigation reveals that collinearity is not a threat to validity of reported results.

Table 3 reports the ordered logistic regression results for factors explaining *GAPABS* in columns under heading (a). This is our primary investigation of the determinants of the magnitude of Gaps. Consistent with expectations, goodwill, other intangibles, merger or acquisition activity, and the amount of special items are positively associated with *GAPABS*. Industry concentration and cross-segment resource transfers also are positively associated with *GAPABS*, which supports the importance of proprietary costs and agency costs. Among control variables, *GAPABS* is positively associated with *NSEG*, *MTB*, and *LOSS*, and is negatively associated with *LNMV* and *LEV*. As additional analyses, we estimate the model for observations with non-positive Gap, and for observations with non-negative gap. Industry concentration is not significant in the non-positive Gap sample but is significant in the non-negative Gap sample, which implies that companies that do not fully allocate their revenues or gains are more likely to be affected by proprietary costs and possibly wish to conceal sources of profit from their competitors. In addition, goodwill and other intangibles are associated with non-positive Gaps, but not with non-negative Gaps. A possible explanation is that companies having more goodwill and other intangibles tend to exclude the associated expenses and losses (such as impairments) from segment earnings.[25] The results for the subsample control variables are fairly similar to those of the full sample. Overall, the results in Table 3 are consistent with our expectations.

Table 4 presents the results of tests investigating whether *AGGEARN* is more persistent than *CORPEARN*. Panel A provides descriptive statistics for model variables. Panel B and Panel C present regression results for samples having negative Gaps and positive Gaps, respectively. In Panel B the left-most columns report results bearing on the persistence of aggregated segment earnings. The dependent variable is *AGGEARN* of the subsequent fiscal year ($AGGEARN_{t+1}$). The right-most columns of the panel report results bearing on the persistence of comparable 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

[25] SFAS No. 142 (or ASC 350-20) changes the accounting treatment for goodwill, effective for fiscal years beginning after December 15, 2001. Therefore we conduct additional tests for samples separated into the period before 2001 and after 2001. Estimated coefficients for goodwill and other intangibles do not differ across the pre- and post-142 eras.

Table 3
Logistic regressions explaining absolute magnitude of Gaps.

Samples		Entire sample		Non-positive Gap sample		Non-negative Gap sample	
Dependent Vble.		GAPABS		GAPABS		GAPABS	
		(a)		(b)		(c)	
Variable	Expected sign	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value
Intercept4		–2.279	0.000***	–2.348	0.000***	–5.214	0.000***
Intercept3		–1.261	0.000***	–1.367	0.000***	–4.171	0.000***
Intercept2		–0.421	0.000***	–0.567	0.000***	–3.400	0.000***
Intercept1		0.559	0.000***	0.150	0.010**	–2.369	0.000***
GW	+	0.851	0.000***	1.043	0.000***	0.097	0.284
OTHRINTAN	+	0.658	0.000***	0.753	0.000***	0.034	0.457
MERGE	+	0.040	0.068*	0.040	0.099*	0.208	0.000***
SPECIAL	+	8.635	0.000***	3.582	0.000***	17.676	0.000***
HERF	+	0.410	0.041**	0.239	0.188	1.595	0.000***
HTRANSFER	+	0.471	0.000***	0.433	0.000***	1.088	0.000***
LNMV	+	–0.088	0.000***	–0.079	0.000***	0.121	0.000***
NSEG	+	0.157	0.000***	0.206	0.000***	0.150	0.000***
MTB	?	0.039	0.000***	0.040	0.000***	–0.019	0.018**
LOSS	+	0.357	0.000***	0.418	0.000***	–0.193	0.001***
LEV	?	–0.173	0.000***	–0.141	0.006***	0.145	0.042**
SGROWTH	?	–0.031	0.235	–0.055	0.123	–0.356	0.000***
N		20,594		15,869		8,312	
Model Chi-sq.	p-value	0.000***		0.000***		0.000***	
R-square		0.125		0.089		0.326	

GAPABS = Quintile rank of absolute value of the difference between corporate operating income after depreciation (Compustat's annual data item OIADP) and summed segment earnings, with the difference scaled by market value of equity at beginning of the period. See Table 2 for other variable definitions. P-values are one-tailed for variables with expected signs, and two-tailed for variables with no expected signs.
* , ** and *** represent significance at the 0.1, 0.05 and 0.01 levels, respectively.

are due to the relative strength of association between the lagged values of *AGGEARN* versus *CORPEARN*. The coefficient of *AGGEARN* (0.522) is greater than the coefficient of *CORPEARN* (0.459) and the difference is significant (p-value = 0.023) in the expected direction. This result indicates that *AGGEARN* is more persistent than *CORPEARN* when companies have negative Gaps.[26]As for control variables, *LOSS*, and *MTB* are negatively associated with both dependent variables. *SGROWTH* and *LNMV* are associated with *AGGEARN* and *CORPEARN*, respectively.

Panel C reports persistence models for the positive Gap sample. The coefficient of *AGGEARN* (0.206) is smaller than the coefficient of *CORPEARN* (0.419) and the difference is significant (0.000). This result suggests that corporate earnings are more persistent than aggregated earnings for companies with positive Gaps. Panel B and C results in Table 4 suggest that Gaps contribute to the differential persistence of aggregated earnings, since Gaps (when they exist) are the primary difference between aggregated earnings and corporate earnings.

Panel A of Table 5 presents the results of tests of informativeness of corporate GAAP earnings and aggregated segment earnings for observations in which *AGGEARN* is larger than *CORPEARN*. The dependent variable in both models is market-adjusted buy-and-hold annual return (*BHAR*).[27]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.[28]The coefficient of *AGGEARN* is 0.448, and is larger than the coefficient of *CORPEARN*, 0.388. The difference between the two coefficients, however, is not significant. The model adjusted R-square with *AGGEARN* as test variable (0.105) exceeds the adjusted R-square when *CORPEARN* is the test variable (0.088). The Vuong test comparing the explanatory power of the two models has a p-value of 0.022 and favors the *AGGEARN* model.[29]The results show that aggregated segment earnings for companies having negative Gaps are more informative than corporate earnings. A possible explanation is that companies having negative Gaps have not allocated transitory, negative components of earnings to segments.

Panel B presents the results of estimating the same model for observations in which *AGGEARN* is smaller than *CORPEARN*. The coefficient of *AGGEARN* is 0.236 and is

[26] To facilitate comparison of coefficients across equations, we standardize all variables as per Bhattacharya et al. (2003, 304). We transform the distribution of each variable so that its mean is 0 and its standard deviation is 1. The coefficients of the standardized variables can be interpreted as the number of standard error changes in the dependent variable resulting from a standard error change in the independent variable. This enables comparison of the relative strengths of *AGGEARN* and *CORPEARN* in explaining variations in the dependent variables.

[27] Results are qualitatively the same when using 1-year cumulative abnormal returns.

[28] The coefficients of the standardized variables can be interpreted as the number of standard error changes in the dependent variable resulting from a standard error change in the independent variable. This enables comparison of the relative strengths of *AGGEARN* and *CORPEARN* in explaining variations in the dependent variables.

[29] The Vuong (1989) test is a likelihood-ratio-based test (Z-statistic) for non-nested model selection and is used to determine whether one model has better explanatory power than another. See Bhattacharya et al. (2003) for its use in an accounting research context.

Table 4
Tests of persistence of summed segment earnings versus corporate earnings.

Panel A: Descriptive statistics (before standardization)

Variable	Mean	Median	1st Q	3rd Q	Std. Dev
AGGEARN	0.116	0.112	0.058	0.177	0.164
CORPEARN	0.086	0.093	0.044	0.141	0.131
LOSS	0.151	0.000	0.000	0.000	0.358
LNMV	6.652	6.724	5.226	8.142	2.132
MTB	2.417	1.832	1.145	2.937	2.257
SGROWTH	0.098	0.071	–0.026	0.177	0.251

Panel B: Regression results for sample having negative Gaps

Dependent Vble. = $AGGEARN_{t+1}$			Dependent Vble. = $CORPEARN_{t+1}$		
Variable	Coeff.	p-Value	Variable	Coeff.	p-Value
Intercept	–0.003	0.483	Intercept	–0.022	0.373
$AGGEARN_t$ b_{1a}	0.522	0.000***	$CORPEARN_t$ b_{1b}	0.459	0.000***
LOSS	–0.084	0.000***	LOSS	–0.164	0.000***
LNMV	–0.010	0.212	LNMV	0.102	0.000***
MTB	–0.062	0.000***	MTB	–0.031	0.000***
SGROWTH	–0.026	0.015**	SGROWTH	–0.009	0.228
INDUSTRY	Included		INDUSTRY	Included	
Model F-stat. p-value	0.000***		Model F-stat. p-value	0.000***	
Adj. R-square	0.326		Adj. R-square	0.424	
N = 7,613					
Coefficient difference: b_{1a} vs. b_{1b}	F-test p-value		0.023**		

Panel C: Regression results for sample having positive Gaps

Dependent Vble. = AGGEARNt+1			Dependent Vble. = CORPEARNt+1		
Variable	Coeff.	p-Value	Variable	Coeff.	p-Value
Intercept	–0.019	0.405	Intercept	0.049	0.353
$AGGEARN_t$ b_{1a}	0.206	0.000***	$CORPEARN_t$ b_{1b}	0.419	0.000***
LOSS	–0.216	0.000***	LOSS	–0.166	0.000***
LNMV	0.039	0.057*	LNMV	0.119	0.000***
MTB	–0.082	0.000***	MTB	–0.041	0.014**
SGROWTH	–0.009	0.334	SGROWTH	–0.032	0.041**
INDUSTRY	Included		INDUSTRY	Included	
Model F-stat. p-value	0.000***		Model F-stat. p-value	0.000***	
Adj. R-square	0.204		Adj. R-square	0.381	
N = 2,881					
Coefficient difference: b_{1a} vs. b_{1b}	F-test p-value		0.000***		

AGGEARN = the aggregated segment operating profit, scaled by total market value at beginning of period. CORPEARN = corporate-level operating income after depreciation, scaled by total market value at beginning of period. P-values are one-tailed.

* , ** and *** represent significance at the 0.1, 0.05 and 0.01 levels, respectively. Standard errors are computed for clustering of observations by firm to mitigate the effect of cross-sectional correlation.

smaller than the coefficient of *CORPEARN*, 0.369. The difference is significant (p-value = 0.000). The adjusted R-square for the *AGGEARN* model is 0.106 and is not significantly different from the R-square of the *CORPEARN* model, 0.109. It is possible that companies having positive Gaps have not allocated persistent, positive components of earnings to segments. This would make aggregated segment earnings less informative than corporate earnings for these companies. Proprietary costs provide a possible motive for not pushing down persistent, positive components to segments.

As a final analysis we test whether aggregated segment earnings are more persistent and informative than a measure of corporate earnings other than that used throughout the prior analyses. In sensitivity tests, we replace corporate-level operating income after depreciation with corporate-level income before extraordinary items, which is closer to the bottom-line earnings number. We find that the persistence of aggregated segment-level earnings is significantly greater than the persistence of corporate-level income before extraordinary items, both for companies with negative Gaps and those with positive Gaps. In addition, aggregated segment-level income has stronger associations with concurrent stock returns than corporate-level income before extraordinary items both for companies with negative Gaps and those with positive Gaps.

Conclusions

A controversial aspect of FAS 131 allows companies to report segment earnings differently than consolidated earnings. Opponents of this provision of FAS 131 argue that it provides managers with an opportunity to manipulate earnings information at the segment level by not allocating certain expenses or revenues to individual segments. Proponents argue that the allocation or non-allocation of expenses or revenues reflects legitimate reporting discretion that results in better information about segment profitability. This study provides evidence regarding this

Table 5
Tests of informativeness of summed segment earnings versus corporate earnings.

Panel A: Negative Gap sample					
Dependent Vble.	BHAR			BHAR	
	Coeff.	p-Value		Coeff.	p-Value
Intercept	–0.002	0.486	Intercept	0.062	0.182
AGGEARNt b_{1a}	0.448	0.000***	CORPEARNt b_{1b}	0.388	0.000***
AGGEARNt-1	–0.182	0.000***	CORPEARNt-1	–0.217	0.000***
AGGEARNt *LNMV	0.086	0.000***	CORPEARNt *LNMV	0.046	0.008***
AGGEARNt *MTB	0.018	0.201	CORPEARNt *MTB	–0.046	0.007***
AGGEARNt *SGROWTH	0.006	0.358	CORPEARNt *SGROWTH	0.011	0.222
INDUSTRY	Included			Included	
Model F-stat. p-value	0.000***			0.000***	
Adj. R-square	0.105			0.088	
N = 7613					
Difference between models					
Coefficient difference: b_{1a} vs. b_{1b} F-test p-value		0.004***			
Explanatory power difference: Vuong test p-value		0.022**			
Panel B: Positive Gap sample					
Dependent Vble.	BHAR			BHAR	
	Coeff.	p-Value		Coeff.	p-Value
Intercept	–0.043	0.368	Intercept	–0.165	0.099
AGGEARNt b_{1a}	0.236	0.000***	CORPEARNt b_{1b}	0.369	0.000***
AGGEARNt-1	–0.152	0.000***	CORPEARNt-1	–0.163	0.000***
AGGEARNt *LNMV	–0.066	0.001***	CORPEARNt *LNMV	0.002	0.465
AGGEARNt *MTB	–0.037	0.051*	CORPEARNt *MTB	–0.018	0.227
AGGEARNt *SGROWTH	0.091	0.000***	CORPEARNt *SGROWTH	0.098	0.000***
INDUSTRY	Included			Included	
Model F-stat. p-value	0.000***			0.000***	
Adj. R-square	0.106			0.109	
N = 2881					
Difference between models					
Coefficient difference: b_{1a} vs. b_{1b} F-test p-value		0.000***			
Explanatory power difference: Vuong test p-value		0.492			

BHAR = one-year buy-and-hold return, adjusted for CRSP value-weighted index, over the period beginning 3 months following the end of fiscal year *t-1* and ending 3 months after fiscal year *t*. See Tables 2 and 4 for other variables' definitions. P-values are one-.

*, ** and *** represent significance at the 0.1, 0.05 and 0.01 levels, respectively. Standard errors are computed for clustering of observations by firm to mitigate the effect of cross-sectional correlation.

issue. We examine the determinants of Gaps, and investigate whether aggregated segment earnings are more useful to investors (i.e. more persistent and informative). We find that approximately 83% of firm-year observations have Gaps. Among those observations with non-zero Gaps, about 72% exhibit summed segment earnings larger than corporate earnings (negative Gaps), indicating that in most firm-years companies tend to forego allocating certain expenses or losses to segment earnings. We hypothesize that the existence of a Gap is determined by two factors: the difficulty of allocating transitory items for which segment-level managers are not responsible, and managers' discretionary disclosure behaviors that could be self-serving. Consistent with the hypothesis, we find that Gaps are positively associated with proxies for transitory income items and income items for which segment level managers likely cannot control. The results suggest a negative Gap scenario in which top managers tend to exclude transitory and 'non-responsible' losses from segment earnings. The motive might be to shield segment-level managers from downside earnings outcomes that are temporary and that they cannot influence or control. The negative Gap results are consistent with the objectives of FAS 131 in that the segment information arguably provides some insight into top managers' internal perspectives on segment activities.

The positive Gap scenario is one in which top managers recognize persistent, positive components in corporate income, but do not allocate them to segments. The motive might be to avoid providing more detailed information about the sources of corporate profit to their competitors. A drawback is that segment-level managers might not be rewarded for positive earnings outcomes that they can influence or control. We also find evidence that corporate-level managers facing high agency costs tend to disclose more and larger Gaps, consistent with the concerns of the opponents of FAS 131's Gap provision. In summary, the existence and signs of Gaps appear to reflect both sensible internal reporting decisions and efforts to obscure differences in profitability across segments.

We also investigate whether Gaps provide useful information to investors. Specifically, we study the persistence and informativeness of summed segment earnings relative to comparable corporate earnings. We find that the exclusion of transitory expenses and losses from segment earnings at negative Gap firms leads to aggregated segment earnings that are more persistent and more informative (for stock prices) than are corporate earnings. In contrast, in

positive Gap firm-years, corporate earnings have higher association with returns, compared to the summed segment earnings. These results for positive and negative Gaps suggest that investors employ information about aggregated segment earnings to value firms' equities when Gaps are negative (the large majority of firm-years), but not when they are positive. We believe that this apparently sophisticated investor use of segment income is evidence that the FASB was justified in allowing firms to report segment earnings that differ from GAAP earnings.

Acknowledgements

We are grateful to Gary Previts (editor) and two reviewers for their helpful comments. We thank participants attending workshops at Iowa State University, the University of Oklahoma, the 2010 annual meeting of the American Accounting Association, and the 2013 American Accounting Association Midyear FARS meeting for useful suggestions.

Appendix

Selected segment data from Walt Disney Co. form 10-K for fiscal year 2009

Note: all dollar figures are in millions.

SEGMENT INFORMATION

The operating segments reported below are the segments of the Company for which separate financial information is available and for which segment results are evaluated regularly by the Chief Executive Officer in deciding how to allocate resources and in assessing performance.

Segment operating results reflect earnings before corporate and unallocated shared expenses, restructuring and impairment charges, other income (expense), net interest expense, income taxes, and minority interests. Segment operating income includes equity in the income of investees. Equity investees consist primarily of AETN/Lifetime, which is a cable business included in the Media Networks segment. Corporate and unallocated shared expenses principally consist of corporate functions, executive management, and certain unallocated administrative support functions.

	2009	2008	2007
Segment operating income (loss)			
Media Networks	**$4765**	$4981	$4534
Parks and Resorts	**1418**	1897	1710
Studio Entertainment	**75**	1086	1195
Consumer Products	**609**	778	689
Interactive Media	**(295)**	(258)	(291)
Total segment operating income	**$6672**	$8484	$7837
Reconciliation of segment operating income to income from continuing operations before income taxes and minority interests			
Segment operating income	**$6672**	$8484	$7837
Corporate and unallocated shared expenses	**(398)**	(460)	(497)
Restructuring and impairment charges	**(492)**	(39)	(26)
Other income (expense)	**342**	(59)	1004
Net interest expense	**(466)**	(524)	(593)
Income from continuing operations before income taxes and minority interests	**$5658**	$7402	$7725

References

Baginski, S. P., Lorek, K. S., Willinger, B. L., & Branson, B. C. (1999). The relation between economic characteristics and alternative annual earnings persistence measures. *The Accounting Review*, *74*(1), 105–120.

Bathke, A. W., Lorek, K., & Willinger, G. L. (1989). Firm size and the predictive ability of quarterly earnings data. *The Accounting Review*, *64*(1), 49–68.

Bens, D. A., Berger, P. G., & Monahan, S. J. (2011). Discretionary disclosure in financial reporting: an examination comparing internal firm data to externally reported segment data. *The Accounting Review*, *86*(2), 417–450.

Berger, P. G., & Hann, R. (2007). Segment profitability and the proprietary and agency costs of disclosure. *The Accounting Review*, *82*(4), 869–906.

Bhattacharya, N., Black, E., Christensen, T., & Larson, C. (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., & Stanford, M. (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., & Sloan, R. (2002). GAAP versus the street: an empirical assessment of two alternative definitions of earnings. *Journal of Accounting Research*, *40*(1), 41–66.

Brown, L., & Sivakumar, K. (2003). Comparing the value relevance of two operating income measures. *Review of Accounting Studies*, *8*(4), 561–572.

Bushman, R. M., & Smith, A. J. (2001). Financial accounting information and corporate governance. *Journal of Accounting and Economics*, *32*, 237–333.

Campbell, L., & Lopez, D. (2010). Small cap financial reporting: determinants of emphasis and placement of non-GAAP disclosures. *Research in Accounting Regulation*, *22*(2), 114–120.

Chasan, E. (2013). SEC gets 'serious' on improper segment reporting. *The Wall Street Journal*, online. December 10, 2013. <http://blogs.wsj.com/cfo/2013/12/10/sec-gets-serious-on-improper-segment-reporting/>.

Collins, D., & Kothari, S. (1989). An analysis of intertemporal and cross-sectional determinants of earnings response coefficients. *Journal of Accounting and Economics*, *11*(3), 143–182.

Collins, D., Maydew, E., & Weiss, I. (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.

De La Merced, M. J. (2011). The Groupon I.P.O.: what is adjusted CSOI? New York Times, June 2, 2011. <http://dealbook.nytimes.com/2011/06/02/the-groupon-i-p-o-what-is-adjusted-csoi/?_php=true&_type=blogs&_r=0>.

Easton, P., & Zmijewski, M. (1989). Cross-sectional variation in the stock market response to accounting earnings announcements. *Journal of Accounting and Economics*, *11*(July), 117–142.

Elliott, J., & Hanna, D. (1996). Repeated accounting write-offs and the information content of earnings. *Journal of Accounting Research*, *34*(Suppl.), 135–155.

Ettredge, M., Kwon, S. Y., Smith, D., & Stone, M. (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) (1997). *Statement of financial accounting standards No. 131: disclosures about segments of an enterprise and related information*. Norwalk, CT: FASB.

Francis, J., & Schipper, K. (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.

Healy, P. M., & Palepu, K. G. (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.

Hope, O., & Thomas, W. B. (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., & Zarowin, P. (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., & Marquardt, C. A. (2004). Earnings informativeness and strategic disclosure: An empirical examination of "pro forma" earnings. *The Accounting Review*, *79*(3), 769–795.

Marques, A. (2006). SEC interventions and the frequency and usefulness of non-GAAP financial measures. *Review of Accounting Studies*, *11*(3), 549–574.

Securities Exchange Commission (2003). Frequently asked questions regarding the use of non-GAAP financial measures. <http://www.sec.gov/divisions/corpfin/faqs/nongaapfaq.htm>.

Trachtenberg, J. A. (2013). SEC investigates Barnes & Noble's accounting. *The Wall Street Journal*, online. December 6, 2013. <http://online.wsj.com/news/articles/SB10001424052702304096104579242102185847562>.

Vuong, Q. H. (1989). Likelihood ratio tests for model selection and non-nested hypotheses. *Econometrica: Journal of the Econometric Society*, *57*(2), 307–333.

Weber, S. J., Nichols, N. B., Street, D. L., & Cereola, S. J. (2013). Non-GAAP adjustments to net income appearing in the earnings releases of the S&P 100: An analysis of frequency of occurrence materiality and rationale. *Research in Accounting Regulation*, *25*(2), 236–251.