The Joint Effect of Segment Disaggregation and Segment-Specific Information on Managers' Operating Decisions: Competitor Orientation Matters

Chezham L. Sealy
Culverhouse College of Business
University of Alabama
cslealy@cba.ua.edu

Elaine Wang
Isenberg School of Business
University of Massachusetts Amherst
ewang@isenberg.umass.edu

Yao Yu
Isenberg School of Business
University of Massachusetts Amherst
yyu@isenberg.umass.edu

November 2019

The Joint Effect of Segment Disaggregation and Segment-Specific Information on Managers' Operating Decisions: Competitor Orientation Matters

ABSTRACT

Recently, the Financial Accounting Standards Board (FASB) initiated a project that would require companies to disaggregate reportable operating segments and expand the list of required disclosures for each segment (FASB 2019b). This study examines how disaggregated segment disclosures and the reporting of segment-specific information jointly affect managers' operational decisions. We find that disaggregated segment disclosures increase the pressure on managers to outperform competitors at the segment level, causing managers to engage in operational distortion to boost segment-level performance at a cost to overall firm value. Furthermore, we find that disaggregated segment disclosures alone cause managers who are *more* competitor-oriented to engage in operational distortion. For managers who are *less* competitor-oriented, the effects of disaggregation are only significant when additional segment-specific information is present. Our study informs regulators about potential unintended consequences of the proposed segment disclosure standard and contributes to the segment disclosure literature on multiple dimensions.

Keywords: *managers' operating decisions; segment disclosures; disaggregation; segment-specific information; competitor orientation; peer pressure*

Data Availability: *Contact the authors.*

I. INTRODUCTION

In an effort to provide more decision-useful information to investors, segment disclosure regulations and practices have evolved tremendously over the past few decades (FASB, 1997, 2010, 2019a; IASB 2013). The current segment reporting standard (SFAS No. 131) provides managers with the flexibility to discretionally aggregate or disaggregate operating segments through the use of "the management approach," resulting in varying levels of disaggregation in segment disclosures across firms. Additionally, while the current standard requires firms to disclose a limited set of segment-specific information (e.g., revenues, material expense items), the reporting of segment-specific information varies significantly across firms. In fact, management's discretionary reporting of additional segment-specific information has been criticized by the Securities and Exchange Commission (SEC) (2016, 2017).

Recently, the Financial Accounting Standards Board (FASB) added "the segment disclosure project" to their technical agenda (FASB 2016). This new project proposes that companies should disaggregate reportable operating segments and expand the list of segment-specific information required to be reported for each operating segment (FASB 2019b). Although the current proposal aims to enhance the transparency of segment reporting, the required level of disaggregation and the expanded disclosure of segment-specific information could result in additional disclosure costs to management. In response to these changes, managers may engage in *operational* decisions to manage outside perceptions of the firm (i.e., operational distortion) (Bloomfield 2016; Bentley 2018). In this study, we examine whether segment disaggregation and the reporting of segment-specific information jointly affect managers' operational decisions. Furthermore, while managers have a goal to maximize firm value, they also differ in terms of their desire to outperform competitors (i.e., competitor-orientation) (Griesinger and Livingston 1973;

Liebrand and van Run 1985; Armstrong and Collopy 1996). We investigate how the joint effect of segment disaggregation and the reporting of segment-specific information affect operational decisions for managers with different competitor-orientations.

Understanding the impact of segment disclosures is important because regulators believe that more disaggregated segment disclosures and the reporting of additional segment-specific information will enhance financial reporting transparency and improve investors' judgment and decision making (IASB 2013; FASB 2019b). Existing accounting research also supports the view that more transparent segment reporting can increase the decision-usefulness of financial statements by improving the market's ability to predict future earnings, providing greater faithful representation of companies' internal organization structures, and decreasing the cost of capital for companies (Ettredge, Kwon, Smith, and Zarowin 2005; Tse 1989; Botosan et al. 2009; Chen and Liao 2015). Moreover, companies' segment disclosures differ in terms of the degree of disaggregation. Appendix A presents excerpts of the segment disclosures from Amazon, Microsoft, and Alphabet (the parent company of Google), the three major plays in the cloud computing service market (Canalys 2019). While both Amazon and Microsoft disaggregate their cloud computing segments, Alphabet aggregated all Google's business lines into one reportable segment "Google."

However, research also suggests that more transparent segment disclosures create costs for managers, who respond by intentionally aggregating reportable segments to either hide *inferior* segment performance from investors (i.e., agency costs) or hide *superior* segment performance from competitors (i.e., proprietary costs) (Bens, Berger, and Monahan 2011; Wang 2016; Ebert, Simons, and Stecher 2017; Wang, Ettredge, Huang, and Sun 2011; Botosan and Stanford 2005). Under the newly proposed segment reporting requirements, it will become more difficult for

3

managers to manipulate segment financial disclosures through aggregation, and the required reporting of additional segment-specific information will further increase the transparency of segment performance. As a result, managers may use other avenues, such as altering their operational decisions in order to hide inferior and/or superior segment performance, which could have an adverse impact on firm value creation and long-term growth.

Unpacking theory in psychology suggests that providing more detailed information of specific events can lead to increased probability judgements and more extreme evaluations of those events (Van Boven and Epley 2003; Shah and Oppenheimer 2011). Compared to aggregated segment disclosures, disaggregated segment disclosures "unpack" the overall firm performance into more segment-level performance, creating more new reference points for managers to consider. Additionally, disaggregation allows for more direct comparison of segment-level performance across *peer firms* (e.g., De Franco, Hope, and Larocque 2015; Martin and Mickle 2017). The increased focus on peer firm comparison benchmarks should exacerbate the comparison pressure that management feels to outperform their competitor. Research in social psychology also shows that engaging in social comparisons (e.g., comparing segment performance with a peer firm) can cause individuals to accept lower absolute outcomes in an effort to outperform their competitor (Gilbert et al. 1995; Van Yperen & Leander 2014; Zell & Alicke 2010; Dagogo-Jack et al. 2019). Therefore, we posit that when segments are more disaggregated (versus less disaggregated), managers are more likely to engage in operational distortions that boosts segment-level performance, even at a cost of overall firm value maximization, because disaggregated segment disclosures cause managers to feel more pressure to outperform their competitors at the segment level.

Additionally, we predict that the effect of disaggregation depends on managers' competitor orientation and the reporting of segment-specific information. According to psychology research, individuals differ in their tendency to accept lower absolute outcomes in order to outperform their competitors (Griesinger and Livingston 1973) (Gilbert et al. 1995; Van Yperen & Leander 2014; Zell & Alicke 2010; Dagogo-Jack et al. 2019), indicating that individuals can be more or less competitor-oriented (Griesinger and Livingston 1973). For managers who are less competitor-oriented, the effect of disaggregation will be exaggerated when segment-specific information is present. The presence of additional segment-specific information can cause managers to further overestimate the importance of individual segment performance (Van Boven and Epley 2003; Shah and Oppenheimer 2011), leading to more extreme operational distortion. However, for managers who are more competitor-oriented, the effect of disaggregation will not vary with the presence or absence of segment-specific information because disaggregation alone is sufficient to induce managers' pressure to outperform competitors at the segment level.

We conduct a $2 \times 2 \times 2 + 1$ between-participants experiment, where we ask participants to assume the role of a corporate manager who is contemplating an operational decision that involves an internal investment. We manipulate segment disaggregation (more versus less), the presence of additional segment-specific information (present verses absent), and include a control condition with no segment disclosures. We also measure managers' competitor orientation by asking participants to indicate the extent to which they are concerned about beating competitors, and median split our sample into low and high competitor orientation subsamples. Our dependent variable is captured by asking participants to invest their advertising budget in one of two options. Option A is an investment in the primary segment, which will cause the projected revenue of the firm's primary segment to be higher than a peer firm's projected revenue, but it has a lower overall

5

investment return than Option B. Option B is an investment in one of the firm's non-primary segments, which will cause the projected revenue of the firm's *primary* segment to be lower than a peer firm's projected revenue, but it has a higher overall investment return. Thus, managers' choices between Option A and Option B represent the trade-off between primary segment performance and overall firm value creation where a higher likelihood of choosing Option A (versus Option B) indicates that participants engage in operational distortion that sacrifices overall firm value to increase primary segment performance.

Consistent with our predictions, we find that managers are more likely to sacrifice overall firm value to increase segment-level performance when segment disclosures are more disaggregated than less disaggregated. Our mediation analysis provides evidence that managers' decisions to engage in operational distortion occurs because more disaggregated segment disclosures increase managers' pressure to outperform competitors at a segment level. Furthermore, we find evidence that the effect of segment disaggregation depends on both managers' competitor orientation and the reporting of segment-specific information. Specifically, for managers who are *less* competitor-oriented, more disaggregated segment disclosures only lead to operational distortion when additional segment-specific information is present. In contrast, for managers who are *more* competitor-oriented, more disaggregated segment disclosures result in operational distortion irrespective of the presence or absence of segment-specific information.

Our study contributes to segment disclosure research by showing that more disaggregated segment disclosures can lead to increased operational distortion at a cost to overall firm value. Importantly, our results also suggest that the adverse effect of disaggregated segment disclosures on managers' operating decisions varies with managers' competitor orientation and the reporting of segment-specific information. Although investors, capital markets, and regulators appear to

value increased levels of disaggregation in segment disclosures, we show that it can come at a cost in the form of increased operational distortion and reduced firm value, especially for managers who are more competitor-oriented. For managers who are less competitor-oriented the potentially negative affect resulting from segment disaggregation only occurs in the presence of additional segment-specific information. These findings have important implications for regulators, who may consider the potential down-stream effects of requiring more disaggregated segment disclosures and/or expanding the required list of segment-specific information. Our study also answers the FASB's call to identify potential unintended consequences associated with the new segment disclosure proposal (FASB 2019b).

In the next section, we review the related literature and develop our hypotheses. Section III describes our research design and method. Section IV analyzes our results. Finally, we conclude this paper in Section V.

II. THEORY AND HYPOTHESIS DEVELOPMENT

Background of Segment Disclosures

The first segment disclosure regulation, SFAS No. 14 (Financial Reporting for Segments of a Business Enterprise, issued in December 1976), simply required companies to disclose segment information by line-of-business and geographic area. Following calls to provide investors with more decision-useful information, the FASB instituted SFAS No. 131 (Disclosure about Segments of an Enterprise and Related Information, now ASC 280) in 1997. Under SFAS No. 131, companies are required to use "the management approach" for segment reporting. This approach requires that public companies disclose operating segments based on the information management uses for internal evaluation and resource allocation purposes (FASB 1997).

7

Although the segment reporting rules required by SFAS No. 131 increased the amount of decision-useful segment information available to investors relative to SFAS No. 14 (Herrmann and Thomas 2000), the FASB has identified a number of remaining issues, including inadequate disaggregation and a lack of detailed financial information available for each segment (FASB 2016). Specifically, since managers can discretionarily determine the (dis)aggregation of reportable segments based on the more subjective management approach, managers may intentionally aggregate operating segments to avoid increased scrutiny from investors (i.e., agency cost) and/or avoid revealing proprietary information to competitors (i.e., proprietary cost) (Bens, Berger, and Monahan 2011; Wang 2016; Ebert, Simons, and Stecher 2017; Wang, Ettredge, Huang, and Sun 2011; Botosan and Stanford 2005).

In response to the issues discussed above, the FASB initiated a segment reporting project in 2017 that aims to provide more decision-useful information to investors (FASB 2019b). One proposed revision in this project is to remove the current aggregation criteria and require that *all* operating segments are reported until a practical limit is reached (FASB 2019b).[1] Another important proposed revision is to expand the list of financial information required to be disclosed for each segment (FASB 2019b). This new segment disclosure proposal (hereafter, the proposed standard) makes it clear that the FASB considers segment reporting to be an important issue, and they view more disaggregated segment disclosures and the reporting of more segment-specific financial information as potential avenues to enhance the decision-usefulness of financial disclosures.

---

[1]The current segment disclosure standard (SFAS No. 131) does not require companies to separately report an operating segment if its revenue is less than 10 percent of total company revenue comprising all segments (FASB 1997).

Managers' Strategic Segment Disclosures

While more disaggregated and transparent segment reporting appears to be useful for investors (Ettredge, Kwon, Smith, and Zarowin 2005; Tse 1989; Botosan et al. 2009), management of publicly traded companies constantly expresses concerns regarding potential agency costs and proprietary costs associated with segment reporting. In an effort to reduce the costs associated with segment reporting, prior literature shows that managers discretionally aggregate segment disclosures and withhold segment-specific financial information (Berger and Hann 2007; Wang et al. 2011; Wang 2016; Bens et al. 2011; Botosan and Stanford 2005; Ebert et al. 2017). Additionally, prior studies show that managers manipulate reported segment performance to achieve strategic purposes (Chen and Zhang 2007; You 2014; Lail, Thomas, and Winterbotham 2014). For example, You (2014) documented that managers transfer reported profits from segments with lower valuation multiples to those with higher valuation multiples in order to achieve higher firm-level equity valuations. At the same time, research has shown that managers will shift reported expenses away from underperforming core segments to other segments in order to boost core segment performance (Lail et al. 2014).

This research indicates that managers will manipulate reported segment earnings to influence financial statement users' perceptions of firm performance and valuation. However, under the proposed standard where managers have less flexibility to aggregate segment disclosures and/or withhold segment-specific financial information, it will be more difficult to manipulate reported segment performance. As such, managers may alter their *operating decisions* to achieve their strategic goals (See Libby, Rennekamp, and Seybert 2015 for a review).

Managers' Focus on Segment-Level Performance

Prior psychology research suggests that individuals can simultaneously consider multiple reference points (March and Shapira 1987, 1992). While managers only need to focus on perceptions of firm-level performance when segment disclosures are absent, the issuance of segment disclosures will cause managers to pay more attention to segment-level performance. As a result, managers will consider both firm-level and segment-level performance measures and try to signal favorable performance for *both* of these metrics. Sullivan and Kida (1995) suggests that when individuals consider multiple benchmarks, their attention may shift from one focal point to another under certain circumstances. We expect that more disaggregated segment disclosures (as required in the proposed standard) will draw managers' attention away from firm-level performance and towards segment-level performance, compared to when segment disclosures are less disaggregated(i.e., the current regulation).

According to unpacking theory in psychology, an individual's judged probability increases when an object or event is unpacked into several sub-groups, and as the number of sub-groups increases, the unpacking effect becomes stronger (Tversky and Koehler 1994; Tversky and Fox 1994; Wallsetn, Budescu, and Zwick 1993). In the setting of segment disclosures, more disaggreted segment disclosures increase the number of segment-level sub-groups, creating new focal points for managers to consider. As such, compared to less disaggregated segment disclosures, we predict that more disaggregated segment disclosures will cause managers to place greater emphasis on segment-level performance.

Peer Pressure in Segment-Level Performance

More disaggregated segment disclosures also induces greater peer firm comparison pressure for segment-level performance (hereafter, segment performance peer pressure). Under

the proposed standard, companies will be required to disaggregate each operating segment, and segment-level performance will become more comparable across peer firms. Prior research suggests that investors use peer firm performance as a benchmark to evaluate firm perofmance (Cao, Ma, Tucker, and Wan 2018; Du and Shen 2018; Gao and Zhang 2019), and that peer firm comparison plays an important role in both firm valuation (De Franco et al. 2015; Easton, McAnally, Sommers, and Zhang 2018) and managers' compensation (Aggarwal and Samwick 1999; Gong, Li, and Shin 2011; Jenter and Kanaan 2015). Since large companies often have multiple operating segments, less disaggregated segment disclosures can conceal the performance of each individual operating segment, making it difficult for investors to compare the performance of similar operating segments across peer firms. In contrast, more disaggregation will make the performance of each operating segment available, which will facilitate clear comparisons across peer firms, increasing managements' pressure to outperform peer firms' performance at segment level.

In an effort to report favorable segment-level performance compared to their peers, managers may engage in opportunistic behavior. Under the current regulation (SFAS No. 131), managers can discretionarily aggregate operating segments to conceal underperforming segments (Chen and Zhang 2007; You 2014; Lail, Thomas, and Winterbotham 2014). In contrast, the newly proposed requirement of more disaggregation will restrict managers' ability to discretionarily aggregate operating segments. As a result, managers may pursue other avenues, such as operational distortions that could potentially decrease overall firm value. When the goal of firm value maximization and the goal of beating peer firms' segment-level performance are conflicting, prior research indicates that individuals may accept lower absolute outcomes in order to outperform their competitors (Gilbert et al. 1995; Van Yperen & Leander 2014; Zell & Alicke

2010; Dagogo-Jack et al. 2019). The seemingly irrational behavior observed in these studies is theorized to stem from both cognitive and affective reactions due to the competitave nature of humans (Brickman and Bullman 1997; Tesser 1991; Taylor and Lobel 1989; Salovey and Rodin 1984).

Since more disaggregated segment disclosures tend to shift managers' focal point of interest from firm-level performance to segment-level performance and increase peer pressure in segment-level performance, managers will be more likely to forego their objective to maximize firm value in order to beat competitors in certain reported operating segments. In summary, we predict that when segment disclsoures are more disaggrgated (versus less disaggregated), managers will feel greater peer pressure to outperform their competitors at a segment level will be more likely to engage in operational distortions that sacrifice overall firm value to outperform competitors at a segment level. We state our prediction more formally as Hypothesis 1:

> **H1:** *Managers are more likely to sacrifice overall firm value to outperform competitors at a segment level when segment disclosures are more disaggregated than less disaggregated because they feel more peer pressure related to segment performance.*

Competitor Orientation

While psyhcology research suggests that individuals may accept lower absolute outcomes in order to outperform their competitors (Gilbert et al. 1995; Van Yperen & Leander 2014; Zell & Alicke 2010; Dagogo-Jack et al. 2019), individuals vary in terms of whether they are more or less competitor-oriented (Griesinger and Livingston 1973). For example, using decisions made in simple games, Kuhlman and Marshello (1975) find that 21 percent to 49 percent of their participants are considered to be more competitor-oriented than self-oriented. Liebrand and van Run (1985) find similar results in different culture contexts. Further, Armstrong and Collopy (1996) conduct a series of surveys with Master of Business Administration (MBA) students and

managers, and they also document similar variations in competitor orientations. Specifically, they ask MBA students to choose whether the primary purpose of the firm is (a) to do better than its competitors, or (b) to do the best that it can. They find that around 33% (40%) of MBA students in the U.S. (Korea) choose (a), indicating that they are more competitor-oriented than self-oriented. Similarly, they ask managers to indicate their agreements to the statement that "the primary purpose of our firm is to be better than its competitors", and they find 50% (29%) of managers in the U.S. (Japan) agree with that statement. Importantly, Armstrong and Collopy (1996) show that in a laboratory setting, when competitor-oriented information is available, almost half of their participants are willing to sacrifice firm value to beat or harm competitors. Their lab study results suggest firms with competitor-oriented objectives (e.g., increase market share) are less profitable and less likely to survive than those with self-oriented objectives (i.e., maximize profits). Accordingly, we posit that managers' competitor orientation should moderate the effect of disaggregated segment disclosures on their operating decisions.

With respect to managers who are more competitor-oriented, we expect that they will be more concerned about outperforming competitors at a segment level, and that more disaggregated segment disclosures alone will be sufficient to induce the feeling of peer pressure, leading managers to sacrifice overall firm value for better segment-level performance compared to peer firms. Conversely, with respect to managers who are less competitor-oriented, even though more disaggregated segment disclosures may increase some level of peer pressure in segment-level performance, it may not be sufficient for these managers to engage in operational distortion that sacrifices overall firm value. In such cases, the reporting of segment-specific information should further increase the pressure on managers to outperform competitors at a segment level. Next, we will discuss how segment disclosure disaggregation and the reporting of segment-specific

13

information can jointly affect managers' pressure to outperform their competitors at a segment level as well as their subsequent operating decisions.

Reporting of Segment-Specific Information

In addition to segment disaggregation, the FASB's proposed standard would also require companies to reveal additional segment-specific information that was previously unknown to the market. Currently, there is large variation in the type of segment-specific information that firms choose to report, and the reporting of segment profitability information varies significantly across firms. In fact, management's use of discretion in reporting segment information such as profitability metrics has been criticized by the SEC (2016, 2017). For example, both Amazon and Alphabet Inc. received comment letters from the SEC condemning the inconsistent and discretionary reporting of profitability information for the Amazon Web Services and YouTube segments, respectively. Misrepresenting segment performance through discretionarily reporting segment-specific information is a problematic issue that the FASB appears to view the use of additional required segment-specific disclosures as a potential remedy. While this solution may increase transparency and provide decision-useful information to investors, increasing the amount of required disclosures could lead to unintended consequences.

Unpacking theory also suggests that additional detailed information can magnify the perceived importance of the underlying event and further increase individuals' focus on that event (Van Boven and Epley 2003; Shah and Oppenheimer 2011). This research suggests that the perceived likelihood of a specific outcome depends on the amount of information available to support that outcome *relative* to alternate outcomes. When more information about a specific event is available, it becomes easier to summon support for that event, which causes more extreme evaluations and increases the perceived likelihood and frequency of occurrence (Van Boven and

14

Epley 2003; Tversky and Koehler 1994). Since additional segment-specific information provides more detailed descriptions of segment-level performance, more disaggregated segment disclosures with additional information are expected to further exacerbate some managers' tendency to focus on individual segment performance and increase the pressure for segment-level performance. When segment disclosures are less disaggregated, peer firm comparisons at a segment level are not directly available and the inclusion of segment-specific information is less likely to exacerbate the segment-level peer pressure.

Taken together, we predict that managers who are less competitor-oriented will be more likely to sacrifice overall firm value to outperform their competitors at a segment level when segment disclosures are more disaggregated than when they less disaggregated. Additionally, the effect of disaggregation will be stronger when segment-specific information is present compared to when it is absent. In contrast, for managers who are more competitor-oriented, the effect of disaggregation will not vary with the presence or absence of segment-specific information due to their innate preference to outperform competitors. Hypothesis 2a and 2b formally make this prediction.

> *H2a: Less competitor-oriented managers are more likely to sacrifice overall firm value to outperform competitors at a segment level when segment disclosures are more disaggregated than when they are less disaggregated, and this effect is larger with the inclusion of additional segment-specific information than without additional segment-specific information..*

> *H2b: More competitor-oriented managers are more likely to sacrifice overall firm value to outperform competitors at a segment level when segment disclosures are more disaggregated than when they are less disaggregated, irrespective of the inclusion of additional segment-specific information.*

III. RESEARCH METHOD

Participants

Two hundred and forty-two business school graduate students from two large public universities in the United States completed our study.[2] Participants have an average work experience of 8.03 years, with 2.11 years working in accounting or finance-related fields. They have taken an average of 4.67 accounting courses, 1.93 finance courses, and 2.04 economic courses, with an average investment experience of 1.78 years. On average, participants are 28.49 years old, and 57.9% of them are male.[3, 4]

Procedure

Participants begin the experiment by reading general instructions indicating that they will assume the role of the CEO of Firm X and determine whether to make an advertising investment in the company's Cell Phone segment or Smart Home segment. Participants then proceed to read the background information about Firm X and its primary competitor, Firm Z. The two firms operate in the same industry and have similar product lines. Both firms have three main segments: Cell Phone, Smart Home, and Home Appliance, with Cell Phone as the primary segment for both Firm X and Firm Z.

---

[2] Among our participants, 101 of them come from the first university and 141 from the second university; 156 are Master of Business Administration (M.B.A.) students and 86 are Master of Accounting (M.S.A.) students. We code participants' university and program as two binary variables and re-run all our tests controlling for those two binary variables. Results indicate that the covariates are insignificant (all $p > 0.373$) and the results of our main analyses are similar after adding the covariates. This suggests that the differences in university and program do not explain our results.

[3] Participants who are from the M.S.A. program have taken significantly more courses in accounting, finance, and economics (all $p < 0.001$), have more accounting-related work experience ($p < 0.001$), and are more familiar with segment disclosure ($p = 0.005$) than M.B.A. participants. We re-run all of our tests controlling for all these demographic variables and the test results are similar after adding the covariates. Overall, the results show that none of these covariates are significant (all $p > 0.685$).

[4] All p-values are two-tailed unless stated otherwise.

Next, participants receive information on the expected returns of a potential advertising investment if it were to be made in either the Cell Phone segment or the Smart Home segment. This information indicates that the return on an advertising investment in the Smart Home segment would be substantially higher than the return on the same investment made in the Cell Phone segment since the former is a more rapidly growing market. Specifically, an advertising investment of $8 million would increase the revenue of the Cell Phone segment by $10 million, whereas the same $8 million advertising investment would increase the revenue of the Smart Home segment by $20 million. Thus, from an investment return perspective, the optimal decision is to invest in the Smart Home segment.

Participants then read how Firm X and Firm Z present their segments in the annual reports, where we manipulate our independent variables. After reading the case materials, participants indicate whether they will invest the advertising budget in the Cell Phone or Smart Home segment. This binary choice question is followed by a scale question measuring the strength of their preference indicated in the binary choices (0 = very weak preference; 5 = neutral; 10 = very strong preference). We also ask participants to explain the rationales of their operational decisions. Finally, participants respond to questions in the post-experimental questionnaire, which captures manipulation checks, process measures, and demographic information. [5]

Design and Independent Variables

To test our hypotheses, we employ a $2 \times 2 \times 2 + 1$ between-participants experiment. We manipulate segment disaggregation at two levels (more versus less). In the more disaggregated condition, we inform participants that, consistent with accounting regulations, both their firm (Firm X) and their peer firm (Firm Z) report revenues from the three segments (Cell Phone, Smart

---

[5] Our study received approvals from the Institutional Review Boards at the universities where the study was administered.

Home, and Home Appliance) separately in their segment disclosures. As a result, investors will be able to directly compare the revenue of the primary (Cell Phone) segment between the two firms. In the less disaggregated condition, we tell participants that, consistent with accounting regulations, both firms combine certain segments in their segment disclosures. Their firm (Firm X) combines the Smart Home and Home Appliance segments into a single "Home Product" segment, whereas their peer firm (Firm Z) combines the Cell Phone and Smart Home segments into a single "Smart Device" segment. Due to the manner in which the segments are aggregated, investors will not be able to directly compare the revenue of the primary (Cell Phone) segment between the two firms. We use segment profitability metrics to operationalize segment-specific information, where we manipulate its presence or absence. Specifically, in the present condition, we tell managers that their firm (Firm X) includes operating income as a percentage of revenue for each *reported* segment. We do not provide such information in the absent condition.

Consistent with Amstrong and Collopy (1996), we measure our third variable, competitor-orientation (low vs. high), by asking participants to indicate the extent to which they feel pressure from peer companies that the overall revenue of Firm X is worse than that of Firm Z (0 = not concerned at all, 10 = extremely concerned). A higher (lower) rating on this question indicates that the manager is more (less) competitor-oriented. We split participants into the low and high competitor orientation groups based on the median response of 7.00. The mean responses for the low and high groups are 4.13 and 8.29, respectively. According to Asay et al. (2019), measured moderators should not be affected by either the manipulated variables or the dependent variable. In order to test these requirements, we first conduct a two-way ANOVA with segment disaggregation and segment profitability as the independent variables and competitor orientation as the dependent variable. We find no significant main effect or interaction (all $p > 0.285$). Second,

18

we find that our dependent variable (i.e., manager operational decision) is not correlated with competitor orientation (p = 0.887). Thus, our measure of competitor orientation is independent of our manipulations and not influenced by managers' operating decisions. In addition to the eight treatment conditions, we include a control condition where firms do not provide any segment disclosures. In this condition, firms only disclose overall company revenue. Appendix B provides the details of our manipulations.

Dependent Variable

Recall that our experiment is designed so that an investment in the Cell Phone segment is considered less optimal (i.e., lower returns) than an investment in the Smart Home segment (a $10 million return versus $20 million return, respectively, with the same investment amount). Our dependent variable is computed using participants' decision to invest in either the Smart Home segment or Cell Phone segment scaled by the strength of their preference. Specifically, we code the decision to invest in the Smart Home segment as "+1" and the decision to invest in the Cell Phone segment as "-1." We then multiply the decision by the strength of preference to get a variable ranging from -10 (strong preference to invest in the Cell Phone segment) to +10 (strong preference to invest in the Smart Home segment) (see Clor-Proell, Koonce, and White 2016). Thus, the computed dependent variable captures participants' investment preferences ranging from less optimal (-10) to more optimal (+10).

IV. RESULTS

Manipulation Checks

To check our manipulation of segment disaggregation in the treatment conditions, we first ask participants to indicate whether the firms disclosed segment information or not. Eighty-one percent of participants answer this question correctly. Participants who answer "yes" to the first

question are then asked whether the firms reported two or three segments. Eight-one percent of participants also answer this question correctly. Next, we ask participants to indicate the extent to which they agree that investors can easily compare the revenue of the primary segment of Firm X and Firm Z on an 11-point scale (0 = completely disagree; 10 = completely agree). Participants believe that it is easier for investors to compare the revenue of the primary segment between the two firms when segment disclosures are more disaggregated than less disaggregated (means = 8.23 vs. 2.65; $F_{1, 209}$ = 298.743, p < 0.001). Hence, our manipulation of Segment Disaggregation is successful.

To check our manipulation of the reporting of segment profitability information in the treatment conditions, we ask participants to indicate the extent to which they agree with the following statement, "Firm X reported extra information (e.g., operating income as a percentage of revenue) in addition to the reported revenue," on an 11-point scale, ranging from 0 (completely disagree) to 10 (completely agree). Participants in the present condition indicate a higher rating (mean = 7.27) than those in the absent condition (mean = 3.17; $F_{1, 209}$ = 123.515, p < 0.001). Thus, our manipulation of the reporting of segment profitability information is successful.

Hypothesis Testing

Test of H1

H1 predicts that compared to less disaggregated segment disclosures, more disaggregated segment disclosures will cause managers to feel more peer pressure at a segment level, which in turn leads managers to sacrifice firm value to boost segment-level performance. We measure peer pressure for segment performance by asking participants to indicate the extent to which (1) they are concerned that investors are comparing the revenue of the *primary* segments between the two firms, (2) they feel pressure that the revenue of the *primary* segment is better/worse than that in

20

the peer firm, (3) they are concerned that investors are comparing the revenue of the *secondary* segments between the two firms, and (4) they feel pressure that that the revenue of *secondary* segments between the two firms. All four of the questions are measured on 11-point scales (0 = not concerned at all; 10 = extremely concerned). Responses to these four questions are highly correlated (all $p < 0.001$) and capture the same underlying construct (Cronbach's Alpha = 0.752). We use the average of these four questions as the measure of segment performance peer pressure.[6]

We conduct a structural equation modeling (SEM) analysis to test H1. As shown in Figure 1, the model includes disaggregation as the independent variable, segment performance peer pressure as the mediator, and manager operational decision as the dependent variable.[7] Results show that more disaggregated (versus less disaggregated) segment disclosure significantly increases segment performance peer pressure (standardized coefficient = 0.175, $p = 0.005$, one-tailed); segment performance peer pressure significantly causes managers to make less optimal operational decisions (standardized coefficient = -0.294, $p < 0.001$, one-tailed), and more disaggregated (versus less disaggregated) segment disclosures significantly cause managers to make less optimal operational decisions with the presence of the mediator (standardized coefficient = -0.129, $p = 0.051$). The SEM results also show that the direct effect of disaggregation on manager operational decisions is significant (standardized direct effects = -0.129, $p = 0.042$). The indirect effect of disaggregation on managers operational decision *through* segment performance peer pressure is also significant (standardized direct effects = -0.052, $p = 0.001$, one-tailed). These results indicate that segment performance peer pressure mediates the effect of segment

---

[6] We obtain similar results using the factor extracted from these four questions.
[7] We collapse segment profitability and manager competitor orientation in this model. This model is a saturated model because no more links can be added between any variables. As such, the degree of freedom is 0, and model fit statistics become meaningless and cannot be calculated.

disaggregation on managers' operational decisions (Hayes 2018). Overall, these results support H1.

(Insert Figure 1 about here)

Tests of H2a and H2b

All managers. H2a and H2b jointly predict a three-way interaction between segment disaggregation, segment profitability information, and manager competitor orientation on managers' operational decisions. We conduct a three-way ANOVA with segment disaggregation, segment profitability, and manager competitor orientation as the independent variables, and manager operational decision as the dependent variable. Table 1, Panel A presents descriptive statistics and Table 1, Panel B presents the three-way ANOVA results. Consistent with our prediction, results show a significant three-way interaction ($F_{1, 203} = 3.358$, $p = 0.034$, one-tailed). We also find a significant main effect of disaggregation such that managers are more likely to engage in operational distortion when segment disclosures are disaggregated than aggregated (means = 4.236 vs. 6.381; $F_{1, 203} = 7.585$, $p = 0.003$, one-tailed). This result is consistent with our prediction in H1 that disaggregated segment causes manages to make less optimal operational decisions.

(Insert Table 1 about here)

Low competitor orientation managers. H2a predicts that less competitor-oriented managers are more likely to sacrifice overall firm value to outperform competitors at a segment level when segment disclosures are more disaggregated than when they are less disaggregated, and that this effect is larger when segment-specific information is present than when it is absent. To test H2a, we conduct a two-way ANOVA with segment disaggregation and segment profitability as the independent variables and manager operational decision as the dependent variable, within the *low*

22

competitor orientation subsample. Figure 2, Panel A presents the results. Table 2, Panel A reports the descriptive statistics and Table 2, Panel B reports the ANOVA test results. Consistent with our prediction, results show a marginally significant two-way interaction ($F_{1, 95} = 2.125$, p = 0.074, one-tailed). In addition, we observe two main effects for each manipulated variable. First, the main effect of segment disaggregation is significant ($F_{1, 95} = 4.588$, p = 0.035) indicating that participants in the more disaggregated condition (mean = 3.480) make *less* optimal decisions than those in the less disaggregated condition (mean = 6.082). Second, the main effect of segment profitability is marginally significant ($F_{1, 95} = 2.946$, p = 0.089) indicating that participants make *less* optimal decisions when segment profitability is present (mean = 3.667) than absent (mean = 5.804).

Next, we analyze the simple effects for low competitor-orientation managers to further support our theory. As shown in Table 2, Panel C, when segment profitability information is present, participants make less optimal decisions if segment disclosures are more disaggregated than if they are less disaggregated (means: 1.417 vs. 5.917; $F_{1, 95} = 6.290$, p = 0.007, one-tailed); however, when segment profitability information is absent, participants make similar decisions regardless of whether segment disclosures are more or less disaggregated (means: 5.385 vs. 6.240; $F_{1, 95} = 0.241$, p = 0.624). Similarly, when segment disclosures are more disaggregated, participants make less optimal decisions when segment profitability is present than when it is absent (means: 1.417 vs. 5.385; $F_{1, 95} = 5.086$, p = 0.013, one-tailed), and they make similar decisions when segment disclosures are less disaggregated, whether additional segment-specific information is present or absent (means: 5.917 vs. 6.240; $F_{1, 95} = 0.033$, p = 0. 856). These results support H2a.

(Insert Figure 2 and Table 2 about here)

High competitor orientation managers. H2b predicts that more competitor-oriented managers are more likely to sacrifice overall firm value to outperform competitors at a segment

23

level when segment disclosures are more disaggregated than when they are less disaggregated, irrespective of the presence or absence of additional segment-specific information. To test H2b, we conduct a two-way ANOVA with segment disaggregation and segment profitability as the independent variables and manager operational decision as the dependent variable, for the *high* competitor orientation subsample. Figure 2, Panel B presents the results. Table 3, Panel A reports the descriptive statistics and Table 3, Panel B reports the ANOVA test results. Consistent with our prediction, we find a significant main effect of disaggregation ($F_{1, 108}$ = 2.885, p = 0.046, one-tailed). Specifically, participants in the more disaggregated condition (mean = 4.911) make less optimal decisions than those in the less disaggregated condition (mean = 6.643). The main effect of segment profitability is insignificant ($F_{1, 108}$ = 0.046, p = 0.830) indicating that participants make similar decisions whether segment profitability is present (mean = 5.638) or absent (mean = 5.926). Lastly, the interaction between segment disaggregation and segment profitability is insignificant ($F_{1, 108}$ = 1.191, p = 0.278). H2b is supported.

<center>(Insert Table 3 about here)</center>

Control Group Results

Unpacking theory predicts that segment disclosure causes managers to focus more on segment-level than firm-level performance, and social comparison theory argues that the more disaggregated segment disclosures allow for comparisons of segment performance across peer firms. This creates peer pressure that can distort managers' operational decisions. Our theory suggests that the mere presence of segment disclosure is not sufficient to induce distorted operational decisions since social comparison is a key element of the disaggregation effect. To test this argument, we conduct a one-way ANOVA to compare the control, more disaggregated, and less disaggregated conditions. Table 4, Panel A reports the descriptive statistics for each condition,

<center>24</center>

and Table 4, Panel B presents the one-way ANOVA results. Results show a significant main effect of disaggregation, including the control group ($F_{2, 239}$ = 4.598, p = 0.011). Follow-up pair-wise comparison tests among these three conditions (see Table 4, Panel C) indicate that participants in the control group make similar decisions to those in the less disaggregated condition (means: 6.774 vs. 6.381; t = 0.336, p=0.737); participants in the control group make significantly more optimal decisions than those in the more disaggregated condition (means: 6.774 vs. 4.236; t = 2.172, p=0.016, one-tailed); and participants in the less disaggregated condition make significantly more optimal decisions than those in the more disaggregated condition (means: 6.381 vs. 4.236; t = 2.722, p=0.04, one-tailed). These results suggest that segment disclosure alone (if less disaggregated) is not sufficient to induce operational distortion; instead, social comparison pressure, induced by more disaggregated segment disclosures, appear to drive our results.

(Insert Table 4 about here)

V. CONCLUSION

In this study, we conduct an experiment to examine potential consequences of requiring more segment disaggregation and the reporting of additional segment-specific information, as recently proposed by the FASB as well as how this joint effect is conditional on managers' competitor orientation. Our results show that more disaggregated segment disclosures impose more pressure on managers to outperform competitors at a segment level, which causes them to engage in operational distortion that sacrifices overall firm value. We also find that the effect of disaggregation depends on both managers' competitor orientation and the reporting of segment-specific information. Specifically, for managers who are less competitor-oriented, more disaggregated segment disclosures lead to operational distortion only when additional segment-specific information is present. For managers who are more competitor-oriented, however, more

25

disaggregated segment disclosures result in operational distortion whether additional segment-specific information is present or absent.

Our study contributes to the literature and expands theory on multiple dimensions. We contribute to segment disclosure research (e.g., Berger and Hann 2003; Ettredge et al. 2005) by showing an unintended effect of disaggregated segment disclosures. Specifically, we show that more disaggregated segment disclosures will highlight segment-level performance and cause managers to experience segment-level performance pressure. Moreover, since managers cannot discretionarily aggregate operating segments to hide inferior primary segment performance, managers who are required to report more disaggregated segment disclosures are willing to make operational decisions that sacrifice overall firm value. Moreover, our results show that managers who are more competitor-oriented are more prone to the pressure induced by disaggregation since more disaggregated segment disclosures cause these managers to engage in operational distortion even without the presence of additional segment-specific information. For managers who are less competitor-oriented, the effect of disaggregation can be exacerbated when additional segment-specific information is reported. While regulators appear to believe that providing more disaggregated segment disclosures and additional segment-specific information to investors will increase the usefulness of segment disclosures, our results suggest that managers are willing to engage in operational distortion when they are required to provide more disaggregated and detailed segment disclosures.

Our study has practical implications for standard setters. Specifically, this study indicates that a requirement to disaggregate segment reporting could cause managers to engage in operational distortion that sacrifices overall firm value, and that the inclusion of additional segment-specific information may exacerbate these actions for certain type of managers. As such,

26

regulators and standard setters may consider the implications of these results in their decisions. Importantly, although we document an unintended effect of the proposed segment disclosure standard, we *do not* argue against the FASB's proposal. It is apparent that investors demand more segment information than what is currently required under SFAS No. 131 (CFA Institute 2018). Instead, our study answers the FASB's request to identify potential unintended consequences associated with the new segment disclosure proposal (FASB 2019b).

As with all research, our study has important limitations. First, it assumes that managers perceive investors to be particularly interested in the performance of a company's operating segments. The results may change if managers do not weight the performance of the operating segments as heavily. Second, the participants in this study did not have the option to increase segment performance through other avenues. As such, we do not argue that operational distortion is the *only* way that managers could accomplish their objectives. Rather, it is one viable option that is not easily observed by outsiders. If their decision to distort earnings could be easily observed by outsiders (e.g., through the use of capital expenditures), managers may perceive a greater level of scrutiny which could constrain their sub-optimal decisions. Future research may examine these areas to extend the current study.

Appendix A: Segment Disclosure Examples

In this appendix, we present examples of segment disclosure from the three major players in the cloud computing services: Amazon—Amazon Web Service (AWS), Microsoft—Azure Cloud, and Google—Google Could Platform. While both Amazon and Microsoft disaggregate the segment of their cloud computing services, Alphabet (Google's parent company) aggregated all Google's business lines into one reportable segment "Google."

Amazon's Segment Disclosure in 2018 10-K (Note 10: Segment Information)

		Year Ended December 31,				
		2016		2017		2018
North America						
Net sales	$	79,785	$	106,110	$	141,366
Operating expenses		77,424		103,273		134,099
Operating income	$	2,361	$	2,837	$	7,267
International						
Net sales	$	43,983	$	54,297	$	65,866
Operating expenses		45,266		57,359		68,008
Operating income (loss)	$	(1,283)	$	(3,062)	$	(2,142)
AWS						
Net sales	$	12,219	$	17,459	$	25,655
Operating expenses		9,111		13,128		18,359
Operating income	$	3,108	$	4,331	$	7,296
Consolidated						
Net sales	$	135,987	$	177,866	$	232,887
Operating expenses		131,801		173,760		220,466
Operating income		4,186		4,106		12,421
Total non-operating income (expense)		(294)		(300)		(1,160)
Provision for income taxes		(1,425)		(769)		(1,197)
Equity-method investment activity, net of tax		(96)		(4)		9
Net income	$	2,371	$	3,033	$	10,073

Microsoft's Segment Disclosure in 2018 10-K (Note 21: Segment Information and Geographic Data)

(In millions)

Year Ended June 30,		2018		2017		2016
Revenue						
Productivity and Business Processes	$	35,865	$	29,870	$	25,792
Intelligent Cloud		32,219		27,407		24,952
More Personal Computing		42,276		39,294		40,410
Total	$	110,360	$	96,571	$	91,154
Operating Income (Loss)						
Productivity and Business Processes	$	12,924	$	11,389	$	11,756
Intelligent Cloud		11,524		9,127		9,249
More Personal Computing		10,610		8,815		6,183
Corporate and Other		0		(306)		(1,110)
Total	$	35,058	$	29,025	$	26,078

Alphabet's Segment Disclosure in 2018 10-K (Note 14: Information about Segments and Geographic Areas)

		Year Ended December 31,				
		2016		2017		2018
Revenues:						
Google	$	89,984	$	110,378	$	136,224
Other Bets		288		477		595
Total revenues	$	90,272	$	110,855	$	136,819

		Year Ended December 31,				
		2016		2017		2018
Operating income (loss):						
Google	$	27,055	$	32,287	$	36,517
Other Bets		(2,741)		(2,734)		(3,358)
Reconciling items[1]		(598)		(3,407)		(6,838)
Total income from operations	$	23,716	$	26,146	$	26,321

Appendix B: Experiment Manipulations

[More Disaggregated/ Segment Profitability Information Present]

(in millions)	**Firm X (focal)**			**Firm Z (competitor)**	
Investment Strategy		Revenue	Operating Income as % of revenue		Revenue
If invest Promotion Strategy in **Cell Phone**	Cell Phone	100	3.0%	Cell Phone	95
	Smart Home	10	28.0%	Smart Home	5
	Home Appliances	20	-10.0%	Home Appliances	10
	Total	130	2.92%	Total	110
If invest Promotion Strategy in **Smart Home**	Cell Phone	90	3.0%	Cell Phone	95
	Smart Home	30	28.0%	Smart Home	5
	Home Appliances	20	-10.0%	Home Appliances	10
	Total	140	6.50%	Total	110

[Less Disaggregated/ Segment Profitability Information Present]

(in millions)	**Firm X (focal)**			**Firm Z (competitor)**	
Investment Strategy		Revenue	Operating Income as % of revenue		Revenue
If invest Promotion Strategy in **Cell Phone**	Cell phone	100	3.00%	Smart Devices	100
	Home Products	30	2.67%	Appliances	10
	Total	130	2.92%	Total	110
If invest Promotion Strategy in **Smart Home**	Cell phone	90	3.00%	Smart Devices	100
	Home Products	50	12.80%	Appliances	10
	Total	140	6.50%	Total	110

[More Disaggregated/ Segment Profitability Information Absent]

(in millions)	**Firm X (focal)**		**Firm Z (competitor)**	
Investment Strategy		Revenue		Revenue
*If invest Promotion Strategy in **Cell Phone***	Cell Phone	100	Cell Phone	95
	Smart Home	10	Smart Home	5
	Home Appliances	20	Home Appliances	10
	Total	130	Total	110
*If invest Promotion Strategy in **Smart Home***	Cell Phone	90	Cell Phone	95
	Smart Home	30	Smart Home	5
	Home Appliances	20	Home Appliances	10
	Total	140	Total	110

[Less Disaggregated/ Segment Profitability Information Absent]

(in millions)	**Firm X (focal)**		**Firm Z (competitor)**	
Investment Strategy		Revenue		Revenue
*If invest Promotion Strategy in **Cell Phone***	Cell phone	110	Smart Devices	95
	Home Products	20	Appliances	15
	Total	130	Total	110
*If invest Promotion Strategy in **Smart Home***	Cell phone	120	Smart Devices	95
	Home Products	20	Appliances	15
	Total	140	Total	110

[Control Condition]

(in millions)	**Firm X (focal)**	**Firm Z (competitor)**
Investment Strategy	Total Revenue	Total Revenue
*If invest Promotion Strategy in **Cell Phone***	130	110
*If invest Promotion Strategy in **Smart Home***	140	110

REFERENCES

Aggarwal, R. K., and A. A. Samwick. 1999. Executive Compensation, Strategic Competition, and Relative Performance Evaluation: Theory and Evidence. *The Journal of Finance* 54 (6): 1999-2043.

Armstrong, S. J., and F. Collopy. 1996. Competitor Orientation: Effects of Objectives and Information on Managerial Decisions and Profitability. *Journal of Marketing Research* 33 (2): 188-199.

Asay, S., R. Guggenmos, K. Kadous, L. Koonce, R. Libby. Theory Testing and Process Evidence in Accounting Experiments. Working paper.

Bens, D. A., P. G. Berger, and S. J. Monahan. 2011. Discretionary Disclosure in Financial Reporting: An Examination Comparing Internal Firm Data to Externally Reported Segment Data. *Accounting Review* 86 (2): 417–49.

Bentley, J. W. 2018. Decreasing Operational Distortion and Surrogation through Narrative Reporting. *The Accounting Review* 94 (3): 27–55.

Berger, P. G., and R. Hann. 2003. The Impact of SFAS No. 131 on Information and Monitoring. *Journal of Accounting Research* 41 (2): 163–223.

Berger, P. G., and R. N. Hann. 2007. Segment Profitability and the Proprietary and Agency Costs of Disclosure. *The Accounting Review* 82 (4): 869–906.

Bhojraj, S., C. M. C. Lee, and D. K. Oler. 2003. What's My Line? A Comparison of Industry Classification Schemes for Capital Market Research. *Journal of Accounting Research* 41 (5): 745-774.

Bloomfield, R., M. W. Nelson, and E. Soltes. 2016. Gathering Data for Archival, Field, Survey, and Experimental Accounting Research. *Journal of Accounting Research* 54 (2): 341–95.

Botosan, C. A., and M. Stanford. 2005. Managers' Motives to Withhold Segment Disclosures and the Effect of SFAS No. 131 on Analysts' Information Environment. *Accounting Review* 80 (3): 751–71.

Botosan, C., S. McMahon, and M. H. Stanford. 2009. Representationally Faithful Disclosures, Organizational Design and Managers' Segment Reporting Decisions. Working paper.

Brickman, P., & Bullman, R. J. (1977). Pleasure and pain in social comparison. In *Social comparison processes: Theoretical and empirical perspectives,* edited by J. Suls and T. A. Wills, 149-186. Washington, DC: Hemisphere.

Brown, L. D., and M. L. Caylor. 2005. A Temporal Analysis of Quarterly Earnings Thresholds: Propensities and Valuation Consequences. *The Accounting Review* 80 (2): 423-440.

Burgstahler, D., and I. Dichev. 1997. Earnings management to avoid earnings decreases and losses. *Journal of Accounting and Economics* 24 (1): 99-126.

Burgstahler, D., and M. Eames. 2006. Management of Earnings and Analysts' Forecasts to Achieve Zero and Small Positive Earnings Surprises. *Journal of Business Finance & Accounting* 33 (5-6): 633-652.

Cao, S. S., G. Ma, J. W. Tucker, and C. Wan. 2018. Technological Peer Pressure and Product Disclosure. *The Accounting Review* 93 (6): 95-126.

CFA Institute. 2018. *Segment Disclosures: Investor Perspectives*. CFA Institute.

Chen, P. F., and Guochang Zhang. 2007. Segment Profitability, Misvaluation, and Corporate Divestment. *Accounting Review* 82 (1): 1–26.

Chen, T.-K., and Y.-P. Liao. 2015. The Economic Consequences of Disclosure Quality under SFAS No. 131. *Accounting Horizons* 29 (1): 1-22.

Clor-Proell, S., L. Koonce, and B. White. 2016. How Do Experienced Users Evaluate Hybrid Financial Instruments? *Journal of Accounting Research* 54 (5): 1267–96.

Dagogo-Jack, T., J. Beck, and M. Norton. People Prefer Beating Others to Beating Their Past. Working paper.

Das, S., K. Kim, and S. Patro. 2011. An Analysis of Managerial Use and Market Consequences of Earnings Management and Expectation Management. *The Accounting Review* 86 (6): 1935-1967.

De Franco, G., O.-K. Hope, and S. Larocque. 2015. Analysts' choice of peer companies. *Review of Accounting Studies* 20 (1): 82-109.

Degeorge, F., J. Patel, and R. Zeckhauser. 1999. Earnings Management to Exceed Thresholds. *The Journal of Business* 72 (1): 1-33.

Du, Q., and R. Shen. 2018. Peer performance and earnings management. *Journal of Banking & Finance* 89: 125-137.

Easton, P. D., M. L. McAnally, G. A. Sommers, and X.-J. Zhang. 2018. *Financial Statement Analysis & Valuation*. 5th edition. Cambridge Business Publishers, LLC.

Ebert, M., D. Simons, and J. D. Stecher. 2017. Discretionary Aggregation. *Accounting Review* 92 (1): 73–91.

Ettredge, M. L., S. Y. Kwon, D. B. Smith, and P. A. Zarowin. 2005. The Impact of SFAS No. 131 Business Segment Data on the Market's Ability to Anticipate Future Earnings. *Accounting Review* 80 (3): 773–804.

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.

Financial Accounting Standards Board (FASB). 2010. *Statement of Financial Accounting Concept No. 8: Conceptual Framework for Financial Reporting.* Norwalk, CT: FASB.

Financial Accounting Standards Board (FASB). 2016. *Invitation to Comment: Agenda Consultation.* Norwalk, CT: FASB.

Financial Accounting Standards Board (FASB). 2019. *Accounting Standards Codification.* Norwalk, CT: FASB.

Financial Accounting Standards Board (FASB). 2019. *Project Update.* Norwalk, CT: FASB.

Francis, J. R., M. L. Pinnuck, and O. Watanabe. 2014. Auditor Style and Financial Statement Comparability. *The Accounting Review* 89 (2): 605-633.

Gao, P., and G. Zhang. 2019. Accounting Manipulation, Peer Pressure, and Internal Control. *The Accounting Review* 94 (1): 127-151.

Gilbert, D. T., R. B. Giesler, and K. A. Morris. 1995. When Comparisons Arise. *Journal of Personality and Social Psychology* 69 (2): 227-236

Gong, G., L. Y. Li, and J. Y. Shin. 2011. Relative Performance Evaluation and Related Peer Groups in Executive Compensation Contracts. *The Accounting Review* 86 (3): 1007-1043.

Griesinger, D. W., and J. W. Livingston, Jr. 1973. Toward a Model of Interpersonal Motivation in Experimental Games. *Behavioral Science* 18 (3): 173-188.

Hayes, A. F. 2018. *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*. 2nd edition. New York, NY: The Guilford Press.

Herrmann, D., and W. B. Thomas. 2000. An Analysis of Segment Disclosures under SFAS No. 131 and SFAS No. 14. *Accounting Horizons* 14 (3): 287–302.

Hirshleifer, D., and S. H. Teoh. 2003. Limited attention, information disclosure, and financial reporting. *Journal of Accounting and Economics* 36 (1–3): 337-386.

International Accounting Standards Board (IASB). 2013. *IFRS 8 Post-Implementation Review*. London, UK: IFRS Foundation

Jayaraman, S., and R. Verdi. 2014. Are Reporting Incentives and Accounting Standards Substitutes or Complements in Achieving Accounting Comparability? Working paper.

Jenter, D., and F. Kanaan. 2015. CEO Turnover and Relative Performance Evaluation. *The Journal of Finance* 70 (5): 2155-2184.

Kahle, K. M., and R. A. Walkling. 1996. The Impact of Industry Classifications on Financial Research. *Journal of Financial and Quantitative Analysis* 31 (3): 309-335.

Kuhlman, D. M., and A. F. J. Marshello. 1975. Individual Differences in Game Motivation as Moderators of Preprogrammed Strategy Effects in Prisoner's Dilemma. *Journal of Personality and Social Psychology* 32 (5), 922-931

Lail, B. E., W. B. Thomas, and G. J. Winterbotham. 2014. Classification Shifting Using the 'Corporate/Other' Segment. *Accounting Horizons* 28 (3): 455–77.

Liebrand, W. B. G., and G. J. Van Run. 1985. The Effects of Social Motives on Behavior in Social Dilemmas in Two Cultures. *Journal of Experimental Social Psychology* 21 (1): 86-102.

Libby, R., K. M. Rennekamp, and N. Seybert. 2015. Regulation and the interdependent roles of managers, auditors, and directors in earnings management and accounting choice. *Accounting, Organizations and Society* 47 (C): 25-42.

March, J. G., and Z. Shapira. 1987. Managerial Perspectives on Risk and Risk Taking. *Management Science* 33(11): 1404-1418.

March, J. G., and Z. Shapira. 1992. Variable Risk Preferences and the Focus of Attention. *Psychological Review* 99(1): 172-183.

Martin, T. W., and T. Mickle. 2017. Samsung, Apple Intensify Battle for Smartphone Users. *The Wall Street Journal*. March 31, 2017

Matsumoto, D. A. 2002. Management's Incentives to Avoid Negative Earnings Surprises. *The Accounting Review* 77 (3): 483-514.

Richardson, S., S. H. Teoh, and P. D. Wysocki. 2004. The Walk-down to Beatable Analyst Forecasts: The Role of Equity Issuance and Insider Trading Incentives. *Contemporary Accounting Research* 21 (4): 885-924.

Salovey, P., and J. Rodin. 1984. Some antecedents and consequences of social comparison jealousy. *Journal of Personality and Social Psychology* 47: 780-792.

Securities and Exchange Commission (SEC). 2016. Amazon.com, Inc. Form 10-K for Fiscal Year Ended December 31, 2015.

Securities and Exchange Commission (SEC). 2017. Alphabet, Inc. Form 10-Q for the Quarterly Period Ended June 30, 2017.

Shah, A. K., and D. M. Oppenheimer. 2011. Grouping Information for Judgments. *Journal of Experimental Psychology: General* 140(1), 1-13.

Sullivan, K., and T. Kida. 1995. The Effect of Multiple Reference Points and Prior Gains and Losses on Managers' Risky Decision Making. *Organizational Behavior and Human Decision Processes* 64 (1): 76-83.

Taylor, S. E., and M. Lobel. 1989. Social comparison activity under threat: Downward evaluation and upward contacts. *Psychological Review* 96: 569-575.

Tesser, A. 1991. Emotion in social comparison and reflection processes. In *Social comparison: Contemporary theory and research*, edited by J. Suls and T. A. Wills, 117-148. Hillsdale, NJ: Erlbaum.

Tse, S. 1989. Attributes of Industry, Industry Segment and Firm-Specific Information in Security Valuation. *Contemporary Accounting Research* 5 (2): 592–614.

Tversky, A., and C. R. Fox. 1995. Weighing Risk and Uncertainty. *Psychological Review* 102, 269–283.

Tversky, A., & Koehler, D. J. 1994. Support theory: A non-extensional representation of subjective probability. *Psychological Review*, 101, 547–567.

Van Boven, L., and N. Epley. 2003. The Unpacking Effect in Evaluative Judgments: When the Whole is Less than the Sum of Its Parts. *Journal of Experimental Social Psychology* 39(3), 263-269.

Van Yperen, N. W., and N. P. Leander. 2014. The Overpowering Effect of Social Comparison Information: On the Misalignment between Mastery-Based Goals and Self-Evaluation Criteria. *Personality and Social Psychology Bulletin* 40 (5): 676-688.

Wallsten, T. S., D. V. Budescu, and R. Zwick. 1993. Comparing the Calibration and Coherence of Numerical and Verbal Probability Judgments. *Management Science* 39 (2): 176-190.

Wang, Q. 2016. Determinants of Segment Disclosure Deficiencies and the Effect of the SEC Comment Letter Process. *Journal of Accounting & Public Policy* 35 (2): 109–33.

Wang, Q., M. Ettredge, Y. Huang, and L. Sun. 2011. Strategic Revelation of Differences in Segment Earnings Growth. *Journal of Accounting & Public Policy* 30 (4): 383–92.

Yip, R. W. Y., and D. Young. 2012. Does mandatory IFRS adoption improve information comparability? *The Accounting Review* 87 (5): 1766-1789.

You, H. 2014. Valuation-driven profit transfer among corporate segments. *Review of Accounting Studies* 19 (2), 805–838.

Zell, E., and M. D. Alicke. 2010. The Local Dominance Effect in Self-Evaluation: Evidence and Explanations. *Personality and Social Psychology Review* 14 (4): 368-384.
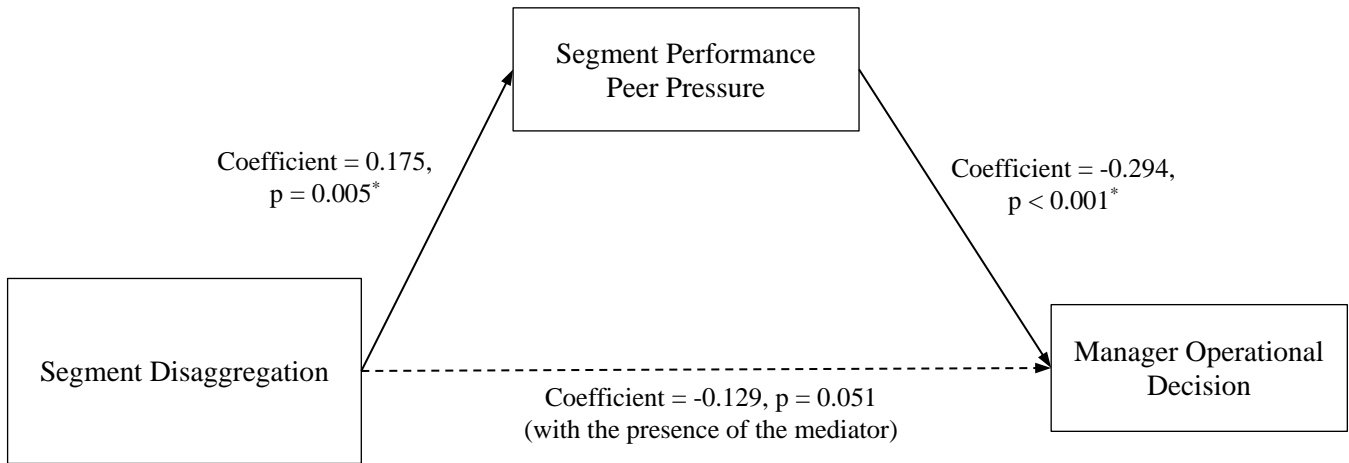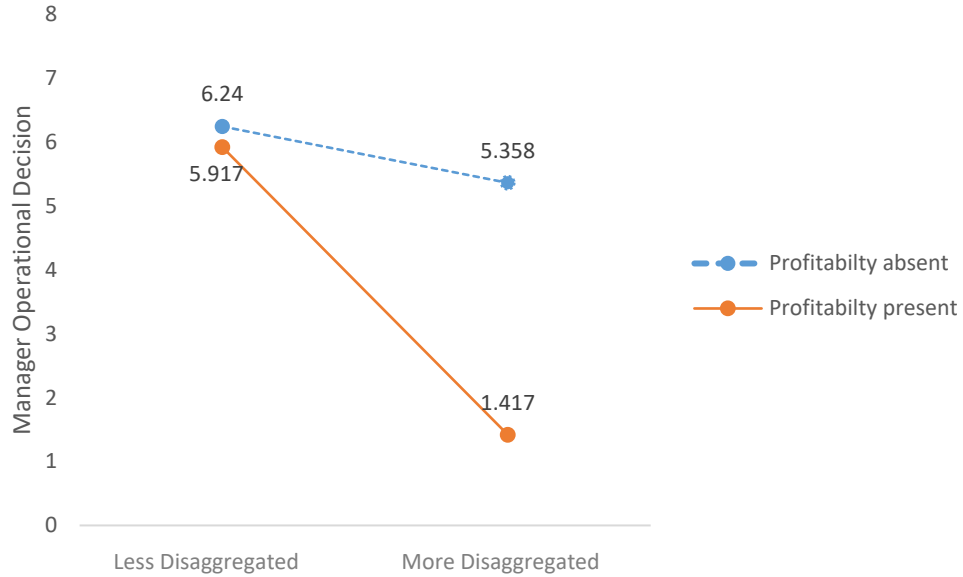
FIGURE 1

Mediation Analysis

Figure 1 presents the SEM model with disaggregation as the independent variable, segment performance peer pressure as the mediator, and manager operational decision as the dependent variable. We collapse segment profitability and manager competitor orientation in this model. Since this model is a saturated model, model fit statistics cannot be calculated. All regression coefficients are standardized.

* One-tailed p-values given directional predictions.

FIGURE 2

Experimental Results on Manager Operational Decision

Panel A: *Low* Competitor-Orientated Managers

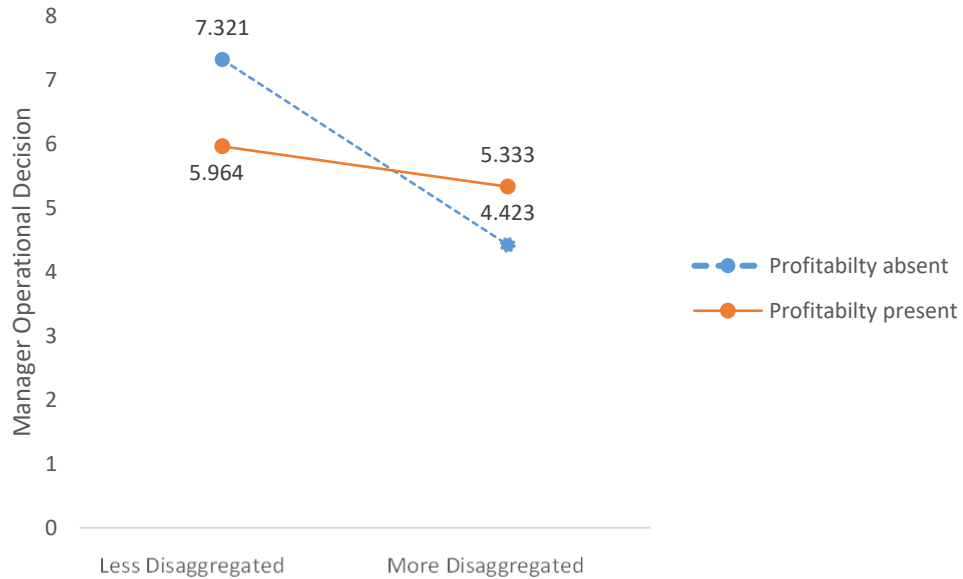**Panel B: *High* Competitor-Orientated Managers**

Figure 2 presents the experimental results of managers' operational decision for low and high competitor-orientated managers, respectively. Panel A (Panel B) shows the joint effect of segment disaggregation and segment profitability on operational decision for low (high) competitor-orientated managers.

TABLE 1

Results on Manager Operational Decision—*All Participants*

Panel A: Descriptive Statistics—Mean (SD), *n = Sample Size*

	Low Competitor Orientation		High Competitor Orientation		
	Profitability Absent	Profitability Present	Profitability Absent	Profitability Present	Total
Less Disaggregated	6.240 (5.790) *n = 25*	5.917 (5.225) *n = 24*	7.321 (3.255) *n = 28*	5.964 (4.985) *n = 28*	6.381 (4.829) *n = 105*
More Disaggregated	5.385 (6.357) *n = 26*	1.417 (7.306) *n = 24*	4.423 (6.748) *n = 26*	5.333 (6.326) *n = 30*	4.236 (6.761) *n = 106*

Panel B: Three-Way ANOVA

Source	S. S.	df	M. S.	F	p-value
Disaggregation	258.797	1	258.797	7.585	0.003[*]
Profitability	73.603	1	73.603	2.157	0.143
Competitor Orientation	54.687	1	54.687	1.603	0.207
Disaggregation × Profitability	6.218	1	6.218	0.182	0.670
Disaggregation × Competitor Orientation	10.932	1	10.932	0.320	0.572
Profitability × Competitor Orientation	48.454	1	48.454	1.420	0.235
Disaggregation × Profitability × Competitor Orientation	114.590	1	114.590	3.358	0.034[*]
Error	6926.465	203	34.121		

Table 1 shows results of Disaggregation, Segment Profitability, and Competitor Orientation on Manager Operational Decision for *all participants*. Panel A presents the descriptive statistics. Panel B presents the results of the three-way ANOVA.

[*]One-tailed p-values given directional predictions.

TABLE 2

Results on Manager Operational Decision— *Low Competitor Orientation*

Panel A: Descriptive Statistics—Mean (SD), *n = Sample Size*

	Profitability Absent	Profitability Present	Total
Less Disaggregated	6.240 (5.790) n = 25	5.917 (5.225) n = 24	6.082 (5.465) n = 49
More Disaggregated	5.385 (6.357) n = 26	1.417 (7.306) n = 24	3.480 (7.049) n = 50
Total	5.804 (6.040) n = 51	3.667 (6.682) n = 48	4.768 (6.417) n = 99

Panel B: Two-Way ANOVA

Source	S. S.	df	M. S.	F	p-value
Disaggregation	177.262	1	177.262	4.588	0.035
Profitability	113.818	1	113.818	2.946	0.089
Disaggregation × Profitability	82.099	1	82.099	2.125	0.074*
Error	3670.381	95	38.636		
Total	6286.000	99			

Panel C: Simple Effects

Source	df	F	p-value
Effect of disaggregation when profitability is absent	1	0.241	0.624
Effect of disaggregation when profitability is present	1	6.290	0.007*
Effect of profitability when segment disclosure is aggregated	1	0.033	0.856
Effect of profitability when segment disclosure is disaggregated	1	5.086	0.013*

Table 2 shows results of Disaggregation and Segment Profitability on Managers' Operational Decisions for *Low Competitor-Orientated* participants. Panel A presents the descriptive statistics. Panel B presents the results of the two-way ANOVA. Panel C presents simple effect test.
*One-tailed p-values given directional predictions.

TABLE 3

Results on Manager Operational Decision— *High Competitor Orientation*

Panel A: Descriptive Statistics—Mean (SD), *n = Sample Size*

	Profitability Absent	Profitability Present	Total
Less Disaggregated	7.321 (3.255) *n = 28*	5.964 (4.985) *n = 28*	6.643 (4.227) *n = 56*
More Disaggregated	4.423 (6.748) *n = 26*	5.333 (6.326) *n = 30*	4.911 (6.482) *n = 56*
Total	5.926 (5.386) *n = 54*	5.638 (5.678) *n = 58*	5.777 (5.516) *n = 112*

Panel B: Two-Way ANOVA

Source	S. S.	df	M. S.	F	p-value
Disaggregation	86.969	1	86.969	2.885	0.046[*]
Profitability	1.394	1	1.394	0.046	0.830
Disaggregation × Profitability	35.896	1	35.896	1.191	0.278
Error	3256.084	108	30.149		
Total	7115.000	112			

Panel C: Simple Effects

Source	df	F	p-value
Effect of disaggregation when profitability is absent	1	3.756	0.028[*]
Effect of disaggregation when profitability is present	1	0.191	0.332[*]
Effect of profitability when segment disclosure is aggregated	1	0.855	0.357
Effect of profitability when segment disclosure is disaggregated	1	0.383	0.537

Table 3 shows results of Disaggregation and Segment Profitability on Managers' Operational Decisions for *High-Competitor Orientated* participants. Panel A presents the descriptive statistics. Panel B presents the results of the two-way ANOVA. Panel C presents simple effect tests.
[*]One-tailed p-values given directional predictions.

TABLE 4

Control Group Results

Panel A: Descriptive Statistics—Mean (SD), *n = Sample Size*

Control Group	Aggregate	Disaggregate	Total
6.770	6.381	4.236	5.303
(4.485)	(4.829)	(6.761)	(5.963)
n = 31	*n = 105*	*n = 106*	*n = 211*

Panel B: One-Way ANOVA

Source	S. S.	*df*	M. S.	F	p-value
Between Groups	301.198	2	150.599	4.598	0.011
Within Groups	7827.285	239	32.750		
Total	8128.483	241			

Panel C: Contrast Tests

Contrast weights	*df*	t	p-value
Control (1), Less Disaggregated (-1), More Disaggregated (0)	239	0.336	0.737
Control (1), Less Disaggregated (0), More Disaggregated (-1)	239	2.172	0.016[*]
Control (0), Less Disaggregated (1), More Disaggregated (-1)	239	2.722	0.004[*]

Table 4 shows results of the comparisons among the Control, Less Disaggregated and More Disaggregated conditions. Panel A presents the descriptive statistics. Panel B presents the results of the one-way ANOVA. Panel C presents results of the contrast tests.

*One-tailed p-values given directional predictions.