

Mental Accounting and Disaggregation Based on the Sign and Relative Magnitude of Income Statement Items

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ABSTRACT: Current financial reporting guidance allows managers flexibility as to whether to disaggregate income statement items. Such flexibility is problematic if managers prefer to aggregate in some situations and disaggregate in others because we conjecture that investors' evaluations of firms will predictably differ depending on whether performance information is shown in an aggregated or disaggregated fashion. We conduct a series of related experiments within the context of compound financial instruments to investigate whether managers' preferences follow the predictions of mental accounting theory; specifically, that presentation preferences vary as a function of the sign and relative magnitude of the income statement items. Results reveal that managers' disaggregation preferences reflect mental accounting. Further, the effects of mental accounting are moderated only when managers feel high pressure to report transparently. Finally, and most importantly, the preferred presentations of managers result in the highest firm valuations from investors, indicating that investors also rely on mental accounting. Our study has implications for standard setters, regulators, and researchers.

Keywords: *disaggregation; mental accounting theory; transparency; income statement items.*

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I. INTRODUCTION

A fundamental issue in financial reporting is determining whether and how to disaggregate income statement items (Chartered Financial Analyst [CFA] Institute 2007; Deloitte 2010; Financial Accounting Standards Board [FASB]/International Accounting Standards Board [IASB] 2009). We define disaggregation as separately presenting the underlying components of one or more items in the financial statements. Investors have expressed a desire for disaggregated information because they view it as more transparent (Barth and Schipper 2008; Financial Accounting Standards Advisory Council [FASAC] 2013), and standard setters and market regulators have voiced concerns about the variation in income statement disaggregation across firms (Desroches 1998; Tjon-Hing 2006; FASB/IASB 2010).¹ Such variation in presentation exists because there is little reporting guidance regarding income statement disaggregation, giving managers flexibility as to whether to aggregate or disaggregate.² Such flexibility is problematic if managers prefer to aggregate in some situations and disaggregate in others—based on which presentation makes the firm look more favorable—because we conjecture that investors' evaluations of firms will differ depending on whether performance information is shown in an aggregated or disaggregated fashion.

Our study has three purposes. First, we posit and experimentally test our conjecture that managers' disaggregation preferences will systematically vary depending on the sign and relative magnitude of the income statement items. That is, we posit their preferences will be consistent with mental accounting (Thaler 1985, 1999). Drawing on the S-shaped value curve of prospect theory, mental accounting theory indicates that whether aggregation or disaggregation is preferred depends on whether items are gains or losses and their corresponding relative magnitudes. In brief, it posits that if the utility of aggregating two or more items exceeds that of disaggregating them, individuals will prefer to combine them into one "mental account" (aggregate them on the income statement). Otherwise, they will prefer to keep items in separate "mental accounts" (disaggregate them on the income statement). Overall, managers will then favor the aggregated or disaggregated presentation based on which has a higher utility.³ Second, we also examine whether pressure to report transparently—an important institutional feature that is desired by investors—moderates the effects of mental accounting on managers' preferences. Third, we test whether investors' valuation judgments are systematically affected by aggregated versus disaggregated presentations. That is, we address the question of whether and how managers' presentation preferences matter.

Our study is important for several reasons. First, if managers' reporting choices are consistent with those predicted by mental accounting theory in that they prefer presentations that yield the most favorable evaluation of the firm, then regulators will glean insights from our study about the types of income statement items for which managers may choose aggregated versus disaggregated reporting and, thus, how investors may be affected. Such insights about the unintended consequences of the current flexibility in the disaggregation decision also will be useful to standard setters as they continue to struggle with the cost/benefit trade-offs associated with different types of financial statement presentations (FASB/IASB 2009). Specifically, we investigate one

¹ Our discussions with current and former Securities and Exchange Commission (SEC) staff, including the chief accountant, also confirm their strong desire to gain a better understanding of this important issue.

² Among the few exceptions, SEC Regulation S-X requires firms to show revenues from different activities if those revenues equal or exceed 10 percent of total revenues.

³ Although our study does not systematically address whether managers strategically or unintentionally engage in mental accounting, most of the prior research on mental accounting in other domains, such as marketing, strongly suggests that people are strategic in using it (e.g., Kivetz 1999, 262; Thaler 1999, 190). We argue that the effects we document in our domain are meaningful irrespective of whether they are strategic or unintentional on the part of managers.

important consequence of such reporting flexibility—namely, whether investors render different evaluations of the firm depending on whether given income statement items are aggregated or disaggregated. Although our study does not (and cannot) answer the normative question of whether aggregation or disaggregation should be mandated for the effective functioning of the capital markets (Schipper 1994), it does provide systematic, scholarly input to standard setters and regulators when they deliberate this important issue.

Second, although mental accounting theory has been shown to be applicable in areas besides financial reporting, it is unclear whether we will observe it in the financial reporting domain where other institutional pressures, such as that for transparent reporting, are present (Barth and Schipper 2008). By investigating the potential influence of mental accounting theory both in the absence and presence of this important institutional feature, we provide a meaningful test of its boundary conditions, thereby contributing both to accounting knowledge and to mental accounting theory. That is, we investigate the extent to which pressures to report transparently moderate the effects of the sign and magnitude of income statement items on managers' disaggregation preferences.

To examine these issues, we conduct a series of related experiments in the setting of compound financial instruments (i.e., callable and puttable bonds) and fair value accounting. For a given interest rate shock, the income statement consequences for such instruments typically consist of one gain and one loss and vary in their magnitudes depending on the instrument and direction of the interest rate change.⁴ Thus, in the first two experiments, we are able to vary the sign of the aggregated item (i.e., net gain or net loss) and the relative magnitudes of the underlying components. We ask M.B.A. student participants in the role of managers about the strength of their preferences for the two possible reporting alternatives of aggregated versus disaggregated presentations and also about how they believe investors will react to each of these alternatives. In the third experiment, we examine the extent to which the effects of sign and relative magnitude on managers' preferences is robust to transparency pressure. Specifically, Experiment Three examines whether managers given explicit information about the valuation benefits of transparency are less likely to exhibit mental accounting. Finally, Experiment Four examines whether managers' choices to aggregate or disaggregate influence investors' judgments about firm valuation. In this way, we examine whether different reporting presentations systematically influence investors' evaluations of firms in ways that are consistent with mental accounting. We seek to determine whether mental accounting matters to investors who use financial reports.

Experimental results support our predictions. In our first two experiments, we observe that when fair value changes result in either a small or large net gain, managers generally prefer to aggregate the underlying gain and loss so as to report a net gain. In contrast, when fair value changes result in a net loss, managers' preferences depend on the relative magnitudes of the underlying components. When the net loss is comprised of a large loss and a small gain, managers prefer disaggregation. However, when the net loss is comprised of a large loss and a large gain, they are equally likely to prefer disaggregation and aggregation. These results indicate that managers' preferences are consistent with mental accounting.

Results from the third experiment show that the provision of explicit information to be transparent only partially overrides mental accounting-based preferences. Specifically, in situations

⁴ We focus on compound financial instruments and their fair value changes for several reasons. First, the issue of disaggregation in the context of compound financial instruments has been a source of debate and discussion among regulators and standard setters (Deloitte 2010; Fields 2009). Second, using this setting allows us to systematically vary the relative magnitudes of the underlying gains and losses. Third, the setting also allows us to hold constant factors that are not our focus, but may influence firms' financial statement disaggregation decisions for other types of income statement items, such as the persistence and materiality of gains and losses and their effects on key subtotals and benchmarks (Heitzman, Wasley, and Zimmerman 2010; Riedl and Srinivasan 2010; Schrand and Walther 2000).

where the directional predictions of mental accounting and transparency differ, our results show no average preference for aggregating or disaggregating the items. Although this result could imply that the forces of mental accounting and transparency offset each other, an additional analysis reveals the sensitivity of this conclusion to how strongly managers feel the manipulated pressure to report transparently. Those who feel less pressure continue to exhibit preferences that are consistent with mental accounting, but those who feel more pressure to be transparent consistently disaggregate. Overall, these results suggest that mental accounting preferences can be moderated by information about the benefits of transparency, depending on how sensitive individual managers are to this information. Across all three experiments, our results also show that managers generally believe that investors will be even more inclined to think in mental accounting terms than the managers do.

In our final experiment, we find that managers' reporting preferences do, indeed, have consequences for investors. Investors' views about a firm's value are systematically influenced by whether net gains and losses are disaggregated on the income statement, *even though* we provide investors with the underlying gain and loss information. These results are not only consistent with mental accounting, but also with how managers believe investors will react. Further, these results confirm that managers' mental accounting preferences for aggregation versus disaggregation systematically affect the judgments of investors, an important group of market participants.

Our paper has implications for standard setters, regulators, and researchers. For standard setters, our study provides rigorous empirical evidence suggesting that the current flexibility in financial reporting has unintended consequences for investors. That is, managers systematically prefer aggregation in some cases, but disaggregation in others, and investors react differently to aggregated and disaggregated presentations. These results suggest the need for standard setters to reconsider mandating guidance about disaggregation (FASB/IASB 2009).⁵ Although our study cannot address whether aggregation or disaggregation is superior, it does suggest that an important downside of the current flexibility is that, without financial reporting guidance on disaggregation, managers' preferences will vary in a predictable fashion depending on the sign and magnitude of the items. In turn, these preferences influence investors in a predictable fashion.

Regulators also should be interested in the finding that investors react differently to the same economic transaction depending on whether the underlying gains and losses are aggregated or disaggregated by managers. Given regulators' concerns about investor protection (SEC 2013), these results provide insights regarding the factors that affect managers' presentation choices and how investors are likely to react differently to varying presentations. Accordingly, regulators should be better equipped to understand how the reporting choices by managers can influence investors' firm valuation judgments.

Finally, our paper provides a theoretical basis for understanding preferences for aggregation versus disaggregation on the income statement that is new to this domain. Prior research has identified other determinants of managers' choices regarding whether to aggregate or disaggregate, such as the persistence and materiality of items (Riedl and Srinivasan 2010; Heitzman et al. 2010), whether proprietary costs are of concern (Harris 1998), and the levels of key subtotals and benchmarks (McVay 2006; Schrand and Walther 2000). We add to this

⁵ Although both the FASB and IASB consider the issue of disaggregation to be important and have previously proposed a potential standard on this topic in the financial statement presentation project, this initiative has stalled due to several concerns, including the potential implementation costs associated with more disaggregation in the financial reports and concerns about user benefits (FASB 2009). A recent survey by the Financial Accounting Standards Advisory Council survey (FASAC 2013) indicates the continued interest in such a project.

literature by identifying perhaps even more fundamental factors in the form of the sign and magnitude of the components of income statement items that determine whether managers will present results in an aggregated or disaggregated manner. In other words, mental accounting is a powerful theory to apply to financial reporting because it can allow researchers to make predictions across a wide variety of income statement items. Further, our study may allow researchers to understand previously unexplained findings, such as [Riedl and Srinivasan's \(2010\)](#) finding that firms are more likely to disaggregate special items when their aggregated effect results in a net loss rather than a net gain. Finally, our results show that those who felt relatively greater pressure to be transparent in their reporting were not susceptible to mental accounting, a finding that extends the basic insights of this theory. Further, we find that individual managers vary in their sensitivity to transparency pressure, indicating that future research on the effects of individual manager characteristics (e.g., [Bamber, Jiang, and Wang 2010](#)) on income statement disaggregation preferences would be fruitful.

Section II describes the related accounting literature and presents theoretical arguments in support of our predictions. Sections III through VI describe our experiments and their results. Section VII presents our conclusions.

II. BACKGROUND AND HYPOTHESES

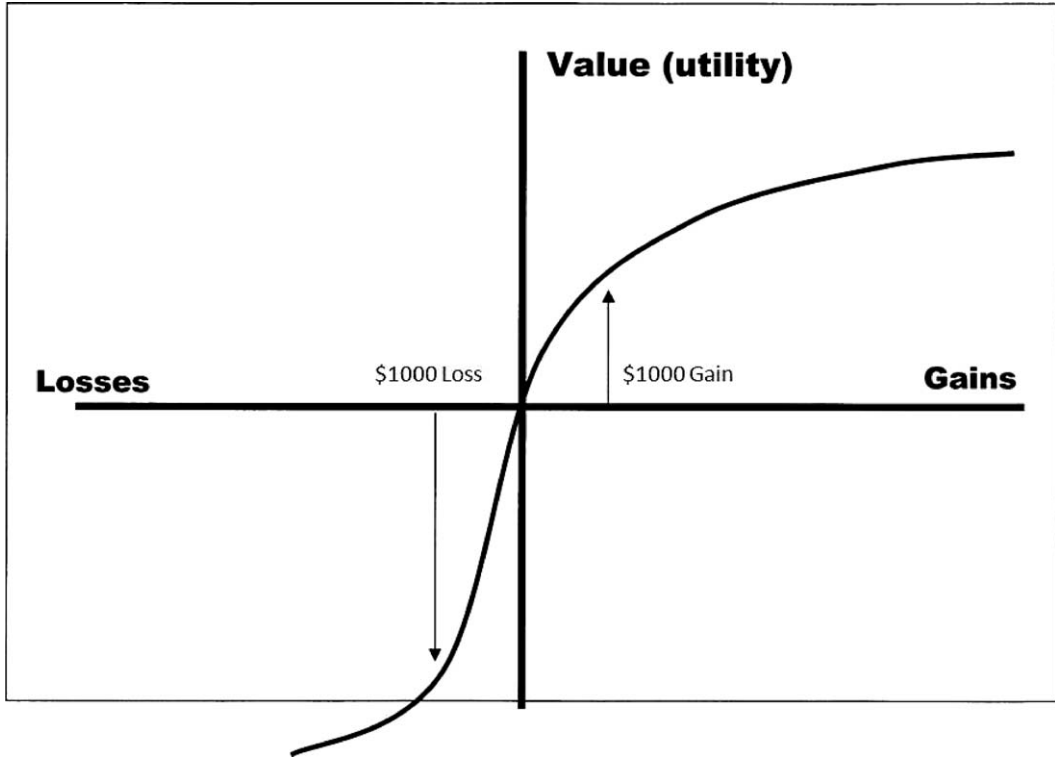
Disaggregation and Mental Accounting

Disaggregation is an important and pervasive issue in financial reporting ([CFA Institute 2007](#); [Deloitte 2010](#); [FASB/IASB 2009](#); [Schipper 2007](#)). We define disaggregation as separately presenting the underlying components of one or more items in the financial statements. In some circumstances, accounting guidance indicates when to aggregate or disaggregate. For example, when a seller has (does not have) inventory risk, it must disaggregate (aggregate) revenues and cost of sales on the income statement ([FASB 2012](#), ASC 605-45-45). However, in most situations, accounting standards are silent on the disaggregation issue. For example, whether to separately report, i.e., disaggregate, gains and losses on asset sales or early debt extinguishment is not prescribed by accounting standards. Accordingly, some firms separately report such gains and losses, while others aggregate them with other income statement line items. In sum, there is wide variation in the extent to which firms choose to aggregate or disaggregate information in their financial reports ([American Institute of Certified Public Accountants \[AICPA\] 2011](#); [Glaum, Street, and Vogel 2005](#); [Wallace 2003](#)).

As noted previously, prior research has examined factors that affect managers' disaggregation choices for income statement items such as the persistence and materiality of those items ([Riedl and Srinivasan 2010](#); [Heitzman et al. 2010](#)), proprietary costs ([Harris 1998](#)), and the levels of key subtotals and benchmarks ([McVay 2006](#); [Schrand and Walther 2000](#)). In contrast, we hold constant these factors and investigate the more fundamental effects of the sign and relative magnitude of the components of income statement items on managers' presentation choices and investors' reactions to aggregated versus disaggregated presentations.

Our investigation relies on mental accounting theory, which makes specific predictions about how sign and magnitude systematically affect individuals' preferences for aggregated or disaggregated information. In the case of the income statement, it addresses whether individuals have preferences about whether sets of transactions or economic events are presented as a single line item or multiple line items on the income statement. The theory proposes that individuals code financial events as gains or losses, categorize the coded gains or losses into either one mental account or multiple mental accounts, and then evaluate the utility of the single mental account versus the combined utility of the multiple mental accounts according to the prospect theory value

FIGURE 1
Prospect Theory Value Function



function (Thaler 1985, 1999).⁶ As shown in Figure 1, the value function has several important features. It is defined over gains and losses rather than over total wealth. Further, it is S-shaped, being concave for gains and convex for losses, and it is steeper for losses than for gains, reflecting loss aversion.

While prospect theory addresses the evaluation of single outcomes, such as an individual's reaction to a \$500 gain, mental accounting is concerned with multiple outcomes. Mental accounting addresses issues such as whether individuals would rather combine a \$500 gain and a \$400 loss into one mental account or consider them as two separate accounts. This choice matters because an individual's utility will differ depending on whether the two events are evaluated separately or first combined and then evaluated, as summarized below. In the case of the income statement, an individual would compare the utility of one line item that combines gains and/or losses to the combined utility of multiple line items that separate gains and/or losses.

⁶ On the income statement, items are already coded as gains and losses, so individuals do not need to engage in the first step. Gains and losses in prospect theory refer to positive and negative changes in wealth from a given reference point, which can be zero, as in financial reporting (Kahneman and Tversky 1979). Further, these gains and losses are typically monetary, but also could be non-monetary, such as gains in the form of Christmas presents and losses in the form of lives lost to disease.

Based on the prospect theory value curve, mental accounting theory predicts that individuals will prefer to aggregate an overall loss comprised of multiple smaller losses. The convexity of the value function in the loss domain causes the disutility from the combined loss to be *less* than the total disutility from the multiple individual losses. Conversely, individuals will prefer to disaggregate an overall gain comprised of several gains because of the concavity of the value function over gains. The total utility from the multiple individual gains will exceed the utility derived from combining the individual gains into one larger gain.

Turning to mixed gains and losses, mental accounting theory predicts that individuals will prefer to aggregate gains and losses that combine to form an overall gain. Because the slope of the function is steeper in the loss domain, the disutility from separately showing a loss is greater than the added positive utility that comes from showing a larger gain. In contrast, when gains and losses combine to form an overall loss, mental accounting theory's predictions depend on the size of the underlying gains and losses. When an overall loss is comprised of a large loss and a relatively small gain, often called a "loss with a silver lining," individuals will prefer disaggregation. However, as discussed by [Thaler \(1985, 1999\)](#), as the size of the gain increases relative to the size of the loss, preferences for aggregated or disaggregated reporting are sensitive to the specific shape of an individual's value function ([Abdellaoui, Bleichrodt, and Paraschiv 2007](#)), making it difficult to make on-average predictions in this setting.⁷ Accordingly, researchers generally do not make directional predictions for small net loss situations (e.g., [Linville and Fischer 1991](#)).

Managers' Presentation Preferences without Transparency Pressure

We first test whether managers behave in a fashion consistent with mental accounting theory. We do so within the context of compound financial instruments (i.e., puttable and callable bonds) and fair value accounting. These compound instruments have embedded derivatives in the form of written put options and purchased call options, whose fair values move, in response to an interest rate change, in an opposite direction to that of the underlying bond. Further, because the embedded derivatives are option contracts, the offsetting fair value amounts are not symmetric because of time value degradation on the option. Thus, these instruments enable us to study four mixed gain and loss situations—small net gain, large net gain, small net loss, and large net loss—thereby testing the robustness of the theory. Figure 2 summarizes these ideas, which also are described in more detail below.

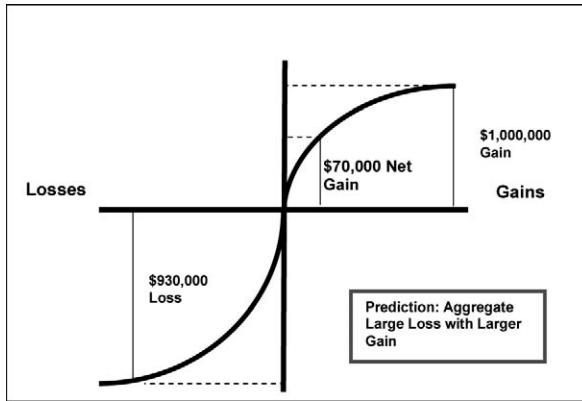
Turning first to the puttable bond setting, interest rate changes create fair value gains and losses, which yield either an aggregate small net gain or large net loss. Based on mental accounting theory, managers should prefer to aggregate the components of the small net gain because separately reporting the large loss creates extreme disutility, as shown in Figure 2, Panel A. In contrast, when there is a large net loss, similar to the "silver lining" example described earlier and shown in Figure 2, Panel B, mental accounting theory predicts that managers will prefer to report in a disaggregated fashion.

Next, for callable bonds, interest rate changes create fair value gains and losses, which yield either an aggregate large net gain or small net loss. Given the shape of the value function, mental accounting theory predicts that managers will prefer to report the aggregated net gain to avoid the

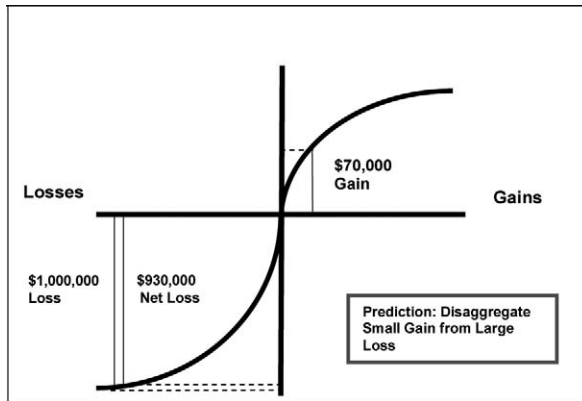
⁷ The specific shape of the value function depends on the degree of concavity in the gain domain, the degree of convexity in the loss domain, and the extent of loss aversion (i.e., the difference in slopes across the gain and loss domains). When the size of a gain increases relative to the size of a loss, variation in these parameters can influence whether aggregation or disaggregation is preferred. In most cases where the size of a gain increases relative to the size of the loss, though, variation in the parameters nevertheless leads to a preference for aggregation about as often as a preference for disaggregation. We thank an anonymous reviewer for this insight.

FIGURE 2
Mental Accounting Predictions for Mixed Gains and Losses

Panel A: Small Net Gains



Panel B: Large Net Loss



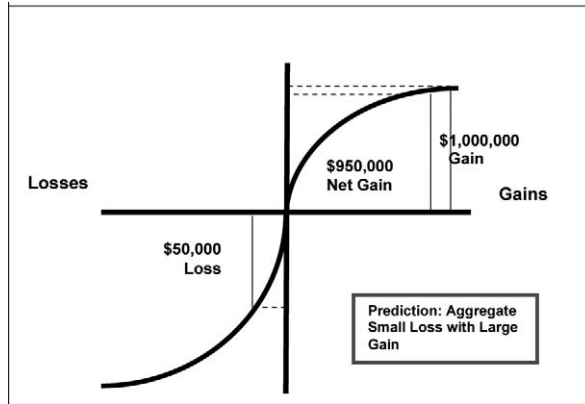
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large disutility from separately reporting a loss, as shown in Figure 2, Panel C. In contrast, when there is a small net loss comprised of an underlying loss and gain of relatively similar sizes, it is difficult to make a prediction because preferences are sensitive to the specific shape of an individual’s value function, as shown in Figure 2, Panel D and discussed in footnote 7. Thus, we expect that managers in this circumstance will be as likely to prefer aggregation as disaggregation.⁸

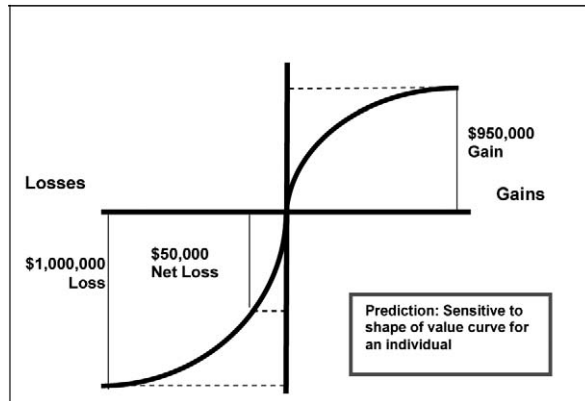
⁸ The underlying logic for puttable and callable bonds is as follows: For puttable bonds, when interest rates increase, the firm experiences a large gain on the bond liability and a relatively large loss on the option because investors will want to redeem the debt. In contrast, when interest rates decrease, a significantly larger loss occurs on the bond than the gain that occurs on the put option because of time value degradation. For callable bonds, when rates increase, a large net gain occurs because a large fair value gain on the bond occurs, but a relatively small time value loss occurs on the option because the issuer would not want to call the debt. In contrast, when interest rates decrease, there will be a relatively large fair value gain on the option, and the bond itself will show a relatively large loss.

FIGURE 2 (continued)

Panel C: Large Net Gain



Panel D: Small New Loss



Managers' Preferences with Transparency Pressure

The predictions of mental accounting theory for callable and puttable bonds are based on the individuals' reactions to the S-shaped value curve of prospect theory, with the utility being a function of the dollar amounts associated with gains and/or losses. A natural follow-on question concerns how other important considerations in financial reporting, such as reporting transparency, interact with the effects of the sign and relative magnitude of income statement items to affect the presentation preferences of managers. While there are several ways that firms can increase their reporting transparency, such as through salient placement within financial reports or through recognition rather than disclosure, one common mechanism is to disaggregate financial information (Barth and Schipper 2008). Disaggregation leads to enhanced transparency because it more clearly reveals the underlying details of transactions.

Although research has documented a negative association between transparency and cost of capital (Barth, Konchitchki, and Landsman 2013), not all firms are highly transparent in their disclosures. We examine mental accounting, one of many possible reasons for managers to perceive

greater benefits from something other than transparent reporting. We use the foregoing ideas to investigate whether managers' preferences for aggregation versus disaggregation, and their views about investors' valuation of the firm given their reporting choices, are sensitive to pressures to be transparent.

Managers' Beliefs about Investors

While we predict that in the absence of transparency pressure, managers will behave in a manner consistent with the predictions of mental accounting theory, it is unclear whether they believe that investors who observe their reporting choices will behave in a similar manner. One line of research indicates that individuals expect that others are similar to themselves (Krueger 2007). This sort of social projection has been documented across many domains, as individuals tend to believe that others will have similar views about situations, events, or norms (Krueger 1998; Van Boven, Dunning, and Loewenstein 2000). However, this social projection is typically strongest when "others" come from the same group as the decision maker (Robbins and Krueger 2005). Thus, managers may be more likely to project their preferences to other managers than to investors.

Another line of research shows that in domains where loss aversion is pertinent, individuals often underestimate others' loss aversion (Polman 2012; Faro and Rottenstreich 2006). That is, individuals believe that others will react in a more muted fashion.⁹ Therefore, it is unclear whether managers believe that investors' views will align with their own or whether they believe investors will be less likely to engage in mental accounting.

Investors' Beliefs

We next examine whether investors are sensitive to aggregated versus disaggregated presentations. We consider whether the reporting preferences of managers matter to investors. On the one hand, it is possible that investors may not react differently to information that is aggregated versus disaggregated. As noted by Thaler (1999, 185), if decision makers are presented with the underlying information, as they are in our setting, then the aggregated or disaggregated presentation of that information should not affect their judgments. On the other hand, mental accounting is likely to be a powerful cognitive force that affects investors, as well as managers. Indeed, Thaler (1999) argues that because the value functions of individuals are neither linear nor symmetric over the domain of gains and losses, the manner in which gains and losses are presented to those decision makers could be influential. Accordingly, we use the puttable bond context to test whether investors react differently to aggregated versus disaggregated presentations.

Summary

To test the preceding ideas, we conduct four experiments. Experiments One and Two pertain to puttable and callable bonds, respectively, and investigate managers' preferences for aggregated versus disaggregated presentations and their beliefs about how investors will value the firm under different presentation alternatives. Experiment Three focuses on managers' presentation preferences for puttable bonds, but adds pressures for transparent reporting. This experiment also elicits data on managers' beliefs about investors. Finally, Experiment Four addresses whether

⁹ As noted earlier, our study does not address the issue of whether managers are unintentionally subject to mental accounting or strategically engage in mental accounting. Although prior research (Burgstahler and Dichev 1997; Degeorge, Patel, and Zeckhauser 1999; Schrand and Walther 2000) suggests that managers are strategic in their choices to present information to investors, these studies were not designed to empirically distinguish between strategic and unintentional forces. Further, it is possible that both factors could be at work (e.g., Hobson and Kachelmeier 2005).

investors' valuation judgments are affected by aggregated versus disaggregated income statement presentations.

III. EXPERIMENTS ONE AND TWO

Design and Participants

We discuss our first two experiments together because they are identical except for the financial instrument involved, and we conducted both experiments at the same time. Our first experiment investigates managers' preferences for disaggregation when fair value gains and losses from a puttable bond lead to either a small net gain or a large net loss. Our second experiment studies managers' preferences when fair value gains and losses from a callable bond lead to a large net gain or a small net loss.¹⁰ Neither study includes information about transparency pressure.

Both experiments utilize a 2×2 mixed design, crossing the net gain versus net loss outcome with disaggregated versus aggregated presentation. We manipulate the sign of the outcome between participants, and presentation within participants. All participants view two income statement presentation alternatives. The aggregated condition reports the net gain or net loss as one line item, while the disaggregated condition reports the components of the net gain or net loss as two separate line items. We manipulate presentation on a within-participants basis because it is generally extremely difficult for individuals to make evaluative judgments on an absolute basis (Weber and Johnson 2009).

A total of 55 (56) M.B.A. students from two top-25 business schools participated in Experiment One (Two).¹¹ Participants from each school were randomly assigned to the experimental conditions. The experiments took approximately ten minutes to complete. Participants had an average of five years of work experience. We chose to use M.B.A. students as participants in our experiment because they have a reasonable level of business knowledge without being more sophisticated than necessary to complete the experimental task. Thus, we follow the advice of Libby, Bloomfield, and Nelson (2002), who caution against using professional subjects unless it is necessary to achieve the research goal.

Materials, Manipulations, and Dependent Measures

Participants in the experiments complete a paper-and-pencil task in which they assume the role of Chief Financial Officer (CFO). They are told that as part of the preparation of the financial statements, they must decide how to present the income statement information related to the company's fixed-rate bonds. The Experiment One materials explain to participants that these bonds have two underlying components—a written put option and a bond payable. The Experiment Two materials indicate that the bonds have two underlying components—a purchased call option and a bond payable. As CFO, participants must decide whether to show the fair value gain and loss associated with the bonds as one aggregated number (Alternative A) or to show the gain and loss separately (Alternative B). The materials then provide participants with the relevant excerpt from the income statement for each reporting alternative; the materials also note that all

¹⁰ We use experiments to address our research questions for several reasons. First, experiments enable us to hold constant extraneous factors such as the underlying economics and type of financial instrument. Thus, we can focus on the relation between the sign and magnitude of financial statement items and managers' reporting preferences. Second, experiments allow us to examine conditions that may not exist in sufficient frequency in the real world, such as aggregation versus disaggregation of similar magnitudes of gains and losses from the same source and with the same persistence.

¹¹ The use of human subjects in all experiments reported in this paper was approved by the Institutional Review Boards at all universities where data were collected.

amounts are material to the company. Panels A and B of Figure 3 show the actual amounts and presentations used.¹²

When designing our experimental materials, we made two key design choices. First, to ensure that participants believed that they had two viable reporting choices, we told them that both alternatives were acceptable under SEC and FASB reporting guidelines. Second, to avoid the two alternatives having different costs, we purposely did not set our study within a scenario involving transaction structuring. For example, we did not ask participants whether they would rather show disaggregated numbers by issuing a bond and then separately purchasing a call option, or show aggregated numbers by issuing a callable bond. The latter approach introduces confounding factors, such as differential costs between the two alternatives. One cost is monetary—two separate transactions are likely more costly to execute than one. Another cost includes revealing transaction structuring behavior that may be viewed as deceitful. Both design choices substantially improve the internal validity of our studies.

After reading the case, participants respond to two questions that are intended to measure managers' preferences for aggregation or disaggregation. We ask participants to rate (1) how desirable, and (2) how advantageous both Alternatives A and B are in terms of reporting the financial performance of the company. We elicit responses to both of these questions on 101-point scales, with endpoints of "not at all" (0) and "extremely" (100). For both questions, we instruct participants to place two slash marks on the scale—one that corresponds to their rating of Alternative A and another that corresponds to their rating of Alternative B.¹³ As expected, participants' responses to these two questions are significantly positively correlated in both experiments (both Pearson correlations = 0.46, $p < 0.01$). Thus, we average these two measures into one composite preference judgment.

After eliciting these two measures, we then ask managers to indicate how they believe investors would perceive the value of the company under Alternatives A and B (the aggregated and disaggregated presentations, respectively). We elicit responses to this question with a 101-point scale that has endpoints of "significantly reduces perceived value" (−50) and "significantly increases perceived value" (50). Participants are instructed to place two slash marks on the scale—one that corresponds to their rating of Alternative A and another that corresponds to their rating of Alternative B.

Experiments One and Two Results

Panel A of Table 1 shows the preference judgments, by experiment, for each of the conditions. (We analyze and present the responses to the question asking managers about investors' beliefs in Section V of the paper.) Although our analysis is focused primarily on the simple main effects of aggregated versus disaggregated presentation within a particular outcome, we estimate an overall mixed-model analysis of variance (ANOVA) to obtain an appropriate mean-square error term for these simple main effect tests.¹⁴ For completeness, we show in Panel B the overall analysis, as well as the resulting simple main effects.

¹² Because the valuations assigned to puts and calls are not symmetric, we were not able to use the same dollar amounts in Experiment Two as in Experiment One. However, we consulted with fixed-income professionals from two large banking firms to ensure that our materials were realistic with respect to (1) the relationship between the gain (loss) on the option and the loss (gain) on the bond in terms of relative size, and (2) the interest rate change necessary to generate the gains and losses reported on the income statement.

¹³ The advantage of this approach is that we are able to obtain a measure of the degree to which one reporting alternative is preferred over the other. An alternative would have been to use a forced-choice question, but information about the degree of preference is not captured with such an approach. To ensure that participants understood our approach, we provided them with an unrelated sample question and responses prior to the introduction of the main experiment.

¹⁴ Because the two simple main effects within a given experiment are, by definition, directionally different (e.g., one shows aggregation preferences and the other shows disaggregation preferences), the overall ANOVA will show a significant interaction in each experiment. Throughout the paper, all p-values are two-tailed.

FIGURE 3
Manipulations Used in Each Experiment

Panel A: Experiment One Stimuli (Income Statement Effects of Puttable Bond—Small Net Gain and Large Net Loss)

Small Net Gain Condition (interest rates increasing)		Large Net Loss Condition (interest rates decreasing)	
Alternative A	Alternative B	Alternative A	Alternative B
Gain on the Puttable Bond \$70,000	Gain on the Puttable Bond \$1,000,000	Loss on the Puttable Bond (\$930,000)	Loss on the Puttable Bond (\$1,000,000)
Loss on the Put Option Associated with the Bond (\$930,000)	Loss on the Put Option Associated with the Bond (\$930,000)	Gain on the Put Option Associated with the Bond \$70,000	Gain on the Put Option Associated with the Bond \$70,000

Panel B: Experiment Two Stimuli (Income Statement Effects of Callable Bond—Large Net Gain and Small Net Loss)

Large Net Gain Condition (interest rates increasing)		Small Net Loss Condition (interest rates decreasing)	
Alternative A	Alternative B	Alternative A	Alternative B
Gain on the Callable Bond \$950,000	Gain on the Callable Bond \$1,000,000	Loss on the Callable Bond (\$50,000)	Loss on the Callable Bond (\$1,000,000)
Loss on the Put Option Associated with the Bond (\$50,000)	Loss on the Put Option Associated with the Bond (\$50,000)	Gain on the Put Option Associated with the Bond \$950,000	Gain on the Put Option Associated with the Bond \$950,000

Panel C: Experiment Three—Transparency Wording
High-Transparency Condition

The CFA Institute evaluates the transparency of firms' financial reports and makes this information available to current and potential investors. Thus, higher transparency in financial reports is important to the value of your firm.

Extremely High-Transparency Condition

Your firm is well known for its financial reports that accurately portray the underlying economics of the firm and are understandable to users. In fact, the CFA Institute, a group that evaluates transparency and makes this information available to current and potential investors, has rated your firm an industry leader in transparent financial reporting. As a result of your rating, your firm has enjoyed a lower cost of capital and lower stock price volatility for several years. Thus, as always, your objective is to be as transparent as possible in your financial reports since higher transparency is important to the value of your firm.

TABLE 1
Results of Experiments One and Two
Managers' Preference Judgments

Panel A: Descriptive Statistics—Mean Judgments (Standard Deviation)

Experiment One: Puttable Bond				Experiment Two: Callable Bond			
Presentation				Presentation			
Outcome	Aggregated	Disaggregated	Row Means	Outcome	Aggregated	Disaggregated	Row Means
Small Net Gain	68.20 (17.12) n = 27	54.94 (19.25) n = 27	61.57 (19.25) n = 54	Large Net Gain	69.14 (16.08) n = 28	57.18 (19.72) n = 28	63.16 (18.82) n = 56
Large Net Loss	50.71 (13.68) n = 28	61.82 (14.26) n = 28	56.27 (14.94) n = 56	Small Net Loss	55.04 (13.55) n = 28	57.93 (14.33) n = 28	56.48 (13.89) n = 56
Column Means	59.30 (17.68) n = 55	58.45 (17.09) n = 55		Column Means	62.09 (16.36) n = 56	57.55 (17.08) n = 56	

Panel B: Analysis of Variance Results and Simple Effects Tests

Source	Experiment One: Puttable Bond		Experiment Two: Callable Bond	
	Statistic	Two-Tailed p-value	Statistic	Two-Tailed p-value
Presentation	F = 0.10	0.75	F = 1.74	0.19
Outcome	F = 3.75	0.06	F = 6.70	< 0.05
Presentation × Outcome	F = 12.84	< 0.01	F = 4.66	< 0.05
Simple Effect: Net Gain	t = 2.73	< 0.01	t = 2.46	< 0.05
Simple Effect: Net Loss	t = -2.33	< 0.05	t = -0.59	0.55

This table shows the results for Experiments One and Two, which investigate how presentation (a within-participants variable) and outcome (a between-participants variable) affect participants' reporting preferences. The disaggregated (aggregated) presentation shows the gain and loss associated with the company's bonds separately (as one net number) on the face of the income statement. In the net gain (loss) condition, the gain (loss) associated with the bonds is greater than the loss (gain) associated with the option. Participants rate the desirability and advantageousness associated with each presentation alternative on 101-point scales with endpoints of 0 and 100. The average of these measures is our composite preference measure. Panel A shows the means and standard deviations by experimental condition, and Panel B shows the ANOVA and simple effects tests.

The results for Experiment One are consistent with mental accounting theory. Participants' preference judgments in the small net gain condition are significantly greater for the aggregated presentation (68.20) than for the disaggregated presentation (54.94) ($t = 2.73$, $p < 0.01$). Managers prefer to combine a large loss with a larger gain rather than to show each separately, presumably because of the great disutility associated with the loss. Turning to the large net loss condition of Experiment One, we observe that participants' preference judgments are significantly lower for the aggregated presentation (50.71) than for the disaggregated presentation (61.82) ($t = -2.33$, $p < 0.05$). Here, managers prefer disaggregation, presumably because the utility from a separately shown gain is greater than the decrease in utility from combining that gain with the large loss. Both

results are consistent with mental accounting preferences for presentation of gains and losses on the income statement.

Turning to Experiment Two, we again observe results that are consistent with the predictions of mental accounting. In the large net gain condition, participants' mean preference judgment is significantly greater for the aggregated presentation (69.14) than for the disaggregated presentation (57.18) ($t = 2.46, p < 0.05$). Managers prefer to combine a small loss with a large gain rather than show them separately, presumably because of the great disutility associated with the small loss. In the small net loss condition, the difference in preferences between the disaggregated (57.93) and aggregated (55.04) conditions is not statistically significant ($t = -0.59, p = 0.55$).¹⁵ As discussed, as the size of the gain increases relative to the size of the loss, preferences for aggregated or disaggregated reporting are sensitive to the specific shape of an individual's value function.¹⁶

IV. EXPERIMENT THREE

Design, Materials, and Participants

Experiment Three addresses whether managers continue to make the reporting choices predicted by mental accounting theory even when they face pressure to make transparent reporting choices. Because of the relative clarity of the predictions in the Experiment One puttable bond context, we relied on that context when conducting Experiment Three. The experiment employs a $2 \times 2 \times 2$ mixed design. As in Experiment One, we manipulate the net gain versus net loss outcome on a between-participants basis and also manipulate the disaggregated versus aggregated presentation on a within-participants basis. Because it was unclear, *ex ante*, how strong the pressure for transparency must be to potentially alter managers' preferences, we introduced the pressure for transparent reporting at two levels on a between-participants basis—high and extremely high. The wording used for these manipulations is shown in Panel C of Figure 3. With the exception of adding the transparency wording, the materials used in Experiment Three are identical to those used in Experiment One. Participants are in the role of the company CFO and must decide how to present the income statement information related to the company's fixed-rate puttable bonds.

A total of 125 M.B.A. students took part in this experiment. These participants were from one of the two business schools that participated in Experiments One and Two, with no overlap in participants across the experiments.

Experiment Three Results

To check that we created two different levels of transparency pressure, we asked participants: "How substantial are the benefits to your firm if your reporting choice is deemed transparent by

¹⁵ For both Experiments One and Two, separate analyses of the desirability and advantageousness judgments comprising our preference measure yield similar conclusions, with one exception. For Experiment One, disaggregation of large net losses is viewed both as more desirable and advantageous (both $p < 0.10$). However, while aggregation of small net gains is viewed as more advantageous ($p < 0.01$), it is not viewed as more desirable ($p = 0.19$). For Experiment Two, the simple main effects show that aggregation of large net gains is viewed as more desirable and more advantageous (both $p < 0.05$), while disaggregation of small net losses is viewed as equally desirable and advantageous as aggregation (both $p > 0.10$).

¹⁶ As a robustness check, we conducted an additional experiment with participants similar to those in Experiments One and Two to determine whether the mental accounting insights extend to a balance sheet setting (i.e., final asset and liability values). Because mental accounting theory applies strictly to changes in income or wealth and not final states, we did not anticipate that mental accounting would apply to the balance sheet setting. As expected, we do not observe choices consistent with mental accounting for the balance sheet presentation of a puttable bond (either as an asset or as a liability).

external parties, like current and potential investors?” Participants responded on a 51-point scale with endpoints of 50 (somewhat beneficial) and 100 (extremely beneficial). We find that participants in the high-transparency condition assigned a lower rating than did participants in the extremely high-transparency condition (84.08 versus 87.96, $t = 2.20$, $p < 0.05$). Although statistically significant, this difference appears relatively small. Further, in the overall untabulated ANOVA, the pressure to report transparently did not have any main or interactive effects on participants’ preference and value judgments (all $F < 0.63$, all $p > 0.42$). Accordingly, we collapse our analyses over the transparency manipulation. Most importantly, it appears that participants, on average, felt high levels of transparency pressure, which is necessary to test the boundaries of mental accounting. We return to this point later in this section.

Panel A of Table 2 shows the preference judgments for the net gain and loss conditions. As in Experiments One and Two, the desirability and advantageousness measures are significantly positively correlated (Pearson correlation = 0.54, $p < 0.01$). Accordingly, we average them to create one preference judgment. Central to our test is whether managers prefer aggregation (disaggregation) in the small net gain (large net loss) condition or whether they consistently prefer disaggregation across both outcomes. The former result would be consistent with mental accounting, while the latter would be consistent with transparent reporting.

Turning first to the large net loss results collapsed over transparency conditions (as shown in Table 2, Panel B), we see that the mean preference judgment is significantly lower for the aggregated presentation (50.02) than for the disaggregated presentation (61.64) ($t = -3.55$, $p < 0.01$). This result indicates that managers favor disaggregation for a large net loss, which is consistent with the “silver lining” idea of mental accounting and also consistent with transparent reporting. The critical test lies in the small net gain condition, where mental accounting favors aggregation, but transparency favors disaggregation. Our results there reveal that participants’ preference judgments do not significantly differ between the aggregated (60.39) and disaggregated presentations (58.67) ($t = 0.52$, $p = 0.60$).¹⁷ Because this result is not consistent with either mental accounting or transparent reporting, the most plausible interpretation is that the forces for transparent reporting offset the forces for mental accounting so that no overall preference emerges. This interpretation is bolstered by the analogous net gain finding from Experiment One where the pressure for transparency was not made explicit, and the result clearly indicated mental accounting preferences (i.e., aggregation).

Because this result is based on individual responses collapsed into one overall average, we also conducted an *ex post* analysis based on how much transparency pressure managers *felt*. That is, do those who feel less (more) pressure to be transparent exhibit mental accounting (transparent reporting) preferences? To conduct this test, we created a median split based on self-reported transparency pressure (see manipulation check data reported previously), and included this lower/higher partition as an independent variable in an ANOVA along with the two manipulated variables. As shown in the second and third columns of Table 2, we see a moderating effect of perceived transparency, as shown by the three-way interaction among presentation, outcome, and transparency ($F = 5.13$, $p < 0.05$). Looking at the simple main effects, we find that managers who self-reported feeling more transparency pressure consistently preferred disaggregation in both the small net gain (means of 64.42 versus 54.67, $t = -1.96$, $p < 0.10$) and large net loss (means of 62.00 versus 49.30, $t = -2.42$, $p < 0.05$) conditions. In contrast, managers who reported feeling less transparency pressure preferred aggregation in the small net gain condition (means of 65.75

¹⁷ Separate analysis of the desirability and advantageousness measures yields similar conclusions, with one exception. Specifically, disaggregation of net losses is viewed as both more desirable and more advantageous than aggregation (all $p < 0.10$). However, while aggregation of net gains is not viewed as more desirable ($p = 0.44$), it is viewed as more advantageous ($p < 0.10$).

TABLE 2
Results of Experiment Three
Puttable Bonds, Managers' Preference Judgments under Pressure for Transparency

Panel A: Descriptive Statistics—Mean Judgments (Standard Deviations)

Outcome	Collapsed Over Manipulated Transparency			Lower Perceived Transparency Pressure			Higher Perceived Transparency Pressure		
	Presentation			Presentation			Presentation		
	Aggregated	Disaggregated	Row Means	Aggregated	Disaggregated	Row Means	Aggregated	Disaggregated	Row Means
Small Net Gain	60.39 (13.96) n = 62	58.67 (15.54) n = 62	60.24 (15.35) n = 124	65.75 (12.08) n = 32	53.28 (16.72) n = 32	59.52 (15.77) n = 64	54.67 (13.69) n = 30	64.42 (11.96) n = 30	59.54 (13.66) n = 60
Large Net Loss	50.02 (17.33) n = 63	61.64 (16.61) n = 63	55.29 (19.40) n = 126	50.56 (14.04) n = 36	61.38 (13.90) n = 36	55.97 (14.91) n = 72	49.30 (21.20) n = 27	62.00 (19.94) n = 27	55.65 (21.37) n = 54
Column Means	54.94 (17.85) n = 125	60.44 (17.18) n = 125		57.71 (15.13) n = 68	57.57 (15.72) n = 68		52.12 (17.69) n = 57	63.27 (16.13) n = 57	

Panel B: Analysis of Variance Results and Simple Effects Tests

Source	Collapsed Over Manipulated Transparency		Partitioned on Perceived Transparency Pressure		Two-Tailed p-value
	Statistic	Two-Tailed p-value	Source	Statistic	
Presentation	F = 4.54	< 0.05	Presentation	F = 5.37	< 0.05
Outcome	F = 5.06	< 0.05	Outcome	F = 4.99	< 0.05
Presentation × Outcome	F = 8.24	< 0.01	Presentation × Outcome	F = 8.54	< 0.01
			Transparency	F = 0.01	0.93
			Presentation × Transparency	F = 7.20	< 0.01

(continued on next page)

TABLE 2 (continued)
Partitioned on Perceived Transparency Pressure

Collapsed Over Manipulated Transparency		Two-Tailed	
Source	Statistic	p-value	
Simple Effect: Net Gain	t = 0.52	0.60	
Simple Effect: Net Loss	t = -3.55	< 0.01	

Source		Statistic		Two-Tailed	
				p-value	
Outcome × Transparency		F = 0.01			0.92
Presentation × Outcome × Transparency		F = 5.13			< 0.05
Lower Pressure, Simple Effect: Small Net Gain		t = 3.08			< 0.01
Lower Pressure, Simple Effect: Large Net Loss		t = -2.83			< 0.01
Higher Pressure, Simple Effect: Small Net Gain		t = -1.96			< 0.10
Higher Pressure, Simple Effect: Large Net Loss		t = -2.42			< 0.05

This table shows the results for Experiment Three, which investigates how, under pressure for transparency, presentation (a within-participants variable) and outcome (a between-participants variable) affect participants' reporting preferences. The disaggregated (aggregated) presentation shows the gain and loss associated with the company's puttable bonds separately (as one net number) on the face of the income statement. In the net gain (loss) condition, the gain (loss) associated with the bonds is greater than the loss (gain) associated with the put option. Although we manipulated transparency at two levels—high transparency and extremely high transparency—there were no differences in results based on this manipulation; accordingly, we collapse over this variable in the table above. However, results differ depending on participants' self-reported perceptions of transparency pressure. Thus, we conducted a median split on this variable and report the results above. Participants rate the desirability and advantageousness associated with each presentation alternative on 101-point scales with endpoints of 0 and 100. The average of these measures is our composite preference measure. Panel A shows the means and standard deviations for the preference measure by experimental condition. Panel B shows the ANOVA and simple effects tests.

versus 53.28, $t = 3.08$, $p < 0.01$) and disaggregation in the large net loss condition (means of 61.38 versus 50.56, $t = -2.83$, $p < 0.01$). These results are robust to sensitivity tests using different cutoffs, and suggest that only participants who perceived a very high level of pressure to be transparent deviated from the mental accounting predictions.¹⁸

Considered together, the results of Experiment Three present an interesting overall set of findings. Tests regarding managers' preferences indicate that when they feel enough pressure to report transparently, they will consistently prefer disaggregation. Otherwise, consistent with mental accounting, managers' preferences depend on whether the components of items create overall net gains versus net losses, as well as the components' corresponding dollar amounts. Importantly, the difference between these two sets of results (i.e., collapsed versus *ex post* partitioned) suggests that individual managers differ as to how they internalize transparency pressure and, therefore, the extent to which firms' presentation choices reflect mental accounting may depend on the transparency pressure felt by managers.

V. MANAGERS' BELIEFS ABOUT INVESTORS

The results reported above reveal that managers' own preferences are consistent with mental accounting unless they perceive strong pressure to be transparent. It is unclear whether these preferences extend to managers' beliefs about how investors react to aggregation versus disaggregation. As noted earlier, some research indicates that managers will project their own beliefs onto investors, while other research suggests that managers might believe that investors will be less averse to losses, and thereby less susceptible to mental accounting. We examine this issue using data from the first three experiments, in which we asked managers to indicate how they believed investors would perceive the value of the company under Alternatives A and B (the aggregated and disaggregated presentations, respectively). Panel A of Table 3 shows the managers' judgments about investors' beliefs by experiment.

We discuss these multi-experiment results by outcome. Beginning with the net gain outcomes, we observe that in Experiments One and Two, managers believe that investors will think about aggregation and disaggregation in the same way they do. In Experiment One, managers indicate that investors will judge the value of the firm as greater when the gains and losses from the puttable bond are aggregated to form one small net gain (19.30) as compared to disaggregated into a large gain and a slightly smaller loss (-3.22) ($t = 4.42$, $p < 0.01$). We see the same pattern of results in Experiment Two with the callable bond. There, the managers in the large net gain condition indicate that investors will judge the value of the firm as greater for the aggregated presentation (25.89) than for the disaggregated presentation where the large gain and small loss are separately reported (5.25) ($t = 4.47$, $p < 0.01$). In other words, in these two experiments, managers expect investors to think as do they, in a manner consistent with mental accounting.

An interesting result emerges in Experiment Three in the small net gain condition. Recall that in our *ex post* partitioning of the data, managers who felt lower transparency pressure exhibited mental accounting, while those who felt higher transparency pressure consistently favored disaggregation. Managers' judgments about investors displayed a different pattern. Specifically, managers, on average, believe that investors will judge the firm value to be greater under aggregated presentation (15.50) than under disaggregated presentation (3.63) ($t = 2.94$, $p < 0.01$). Interestingly, this untabulated result occurs both for the managers who felt lower pressure (means of 16.03 and 4.22, $t = 2.03$, $p < 0.05$), as well for those who felt higher pressure (means of 14.93 and

¹⁸ Our results are robust to (1) eliminating the participants with judgments equal to the median value, (2) eliminating the participants with judgments that are closest to the median, and (3) coding participants with judgments equal to the median as "high" rather than "low."

TABLE 3
Results by Experiment for Managers' Judgments about Investors' Views

Outcome	Puttable Bond						Callable Bond					
	Experiment One			Experiment Three			Experiment Two			Experiment Two		
	Presentation		Row Means	Presentation		Row Means	Presentation		Row Means	Presentation		Row Means
Aggregated	Disaggregated	Aggregated	Disaggregated	Aggregated	Disaggregated	Outcome	Aggregated	Disaggregated	Aggregated	Disaggregated	Row Means	
Small Net Gain	19.30 (17.11) n = 27	8.04 (22.53) n = 54	15.50 (15.96) n = 62	3.63 (21.11) n = 62	9.56 (19.57) n = 124	Large Net Gain	25.89 (13.18) n = 28	5.25 (19.29) n = 28	15.57 (19.40) n = 56			
Large Net Loss	-2.21 (16.72) n = 28	3.18 (19.60) n = 28	0.48 (18.25) n = 56	6.43 (20.86) n = 63	0.54 (20.41) n = 126	Small Net Loss	2.29 (18.71) n = 28	-7.14 (17.56) n = 28	-2.43 (18.60) n = 56			
Column Means	8.34 (19.96) n = 55	0.04 (20.81) n = 55	4.99 (20.05) n = 125	5.04 (20.95) n = 125	Column Means	14.09 (19.97) n = 56	-0.95 (19.31) n = 56					

Panel B: Analysis of Variance Results and Simple Effects Tests

Source	Experiment One		Experiment Three		Experiment Two	
	Statistic	Two-Tailed p-value	Statistic	Two-Tailed p-value	Statistic	Two-Tailed p-value
Presentation	F = 5.74	< 0.05	F = 0.00	0.98	F = 21.18	< 0.01
Outcome	F = 4.29	< 0.05	F = 22.21	< 0.01	F = 29.94	< 0.01
Presentation × Outcome	F = 15.25	< 0.01	F = 17.27	< 0.01	F = 2.94	0.09
Simple Effect: Net Gain	t = 4.42	< 0.01	t = 2.94	< 0.01	t = 4.47	< 0.01
Simple Effect: Net Loss	t = -1.08	0.29	t = -2.94	< 0.01	t = 2.04	< 0.05

(continued on next page)

TABLE 3 (continued)

This table shows the results for Experiments One, Two, and Three, which investigate how presentation (a within-participants variable) and outcome (a between-participants variable) affect managers' perceptions of how investors will value the firm. The disaggregated (aggregated) presentation shows the gain and loss associated with the company's bonds separately (as one net number) on the face of the income statement. In the net gain (loss) condition, the gain (loss) associated with the bonds is greater than the loss (gain) associated with the option. Participants use a 101-point scale with endpoints of -50 and 50 to rate how they believe each presentation alternative will influence how investors value the company. Panel A shows the means and standard deviations by experimental condition, and Panel B shows the ANOVA and simple effects tests.

3.00, $t = 1.98$, $p < 0.10$). Thus, managers appear to believe that investors will be more prone to mental accounting, i.e., relatively more sensitive to losses than gains, than they themselves are. We return to this finding momentarily.

Turning to the net loss conditions, we observe that in Experiments One and Three, managers believe that investors will think about aggregation and disaggregation in the same way as they do. In Experiment One, managers believe that investors will judge the value of the firm as lower in the aggregated presentation (-2.21) than in the disaggregated presentation (3.18). Although directionally consistent with managers' mental accounting-based preferences, this comparison does not reach conventional significance levels ($t = -1.08$, $p = 0.29$), perhaps due to a lack of statistical power. Indeed, with a larger sample, the analogous comparison from Experiment Three shows that managers believe that investors will judge the value of the firm as lower for the aggregated (-5.35) versus disaggregated presentation (6.43) ($t = -2.94$, $p < 0.01$), consistent with their own mental accounting-based preferences. As in the case of net gains, this untabulated result holds in both the lower- and the higher-felt transparency groups (all $t > 1.84$, all $p < 0.10$).

Another interesting result emerges for net losses. Recall that managers' own beliefs about a net loss showed no preference for aggregation or disaggregation in Experiment Two, because when the size of the gain increases relative to the size of the loss, preferences for aggregation or disaggregation are sensitive to the shape of an individual's value function. However, managers believe that investors will judge a greater firm value for the aggregated presentation (2.29) than for the disaggregated presentation (-7.14) ($t = 2.04$, $p < 0.05$). These results again suggest that managers believe that investors are relatively more sensitive to losses (versus gains) than they themselves are.

Overall, these results suggest a more complicated picture of how managers believe investors will react to aggregation versus disaggregation. That is, contrary to what the prior literature suggests might occur, in our experiments, managers' beliefs about investors are neither fully consistent with their own beliefs nor are they consistent with believing that investors are *less* loss averse. In fact, taken as a whole, our results suggest that managers believe investors are *more* likely to exhibit mental accounting tendencies than they do.

VI. EXPERIMENT FOUR

The first three experiments address managers' preferences for aggregation and disaggregation without and with transparency pressures, and how they believe investors will value the firm under these alternative presentations. In our fourth experiment, we directly investigate investors' beliefs. That is, we examine whether the mental accounting-based presentation preferences of managers influence investors' judgments about firm value.

Design, Materials, Dependent Measures, and Participants

Experiment Four uses a 2×2 mixed design, crossing the net gain versus net loss outcome with disaggregated versus aggregated presentation. As in our previous experiments, outcome is a between-participants variable, and presentation is a within-participants variable. Because it is set in the puttable bond context, the gain and loss numbers in Experiment Four are identical to those used in Experiments One and Three (see Figure 3, Panel A).

However, there are four key differences in Experiment Four. First, participants are in the role of an investor rather than the role of firm CFO. Second, participants are asked to consider an investment in Alpha and/or Beta Company, two otherwise identical companies. Both companies have puttable bonds comprised of a written put option and a bond payable that can result in fair value gains and losses. The materials explain that the companies can choose whether to show the gains and losses as one net number or to show them as separate numbers. The two companies differ

only in how they present the net gain or net loss from the puttable bond. Alpha Company presents the net gain or net loss as one aggregate amount, while Beta Company presents the net gain or net loss as two disaggregated amounts. In contrast, in Experiments One and Three, participants were asked to consider two possible presentation choices (Alternatives A and B) for a *single* company. Third, Experiment Four was conducted via the Internet. Fourth, the dependent measure in Experiment Four is participants' evaluation of firm value, which is elicited by asking participants to rate the presentation of the puttable bond in terms of the impact on the perceived value of the company(ies). We elicit responses to this question on a 101-point scale, with endpoints of "significantly decreases perceived value" (-50) and "significantly increases perceived value" (50).

We conducted Experiment Four in two ways. Participants either rated only one of the two firms, i.e., Alpha or Beta, or rated both firms, i.e., both Alpha and Beta. We believe the latter approach reflects the decision setting that investors typically face because they often evaluate investment options simultaneously (e.g., Jackson 2008) and are encouraged to do so by financial analysis textbooks (e.g., Reilly and Brown 2012). We also believe that this approach increases tension by giving participants the greatest chance to respond similarly to each firm, given that the firms' economics are identical. However, this approach could increase the chance for demand effects if participants believe that they must judge the two firms differently. Therefore, having another version of this experiment in which participants rate only one company enhances the reliability of our insights. This approach is patterned after Kahneman and Tversky (1996), who hold constant the underlying information and vary the dependent measures to which participants respond.

A total of 197 individuals participated in Experiment Four via Amazon.com's Mechanical Turk platform.¹⁹ Prior to receiving the experimental materials, participants were screened for accounting knowledge and experience with financial statements. Only participants who (1) had purchased or planned to purchase common stocks or mutual funds, and (2) had taken at least four accounting courses or had previously read a company's financial statements were allowed to proceed with the task. With respect to requirement (2), 86 percent of the participants had taken fewer than four accounting courses, but had previously read a company's financial statements.

Experiment Four Results and Discussion

Panel A of Table 4 shows the average firm value judgments by experimental condition for the rate-one versus rate-both elicitation techniques. Panel B shows the simple effects tests. In the small net gain condition, investors' mean value judgments are significantly greater for the aggregated presentation (rate one = 16.07; rate both = 18.25) than for the disaggregated presentation (rate one = 8.43; rate both = 1.47) (all $p < 0.10$). In the large net loss condition, participants' mean value judgments are significantly lower for the aggregated presentation (rate one = -9.56; rate both = -11.87) than for the disaggregated presentation (rate one = 0.62; rate both = 3.37) (all $p < 0.05$). Overall, these results indicate that the sign and relative magnitude of the components of income statement items affect investors' judgments as predicted by mental accounting theory, regardless of how these judgments are elicited. That is, investors' firm valuation judgments based on aggregated versus disaggregated presentations of the same economic transaction differ in a way consistent with investors using mental accounting. Together with the results of Experiment One, our results reveal that the presentation preferred by managers also results in the highest valuation judgments from investors.

¹⁹ See Rennekamp (2012) for a description of Mechanical Turk and for evidence concerning the effectiveness of this platform for conducting experiments. Participation in our experiment was limited to U.S.-based individuals who are native English speakers.

TABLE 4
Results of Experiment Four
Puttable Bonds, Investors

Panel A: Descriptive Statistics—Mean Value Judgments (Standard Deviation)

Outcome	Rate One—Either Aggregated or Disaggregated Presentation			Rate Both—Both Aggregated and Disaggregated Presentations		
	Presentation		Row Means	Presentation		Row Means
	Aggregated	Disaggregated		Aggregated	Disaggregated	
Small Net Gain	16.07 (15.34) n = 30	8.43 (16.82) n = 35	11.95 (16.48) n = 65	18.25 (12.91) n = 32	1.47 (24.35) n = 32	9.86 (21.10) n = 64
Large Net Loss	-9.56 (17.67) n = 36	0.62 (21.46) n = 34	-4.61 (20.12) n = 70	-11.87 (21.23) n = 30	3.37 (20.84) n = 30	-4.25 (22.23) n = 60
Column Means	2.09 (20.94) n = 66	4.58 (19.51) n = 69		3.68 (23.00) n = 62	2.39 (22.56) n = 62	

Panel B: Analysis of Variance Results and Simple Effects Tests

Source	Rate Either Aggregated or Disaggregated Presentation		Rate Both Aggregated and Disaggregated Presentations	
	Statistic	Two-Tailed p-value	Statistic	Two-Tailed p-value
Presentation	F = 0.17	0.68	F = 0.05	0.83
Outcome	F = 28.88	< 0.01	F = 14.64	< 0.01
Presentation × Outcome	F = 8.20	< 0.01	F = 19.88	< 0.01
Simple Effect: Net Gain	t = 1.70	0.09	t = 3.36	< 0.01
Simple Effect: Net Loss	t = -2.36	0.02	t = -2.95	< 0.01

This table shows the results for Experiment Four, which investigates how presentation (a within-participants variable) and outcome (a between-participants variable) affect investors' perceptions of firm value. After viewing both presentations, participants rated either the aggregated or disaggregated presentation or both presentations. The disaggregated (aggregated) presentation shows the gain and loss associated with the company's puttable bonds separately (as one net number) on the face of the income statement. In the net gain (loss) condition, the gain (loss) associated with the bonds is greater than the loss (gain) associated with the put option. Participants use a 101-point scale with endpoints of -50 and 50 to rate how each presentation alternative affects how they perceive the value of the company. Panel A shows the means and standard deviations by experimental condition, and Panel B shows the ANOVA and simple effects tests.

VII. CONCLUSIONS

Currently, there is little reporting guidance regarding income statement disaggregation, which gives managers flexibility to aggregate or disaggregate income statement items. Given such flexibility, we examine whether managers have systematic preferences concerning disaggregation of income statement items based on the sign and magnitude of the underlying components of those items, as predicted by mental accounting theory. We also investigate whether the effect of mental

accounting on managers' preferences is moderated by pressure to report transparently. Further, we examine whether managers believe that investors will value the firm differently depending on their decision to aggregate or disaggregate. Finally, we assess whether investors' judgments about firm value also are affected by the sign and magnitude of the components of income statement items in the manner predicted by mental accounting theory. That is, we examine whether managers' presentation preferences matter to investors in terms of judged firm value.

Examining these issues is important for a number of reasons. Prior research on income statement disaggregation has lacked a theory from which to predict both managers' disaggregation preferences and investors' reactions to those preferences. Introducing mental accounting theory to this line of research provides a structure for making predictions about disaggregation choices for a broad range of income statement items. It may also help explain previously unexplained results, such as [Riedl and Srinivasan's \(2010\)](#) finding that firms are more likely to disaggregate special items when their aggregated effect results in a net loss rather than a net gain. Further, examining whether the mental accounting framework applies to financial reporting is useful to both standard setters and market regulators as they grapple with firms' disaggregation choices and investors' reactions to those choices.

The results of multiple related experiments set in a compound financial instruments context indicate that managers' disaggregation preferences are consistent with the predictions of mental accounting theory. That is, managers' preferences for aggregation versus disaggregation are systematically influenced by the sign and relative magnitude of the underlying gain and loss, which, in turn, leads them to prefer aggregation in some cases, but disaggregation in others. Further, we find that pressure for transparent reporting, which is valued by investors, only partially moderates the effects of mental accounting on managers' preferences. Specifically, when the directional predictions of mental accounting and transparency differ, we find that managers who feel more transparency pressure will choose to disaggregate, whereas managers who feel less transparency pressure will continue to engage in mental accounting. We view this result as particularly interesting because it reveals that individual managers experience transparency pressure differently, a result that warrants future research.

One unexpected, but interesting, finding is that managers believe investors will be even more prone to mental accounting than they themselves are. While prior research suggests that managers would believe that investors will either think like the managers do or will be less loss averse, our results suggest that managers believe that investors are relatively more loss averse than they are. Albeit *ex post*, this result suggests that managers are considering additional factors when considering investors' reactions, such as accountability for earnings outcomes or desire for retaining investors. Understanding such additional factors would be of interest for future research.

Finally, our experiments show that investors' judgments are consistent with the predictions of mental accounting theory. Specifically, investors in our study evaluated two otherwise identical transactions differently depending on the presentation. These results are consistent using either a between- or within-participants approach, suggesting that investors are likely to be affected by managers' choices in a number of settings. This finding could be of interest to market regulators who are concerned with investor protection ([SEC 2013](#)). Specifically, our results may help the SEC to more easily identify and evaluate presentation choices that are most likely to adversely affect investors.

Some of our design choices suggest opportunities for additional research. First, we chose to study the presentation of fair value gains and losses related to compound financial instruments because this setting offers several important advantages from an internal validity standpoint, e.g., constant persistence of gains and losses and one underlying cause of the gains and losses. However, our study did not examine mental accounting preferences in the contexts of revenues and expenses, multiple consistent gains or multiple consistent losses, or for information that appears in the

footnotes rather than on the face of the income statement (Riedl and Srinivasan 2010). Mental accounting theory likely extends to such situations, but confirming this, as well as investigating other moderators that are unique to the accounting setting, would be useful. For example, mental accounting predicts that investors will view multiple revenue items as multiple positives and, thus, they would respond more favorably to disaggregation of these items. However, investors may focus more on the revenue subtotal, and be relatively unconcerned about the number of line items that make up that subtotal. Future research could address this possibility.

Second, as noted earlier, our study does not seek to distinguish between strategic and unintentional behavior on the part of managers. This distinction is not necessary in our study because investors were affected by managers' choices regardless of whether those choices were strategic or unintentional. However, given the importance of disaggregation in financial reporting, future research could attempt to disentangle the strategic and unintentional elements of managers' disaggregation preferences, as such insights could have implications for standard setters should they resume consideration of policy changes regarding financial statement presentation. For example, if managers' behavior is strategic, then we would expect managers to make fewer mental accounting-based presentation choices in the footnotes than in the income statement because investors are less sensitive to information reported in the footnotes (Bernard and Schipper 1994). Disentangling the strategic and unintentional elements of managers' disaggregation preferences also could provide useful information to market regulators, such as the SEC, because they sometimes must determine whether firms acted with the intent to defraud.

Finally, we did not examine factors that could affect the shape of participants' value functions. For example, prior research indicates that factors such as age, income, and amount of education significantly affect loss aversion and, hence, the shape of the value function (Gächter, Johnson, and Herrmann 2007). Thus, individual differences across managers may lead to predictable differences in the extent to which they exhibit mental accounting-based presentation preferences, much like managers' individual differences affect their voluntary disclosure choices (Bamber et al. 2010). In sum, there are many opportunities for additional research on the important topic of disaggregation.

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