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Do regulatory requirements influence managers' information processing bias in impairment decisions?

Abstract

We conduct an experiment to investigate how regulatory requirements in the accounting for impairment, namely, reversibility of impairment losses and disclosure of impairment assumptions, influence managers' bias in the processing of impairment information. Our results show that regulatory requirements influence managers' information evaluation bias but not their bias in the search process. We find that managers' evaluation of impairment information is not biased when impairment losses are reversible. When impairment losses are not reversible, the direction of bias depends on whether managers are required to make a full or partial disclosure of the impairment assumptions. When managers are required to disclose all assumptions regardless of their impairment decisions, managers tend to exhibit favorable evaluation of positive information about the asset and unfavorable evaluation of negative information about the asset. However, when managers are required to disclose assumptions only when impairment losses are recognized, a reverse behavior is observed, with managers being more prone to evaluate negative information favorably. Despite the significant information bias, we do not find a link between information bias and managers' decisions to recognize impairment. Future research involving more experienced managers will investigate this issue.

Do regulatory requirements influence managers' information processing bias in impairment decisions?

1. Introduction

Managerial judgments related to the impairment of assets have received considerable attention from regulators both in the US¹ and internationally² (ASIC 2012b, Deloitte 2012, FRC 2013, IFIAR 2014). Accounting standards for the impairment of long-lived assets require managers to make a series of judgments and decisions related to an asset's future cash flows in order to determine its recoverability. A concern of regulators is that the various estimations required in an impairment setting would introduce subjectivity to the recognition process, allowing managers to avoid recognizing impairment losses. However, little is known about why a subjective assessment of impairment information may occur. Prior archival research suggests that the subjectivity may relate to the dual responsibilities of managers in making the investment decision and also the impairment decision (Hilton and O'Brien 2009). Hilton and O'Brien (2009) find that managers responsible for investing in an underperforming asset do not recognize impairment losses even when the stock market had already discounted the company's value in anticipation of the impairment loss. For these managers, recognizing an impairment loss would be equivalent to an acknowledgement that their prior decision was erroneous.

Prior psychological research shows that the reluctance to acknowledge a past suboptimal decision can create a bias in the processing of post-decisional information (Frey 1986, Hart et al. 2009, Schutze et al. 2012). Because the search and evaluation of impairment information is critical part of the impairment decision, managers' reluctance to acknowledge their prior suboptimal investment decisions may manifest in how they process impairment information related to the asset. In this study, we investigate the search and evaluation behaviors of managers with respect to impairment information. Specifically, we investigate how the presence of two regulatory requirements, namely, reversibility of impairment loss and

¹ An example of an SEC comment to a company related to its impairment decision: "Please include a more specific and comprehensive discussion of the nature of the events or change in business circumstances that may cause you to test your long-lived assets for impairments and indicate the level at which assets are evaluated. In addition, please discuss if any impairment testing has been conducted, and if so, disclose the results of the testing." (Deloitte 2012, p. 31)

² For example, since 2008, asset impairment is one of the major areas that Australian Securities and Investments Commission focuses on in its review of financial statements of companies (ASIC, 21 December 2012a).

disclosure of impairment assumptions, may reduce or exacerbate managerial bias in the processing of impairment information.

Managers' reluctance to acknowledge their prior suboptimal investment decisions can create bias in the processing of impairment information in two ways. First, managers may search for information that supports their prior decision to invest in the underperforming asset. That is, they will search for information that indicates that the asset has positive future prospects, which can contribute to the recoverability of the asset and impairment would not be needed. A second possibility is that the manager will favorably evaluate impairment information that is consistent with their prior decision, but will denigrate inconsistent information. That is, information that suggests that the asset is recoverable is considered to be of higher quality than information that suggests otherwise. Research in organizational behavior and psychology demonstrates that both behaviors can be present when individuals are required to evaluate information after individuals made a poor investment decision (Colon and Parks 1987; Beeler and Hunton 1997; Brockner 1992). Thus, while managers who have initiated poorly performing assets have been observed to avoid impairing assets, the process by which they arrive at the decision is not known.

An understanding of how managers process information prior to an impairment decision is important because this activity is an integral part of the impairment process (ASC 360-10 and IAS 36). Impairment studies using archival data generally focus on the direct effect of external influences (e.g. stock market effects) on manager's impairment decision but do not consider how managers process impairment information in a manner that supports or rejects these decisions (Riedl 2004). Prior psychological research shows that decision-makers who receive negative feedback about their past actions demonstrate a confirmatory bias in the processing of post-decisional information (Hart et al. 2009). However, little is known about whether the same bias occurs in an impairment setting, despite expressed concerns of regulators and auditors that the impairment process is subjective (Ernst & Young 2011). Our study investigates how regulatory requirements can create biases in the processing of impairment information. Standard setters are concerned about issues of conservatism and neutrality in accounting (Watts 2003). Conservatism requires managers to anticipate all losses, while neutrality implies an unbiased evaluation of information (SFAC No. 5). In an impairment setting, conservatism would suggest that managers have a pessimistic outlook about the asset's future prospects. Neutrality would mean that managers are not biased either

way about the prospects of the asset. However, little is known about how regulatory requirements can promote or reduce conservatism (and neutrality) in an impairment setting. Evidence that managers exhibit bias in processing of impairment information in response to regulations would be useful to regulators who seek understand how regulations contribute to the bias in processing of impairment information.

One of the key differences in accounting treatment of impairment losses is that IFRS allows companies to reverse a previously recognised impairment loss, but this action is not allowed under US GAAP. Investigating the effect of reversibility is important because of suggestions from archival literature that this difference in accounting treatment is driving managers' willingness to recognize impairment losses. For example, Zhang et al. (2010) find that there were fewer instances of impairment among China companies during the 'transition period' when China disallowed reversibility of impairment losses. In contrast, companies that apply SFAS 144 (the predecessor of ASC 360-10) are less willing to recognize impairment losses (Hilton and O'Brien 2009; Alciatore, et al. 2000; Collins and Henning 2004). Because these studies are conducted either on IFRS companies or US companies, the differential impact of reversibility on impairment losses cannot be inferred from their results. Our study investigates whether reversibility is a causal factor in managerial judgements on impairment, and as such, will inform international and US standard setters as they work towards convergence in accounting treatments between the two accounting regimes.

We also investigate the moderating role of disclosure on reversibility of impairment losses. The US reporting rules and IFRS differ in their disclosure requirements for impairment losses. The SEC requires listed companies to disclose impairment assumptions, whether or not the asset is impaired, once an impairment assessment had been undertaken. IFRS only require companies to disclose information about their impairment assumptions when they have recognised the impairment losses. The SEC advocates greater disclosure in the financial statements in order to alleviate the information asymmetry between the companies and investors (Healy and Palepu 2001). Recent studies demonstrate that in order to compensate for the additional disclosures, individuals sometimes engage in strategic exaggeration and self-serving behaviours at the expense of the recipients of the disclosure (Cain et al. 2005, Jamal et al. 2011). However, little is known about whether disclosures exacerbate or reduce

managers' information processing bias when accounting standards are more (versus less) restrictive.

Because managers' utilization of information prior to an impairment decision is not observable in an archival setting, we use an experimental approach, which allows us to observe and measure the biases in these information processing behaviors. Using an experimental approach also allows us to compare the relative impact of reversibility and disclosure, while holding constant other intervening variables. Archival studies that investigate the impact of reversibility on impairment decisions are based on data from either an IFRS or US reporting regime. Consequently, limited conclusions can be made from these archival studies about the differential impact of regulatory requirements on impairment decisions. We also capitalize on the comparative advantage of experiments by examining two situations that is currently not observed in either the IFRS or the US reporting regimes, namely, reversibility of impairment loss and full disclosure, and no reversibility of impairment losses and partial disclosure.

We conduct an experiment in which participants assume the role of a group manager in a hypothetical company and make an investment choice between two products. Following feedback on the failure of their chosen product, the participants select and then evaluate impairment information related to the future cash flows of the product. Participants subsequently provided their opinion on whether an impairment of the asset should be recognized. The experiment has a 2 x 2 between-subjects design with one control group. The manipulated factors are reversibility of the impairment loss (can be reversed vs. cannot be reversed) and disclosure of impairment assumptions (full vs. partial).

Our results show that regulatory requirements influence managers' information evaluation bias but not their bias in the search process. We find that managers' evaluation of impairment information was similar to that of a control group of managers when impairment losses can be reversed. When managers cannot reverse their impairment losses, the direction of bias depends on whether managers are required to make a full or partial disclosure of the impairment assumptions. When managers are required to disclose all assumptions regardless of their impairment decisions, managers tend to exhibit favorable (unfavorable) evaluation of positive (negative) information about the asset. However, when managers are required to

disclose assumptions only when impairment losses are recognized, a reverse behavior is observed. Managers are more prone to evaluate positive information less favorably. Despite the significant information bias, we do not demonstrate a link between information bias and managers' decision to recognize impairment.

Our study makes a number of major contributions. First, the search and evaluation of information about the future prospects of the underperforming asset is a critical part of the impairment process (ASC 360-10 and IFRS 36). Because assessments of the future prospects of the assets are based on assumptions and estimates, standard setters acknowledge that subjectivity can be introduced when managers undertake these tasks (IAS 36BC, para BCZ16(a)). However, little is known about that factors that can influence subjectivity during an impairment assessment. Our study contributes to the impairment literature by investigating how regulations can deter or promote subjectivity in the processing of impairment information. Our study shows that managerial bias occurs in the information evaluation phase instead of the information search phase.

Second, we contribute to the disclosure literature by showing that disclosure requirements can influence manager's evaluation of impairment information depending on whether the recognition of the impairment loss is permanent or temporary. Prior research generally investigates accounting settings in which recognition and disclosure requirements are mutually exclusive such as in the accounting for loss contingencies (Clor-Proell and Maines 2014). While there are many accounting situations where managers need to disclose information about items that they have recognized and those that they did not recognize, there are no studies that investigate how disclosure and recognition can interact to affect managerial judgments and decisions. Using accounting for impairment loss as a setting, we demonstrate that the extent of disclosure interacts with recognition requirements to affect managers' processing of impairment decision. Our study shows that allowing managers to reverse an impairment loss promotes a balanced search for information but disallowing it will always lead to a bias in the processing of impairment information. The direction of the bias is dependent on the extent to which managers have to disclose their impairment assumptions. Third, we provide a first demonstration on how conservatism in accounting can be encouraged. Conservatism in accounting requires managers to "anticipate no profits but anticipate all losses" (Bliss 1924, Watts 2003). Yet in recent years, the FASB has provided indications that they favor "neutrality" in accounting for transactions and events (Watts 2003,

p. 218). Our study demonstrates that regulations can promote the “neutral” or “conservative” tendency of managers in the processing of information prior to the recognition decision.

In the next section, we describe the background and hypothesis development. Section 3 presents the experimental design and section 4 reports the results from the experiment. Section 5 contains a discussion of the results and section 6 provides the conclusion.

2. Background and hypothesis development

2.1 Impairment of long-lived assets

Long-lived assets that are “held and used” by companies have to be periodically reviewed for impairment (ASC 360-10-05-4), and impairment losses have to be recognised when the assets’ fair value is below the assets’ carrying amount. However, managers do not recognise impairment losses on a timely basis (Alciatore et al. 2000, Collins and Henning 2004), even when there are no economic benefits for the delay. Prior studies (Alciatore et al. 2000, Hilton and O’Brien 2009) show that declines in stock prices precede manager’s recognition of impairment losses, which indicates that the reluctance to impair assets is unlikely to be due to managers’ desire to protect stock prices. Hilton and O’Brien (2009) further find that impairment decisions are not motivated by earnings management reasons, or pressure from stakeholders including auditors, board of directors, institutional investors and regulators. These findings led Hilton and O’Brien to suggest that impairment decisions may be driven by a psychological reluctance to acknowledge a previous suboptimal investment decision.

In the following sections we discuss how this managerial reluctance can arise and contribute to biases in managers’ processing of information prior to their impairment decision. We also develop our hypotheses on how regulatory requirements may reduce or exacerbate the bias.

2.2 Biased processing of information

Many decisions including impairment decisions require manager to search and evaluate ambiguous information. It is in these situations where bias in information processing is likely to present itself. Psychological research shows that individuals who encounter negative feedback about their chosen alternative are likely to experience cognitive dissonance, and will seek ways to alleviate this psychological discomfort (Festinger 1957) through various means including confirmatory information processing (e.g. Frey 1986, Schultze et al. 2012 Ricchiute 2010, Thayer 2010). Confirmatory information processing occurs primarily

through two routes: selective exposure or biased information assimilation (Hart et al. 2009, Frey 1986). Selective exposure refers to the tendency of individuals to search for information that supports a prior decision (consistent information), and to avoid information that is critical of their prior decision (inconsistent information). Because inconsistent information is more difficult to process, it creates greater dissonance in the decision maker's cognitive system, and the decision maker will avoid this information (Frey 1986). In contrast, the search for consistent information allows individuals to alleviate the dissonance experienced after the negative feedback (Festinger 1957). Biased assimilation of information occurs when individuals consider information that is consistent with their viewpoints to possess higher quality, greater relevance and more importance than inconsistent information (Ditto & Lopez, 1992; Ditto, Scepansky, Munro, Apanovitch, & Lockhart, 1998; Greitemeyer, Fischer, Frey, & Schulz-Hardt, 2009; Lord et al., 1979). Both types of confirmatory information processing can lead to poor decision outcomes (Greitemeyer and Schulz-Hardt 2003, Janis 1982).

Prior research generally focuses on either confirmatory information search (Frey 1986) or confirmatory information evaluation (Lord et al. 1979). The exception is by Schultze et al. (2012) who simultaneously investigated both behaviors in the same experimental setting and found that the participants demonstrated confirmatory information evaluation but not confirmatory search behaviors. In the following sections, for the simplicity in exposition of the theoretical foundations, any reference to information processing encompasses both information search and evaluation.

Confirmatory information processing has been demonstrated in situations involving escalation of commitments (Schultze et al. 2012). Escalation of commitment is said to occur when managers commit additional resources to unsuccessful projects they have initiated despite being aware of negative feedback about these projects (Staw 1976). The antecedents present in these escalation of commitment situations, namely, responsibility for a project and subsequent poor performance of the project, are also present in an impairment setting. The search and evaluation of information about the underperforming asset is an integral part of the impairment process. Because the fair value of long-lived assets generally do not have readily available market prices, fair values are generally determined by the discounted cash flow method. In order to obtain these fair values, managers are required to make assumptions about the future cash flows of the assets. These assumptions could relate to economic, industry and other competitive factors that may impact the future cash flows of the asset

(ASC 360-10-05-29 to 30). Thus, as in an escalation of commitment setting, we expect that the search and evaluation of information related to these factors in an impairment setting will be subjected to confirmatory bias.

Prior experimental studies that investigate managerial impairment decisions either hold the information processing of managers constant (Rennekamp et al. 2014), or do not consider how managers process information prior to the impairment decision (Trottier 2013). We extend this literature by investigating the information processing bias of managers with respect to their impairment decisions. We investigate how two regulatory requirements, namely, reversibility of impairment losses and disclosure of impairment assumptions, can exacerbate or reduce the bias in the processing of impairment information. The following sections discuss these two regulatory requirements and develop our hypotheses.

2.3 Regulatory requirements

In sections 2.3.1 and 2.3.2 we discuss prior literature related to the two factors, reversibility of impairment losses and disclosure of impairment assumptions. In section 2.3.3 we discuss and predict how these two factors can affect the processing of impairment information.

2.3.1 Reversibility of impairment losses

One of the key differences in the accounting treatment for impairment losses under US GAAP and IFRS is that impairment losses are not reversible under US GAAP even when the fair value of the asset recovers in the future. Prior research shows that managers are reluctant to impair assets under the more restrictive US impairment standards (e.g. Alciatore et al. 2000). Write-downs of assets by US companies are not recognised even when there are objective indicators of a decline in the value of the asset (Hilton and O'Brien 2009), and they typically occur after the stock market has already incorporated some of the effects of the write down (Alciatore et al. 2000, Collins and Henning 2004, Hilton and O'Brien 2009).

There are limited studies on the impairment decisions of companies using IFRS. However, findings from these studies suggest that managers may be more willing to recognize impairment losses under IFRS. Zhang et al. (2010) investigate how companies in China reacted to a ban on the reversal of impairment losses. Chinese accounting standards had

previously permitted companies to reverse their impairment losses. They find that in the period after the new regulation was announced but before it was implemented, fewer companies reported write-downs and reversals of losses, and the magnitude of write-downs and reversals also decreased. Duh et al. (2009) find that Taiwanese companies who comply with the requirements of IAS 36 are more likely to reverse the impairment loss in future years, which suggests that managers may be more prepared to recognize impairment losses in the first instance.

2.3.2 Disclosure of impairment information

Disclosures by companies, whether voluntary or mandatory, are an important way to reduce the information asymmetry between companies and investors (Healy and Palepu 2001). Although there is no unifying theory on what mandatory disclosures should be provided in the financial statements (Schipper 2007), an examination of the disclosures requirements in the standards indicates that mandatory disclosures can be broadly categorized into (1) information that elaborates on items that are recognised in the financial statements, and (2) information that relate to items that are not recognised in the financial statement because they do not satisfy the recognition criteria in the accounting standards. Examples of the first category include asset classes for property, plant and equipment, and disclosures on LIFO reserves. Examples of the second category include information about contingent liabilities that are not recognised in the financial statements. Prior research has largely focused on the second category of disclosures by investigating whether investors attribute different valuation to disclosed versus recognised items (e.g. Cheng and Smith 2013) and how preparers respond to the recognition versus disclosure requirements in standards (e.g. Clor-Proell and Maines 2014).

However, the two categories of disclosures mentioned above are not mutually exclusive as illustrated in the case of impairment disclosures. Both IFRS (IAS 36) and US GAAP (ASC 820-10-50-1) require companies to disclose key assumptions used to determine the fair value of assets less costs of disposal related to all impairment losses recognized during the reporting period. In addition to these disclosure requirements, companies listed on the stock exchanges in the US are required to provide impairment disclosures in the Management's Discussion and Analysis of Financial Condition and Results of Operations that will "supplement, not duplicate, the description of accounting policies that are already disclosed

in the notes to the financial statements”³. While the SEC interpretative guidance does not mention specific types of impairment disclosures, an examination of SEC’s comment letters about companies’ disclosures indicates that the SEC requires companies to disclose information about assets that have been subjected to an impairment assessment but were not impaired in the current year (Ernst and Young 2012). For example, in its comment letter to Nucor, a listed company on the NYSE, the SEC required Nucor to provide information on assets that are not impaired (despite the existence of triggering events) in order for investors to “*assess the probability of a future material impairment charge and to address the material implications of uncertainties associated with the methods, assumptions and estimates underlying the company’s critical accounting measurements*” (Appendix 1).

Advocates of disclosure maintain that disclosures would ensure that managers will not take actions that are against the interest of investors such as earnings management or fraud (Healy and Palepu 2001). Regulators are keen supporters of this perspective (Schipper 2007). However, recent research suggests that disclosures can generate self-serving behaviours. Auditors and business valuers were observed to engage in strategic exaggeration and moral licensing (Cain et al. 2005, Cain 2006, Jamal et al. 2011). In this study we contribute to this debate by investigating how disclosures may influence the way managers process information prior to their impairment decision. We posit that disclosure can modify how managers process impairment information by either encouraging a more optimistic or pessimistic assessment of the future performance of the underperforming asset, depending on whether or not managers can reverse the impairment loss.

2.3.3 Effect of reversibility and disclosure on information processing

Prior psychological research shows that the focus that individuals adopt influences how they process information after a decision is made. Individuals who focus on their prior suboptimal decisions (decision focus) demonstrate more processing bias than individuals who focus on

³ SEC interpretative guidance FR-72, “Interpretation: Commission Guidance Regarding Management’s Discussion and Analysis of Financial Condition and Results of Operations”. The interpretative guidance provides SEC’s views on what should be included in the Management’s Discussion and Analysis of Financial Condition and Results of Operations (MD&A). Specifically, the SEC requires companies to provide additional disclosures their critical accounting estimates. Impairment of assets is an area of accounting where [1] the nature of the estimates or assumptions is material due to the levels of subjectivity and judgment necessary to account for highly uncertain matters or the susceptibility of such matters to change; and [2] the impact of the estimates and assumptions on financial condition or operating performance is material” (FR-42 para. V). See www.sec.gov/rules/interp/33-8350.htm

the post-decisional information (information focus) (Jonas et al. 2008). We posit that the reversibility of impairment loss can affect the focus that managers adopt when processing impairment information. When impairment losses can be reversed, managerial concerns that a write-down is an acknowledgment of their past erroneous decision is likely to be diminished. The recognition of the impairment loss is “temporary” because the manager can write up the value of the asset when the factors causing the impairment no longer exist. Consequently, it can be expected that managers will focus on the information related to the future prospects of the assets, and exhibit less information processing bias. In contrast, when impairment decisions cannot be reversed, recognizing impairment losses would result in a permanent downward adjustment to the carrying value of the asset. From the manager’s perspective, the recognition of impairment losses would also be a recognition that the manager’s past action was erroneous. As discussed in Section 2.1, prior research shows that individuals are reluctant to acknowledge their past failings. Thus, we expect that managers will adopt a decision focus when they cannot reverse the impairment losses, and hence will exhibit information processing bias in support of their initial decisions. That is, they may search for positive information about the future performance of the asset. They may further demonstrate a more optimistic assessment of the future performance of the underperforming asset.

Because the extent of disclosure and the recognition decision for impairment losses is intricately linked, we expect that nature of information processing bias will further depend on whether or not the company has to make full or partial disclosure about their impairment decision. We posit that disclosure requirements will affect the processing bias only when the recognition of the impairment loss cannot be reversed but not when it can be reversed. We first discuss the effect of partial and full disclosure when impairment losses cannot be reversed. Recall that when impairment losses cannot be reversed, managers are expected to be optimistic about the prospects of the asset because of the decision focus they adopt. We posit that this tendency to be optimistic about the prospects of the underperforming asset will continue when managers are required to make full disclosure about their decisions, whether or not they impair the asset. Prior psychological research shows that accountability for decision outcomes encourages commitment to prior courses of action (Simonson and Staw 1992). Therefore we expect when managers are required to disclose assumptions regardless of their impairment decision, they will be more committed to their underperforming asset.

Consequently, we expect that manager will demonstrate a bias in favor of information that indicates the asset will have favorable prospects.

In contrast, when disclosures are required for impairment losses, managers are likely to perceive that these disclosures are needed to support their decision to impair. We expect that managers will exhibit a tendency to be accurate (Simonson and Staw 1992). In our experiment, participants were informed that the assets producing the underperforming product are likely to be impaired. However, they could make the final decision on whether or not to impair the assets. If managers were reluctant to recognize their past suboptimal decision, they would display a confirmatory bias. In contrast, when they wish to be accurate, they are likely to adopt the position given by the initial assessment. In our experimental setting this would mean a tendency to favor information in support of impairment. We argue that partial disclosure of impairment assets will create a pessimistic evaluation of impairment information.

Finally, in the condition in which managers can reverse the impairment loss, we expect that disclosure, whether partial or full, will have no effect on bias in the processing of impairment information. As discussed above, reversible decisions will encourage a balanced search and evaluation of impairment information. Because managers can reverse the impairment loss when the prospects for the asset improve, disclosures are not expected to influence how they process the impairment information.

In summary, we expect that the extent of disclosure affects processing bias only when the impairment loss cannot be reversed. On the basis of our theoretical development, our first hypothesis, stated in terms of information search, is:

H1: When there is full disclosure (partial disclosure), managers who cannot reverse the impairment loss are more likely to *search for* information that indicates that the asset has positive (negative) prospects than managers who can reverse the loss.

Our second hypothesis, stated in terms of the information evaluation, is:

H2: When there is full disclosure (partial disclosure), managers who cannot reverse the impairment loss are more likely to *favorably evaluate* information that indicates that the asset has positive (negative) prospects than managers who can reverse the loss.

In section 2.3.3, we argue that the processing of information about the future cash flows of the asset is integral to the impairment decision. Regulatory requirements are expected to affect impairment decisions through their effect on manager' processing bias. Our last predictions state how the bias in managers' information processing mediates managers' impairment decision. Because managers' response to impairment information can occur either via the search or the evaluation of impairment information, our third set of hypotheses is as follows:

H3a: Manager's search for information about the asset partially mediates the effect of reversibility on managers' impairment decision. The indirect effect is moderated by the extent of disclosure of impairment assumptions.

H3b: Manager's evaluation of information about the asset partially mediates the effect of reversibility on managers' impairment decision. The indirect effect is moderated by the extent of disclosure of impairment assumptions.

3 Method

3.1 Participants

Seventy-five participants took part in the web-based experiment. Participants were allocated randomly to each of the four experimental conditions and the control condition. Each condition had 15 participants. In the main experiment, the two largest groups of participants were from service (22%) and the finance, real estate and insurance industries (22%). Another 13% were from the retail trade industry. Forty-four percent of the participants have at least one of the following qualifications, namely, Chartered Accountant, Certified Public Accountant, Chartered Financial Analyst, or Certified Financial Planner qualifications. In the control group, 6 out of the 15 participants had at least one of the professional qualifications. Similar to the experimental groups, the majority of the participants in the control group came from the service and finance industries (40%).

We recruited participants for our study using a panel provider, Qualtrics, a US-based a research software supplier. Qualtrics, in collaboration with their panel partners, identified

potential participants and administered the web-based experiment by distributing email messages describing the research study to members in their proprietary data base. In order to obtain participants with the requisite accounting or finance background and managerial experience, we asked participants four screening questions, namely, whether they had a college or university degree, their degree specialization, the number of years of managerial experience and their ability to read financial statements. Only potential participants who indicated that they had a college or university degree in accounting, finance or business administration, had at least 3 years of managerial experience and at least agreed that they were able to read financial statements were allowed to proceed to the experiment. To encourage attention to the experimental materials, Qualtrics only rewards participants who correctly respond to the manipulation check questions in our study. Our payment of \$30 per participant to Qualtrics was also based on the number of participants who successfully completed the study.

3.2 Design

We employed a 2×2 between-subjects design, with the reversal of impairment loss (“can be reversed” versus “cannot be reversed”) and the disclosure of impairment assumptions (partial versus full) as independent variables. Participants in the “can be reversed” (“cannot be reversed”) impairment loss condition were told that “Any write-down expenses that you charge to this year's earnings CAN (CANNOT) BE REVERSED IN THE FUTURE when the Division's performance improves”. Participants in the full (partial) disclosure condition were told “You must disclose the assumptions used to estimate your Division’s future cash flows when you write down the Division’s assets. Assumptions are ALSO DISCLOSED EVEN (NOT DISCLOSED) WHEN THERE IS NO WRITE DOWN”. Unlike the experimental groups where participants had to make an investment decision prior to their impairment decisions, participants in the control decision did neither. Participants in the control group were told that one of the medical equipment products in their segment was not performing well and that there was some information about the future prospects of the underperforming product that they had to evaluate. All eight pieces of information were presented to them for evaluation. In the experimental groups, participants had to choose four out of the eight pieces of information. The information available to participants in the control condition was the same as that available to participants in the other conditions. The responses of the participants

in experimental group were compared to the responses of participants in the control condition in order to determine the extent of information processing bias.

3.3 Materials and procedure

We first obtained the informed consent of participants who passed the screening tests. The participants were then instructed to assume the role of a group manager of the medical equipment segment in a publicly listed company, Medixcel, which manufactures and sells pharmaceutical products and medical equipment. All participants were given the same background information, choice of product to invest in, information about the subsequent poor performance of their chosen product, and information about the factors affecting the product's future cash flows. After reading the background information about the company, the participants were given information about two types of personal medical equipment (REMITOR and DSTRESS) that are expected to boost the segment's revenues and earnings. Participants were required to choose one of the two products to invest in. Regardless of their choice, participants were informed that their chosen product did not perform well and that an initial assessment indicated that the assets of the Division manufacturing the product might have to be written down. The participants were told that they were to make the final decision on whether to recognize impairment. In order to facilitate their decision, participants were further informed that analyses of eight factors that had the potential to affect the product's future cash flows were available. Four of the factors had a positive impact on the products future cash flow while the rest had a negative impact. Participants were required to choose any four of eight factors for further evaluation. The summaries of the eight factors were presented simultaneously for the participants to choose. The manipulation of the reversal of impairment loss and the disclosure occurred before the participants were shown the summaries of the eight factors. Participants first read the information about the reversibility of the impairment loss, followed by information about the disclosure requirements.

Following this, participants were provided a detailed analysis of the factors that they had chosen. After reading the information about their four chosen factors, participants responded to a series of questions that asked their opinion about whether the analyses about the factors were credible, convincing and relevant to their assessment on whether to write down the assets of the underperforming division. The participant then made a decision on whether or not to write down the assets of the division. If they chose (chose not) to write down the

assets, they were required to estimate the percentage in which the total future cash flows would be lower (higher) than the book value of the division's assets. The participants finally completed their manipulation check questions and demographic questions.

3.4 Measures

3.4.1 Dependent variables

Our dependent variables related to information processing are denoted by *SEARCH* and *EVAL*. Bias in information search is usually determined by the relative number of pieces of consistent and inconsistent information chosen by decision maker. A balanced search is said to occur when the decision maker chooses an equal number of information items supporting and rejecting their prior decision. In context of our experiment, factors that indicate an increase in the future cash flows of the product will provide support that impairment of the assets of the Division manufacturing the product is not required. In contrast, factors that indicate that the future cash flows of the product will decline suggest that impairment of the assets may be necessary. A balanced search for impairment information occurs when the manager chooses an equal number of positive and negative factors. A confirmatory search occurs when the manager searches for relatively more positive factors than negative factors, that is, the manager's information search is biased against impairment. On the other hand, if the manager chooses more negative factors than positive factors, the manager demonstrates a bias in favor of impairment.

In the experiment the participants were required to choose among eight pieces of information where four pieces of information indicated that the product had positive cash flow prospects, and the other four pieces indicated that the product had negative cash flow prospects. In order to capture managers' proclivity towards consistent information (i.e. positive information about the future prospects of the product), we measured participants' search for consistent information (*SEARCH*) by taking the number of positive pieces of information chosen minus the number of negative pieces of information. Thus, a positive number for *SEARCH* indicates that managers have chosen relatively more pieces of positive information about the product's future prospects than negative pieces of information.

The process of measuring information evaluation bias is more involved because what constitutes an objective evaluation of information is difficult to define. Experimental studies generally measure bias in information evaluation by comparing the responses of decision makers in the experimental condition with a control group of decision makers unaffected by the experimental manipulations. In order to measure participant's information evaluation bias (*EVAL*), we elicited participants' opinions about quality of the information about the product's prospects along the following dimensions: (1) whether the information was convincing, (2) whether the information was credible, and (3) whether they would rely on the information for their impairment decision. We assessed participants' opinions on a ten-point scale (1= *strongly disagree*, 5=somewhat *disagree*, 6=somewhat *agree*, 10=*strongly agree*).

We measure bias in managers' evaluation of the impairment information by comparing their evaluations of the information with those from participants in the control condition. Recall that in our experiment, managers are provided with positive and negative factors affecting future cash flows of the product. Therefore, bias evaluation should consider how managers evaluate both types of factors. A negative (positive) assessment of the product's cash flow prospects would suggest that the division producing the underperforming product should (should not) be impaired. Therefore, we expect that if participants are biased against impairment, they would (1) evaluate positive information more favorably and (2) evaluate negative information less favorably than the control group. Conversely, if participants are biased in favor of impairment, they would (1) evaluate positive information less favorably and (2) evaluate negative information more favorably than the control group. In order to obtain a consistent interpretation of their assessments of both positive and negative information, we did the following. First, we compared participants' raw responses with the control group by subtracting participants' responses from those of the control group. We call this the adjusted response. Second, for negative information about the product's future cash flows, we reversed the sign of the adjusted response obtained in the first step. Last, we added the adjusted responses for all the four pieces of information chosen by the participants in order to obtain the score for *EVAL* for each of the participants. Thus, a positive (negative) number for *EVAL* indicates that participant's information evaluation is biased against (in favor of) impairment.

Finally, our dependent variable for managers' impairment decision is denoted by *IMPAIR*. We measure this variable by directly asking managers their opinion on whether the assets of

the division should be written down. We use a ten-point scale (1= *strongly disagree*, 5=*somewhat disagree*, 6=*somewhat agree*, 10=*strongly agree*).

3.4.2 Mechanisms

In our discussions in Section 2, we propose that the effect of the reversibility on manager's decision to impair the assets occurs indirectly via their processing of the impairment information. Therefore both our information processing variables, *SEARCH* and *EVAL* are potential mediators of the effect of reversibility on managers' impairment decision, *IMPAIR*. Our results on mediation are discussed in Section 4.3.

4 Results

4.1 Manipulation checks

In the first manipulation check question, we ask participants to indicate whether they had been provided with a statement "Any write-down expenses that you charge to this year's earnings CAN BE REVERSED IN THE FUTURE when the Division's performance improves" or the statement "Any write-down expenses that you charge to this year's earnings CANNOT BE REVERSED IN THE FUTURE when the Division's performance improves". The second manipulation check question asks participants to indicate whether they had been given the statement "You must disclose the assumptions used to estimate your Division's future cash flows when you write down the Division's assets. Assumptions are ALSO DISCLOSED EVEN WHEN THERE IS NO WRITE DOWN" or the statement "You must disclose the assumptions used to estimate your Division's future cash flows when you write down the Division's assets. Assumptions are NOT DISCLOSED WHEN THERE IS NO WRITE DOWN". Only the responses of participants who correctly answered both questions are used in this study (see section 3.1).

4.2 Primary analyses

4.2.1 ANOVA for information search

We first report our results for the information search using ANOVA. The cell means and the ANOVA results are presented in Table 1. Figure 1a also presents the raw means for each of

the cells. We do not find a main effect for *REVERSE* ($p=0.500$ one-tailed), *DISCLOSE* ($p=0.332$ one-tailed) or the interaction between *REVERSE* and *DISCLOSE* ($p=0.193$ one-tailed).

INSERT TABLE 1 and FIGURE 1 here

H1 states that managers will search for positive information when impairment losses cannot be reversed and there is full disclosure, but they will search for negative information when impairment losses cannot be reversed and there is partial disclosure. The search for information when managers can reverse the impairment loss is expected to be balanced. We test this hypothesis with a planned contrast. We computed the difference in the means for the two cells under the “can be reversed” conditions and the difference in means for the two cells under the “cannot be reversed” conditions. We then evaluated the significance of these two differences. Our test indicates that the difference is insignificant ($t = 0.87$, $p=0.193$ (one-tailed)). We do not find support for hypothesis H1.

4.2.2 ANOVA for information evaluation

We first report the cell means and the ANOVA results for information evaluation. The results are presented in Table 2. Figure 1b also presents the raw means for each of the cells. We find that the interaction between *REVERSE* and *DISCLOSE* is significant ($p=0.024$ one-tailed). There is no a main effect for *REVERSE* ($p=0.251$ one-tailed) or for *DISCLOSE* ($p=0.158$ one-tailed).

INSERT TABLE 2 here

H2 states that compared to the reversal condition, managers will favorably evaluate positive information about the asset’s future prospects when there is full disclosure but not when there is partial disclosure. We conduct a planned contrast to test our hypothesis. We first measured the difference in means for the partial and disclosure conditions in each of the reversal conditions. Then we compared the difference in means for the two reversal conditions. Our

test indicates that the difference is significant ($t = 2.02$, $p = 0.024$, one tailed). Hypothesis H2 is therefore supported.

4.2.3 ANOVA for impairment decision

Because we predict that manager's information processing bias is a partial mediator of the effect of reversibility, reversibility and disclosure can have a direct effect on impairment decisions. Thus, we also performed an ANOVA for the impairment decision. The cell means and the ANOVA results are presented in Table 3. Figure 1c also presents the raw means for each of the cells. There is marginal main effect for *REVERSE* ($p = 0.090$ one-tailed) but *DISCLOSE* is not significant ($p = 0.403$ one-tailed). The interaction between *REVERSE* and *DISCLOSE* is also not significant ($p = 0.270$ one-tailed). Our results provide marginal support for a direct effect of the reversibility on impairment decisions.

INSERT TABLE 3 here

4.3 Mediation analysis

We also conducted a mediation analysis to investigate the effect of information search and information evaluation on manager's impairment decision. The mediated effects are also predicted to be moderated by disclosure. We adopt the moderated path analysis procedure described in Edwards and Lambert (2007) for our tests. However, none of the path coefficients was significant at $p = 0.05$.

5. Discussion

In this study, we investigated information processing bias in an impairment setting through two routes, namely information search and information evaluation. Our results demonstrate that managers do not exhibit any bias when they search for information about the future prospects of the asset. However, we find that information evaluation bias occurs in an impairment setting and that this bias is influenced by the regulatory requirements. In particular, we showed that the disclosure requirement can create either an optimistic or a pessimistic outlook about the underperforming asset when impairment losses cannot be reversed. However, this bias in information evaluation did not exert an influence managers' impairment decision.

Our results corroborate those obtained in Schultze et al. (2012) who investigated information processing bias in an escalation of commitment setting. In that study they found that selective exposure did not occur among participants when they were given prospective information about the project. Participants in their study were more biased in their evaluation of information when they had responsibility for the project than when they did not have responsibility. In our study, we similarly provided participants with prospective information and these participants did not demonstrate any information search bias but an information evaluation bias. However, unlike Schulze et al. (2012) we were unable to demonstrate a link between the information evaluation bias and participants' subsequent decision. Schultze et al. (2012) showed that the information bias was a mediator in the decision to commit more resources to the failing project. As in Schultze et al. (2012), our experimental design was adapted from the similar designs used in the escalation of commitment literature (Staw and Ross 1989). Given the similarity in antecedents in the escalation of commitment setting and an impairment setting, it was therefore surprising that we were not able to demonstrate the causal link between information processing bias and impairment decisions.

Consequently, we can only speculate on the possible reasons for the lack of causal effect between information evaluation bias and the impairment decision. The absence of a causal effect between the information processing bias and the impairment decision cannot be attributed to failure in the manipulated variables because we included participants with correct responses in this study. A plausible explanation is that managers in all conditions may have anchored on the initial assessment that the asset may be impaired, even though they demonstrate an information processing bias. Our examination of the impairment responses shows that managers are more willing to impair the assets when they can reverse the impairment loss than when they are unable to. However, the variation in the responses is not sufficient to achieve statistical significance.

6. Conclusion

Prior research shows that managers who were responsible for an underperforming asset tend to demonstrate bias in their processing of post-decisional information related to the asset (Colon and Parks 1987). Impairment assessments are typically carried out when assets are underperforming. This assessment generally involves acquiring and evaluating information about the future prospects of their underperforming asset. Consequently, it can be expected

that managers will also demonstrate these well-documented information processing biases. In this study we investigate how two regulatory requirements, reversibility of impairment loss and disclosure of impairment assumptions can reduce or exacerbate a manager's tendency to be biased in their processing of information related to an underperforming asset. We investigate the two routes in which information processing bias can affect decisions, namely, the search for information and the evaluation of information.

Our experimental results show that disclosure and reversibility interact to affect manager's evaluation of impairment information but not their search for information. When the impairment loss can be reversed, disclosure does not exert any effect on how managers evaluate information. Managers in this condition adopt a more balanced evaluation of information than those who cannot reverse the impairment loss. In contrast when impairment loss cannot be reversed, the level of disclosure affects how managers evaluate information about the asset's prospects. Full disclosure leads managers to more favorably evaluate positive information about the assets than managers in the partial disclosure condition. However, this information evaluation bias does not have an impact on their impairment decisions.

While we did not find a significant relationship between managers' information processing bias and impairment decision, our study sheds light on how regulatory requirements can affect the unconscious bias in managers when they process impairment information. Regulators and investors are concerned that the need to estimate several parameters, including cash flows and discount rates, in order to calculate the fair value of assets would introduce subjectivity to the impairment process. We demonstrate that subjectivity may arise through the unconscious bias of managers, and that this bias is affected by the regulatory requirements. The ability to reverse the impairment loss creates a balanced evaluation of impairment information. The responses of managers in this condition were similar to those in the control group. In contrast, managers who cannot reverse the impairment loss respond differently to the level of disclosure. When full disclosure is required, managers tend to demonstrate an optimistic bias (i.e they favourably evaluate information that indicates that the asset has positive prospects). However, when disclosure is restricted to situations in which impairment is recognised, managers tend demonstrate a pessimistic bias. If conservatism is a desired behavior in managers when faced with potential losses, it would appear from the findings in this study that no-reversibility combined with partial disclosure would create this tendency in managers.

Our study has a number of limitations which need to be considered in interpreting the case. First, the managers who participated in our study had relatively low levels of experience and future research needs to investigate these issues with more experienced participants. Second, we focus on impairment situations in which uncertainty exists about the future value of the underperforming asset. In some impairment situations, the fair value of the asset is readily available because these assets are traded as in the case of many financial instruments. In these situations the evaluation of impairment information may not be as critical as the search for information. Future research can investigate the extent to which information search bias is prevalent in other types of impairment situations.

Third, we designed the experiment such that managers undertake an information search first before they evaluate the information. In practice, the search and evaluation process can occur simultaneously, that is, managers search and evaluate the information one at a time, and will move to a next search only when the previous set of information does not satisfy their requirements. This form of search and evaluation may occur especially when managers are subjected to time pressure. How this form of search and evaluation process can influence the bias in managers is an avenue for future research.

Finally, we have focused on two regulatory requirements that we expect will influence the information processing bias of managers. Other environmental factors such as reward systems, existence of analyst following, and visibility of the manager's action may influence managers' search for the impairment information. Examining these factors will provide us a better understanding on what drives managers' reluctance to impair assets.

TABLE 1

Bias in manager's information search

Panel A: Descriptive Statistics				
	<i>REVERSE</i>			
	Can be reversed	Cannot be reversed	Overall	
<i>DISCLOSE</i>				
Partial	0.933 (s.d.=1.981) n=15	0.400 (s.d.=2.028) n=15	0.666 (s.d.=1.988) n=30	
Full	0.133 (s.d.=2.670) n=15	0.667 (s.d.=2.690) n=15	0.400 (s.d.=2.647) n=30	
Overall	0.533 (s.d.=2.345) n=30	0.533 (s.d.=2.345) n=30		
* A positive number indicates more positive information is selected.				
Panel B: Analysis of Variance				
Factor	<i>df</i>	Mean Square	<i>F</i> -statistic	One-tailed <i>p</i>-value
<i>REVERSE</i>	1	0.000	0.00	0.500
<i>DISCLOSE</i>	1	1.067	0.19	0.332
<i>REVERSE</i> × <i>DISCLOSE</i>	1	4.267	0.76	0.193
Error	56	5.600		
Panel C: Planned Contrasts				
Hypothesized Contrast		<i>Mean square</i>	<i>t</i> -statistic	One-tailed test (<i>p</i>-value)
Full versus partial disclosure at no reversal		0.533	0.32	0.379
Full versus partial disclosure at reversal		4.800	0.93	0.179
H1: Full versus partial disclosure at reversal compared to no reversal		4.267	0.87	0.193

TABLE 2

Bias in managers' evaluation of impairment information

Panel A: Descriptive Statistics (mean, standard deviation (s.d.) and number of observations (n))				
	<i>REVERSE</i>			
	Can be reversed	Cannot be reversed	Overall	
<i>DISCLOSE</i>				
Partial	0.883 (s.d.=2.059) n=15	-1.419 (s.d.=2.935) n=15	-0.268 (s.d.=2.753) n=30	
Full	0.015 (s.d.=4.217) n=15	1.173* (s.d.=3.597) n=15	0.594 (s.d.=3.900) n=30	
Overall	0.449 (s.d.=3.290) n=30	-0.123 (s.d.=3.485) n=30		
*A positive number indicates bias against of impairment and a negative number indicates bias in favor of impairment				
Panel B: Analysis of Variance				
Factor	<i>df</i>	Mean Square	<i>F</i> -statistic	One-tailed <i>p</i>-value
<i>REVERSE</i>	1	4.905	0.45	0.251
<i>DISCLOSE</i>	1	11.151	1.02	0.158
<i>REVERSE</i> × <i>DISCLOSE</i>	1	44.912	4.12	0.024
Error	56	10.895		
Panel C: Planned Contrasts				
Hypothesized Contrast		<i>Mean square</i>	<i>t</i> -statistic	One-tailed test (<i>p</i>-value)
Full versus partial disclosure at no reversal		50.411	2.15	0.018
Full versus partial disclosure at reversal		5.653	0.72	0.235
H2: Full versus partial disclosure at reversal compared to no reversal		44.913	2.02	0.024

TABLE 3

Manager's impairment decision

Panel A: Descriptive Statistics				
	<i>REVERSE</i>			
	Can be reversed	Cannot be reversed	Overall	
<i>DISCLOSE</i>				
Partial	7.800 (s.d.=1.935) n=15	6.730* (s.d.=2.604) n=15	7.260 (s.d.=2.318) n=30	
Full	7.600 (s.d.=1.300) n=15	7.200 (s.d.=2.305) n=15	7.400 (s.d.=1.850) n=30	
Overall	7.700 (s.d.=1.622) n=30	6.960 (s.d.=2.428) n=30		
* A larger number indicates greater willingness to impair the Division's assets				
Panel B: Analysis of Variance				
Factor	<i>df</i>	Mean Square	<i>F</i> -statistic	<i>One tailed p-value</i>
<i>REVERSE</i>	1	8.067	1.84	0.090
<i>DISCLOSE</i>	1	0.267	0.06	0.403
<i>REVERSE*DISCLOSE</i>	1	1.667	0.38	0.270
Error	56	4.381		

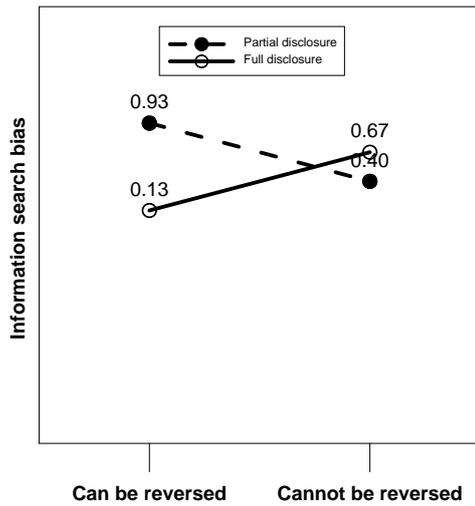


Figure 1a

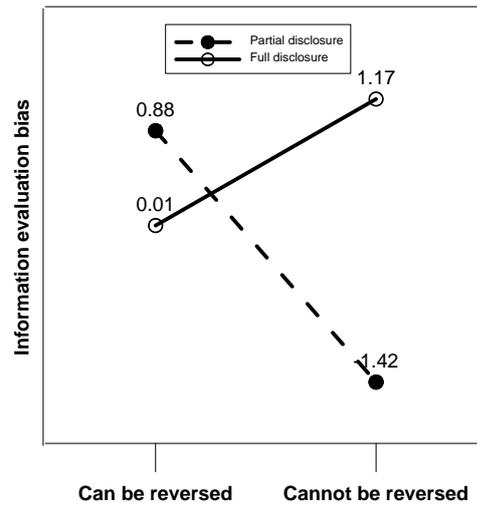


Figure 1b

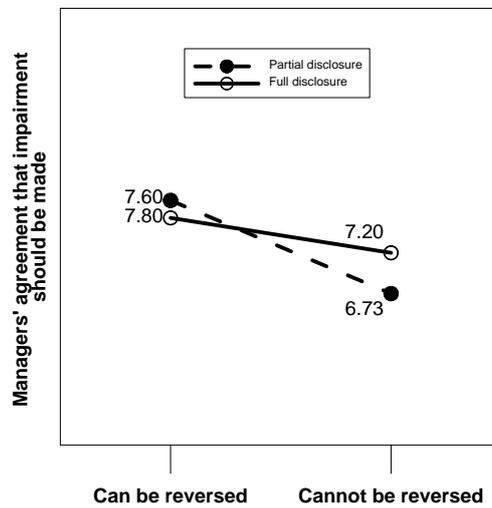


Figure 1c

Figure 1: Plots of means for information search bias, information evaluation bias and impairment decision

September 30, 2013

Mr. Terence O'Brien Accounting Branch Chief Division of Corporation Finance
United States Securities and Exchange Commission
100 F Street, N.E. Washington, D.C. 20549

RE: Nucor Corporation
Form 10-K for Fiscal Year Ended December 31, 2012
Filed February 28, 2013
Form 10-Q for Fiscal Quarter Ended June 29, 2013
Filed August 7, 2013
File No. 1-04119

Dear Mr. O'Brien:

This letter is submitted on behalf of Nucor Corporation (the "Company" or "Nucor") in response to comments of the staff (the "Staff") of the Securities and Exchange Commission (the "Commission") set forth in your letter dated September 16, 2013. Our responses to your comments are set forth below, and we have included the Staff's comments in italicized text prior to the Company's responses.

Form 10-K for the Fiscal Year Ended December 31, 2012

Critical Accounting Policies and Estimates, page 35

Equity Method Investments, page 36

- 1. We note your response to prior comment 1. In 2012 you recognized a \$30 million impairment charge on your investment in Duferdofin Nucor. You have disclosed that challenging market conditions in Europe could lead to additional impairment charges that could have a material effect on your results in the near term. The discussion of critical accounting policies in your 2012 Form 10-K does not address the specific methods and assumptions used, apart from the disclosure, "The assumptions that most significantly affect the fair value determination include projected revenues and the discount rate." You have proposed expanding this disclosure by adding, "We calculate estimated fair value using a probability-weighted multiple scenario income approach consistent with the quantitative analysis described in our goodwill policy above."*

In future filings, please expand the proposed disclosure to provide a description of the methods and key assumptions used, including:

- *Disclosure of the “best case,” “base case,” and “recessionary case” scenarios described in your supplemental response, along with the weighting;*
- *An explanation of the degree of uncertainty associated with the key assumptions and how these cases differ from past historical results. The discussion should provide specifics to the extent possible (e.g., the valuation model assumes recovery from a business downturn within a defined period of time), with quantified information where available and useful to an investor’s understanding of the risk of potential additional impairment;*
- *Additional assumptions that are key to your testing;*
- *A description of how the key assumptions were determined.*

In addition, please tell us and disclose in future filings the percentage by which the estimated fair value exceeded carrying value as of the date of the most recent test. The objective of the proposed disclosure is to provide information for investors to assess the probability of a future material impairment charge and to address the material implications of uncertainties associated with the methods, assumptions and estimates underlying the company’s critical accounting measurements. Refer to S-K 303(a)(3)(ii) and Section V of Interpretive Release No. 33-8350. Provide us with an example of your intended future disclosure.

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