

THE IMPACT OF VERIFIABILITY ON THE RELIABILITY OF FAIR VALUE  
ESTIMATES: EVIDENCE FROM THE LEVEL 3 ROLLFORWARD DISCLOSURE

by

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## DEDICATION

To my wife, Lea, and our children, Bel, Tommy, Shad, and Penny. You are my joy and motivation. I love you.

To my mother for teaching me to love learning and my father for teaching me to love working.

## TABLE OF CONTENTS

LIST OF TABLES.....	8
ABSTRACT.....	9
1. INTRODUCTION.....	10
2. BACKGROUND INFORMATION AND HYPOTHESES.....	16
2.1 OVERVIEW OF FAIR VALUE DISCLOSURES.....	16
2.2 RELATED FAIR VALUE LITERATURE.....	17
2.3 HYPOTHESES DEVELOPMENT.....	20
3. RESEARCH DESIGN.....	24
3.1 CLOSED-END FUND SETTING.....	24
3.2 SAMPLE SELECTION.....	25
3.3 DESCRIPTIVE STATISTICS.....	27
3.4 EMPIRICAL DESIGN.....	28
4. RESULTS.....	31
4.1 HYPOTHESIS 1.....	31
4.2 HYPOTHESIS 2.....	33
4.3 HYPOTHESIS 3.....	34
5. ADDITIONAL ANALYSIS.....	35
5.1 LIVE FUND SAMPLE.....	35
5.2 MEDIAN QUANTILE ANALYSIS.....	36
5.3 DIRECTLY VS INDIRECTLY VERIFIABLE CHANGE IN VALUE.....	36

## TABLE OF CONTENTS (cont.)

5.4 RESOLVED VS ONGOING DIRECTLY VERIFIABLE CHANGES.....	38
6. CONCLUSION.....	39
APPENDIX A: VARIABLE DEFINITIONS.....	41
APPENDIX B: MISCELLANEOUS.....	44
TABLES.....	47
REFERENCES.....	66



## LIST OF TABLES

TABLE 1: Sample Selection.....	47
TABLE 2: Descriptive Statistics.....	48
TABLE 3: Correlation Table.....	50
TABLE 4: Perceived Reliability of Changes to Fair Value Estimates Based on Directly Versus Indirectly Verifiable Inputs.....	51
TABLE 5: Impact of Prior Manager Overvaluations on Perceived Reliability of Indirectly Verifiable Changes to Fair Value Estimates.....	53
TABLE 6: How Recency of Security Acquisition Impacts Perceived Reliability of Indirectly Verifiable Changes to Fair Value Estimates.....	55
TABLE 7: Test of Hypotheses Using Only Live Funds.....	57
TABLE 8: Test of Hypotheses Using Median Regression Analysis.....	59
TABLE 9: Test of Hypotheses Comparing Directly and Indirectly Verifiable Changes in Value.....	61
TABLE 10: Test of Hypotheses Using Resolved and Ongoing Direct Changes.....	63
APPENDIX B, TABLE 1: Replication of Lawrence et al. (2016).....	65

## ABSTRACT

Using hand-collected data from the Level 3 reconciliation disclosure, I study the impact of verifiability on the perceived reliability of changes to fair value estimates. Using a value relevance framework, I find that investors perceive indirectly verifiable changes to Level 3 fair value holdings as less reliable than directly verifiable Level 3 changes. I next show that, consistent with a Bayesian updating framework, the value relevance of indirectly verifiable changes is moderated by the overstatement of prior fair value estimates, and by the recency of the investment's acquisition. My study provides new insights on how investors price fair value estimates and also contributes some of the first empirical evidence on the positive relation between the enhancing qualitative characteristic verifiability and investor perceptions of the reliability of information. Relatedly, my study highlights the difference between verifiability and the ASC 820 characteristic observability and finds that observability does not capture investor perceptions of reliability. Finally, the results of my study contradict recent claims that the ASC 820 disclosures are uninformative.

## 1. INTRODUCTION

In this study, I examine how verifiability<sup>1</sup> affects investor perceptions of the reliability<sup>2</sup> of information within the context of fair value estimates. In Statement of Financial Accounting Concepts No. 8 (FASB 2010; SFAC 8) the FASB identifies verifiability as a qualitative characteristic that enhances the representational faithfulness of accounting information. Although this is one of the primary relationships relied on by the FASB when developing financial reporting standards, there is little empirical evidence confirming that it accurately reflects investor perceptions. I provide this evidence by comparing the value relevance of changes to fair value holdings across different levels of verifiability. My research question is of particular interest within the context of fair values for a number of reasons. First, the reliability of valuation estimates is a primary concern to fair value accounting. Second, using hand collected data from the ASC 820 mandated disclosures, I am able to identify objectively variation in the verifiability of changes to fair value holdings. Finally, prior fair value hierarchy research and practitioner comment letters to the FASB conflict with the prediction that verifiability enhances reliability. Therefore, the results of my study not only contribute to the understanding of how verifiability affects investor perceptions of reliability, but also provide new insights on how investors price changes to fair value holdings, and the usefulness of the disclosures required by ASC 820.

SFAC 8 categorizes information as directly or indirectly verifiable, with directly verifiable information considered to have a higher degree of verifiability. For fair value accounting, changes to fair value holdings are considered directly verifiable if they can be confirmed by a market transaction, while indirectly verifiable changes to fair value holdings can

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<sup>1</sup> Per Statement of Financial Accounting Concepts No. 8, verifiability implies that reported information can be confirmed to the level that different people can agree the information is representationally faithful.

<sup>2</sup> The terms reliability and representational faithfulness are substitutes in my study. However, to be consistent with recent fair value studies, I primarily use the term reliability.

only be confirmed via recalculation using the given inputs and assumptions (Johnson 2005). For example, a change to reported fair value holdings based on either an observable trading price or a market transaction in which the firm directly engages (e.g., a purchase) is directly verifiable. Alternatively, a change in reported fair value holdings based on adjustments to manager valuation inputs (e.g., the discount rate or expected timing of future cash flows) is indirectly verifiable. Given the assertions of SFAC 8 regarding verifiability, I expect investors to perceive indirectly verifiable changes to fair value holdings as less reliable, or more uncertain, than directly verifiable changes.

My study is related to the growing number of papers that test for variation in the reliability of the three level fair value hierarchy created by ASC 820<sup>3</sup> (e.g., Song, Thomas, and Yi 2010; Goh, Li, Ng, and Yong 2015; Lawrence, Siriviriyakul, and Sloan 2016; Iselin and Nicoletti 2017). However, there are a number of significant differences between my paper and the fair value hierarchy papers. One of the most important of these differences is that fair value hierarchy papers focus on the impact of *observability* as defined by ASC 820, while my paper is the first to focus on the impact of *verifiability* as defined by SFAC 8.

Within the framework of ASC 820, an investment valuation is classified as observable (Level 1 or 2) only if it can be confirmed by a market price, and otherwise as unobservable (Level 3). In contrast, while an observable market price is a sufficient condition for a valuation to be directly verifiable, it is not a necessary condition since direct verification can also be obtained from a direct market transaction. As a result, all changes to Level 1 and 2 holdings are directly verifiable, but changes to Level 3 holdings can be either directly or indirectly verifiable. For example, an increase in Level 3 holdings due to the purchase of an illiquid investment is an unobservable change under the ASC 820 framework, yet because the change is based on a

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<sup>3</sup> See Section II for a detailed discussion of ASC 820 and the findings of prior fair value hierarchy research.

market transaction, it is directly verifiable. This simple example highlights that the impact of verifiability cannot be inferred from the results of prior studies that focus on fair value hierarchy levels (i.e., observability).

To distinguish between indirectly verifiable changes (indirect changes) to fair value holdings and directly verifiable changes (direct changes), I hand-collect data from the two fair value disclosures mandated by ASC 820, the fair value hierarchy disclosure and the Level 3 reconciliation disclosure. In the fair value hierarchy disclosure firms provide the total fair value holdings in each of the three fair value hierarchy levels, while the Level 3 reconciliation disclosure, commonly referred to as the Level 3 rollforward<sup>4</sup>, is a reconciliation between the beginning and ending holdings of fair value securities for which the trading price is unobservable (i.e., Level 3 holdings). By combining the data from these disclosures, I am able to distinguish between changes to fair value holdings that are based on a market transaction (direct changes) and changes that are not (indirect changes).

To test the effect of verifiability on the reliability of changes to fair value estimates, I estimate the value relevance<sup>5</sup> of direct changes to Level 1, 2, and 3 holdings, as well as the value relevance of indirect changes to Level 3, for a sample of closed-end funds.<sup>6</sup> Hodder, Hopkins, and Schipper (2014) note that a challenge to interpreting differences in value relevance across

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<sup>4</sup> Throughout the paper I interchangeably refer to this disclosure as the Level 3 reconciliation disclosure, the Level 3 rollforward, the rollforward, and the reconciliation.

<sup>5</sup> A number of concerns have been raised regarding the usefulness of the value relevance literature, however, these concerns are typically diminished for studies on the fair value estimate of investment securities. For example, while Holthausen and Watts (2001, p. 20) questions the usefulness of the value relevance literature for financial accounting standard setters, it does concede that “The inferences for the relevance and reliability of fair value estimates of investment securities... have a greater probability of being valid than do inferences for intangibles and goodwill.” Holthausen and Watts (2001) goes on to express that for investment securities, the valuation model is also likely to be relatively well-specified. Therefore, while criticisms of the value relevance literature exist, they are arguably of less concern within the scope of my study.

<sup>6</sup> I focus on closed-end funds as they do not suffer from the value relevance bias recently highlighted by Lawrence et al. (2016). See Section III for a general discussion of closed-end funds.

fair value hierarchy levels is that both information risk and outcome risk<sup>7</sup> vary across hierarchy levels. Therefore, I base my principal conclusions on the comparison of the value relevance of indirectly verifiable changes to Level 3 holdings against the value relevance of directly verifiable changes to Level 3 holdings. By focusing on a single level of the fair value hierarchy, Level 3, I reduce the concern that my results are driven by variations in outcome risk.

I find that indirectly verifiable changes to fair value estimates are less value relevant than directly verifiable changes. Specifically, I find that a one-dollar change in Level 3 holdings based on indirectly verifiable inputs is priced by the market at approximately 75 cents, which is significantly less than both the value relevance of directly verifiable Level 3 changes and the theoretical dollar-for-dollar ratio of an estimate that is perceived as perfectly reliable. This result is consistent with a positive relation between verifiability and investor perceptions of the reliability of reported information, as asserted by SFAC 8.

Having established that investors discount the value relevance of indirectly verifiable changes, I next test for cross-sectional variations in this relationship as predicted by a Bayesian updating valuation framework. I first test how the accuracy of prior indirectly verifiable estimates impacts the reliability of current indirectly verifiable changes. I calculate the accuracy of the prior year-end Level 3 estimates using data collected from the Level 3 rollforward. I then compare the value relevance of indirectly verifiable changes to Level 3 holdings for the sample of observations that overstated prior year-end valuations (overstated sample) versus those observations that were not overstated (non-overstated sample). I find that for the overstated sample, the value relevance of indirectly verifiable changes to Level 3 holdings is significantly

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<sup>7</sup> Hodder et al. (2014) describe information risk as information uncertainty, while outcome risk is “economic differences in the uncertainty of payoffs”.

lower than directly verifiable Level 3 changes; however, I do not find a significant difference for the non-overstated sample.

My next analysis considers how the value relevance of indirectly verifiable changes is modified by the recency of the security's acquisition. I contend that when an investment is recently acquired, the directly observable purchase price is a reliable estimate of actual valuation, however, as the time between purchase date and valuation date increases, the purchase price becomes "stale". The Bayesian updating valuation framework suggests that when a beginning valuation is more reliable, uncertain changes to the valuation will be less value relevant. As such, I expect indirectly verifiable changes to Level 3 holdings to be less value relevant when the security is recently purchased. I test this prediction using the percentage of Level 3 holdings acquired during the year as a proxy for the recency of the directly verifiable acquisition prices. Consistent with my prediction, I find that the value relevance of indirectly verifiable changes is significantly lower for observations with an above average ratio of Level 3 holdings acquired during the year. I find similar results for samples split on the median ratio as well as for observations in the top tercile.

I conduct a number of additional analysis to provide assurance that my results are not driven by liquidating funds, outlier observations, or differences in the underlying economic transactions of directly and indirectly verifiable changes. My results are robust to all specifications.

My paper makes several important contributions to understanding the impact of verifiability on reliability and the capital market's pricing of fair value estimates. First, I provide empirical evidence of the positive relation between verifiability and reliability predicted in SFAC 8. Specifically, I find that investors perceive indirectly verifiable changes to Level 3 fair value

holdings as less reliable than directly verifiable changes to Level 3 holdings. Second, I show that the perceived reliability of indirectly verifiable changes is not homogeneous; rather, it is impacted by the accuracy of prior estimates and by the recency of investment acquisition. Third, I clarify the relationship between verifiability, as defined by SFAC 8, and observability, as defined by ASC 820. The results of my study suggest that unobservability (i.e., designation as Level 3) is not sufficient to predict whether markets discount the reported fair value, at least when information on verifiability is available to investors.

My study is also the first to provide evidence, in a setting free from the value relevance bias identified by Lawrence et al. (2016), that investors find the disclosures required by ASC 820 useful. In particular, I find that the Level 3 reconciliation disclosure required by ASC 820 contains otherwise unavailable data which are useful to investors for valuation purposes. This finding supports the FASB's decision to continue requiring that public companies provide a Level 3 reconciliation. The results of my study also suggest that financial statement users would benefit from an expansion of the fair value disclosures, including a disclosure of total unrealized gains (losses) by hierarchy level and disclosure of the time since, and value of, the last directly verifiable market transaction for Level 3 holdings.

The remainder of my paper is organized as follows: Section II provides background information on the ASC 820 disclosures, reviews related fair value studies, and develops the hypotheses. Section III describes my closed-end fund setting, sample selection, and research design. Section IV presents results of my primary analysis while additional analysis are presented in Section V. Section VI offers my concluding remarks.



## 2. BACKGROUND INFORMATION AND HYPOTHESES

### 2.1 Overview of Fair Value Disclosures

In September 2006<sup>8</sup> the FASB issued FAS 157, subsequently codified as ASC 820. This accounting standard clarifies the GAAP definition of fair value, establishes a framework for measuring fair value, and requires that firms categorize assets and liabilities recorded at fair value on the balance sheet into a three level hierarchy based on the observability of inputs used in estimating their value. Level 1 estimates are the least subjective and are based on the trading price of identical securities in an active market, Level 2 estimates are also based on observable inputs,<sup>9</sup> but Level 3 estimates rely significantly on unobservable inputs.

ASC 820 also requires two disclosures for firms with assets and liabilities measured at fair value on a recurring basis: the fair value hierarchy disclosure, and the Level 3 reconciliation disclosure. The fair value hierarchy disclosure requires firms to disclose how assets and liabilities included on the balance sheet at fair value as of the reporting date are allocated across the three hierarchy levels. The fair value hierarchy disclosure is the subject of a growing academic literature on the market perception of fair value estimates, including studies on the value relevance of estimates (Song, Thomas, and Yi 2010; Kadous, Koonce, and Thayer 2012; Goh, Li, Ng, and Yong 2015; Lawrence Siriviriyakul Sloan 2016), the accuracy of analyst forecasts (Magnan, Menini, and Parbonetti 2015), how regulatory enforcement impacts market participants' perception of valuation (Bens, Cheng, and Neamtiu 2016), and whether managers take actions to reduce the disclosure of Level 3 holdings (Iselin and Nicoletti 2017).

The second disclosure introduced by ASC 820, the Level 3 reconciliation, provides a reconciliation of changes to total Level 3 holdings from the beginning to the end of the reporting

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<sup>8</sup> Although issued in 2006, FAS 157 was effective for fiscal years beginning after November 15, 2007 (FASB 2006).

<sup>9</sup> For example, the recent trading price of an identical asset or liability in a less active market, or the trading price of a substantially similar asset or liability in an active market.

period. In the Level 3 reconciliation, firms are required to disclose i) total gains or losses from Level 3 holdings for the period, ii) the amount of Level 3 gains or losses attributable to assets still held at the reporting date, iii) total purchases and sales of Level 3 holdings, and iv) the amount of Level 3 holdings transferred-in or out of other fair value levels.<sup>10</sup> As discussed in more detail below, a number of data items provided in the Level 3 rollforward cannot be gleaned from any other part of the financial statements. Yet, the Level 3 rollforward has received little attention from academia; further, the existing literature has generally failed to find that the data in the Level 3 rollforward are informative (e.g., Goh, Li, Ng, and Yong 2015).

Since the issuance of ASC 820, the rollforward disclosure has faced criticism from many practitioners who either doubt the informativeness of the disclosure or assert that the cost to prepare the required information outweighs the benefits to financial statement users (e.g., AICPA 2016). Critics of the rollforward disclosure claim that it represents a regulatory overreach and have petitioned the FASB to eliminate its requirement. In response to practitioners concerns, the FASB proposed an exemption from the rollforward requirement for private companies in the December 2015 FASB exposure draft (FASB 2015). Interestingly, the same exposure draft also proposed expanding the rollforward requirement to all levels of the fair value hierarchy (FASB 2015), indicating standard setters' continued belief that the information in the rollforward is useful to financial statement users. I expect my results to be of particular interest to standard setters as they continue to consider the usefulness of the ASC 820 disclosures.

## **2.2 Related fair value literature**

A primary concern of fair value accounting is that both manager bias and the difficulty of estimating valuations could lead to biased financial reporting (Ramanna and Watts 2009;

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<sup>10</sup> An example of the Level 3 reconciliation disclosure is provided in Appendix B.

Dechow, Myers, and Shakespeare 2010). To better understand investor perceptions of both the relevance and reliability of fair value estimates, a number of academic studies investigate the value relevance of these estimates. In this literature, an estimate is considered value relevant if it has a significant positive relation with the market value of equity, with more positive relationships indicating higher value relevance. In most instances, fair value estimates are found to be value relevant, with the magnitude of the value relevance being positively correlated with the reliability of the information (e.g., Barth 1994; Petroni and Wahlen 1995; Barth, Beaver, and Landsman 1996; Eccher, Ramesh, and Thiagarajan 1996; Nelson 1996; Venkatachalam 1996; Barth, Beaver, and Landsman 2001; Carroll, Linsmeier, and Petroni 2003).

As discussed above, the passage of ASC 820 required additional disclosures regarding fair value holdings. A growing number of studies investigate how the fair value hierarchy disclosure impacts perceived reliability. These studies focus on the impact of observability within the construct of ASC 820, rather than the related but distinct FASB concept of verifiability. In my introduction I explain that while all observable inputs are directly verifiable, not all directly verifiable inputs would be considered observable within the framework of ASC 820. Although verifiability is distinct from observability, given the related nature of the two concepts, and the influence of the literature on my research design, I believe it informative to review some of the existing fair value hierarchy studies.

In general, the fair value hierarchy literature predicts a positive association between the observability of valuation estimates and investor perceptions of their reliability (e.g., Song, Thomas, and Yi 2010; Riedl and Serafeim 2011; Goh, Li, Ng, and Yong 2015; Bens, Cheng, and Neamtiu 2016; Iselin and Nicoletti 2017). Evidence in support of this prediction include findings that Level 1 and 2 holdings are more value relevant than Level 3 holdings (Song, Thomas, and

Yi 2010; Goh, Li, Ng, and Yong 2015) and that firms with more Level 3 financial assets have a higher cost of capital (Riedl and Serafeim 2011). Further, a number of studies conclude that the uncertainty associated with Level 3 holdings is reduced by either internal or external oversight (Song et al. 2010; Riedl and Serafeim 2011; Bens, Cheng, and Neamtiu 2016). Finally, Iselin and Nicoletti (2017) finds that managers change the composition and classification of fair value investments in order to avoid disclosing Level 3 holdings.

A number of concerns have been raised in regards to the above results, largely due to limitations of previous research designs. Hodder, Hopkins, and Schipper (2014) argues that much of the earlier results could be driven by variation in the outcome risk of investments across the hierarchy. Hodder et al. (2014) states that to understand if variation in observability or verifiability impacts value relevance, studies should hold constant the economic attributes of the investments across the hierarchy categories.

The recent Lawrence, Siriviriyakul, and Sloan (2016) study also casts doubt on the results of prior studies by highlighting how the sample selection of prior studies suffer from correlated omitted variable bias. Lawrence et al. (2016) notes that prior studies use samples for which fair value assets are small relative to total assets. If changes to the market value of assets recorded at fair value are correlated with changes to the market value of assets not recorded at fair value, the value relevance of fair value assets will be biased; moreover, this bias is stronger when a smaller fraction of total assets is recorded at fair value (Ahmed and Takeda 1995; Boone 2002; Carroll, Linsmeier, and Petroni 2003). Therefore, Lawrence et al. (2016) reexamines the variation of value relevance across the fair value hierarchy using a sample of closed-end funds, since nearly all closed-end fund assets are recorded at fair value (Carroll et al. 2003). Lawrence et al. (2016) finds that in a bias free setting, total Level 3 holdings have similar value relevance as total Level

1 and 2 holdings. Given this result, the study concludes that the reliability of total fair value estimates is not impacted by observability, and also that investors do not find the fair value hierarchy disclosure informative for valuation purposes.

In summary, prior literature generally finds that the value relevance of fair value estimates is dependent on the perceived reliability of the estimate. In addition, due to limitations in the research design of prior studies, it is unclear whether investors find the data required by ASC 820 to be useful.

### **2.3 Hypotheses development**

For my first hypothesis I consider how verifiability affects the perceived reliability of manager estimates. More specifically, I consider whether investors perceive changes to fair value holdings that are indirectly verifiable as less value relevant than changes to fair value holdings that are directly verifiable.

In Statement of Financial Accounting Concepts No. 8 (FASB 2010; SFAC 8) the FASB identifies verifiability as one of the enhancing qualitative characteristics of useful accounting information and notes that as the verifiability of information decreases, the risk that the information is not representationally faithful increases. The FASB states that verifiability can be categorized as either direct or indirect. For fair value purposes, directly verifiable information includes quoted prices for marketable securities and other market transactions between independent entities, whereas indirectly verifiable information is calculated using certain estimates and assumptions (Johnson 2005). While direct verification reduces both measurer bias and measurement bias, indirect verification only reduces measurer bias (Johnson 2005); this suggests that indirectly verifiable information has greater uncertainty than directly verifiable information.

Since observable market prices are available for Level 1 and 2 investments, all changes to their holdings are directly verifiable. However, the absence of a quoted trading price for Level 3 investments does not mean that all changes to Level 3 holdings are indirectly verifiable. Indeed, most changes to Level 3 holdings are the result of market transactions, such as purchases or sales, which are directly verifiable. In fact, the only Level 3 changes which are indirectly verifiable are changes to the estimated valuation. As such, I predict that investor's perceptions of the reliability of changes to Level 3 holdings differs depending on the verifiability of the change, with indirectly verifiable changes to Level 3 holdings being perceived as less reliable.

While my prediction is centered on investor perceptions of reliability, a direct measure of reliability is not available. Therefore, I follow prior research in using value relevance as a proxy for investor perception of reliability. If fair value estimates reliably reflect market perceptions of value, then a change to fair value holdings would have a value relevance equal to 1, meaning that the market value of a firm would increase (decrease) one dollar for each dollar increase (decrease) in reported fair value holdings. Alternatively, when there is uncertainty regarding changes to fair value holdings, I expect the value relevance to be less than 1.

My value relevance expectation is consistent with the Bayesian updating framework utilized extensively by prior information processing literature to predict price reactions to uncertain information in financial markets (e.g., Holthausen and Verrecchia 1988; Blume, Easley, and O'Hara 1994; Veronesi 2000; Hautsch and Hess 2007). Organizing the model such that the change in estimated valuation represents the uncertain information results in the following:

$$\Delta \text{Market Value} = \Delta \text{Fair Value Estimate} * [\rho N / (\rho O + \rho N)]$$

Where  $\rho N$  represents the reliability of the new estimate, and  $\rho O$  represents the reliability of the prior estimate. The model predicts that the strength of the market value response to a change in fair value estimate is dependent on the perceived reliability of the change. Specifically, the value relevance of a change to fair value estimates is expected to be lower when the perceived reliability of new estimates is lower (lower  $\rho N$ ). Given my expectation that indirectly verifiable changes to fair value estimates are perceived as less reliable, I predict indirect changes to be less value relevant than direct changes.<sup>11</sup>

In summary, I expect market participants to perceive indirectly verifiable changes to fair value holdings as less reliable than directly verifiable changes. I note that while all changes to Level 1 and 2 holdings are directly verifiable, changes to Level 3 holdings can be either directly or indirectly verifiable. The Bayesian updating framework suggests that investor perceptions of the reliability of changes to fair value estimates will be reflected in the value relevance of the changes. Therefore, I predict that changes to Level 3 fair value estimates that are indirectly verifiable are less value relevant than directly verifiable changes.<sup>12</sup> Given the directional nature of my prediction, I state my first hypothesis in the alternative form as follows:

***H1) Indirectly verifiable changes to Level 3 fair value holdings are less value relevant than directly verifiable changes to fair value holdings.***

In my second hypothesis I consider how the reliability of indirect changes is moderated by the accuracy of prior indirectly verifiable estimates. Specifically, I consider whether the

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<sup>11</sup> My use of a Bayesian updating framework is an important departure from much of the prior fair value hierarchy literature in that it suggests uncertainty is reflected in the value relevance of *changes* to estimates, regardless of the direction of the change (increase or decrease) and without any need for managers to have a consistent directional bias. In contrast, many prior studies focus their empirical analysis on the value relevance of the *level* of fair value holdings (e.g., Song et al. 2010; Goh et al. 2015). The levels approach is dependent on the assumption that investors expect managers to consistently bias valuation estimates upwards when uncertainty increases.

<sup>12</sup> Although the focus of my first hypothesis is the difference in perceived reliability between indirectly and directly verifiable changes, in Section IV I also compare the value relevance of directly verifiable changes.

overestimation of prior Level 3 values impacts the value relevance of the current period's indirectly verifiable changes.

The Level 3 reconciliation disclosure provides data which allow investors to identify the difference between actual consideration received for Level 3 investments sold during the year, and the estimated value of the liquidated investments at the beginning of the year. Given that Level 3 valuations are a forward looking estimate of future cash flows, the difference between sales price and valuation may be perceived as a reflection of the accuracy of the estimates.

A number of research studies find that investors modify their perception of the reliability of manager estimates in response to information on the accuracy of the prior estimates (Ryan 1997; Lundholm 1999; Petroni, Ryan, and Wahlen 2000; Hirst, Jackson, and Koonce 2003). Therefore, consistent with the Bayesian updating framework presented above, if the overestimation of prior valuations reduces the perceived reliability of current-year indirectly verifiable changes (i.e., prior overestimate reduces  $\rho N$ ), I would expect the value relevance of these current changes to also be reduced. This leads to the following hypothesis, again stated in the alternative form:

***H2) The overstatement of prior indirectly verifiable Level 3 fair value estimates lowers the value relevance of current indirectly verifiable changes to Level 3 holdings.***

For my final hypothesis I consider how the value relevance of indirectly verifiable inputs is moderated by the reliability of prior valuations. Intuition for this hypothesis is once again obtained from the Bayesian updating framework which shows that as the reliability of previous valuations ( $\rho O$ ) increases, the value relevance of changes to value estimates decreases.

To test this prediction requires a measure of investor perceptions of prior valuations. I propose that one such measure is the recency of the investment purchase. I expect investors to



perceive the purchase price of an investment as a reliable estimate of fair value on the date of purchase; however, as the valuation date moves farther away from the date of purchase, the purchase price becomes more stale (i.e., less reliable). As such, I expect the value relevance of indirectly verifiable changes to be positively correlated with the time since acquisition. This leads to my third and final hypothesis:

***H3) The value relevance of indirectly verifiable changes to Level 3 fair value estimates is reduced when the directly verifiable Level 3 acquisitions are more recent.***

Collectively, my hypotheses are consistent with market participants distinguishing between changes to fair value estimates that are directly versus indirectly verifiable and with market participants finding this distinction useful for firm valuation. Further, my hypotheses suggest market participants recognize that the observability standard utilized in the fair value hierarchy is distinct from the FASB concept of verifiability. Finally, my hypotheses suggest that the market pricing of fair value estimates is consistent with a Bayesian updating framework such that changes in fair value holdings which are more reliable, or for which existing valuations are less reliable, are more value relevant.

### 3. RESEARCH DESIGN

#### 3.1 Closed-end Fund Setting

Prior literature cautions that calculations of the value relevance of fair value estimates can be biased by a correlation between the change in market value of assets recorded at historical cost and assets recorded at fair value (Ahmed and Takeda 1995; Boone 2002; Carroll, Linsmeier, and Petroni 2003; Lawrence, Siriviriyakul, and Sloan 2016). To mitigate this bias, I follow prior researchers in conducting my analysis on a sample of closed-end fund observations (Carroll,

Linsmeier, and Petroni 2003; Lawrence, Siriviriyakul, and Sloan 2016). The bias is lessened for closed-end funds since they record substantially all assets and liabilities at fair value.

A closed-end fund is a type of publicly traded pooled investment vehicle. While substantially fewer assets are held in closed-end funds than other pooled investment vehicles, such as mutual funds and exchange-traded funds, it is still a substantial investment vehicle with about \$261 billion dollars in assets in 2015.<sup>13</sup> Closed-end funds have several characteristics which are important for my study. First, shares of closed-end funds are traded on a public exchange at values that are allowed to deviate from net asset value, a necessary condition for my research design. This differs from typical open-end mutual funds in which all purchases and sells are directly with the fund at the reported net asset value. Second, closed-end funds raise investment capital by issuing a fixed number of shares which are outstanding for a predetermined period of time. This capital structure removes the uncertainty of capital inflows or outflows, which significantly reduces the risk to investing in illiquid securities. Relatedly, closed-end funds typically follow an active rather than passive investment strategy, such that they are more likely to invest in unique assets. Because of their capitalization structure and investment strategy, closed-end funds are more likely to hold material Level 3 assets than other publicly traded investment funds.

### **3.2 Sample Selection**

Similar to Lawrence et al. (2016), I use the Morningstar Direct Closed-end Fund Database to identify closed-end funds domiciled in the United States. This database lists all funds that were publicly traded each year. Importantly, the Morningstar data includes both live and dead funds, which helps alleviate survivorship bias concerns. My sample begins with the 773

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<sup>13</sup> Source: <https://www.ici.org/pdf/per22-02.pdf>.

closed-end funds identified by Morningstar as in operation at any point during the fiscal years of 2010 to 2015.<sup>14</sup> From the initial sample, I eliminate 21 funds for which the ticker symbol was not available, and another 76 funds which I was unable to match with CRSP. This results in a sample of 676 funds.

Next, I hand-collect data on fund GAAP performance, fair value holdings by hierarchy level, Level 3 rollforward details, and other related data from the audited annual report included in the SEC Form N-CSR filing. I obtain the N-CSR filings from the SEC Electronic Data Gathering, Analysis, and Retrieval system (EDGAR) website using the name and ticker symbol provided by the Morningstar database. I successfully match all but 20 funds to their N-CSR report, yielding a total sample of 3,295 fund year observations, from 656 closed-end funds.

I drop all observations for which a Level 3 rollforward was not provided due to a lack of material Level 3 holdings. This results in the elimination of 2,388 observations and 359 funds. Finally, I eliminate 97 observations (21 funds) that did not disclose the information needed to calculate the indirectly verifiable change to Level 3 holdings. My final sample consists of 810 annual observations from 276 unique closed-end funds. My sample selection process is summarized in Table 1, Panel A.

The distribution of my observations across the six year sample period is well balanced, as shown in Table 1, Panel B. In Panel C, I report the sample distribution of my observations across five groups assigned by Morningstar based on the investment profile of a fund. The majority of observations are classified as fixed income funds (53%), with equity funds producing 27% of the sample, and the remaining observations distributed across the tax preferred (9%), allocation (8%), and convertible (3%) fund classifications.

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<sup>14</sup> I elect to begin my sample in 2010 as this is the first year that gross, rather than net, amounts were required in all data fields of the Level 3 reconciliation (FASB 2010).

[Insert Table 1 Here]

### 3.3 Descriptive Statistics

In Table 2, I present descriptive statistics for my sample. In Panel A, I provide information on the regression variables used in equations (1) through (5)<sup>15</sup> (discussed below). I find my sample has similar mean values as the closed-end sample of Lawrence et al. (2016; Table 2, Panel A). An exception is the variable *L3* which has a greater mean in my sample, however this is expected given that I exclude observations without a Level 3 rollforward. On average, market values of my sample are increasing as are each level of the fair value hierarchy, although the balance of non-fair value holdings is decreasing. The average indirectly verifiable change decreases Level 3, while average directly verifiable changes increase fair value holdings.

In Panel B, I provide descriptive information on the book values (in millions) of my observations by hierarchy level and non-fair value holdings, as well as each component's relative percentage of net asset value (NAV). As expected, assets and liabilities reported at fair value represent the bulk of the NAV of closed-end funds. In Panels C and D, I provide information on the drivers of change to NAV and Level 3 holdings. Because both Panels C and D use denominators that can at times be small, the calculated percentages can be extreme; therefore, to limit the effect of extreme observations I winsorize the variables presented in both panels at the 99 and 1 percent levels. Panel C shows that changes to fair value holdings represent nearly 98% of all changes to NAV on average, with change to Level 3 holdings representing nearly 10% of total changes to NAV. The descriptives in Panel D suggest that the majority of changes to Level 3 holdings are driven by purchases and sales. Also, changes to Level 3 valuations based on unobservable inputs on average explain approximately 14% of total changes to Level 3 holdings

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<sup>15</sup> Equation (5) is discussed in Appendix B.

in my sample. These ratios suggest that studies on the value relevance of indirectly verifiable information may be subject to large amounts of noise if focusing on either the total amount of Level 3 holdings or total change to total Level 3 holdings.

[Insert Table 2 Here]

In Table 3, I present Pearson correlations among the variables of interest for my primary analysis. Consistent with my expectation that changes to market value are primarily explained by changes in book value for closed-end funds, in my sample there is a strong positive correlation of 0.95 between change in market value ( $\Delta MKT\_VAL$ ) and change in net asset value ( $\Delta NAV$ ). I next consider the relation between  $\Delta MKT\_VAL$  (Row/Column (1)), and the independent variables utilized in my regression analysis (Row/Columns (3) – (14)). All statistically significant correlations between the independent variables and  $\Delta MKT\_VAL$  are positive, with the exceptions of  $\Delta NON\_FV$  and  $OVEREST$  which are negative. Importantly, I do not note correlation between explanatory variables used in the same regression that is sufficiently high as to raise multicollinearity concerns.

[Insert Table 3 Here]

### 3.4 Empirical Design

For my first hypothesis I predict that indirectly verifiable changes are less value relevant than directly verifiable changes. To test this prediction, I estimate the value relevance of changes to each level of the fair value hierarchy, with directly verifiable Level 3 changes estimated separated from indirectly verifiable Level 3 changes. I then compare the estimated value relevance of direct versus indirect changes. I calculate my value relevance estimates using the following regression:

$$\Delta MKT\_VAL_{i,t} = \alpha + \beta_1 \Delta L1_{i,t} + \beta_2 \Delta L2_{i,t} + \beta_3 \Delta L3\_INDIRECT_{i,t} + \beta_4 \Delta L3\_DIRECT_{i,t}$$

$$+ \beta_5 \Delta NON\_FV_{i,t} + \lambda_t + \varepsilon \quad (1)$$

My dependent variable,  $\Delta MKT\_VAL$ , is the one year change in equity market value.  $\Delta L1$  ( $\Delta L2$ ) is equal to the change in Level 1 (Level 2) fair value holdings,  $\Delta L3\_INDIRECT$  ( $\Delta L3\_DIRECT$ ) is the change to Level 3 holdings which is indirectly (directly) verifiable, and  $\Delta NON\_FV$  is the change to non-fair value assets and liabilities.  $\Delta L3\_INDIRECT$  is obtained from the Level 3 rollforward as the change in valuation to the Level 3 investments held at year-end.  $\Delta L3\_DIRECT$  is calculated as the total change to Level 3 holdings minus indirect Level 3 changes ( $\Delta L3 - \Delta L3\_INDIRECT$ ). I scale all variables by common shares outstanding in period  $t$  for fund  $i$ . I also control for fiscal year fixed effects ( $\lambda$ ) and cluster standard errors by fund. Given that the value of all independent variables sum to the total change in net asset values, I expect the explanatory power of the regression to be high.

My hypothesis will be supported if the coefficient on  $\Delta L3\_INDIRECT$  is significantly less than the coefficient for  $\Delta L3\_DIRECT$ , suggesting that changes to Level 3 values based on indirectly verifiable inputs are perceived by investors as less reliable. Prior fair value hierarchy research has been criticized for basing conclusions on the relative value relevance of different fair value hierarchy levels without controlling for variation in the outcome risk across the hierarchy levels (Hodder, Hopkins, and Schipper 2014). However, because I base my primary inferences on a single hierarchy category, Level 3, I significantly reduce variation in the outcome risk, allowing me to attribute results to information uncertainty.

In addition, prior research suggests that if investors perceive fair value estimates as reliable, the estimate will have a value relevance of 1 (e.g., Song et al. 2010).<sup>16</sup> Given my expectation that indirectly verifiable changes are perceived by investors as uncertain, I expect the coefficient on  $\Delta L3\_INDIRECT$  to be less than 1. In contrast, I expect the coefficient for each of

<sup>16</sup> An expected value relevance of 1 assumes proper model specification and market efficiency.

the directly verifiable changes to fair value holdings ( $\Delta L1$ ,  $\Delta L2$ , and  $\Delta L3\_DIRECT$ ) to have a value near 1, consistent with investors perceiving changes to fair value holdings based on market transaction as reliable.

In my second hypothesis I predict that the value relevance of unobservable changes to fair values will be lower when prior valuation estimates are shown to have been overstated. I identify observations with prior Level 3 valuation overstatements using data from the Level 3 rollforward disclosure which allows me to calculate the difference between the beginning-of-year valuation for Level 3 investments sold, and actual value received at time of sale.<sup>17</sup> I then create a dummy variable, *OVEREST*, set equal to one if the sales price was less than the beginning-of-year valuation.

To test my second hypothesis, I separate my observations based on the indicator variable *OVEREST* and run equation (1) separately for each sample. My second hypothesis will be supported if the coefficient on  $\Delta L3\_INDIRECT$  is lower in the overestimated sample.

As an additional analysis of my second hypothesis, I run the following regression which modifies equation (1) to include an interaction between  $\Delta L3\_INDIRECT$  and *OVEREST* as follows:

$$\begin{aligned} \Delta MKT\_VAL_{i,t} = & \alpha + \beta_1 \Delta L1_{i,t} + \beta_2 \Delta L2_{i,t} + \beta_3 \Delta L3\_INDIRECT_{i,t} \\ & + \beta_4 \Delta L3\_INDIRECT * OVEREST_{i,t} + \beta_5 \Delta L3\_DIRECT_{i,t} + \beta_6 \Delta NON\_FV_{i,t} \\ & + \beta_7 OVEREST_{i,t} + \lambda_t + \varepsilon \end{aligned} \quad (2)$$

The primary variable of interest in equation (2) is the interaction of  $\Delta L3\_INDIRECT$  and *OVEREST*. A negative and significant coefficient on the interaction will be consistent with my

<sup>17</sup> This difference is equal to the total realized gain (loss) across all Level 3 investments sold during the year, minus the total change in unrealized gains (losses) recorded since purchase for the Level 3 investments sold.

prediction that investors use the fund's track record of indirectly verifiable value estimates to determine the extent to which current changes are reliable.

For my third and final hypothesis I predict that the value relevance of indirectly verifiable changes to fair value estimates is reduced when acquisitions are more recent. I proxy for the recency of acquisition using the percentage of Level 3 holdings acquired during the year.<sup>18</sup> To test my third hypothesis I again modify equation (1), this time to include an interaction between  $\Delta L3\_INDIRECT$  and  $RECENT$  as follows:

$$\begin{aligned} \Delta MKT\_VAL_{i,t} = & \alpha + \beta_1 \Delta L1_{i,t} + \beta_2 \Delta L2_{i,t} + \beta_3 \Delta L3\_INDIRECT_{i,t} \\ & + \beta_4 \Delta L3\_INDIRECT * RECENT_{i,t} + \beta_5 \Delta L3\_DIRECT_{i,t} + \beta_6 \Delta NON\_FV_{i,t} \\ & + \beta_7 RECENT_{i,t} + \lambda_t + \varepsilon \end{aligned} \quad (3)$$

$RECENT$  is an indicator variable set equal to one for observations for which the ratio of Level 3 holdings acquired during the current year is greater than a designated threshold. In my analysis I use three thresholds, including above mean, median, or the top tercile. The primary variable of interest in equation (3) is the interaction of  $\Delta L3\_INDIRECT$  and  $RECENT$ . A negative and significant coefficient on the interaction would support my prediction that when the prior Level 3 valuation is perceived as more reliable, current indirectly verifiable inputs are less value relevant.

## 4. RESULTS

### 4.1 Hypothesis 1

In Table 4, I report the results for the primary analysis of my first hypothesis using one-tailed tests of significance.<sup>19</sup> In Column 1, I present the value relevance of total changes to each level of the fair value hierarchy, as well as changes to non-fair value assets and liabilities. My

<sup>18</sup> I calculate the percentage of Level 3 holdings acquired during the year by adding Level 3 purchases and transfers-in, then dividing by the sum of beginning-of-year Level 3 holdings, Level 3 purchases, and Level 3 transfers-in.

<sup>19</sup> I use one-tailed tests of significance throughout my primary analysis. The use of one-tailed tests is appropriate given the directional prediction of my hypotheses.



results indicate that total changes to Level 1, 2, and 3 all have a value relevance near 1, with changes to Level 3 being somewhat more value relevant. This is consistent with findings from the levels analysis of Lawrence et al. (2016).<sup>20</sup> As expected, the adjusted R-square is high at approximately 90%. The results in Column 1 provide some assurance on the accuracy, power, and interpretation of my changes based regression design.

In Column 2, I present the results of estimating equation (1), the primary analysis of Hypothesis 1. As predicted, the coefficient of 0.7559 on indirect Level 3 changes ( $\Delta L3\_INDIRECT$ ) is less than 1, while the coefficients on directly verifiable Level 3 changes ( $\Delta L3\_DIRECT$ ) is slightly greater than 1. Panel B confirms that the coefficient for  $\Delta L3\_INDIRECT$  is statistically different from the theoretical value of 1 as well as the coefficient of  $\Delta L3\_DIRECT$ , both at the 5% level. In unreported tests, I find that the coefficient on  $\Delta L3\_DIRECT$  is statistically indistinguishable from 1. These results are consistent with my prediction that indirectly verifiable changes to manager estimates are less reliable than directly verifiable changes.

In Column 3, I present the results of an additional analysis conducted to corroborate my primary analysis of Hypothesis 1. In this analysis, I take advantage of the fact that when indirectly verifiable changes become directly verifiable (i.e., a change in Level 3 value goes from unrealized to realized), the previously recorded indirectly verifiable change is reversed.

The variable  $\Delta L3\_DIRECT$  includes the net difference between the realized change in value and the reversal of the unrealized change in value. However, using data from the Level 3 rollforward disclosure, I am able to separately identify the reversal of the previously recorded indirectly verifiable change in value (i.e., previously recorded change in unrealized). Therefore, I

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<sup>20</sup> Table 1 in Appendix B presents the original results of Lawrence et al. (2016), as well as a replication using my sample.

separate  $\Delta L3\_DIRECT$  into two variables,  $\Delta L3\_REVERSAL$  which is equal to this indirectly verifiable reversal, and  $\Delta L3\_DIRECT\_GROSS$ , which is equal to all other directly verifiable changes to Level 3 holdings. I scale both of these variables by shares outstanding. I expect  $\Delta L3\_REVERSAL$  to have a similar value relevance as when initially recorded. Therefore, the results I present in Column 2 will be corroborated if the value relevance of  $\Delta L3\_REVERSAL$  is less than both 1 and other directly verifiable changes to fair value holdings.

To test this prediction, I modify equation (1) by replacing  $\Delta L3\_DIRECT$  with  $\Delta L3\_REVERSAL$  and  $\Delta L3\_DIRECT\_GROSS$ . As expected, I find the coefficient on  $\Delta L3\_REVERSAL$  is both less than 1 and  $\Delta L3\_DIRECT\_GROSS$ . In Panel B I show that these differences are statistically significant.

Collectively, the results presented in Table 4 provide evidence consistent with my prediction that changes to fair value estimates based on indirectly verifiable inputs are perceived by investors as less reliable, and therefore less value relevant, than changes based on directly verifiable inputs.

[Insert Table 4 Here]

## 4.2 Hypothesis 2

In Table 5, I present the empirical analysis of my second hypothesis. The results support my prediction that indirectly verifiable changes are less value relevant when prior year Level 3 valuation estimates were overstated. I present the results of equation (1) separately for the samples where *OVEREST* is equal to one and zero, in Columns 1 and 2 respectively. I estimate the value relevance of  $\Delta L3\_INDIRECT$  to be 0.4179 when prior valuations have been overstated, which is much lower than the value relevant of 1.0250 I estimate for observations without prior

overstatement. In Panel B, I show that the estimated coefficients on  $\Delta L3\_INDIRECT$  is statistically less than 1 and  $\Delta L3\_DIRECT$  only for the overestimated sample.

In Column 3 I present the additional supporting results from equation (2). The primary variable of interest is the interaction term  $\Delta L3\_INDIRECT*OVEREST$ , which represents the incremental value relevance of indirectly verifiable changes to Level 3 holdings when managers are known to have overstated prior valuation estimates. As predicted, the coefficient on the interaction is negative at -0.5737 and significant at the 10% level, providing some support that investors view unobservable changes to Level 3 values as less reliable when prior estimates are shown to have been overstated. Because of the inclusion of my interaction variable,  $\Delta L3\_INDIRECT$  represents the value relevance of indirect changes to Level 3 holdings when prior estimates are shown to be either accurate or undervalued. The coefficient on  $\Delta L3\_INDIRECT$  is estimated to be 0.9604, which in Panel B I show to be indistinguishable from 1, consistent with the results in Column 2. In Panel B I also show that indirectly verifiable changes to Level 3 holdings for observations which have been overestimated ( $\Delta L3\_INDIRECT + \Delta L3\_INDIRECT*OVEREST$ ) is statistically less than 1 and  $\Delta L3\_INDIRECT$ .

[Insert Table 5 Here]

### 4.3 Hypothesis 3

In Table 6, I report the empirical results for equation (3), which provides evidence on my third hypothesis. The three columns differ in the ratio of new Level 3 holdings used to delineate the indicator variable *RECENT*. In Column 1, 2, and 3 *RECENT* is equal to 1 if the ratio of new Level 3 holdings is above the sample mean, above the sample median, or in the top tercile respectively. In each specification the interaction  $\Delta L3\_INDIRECT*ABOVE$  is negative, with the top tercile being most statistically significant. Further, in Panel B I report that the estimated

value relevance of indirectly verifiable changes for observations above the threshold ( $\Delta L3\_INDIRECT + \Delta L3\_INDIRECT * RECENT$ ) is statistically less than 1 and  $\Delta L3\_DIRECT$ . The results provide evidence consistent with my third hypothesis. Namely, that as directly verifiable valuations become more stale, the value relevance of indirectly verifiable changes to Level 3 holdings increases.

[Insert Table 6 Here]

The results of my primary empirical analysis are consistent with the central prediction of my paper, that investor perceptions of the reliability of changes to fair value estimates is impacted by the verifiability of the changes.

## 5. ADDITIONAL ANALYSIS

### 5.1 Live fund sample

In my primary analysis, I include observations from funds that ceased operations during or shortly after the conclusion of my sample period. This decision reduces the concern raised in prior academic studies that exclusion of “dead” funds can bias results (e.g., Elton, Gruber, and Blake 1996). However, it is also possible that investor perceptions of the reliability of managerial estimates change as a fund nears liquidation. Further, during the liquidation process it may be possible that the portfolio of a fund is skewed in such a way that biases value relevance. Therefore, to provide assurance that my results are not driven by funds nearing liquidation, I eliminate the 110 observations from the funds that ceased operations prior to the fourth quarter of 2016 and rerun my analysis of equations (1), (2), and (3). I present the results for this sample of live funds in Table 7. All results are consistent with those obtained from the full sample, suggesting that the liquidating funds do not skew the findings of my primary analysis.

[Insert Table 7 Here]

## 5.2 Median quantile analysis

The descriptive statistics I present in Table 2 show that there is substantial variation across the regression variables in my sample. If extreme outliers are the cause of this variation, the results the least squares regressions I employ in my primary analysis could be biased. Therefore, I rerun equations (1) through (3) using median quantile regression analysis, which is less affected by outlier observations than least squares regressions.<sup>21</sup> I present the results of my median quantile analysis in Table 8. In Column 1, I confirm that the value relevance of indirect changes to Level 3 holdings ( $\Delta L3\_INDIRECT$ ) is less than both 1 and direct changes to Level 3 holdings ( $\Delta L3\_DIRECT$ ). In Column 2 I show that prior overvaluations ( $OVEREST$ ) reduces the value relevance of  $\Delta L3\_INDIRECT$ . In Column 3, the interaction  $\Delta L3\_INDIRECT*RECENT$  has a similar magnitude as my primary analysis, but it is not statistically significant. However, in Panel B I find that the value relevance of indirect changes to Level 3 holdings is only less than 1 and  $\Delta L3\_DIRECT$  for observations that have an above average percentage of Level 3 holdings purchased during the year. The results in Table 8 provide some assurance that outliers do not drive my primary results.

[Insert Table 8 Here]

## 5.3 Directly versus indirectly verifiable change in value

In my primary analysis, I assume that the underlying economic incident that causes the change in fair value holdings (e.g., change in value versus a purchase) does not influence the value relevance of the change. As a robustness check on this assumption, I test each of my three hypotheses using an alternative empirical approach in which I hold the underlying economic

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<sup>21</sup> See Imbens, Guido W., Jeffrey M. Wooldridge, 2007. Lecture Notes 14, Summer '07. Available at [http://www.nber.org/WNE/lect\\_14\\_quantile.pdf](http://www.nber.org/WNE/lect_14_quantile.pdf), for a review of the technical aspects and relative strengths of quantile regression.

event constant. Specifically, I compare the value relevance of directly versus indirectly verifiable changes in value.

In my primary analysis, I include in my independent variables all changes to the balance sheet, such that the sum of my independent variables is equal to the change in fund NAV. Because of the articulation of financial statements, an alternative set of independent variables that sum to the change in fund NAV can be constructed from net income and cash flow from capital activity (i.e.,  $\Delta NAV = \text{Net Income} + \text{Cash Flow from Capital Activity}$ ). Further, using data from the Level 3 rollforward, I can separate net income into indirectly verifiable changes in investment values ( $\Delta L3VALUE\_INDIRECT$ ), directly verifiable changes to investment values ( $\Delta VALUE\_DIRECT$ ), and non-valuation related income ( $OTHER\_INCOME$ ). This separation of net income allows me to confirm the impact of verifiability on value relevance, while holding the economic transaction constant, with the following regression:

$$\Delta MKT\_VAL_{i,t} = \alpha + \beta_1 \Delta L3VALUE\_INDIRECT_{i,t} + \beta_2 \Delta VALUE\_DIRECT_{i,t} + \beta_3 OTHER\_INCOME_{i,t} + \beta_4 CAPITAL\_CASH\_FLOW_{i,t} + \lambda_t + \varepsilon \quad (4)$$

$\Delta L3VALUE\_INDIRECT$  represents indirectly verifiable changes in valuation, is the same as the variable  $\Delta L3\_INDIRECT$  used in the primary analysis, and is equal to the change in unrealized gain or loss on Level 3 securities held at year-end.  $\Delta VALUE\_DIRECT$  equals total directly verifiable changes to investment values, calculated as the difference between total gain or loss from investment and  $\Delta L3VALUE\_INDIRECT$ .  $OTHER\_INCOME$  is total non-valuation income, which consists primarily of interest income and recurring fund operating expenses. The final variable,  $CAPITAL\_CASH\_FLOW$  is the sum of cash flow from capital contributions and distributions. All variables are scaled by common shares outstanding. As with my primary analysis, I also control for year fixed effects ( $\lambda$ ) and cluster standard errors by fund.

The results, presented in Table 9, are consistent with my three hypotheses. In Panel B of Column 1, I show that the coefficient on indirect changes to value ( $\Delta L3VALUE\_INDIRECT$ ) is less than both 1 and the coefficient on direct changes in value ( $\Delta VALUE\_DIRECT$ ). In Column 2, I find that indirect changes are less value relevant when prior valuations were overestimated. Finally, in Column 3, I find that the value relevance of indirect changes is lower for observations with above average ratio of recent Level 3 acquisitions.

[Insert Table 9 Here]

This robustness analysis provides some assurance that the findings in Tables 5, 6, and 7 are not the result of differences in the underlying economic transaction between directly and indirectly verifiable changes to holdings.

#### **5.4 Resolved versus ongoing directly verifiable changes**

A difference between directly and indirectly verifiable changes is that investments with indirectly verifiable changes continue to be held, while directly verifiable changes are often related to an investment being resolved (e.g., a sale or realized gain). For my final robustness test, I consider if the ongoing or resolved status of an investment following a change transaction affects my primary results.

For this robustness test, I separate directly verifiable changes to Level 3 holdings ( $\Delta L3\_DIRECT$ ) into changes that result in ongoing investment ( $\Delta L3\_DIRECT\_ONGOING$ )<sup>22</sup> and changes that are associated with an investment being resolved ( $\Delta L3\_DIRECT\_RESOLVED$ ). I then rerun the analysis for each of my hypothesis. I find that each of my three hypothesis are supported, regardless of whether the coefficient of  $\Delta L3VALUE\_INDIRECT$  is compared to  $\Delta L3\_DIRECT\_ONGOING$  or  $\Delta L3\_DIRECT\_RESOLVED$ . Further, I find that the coefficients for

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<sup>22</sup> Ongoing changes consist of purchases and transfers-in, while I classify all other changes as resolved.

$\Delta L3\_DIRECT\_ONGOING$  and  $\Delta L3\_DIRECT\_RESOLVED$  are not statistically different. This suggests that the value relevance of directly verifiable changes is not impacted by whether the change is related to a resolved or ongoing investment. I present these results in Table 10.

[Insert Table 10 Here]

## 6. CONCLUSION

In this study, I provide evidence of how verifiability impacts investors' perceptions of the reliability of fair value estimates. Specifically, using a unique hand-collected data set from the Level 3 rollforward disclosure, I categorize changes to fair value holdings as either indirectly or directly verifiable. I then show that indirectly verifiable changes to fair value holdings are less value relevant than directly verifiable changes. I interpret this result as evidence that investor perceptions of the reliability of manager estimates are positively associated with verifiability, consistent with the classification of verifiability as an enhancing qualitative characteristic of information.

I next consider the Bayesian updating prediction that the value relevance of uncertain changes is modified by both the accuracy of prior valuation estimates and also the perceived reliability of beginning valuations. I find that when investors are aware that the beginning-of-year valuations were overstated, current indirectly verifiable changes are less value relevant. I also find that when a higher percentage of Level 3 holdings were acquired during the year (i.e., the directly verifiable acquisition price is not stale), indirectly verifiable changes to valuation are less value relevant. These results are consistent with investors applying a Bayesian updating framework to the valuation of indirectly verifiable changes to fair value estimates.

My study highlights the distinction between the ASC 820 construct of observability and the enhancing characteristic of verifiability identified by Statement of Financial Accounting



Concepts No. 8. My findings suggest that total Level 3 holdings is not a dependable measure of valuation reliability; rather, reliability would be better proxied by the total valuation of Level 3 holdings that are indirectly verifiable (i.e., total unrealized gain or loss).

My study is also the first to show the usefulness of the disclosures required by ASC 820 in a setting free from the bias identified by Lawrence et al. (2016). In particular, I provide empirical evidence that the Level 3 reconciliation disclosure required by ASC 820 contains otherwise unavailable data which are informative to investors for valuation purposes. This finding supports the FASB's decision to continue requiring public companies to provide a Level 3 reconciliation disclosure. My results also suggest that financial statement users may benefit from an expansion of the fair value disclosures, including disclosure of the balance of total unrealized gains by hierarchy level, and the disclosure of the time since the last directly verifiable market transaction for Level 3 investments.

## APPENDIX A: VARIABLE DEFINITIONS

### **Dependent Variables**

*$\Delta$ MKT\_VAL*

The one year change in market value divided by ending common shares outstanding. Calculated as current year-end common shares outstanding multiplied by trading price, minus common shares outstanding a previous fiscal year-end multiplied by trading price at previous fiscal year-end, divided by current shares outstanding.

*PRICE*

The fund stock price per share as of the current fiscal year-end.

### **Independent Variables**

*$\Delta$ L1*

The one year change in total Level 1 holdings divided by the number of common stock shares outstanding at year-end.

*$\Delta$ L2*

The one year change in total Level 2 holdings divided by the number of common stock shares outstanding at year-end.

*$\Delta$ L3*

The one year change in total Level 3 holdings divided by the number of common stock shares outstanding at year-end.

*$\Delta$ L3\_INDIRECT*

The change to Level 3 holdings based on indirectly verifiable inputs, equal to the change in unrealized gain (loss) on investments held at year-end, scaled by shares outstanding at year-end. Calculated using the Level 3 reconciliation disclosure.

*$\Delta$ L3\_DIRECT*

The change to Level 3 holdings based on market transactions scaled by shares outstanding at year-end. Calculated as total change to Level 3 holdings minus indirectly verifiable changes to Level 3 holdings ( $\Delta$ L3-  $\Delta$ L3\_INDIRECT). Calculated using the Level 3 reconciliation disclosure.

*$\Delta$ L3\_REVERSAL*

The change to Level 3 holdings based on the reversal of previously recorded indirectly verifiable inputs for investments sold during the year, scaled by shares outstanding at year-end. Calculated as total change in Level 3 unrealized gains (losses) minus the portion of change to unrealized attributable to Level 3 securities held at year-end. Calculated using the Level 3 reconciliation disclosure.

*$\Delta$ L3\_DIRECT\_GROSS*

All directly verifiable changes to Level 3 holdings except the reversal of previously recorded indirectly verifiable inputs ( $\Delta$ L3\_DIRECT-  $\Delta$ L3\_REVERSAL ), scaled by shares outstanding at year-end. Calculated using the Level 3 reconciliation disclosure.

*$\Delta$ NON\_FV*

The one year change in assets and liabilities not recorded on the balance sheet at fair value scaled by the shares of common stock outstanding at year-end.

## Independent Variables (cont.)

<i>OVEREST</i>	Indicator variable set equal to one if the beginning-of-year valuations of the Level 3 holdings sold during the year exceeded actual sales price. Calculated using the Level 3 reconciliation disclosure.
<i>RECENT</i>	Indicator variable set equal to one for observations for which the ratio of Level 3 holdings acquired during the current year is greater than the designated threshold (thresholds include above mean, median, or top tercile). Ratio calculated as newly acquired Level 3 holdings, divided by newly acquired Level 3 holdings plus beginning-of-year Level 3 holdings. Calculated using the Level 3 reconciliation disclosure.
<i>ΔL3VALUE_INDIRECT</i>	The change in Level 3 valuations based on indirectly verifiable inputs per share outstanding. Equal to $\Delta L3\_INDIRECT$ . Calculated using data from the Level 3 reconciliation disclosure.
<i>ΔVALUE_DIRECT</i>	The change in valuations based on directly verifiable inputs per share outstanding. Equal to total gain (loss) on investments minus the change in unrealized from Level 3 investments held at year-end. Calculated using the Level 3 reconciliation disclosure.
<i>OTHER_INCOME</i>	Total non-valuation related income per share outstanding. (Net income - gain (loss) on investments).
<i>CAPITAL_CASH_FLOW</i>	Net cash flow from capital activities per share outstanding
<i>ΔL3_DIRECT_RESOLVED</i>	Directly verifiable changes to Level 3 holdings that are associated with an investment being resolved, scaled by shares outstanding at year-end. Calculated as $\Delta L3\_DIRECT - \Delta L3\_DIRECT\_ONGOING$ .
<i>ΔL3_DIRECT_ONGOING</i>	Directly verifiable changes to Level 3 holdings that result in ongoing investment, scaled by shares outstanding at year-end. Calculated as the sum of Level 3 purchases and transfers-in as reported in the Level 3 reconciliation disclosure.
<i>L1</i>	The reported value of Level 1 holdings per share of common stock outstanding at fiscal year-end. Obtained from the fair value hierarchy disclosure.
<i>L2</i>	The reported value of Level 2 holdings per share of common stock outstanding at fiscal year-end. Obtained from the fair value hierarchy disclosure.

### **Independent Variables (cont.)**

<i>L3</i>	The reported value of Level 3 holdings per share of common stock outstanding at fiscal year-end. Obtained from the fair value hierarchy disclosure.
<i>NON_FV</i>	The reported value of net assets and liabilities not recorded at fair value on the balance sheet, scaled by common stock shares outstanding at fiscal year-end.
$\Delta NAV$	The one year change in net asset value divided by the number of common stock shares outstanding at fiscal year-end.

## APPENDIX B: MISCELLANEOUS

### Level 3 Reconciliation Example

The following example of a Level 3 rollforward disclosure is from the Form N-CSR<sup>1</sup> of BlackRock Floating Rate Income Trust for the fiscal year ended October 31, 2016.

	Common Stocks	Asset-Backed Securities	Corporate Bonds	Floating Rate Loan Interests	Other Interests	Warrants	Total
<b>Assets:</b>							
<b>A</b> Opening Balance, as of October 31, 2015	\$ 242,024	\$ 4,308,660	\$ 584,504	\$20,360,572	\$ 173,792	\$ 8,643	\$ 25,678,195
Transfers into Level 3 <sup>1</sup>	—	248,783	—	7,212,173	—	—	7,460,956
Transfers out of Level 3 <sup>2</sup>	—	(1,211,028)	(584,504)	(5,976,292)	(169,417)	—	(7,941,241)
Accrued discounts/premiums	—	2,196	—	46,841	—	—	49,037
Net realized gain (loss)	—	(186,454)	—	(983,469)	—	—	(1,169,923)
<b>B</b> Net change in unrealized appreciation (depreciation) <sup>3,4</sup>	983,889	59,673	13,080	503,396	(4,370)	(4,293)	1,551,375
Purchases	6,264	959,447	—	9,423,848	—	—	10,389,559
Sales	—	(2,683,503)	—	(8,159,493)	—	—	(10,842,996)
<b>C</b> Closing Balance, as of October 31, 2016	\$1,232,177	\$ 1,497,774	\$ 13,080	\$22,427,576	\$ 5	\$ 4,350	\$ 25,174,962
<b>D</b> Net change in unrealized appreciation/depreciation on investments still held at October 31, 2016 <sup>4</sup>	\$ 983,889	\$ 40,997	\$ 13,080	\$ 142,791	\$ (4,370)	\$(4,293)	\$ 1,172,094

The Level 3 rollforward variables used in my primary analysis are calculated as follows:

$$\Delta L3 = (C - A) / \text{Shares outstanding}$$

$$\Delta L3\_INDIRECT = D / \text{Shares outstanding}$$

$$\Delta L3\_DIRECT = (C - A - D) / \text{Shares outstanding}$$

$$\Delta L3\_REVERSAL = (B - D) / \text{Shares outstanding}$$

$$\Delta L3\_DIRECT\_GROSS = (C - A - B) / \text{Shares outstanding}$$

With the exception of  $\Delta L3$ , each of the above variables would not be identifiable without the Rollforward disclosure.  $\Delta L3\_INDIRECT$  represents the changes to Level 3 holdings which are not supported by a market transaction. This amount is recorded to either net income, for trading securities, or to other comprehensive income, for available-for-sale securities.

$\Delta L3\_DIRECT$  represents the total change to Level 3 holdings which are supported by a market transaction.  $\Delta L3\_REVERSAL$  is equal to the amount of indirectly verifiable changes recorded for securities sold during the year. To calculate this amount I subtract change in unrealized to Level

<sup>1</sup> Closed-end funds are required to publicly provide a Level 3 rollforward disclosure at least quarterly in Forms N-Q, N-CSR, or N-CSRS.

3 securities held at period-end from total Level 3 change in unrealized.  $\Delta L3\_REVERSAL$  are all non-unrealized changes to Level 3 holdings.

## Replication Analysis

Although I follow Lawrence et al. (2016) in constructing a sample from closed-end funds, our samples have two notable differences. First, while my observations are from fiscal year-ends 2010 to 2015, Lawrence et al. (2016) includes observations from 2008 to 2013. Second, my sample is limited to observations with Level 3 reconciliation disclosures, while approximately two thirds of observations in Lawrence et al. (2016) do not hold Level 3 assets or liabilities. To provide assurance on my sample, and improve the comparability of my study with prior research, I replicate the analysis of Lawrence et al. (2016; Table 4, Column 1) using the following regression analysis:

$$PRICE_{i,t} = \alpha + \beta_1 LI\_SHARE_{i,t} + \beta_2 L2\_SHARE_{i,t} + \beta_3 L3\_SHARE_{i,t} + \beta_4 NON\_FV\_SHARE_{i,t} + \beta_5 \Delta NAV\_SHARE_{i,t} + \lambda_t + \varepsilon \quad (4)$$

Equation (4) is a levels analysis similar to that employed by prior fair value hierarchy research (e.g. Song et al. 2010; Goh et al. 2015; Lawrence et al. 2016).  $PRICE$  is the stock price per share of closed-end fund  $i$ , at fiscal year-end  $t$ .  $L1$ ,  $L2$ , and  $L3$  are the primary variables of interest and are calculated by dividing total Level 1, Level 2, and Level 3 net assets and liabilities by shares outstanding.  $NON\_FV$  is the per share book value of all assets and liabilities not recorded at fair value. Finally,  $\Delta NAV$  is the annual change to net asset values per share. Additionally, I control for year fixed effects ( $\lambda$ ) and cluster standard errors by fund.

I report the results of my replication in Appendix B, Table 1. For ease of comparison, in the first column I present the results from Lawrence et al. (2016; Table 4, Column 1). In Column 2, I present the results of estimating equation (4) for my sample. Consistent with Lawrence et al.

(2016), I find the coefficient on  $L3$  (0.99) to be both statistically indistinguishable from 1 and somewhat larger than the coefficients on  $L1$  (0.88) and  $L2$  (0.91). One difference between the results is that I do not find the coefficient on  $\Delta NAV$  to be significant. However, I consider this difference to be minor given the interpretation by Lawrence et al. (2016) that net income provides little incremental value relevance in the closed-end fund setting since there are limited off-balance sheet assets. Overall, my results are consistent with that of Lawrence et al. (2016), providing some assurance on the representation of my sample.

[Insert Appendix B, Table 1 Here]

**TABLE 1**  
**Sample Selection**

**Panel A: Sample Derivation**

Description	Closed-end Funds	Annual Observations
Closed-end funds listed by Morningstar	773	
Less: Funds missing ticker symbol	(21)	
Less: Funds not matched to CRSP	(76)	
Less: Funds not matched to N-CSR filings	(20)	
<b>Observations with N-CSR Report (2010-2015)</b>	<b>656</b>	<b>3,295</b>
Less: Observations without Level 3 rollforward	(359)	(2,388)
Less: Observations without info needed to identify changes to Level 3 valuations based on unobservable inputs	(21)	(97)
<b>Primary Sample</b>	<b>276</b>	<b>810</b>

**Panel B: Sample by Year**

Fiscal Year	Annual Observations	
	Number	Percentage
2010	138	17%
2011	183	23%
2012	121	15%
2013	124	15%
2014	114	14%
2015	130	16%
<b>Total Observations</b>	<b>810</b>	<b>100%</b>

**Panel C: Sample by Morningstar Group**

Morningstar Group	Annual Observations	
	Number	Percentage
Allocation	63	8%
Convertibles	27	3%
Equity	217	27%
Fixed Income	429	53%
Tax Preferred	74	9%
<b>Total Observations</b>	<b>810</b>	<b>100%</b>



**TABLE 2**  
**Descriptive Statistics**

	N	Mean	Q1	Median	Q3	STD
<b>PANEL A - Regression Variables</b>						
<i>Balance Sheet Change Approach</i>						
$\Delta$ MKT_VAL	810	0.05	-1.14	-0.05	1.41	3.22
$\Delta$ L1	810	0.17	-0.13	0.00	0.31	4.66
$\Delta$ L2	810	0.06	-0.85	-0.02	0.87	3.65
$\Delta$ L3	810	0.01	-0.08	0.00	0.13	1.04
$\Delta$ L3_INDIRECT	810	-0.01	-0.02	0.00	0.01	0.37
$\Delta$ L3_DIRECT	810	0.02	-0.07	0.00	0.12	1.00
$\Delta$ L3_REVERSAL	810	0.01	0.00	0.00	0.02	0.26
$\Delta$ L3_DIRECT_GROSS	810	0.00	-0.10	0.00	0.11	1.02
$\Delta$ NON_FV	810	-0.07	-0.40	-0.01	0.32	2.23
OVEREST	810	0.28	0.00	0.00	1.00	0.45
RECENT (Mean)	810	0.42	0.00	0.00	1.00	0.49
RECENT (Median)	810	0.50	0.00	0.00	1.00	0.50
RECENT (Top Tercile)	810	0.33	0.00	0.00	1.00	0.47
<i>Income Statement Approach</i>						
$\Delta$ L3VALUE_INDIRECT	810	-0.01	-0.02	0.00	0.01	0.37
$\Delta$ VALUE_DIRECT	810	0.34	-0.49	0.16	1.12	2.46
OTHER_EARN	810	0.73	0.29	0.70	1.04	0.66
CAPITAL_CASH_FLOW	810	-0.92	-1.34	-0.91	-0.60	1.80
<i>Lawrence et al. Replication</i>						
PRICE	810	14.01	9.55	13.45	17.03	6.67
L1	810	6.45	0.08	0.59	10.50	10.59
L2	810	11.26	3.68	10.31	18.22	9.13
L3	810	1.11	0.02	0.22	0.86	2.50
NON_FV	810	-4.18	-6.62	-3.31	-0.39	4.42
$\Delta$ NAV	810	-0.11	-0.79	-0.01	0.95	3.37
<b>PANEL B - Book Values</b>						
<i>Total (in millions)</i>						
NET ASSET VALUE (NAV)	810	421.42	130.86	284.45	571.80	432.01
NET FAIR VALUE HOLDINGS	810	550.72	173.22	367.23	701.62	641.97
LEVEL 1	810	204.57	1.44	17.27	153.78	531.73
LEVEL 2	810	322.35	47.03	180.25	444.94	420.56
LEVEL 3	810	23.80	0.31	5.23	21.88	47.39
NONFAIR VALUE	810	-129.30	-159.32	-60.72	-9.68	253.27
<i>As Percentage of NAV</i>						
FAIR VALUE/NAV	810	128.57%	103.30%	131.45%	144.69%	25.69%
LEVEL 1/NAV	810	36.36%	0.70%	4.64%	81.99%	47.24%
LEVEL 2/NAV	810	84.22%	26.85%	94.37%	129.34%	56.36%
LEVEL 3/NAV	810	7.99%	0.17%	1.73%	6.35%	18.69%
NONFAIR VALUE/NAV	810	-28.57%	-44.69%	-31.45%	-3.30%	25.69%

**TABLE 2 (cont.)  
Descriptive Statistics**

	N	Mean	Q1	Median	Q3	STD
<b>PANEL C - Percentage of NAV Change</b>						
<i>Balance Sheet Variables</i>						
$\Delta NAV$ (in millions)	810	9.53	-16.25	0.70	22.45	135.14
$\Delta FAIR\ VALUE/\Delta NAV$	810	97.93%	77.10%	104.28%	149.68%	503.95%
$\Delta LEVEL\ 1/\Delta NAV$	810	30.59%	-0.72%	7.85%	93.98%	207.57%
$\Delta LEVEL\ 2/\Delta NAV$	810	18.05%	-17.54%	58.27%	140.52%	674.12%
$\Delta LEVEL\ 3/\Delta NAV$	810	9.70%	-5.41%	0.05%	16.36%	165.19%
$\Delta NONFAIR\ VALUE/\Delta NAV$	810	2.29%	-49.40%	-4.11%	24.14%	526.14%
<i>Income Statement Variables</i>						
$\Delta VALUE/\Delta NAV$	810	88.17%	71.27%	96.53%	111.35%	133.24%
$\Delta L3VALUE\_INDIRECT/\Delta NAV$	810	4.45%	-0.19%	0.18%	3.31%	24.41%
$\Delta VALUE\_DIRECT/\Delta NAV$	810	85.72%	59.94%	93.26%	109.13%	129.39%
$OTHER\_EARN/\Delta NAV$	810	-31.06%	-86.13%	-0.69%	69.00%	414.28%
$CASH\_FLOW/\Delta NAV$	810	44.95%	-85.14%	20.03%	127.75%	498.21%
<b>PANEL D - Percentage of Level 3 Change</b>						
$BUY/\Delta L3$	773	78.43%	0.00%	0.00%	91.01%	411.58%
$SELL/\Delta L3$	773	-9.43%	-0.42%	0.00%	55.47%	313.79%
$TRANS\_IN/\Delta L3$	773	19.71%	0.00%	0.00%	14.04%	95.17%
$TRANS\_OUT/\Delta L3$	773	16.24%	0.00%	0.00%	0.00%	128.40%
$\Delta L3VALUE/\Delta L3$	773	8.38%	-5.73%	2.69%	49.97%	97.93%
$\Delta L3VALUE\_INDIRECT/\Delta L3$	773	13.94%	-5.15%	2.66%	46.12%	117.51%
$OTHER/\Delta L3$	773	1.01%	0.00%	0.00%	0.00%	21.16%

Table 2 Notes: In this table I present descriptive statistics for the primary sample of annual closed-end fund observations with Level 3 holdings from the years 2010 to 2015.

Panel A provides descriptive statistics on all regression variables. *PRICE* is equal to the stock price per share as of the fiscal year-end. *L1*, *L2*, and *L3* are equal to the reported value of Level 1, 2, and 3 holdings per share outstanding. *NON\_FV* is equal to the net value of assets and liabilities not reported at fair value per share outstanding.  $\Delta NAV$  is the annual change to net asset value per share outstanding.  $\Delta MKT\_VAL$  is equal to the one year change in market value scaled by shares outstanding.  $\Delta L1$  ( $\Delta L2$ ,  $\Delta L3$ ) is equal to the one year change in Level 1 (Level 2, Level 3) scaled by shares outstanding.  $\Delta L3\_INDIRECT$  is the change to Level 3 holdings that is indirectly verifiable, scaled by shares outstanding.  $\Delta L3\_DIRECT$  is the change to Level 3 holdings that is directly verifiable, scaled by shares outstanding.  $\Delta L3\_REVERSAL$  is the change to Level 3 holdings based on the reversal of previously recorded indirectly verifiable inputs, scaled by shares outstanding.  $\Delta L3\_DIRECT\_GROSS$  is equal to all directly verifiable changes to Level 3 holdings except those based on the reversal of previously recorded indirectly verifiable inputs, scaled by shares outstanding.  $\Delta NON\_FV$  is equal to the one year change in book value of all assets and liabilities not recorded at fair value, scaled by shares outstanding. *OVEREST* is an indicator variable set equal to one if beginning-of-year valuations for those Level 3 holdings sold during the year exceeded actual sales price. *RECENT* is an indicator variable equal to one when the ratio of newly acquired Level 3 holdings is greater than a designated threshold (mean, median, or top tercile).  $\Delta L3VALUE\_INDIRECT$  is equal to the variable  $\Delta L3\_INDIRECT$  and represents gains or losses due to changes in valuation that are based on indirectly verifiable inputs.  $\Delta VALUE\_DIRECT$  is the amount of gains or losses due to changes in valuation that are based on directly verifiable inputs, scaled by shares outstanding. *OTHER\_EARN* is total non-valuation related earnings, scaled by shares outstanding. *CAPITAL\_CASH\_FLOW* is equal to the net cash flow from capital activity, scaled by shares outstanding. See Appendix A for a description of each regression variable.

Panels B through D are included in order to provide insight into the sample. Variables in Panels C and D are winsorized at the 99 and 1 percent levels in order to reduce the impact of extreme observations. Panel D excludes 37 observations which did not have a change in Level 3 holdings.

**TABLE 3**  
**Correlation Table**

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) $\Delta MKT\_VAL$	1													
(2) $\Delta NAV$	<b>0.95</b>	1												
(3) $\Delta L1$	<b>0.58</b>	<b>0.64</b>	1											
(4) $\Delta L2$	<b>0.25</b>	<b>0.24</b>	<b>-0.47</b>	1										
(5) $\Delta L3$	<b>0.27</b>	<b>0.26</b>	<b>0.07</b>	0.04	1									
(6) $\Delta L3\_INDIRECT$	<b>0.28</b>	<b>0.32</b>	<b>0.13</b>	<b>0.12</b>	<b>0.28</b>	1								
(7) $\Delta L3\_DIRECT$	<b>0.18</b>	<b>0.16</b>	0.02	0.00	<b>0.94</b>	<b>-0.07</b>	1							
(8) $\Delta L3\_REVERSAL$	-0.03	-0.02	-0.01	-0.01	-0.01	<b>-0.25</b>	<b>0.08</b>	1						
(9) $\Delta L3\_DIRECT\_GROSS$	<b>0.18</b>	<b>0.16</b>	0.02	0.00	<b>0.93</b>	-0.01	<b>0.97</b>	<b>-0.18</b>	1					
(10) $\Delta NON\_FV$	<b>-0.39</b>	<b>-0.42</b>	<b>-0.43</b>	<b>-0.33</b>	<b>-0.30</b>	<b>-0.14</b>	<b>-0.26</b>	0.01	<b>-0.26</b>	1				
(11) $OVEREST$	<b>-0.08</b>	<b>-0.07</b>	-0.04	-0.04	-0.05	-0.05	-0.04	-0.06	-0.02	<b>0.07</b>	1			
(12) $RECENT$ (Mean)	<b>0.02</b>	0.04	-0.01	-0.01	<b>0.32</b>	-0.03	<b>0.34</b>	0.01	<b>0.33</b>	-0.06	0.00	1		
(13) $RECENT$ (Median)	<b>0.03</b>	0.05	-0.01	0.02	<b>0.29</b>	-0.02	<b>0.31</b>	0.02	<b>0.30</b>	<b>-0.07</b>	0.04	<b>0.85</b>	1	
(14) $RECENT$ (Top Tercile)	<b>0.00</b>	0.01	-0.02	-0.01	<b>0.32</b>	0.00	<b>0.33</b>	-0.02	<b>0.33</b>	<b>-0.07</b>	-0.05	<b>0.83</b>	<b>0.71</b>	1

Table 3 Notes: In this table I present Pearson correlations among the primary variables of interest. Correlations in bold are statistically significant at the 5% level or better. All observations are at the fund level annually for fiscal years 2010-2015.

$\Delta MKT\_VAL$  is equal to the one year change in market value scaled by shares outstanding.  $\Delta L1$  ( $\Delta L2$ ,  $\Delta L3$ ) is equal to the one year change in Level 1 (Level 2, Level 3) scaled by shares outstanding.  $\Delta L3\_INDIRECT$  is the change to Level 3 holdings that is indirectly verifiable, scaled by shares outstanding.  $\Delta L3\_DIRECT$  is the change to Level 3 holdings that is directly verifiable, scaled by shares outstanding.  $\Delta L3\_REVERSAL$  is the change to Level 3 holdings based on the reversal of previously recorded indirectly verifiable inputs, scaled by shares outstanding.  $\Delta L3\_DIRECT\_GROSS$  is equal to all directly verifiable changes to Level 3 holdings except those based on the reversal of previously recorded indirectly verifiable inputs, scaled by shares outstanding.  $\Delta NON\_FV$  is equal to the one year change in book value of all assets and liabilities not recorded at fair value, scaled by shares outstanding.  $OVEREST$  is an indicator variable set equal to one if beginning-of-year valuations for those Level 3 holdings sold during the year exceeded actual sales price.  $RECENT$  is an indicator variable equal to one when the ratio of newly acquired Level 3 holdings is greater than a designated threshold (mean, median, or top tercile). See Appendix A for a description of each variable.

**TABLE 4**  
**Perceived Reliability of Changes to Fair Value Estimates Based on Directly Versus Indirectly Verifiable Inputs**

Dependent Variable =	(1)	(2)	(3)
	$\Delta MKT\_VAL$	$\Delta MKT\_VAL$	$\Delta MKT\_VAL$
PANEL A	Coefficient (P-value)	Coefficient (P-value)	Coefficient (P-value)
<i>INTERCEPT</i>	-0.1104*** ( $< 0.01$ )	-0.1134*** ( $< 0.01$ )	-0.1108*** ( $< 0.01$ )
$\Delta L1$	0.9186*** ( $< 0.01$ )	0.9258*** ( $< 0.01$ )	0.9265*** ( $< 0.01$ )
$\Delta L2$	0.9334*** ( $< 0.01$ )	0.9424*** ( $< 0.01$ )	0.9434*** ( $< 0.01$ )
$\Delta L3$	0.9881*** ( $< 0.01$ )		
<i><math>\Delta L3\_INDIRECT</math></i>		0.7559*** ( $< 0.01$ )	0.7075*** ( $< 0.01$ )
<i><math>\Delta L3\_DIRECT</math></i>		1.0164*** ( $< 0.01$ )	
<i><math>\Delta L3\_REVERSAL</math></i>			0.7701*** ( $< 0.01$ )
<i><math>\Delta L3\_DIRECT\_GROSS</math></i>			1.0210*** ( $< 0.01$ )
$\Delta NON\_FV$	0.9239*** ( $< 0.01$ )	0.9334*** ( $< 0.01$ )	0.9342*** ( $< 0.01$ )
Fixed Effects	<i>YEAR</i>	<i>YEAR</i>	<i>YEAR</i>
Observations	810	810	810
Adjusted R-Square	89.87%	89.93%	89.96%

  

PANEL B	Diff (P-value)	Diff (P-value)
$H_0: \Delta L3\_INDIRECT = 1$	-0.2441** (0.03)	-0.2925** (0.02)
$H_0: \Delta L3\_INDIRECT = \Delta L3\_DIRECT$	-0.2605** (0.02)	
$H_0: \Delta L3\_REVERSAL = 1$		-0.2299** (0.02)
$H_0: \Delta L3\_INDIRECT = \Delta L3\_DIRECT\_GROSS$		-0.3135** (0.01)
$H_0: \Delta L3\_REVERSAL = \Delta L3\_DIRECT\_GROSS$		-0.2509*** ( $< 0.01$ )

Table 4 Notes: In this table I provide evidence on how investor perceptions of the reliability of changes to fair value holdings is impacted by whether the changes are directly or indirectly verifiable. The sample consists of closed-end funds with Level 3 holdings during the years 2010 to 2015. Observations are at the fund level annually.

$\Delta MKT\_VAL$  is equal to the one year change in market value.  $\Delta L1$  ( $\Delta L2$ ,  $\Delta L3$ ) is equal to the total one year change in Level 1 (Level 2, Level 3) holdings.  $\Delta L3\_INDIRECT$  is the change to Level 3 holdings that is indirectly verifiable.  $\Delta L3\_DIRECT$  is the change to Level 3 holdings that is directly verifiable.  $\Delta L3\_REVERSAL$  is the change to Level 3 holdings based on the reversal of previously recorded indirectly verifiable inputs.  $\Delta L3\_DIRECT\_GROSS$  is equal to all directly verifiable changes to Level 3 holdings except those based on the reversal of previously recorded indirectly verifiable inputs.  $\Delta NON\_FV$  is equal to the one year change in book value of all assets and liabilities not recorded at fair value. All variables are scaled by shares outstanding. Year fixed effects are included and standard errors are clustered by fund.

The symbols \*, \*\*, and \*\*\* denote one-tailed statistical significance at the 10%, 5%, and 1% levels respectively. See Appendix A for a description of each variable.

**TABLE 5**  
**Impact of Prior Manager Overvaluations on Perceived Reliability of Indirectly Verifiable Changes to Fair Value Estimates**

Dependent Variable =	(1) $\Delta MKT\_VAL$ Coefficient (P-value)	(2) $\Delta MKT\_VAL$ Coefficient (P-value)	(3) $\Delta MKT\_VAL$ Coefficient (P-value)
<b>PANEL A</b>			
<i>INTERCEPT</i>	-0.1582*** ( $< 0.01$ )	-0.1073*** ( $< 0.01$ )	-0.1076*** ( $< 0.01$ )
$\Delta L1$	0.9781*** ( $< 0.01$ )	0.8872*** ( $< 0.01$ )	0.9260*** ( $< 0.01$ )
$\Delta L2$	0.9109*** ( $< 0.01$ )	0.9200*** ( $< 0.01$ )	0.9438*** ( $< 0.01$ )
$\Delta L3\_INDIRECT$	0.4179 (0.12)	1.0250*** ( $< 0.01$ )	0.9600*** ( $< 0.01$ )
$\Delta L3\_INDIRECT*OVEREST$			-0.5737* (0.06)
$\Delta L3\_DIRECT$	0.9075*** ( $< 0.01$ )	1.0834*** ( $< 0.01$ )	1.0285*** ( $< 0.01$ )
$\Delta NON\_FV$	0.9416*** ( $< 0.01$ )	0.8409*** ( $< 0.01$ )	0.9300*** ( $< 0.01$ )
<i>OVEREST</i>			-0.0378 (0.31)
Fixed Effects	<i>YEAR</i>	<i>YEAR</i>	<i>YEAR</i>
Observations	230	580	810
Observations Included	<i>OVEREST = 1</i>	<i>OVEREST = 0</i>	All
Adjusted R-Square	92.41%	89.04%	90.02%
<b>PANEL B</b>			
	Diff (P-value)	Diff (P-value)	Diff (P-value)
$H_0: \Delta L3\_INDIRECT = 1$	-0.5821** (0.05)	0.0250 (0.42)	-0.0400 (0.39)
$H_0: \Delta L3\_INDIRECT = \Delta L3\_DIRECT$	-0.4896* (0.08)	-0.0584 (0.32)	-0.0685 (0.32)
$H_0: \Delta L3\_INDIRECT + \Delta L3\_INDIRECT*OVEREST = 1$			-0.6137** (0.03)
$H_0: \Delta L3\_INDIRECT + \Delta L3\_INDIRECT*OVEREST = \Delta L3\_DIRECT$			-0.6422** (0.03)

Table 5 Notes: In this table I provide evidence on how prior manager overvaluation of Level 3 holdings impacts the perceived reliability of current changes to fair value holdings based on indirectly verifiable inputs. The sample consists of closed-end funds with Level 3 holdings during the years 2010 to 2015. Observations are at the fund level annually.

$\Delta MKT\_VAL$  is equal to the one year change in market value.  $\Delta L1$  ( $\Delta L2$ ) is equal to the one year change in Level 1 (Level 2) holdings.  $\Delta L3\_INDIRECT$  is the change to Level 3 holdings that is indirectly verifiable.  $OVEREST$  is an indicator variable set equal to one if manager beginning-of-year valuation estimates for those Level 3 holdings sold during the year exceeded actual sales price.  $\Delta L3\_DIRECT$  is the change to Level 3 holdings that is directly verifiable.  $\Delta NON\_FV$  is equal to the one year change in book value of all assets and liabilities not recorded at fair value. All continuous variables are scaled by shares outstanding. Year fixed effects are included and standard errors are clustered by fund.

The symbols \*, \*\*, and \*\*\* denote one-tailed statistical significance at the 10%, 5%, and 1% levels respectively. See Appendix A for a description of each variable.

**TABLE 6**  
**How Recency of Security Acquisition Impacts Perceived Reliability of Indirectly Verifiable Changes to Fair Value Estimates**

<i>RECENT</i> delineator = Dependent Variable =	(1) Mean $\Delta MKT\_VAL$ Coefficient (P-value)	(2) Median $\Delta MKT\_VAL$ Coefficient (P-value)	(3) Top Tercile $\Delta MKT\_VAL$ Coefficient (P-value)
<b>PANEL A</b>			
<i>INTERCEPT</i>	-0.0211 (0.31)	-0.0169 (0.38)	-0.0582* (0.08)
$\Delta L1$	0.9326*** ( $< 0.01$ )	0.9322*** ( $< 0.01$ )	0.9381*** ( $< 0.01$ )
$\Delta L2$	0.9497*** ( $< 0.01$ )	0.9496*** ( $< 0.01$ )	0.9558*** ( $< 0.01$ )
$\Delta L3\_INDIRECT$	0.9531*** ( $< 0.01$ )	0.9515*** ( $< 0.01$ )	0.9188*** ( $< 0.01$ )
$\Delta L3\_INDIRECT*RECENT$	-0.4900* (0.09)	-0.4631* (0.10)	-0.9026** (0.03)
$\Delta L3\_DIRECT$	1.0663*** ( $< 0.01$ )	1.0580*** ( $< 0.01$ )	1.0876*** ( $< 0.01$ )
$\Delta NON\_FV$	0.9503*** ( $< 0.01$ )	0.9473*** ( $< 0.01$ )	0.9520*** ( $< 0.01$ )
<i>RECENT</i>	-0.2291*** ( $< 0.01$ )	-0.1999** (0.02)	-0.1781** (0.02)
Fixed Effects	<i>YEAR</i>	<i>YEAR</i>	<i>YEAR</i>
Observations	810	810	810
Adjusted R-Square	90.08%	90.06%	90.08%
<b>PANEL B</b>			
	Diff (P-value)	Diff (P-value)	Diff (P-value)
$H_0: \Delta L3\_INDIRECT = 1$	-0.0469 (0.38)	-0.0485 (0.39)	-0.0812 (0.24)
$H_0: \Delta L3\_INDIRECT = \Delta L3\_DIRECT$	-0.1132 (0.25)	-0.1065 (0.27)	-0.1688* (0.07)
$H_0: \Delta L3\_INDIRECT$ + $\Delta L3\_INDIRECT*RECENT = 1$	-0.5369** (0.03)	-0.5116*** (0.03)	-0.9838** (0.01)
$H_0: \Delta L3\_INDIRECT$ + $\Delta L3\_INDIRECT*RECENT = \Delta L3\_DIRECT$	-0.6032** (0.02)	-0.5696** (0.02)	-1.0714*** ( $< 0.01$ )



Table 6 Notes: In this table I provide evidence on how the recency of directly verifiable inputs impacts the perceived reliability of changes to fair value holdings based on indirectly verifiable inputs. The sample consists of closed-end funds with Level 3 holdings during the years 2010 to 2015. Observations are at the fund level annually.

$\Delta MKT\_VAL$  is equal to the one year change in market value.  $\Delta LI$  ( $\Delta L$ ) is equal to the one year change in Level 1 (Level 2) holdings.  $\Delta L3\_INDIRECT$  is the change to Level 3 holdings that is indirectly verifiable. *RECENT* is an indicator variable equal to one when the ratio of newly acquired Level 3 holdings is greater than a designated threshold (mean, median, or top tercile).  $\Delta L3\_DIRECT$  is the change to Level 3 holdings that is directly verifiable.  $\Delta NON\_FV$  is equal to the one year change in book value of all assets and liabilities not recorded at fair value. All continuous variables are scaled by shares outstanding. Year fixed effects are included and standard errors are clustered by fund.

The symbols \*, \*\*, and \*\*\* denote one-tailed statistical significance at the 10%, 5%, and 1% levels respectively. See Appendix A for a description of each variable.

**TABLE 7**  
**Test of Hypotheses Using Only Live Funds**

Hypothesis = Dependent Variable =	(1) H1 (Table 5) $\Delta MKT\_VAL$ Coefficient (P-value)	(2) H2 (Table 6) $\Delta MKT\_VAL$ Coefficient (P-value)	(3) H3 (Table 7) $\Delta MKT\_VAL$ Coefficient (P-value)
<b>PANEL A</b>			
<i>INTERCEPT</i>	-0.0866*** ( $< 0.01$ )	-0.0798*** ( $< 0.01$ )	-0.0272 (0.25)
$\Delta L1$	0.9343*** ( $< 0.01$ )	0.9331*** ( $< 0.01$ )	0.9437*** ( $< 0.01$ )
$\Delta L2$	0.9564*** ( $< 0.01$ )	0.9569*** ( $< 0.01$ )	0.9665*** ( $< 0.01$ )
$\Delta L3\_INDIRECT$	0.7927*** ( $< 0.01$ )	1.0620*** ( $< 0.01$ )	1.0617*** ( $< 0.01$ )
$\Delta L3\_INDIRECT*OVEREST$		-0.7287** (0.04)	
$\Delta L3\_INDIRECT*RECENT$			-0.6336** (0.05)
$\Delta L3\_DIRECT$	1.0588*** ( $< 0.01$ )	1.0778*** ( $< 0.01$ )	1.1000*** ( $< 0.01$ )
$\Delta NON\_FV$	0.9521*** ( $< 0.01$ )	0.9426*** ( $< 0.01$ )	0.9760*** ( $< 0.01$ )
<i>OVEREST</i>		-0.0512 (0.25)	
<i>RECENT</i>			-0.1555** (0.03)
Fixed Effects	<i>YEAR</i>	<i>YEAR</i>	<i>YEAR</i>
Observations	700	700	700
Adjusted R-Square	92.60%	92.73%	92.73%
<b>PANEL B</b>			
	Diff (P-value)	Diff (P-value)	Diff (P-value)
$H_0: \Delta L3\_INDIRECT = 1$	-0.2073* (0.07)	0.0620 (0.34)	0.0617 (0.35)
$H_0: \Delta L3\_INDIRECT = \Delta L3\_DIRECT$	-0.2661** (0.01)	-0.0158 (0.46)	-0.0383 (0.41)
$H_0: \Delta L3\_INDIRECT$ $+ \Delta L3\_INDIRECT*OVEREST(RECENT) = 1$		-0.6667** (0.03)	-0.5719** (0.03)
$H_0: \Delta L3\_INDIRECT$ $+ \Delta L3\_INDIRECT*OVEREST(RECENT) = \Delta L3\_DIRECT$		-0.7445** (0.02)	-0.6719** (0.02)

Table 7 Notes: In this table I replicate the primary tests from Tables 5, 6, and 7 using a sample limited to closed-end funds still in operation as of Q4 2016.

$\Delta MKT\_VAL$  is equal to the one year change in market value.  $\Delta L1$  ( $\Delta L2$ ) is equal to the one year change in Level 1 (Level 2) holdings.  $\Delta L3\_INDIRECT$  is the change to Level 3 holdings that is indirectly verifiable.  $OVEREST$  is an indicator variable set equal to one if manager beginning-of-year valuation estimates for those Level 3 holdings sold during the year exceeded actual sales price.  $RECENT$  is an indicator variable equal to one when the ratio of newly acquired Level 3 holdings is greater than the mean.  $\Delta L3\_DIRECT$  is the change to Level 3 holdings that is directly verifiable.  $\Delta NON\_FV$  is equal to the one year change in book value of all assets and liabilities not recorded at fair value. All continuous variables are scaled by shares outstanding. Year fixed effects are included and standard errors are clustered by fund.

The symbols \*, \*\*, and \*\*\* denote one-tailed statistical significance at the 10%, 5%, and 1% levels respectively. See Appendix A for a description of each variable.

**TABLE 8**  
**Test of Hypotheses Using Median Regression Analysis**

Hypothesis = Dependent Variable =	(1) H1 (Table 5) $\Delta MKT\_VAL$ Coefficient (P-value)	(2) H2 (Table 6) $\Delta MKT\_VAL$ Coefficient (P-value)	(3) H3 (Table 7) $\Delta MKT\_VAL$ Coefficient (P-value)
<b>PANEL A</b>			
<i>INTERCEPT</i>	0.1722** (0.02)	0.1667** (0.03)	0.1768** (0.01)
$\Delta L1$	0.9369*** ( $< 0.01$ )	0.9399*** ( $< 0.01$ )	0.9468*** ( $< 0.01$ )
$\Delta L2$	0.9613*** ( $< 0.01$ )	0.9648*** ( $< 0.01$ )	0.9696*** ( $< 0.01$ )
$\Delta L3\_INDIRECT$	0.8066*** ( $< 0.01$ )	0.9874 ( $< 0.01$ )	0.9649*** ( $< 0.01$ )
$\Delta L3\_INDIRECT*OVEREST$		-0.2109* (0.06)	
$\Delta L3\_INDIRECT*RECENT$			-0.2162 (0.23)
$\Delta L3\_DIRECT$	1.0224*** ( $< 0.01$ )	1.0134*** ( $< 0.01$ )	1.0770*** ( $< 0.01$ )
$\Delta NON\_FV$	0.9611*** ( $< 0.01$ )	0.9668*** ( $< 0.01$ )	0.9737*** ( $< 0.01$ )
<i>OVEREST</i>		0.0330 (0.29)	
<i>RECENT</i>			-0.1912*** ( $< 0.01$ )
Fixed Effects	<i>YEAR</i>	<i>YEAR</i>	<i>YEAR</i>
Observations	810	810	810
R-Square	89.98%	89.99%	90.09%
<b>PANEL B</b>			
	Diff (P-value)	Diff (P-value)	Diff (P-value)
$H_0: \Delta L3\_INDIRECT = 1$	-0.1934** (0.03)	-0.0126 (0.44)	-0.0351 (0.45)
$H_0: \Delta L3\_INDIRECT = \Delta L3\_DIRECT$	-0.2158* (0.05)	-0.0260 (0.40)	-0.1121 (0.35)
$H_0: \Delta L3\_INDIRECT$ $+ \Delta L3\_INDIRECT*OVEREST(RECENT) = 1$		-0.2235** (0.01)	-0.2513*** ( $< 0.01$ )
$H_0: \Delta L3\_INDIRECT$ $+ \Delta L3\_INDIRECT*OVEREST(RECENT) = \Delta L3\_DIRECT$		-0.2369** (0.02)	-0.3283*** ( $< 0.01$ )

Table 8 Notes: In this table I replicate the primary tests from Tables 5, 6, and 7 using median quantile regression which reduces the influence of outliers relative to least squared mean regressions.

$\Delta$ MKT\_VAL is equal to the one year change in market value.  $\Delta$ L1 ( $\Delta$ L2) is equal to the one year change in Level 1 (Level 2) holdings.  $\Delta$ L3\_INDIRECT is the change to Level 3 holdings that is indirectly verifiable. OVEREST is an indicator variable set equal to one if manager beginning-of-year valuation estimates for those Level 3 holdings sold during the year exceeded actual sales price. RECENT is an indicator variable equal to one when the ratio of newly acquired Level 3 holdings is greater than the mean.  $\Delta$ L3\_DIRECT is the change to Level 3 holdings that is directly verifiable.  $\Delta$ NON\_FV is equal to the one year change in book value of all assets and liabilities not recorded at fair value. All continuous variables are scaled by shares outstanding. Year fixed effects are included and standard errors are clustered by fund.

The symbols \*, \*\*, and \*\*\* denote one-tailed statistical significance at the 10%, 5%, and 1% levels respectively. See Appendix A for a description of each variable.

**TABLE 9**  
**Test of Hypotheses Comparing Directly and Indirectly Verifiable Changes in Value**

Hypothesis = Dependent Variable =	(1) H1 (Table 5) $\Delta MKT\_VAL$ Coefficient (P-value)	(2) H2 (Table 6) $\Delta MKT\_VAL$ Coefficient (P-value)	(3) H3 (Table 7) $\Delta MKT\_VAL$ Coefficient (P-value)
<b>PANEL A</b>			
<i>INTERCEPT</i>	-0.2310*** ( $< 0.01$ )	-0.2017*** ( $< 0.01$ )	-0.1844*** ( $< 0.01$ )
<i><math>\Delta L3VALUE\_INDIRECT</math></i>	0.7917*** ( $< 0.01$ )	0.9125*** ( $< 0.01$ )	0.9119*** ( $< 0.01$ )
<i><math>\Delta L3VALUE\_INDIRECT*OVEREST</math></i>		-0.3676* (0.08)	
<i><math>\Delta L3VALUE\_INDIRECT*RECENT</math></i>			-0.3295* (0.10)
<i><math>\Delta VALUE\_DIRECT</math></i>	0.9836*** ( $< 0.01$ )	0.9816*** ( $< 0.01$ )	0.9821*** ( $< 0.01$ )
<i>OTHER\_INCOME</i>	1.0605*** ( $< 0.01$ )	1.0503*** ( $< 0.01$ )	1.0634*** ( $< 0.01$ )
<i>CAPTIAL\_CASH\_FLOW</i>	0.8999*** ( $< 0.01$ )	0.9043*** ( $< 0.01$ )	0.9115*** ( $< 0.01$ )
<i>OVEREST</i>		-0.0702 (0.17)	
<i>RECENT</i>			0.0940* (0.09)
Fixed Effects	<i>YEAR</i>	<i>YEAR</i>	<i>YEAR</i>
Observations	810	810	810
Adjusted R-Square	91.14%	91.16%	91.17%
<b>PANEL B</b>			
$H_0: \Delta L3VALUE\_INDIRECT = 1$	-0.208** (0.03)	-0.0875 (0.31)	-0.0881 (0.28)
$H_0: \Delta L3\_VALUE\_INDIRECT = \Delta VALUE\_DIRECT$	-0.1919** (0.05)	-0.0691 (0.35)	-0.0702 (0.32)
$H_0: \Delta L3VALUE\_INDIRECT$ $+ \Delta L3VALUE\_INDIRECT*OVEREST(RECENT) = 1$		-0.4551** (0.02)	-0.4176** (0.01)
$H_0: \Delta L3VALUE\_INDIRECT$ $+ \Delta L3VALUE\_INDIRECT*OVEREST(RECENT) = \Delta VALUE\_DIRECT$		-0.4367** (0.02)	-0.3997** (0.01)

Table 9 Notes: In this table I provide evidence of my three hypotheses using an empirical approach which compares the value relevance of directly and indirectly verifiable changes with a similar underlying economic transaction, a change in value. The sample consists of closed-end funds with Level 3 holdings during the years 2010 to 2015. Observations are at the fund level annually.

$\Delta MKT\_VAL$  is equal to the one year change in market value.  $\Delta L3VALUE\_INDIRECT$  is equal to the variable  $\Delta L3\_INDIRECT$  and represents gains or losses due to changes in valuation that are based on indirectly verifiable inputs.  $OVEREST$  is an indicator variable set equal to one if manager beginning-of-year valuation estimates for those Level 3 holdings sold during the year exceeded actual sales price.  $RECENT$  is an indicator variable equal to one when the ratio of newly acquired Level 3 holdings is greater than the mean.  $\Delta VALUE\_DIRECT$  is the amount of gains or losses due to changes in valuation that are based on directly verifiable inputs.  $OTHER\_INCOME$  is total non-valuation related income.  $CAPITAL\_CASH\_FLOW$  is equal to the net cash flow from capital activity. All continuous variables are scaled by shares outstanding. Year fixed effects are included and standard errors are clustered by fund.

The symbols \*, \*\*, and \*\*\* denote one-tailed statistical significance at the 10%, 5%, and 1% levels respectively. See Appendix A for a description of each variable.

**TABLE 10**  
**Test of Hypotheses Using Resolved and Ongoing Direct Changes**

Hypothesis = Dependent Variable =	(1) H1 (Table 5) $\Delta$ MKT_VAL Coefficient (P-value)	(2) H2 (Table 6) $\Delta$ MKT_VAL Coefficient (P-value)	(3) H3 (Table 7) $\Delta$ MKT_VAL Coefficient (P-value)
<b>PANEL A</b>			
<i>INTERCEPT</i>	-0.1316*** (<0.01)	-0.1113*** (<0.01)	-0.0302 (0.27)
$\Delta$ L1	0.9291*** (<0.01)	0.9262*** (<0.01)	0.9332*** (<0.01)
$\Delta$ L2	0.9466*** (<0.01)	0.9445*** (<0.01)	0.9510*** (<0.01)
$\Delta$ L3_INDIRECT	0.8128*** (<0.01)	0.9621*** (<0.01)	0.9551*** (<0.01)
$\Delta$ L3_INDIRECT*OVEREST		-0.5402* (0.05)	
$\Delta$ L3_INDIRECT*RECENT			-0.4119* (0.08)
$\Delta$ L3_DIRECT_RESOLVED	0.9985*** (<0.01)	1.0240*** (<0.01)	1.0545*** (<0.01)
$\Delta$ L3_DIRECT_ONGOING	1.0330*** (<0.01)	1.0325*** (<0.01)	1.0748*** (<0.01)
$\Delta$ NON_FV	0.9369*** (<0.01)	0.9293*** (<0.01)	0.9489*** (<0.01)
OVEREST		-0.0368 (0.32)	
RECENT			-0.2304*** (<0.01)
Fixed Effects	YEAR	YEAR	YEAR
Observations	810	810	810
Adjusted R-Square	89.97%	90.01%	90.09%
<b>PANEL B</b>			
	Diff (P-value)	Diff (P-value)	Diff (P-value)
H <sub>0</sub> : $\Delta$ L3_INDIRECT = 1	-0.1872** (0.03)	-0.0379 (0.39)	-0.0449 (0.38)
H <sub>0</sub> : $\Delta$ L3_INDIRECT = $\Delta$ L3_DIRECT_RESOLVED	-0.1857* (0.06)	-0.0619 (0.34)	-0.0994 (0.27)
H <sub>0</sub> : $\Delta$ L3_INDIRECT = $\Delta$ L3_DIRECT_ONGOING	-0.2202** (0.02)	-0.0704 (0.32)	-0.1197 (0.22)
H <sub>0</sub> : $\Delta$ L3_INDIRECT + $\Delta$ L3_INDIRECT*OVEREST(RECENT) = 1		-0.5781** (0.02)	-0.4568** (0.02)
H <sub>0</sub> : $\Delta$ L3_INDIRECT + $\Delta$ L3_INDIRECT*OVEREST(RECENT) = $\Delta$ L3_DIRECT_RESOLVED		-0.6021** (0.02)	-0.5113** (0.01)
H <sub>0</sub> : $\Delta$ L3_INDIRECT + $\Delta$ L3_INDIRECT*OVEREST(RECENT) = $\Delta$ L3_DIRECT_ONGOING		-0.6106** (0.02)	-0.5316** (0.01)



Table 10 Notes: In this table I replicate the primary tests from Tables 5, 6, and 7 separating directly verifiable changes into those which result in an investment being resolved and those in which the investment is ongoing.

$\Delta MKT\_VAL$  is equal to the one year change in market value.  $\Delta LI$  ( $\Delta L2$ ) is equal to the one year change in Level 1 (Level 2) holdings.  $\Delta L3\_INDIRECT$  is the change to Level 3 holdings that is indirectly verifiable.  $OVEREST$  is an indicator variable set equal to one if manager beginning-of-year valuation estimates for those Level 3 holdings sold during the year exceeded actual sales price.  $RECENT$  is an indicator variable equal to one when the ratio of newly acquired Level 3 holdings is greater than the mean.  $\Delta L3\_DIRECT\_RESOLVED$  is the directly verifiable changes to Level 3 holdings that are associated with an investment being resolved (e.g., sale, realized gain, etc.).  $\Delta L3\_DIRECT\_ONGOING$  is the directly verifiable changes to Level 3 holdings that are associated ongoing investment (e.g., purchase, transfer-in).  $\Delta NON\_FV$  is equal to the one year change in book value of all assets and liabilities not recorded at fair value. All continuous variables are scaled by shares outstanding. Year fixed effects are included and standard errors are clustered by fund.

The symbols \*, \*\*, and \*\*\* denote one-tailed statistical significance at the 10%, 5%, and 1% levels respectively. See Appendix A for a description of each variable.

**APPENDIX B, TABLE 1**  
**Replication of Lawrence et al. (2016)**

Dependent Variable =	(1) <i>PRICE</i> Coefficient (P-value)	(2) <i>PRICE</i> Coefficient (P-value)
<i>INTERCEPT</i>	-0.536*** ( $< 0.01$ )	0.251 (0.17)
<i>L1</i>	0.915*** ( $< 0.01$ )	0.875*** ( $< 0.01$ )
<i>L2</i>	0.907*** ( $< 0.01$ )	0.911*** ( $< 0.01$ )
<i>L3</i>	0.994*** ( $< 0.01$ )	0.997*** ( $< 0.01$ )
<i>NON_FV</i>	0.728*** ( $< 0.01$ )	0.777*** ( $< 0.01$ )
$\Delta NAV$	-0.099*** ( $< 0.01$ )	0.006 (0.67)
Fixed Effects	<i>YEAR</i>	<i>YEAR</i>
Observations	3,063	810
Adjusted R-Square	93.14%	94.55%
PANEL B	Diff (P-value)	Diff (P-value)
$H_0: L1 = L2$	-0.008** (0.04)	-0.036** (0.01)
$H_0: L1 = L3$	-0.079*** ( $< 0.01$ )	-0.122** (0.04)
$H_0: L2 = L3$	-0.087*** ( $< 0.01$ )	-0.086 (0.14)

Appendix B, Table 1 Notes: In this table I provide assurance on my sample by replicating Table 4, Column 1, of Lawrence, Siriviriyakul, and Sloan (2016) which analyses the value relevance of total holdings across the fair value hierarchy.

In Column 1 I present the results of Lawrence et al., which use a sample of annual closed-end fund observations from the years 2008-2013. In Column 2 I replicate the Lawrence et al. finding using my primary sample of closed-end funds with Level 3 holdings for the years 2010-2015, as shown in Table 1. *PRICE* is equal to the fund stock price per share as of the fiscal year-end. *L1*, *L2*, and *L3* are equal to the reported year-end value of Level 1, 2, and 3 holdings per share of common stock outstanding. *NON\_FV* is equal to the net value of assets and liabilities not reported at fair value, scaled by common shares outstanding.  $\Delta NAV$  is the annual change to net asset value per share of common stock outstanding.

The symbols \*, \*\*, and \*\*\* denote two-tailed statistical significance at the 10%, 5%, and 1% levels respectively. See Appendix A for a description of each variable.

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