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ECONOMIC CONSEQUENCES OF FAIR VALUE ACCOUNTING: A REVIEW OF RECENT LITERATURE

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ABSTRACT

The purposes of this study are two-fold. First, we draw from the findings of prior literature reviews and theoretical studies to develop two hypotheses geared towards explicating the economic consequences of fair valuation. We respectively refer to these hypotheses as the business model hypothesis and the hardness hypothesis. Second, we test these hypotheses by reviewing previous research from the top three journals in the field. We find that the relationship between fair valuation and the usefulness of accounting information varies as a function of the business model employed by the entity under consideration. We also find that the effects of fair valuation are contingent upon differences in the hardness with which relevant assets and/or liabilities are measured. Overall, our results suggest that differences in an entity's business model and the hardness associated with fair value accounting measurement have measurable effects both on valuation and contracting usefulness of accounting information.

KEYWORDS *economic consequences, fair value, value relevance, business model, hardness*

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INTRODUCTION

In the past two decades, the accounting standards of the International Accounting Standards Board (IASB) and Financial Accounting Standards Board (FASB) have changed dramatically. Most notably, fair value accounting has expanded in scope, contents, and timing, as both organizations have begun to apply fair valuation to most financial assets, liabilities, and derivatives. Many researchers examine the valuation usefulness and/or contracting usefulness of fair value accounting, however these studies show mixed results. These results also may raise the following questions: Does fair value accounting provide decision-usefulness information to investors and other contracting parties? What are constraints of fair value accounting?

In this study, we review prior literature that has explored the economic consequences of fair valuation and defined the problems that resulted from it. In doing so, we seek to achieve two complementary goals. First, we review and investigate the reported findings from past literature reviews (Barth *et al.*, 2001; Landsman, 2007; Laux, 2012; Tokuga, 2012) and theoretical studies to develop two hypotheses that delineate the economic consequences of fair valuation. These hypotheses are respectively referred to as the *business model hypothesis* and the *hardness hypothesis*. The second goal of this study is to test these hypotheses through a review of salient literature that has been published in top accounting journals since 2000.

Through our investigation, we find that the effects of fair value accounting usefulness correlate with the differences in the entity's business models (e.g., financial vs. non-financial investments). We also find that the effects of fair valuation vary as a function of the differences in the hardness with which relevant assets and/or liabilities are measured. Taken together, our results suggest that an entity's business model and the hardness with which fair value accounting is measured affect both valuation usefulness and contracting usefulness of accounting information.

The methods and results reported in this study primarily contribute to the accounting literature. By clearly operationalizing our hypotheses, future empirical research related to the economic consequences of fair value accounting becomes possible. This study also has implications for standard-setting in accounting. For example, empirical results from marginal cases may inform the development of future accounting standards.

The remainder of this study is organized in a number of interrelated, but distinct sections. In Section 1 and 2, we present the theoretical background of this study and develop the two hypotheses to be tested. To test these

hypotheses, we review relevant studies in Section 3. Finally, we offer some concluding remarks.

1. THEORETICAL BACKGROUND

1.1. Findings from prior literature reviews

The findings from past literature reviews suggest that the economic consequences of fair value accounting and/or the usefulness of fair value information vary by industry and an objecting property of fair valuation (Barth *et al.*, 2001; Landsman, 2007; Laux, 2012; Tokuga, 2012). Empirical evidence of this nature has generally suggested that fair valuation on financial assets held by financial institutions is value-relevant¹.

Landsman (2007) reviews extant literature on the capital market that has examined the usefulness of fair value accounting information for investors prior to the onset of the global financial crisis between 2007 and 2008. In his review, he classifies research related to value relevance into three categories: US-based research from the 1990s with a particular focus on banks, international research², and US-based stock option research after 2000. Evidence from this literature suggests that the degree to which disclosed and recognized fair values are informative to investors is affected by measurement error and the source of the estimates (i.e., management or external appraisers). For example, prior studies suggest that managers may be incentivized to use discretion in selecting input parameters for fair value estimates of employee stock options based on valuation models and/or firm-specific information,.

Using evidence from studies performed during the financial crisis, Laux (2010) examines the relationship between financial reporting and financial stability³ and came to several notable conclusions. First, fair value accounting does not necessarily cause widespread fire sales of assets or contagion. Second, accounting practices and regulations may have contributed to the financial crisis by allowing several banks to delay their actions. Third, the origin of the financial crisis may have been lax rules that allowed banks to encounter financial and regulatory problems despite increases in share prices. Fourth, fair values can be relevant for assets that a bank intends to hold until maturity if that bank is heavily reliant on short-term financing. Finally, the recognition of fair value does not satisfactorily replace information that allows investors to judge a bank's risk exposure and the validity of reported fair values.

Some research on fair valuation has focused on the reliability (i.e., hardness)

of fair value measurements (see Landsman, 2007; Laux, 2012), but these studies have neglected to consider the effect of an entity's business model on fair valuation. Tokuga (2012) addressed this deficiency, suggesting that an entity's business model significantly relates to the usefulness of fair valuation. Using working papers that have appeared in the Social Science Research Network (SSRN) and published academic manuscripts, he comprehensively reviews empirical studies on fair valuation. Tokuga's (2012) work shows that fair valuation for financial instruments positively affects the support function for investors, but fair valuation for non-financial instruments negatively affects. Further, he finds that whereas fair valuation for financial institutions positively affects the support function for investors, fair valuation in non-financial institutions negatively affects.

In sum, findings from past literature reviews suggest that there are two key factors that influence the economic consequences of fair value accounting: differences in the reliabilities of measurement scales for relevant assets, and the entity's business model.

1.2. Usefulness of accounting information

It is clear that the overall purpose of financial accounting is to provide useful information for assisting in the making of economic decisions. As outlined by the IASB (2010):

The objective of general purpose financial reporting is to provide financial information about the reporting entity that is useful to existing and potential investors, lenders and other creditors in making decisions about providing resources to the entity. Those decisions involve buying, selling, or holding equity and debt instruments, and providing or setting loans and other forms of credit.

In addition, some researchers identify two sub-objectives of financial accounting: to provide valuation-relevant information (especially to market participants), and to provide contracting-relevant information (especially to other contracting party such as lenders and creditors; Watts and Zimmerman, 1986; Christensen and Demski, 2003; Gassen, 2008). Valuation-relevant information helps users "in assessing the amounts, timing, and uncertainty of prospective cash receipts" (FASB, 1978: para. 37) and is thus useful for evaluating corporate value. The most important qualitative characteristic of this information is its "relevance." Contracting-relevant information helps users to evaluate management stewardship and performance (FASB, 1978:

para. 50). The most important qualitative characteristic of this information is “reliability”⁴. Following Gassen (2008), we treat “decision usefulness” as the general purpose of financial accounting and “valuation usefulness” and “contracting usefulness” as complementary, but critical sub-objectives (pp. 3-4).

2. HYPOTHESES DEVELOPMENT

1.2. Business model

As it relates to accounting standards, a business model refers to the ways in which entities differ in terms of their investments or incentives related to resource allocation decisions, and the value creation process of an entity (EFRAG *et al.*, 2013). For instance, IFRS 9 requires all financial assets to be classified on the basis of the entity’s business model for managing financial assets and the contractual cash flow characteristics of the financial assets (IASB, 2009: IN 10). More specifically, IFRS 9 suggests that the entity’s business model does not depend on management’s intentions for an individual instrument, but should be determined at a higher level of aggregation. As a result of these stipulations, a single entity may have more than one business model for managing its financial assets, so classification need not be determined at the reporting entity level (IASB, 2009: B4.2).

Leisenring *et al.* (2012) discuss how an entity’s business model might affect an entity’s financial reporting practices. They conclude that business-model-based accounting preserves comparability, but does not impair relevance.

Saito (2009) discusses the relevance of business models in the context of whether the entity’s basic operations relate to financial investments or nonfinancial investments. He suggests that the risk position of investments and performance measurements from the resolution of uncertainty correspond to substantial characteristics of an entity’s investments. Although accounting standards determined by rules related to valuation and recognition rules depend on asset type (financial vs. nonfinancial), Saito (2009) finds that the substance of investments is the most important factor.

Saito’s (2009) research also provides a useful matrix comprised characteristics of investments and types of assets (see Table 1). In his matrix, financial investments refer to those investments in which investors or management personnel hold assets to earn gains that result from changes in market prices of these assets. In contrast, nonfinancial investments refer to

those investments in which investors or management personnel hold assets with the goal of generating cash from business activities.

Table 1. The matrix of characteristics of investments and types of assets

Types of assets Characteristics of investments	Financial assets	Nonfinancial assets
Financial investment (Expect market price increases)	Available-for-sale securities, derivatives.	Investment properties, precious metals.
Nonfinancial investment (Expect profit from operations)	Investments in securities of subsidiary and associates, accounts receivable.	Land, buildings and equipment, inventories.

(Source: Saito, 2009: 40, Table 2.1)

Similar to the concept of the business model, Sunder (2008) discusses how certain economic parameters, including differences in assets, firms, and industries, may affect errors in fair valuation.

No valuation rule has minimum mean squared error in general, as a matter of principle. Instead, it is a matter of econometrics, and depends on the relative magnitudes of the parameters of the economy. Efficient (in the sense of minimum mean square error) valuation rules vary across assets, firms, and industries. Using known methods, we can discover which rules are better in which circumstances (Sunder, 2008: 121).

Given past empirical investigations and the above discussions, we assume that differences in entities' business models affect the economic consequences of fair value accounting and/or the usefulness of fair value information. Specifically, for financial investments in which investors or management personnel retain assets to achieve gains that result from changes in market prices of financial instruments and derivatives (e.g., banks whose assets are primarily financial instruments), we predict fair value accounting to be more value-relevant. In contrast, for nonfinancial investments in which investors or management personnel hold assets with the goal of generating cash from business activities from leveraging the assets' productive capacities (e.g., a manufacturing company), we predict fair value accounting to be less value relevant. Given these predictions, we propose the following hypothesis, which we dub the *business model hypothesis*:

H1: Economic consequences of fair value accounting vary as a function of the entity's business model.

When considering both valuation usefulness and contracting usefulness, the *business model hypothesis* can be tested with the following hypotheses:

H1a: Fair valuation on assets/liabilities in financial investments increases valuation usefulness of accounting information.

H1b: Fair valuation on assets/liabilities in nonfinancial investments does not increase valuation usefulness of accounting information.

H1c: Fair valuation on assets/liabilities in financial investments increases contracting usefulness of accounting information.

H1d: Fair valuation on assets/liabilities in nonfinancial investments does not increase contracting usefulness of accounting information.

2.2. Hardness of accounting measurement

The “hardness” of a given measurement is comprised of that measurement’s objectivity and reliability, two important criteria for measures related to accounting practices (Ijiri, 1967). The objectivity of an accounting measurement is defined as “the consensus among a given group of observers or measurers” (Ijiri, 1967: 134-135). Objectivity can be gauged in terms of the variability of the accounting measurements (i.e., the measure’s variance). The reliability relates to the degree to which actual measures differ from the fundamental value (i.e., the measurement errors). Given these conceptualizations, measurement hardness is comprised of the variance of the accounting measurements and measurement errors.

Ijiri (1967) identifies three factors as component elements of accounting measurement hardness. First, the input is an *object* whose key property is to be measured. Second, the process is a *measurement system* that consists of a set of rules and instruments. Third, a *measurer* is a mechanism that applies the *measurement system* to the *object*. These three factors collectively produce an output measure. In terms these components, the hardness of an object refers to the degree to which an input parameter is physically and conceptually fixed. The hardness of a measurement system relates to the degree to which measurement rules and instruments are carefully specified and the degree to which those rules and instruments are fixed. Finally, the hardness of a measurer is contingent upon the degree to which that measurer is familiar with the object and measurement system (i.e., expertise), and/or has an interest in output (i.e., incentive to engage in discretionary behaviors). These three factors are mutually interrelated, so a measurement’s hardness cannot be discussed without a consideration of these three factors.

Given the abundance of empirical evidence and the discussions outlined above, we predict that the hardness of measurements affect the economic consequences of fair value accounting. Specifically, when measurement

hardness is high (e.g., a Level 1 financial instrument with quoted prices and an active market in SFAS 157), we expect fair value accounting to be more useful. In contrast, when measurement hardness is low (e.g., a Level 3 financial instrument with a great deal of uncertainty in SFAS 157), we expect fair value accounting to be less useful. Thus, we develop the following hypothesis, which we refer to as the *hardness hypothesis*.

H2 : The economic consequences of fair value accounting are related to the hardness of measurements associated with relevant assets and/or liabilities.

When considering both valuation usefulness and contracting usefulness, the *hardness hypothesis* can be tested with the following sub-hypotheses:

H2a: Fair valuation with high levels of hardness increases valuation usefulness of accounting information.

H2b: Fair valuation with low levels of hardness does not increase valuation usefulness of accounting information.

H2c: Fair valuation with high levels of hardness increases contracting usefulness of accounting information.

H2d: Fair valuation with low levels of hardness does not increase contracting usefulness of accounting information.

2.3. Hypotheses matrix

The possibility exists that the hypotheses presented above are mutually interdependent. For example, financial institutions whose investments primarily consist of financial assets are familiar with those assets and estimation methods, so their measurement hardness is high. Contrarily, when goodwill is acquired as an object, its hardness is low. However, as purchasers, managers are acquainted with those assets and can estimate their value more accurately.

To address the full range of investment intention and object reliability combinations, we propose a hypothesis matrix on the basis of (a) the two hypotheses presented above, and (b) the matrix of investment characteristics and asset types (Saito, 2009). We present this hypothesis matrix in Table 2.

Table 2. Hypotheses matrix

		Hardness hypothesis	
		High	Low
Business model hypothesis	Financial investments	Financial assets (Level 1)	Financial assets (Level 3)
	Nonfinancial investments	Investment property, fair value option of intangible assets	Revalued amount of long-lived tangible and intangible assets

Using this framework, we review empirical studies to test our hypotheses in terms of both valuation usefulness and contracting usefulness.

3. LITERATURE REVIEW

This study is a hypotheses-testing-style review of extant research from 2000 to 2012 in the top three accounting journals in the United States: *The Accounting Review* (TAR); *Journal of Accounting Research* (JAR); and *Journal of Accounting and Economics* (JAE). To identify salient research, we first searched for the term “fair value” in Business Source Premier for TAR and JAR, and Science Direct for JAE. From the studies that the database identified, we chose only empirical studies for inclusion in our analysis. As a result of these selection criteria and procedures, our analysis incorporates a total of 32 papers. We divided these 32 studies into two groups to isolate research that is respectively related to the capital market and contracting.

3.1. Capital market research

Using our hypotheses matrix (see Table 2), we categorize research on the capital market into four categories: financial investment/high-hardness, financial investment/low-hardness, nonfinancial investment/high-hardness, and nonfinancial investment/low-hardness.

Table 3. Capital market research organized in the hypotheses matrix

		Hardness hypothesis	
		High	Low
Business model hypothesis	Financial investments	Ahmed, Kilic, and Lobo (2006) Hodder, Hopkins, and Wahlen (2006) Riedl and Sarafeim (2011) Song, Thomas, and Yi (2010)	Riedl and Sarafeim (2011) Song, Thomas, and Yi (2010)
	Nonfinancial investments	Barth, Hodder, and Stubben (2008) Landsman et al. (2011) Muller III and Riedl (2001) Wong (2000)	Alciatore, Easton, and Spear (2000) D’Souza, Jacob, and Soderstrom (2000) Espahbodi et al. (2002) Haan, Heflin, and Subramanyam (2007) Henning, Lewis, and Shaw (2000) Kimbrough (2007) Riedl (2004)

In both the financial investment/high-hardness and financial investment/low-hardness categories, several studies focus on the economic

consequences of fair value accounting in financial institutions (Ahmed *et al.*, 2006; Song *et al.*, 2010; Hodder *et al.*, 2006; Riedl and Sarafeim, 2011).

Ahmed *et al.* (2006), for example, use data from American banks to compare the valuation implications of recognized and disclosed derivative fair value information under SFAS133. They find that while the coefficients associated with valuation on disclosed derivatives were not significant, the valuation coefficients on recognized derivatives were.

Also using data from American banks (though limited to the period between 1996 and 2004), Hodder *et al.* (2006) investigate the risk relevance of the standard deviation of three performance measures: net income, comprehensive income, and a measure for full-fair-value income. They find full-fair-value income is more than three times as volatile as comprehensive income and more than five times as volatile as net income. Further, they indicate that the incremental volatility of full-fair-value income is positively related to market-model beta, the standard deviation in stock returns, and long-term interest-rate beta. These findings suggest that full-fair-value income volatility reflects elements of risk that are not captured by measures of volatility for net income or comprehensive income.

Through the use of recently disclosed information related to Level 1, 2, and 3 financial instruments, Riedl and Sarafeim (2011) explore whether greater information risk associated with financial instrument fair values leads to higher cost of capital. Their findings show that firms with greater exposure to Level 3 financial assets exhibited higher *Betas* relative to firms exposed to Level 1 or Level 2 financial assets. Similarly, Song *et al.* (2010) use quarterly reports from U.S. banking firms to examine the value relevance of fair valuation at Levels 1-3 and the effects of corporate governance on the value relevance of fair values. They find that the value relevance of Levels 1 and 2 fair values is greater than the value relevance of fair values at Level 3. Further, they demonstrate that the value relevance of fair values is greater for firms with strong corporate governance. Taken together, their findings suggest that fair valuation with high levels of reliability is more value-relevant than fair valuation with low levels of reliability.

We select four studies to include in the nonfinancial investment/high-hardness category (Wong, 2000; Muller III and Riedl, 2001; Barth *et al.*, 2008; Landsman *et al.*, 2011). Using over 49,000 firm-year observations (excluding utility firms, financial services, and real estate firms), Barth *et al.* (2008) explore the possibility that equity value reflects gains and losses associated with changes in debt value. In doing so, the authors seek to inform the debate regarding the “paradox” in fair value accounting for liabilities: if fair value was recognized, then firms experiencing increases in

credit risk would recognize gains because increases in credit risk decrease in debt value. In contrast, firms that experience decreases in credit risk would suffer losses (Barth *et al.*, 2008: 658). They find that equity returns are significantly and negatively correlated to changes in credit risk, but this relationship is less pronounced when the firm has more debt. The opposite is true for upgrade firms; gains or losses are significantly and positively associated with equity return. Their findings suggest that changes in debt value are associated with predictable and measurable effects on changes in equity value. Stated simply, fair value accounting for liabilities is useful for valuation.

Landsman *et al.* (2011) examines whether firms' share prices accurately reflect two accounting measures, dirty surplus (DS) and really dirty surplus (RDS)⁵. Unlike dirty surplus, which can be identified in a firm's financial statements, really dirty surplus is unobservable. Landsman and his colleagues (2011) find that both dirty surplus and really dirty surplus did not influence the forecasting of abnormal comprehensive income. They also find that investors appeared to undervalue really dirty surplus. These findings indicate that investors fail to understand the lack of the extent to which really dirty surplus persists, and over-valuing firms that have large negative really dirty surplus.

Muller III and Riedl (2001) explore the relationship between market-makers' perceptions of information asymmetry across traders in British investment property firms and their setting of a wider spread. Their results show that market-makers perceive information asymmetry across traders to be lower for firms that employ external appraisers relative to those that employ internal appraisers. As such, differences in investment property appraisers' respective reliabilities influence perceptions of information asymmetry on the part of market makers.

Wong (2000) examines whether quantitative disclosures related to notional amount and fair value of foreign exchange (FX) derivatives (as required by SFAS 119, SFAS 105, and SFAS 107) are associated with the information used by investors to assess the sensitivity of equity returns to currency fluctuations (i.e., currency exposure). Results from this study are mixed, and provide only weak support for predictions related to both the association and usefulness tests.

In the nonfinancial/low-hardness category, Alciatore *et al.* (2000) investigate write-downs of oil and gas firms' assets and provide empirical evidence for the value relevance of the full-cost ceiling test write-downs, thus providing a useful contribution to the then-ongoing debate between the oil and gas industry and the SEC⁶. They find a statistically significant correlation

between write-down amounts and contemporaneous return, but this relationship is less pronounced than the correlation between write-down amounts and lagged return. Their findings suggest that although the market perceived that some of the decline in asset value occurred in the quarter in which the write-down was recorded, much of the share market price adjustment due to this decline occurred earlier.

With a focus on nuclear decommissioning costs in U. S. nuclear power plants⁷, D'Souza *et al.* (2000) examine whether net shareholder liability valuation implicitly reflects a utility-specific offsetting factor that corresponds to expected future recoveries of these costs in rates. Their findings provide information not only about utility-specific portions of nuclear decommissioning liabilities, but about total decommissioning costs in all nuclear units. Both kinds of information are useful for potential investors.

Espahbodi *et al.* (2002) examines the reaction of equity price to announcements related to accounting for stock-based compensation. Further, the authors assess the value relevance of recognition versus disclosure in financial reporting. Through their analyses, they reveal that firms exhibit significant abnormal returns around the issuance of (a) Exposure Drafts⁸ that propose the mandatory recognition of stock-based compensation costs, and (b) a reversal of that proposal. They find that the abnormal returns are most pronounced for high-tech firms, high-growth firms, and start-up firms. They also find that the stock prices are positively related to the existence of tax loss carry-forward, the extent to which stock options are used, and debt constraint related to retained earnings. They further find that stock prices are negatively associated with noise in stock price performance, free cash flows over total assets, and firm size. Their findings indicate that the significance of abnormal returns around the reversal of the proposal is consistent with the contracting theory, and that market participants differentially value disclosure and recognition.

Hann *et al.* (2007) compare the value and credit relevance of financial statements using fair-value and smoothing models of pension accounting⁹. They find that fair-value improved the credit relevance of the balance sheet, but it did not improve its value relevance. They also find that unless transitory gains and losses are separated from more persistent income components, fair-value impairs both the value and credit relevance of the income statement and the combined financial statements. These findings suggest that there are no incremental informational benefits to adopting a fair-value pension accounting model.

Henning *et al.* (2000) examine whether investors distinguish identifiable components of goodwill for valuation purposes in the year of acquisition. In

their study, they find that investors attach positive and negative weights to components of goodwill, and that the going-concern and synergy components are significantly and positively valued by the market. In contrast, investors negatively value the residual goodwill component. In addition, they did not find a significant relationship between returns and the amortization of the going-concern or synergy components. Taken together, these findings demonstrate that a negative valuation weight on the residual goodwill component suggests that investors effectively write off this portion of the goodwill asset in the year of the acquisition.

Kimbrough (2007) investigates the degree to which two mechanisms (financial statements recognition of R&D and analyst activities) lead to the public revelation of private information implicit in R&D fair value estimates. His analysis shows that the positive relationship between analyst following and the market's valuation of R&D capital was strongest for the portion of the estimated fair value of R&D capital that was unrecognized by the target prior to the merger announcement.

Riedl (2004) explores the effect of SFAS No. 121 on the characteristics of reported long-lived asset write-offs. Findings suggest that write-offs reported under SFAS No. 121 are less reflective of firms' economic realities than those reported prior to the standard. As an alternative possibility, Riedl (2004) suggests that because SFAS No. 121's subjective criteria may enable managers to more easily justify their reporting choices, managers may exhibit discretion over write-offs more readily after the standard's adoption.

3.2. Contracting research

Once again using the hypotheses matrix, we classify papers related contracting and other research into four categories: financial investment/high-hardness, financial investment/low-hardness, nonfinancial investment/high-hardness; and nonfinancial investment/low-hardness (see Table 6). Although this categorization scheme allows for four categories, we failed to find any contracting research that fell under the financial investment/low-hardness category.

Table 4. Contracting research in Hypotheses matrix

		Hardness hypothesis	
		High	Low
Business model	Financial investments	Badertscher, Burks, and Easton (2012)* Bhat, Frankel, and Martin (2011)*	

hypothesis	Nonfinancial investments	Demerjian (2011) Dietrich, Harris, and Muller III (2001) Zhang (2009)*	Beatty and Weber (2006) Blacconiere et al. (2011) Choudhary (2011) Comprix and Muller III (2011) Dechow, Myers, and Shakespeare (2010) Dichev and Tang (2008)* Lee (2008) Ramanna (2008)
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* *Other* studies: Were not classifiable into the previous group of literature.

Demerjian (2011) explores the sharp decline in the use of balance sheet-based covenants in private debt contracts. He indicates that fair value estimates of assets and/or liabilities may introduce bias and noise into financial statements (particularly balance sheets) and weaken their usefulness for sending accurate liquidation values to lenders. He hypothesizes that increases in unverifiable balance sheet adjustments (e.g., fair value estimates of assets/liabilities) have made balance sheets less useful for debt contracting. To remedy this, his research incorporates the use of the volatility ratio (VR) to capture the extent to which balance sheets are adjusted. He finds that borrowers with a higher VR are less likely to have balance sheet-based covenants. This is consistent with the association between reductions in the contracting usefulness of balance sheets and reductions in balance sheet covenants.

Using data from the 1,000 largest U.S. firms over the last 40 years, Dichev and Tang (2008) explore the effects of poor matching on the properties of accounting earnings. Through this examination, they indicate that although the correlation between revenues and contemporaneous expenses is declining, the correlation between revenues and non-contemporaneous expenses is increasing. They also find strong evidence of increased earnings volatility, declining persistence of earnings, and an increased negative autocorrelation associated with earnings changes.

With a focus on the securitization of receivables, Dechow *et al.* (2010) examine three research questions; first, to what extent managers use discretion to report upward gains under the fair value accounting rule, second, to what extent CEO is compensation sensitive to securitization gains relative to other earnings components, third, boards play a monitoring role in determining either the size of the gains or the sensitivity of CEO compensation in relation to these gains. Their research shows that managers do act opportunistically and use the discretion afforded to them under the fair value accounting rules for securitization. Their findings also show that better monitoring does not reduce earnings management or CEO pay-sensitivity to reported securitization gains. Finally, they demonstrate that CEOs are rewarded for the gains they

report, and boards do not play a monitoring role. These findings suggest that fair value estimates are less reliable or softer when active markets do not exist.

Dietrich *et al.* (2001) examine the reliability of mandatory fair value estimates for U.K. investment property by using a sample of firms in the U.K. investment property industry from 1988 to 1996. They define more “reliable” fair value estimates as those estimates that have a less conservative bias¹⁰, greater accuracy, and less managerial manipulation. They show that appraisal estimates understate actual selling prices. In addition, they also find that fair value estimates of investment properties are less-biased and more-accurate measures of selling price than respective historical costs. Furthermore, the authors demonstrate that managers select an accounting method to report higher earnings and time asset sales. They also find that managers exercise discretion to smooth reported earnings and changes in net asset value, and to boost fair values of investment properties prior to raising new debt. Also, they find that monitoring by external appraisers and the Big 6 auditors enhances the reliability of appraisal estimates.

Zhang (2009) examines how the accounting standard for derivative instruments (SFAS No.133) influence corporate risk-management behavior. She demonstrates that, during the post-SFAS No.133, volatility of cash flows and risk exposures related to interest-rate, foreign exchange-rate, and commodity price decrease for only firms that fail to reduce their risk exposure after initiating derivatives programs.

In the nonfinancial investments/low-hardness category, Beatty and Weaver (2006) investigate decisions related to SFAS No. 142, with a particular focus on the trade-off between recording certain current goodwill impairment charges below the line and uncertain future impairment charges included in income from continuing operations. Their results show that managers’ incentives affect their preferences for above-the-line versus below-the-line accounting treatment. In addition, they also find that contracting and market incentives affect firm’s estimation of goodwill impairment charges. Although their sample is very specific, their findings indicate that the reliability of the fair value estimate of a goodwill impairment write-off is strongly related to managers’ economic incentives.

Ramanna (2008), similar to Beatty and Weber (2006), also focuses on SFAS No. 142. However, his work explores the *evolution* of SFAS No. 142. His findings show that the FASB issued SFAS 142 in response to political pressure over its proposal to abolish pooling accounting. Ramanna (2008)’s findings also show that lobbying firms (i.e. firms opposed to FASB’s original proposal to abolish pooling method) supporting for the SFAS 142 impairment rules

used unverifiable discretion opportunistically under this standard.

Blacconiere et al. (2011) investigate *reliability disavowals* related to the volatility estimates of future stock return (one of the inputs that option pricing models require) disclosed under SFAS 123. They refer to voluntary disclosures in financial statements that raise questions regarding the reliability of fair value estimates (in their study, stock option value estimations) as reliability disavowals. Further, they examine whether the disavowals are informative or opportunistic. Their findings imply that disavowals inform users about the reliability disavowals and managers have an incentive to voluntarily disclose reliability estimates to mitigate information asymmetry between managers and investors.

Choudhary (2011) investigates differences in reliability between *recognition* and *disclosure* regimes by comparing fair values required to disclose under SFAS No. 123 with those required to recognize under SFAS No.123 R. This research indicates that opportunism increases with recognition (relative to disclosure), and that it is associated with incentives to manage earnings. His findings suggest that managers may bias recognized values of employee stock options differently from disclosed values. This study also shows how Level 2 inputs affect the reliability of fair valuation.

Lee (2008) explores the possibility that outstanding employee stock options (ESOs), which represent a firm's contractual obligation to deliver shares upon ESO exercise, provide the useful information for credit-rating agencies. She hypothesizes that outstanding ESOs convey two types of cash flow information—(1) expected cash flows due to equity infusion (Equity Infusion Hypothesis), and (2) expected cash outflows due to probable share repurchase (Predicting Repurchase Hypothesis). Her findings support above two hypotheses, suggesting that outstanding ESOs convey the useful information for credit-rating agencies to assess the issuer's credit risk.

Comprix and Muller III (2011) examine whether employers systematically assume downward-biased pension estimates to obtain agreement with employees when freezing their defined benefit plans. They find that prior to the Sarbanes-Oxley Act (SOX), both expected rate of return and discount rate are downward-biased when firms freeze their benefit plans. They also show that, after SOX, the downward biases are largely reduced. These findings suggest that employers opportunistically bias pension estimates to reduce labor costs. In addition, they show that, during the post-SOX period, the act can mitigate managers' opportunistic accounting behaviors.

In addition to the studies outlined above, there has been some research that, although unclassifiable in our categorization scheme, is nonetheless informative. Badertscher *et al.* (2012), for example, examine whether fair

value provisions in U.S. accounting rules unfavorably affected commercial banking industry in the recent financial crisis. Their industry-level analysis indicates that fair value accounting losses such as other-than-temporary impairments minimally influenced regulatory capital, not supporting that the fair value provisions caused ‘fire-sells’ of securities. Further, their firm-level evidences do not support the hypothesis that banks sell securities at a loss in response to capital-depleting charges during the crisis. Their results do not support that fair valuation caused bank’s pro-cyclical behavior.

In another example, Bhat *et al.* (2011) utilize data of U.S. banks between 2006 and 2009 to illuminate the relationship between bank holdings of mortgage-backed securities (MBS) and MBS prices, and how the easing of mark-to-market (MTM) accounting affects the relationship. They focus on *feedback* effect for examining the relationship. Feedback means an increased tendency of banks to liquidate asset holdings when they confront liquidity driven asset-price decline. They argue that MTM accounting can enhance this feedback effect. Their analysis reveals the existence of this feedback effect. That is, they find that banks are more likely to sell MBS when market price decline. In addition, they find the evidence that the easing of MTM accounting on April, 2009 mitigate the feedback effect.

3.4. Discussion

Recent academic research in top three accounting journals in the United States provides evidence that support our hypotheses for valuation usefulness, but empirical evidence related to contracting usefulness is a bit more unclear.

In the capital market research, empirical evidence from prior studies demonstrates that differences in business models (i.e., short-term price appreciation investing versus long-term cash flow investing) affect the value relevance of fair value information. Our findings are consistent with previous research that shows fair value information of securities to lack value relevance in the case of nonfinancial institutions that do not hold financial assets for short-term buying and selling (Simko, 1999). Further, our findings indicate that fair value information of all assets and liabilities is value relevant for closed-end mutual funds in which financial assets are held for investment (Carroll *et al.*, 2003).

In addition, measurement hardness also influences valuation usefulness for fair value information. Even with respect to financial assets that are held for the purpose of selling, the respective value relevance of Level 1 and Level 2 fair values are greater than that of Level 3 fair value (Song *et al.*, 2010; Riedl and Sarafeim, 2011). Other empirical evidence suggests that firms that possess

mechanisms for strong corporate governance increase the reliability of the financial reporting process, thus increasing of the value relevance of fair value information, particularly at Level 3 (Song *et al.*, 2010). In addition, we find evidence that recognized fair value information of which audit quality is rather high and disclosed fair value information differ with regard to reliability. Further, the former is more value relevant than the latter (Espahbodi, *et al.*, 2002; Ahmed *et al.*, 2006).

Although our findings show some positive effects of fair value accounting for valuation usefulness, we are unable to claim that full fair value accounting in financial instruments (even in financial institutions that hold more financial instruments) is useful for valuation of accounting information because the relationship is confounded by the hardness of accounting measurements. As such, we can expect fair valuation of non-financial assets to be less useful than fair valuation of financial assets for nonfinancial instruments.

Within the contracting research it is difficult to identify empirical evidence that provides definitive results related to the *business model hypothesis*. Because we are unable to identify any contracting studies that incorporate financial investments gauged by measurements with both high and low hardness, we are similarly unable to reasonably predict whether fair value effects on contracting usefulness differ as a result of an entity's business model.

Despite this shortcoming, we identified a number of studies that suggest that the hardness of fair value measurements may affect the contracting usefulness of accounting information. More specifically, the compositional elements of the hardness of accounting measurement such as an object (goodwill, employee stock option, pension), a measurement system (estimation models for ESO or the discount cash flow model), and a measurer (management incentives) may affect contracting usefulness of fair value accounting.

In total, our results suggest that differences in entities business models and the hardness of measurements related to fair value accounting affect both valuation and contracting usefulness of accounting information.

Given these findings, this study has clear theoretical and practical implications. The operationalization of our hypotheses (H1a-H1d, H2a-H2d) provides avenues for future research related to the economic consequences of fair value accounting. In addition, this study has implications for accounting standard-setting. Our findings suggest that the effect of fair value-oriented accounting standards would be limited. For example, our results suggest that in marginal cases (e.g., when Level 3 financial assets are held in financial institutions), valuation usefulness of fair value accounting is limited.

CONCLUSIONS

This study reviewed recent literature related to the capital market and contracting that examined the usefulness of fair value accounting information for investors and other related parties. On the basis of past findings, we developed two hypotheses that we called the *business model hypothesis* and the *hardness hypothesis*. The *business model hypothesis* posits that the economic consequences of fair value accounting differ as a function of an entity's business model. The *hardness hypothesis* explains that the economic consequences of fair value accounting vary according to the hardness or reliability of measurement tools used to gauge relevant assets and/or liabilities.

This study primarily represents a comprehensive review of the accounting literature. We reviewed fair valuation research in the top three accounting journals in the United States and summarized the empirical evidence found therein. From this review, we were able to identify some opportunities for future research. In particular, the operationalization of our hypotheses indicates that several lines of research related to the economic consequences of fair value accounting are now available to researchers. Practically, the findings of this study can inform accounting standard-setting. Ultimately, our findings suggest that the effect of fair value-oriented accounting standards may be limited in some industries and objects.

NOTES

1. See Barth *et al.* (1996); Barth *et al.* (1998); Cornett *et al.* (1996); Eccher *et al.* (1996); and Venkatachalam (1996).

2. Landsman (2007) explores research on (a) value relevance related to fair value information of financial instruments, and (b) revaluation of non-financial assets.

3. Laux and Leuz (2009, 2010) discuss theoretical issues related to the association between the financial crisis and fair value accounting. Specifically, Lax and Leuz (2010) review archival data from past empirical studies to evaluate the effect of fair value accounting on US banks during the financial crisis.

4. For more detailed discussions related to relevance and reliability, refer to Holthausen and Watts (2001); Barth *et al.* (2001); and Landsman (2007).

5. Dirty surplus refers to a component of comprehensive income that is excluded from reported earnings, and therefore violates clean surplus

accounting. Really dirty surplus refers to a scenario in which a firm issues or reacquires its own shares in a transaction that does not record the share at fair market value.

6. Under the Generally Accepted Accounting Principles (GAAP), two accounting methods for oil and gas firms are allowed- full cost or successful efforts. Under the successful efforts method, whereas exploration costs for successful wells are recorded as assets, exploration costs for unsuccessful wells are expensed. Under the full cost accounting method, exploration costs for both dry and successful wells are capitalized. However, the SEC requires full-costs firms that may record dry holes as assets to conduct a quarterly impairment test (i.e., the “ceiling test”) on their capitalized oil and gas assets.

7. FASB’s Exposure Draft 158-B, which is the focus of this study, proposes that the fair value of a company’s total projected liability associated with future decommissioning costs be recognized on the balance sheet at the time the initial plant goes into operation.

8. The FASB issued an Exposure Draft titled *Accounting for Stock-Based Compensation* in June 1993, but the proposal was later reversed.

9. SFAS No. 87 uses an elaborate smoothing mechanism that amortizes changes to the fair value of pension assets and liabilities over remaining employee service, and records a stable pension expense. However, this mechanism only recognizes accrued or prepaid pension costs on the balance sheet.

10. They suggest that the “conservative bias may reflect appraisers' and/or auditors' incentive to undervalue property to protect themselves from litigation if property is sold for less than its appraised value” (Dietrich *et al.*, 2001: 135). Therefore, the more conservative fair value estimates of investment properties may reflect the appraisers and/or auditors’ intent as well as managers’ incentive.

REFERENCES

- Ahmed, A. S., Kilic, E. & Lobo, G. J. (2006) “Does recognition versus disclosure matter? Evidence from value-relevance of banks’ recognized and disclosed derivative financial instruments”, *The Accounting Review*, vol. 81, no. 3: 567-588
- Alciatore, M., Easton, P. & Spear, N. (2000) “Accounting for the impairment of long-lived assets: Evidence from the petroleum industry”, *Journal of Accounting and Economics*, vol. 29: 151-172
- Badertscher, B. A., Burks, J. J. and Easton, P. D. (2012) “A convenient scapegoat: Fair value accounting by commercial banks during the financial crisis”, *The Accounting Review*, vol. 87, no. 1: 59-90

- Barth, M. E., Beaver, W. H. & Landsman, W. R. (1996) "Value-relevance of banks' fair value disclosures under SFAS No. 107", *The Accounting Review*, vol. 71: 513-537
- Barth, M. E., Landsman, W. R. & Rendleman, Jr. R. J. (1998) "Option pricing-based bond value estimates and a fundamental components approach to account for corporate debt", *The Accounting Review*, vol. 73: 73-102
- Barth, M. E., Beaver, W. & Landsman, W. R. (2001) "The relevance of the value relevance literature for financial accounting standards setting: Another view", *Journal of Accounting and Economics*, vol. 31: 77-104
- Barth, M. E., Hodder, L. D. & Stubben, S. R. (2008) "Fair, value accounting for liabilities and own credit risk", *The Accounting Review*, vol. 83, no. 3: 629-664
- Beatty, A. & Weber, J. (2006) „Accounting discretion in fair value estimates: An examination of SFAS 142 goodwill impairments", *Journal of Accounting Research*, vol. 44, no. 2: 257-288
- Bhat, G., Frankel, R. & Martin, X. (2011) "Panacea, pandora's box, or placebo: Feedback in bank mortgage-backed security holdings and fair value accounting", *Journal of Accounting and Economics*, vol. 52: 153-173
- Blacconiere, W. G., Frederickson, J. R., Johnson, M. F. & Lewis, M. F. (2011) "Are voluntary disclosures that disavow the reliability of mandated fair value information informative or opportunistic?" *Journal of Accounting and Economics*, vol. 52: 235-251
- Bushman, R. M. & Williams, C. D. (2012) "Accounting discretion, loan loss provisioning, and discipline of banks' risk-taking", *Journal of Accounting and Economics*, vol. 54: 1-18
- Carroll, T. J., Linsmeier, T. J. & Petroni, K. J. (2003) "The reliability of fair value versus historical cost information: Evidence from closed-end mutual funds", *Journal of Accounting, Auditing and Finance*, vol. 18: 1-23
- Choudhary, P. (2011) "Evidence on differences between recognition and disclosure: A comparison of inputs to estimate fair values of employee stock options", *Journal of Accounting and Economics*, vol. 51: 77-94
- Christensen, J. A. & Demski, J. S. (2003) *Accounting Theory: An Information Content Perspective*, New York: McGraw-Hill
- Comprix, J. & Muller III, K. A. (2011) "Pension plan accounting estimates and the freezing of defined benefit pension plans", *Journal of Accounting and Economics*, vol. 51: 115-133
- Cornett, M. M., Rezaee, Z. and Tehranian, H. (1996) "An investigation of capital market reactions to pronouncements on fair value accounting", *Journal of Accounting and Economics*, vol. 22: 119-154
- Dechow, P. M., Myers, L. A. & Shakespeare, C. (2010) "Fair value accounting and

- gains from asset securitizations: A convenient earnings management tool with compensation side-benefits”, *Journal of Accounting and Economics*, vol. 49: 2-25
- Demerjian, P. R. (2011) “Accounting standards and debt covenants: Has the “balance sheet approach” led to a decline in the use of balance sheet covenants?”, *Journal of Accounting and Economics*, vol. 52: 178-202
- Dichev, I. D. & Tang, V. W. (2008) “Matching and the changing properties of accounting earnings over the 40 years”, *The Accounting Review*, vol. 83, no. 6: 1425-1460
- Dietrich, J. R., Harris, M. S. and Muller III, K. A. (2001) “The reliability of investment property fair value estimates”, *Journal of Accounting and Economics*, vol. 30: 125-158
- D’Souza, J., Jacob, J. & Soderstrom, N. S. (2000) “Nuclear decommissioning costs: The impact of recoverability risk of valuation”, *Journal of Accounting and Economics*, vol. 29: 207-230
- Eccher, E. A., Ramesh, K. & Thiagarajan, S. R. (1996) “Fair value disclosures by bank holding companies”, *Journal of Accounting and Economics*, vol. 22: 79-117
- Espahbodi, H., Espahbodi, P., Rezaee, Z. & Tehranian, H. (2002) “Stock price reaction and value relevance of recognition versus disclosure: The case of stock-based compensation”, *Journal of Accounting and Economics*, vol. 33: 343-373
- European Financial Reporting Advisory Group (EFRAG), the French Autorité des Normes Comptable (ANC), the Accounting Standards Committee of Germany (ASCG), the Organismo Italiano di Contabilità (OIC) and the UK Financial Reporting Council (FRC) (2013) “Getting a better framework: The role of the business model in financial reporting – Bulletin”, Brussels: EFRAG
- Financial Accounting Standards Board (FASB) (1978) *Statement of Financial Accounting Concepts No. 1: Objective of Financial Reporting by Business Enterprises*, Stamford: FASB
- Gassen, J. (2008) “Are stewardship and valuation usefulness compatible or alternatives of financial accounting?” SFB 649 Discussion paper 2008-028, Humbolt University: Berlin
- Hann, R. N., Heflin, F. & Subramanyam, K. R. (2007) “Fair-value pension accounting”, *Journal of Accounting and Economics*, vol. 44: 328-358
- Henning, S. L., Lewis, B. L. & Shaw, W. H. (2000) “Valuation of the components of purchased goodwill”, *Journal of Accounting Research*, vol. 38, no. 2: 375-386
- Hodder, L. D., Hopkins, P. E. & Wahlen, J. M. (2006) “Risk-relevance of fair-value income measures for commercial banks”, *The Accounting Review*, vol. 81, no.2: 337-375

- Holthausen, R. W. & Watts, R. L. (2001) "The relevance of the value-relevance literature for financial accounting standard setting", *Journal of Accounting and Economics*, vol. 31: 3-75
- Ijiri, Y. (1967) *The Foundation of Accounting Measurement: A Mathematical, Economic, and Behavioral Inquiry*, New Jersey: Prentice-Hall
- IFRS Foundation (IFRSF) (2012) *Classification and Measurement: Limited Amendments to IFRS 9 (Proposed Amendments to IFRS 9 (2010)) – Comment to be received by 28 March 2013*, Exposure Draft ED/2012/4, November 2012, London: IFRSF
- International Accounting Standards Board (IASB) (2009) *IFRS 9 Financial Instruments*, November 2009, London: IASB
- International Accounting Standards Board (IASB) (2010) *The Conceptual Framework for Financial Reporting 2010*, September 2010, London: IASB
- Kimbrough, M. D. (2007) "The influences of financial statement recognition and analyst coverage on the market's valuation of R&D capital", *The Accounting Review*, vol. 82, no. 5: 1195-1225
- Landsman, W. R. (2007) "Is fair value accounting information relevant and reliable? Evidence from capital market research", *Accounting and Business Research*, Special Issue 2007, International Policy Forum, vol. 37, no. 3: 19-30
- Landsman, W. R., Miller, B. L., Peasnell, K. & Yeh, S. (2011) "Do investors understand really dirty surplus?" *The Accounting Review*, vol. 86, no. 1: 237-258
- Laux, C. & Leuz, C. (2009) "The crisis of fair-value accounting: Making sense of the recent debate", *Accounting, Organizations and Society*, vol. 34, nos. 6-7: 826-834
- Laux, C. & Leuz, C. (2010) "Did fair-value accounting contribute to the financial crisis?" *Journal of Economics Perspectives*, vol. 24, no. 1: 93-118
- Laux, C. (2012) "Financial instruments, financial reporting, and financial stability", available online at SSRN: <http://ssrn.com/abstract=1991825>.
- Lee, Y. J. (2008) "The effects of employee stock options on credit ratings", *The Accounting Review*, vol. 83, no. 5: 1273-1314
- Leisenring, J., Linsmeier, T., Shipper, K. & Trott, E. (2012) "Business-model (intent)-based accounting", *Accounting and Business Research*, vol. 42: 329-344
- Muller III, K. A. & Riedl, E. J. (2002) "External monitoring of property appraisal estimates and information asymmetry", *Journal of Accounting Research*, vol. 40, no. 3: 865-881
- Penman, S. H. (2001) *Financial Statement Analysis and Security Valuation*, New York: McGraw Hill
- Penman, S. H. (2007) "Financial reporting quality: Is fair value a plus or a minus?",

- Accounting and Business Research*, Special Issue, International Accounting Policy Forum: 33-34
- Ramanna, K. (2008) "The implications of unverifiable fair-value accounting: Evidence from the political economy of goodwill accounting", *Journal of Accounting and Economics*, vol. 45: 253-281
- Riedl, E. J. (2004) "An examination of long-lived asset impairments", *The Accounting Review*, vol. 79, no. 3: 823-852
- Riedl, E. J. & Serafeim, G. (2011) "Information risk and fair values: an examination of equity betas", *Journal of Accounting Research*, vol. 49, no. 4: 1083-1122
- Saito, S. (2009) *A Study on Accounting Standards*, Tokyo: Chuokeizai-sha (In Japanese)
- Serafeim, G. (2011) "Consequences and institutional determinants of unregulated corporate financial statements: Evidence from embedded value reporting", *Journal of Accounting Research*, vol. 49: 529-571
- Simko, P. J. (1999) "Financial instrument fair values and nonfinancial firms", *Journal of Accounting, Auditing and Finance*, vol. 14: 247-274
- Skinner, D.J. (1999) "How well does net income measure firm performance? A discussion of two studies", *Journal of Accounting and Economics*, vol. 26: 105-111
- Song, C.J., Thomas, W. B. and Yi, H. (2010) "Value relevance of FAS No. 157 fair value hierarchy information and the impact of corporate governance mechanisms", *The Accounting Review*, vol. 85, no. 4: 1375-1410
- Sunder, S. (2008) "Econometrics of fair values", *Accounting Horizons*, vol. 22: 111-125
- Tokuga, Y. (2009) "fair value accounting: Clarification of fair value concepts and its impact on the Japanese society", in Sunder, S. and H. Yamaji (Eds.) *Japanese Manufacturing-Oriented Accounting and International Accounting*, Kobe Economic & Business Research Series No. 70, Kobe: Kobe University: 121-164 (In Japanese)
- Tokuga, Y. (2012) "A study on the mixed accounting models: Income model or net assets model", *Kinyu Kenkyu* (Financial Research), vol. 2012/7: 141-203 (In Japanese)
- Venkatachalam, M. (1996) "Value-relevance of banks' derivatives disclosures", *Journal of Accounting and Economics*, vol. 22: 327-355
- Watts, R. L. & Zimmerman, J. L. (1986) *Positive Accounting Theory*, New Jersey: Prentice Hall
- Wong, M. H. F. (2000) "The association between SFAS No. 119 derivatives disclosures and the foreign exchange risk exposure of manufacturing firms", *Journal of Accounting Research*, vol. 38, no. 2: 387-417
- Zhang, H. (2009) "Effect of derivative accounting rules on corporate

risk-management behavior”, *Journal of Accounting and Economics*, vol. 47:
244-264