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Derivative accounting and financial reporting quality: A review of the literature

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ABSTRACT

The financial crisis of 2008 increased the call for standard setters and financial regulators to review the effectiveness of derivative regulation in improving financial reporting quality. Prior literature defines financial reporting quality as the extent to which financial statements provide information that is useful to investors and creditors in their investment decisions (Schipper, 2003; Schipper & Vincent, 2003). This review summarizes the empirical evidence regarding the effectiveness of derivative regulation in achieving its stated objective. Extant literature shows that although derivative regulations have improved information provided to investors, there is still room for improvement. Recommendations from this stream of literature suggest that the Financial Accounting Standards Board (FASB) require managers to provide more complete, transparent, and forward-looking disclosures surrounding their derivative positions (Campbell, 2015; Franco-Wong, 2000). This review may be useful to standard setters, practitioners, and accounting academics by providing a synthesis of extant academic literature on the effectiveness of current derivative regulation. As the FASB and International Accounting Standards Board (IASB) continue to expand derivative accounting rules, this review may also be useful in identifying areas for future academic research.

1. Introduction

Prior literature states that the main goal of the recognition and measurement requirements of accounting standards is decision usefulness, supported by relevance, reliability, and comparability (Schipper, 2003; Schipper & Vincent, 2003). After the global financial crisis of 2008, the Financial Accounting Standards Board (FASB) and International Accounting Standards Board (IASB), sought to significantly improve the decision usefulness of financial instrument reporting for investors. To meet this objective, the Boards created the Financial Crisis Advisory Group (FCAG). The FCAG's primary objective was to identify accounting issues that required immediate attention, with a specific focus on financial instruments. The Group defined effective financial reporting as providing "information about the financial position and performance, and about changes in the financial position of an entity that is useful to a wide range of users in making economic decisions, with primacy given to the needs of providers of debt and equity capital (FCAG, 2009)."

The FCAG identified several areas of weakness related to derivative accounting. These weaknesses included difficulty in applying fair value accounting in illiquid markets, the delayed recognition of losses associated with financial instruments, and the complexity of accounting standards for financial instruments. In their final report, the FCAG classified these weaknesses as a detriment to effective financial reporting (FCAG, 2009). The findings of the FCAG ultimately led to several regulations aimed at improving accounting for derivatives. Included in these regulations are the most recently released Accounting Standard Update (ASU), ASU 2017-12 Derivatives and Hedging (Topic 815): Targeted Improvements to Accounting for Hedging Activities. ASU 2017-12 provides additional guidance on derivative and hedging transactions. The regulation expands and attempts to simplify accounting for certain derivative instruments and hedge relationships. The FASB proposes that the new standard will help entities facilitate financial reporting that more closely reflects an entity's risk management activities (FASB, 2017). The overall goal of ASU 2017-12 is to set forth regulations that provide greater trans-

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parency and decision usefulness concerning the financial reporting for derivative instruments.[1]

This review examines empirical evidence concerning the effectiveness of derivative regulation in improving financial reporting quality, as defined by the FASB and IASB. Although researchers are unable to directly measure the qualitative concept of financial reporting quality, prior literature has identified several empirical measures that attempt to capture the concept. The literature reviewed includes several of the empirical measures of financial reporting quality identified by prior literature, including earnings quality, earnings management, disclosure quality, and information asymmetry (Beest, Braam, & Boelens, 2009).

Prior literature reviews focusing on derivatives have examined the empirical literature addressing corporate hedging and the implications of hedging on shareholder value. Judge (2006) focuses his review on literature that tests the various theories of hedging. These theories suggest that firms hedge to (1) reduce their tax liability, (2) reduce the expected costs of financial distress, (3) reduce bondholder-shareholder conflict, and/or (4) to improve the coordination between financing and investing policy. In the review, Judge examines and documents how empirical research has evolved as a result of increased disclosures related to derivative instruments over the time period covered by the review. However, Judge's review does not specifically address how accounting standard changes have impacted the quality of financial reporting.

Alternatively, Aretz and Bartram (2010) restrict their review to the impact of hedging on shareholder value. Specifically, Aretz and Bartram (2010) reviewed studies examining whether corporate hedging can increase shareholder value in the presence of capital market imperfections. Aretz and Bartram (2010) discuss the implications of derivative use from a corporate risk management perspective. Aretz and Bartram (2010) surmise that corporations do not just use financial derivatives, but rely heavily on pass-through, operational hedging and foreign currency debt to manage financial risk. In contrast to the Judge (2006) and Aretz and Bartram (2010) reviews, this survey of the literature focuses on the effects that changes to derivative regulations have had on financial reporting quality.

Prior literature suggests that over time derivative regulations have improved the decision usefulness of information provided to financial statement users. However, the literature also suggests that there is still much room for improvement. While one stream of literature suggests that current regulation has reduced firms' ability to use derivative positions for earnings management, most studies continue to call for more detailed and uniform derivative disclosures (Campbell, 2015; Campbell, Downes, & Schwartz, 2015). The overall goal of these more informative disclosures is to reduce information asymmetry between firms and investors. Currently, researchers support working within the existing mixed attribute framework of derivative accounting to improve transparency, as opposed to a complete overhaul of current accounting standards. The most prevalent recommendation in this stream of literature suggest that the FASB require managers to provide more complete, transparent, and forward-looking disclosures surrounding their firm's derivative positions. Specifically, Franco-Wong (2000) and Campbell (2015) suggest that the FASB consider requiring additional disclosures explaining the direction of the association between other comprehensive income (OCI) components and firm value. The studies also suggest that the FASB consider requiring additional information on non-derivatives related underlying exposures to reduce information asymmetry.

Our review of the derivative literature may be useful to three groups: standard setters, practitioners, and accounting academics. As accounting for financial instruments continues to be a primary concern for the FASB and IASB, it is important for practitioners and standard setters to consider how the implications of academic research related to derivative accounting may help to improve financial reporting quality. This synthesis of the current derivative accounting literature could be useful to practitioners in providing recommendations to standard setters for future derivative regulations. This review could also be helpful to standard setters in identifying areas of focus for new derivative regulations. Finally, the review could also be useful to accounting academics in identifying potential areas for future research on derivative accounting.

To find studies that address the financial reporting quality implications of derivative regulation, academic databases including, Business Source Complete, Google Scholar, ScienceDirect, and within the Accounting Research Network (ARN) of the Social Science Research Network (SSRN) were searched. Scholarly working papers, top accounting and finance journals, including (but not limited to) The Accounting Review, Journal of Accounting Research, Journal of Accounting and Economics, Contemporary Accounting Research, Accounting Horizons, Journal of Accounting and Public Policy, Advances in Accounting, Review of Accounting Studies, Journal of Finance, Journal of Financial Economics, Journal of Banking and Finance, and the Journal of Corporate Finance were searched using terms such as "financial instruments," "financial derivatives," and "hedge accounting." Studies published prior to 1994 were excluded because prior to the implementation of Statement of Financial Accounting Standard (SFAS) 119[2], all firms were not required to disclose the intended use of derivative instruments.[3] In addition, studies that did not examine the impact of derivative regulation on financial reporting quality were excluded from the scope of this review.[4] Although other literature reviews have been conducted on derivatives, these reviews do not focus on accounting or the financial reporting issues surrounding derivative instruments. Our review includes a summary of over 25 studies that examine the impact of derivative regulation on financial reporting quality as proxied by earning quality, earnings management, disclosure quality, or information asymmetry.

The remainder of this paper is organized as follows: section 2 describes the background of accounting for derivatives, section 3 summarizes the literature examining the impact derivatives have on financial reporting quality, section 4 discusses future research opportunities, and section 5 concludes.

[1] Specifically, the standard update aims to achieve this goal by changing the designation and measurement guidance for qualifying hedge relationships and the presentation of hedge results (FASB 2016). The amendments in the standard update attempt to address these issues by expanding hedge accounting for financial and nonfinancial risk components, eliminating the separate measurement and reporting of hedge ineffectiveness, simplifying the manner in which assessments of hedge ineffectiveness may be performed, and enhancing disclosures for hedge results (FASB 2016).

[2] SFAS 119 was superseded by SFAS 133, which is now Accounting Standard Codification (ASC) topic 815: *Derivatives and Hedging*. Additionally, in order to clearly convey the progression of the accounting standards related to derivatives, we use the SFAS classification system. This classification system provides greater insight into the progression of derivatives regulation than the ASC codification as many of the early standards were later amended or superseded by SFAS 133, which is now ASC 815. However, we reference the ASC codification in the footnotes of this review, where applicable.

[3] Firms in regulated industries (i.e. banking, utilities, and extractive industries) are subject to stricter disclosure requirements related to their derivative positions and as such their samples may include periods prior to 1994. In addition, firms that are not in regulated industries have varying levels of disclosure related to derivatives and as such some studies including these firms may also have samples including periods prior to 1994.

[4] The scope of this review is limited to archival studies; studies that examine behavioral factors were excluded from this review but could be addressed in future research as these studies demonstrate that nonfinancial factors also significantly influence derivative use.

2. Background

2.1. Challenges accounting for derivatives

Derivatives are financial instruments that derive their value from an underlying asset, market indicator, or condition. The value of a derivative contract is dependent upon the value of the underlying, not the contract itself. Although derivatives have existed in some form for centuries, accounting for these instruments has presented challenges due to the complexity of initial and ongoing valuations (Stewart, 1989). The FASB's move toward a balance sheet-based approach to financial reporting compounds the difficulties firms face accounting for financial instruments.

The balance sheet approach implies that proper valuation of assets and liabilities is the primary goal of financial reporting (CEASA, 2007). Fair value accounting is a direct product of the balance sheet approach, in that fair value accounting implies that the "primacy of market and market-type prices are the benchmark for value for company accounting (CEASA, 2007 p. 6)." Proponents of fair value accounting suggest that fair value measurements are timelier and more relevant to shareholders, given that fair values directly reflect the current value of assets and liabilities. However, critics of fair value accounting contend that fair value estimates are less reliable than historical costs because there is often significant subjectivity in measuring the fair value of assets and liabilities.

2.2. FASB and derivative regulations

To address the measurement and classification issues related to derivatives, the FASB issued various Statements on Financial Accounting Standards (SFAS) during the 1980s. SFAS 52[5], Foreign Currency Translation, issued in 1981, was used to account for foreign exchange derivatives. In 1984, SFAS 80[6], Accounting for Futures Contracts, was issued and used to account for exchange traded future contracts. Although more comprehensive than previous FASB statements for financial instruments, SFAS 52 and SFAS 80 were very limited in scope as the standards did not provide standardized accounting treatment for all types of derivative instruments. The two standards specified accounting treatment for foreign exchange forwards and futures, currency swaps, and exchange traded futures contracts. However, the standards excluded accounting treatment for derivative instruments such as interest rate swaps, interest rate forwards, and most types of options. Although both standards did have hedge accounting provisions, there were inconsistencies between qualifying for and applying hedge accounting treatment under SFAS 52 and SFAS 80. While risk reduction was key to qualifying for hedge accounting under both standards, SFAS 52 focused on transactions, whereas, SFAS 80 focused on overall firm risk.

To address the scope and inconsistencies in accounting for derivatives under SFAS 52 and SFAS 80, the FASB, in 1986, added a major project to their agenda on financial instruments and off-balance-sheet financing. The project included three phases: disclosure, recognition and measurement, and distinguishing between liabilities and equity (FASB, 1990). This project resulted in several new standards for financial instruments, but ultimately culminated with SFAS 133[7], Accounting for Derivative Instruments and Hedging Activities, issued in 1998. SFAS 133 specifically addressed the second phase of the financial instruments and off-balance-sheet financing project, recognition and measurement. The statement had several key provisions including: (1) defining what qualified as a derivative instrument, (2) requiring firms to recognize all derivative instruments at fair value on the balance sheet, (3) requiring all derivative instruments to be classified either as held for hedging or trading purposes, and (4) establishing a uniform method of accounting for changes in fair value of derivative instruments held for hedging and trading purposes (FASB, 1998).

Despite the comprehensive nature of SFAS 133, there was still concern over the limited disclosures required under the standard. In response to these concerns, the FASB issued SFAS 161[8], Disclosures about Derivative Instruments and Hedging Activities, in 2008. SFAS 161 expanded the disclosure requirements under SFAS 133. The goal of SFAS 161 was to include additional "qualitative disclosures about the objectives and strategies for using derivatives, quantitative disclosures about fair value amounts of and gains and losses on derivative instruments, and disclosures about credit-risk-related contingent features in derivative agreements (FASB, 2008)." However, these additional disclosures were criticized for their subjectivity and overall lack of comparability. As a result, the FASB recently issued a standard update designed to address many of the lingering issues related to accounting for derivatives.

According to the FASB, ASU 2017-12 Derivatives and Hedging (Topic 815): Targeted Improvements to Accounting for Hedging Activities is designed to help entities facilitate financial reporting that more closely reflects an entity's risk management activities (FASB, 2017). The standard aims to achieve this goal by changing the designation and measurement guidance for qualifying hedge relationships and the presentation of hedge results (FASB, 2017). Specifically, the standard update attempts to address these issues by: (1) expanding hedge accounting for financial and nonfinancial risk components, (2) eliminating the separate measurement and reporting of hedge ineffectiveness, (3) simplifying the manner in which assessments of hedge ineffectiveness may be performed, and (4) enhancing disclosures for hedge results (FASB, 2017).

2.3. Derivatives and firm risk exposures

Firms can use derivatives to offset the risk that fair values or cash flows will be negatively impacted by adverse price or market movements (i.e. foreign currency and variable rate loans). The use of derivatives in instances such as these is referred to as hedging. However, only derivatives that meet certain complex accounting criteria qualify for hedge accounting treatment.[9] Gains and losses from derivative instruments designated as qualifying hedges under SFAS 133 are netted with the changes in fair value of the asset or liability underlying the hedge. Only the portion of the derivative gain/loss that exceeds the netted amount is reported in current earnings. However, if derivative positions do not qualify for hedge accounting, then the firm must classify them as trading and report all gains or losses related to the trading derivative in current earnings (FASB, 1998).

Although a derivative position may not qualify for hedge accounting treatment, disqualification from hedge accounting treatment does not necessarily imply that the derivative position is purely speculative in nature. Derivative positions that are intended to be used as economic and/or partial hedges may be classified as trading derivatives because the derivatives do not meet the FASB's hedge designation criteria or effectiveness test. As a result, derivative positions held as economic

[5] SFAS 52 is now a part ASC topic 830: *Foreign Currency Matters*.

[6] SFAS 80 was superseded by SFAS 133, which is now ASC topic 815: *Derivatives and Hedging*.

[7] SFAS 133 is now ASC topic 815: *Derivatives and Hedging* (FASB, 2008).

[8] SFAS 161 is now part of ASC 815: *Derivatives and Hedging*. The specific requirements of this standard can be found at ASC 815-10-50 (FASB, 2008).

[9] In order for derivative instruments to qualify for hedge designation, "at the inception of the hedge, the firm must provide formal documentation of the hedging relationship and the entity's risk management objective and strategy for undertaking the hedge, including identification of the hedging instrument, the hedged item, the nature of the risk being hedged, and how the hedging instrument's effectiveness in offsetting the exposure to changes in the hedged item's fair value will be assessed (FASB, 1998)." The hedge relationship is required to be highly effective both at inception and on an ongoing basis.

and/or partial hedges may be costlier for firms because the positions do not qualify for hedge accounting. However, if the benefits of the derivative position outweigh the costs, firms may still choose to reduce uncertainty and risk exposure with derivatives.

Alternatively, firms may use derivatives to increase their risk exposure through speculation. Speculation refers to the act of firms taking derivative positions that are not offset by an asset or liability. These positions are taken based on the firms' market views concerning the movements of interest rates, foreign exchange rates, or other various market conditions. The use of derivative instruments, either to hedge or speculate, is directly correlated with a firm's overall risk exposure. As such, it is important that practitioners correctly identify the intended use of derivative instruments in order to effectively communicate the firm's risk exposure in the financial statements.

3. Derivative use and financial reporting quality

Financial reporting quality is a qualitative concept. Financial reporting quality requires that financial information be relevant and faithfully represented in the financial statements to improve the decision usefulness of financial information for investors and creditors (IASB, 2008). However, researchers are unable to directly measure qualitative concepts. The inability to directly measure financial reporting quality has resulted in studies focusing on empirically measurable factors that are believed to reflect financial reporting quality. Earnings management, disclosure quality, and earnings quality are some of the empirical measures that have commonly been used to measure financial reporting quality (van Beest, Braam, & Boelens, 2009). This review includes discussion of literature related to several key empirical measures of financial reporting quality identified by prior literature, including earnings quality, earnings management, disclosure quality, and information asymmetry.

3.1. Earnings quality

Prior literature defines earnings quality as the degree to which reported earnings reflect economic reality (Krishnan & Parsons, 2008; van Beest et al., 2009). Francis, LaFond, Olsson, and Schipper (2004) identify and examine the effect of seven earnings attributes, proxies for earnings quality, on the cost of equity capital. Francis et al. (2004) categorize these attributes as accounting- or market-based. Accounting-based attributes include accrual quality, earnings persistence, earnings predictability and smoothness. Market-based attributes include value relevance, timeliness, and conservatism. Francis et al. (2004) find that although all of the earnings attributes influence the cost of equity capital, the accounting-based attributes have the largest impact. This review focuses on two of the four accounting-based attributes, earnings smoothness and predictability because the topics are more heavily covered in the derivatives literature and are directly related to the decision usefulness of financial statements.[10] An overview of the studies reviewed in this section is presented in Table 1.

3.1.1. Earnings predictability

Given current derivative accounting requirements under U.S. Generally Accepted Accounting Principles (GAAP), several studies in the accounting and finance literature focus on how derivative usage influences earnings predictability. Under current accounting regulations, fair value adjustments related to unrealized cash flow hedge gains and losses are included in OCI on the income statement. At the end of the accounting period, these gains and losses are closed to shareholders' equity, specifically Accumulated Other Comprehensive Income (AOCI), until the future transaction occurs. After the transaction occurs the firm must then net the realized gain or loss against the unrealized gain or loss that the firm had accumulated in shareholders' equity (in AOCI). Only the portion of the realized gain/loss that exceeds this netted amount is reported in current period earnings. As a result, the translation of unrealized cash flow hedging gains and losses has the ability to influence future earnings.

Campbell et al. (2015) examine whether sophisticated investors understand the information provided by the fair value of cash flow hedges. In the study, Campbell et al. (2015) find that unrealized cash flow hedge gains/losses are negatively associated with future profitability and firm value. In addition, Campbell et al. (2015) find that analysts and investors do not correctly incorporate unrealized cash flow hedge gains and losses into their future earnings forecasts. Campbell et al. (2015) argue that cash flow hedges are not accurately priced by the stock market due to difficultly in mapping current unrealized gains/losses to forecasts of profitability. The results from Campbell et al. (2015) illustrate that cash flow hedges have implications for earnings predictability relative to other components of OCI.

Although their study is limited to the banking industry, Bratten, Causholli, and Kahn (2016) also examine whether fair value adjustments included in OCI predict future firm performance. Bratten et al. (2016) find that fair value adjustments included in OCI can predict future earnings. However, the results suggest that not all unrealized gains and losses included in OCI have similar implications, especially those that are fair value related. Similar to the results of Campbell et al. (2015), Bratten et al. (2016) find that unrealized cash flow hedge gains and losses included in OCI are negatively associated with future earnings. However, Bratten et al. (2016) find that unrealized gains and losses on available-for-sale securities are positively associated with future earnings. The findings of Campbell et al. (2015) and Bratten et al. (2016) demonstrate the varied effects that different fair-value related components of OCI can have on earnings predictability.

Bratten et al. (2016) also examine the relationship between fair value adjustments included in OCI and earnings predictability during the 2007-2009 financial crisis. Bratten et al. (2016) continue to find a significant relationship between fair value adjustments and future earnings during this time period. The findings are consistent with fair value adjustments predicting future performance during the financial crisis period. Bratten et al.'s (2016) results are in opposition to the claims that declines in fair values during the crisis were unrelated to deterioration in the underlying fundamentals. Overall, their findings are consistent with fair value accounting meeting the FASB's objective concerning the provision of decision useful information that aids in the prediction of future performance. However, Bratten et al. (2016) also find that OCI only predicts future earnings for banks that hold a higher proportion of securities guaranteed by the U.S. government. This implies that the reliability with which fair values are measured influence the ability of OCI to predict future earnings. The results of Bratten et al. (2016) suggest that fair value accounting increases the relevance of financial reporting but reduces its reliability, which may ultimately

[10] In their conceptual frameworks, both the FASB and IASB stress the importance of firms providing financial information that helps financial statement users assess the prospects of an entity's future performance (FASB, 2006; IASB, 2008). Based on this objective, earnings smoothness and earnings predictability are desirable earnings attributes. The attributes are desirable because they provide relevant information that can be used to forecast future firm performance. Specifically, earnings predictability implies that the information provided in the financial statements meets the FASB's relevance requirement, in that future earnings can be reliably forecast based on current financial statement data. Additionally, consistent earnings and cash flows have higher present values, which impact firms' valuation in the context of the dividend capitalization model. Earnings smoothness is also a desirable attribute because volatile earnings imply higher firm risk, which is linked to higher costs of external financing and a higher probability of bankruptcy. However, smooth earnings may also be indicative of firms managing earnings to reduce volatility, which is expanded upon in the earnings management portion of the review.

(footnote continued)

Table 1
Summary of Selected Accounting Literature on Derivative Use and Earnings Quality

Subject area	Article	Time period	Sample	Findings related to derivatives
Earnings Predictability	Campbell, Downes, & Schwartz (2015)	2001-2008	Non-financial firms (n = 481 firms; 2,281 firm-years)	Unrealized cash flow hedging gains and losses are negatively related to analyst forecast errors in the subsequent 2 years, which suggests that sophisticated investors fail to incorporate cash flow hedge information into their forecasts. However, when managers provide forecasts of earnings, unrealized cash flow hedging gains and losses are no longer associated with analyst forecast errors.
	Chang, Donohoe, & Souigiannis (2016)	1998-2011	U.S. Publicly Traded Non-financial firms (n = 23,353 firm-years)	Analysts' earnings forecasts for new derivatives users are less accurate and more dispersed after derivatives initiation. Their results imply that analysts routinely misjudge the earnings implications of firms' derivatives activity.
	Bratten, Causholli, & Khan (2016)	2001-2013	U.S. bank holding companies (n = 2,420 bank holding companies; 14,781 bank-years)	Fair value oriented OCI is incrementally associated with 1- and 2-year-ahead bank performance. Net unrealized gains and losses from derivatives are negatively associated related to future earnings and net unrealized gains and losses from available-for-sale securities are positively and significantly associated with future earnings.
Earnings Smoothness	Richie, Glegg, & Gleason (2006)	1995-2002	U.S. multinational corporations with at least 10% of revenues generated in Europe (n = 345 firms)	Following SFAS 133, firms observe a significant decrease in earnings predictability accompanied by a significant decrease in earnings volatility, and this is true particularly for firms who are hedged using techniques other than operational hedges, such as derivative hedges.
	Zhang (2009)	1995-2001	Non-financial firms (n = 950 firms)	Cash flow volatility and risk exposures related to interest rate, foreign exchange rate, and commodity price decrease significantly for firms that are ineffective hedgers/speculators but not for firms that are effective hedgers after SFAS 133.
	Hughen (2010)	2000-2007	Firms that filed restatements related to SFAS 133 (n = 105 restatements)	Firms' historic abilities to meet earnings targets are positively associated with the likelihood that firms will focus on accounting earnings rather than economic earnings, which implies that a change in management behavior following a change in accounting method.
	Abdel-khalic & Chen (2015)	1995-2012	U.S. bank holding companies (n = 397 bank holding companies; 7,645 bank-quarters)	Provide evidence of a temporal association between the passage of two Congressional Acts and the abnormal growth in trading over-the-counter derivatives.

This table presents summaries of selected works cited within. The "findings related to derivatives" column include text taken directly from the works' abstract, introductions, and/or conclusion.

lead to agency conflict.

Chang, Donohoe & Sougiannis (2016) add to this stream of literature by investigating whether and how the complexity of derivatives influences analysts' earnings forecast properties. Chang et al. (2016) find that, despite their financial expertise, analysts routinely misjudge the earnings implications of firms' derivatives activities. Using the focused setting of new derivative users, Chang et al. (2016) find that earnings forecasts for new derivatives users were 26 percent less accurate and 27 percent more dispersed after the initiation of a derivatives program. The results suggest the economic and reporting complexities of derivatives jointly hinder the accuracy of analysts' earnings forecasts. This leads analysts to routinely misjudge the earnings implications of firm's derivative activities. Chang et al. (2016) contend that economic complexity does not hinders analysts' assessment of derivatives users, but rather the reporting of such economic complexity.

Although accounting for derivatives has improved the predictability of earnings, the literature suggests that more work must be done. The mechanics of derivative accounting prove to be relevant and map through the financial statements as expected. However, practitioners and standard setters must do more to improve the communication of this value relevant information. Improved communication concerning derivatives and their usage can help financial statement users properly apply this information in order to more effectively assess firm performance.

3.1.2. Earnings smoothness

Under current accounting regulations, all hedge ineffectiveness[11] and trading gains/losses are required to be reported in current earnings. In addition, fair value adjustments related to unrealized cash flow hedge gains and losses are to be included in OCI until realized. The gains and losses related to hedge ineffectiveness and the translation of unrealized cash flow hedging gains and losses have the ability to influence future earnings and earnings volatility. Several studies suggest that earnings volatility does not increase after the implementation of SFAS 133 and often provide evidence of a reduction in volatility for firms hedging with derivatives (Beneda, 2013; Dorminey & Apostolou, 2012; Hairston, 2014; Park, 2004; Pierce, 2018; Singh, 2004; Zhang, 2009).

Zhang (2009) examines the risk exposure, earnings and cash flow volatility of firms that use derivatives after the implementation of SFAS 133. In the study, Zhang (2009) classifies derivative users into two categories, effective hedgers and ineffective hedgers/speculators. Effective hedgers (ineffective hedgers/speculators) are defined as firms whose risk exposure (i.e. interest rate, foreign exchange, or commodity price risk) is lower (higher) than the expected level[12] after the initiation of a derivative program. While Zhang (2009) does not find a significant increase in earnings volatility related to derivative use for either group, she does find a significant decrease in cash flow volatility for ineffective hedgers/speculators after SFAS 133. Zhang (2009) attributes the decrease in cash flow volatility to a decrease in overall risk exposure after the passage of the SFAS 133.

Similar to Zhang (2009), Richie, Glegg, and Gleason (2006) also examine the effect of the implementation of SFAS 133 on earnings volatility and predictability. Richie et al. (2006) divide derivative users into multiple categories, firms that manage risk exposure using operational hedges, derivatives, or both. In contrast to Zhang (2009), Richie et al. (2006) find that although firms that hedged using derivatives prior to SFAS 133 reduced their exchange rate risk exposures, the firms also experienced a significant increase in earnings volatility. The firms that hedged with derivatives also experienced a decrease in earnings predictability after the implementation of SFAS 133, if the firms remained hedged. However, Richie et al. (2006) also found that market value did not change following SFAS 133. These findings suggest that investors did not equate accounting regulation changes, and earnings per share (EPS) volatility, with changes in cash flow.

Abdel-khalik and Chen (2015) extend this stream of literature by examining the growth of financial derivatives among a sample of bank holding companies in the U.S., from 1995 to 2012. In their study, Abdel-khalik and Chen (2015) predict and find that the use of cash flow hedge accounting treatment helps reduce earnings volatility among financial institutions using derivatives. In addition, Abdel-khalik and Chen (2015) document a negative relationship between market return volatility and the extent of using cash flow hedge accounting. This finding suggests that the market views the use of cash flow hedging as a risk-reducing device. Abdel-khalik and Chen (2015) contend that their findings support the notion that hedge accounting provides firms with the incentive to use derivatives for hedging purposes, if their goal is to reduce volatility in reported earnings.

Hughen (2010) uses a unique setting to determine if firms are more concerned with economic or accounting earnings volatility that results from derivative use. Using firm restatements due to misapplication of hedge accounting, Hughen (2010) tests whether firms will forgo existing hedging strategies to avoid reporting earnings volatility in restated financial statements. Hughen suggests that firms have three options when restating their financial statements, (1) properly document the hedge so that the firm can apply hedge accounting treatment, (2) continue the position as an economic hedge, or (3) discontinue the hedge. Hughen (2010) finds that the likelihood that a firm will continue an economic hedge is negatively associated with the firm's ability to meet earnings targets.

The findings from Richie et al. (2006), Zhang (2009), Hughen (2010), and Abdel-khalik and Chen (2015) imply that current derivative regulation has both positive and negative effects on earnings smoothness. Some studies suggest that the passage of SFAS 133 has been effective at reducing the incentive of firms to engage in speculative behavior, as demonstrated by the overall reduction in risk exposure for hedgers and speculators documented by Zhang (2009) and Abdel-khalik and Chen (2015). However, Richie et al. (2006) demonstrate that SFAS 133 also had an unintended consequence of increasing volatility for hedgers in their sample. Richie et al. (2006), Zhang (2009), Hughen (2010), and Abdel-khalik and Chen (2015) may reveal a flaw in the hedge criterion that disallows hedge accounting for economic hedges. Under current regulation economic hedges may require reclassification as trading positions either because the derivatives fail to meet the hedge criterion, or it is economically infeasible for firms to document the hedge relationship, as evidenced by Hughen (2010).

3.1.3. Implications of earnings quality literature

Richie et al. (2006), Hughen (2010), Abdel-khalik and Chen (2015), Campbell et al. (2015), Bratten et al. (2016), and Chang, Donohoe, and Sougiannis (2016) confirm the necessity of improving financial reporting quality for derivative positions. Although investors may be able to more accurately use derivative disclosures to identify firms' risk exposure and predict future earnings, the financial information investors utilize related to non-hedge positions may actually reflect economic hedges, or other positions, that are intended to reduce risk but are classified as trading positions due to strict hedge criteria. Additionally, Abdel-khalik and Chen (2015) provide evidence that financial firms' trading positions drastically increase after the deregulation of the banking industry, with the Financial Services Modernization Act of 1999 and the Commodity Futures Modernization Act of 2000

[11] Hedge ineffectiveness is the extent to which changes in the fair value or cash flows of the hedging (derivative) instrument do not offset changes in the fair value or cash flow of the asset or liability underlying the hedge.

[12] Zhang (2009) uses three models to estimate interest rate, foreign exchange rate, and commodity price risk before the initiation of a derivatives program for firms in her sample. This allows Zhang (2009) to have a reasonable estimate of firm's risk exposure prior to initiation of a derivatives program. Using the risk estimates prior to the initiation of a derivatives program, Zhang (2009) then calculates the expected level of risk exposures for each sample firm after the initiation of their derivatives program.

act.[13] Abdel-khalik and Chen (2015) suggest that the favorable treatment of qualifying hedges under SFAS 133 also increased financial firms' ability to take on additional risk by increasing their trading positions. Thus, the amendment to the current hedge accounting model may serve to remedy many of the issues identified in prior literature related to hedge accounting under the current standard. Specifically, ASU 2017-12 expands hedge accounting for financial and nonfinancial risk components, eliminates the separate measurement and reporting of hedge ineffectiveness, simplifies the manner in which assessments of hedge ineffectiveness may be performed, and enhances disclosures for hedge results (FASB, 2017). Although this is not a comprehensive list of the issues related to accounting for derivatives, the standard update addresses many of the most prominent difficulties that are documented in Richie et al. (2006), Abdel-khalik and Chen (2015), and Campbell et al. (2015).

3.2. Earnings management

Given the potential for derivative use to increase earnings volatility through hedge ineffectiveness and/or trading gains and losses, several studies examine the relationship between derivative use and earnings management. These studies tend to focus on the tradeoff between accrual-based earnings management techniques and hedging with derivatives. Several studies have also suggested that hedging with derivatives can be considered a form of real earnings management given that firms undertake a "real" activity to reduce income volatility. A summary of the studies reviewed in this section is presented in Table 2.

Barton (2001) was one of the first to empirically examine the relationship between hedging with derivatives and income smoothing. Using a sample of Fortune 500 firms from 1994-1996, Barton (2001) examines whether firms trade-off using derivatives and discretionary accruals to smoothing earnings, prior to the implementation of SFAS 133. Barton (2001) finds evidence that derivatives and discretionary accruals are partial substitutes for smoothing earnings. In the study, Barton (2001) noted lower levels of discretionary accruals in firms that held large notional values of derivatives. Pincus and Rajgopal (2002) also examine this relationship using a sample of firms in the Oil and Gas industry prior to the implementation of SFAS 133 and confirm the findings of Barton (2001). Barton's (2001) and Pincus and Rajgopal's (2002) findings suggest that prior to the implementation of SFAS No. 133 firms could choose between hedging and accruals management as alternative income smoothing mechanisms.

However, after the implementation of SFAS 133, hedging derivatives became less useful for smoothing earnings (Choi, Mao, & Upadhyay, 2015; Kilic, Lobo, Ranasinghe, & Sivaramakrishnan, 2013). Kilic et al. (2013) examine the impact of SFAS 133 on the financial reporting of U.S. commercial banks. Kilic et al. (2013) divide their sample into two categories, banks that are unaffected and affected by SFAS 133. Unaffected banks are defined as those that use derivatives and do not report gains/losses from ineffective hedging. Affected banks are defined as those that use derivatives and report gains/losses from ineffective hedging. The results from Kilic et al. (2013) indicate that those banks more affected by the regulation use discretionary accruals, specifically loan loss provisions, to report smoother income, whereas unaffected banks do not.

In an extension of Kilic et al. (2013), Choi et al. (2015) examine how the adoption of the fair value derivative accounting rules under SFAS 133 have altered the relation between derivative hedging and accrual management for non-financial firms. Choi et al. (2015) find that the relation between financial derivative use and discretionary accruals is negative before SFAS 133, consistent with Barton (2001) and Pincus and Rajgopal (2002). However, Choi et al. (2015) also find that the substitution relation is significantly mitigated following the implementation of SFAS 133, which is consistent with Kilic et al. (2013). Choi et al. (2015) contend that their findings are consistent with the argument suggesting that financial derivatives became less effective in smoothing earnings due to the mandated fair value accounting treatment for derivatives under SFAS 133.

Alternatively, Attia (2012) examines the relationship between hedging derivatives and discretionary accruals and find a complimentary relationship between the two income smoothing practices. Attia (2012) also finds that this relationship is moderated by corporate governance. In the study, Attia (2012) shows that good corporate governance is associated with higher levels of hedging and lower levels of overall income smoothing. Because the sample period used in Attia's (2012) study spans two regulatory periods, pre- and post-SFAS 133, it could be argued that the results support a complimentary view of the relationship between hedging and accruals management. However, it is possible that Attia's (2012) findings may be more heavily influenced by one regulatory period than another. Given that Barton (2001) and Pincus and Rajgopal (2002) examine the pre-SFAS 133 period and find similar results, Attia's (2012) finding may also be significantly influenced by this time period.

Barton (2001), Pincus and Rajgopal (2002), Attia (2012), Kilic et al. (2013), and Choi et al. (2015) all suggest that hedging with derivatives is a real activity that can be used as either a substitute or compliment to accrual management techniques in smoothing earnings. These studies also suggest that accounting regulations influence the benefits derived from using one income smoothing method over another. However, there seems to exist a consensus in the literature that the standards issued by the FASB did effectively reduce the ability of firms to use derivative positions to manage earnings following the passage of SFAS 133. Overall, the findings from prior literature suggests that derivative accounting regulation was successful in improving financial reporting quality for firms that previously used derivatives to manage their earnings.

3.3. FASB regulations and derivative disclosure quality

Over the past 30 years derivatives disclosures have significantly changed. The first substantial change occurred in 1994 with the implementation of SFAS 119, which required firms to disclose the intended use of derivative instruments. SFAS 119 was followed by Financial Reporting Release (FRR) No. 48, in 1997. FRR No. 48 required SEC registrants to make additional quantitative and qualitative disclosures on the market-risk of derivative positions. However, there was limited guidance as to the detail required under this release. As such, there were a great deal of inconsistencies in regard to the value added by FRR No. 48's market-risk disclosures (Roulstone, 1999). In 1998 and 2008, SFAS 133 and SFAS 161, were released to consolidate the accounting and disclosure requirements for derivatives and hedging activities. These standards significantly increased the required disclosures related to derivative instruments. Since their release, several studies have examined the value relevance of derivative disclosures, and an overview of the studies reviewed in this section is presented in Table 3.

3.3.1. SFAS 119

Venkatachalam (1996) examines the value relevance of derivative disclosures amongst banks under SFAS 119. SFAS 119 had three primary provisions that influenced derivatives disclosures: (1) identify the purpose of derivative financial instruments, (2) indicate if the aggregate fair value of derivative instruments is a net asset or liability position, and (3) disaggregate information about financial instruments with off-balance-sheet risk of accounting loss (FASB, 1994). Venkatachalam (1996) finds that, in bank holding companies, fair values of derivatives

[13] The Financial Services Modernization and Commodity Futures Modernization Acts reversed portions of the Glass-Steagall act that limited banks' ability to trade in derivatives and required the separation of investment and deposit-taking banks.

Table 2
Summary of selected accounting literature on derivative use and earnings management.

Article	Time Period	Sample	Findings Related to Derivatives
Barton (2001)	1994-1996	Nonregulated Fortune 500 firms (n = 304 firms; 912 firm-years)	Managers use hedging derivatives and discretionary accruals as partial substitutes for smoothing earnings. Barton (2001) documents a significant negative relationship between hedging derivatives' notional amounts and the magnitude of discretionary accruals.
Pincus and Rajgopal (2002)	1993-1996	Oil and gas exploration and producing firms (n = 236 firm years)	Managers of oil and gas producing firms first determine the extent to which the firm will uses derivatives to hedge oil price risk, and then manage residual earnings volatility by trading off abnormal accruals and hedging with derivatives to smooth income.
Attia (2012)	1993-2004	U.S. non-financial firms (n = 504 firms)	Accounting manipulations and derivatives are complimentary income smoothing instruments and the income smoothing process is simultaneous.
Kilic, Lobo, Ranasinghe, & Sivaramakrishnan (2013)	1998-2003	U.S. bank holding companies (n = 1,427 bank-years)	Document that mandatory recognition of hedge ineffectiveness under SFAS 133 reduced banks' ability to smooth income through derivatives, and that banks that are more affected by SFAS 133 rely more on loan loss provisions to smooth income.
Choi, Mao, & Upadhyay (2015)	Even years during the period of 1996-2006	Firms included in S&P 500 index at the fiscal year-end 2000 (n = 404 firms; 1,654 firm-years)	The substitute relationship between derivative hedging and discretionary accruals is significantly lower after the implementation of SFAS 133. Their results suggest that a material change in an accounting rule regarding derivatives can influence the level and volatility of reported earnings, as well as the method of income smoothing.

This table presents summaries of selected works cited within. The "findings related to derivatives" column include text taken directly from the works' abstract, introductions, and/or conclusion.

reported under SFAS 119 explain more of the cross-sectional variation in bank share prices than the notional values of derivatives. Although Venkatachalam (1996) provides evidence of the value relevance of information disclosed under SFAS 119, the study suffers from similar limitations of previous derivatives research. Specifically, Venkatachalam (1996) examines derivative disclosures in one industry, has a small sample size (99 companies), and examines a relatively small sample period (1993-1994).

Similar to Venkatachalam (1996), Schrand (1997) examines the association between stock-price sensitivity to unexpected changes in interest rates and the use of interest rate derivatives, prior to the implementation of SFAS 119 for savings and loan associations. Schrand (1997) uses this sample group because these firms are required to have more detailed derivative disclosures, and the majority of their assets and liabilities are highly sensitive to interest rate risk. The results confirm that the disclosures being considered by the SEC and encouraged in SFAS No. 119 were associated with the market's perception of interest rate sensitivity even though these disclosures were only reported to regulators and were not required public disclosures.

Nelson, Moffit, and Affleck-Graves (2005) examine the annual stock performance of firms that disclose the use of derivatives to hedge under SFAS 119. Nelson et al. (2005) find that the stock returns of firms that hedge outperform non-hedging firms by an average of 4.3 percent per year over their sample period. However, when derivative users are partitioned into three types: interest rate, currency, and commodity, abnormal gains are limited to currency hedgers. The findings suggest that the derivative disclosures under SFAS 119 were value relevant in that firms using currency derivatives to hedge are likely to experience abnormal stock returns. Thus, SFAS 119 disclosures are likely to contain some information that influences the market and is relevant to financial statement users.

Alternatively, Franco-Wong (2000) empirically examines and models the association between currency exposure and accounting disclosures about foreign exchange derivatives under SFAS 119. He finds that derivative disclosures under SFAS 119 are only partially consistent with his expectations that financial statement users would find these disclosures useful in assessing firms' currency exposures. Franco-Wong (2000) suggests that the weak findings are attributable to the shortcomings of the derivative disclosures under SFAS 119. Specifically, Franco-Wong (2000) suggests that additional disclosures such as disaggregated notional amount information by class of instrument, information on non-derivatives related underlying exposures, information on the notional amount and fair value by currency, and separate information on the amounts of derivatives related and non-derivatives related foreign currency gains and losses would be useful.

3.3.2. FFR No. 48

In 1997, the SEC issued FRR No. 48, which attempted to address some of the issues raised by investors and other constituents for enhanced public disclosure of firm exposure to market risk (Franco-Wong, 2000; Linsmeier & Pearson, 1997). FFR No. 48 required additional forward-looking quantitative market risk disclosures in 10-K reports. In an assessment of the informativeness of FRR No. 48, Linsmeier, Thornton, Venkatachalam, & Welker (2002) find that after firms disclose mandated FRR No. 48 information on their derivative positions, trading volume sensitivity related to changes in the underlying market rates and prices (i.e. interest rate, exchange rate, and commodity prices) declines. Additionally, Linsmeier, Thornton, Venkatachalam, and Welker (2002) show that tabular disclosures were more effective in reducing trading volume sensitivity to interest rate movements, whereas sensitivity and value-at-risk (VaR)[14] disclosures were more effective in reducing the trading volume sensitivity to foreign currency exchange rate movements. Linsmeier et al. (2002) contend that the observed declines in trading volume sensitivity are consistent with FRR No. 48 market risk disclosures providing useful information to investors.

Ahmed, Beatty, and Bettinghaus (2004) also examine the value relevance of derivative disclosures made by commercial banks under FRR No. 48. Ahmed et al. (2004) provides indirect evidence on the efficacy of the SEC's tabular market-risk disclosure requirements[15] in indicating commercial bank interest-rate risk. Ahmed et al. (2004) determine the value relevance of derivative disclosures by examining the association between maturity-gap[16] data disclosed in bank call reports and future

[14] Value-at-risk (VaR) is a measure of the risk of loss for investments. VaR estimates how much a group of investments might lose (with a given probability), based on normal market conditions, in a set time period.

[15] FRR 48 requires firms to report their market risks in one of three formats: tabular, value at risk (VAR), or a sensitivity analysis. See Linsmeier and Pearson (1997) for a description of the three forms.

[16] Maturity-gap is a measure of interest rate risk and refers to the gap between the maturities of assets and liabilities held by the firm. In the event the

Table 3
Summary of selected accounting literature on derivative use and disclosure quality.

Article	Time period	Sample	Findings related to derivatives
Venkatachalam (1996)	1993-1994	U.S. bank holding companies (n = 99 bank holding companies)	The findings suggest that the fair value estimates for derivatives help explain cross-sectional variation in bank share prices and that the fair values have incremental explanatory power over and above notional amounts of derivatives.
Roulstone (1999)	1997	SEC registrants (n = 25 firms)	Market risk disclosures, encouraged but not required under FAS No. 119, improved greatly under FRR No. 48 but varied widely in detail and clarity. The majority of registrants provided quantitative and qualitative disclosures of market risk; however, only about half of these firms discussed the details and limitations of their risk measurement models and disclosures.
Franco-Wong (2000)	1994-1996	Fortune 500 Manufacturing Firms (n = 145 firms)	This study suggests that derivatives disclosures are potentially useful because notional amount serves as the independent variable in the estimation of the unknown per-unit deltas of FX-sensitive portfolios. The author finds that neither aggregated nor disaggregated fair value disclosures complement notional amount in assessing currency risk exposure.
Linsmeier, Thornton, Venkatachalam, & Welker (2002)	1997-1998	Firms Providing FRR No. 48 Market Risk Disclosures (n = 222 firms)	After firms disclose FRR No. 48 mandated information about their exposures to interest rates, foreign currency exchange rates, and energy prices, trading volume sensitivity to changes in these underlying market rates and prices declines, which suggests that FRR No. 48 market risk disclosures provide useful information to investors.
Ahmed, Beatty, & Bettinghaus (2004)	1990-1997	Commercial banks (n = 54,489 bank-years)	Commercial bank maturity-gap disclosures are effective in indicating the net interest income that is exposed to interest-rate risk.
Nelson, Moffitt, & Affleck-Graves (2005)	1995-1999	Publicly Traded Non-Financial Firms (n = 1308 firms	Companies that hedge outperform other securities by 4.3% per year on average over the study's sample period. When the authors segment performance by the type of hedge used, Nelson et al. (2005) find that the over-performance is due entirely to larger firms that hedge currency.
Ahmed, Kilic, & Lobo (2006)	1995-2000	U.S. bank holding companies (n = 146 banks)	Investor valuation of derivative financial instruments differs depending upon whether the fair value of the instruments is recognized or disclosed. The valuation coefficients on disclosed derivatives are not significant; whereas, the valuation coefficients on recognized derivatives are significant. The results are consistent with the idea that recognition and disclosure are not substitutes and provide evidence that SFAS 133 increases the transparency of accounting for derivatives.
Gay, Lin, & Smith (2011)	1992-1996; 2002-2004	Fortune 500 and Business Week 1000 firms (n = 1,541 firms; 3,440 firm-years)	The cost of equity of derivatives users is lower than non-users by 24–78 basis points. Further, the authors find that the reduction in the cost of equity is attributable to both lower market beta and SMB beta, suggesting that firms use derivatives to reduce their financial distress risk and that this distress risk has a systematic component that is priced in the market.
Makar, Wang, & Alam (2013)	2001-2006	Non-financial U.S. multinational firms (n = 144 firms; 708 firm-years)	The SFAS 133 mixed attribute model of including cash flow hedge adjustments in other comprehensive income, does not provide the information necessary for investors to understand the economic effects of derivative use.
Chen & King (2014)	1994-2009	Non-financial firms (n = 2,612 firms; 13,066 bonds)	Hedging is associated with a lower cost of debt. The influence of hedging on cost of debt is mainly through the lowering of bankruptcy risk and agency cost, and the reduction in information asymmetry.
Campbell (2015)	2001-2006	Non-financial firms (n = 1,754 firms; 6,324 firm-years)	Unrealized cash flow hedge gains/losses are negatively associated with future changes in gross profit and future stock returns over the subsequent 2 years.
Manchiraju, Hamlen, Kross, & Suk (2016)	2007-2012	Oil and Gas Firms (n = 87 firms; 445 firm-years)	Their findings indicate that firms use derivatives for both hedging and non-hedging purposes and that the derivative gains have a substantial impact on firms' overall earnings. Manchiraju et al. (2016) find that CEOs are rewarded for hedge derivative gains, more so in firms facing high financial contracting costs. However, non-hedge derivative gains are also rewarded. Furthermore, CEO compensation is more sensitive to non-hedge derivative gains than it is to non-hedge derivative losses.

This table presents summaries of selected works cited within. The "findings related to derivatives" column include text taken directly from the works' abstract, introductions, and/or conclusion.

changes in net interest income. Ahmed et al. (2004) examines maturity-gap data because its presentation is very similar to the tabular format required under FRR 48. Ahmed et al. (2004) find that maturity-gap measures are positively associated with interest-rate changes, and thus explain a significant portion of banks' interest-rate risk. However, Sribunnak and Franco-Wong (2006) suggest that quantitative disclosures under FRR No. 48 did not go far enough to explain firms' exposure to market risk because of the exclusion of nonfinancial instruments from the scope of the disclosure.

3.3.3. SFAS 119 and SFAS 133

In 1994, SFAS 119 was implemented by the FASB in an effort to provide more detailed disclosures related to the use of derivatives instruments. However, this statement was later superseded by SFAS 133 in 1998, which was a significantly more comprehensive standard detailing the definition of and accounting treatment for derivative instruments. In an examination of the impact of corporate hedging on the cost of public debt, Chen & King (2014) find that hedging is associated with a lower cost of debt. Chen & King (2014) contend that unlike equity investors, debtholders prefer that firms engage in risk reducing activities. This implies that hedging disclosures are of particular interest to debtholders given the potential risk reduction from hedging. The longer sample period covered in this study, 1994-2009, lends credibility to their findings. However, the sample period covers two regulatory periods, SFAS 119 and SFAS 133, which may

(*footnote continued*)
interest rates change interest income and interest expense will be affected, which could expose the firm to higher levels of liquidity risk. If this gap between maturities is large then a firm is exposed to higher levels of liquidity risk.

influence the generalizability of the results. Although Chen & King (2014) rely on general derivatives use disclosures (i.e. keyword searches for derivative use), which were available under SFAS 119 and SFAS 133, the additional information available under SFAS 133 may also influence the relationship between hedging and the cost of debt. Chen & King's (2014) findings suggest that debt investors find value relevant information in derivative disclosures. However, given that Chen & King (2014) spans two regulatory periods (SFAS 119 and SFAS 133) it is difficult to distinguish between the two standards in determining the significance of the findings.

Examining an alternative source of capital than Chen & King (2014), Gay, Lin, and Smith (2011) examine the relationship between derivative use and firms' cost of equity capital. Gay et al. (2011) find that the cost of equity for derivative users is significantly lower than that of non-users. Given the expanded availability of data under SFAS 119 and 133, Gay et al. (2011) use both an indicator variable and the total notional value of derivatives positions to estimate this relationship between the cost of equity and derivative usage. Gay et al. (2011) find evidence consistent with a reduction in the cost of equity among derivative users. Similar to Chen & King (2014), Gay et al.'s (2011) sample period also covers multiple regulatory periods, SFAS 105, 119 and 133.

However, unlike Chen & King (2014), Gay et al. (2011) perform univariate and multivariate analysis comparing the two different regulatory periods, which lends additional credibility to their findings. In the univariate analysis, Gay et al. (2011) find a significant difference between the average cost of equity for derivative users and non-users during the 1992-1996 sample period (SFAS 105 and 119 period). However, Gay et al. (2011) find an insignificant difference between the average cost of equity for derivative users and non-users during the 2002-2004 sample period (SFAS 133 period). In their multivariate analysis, Gay et al. (2011) find that a more significant negative association exists between derivative users and the cost of equity capital during the SFAS 133 portion of the sample (2002-2004) than the SFAS 105 and 119 portion (1992-1996). Their findings suggest that the disclosure information presented in the financial statements related to derivatives is value relevant to shareholders and provide some evidence of the decision usefulness of derivative disclosures.

Although progress was being made on the expansion of derivative disclosures, prior to SFAS 133, the FASB still lacked a comprehensive standard that addressed derivative accounting. After the implementation of SFAS 133, Ahmed, Kilic, and Lobo (2006) took advantage of the unique setting provided by the passage of the standard and examined whether disclosure or recognition of derivative instruments in the financial statements influenced investor valuation. Ahmed et al. (2006) find that investor valuations of derivatives are not significant when derivatives are disclosed prior to SFAS 133 but are significant when derivatives are recognized after SFAS 133.

In contrast to Ahmed et al. (2006), Campbell (2015) examines the more complex information requiring recognition under SFAS 133. Specifically, Campbell (2015) examines the value relevance of cash flow hedging gains and losses reported in OCI, whereas, Ahmed et al. (2006) examine the recognition of derivatives at fair value on the balance sheet. Campbell (2015) suggests that SFAS 133 disclosures are complex and incomplete, which results in investors underreacting to derivative disclosures. Campbell (2015) finds that investors fail to immediately impound cash flow hedge information conveyed by cash flow hedge gains/losses but are instead surprised at the later dates when firms disclose their profits. However, Campbell (2015) "cannot distinguish whether the underreaction is due to a lack of disclosure transparency, or incomplete disclosures related to the derivative contract or to the underlying hedged transaction." Makar, Wang, and Alam (2013) also find that the pricing of cash flow hedge adjustments reported in OCI do not provide the necessary information for investors to understand the economic effects of derivative use.

Campbell et al. (2015) suggest that even sophisticated investors have trouble processing information provided by unrealized cash flow hedging gains/losses. However, Campbell et al. (2015) contend that the trouble investors face in processing information could be mitigated if firms provided more transparent, complete, and forward-looking derivative disclosures. Campbell et al. (2015) document an insignificant association between cash flow hedging gains/losses and analysts' forecast errors when managers provide forecasts of earnings. Their findings demonstrate the merits of providing greater disclosure in financial statements. Campbell (2015) and Campbell et al. (2015) suggest that future research should examine whether the implementation of FAS 161 reduces, or eliminates, investor underreaction to unrealized cash flow hedge gains/losses reported in OCI. However, Campbell (2015) and Campbell et al. (2015) also caveat this call for research, stating that SFAS 161 may not be sufficient as the standard does not require firms to disclose when cash flow hedges will be reclassified into earnings.

3.3.4. FAS 161

Addressing Campbell's (2015) and Campbell et al.'s (2015) call for research related to the value relevance of additional disclosures required under SFAS 161, Manchiraju, Hamlen, Kross, and Suk (2016) examine the sensitivity of CEO compensation to fair value gains and losses in derivatives. In order to examine this issue, Manchiraju et al. (2016) use enhanced derivatives disclosures required under SFAS 161 over the sample period 2007-2012. Manchiraju et al. (2016) find that CEOs are rewarded for both hedging and trading derivative gains, particularly in firms facing high financial contracting costs. Manchiraju et al. (2016) also find that CEO compensation is more sensitive to trading derivative gains than it is to trading derivative losses, which is contrary to expectations given that trading derivatives often relate to speculation or inefficient hedging. Manchiraju et al. (2016) contend that their results suggest that the board of directors does not fully distinguish between the nature of derivative activities and rewards all gains in a similar fashion. However, the presence of an accounting financial expert on the compensation committee was found to be a mitigating factor.

Although Manchiraju et al. (2016) does not specifically examine the efficacy of SFAS 161 in improving financial reporting quality, inferences can be drawn as to its efficacy based on the results. Overall, the findings suggest that not enough information is contained in the enhanced disclosures required under SFAS 161. Due to the lack of information contained in the disclosures the reader is unable to distinguish between several competing hypotheses as to why CEOs are rewarded similarly for trading derivative gains and losses. [17]

3.3.5. Implications of the Disclosure Quality Literature

While there have been significant improvements to disclosures regarding derivative instruments, Campbell (2015) and Campbell et al. (2015) continue to call for more transparent and complete disclosures. Additionally, Ahmed et al.'s (2006) and Manchiraju et al.'s (2016) findings highlight how subjectivity in firm provided disclosures can negatively affect financial reporting quality. Alternatively, Gay et al. (2011) and Chen & King (2014), provide evidence that derivative disclosures contain value relevant information as demonstrated by their impact on the cost of equity and debt capital. This literature supports the FASB's continued movement toward more expansive derivative disclosures in ASU 2017-12.

[17] There are several ways that the results of this study may be interpreted. First, we may infer that boards of directors are unable to correctly interpret the measurements of hedge ineffectiveness under current accounting regulation. Second, the findings may be indicative that economic hedges are commonly classified as trading derivatives as the derivatives do not meet the requirements for hedge accounting, and as a result boards of directors do not differentiate between gains and losses for hedging and trading derivatives in determining CEO compensation. Finally, the findings could be the result of CEOs relying on the complex derivative accounting rules to boost their income using higher risk trading derivatives.

3.4. Information asymmetry

Given the complex nature of derivative instruments, as well as the complexity associated with accounting for derivatives, several studies have examined the relationship between information asymmetry and derivative usage. Although current accounting regulation has improved the transparency of firms' derivative positions, derivatives are accounted for at fair value on the balance sheet, and there has been considerable debate as to the informativeness of fair value accounting (Campbell et al., 2015; Chang et al., 2016; Ayres, Huang, & Myring, 2017; Bick, Orlova, & Sun, 2018).

Dadalt, Gay, and Nam (2002) were some of the first researchers to empirically address the issue of information asymmetry and derivative use under SFAS 119. Dadalt et al. (2002) find that analysts' earnings forecasts are more accurate and there is less dispersion between forecasts for firms using derivatives, which is consistent with lower information asymmetry for firms using derivatives. However, Lin and Lin (2012) and Dewally and Shao (2013) find evidence of increased information asymmetry among firms using derivatives.

Lin and Lin (2012) examine the relationship between information asymmetry and a firm's hedging versus speculation decision through the use of foreign currency derivatives, following the passage of SFAS 133. Lin and Lin (2012) provide evidence that there is a non-monotonic, U-shaped, relationship between the level of information asymmetry faced by a firm and hedge/speculative activity. Specifically, Lin and Lin (2012) find when levels of asymmetric information are low, as indicated by lower analyst forecast errors, firms are more likely to speculate.

Similarly, Dewally and Shao (2013) examine how the use of financial derivatives affects banks' informational structure and future stock performance from 1995-2010, which includes two regulatory periods.[18] Dewally and Shao (2013) find that higher levels of derivative use is associated with an increase in synchronicity of stock price movements with the market index. Dewally and Shao (2013) contend that this increased synchronicity is indicative of the revelation of less bank-specific information to the market. Although Dewally and Shao's (2013) findings contribute to the literature, their findings may not be generalizable to non-financial firms. Bank holding companies are generally excluded from accounting studies because banks are subject to more stringent regulation, specifically related to their derivative usage. In addition, the business structure of most bank holding companies is significantly different from non-financial firms. Moreover, the sample period of Dewally and Shao (2013) spans two regulatory periods, which makes it more difficult to distinguish between the effects of SFAS 119 and SFAS 133. As a result, two attributes of Dewally and Shao (2013) limit its generalizability, (1) the use of one highly regulated industry, and (2) the sample period encompassing two regulatory periods.

Chang et al. (2016) examine how the complexity of derivatives influences analysts' earnings forecasts. Focusing on new derivative users, Chang et al. (2016) find that earnings forecasts for new derivative users are 26 percent less accurate and 27 percent more dispersed after implementing a derivatives program. Chang et al. (2016) suggest that the findings imply that the economic and reporting complexity of derivatives reduce the accuracy of analysts' earnings forecasts. In additional analysis, Chang et al. (2016) note that the reduction in forecast accuracy and dispersion is significantly related to reporting complexity as opposed to economic complexity. In the study, Chang et al. (2016) define economic complexity as using more than one type of derivative instrument. Reporting complexity is defined as initiating derivative programs with relatively limited and ambiguous guidance from standard setters. To substantiate their claims of ambiguity in financial reporting in the early years of fair value accounting for derivatives under SFAS 133, Chang et al. (2016) apply their testing to all derivative users as opposed to only new users. Chang et al. (2016) find that earnings forecast accuracy and dispersion for all derivative users deteriorates after the implementation of SFAS 133. Chang et al.'s (2016) findings allude to one of the key criticisms of fair value accounting which is the reliability of fair value measures.

Ayres et al. (2017) examine the effect of fair value accounting on the behavior of analysts using a large sample of U.S. firms. Ayres et al. (2017) provides evidence showing that firms with higher fair value intensity[19] have more accurate earnings forecasts by using disclosures required by SFAS 157. In the study, Ayres et al. (2017) find significant positive associations between analyst forecast accuracy and Level 1 and 2 fair value measurements. The findings suggest that qualitative features of fair value measurements, including their business purpose and accounting treatment could also have an impact on analyst forecasting accuracy beyond typical measurement issues. By expanding their sample to include all firms, Ayres et al. (2017) is able to provide generalizable evidence on the relevance of fair value measurements across financial and non-financial firms.

3.4.1. Implications of the information asymmetry literature

Overall, this literature suggests that derivative accounting standards are working to reduce information asymmetry between firms and investors; however, there is still considerable room for improvement. Although many of these studies (Chang et al., 2016; Dewally & Shao, 2013; Lin & Lin, 2012) confirm that management possesses an informational advantage over analysts and investors, with respect to derivative accounting, the literature also suggests that managers can reduce the information processing costs for investors through voluntary disclosures (Ayres et al., 2017; Campbell et al., 2015). A summary of the studies reviewed in this section can be found in Table 4.

4. Future research

Accounting and Finance literature related to derivatives has grown significantly over the past two decades. However, there are still many opportunities for researchers to make significant contributions to this literature, particularly in the stream of literature related to financial reporting quality. Although there are many possible directions for future research related to derivatives and fair value accounting, we discuss some ideas for future research on audit quality and accounting differences between U.S. GAAP and International Financial Reporting Standards (IFRS) in the following sections.

4.1. Audit quality

Given the significant impact of derivative accounting on financial reporting quality and the inherent complexity in accounting for derivatives, a natural progression of the literature could be to consider the impact of derivative use on the external audit market. Other than anecdotal evidence that firms using derivatives tend to have Big N auditors and a recent study on the impact of OCI on audit fees (Huang, Lin, & Raghunandan, 2016; Lee & Park, 2013), there is very little research that addresses the impact of derivative use on audit quality or audit outcomes.

According to prior literature, even sophisticated investors and board members have trouble processing information related to derivative gains/losses (Campbell et al., 2015; Chang et al., 2016). This implies that auditors should be inherently more conservative when auditing firms that use derivatives. Because of the inherent risk and complexity related to accounting for derivatives, derivative accounting is likely to be considered a very high-risk audit area. In order to compensate for this increased risk, auditors could be expected to (1) perform additional

[18] Bank holding companies have been required to report derivative use in a manner consistent with SFAS 133 in their Federal Reserve Y-9C reports since 1994.

[19] Ayres et al. (2017) measure fair value intensity as the total fair value of assets and liabilities scaled by total assets.

Table 4
Summary of selected accounting literature on derivative use and information asymmetry.

Article	Time period	Sample	Findings related to derivatives
Dadalt, Gay, & Nam (2002)	1992-1996	Non-financial firms (n = 2,086 firm-years)	The use of derivatives and the extent of derivative usage is associated with lower asymmetric information.
Lin and Lin (2012)	2000-2004	S&P 1500 firms (n = 96 firms; 116 firm-years)	Firms facing a medium level of information asymmetry are more likely to hedge, while firms with very high and low levels of asymmetric information tend to speculate.
Dewally and Shao (2013)	1995-2010	Publicly traded bank holding companies (n = 98 banks, 1,035 bank-years)	High level use of financial instruments is associated with an increase in synchronicity of stock price movements with the market index, which indicates more opacity of bank-specific information to the market.
Chang, Donohoe, & Souigiannis (2016)	1998-2011	U.S. Publicly Traded Non-financial firms (n = 23,353 firm-years)	Analysts' earnings forecasts for new derivatives users are less accurate and more dispersed after derivatives initiation. Their results imply that analysts routinely misjudge the earnings implications of firms' derivatives activity.
Ayers, D., X. Huang, & M. Myring. 2017	2007-2013	Non-Financial and Financial Industry Firms (n = 13,990 firm-years; 11,662 non-financial industry; 2,338 financial industry firms)	Firms with higher fair value intensity have more accurate earnings forecasts. Find significant positive association between analysts forecast accuracy and Level 1 and 2 fair value measurements using the disclosure requirements of SFAS 157. Result imply that qualitative features of fair value measurements can have an impact on analysts forecast accuracy.

This table presents summaries of selected works cited within. The "findings related to derivatives" column include text taken directly from the works' abstract, introductions, and/or conclusion.

audit procedures to gain reasonable assurance that the financials are fairly stated (i.e. increase audit effort, resulting in higher fees and audit delays), and/or (2) issue more adverse opinions to lower their exposure to litigation risk. These issues have yet to be explored in the current empirical literature.

Although derivative accounting is complex and may increase firms' risk exposure, if there is not a departure from U.S. GAAP, auditors cannot issue adverse opinions. However, auditors may choose to use other mechanisms to communicate risk related to derivatives. Czerney, Schmidt, and Thompson (2014) suggest that auditors add explanatory language to audit opinions to emphasize matters that may be informative to financial statement users, and as a "practical mechanism to communicate risk." Czerney et al. (2014) contend, in circumstances where there is uncertainty, but no known misstatement, auditors may wish to include explanatory language to attract the attention of financial statement users. Adding explanatory language to an audit opinion creates an additional layer of protection from litigation risk. Accordingly, given the complexities inherent in derivative accounting, researchers could examine if derivative users are more likely to receive unqualified opinions with additional explanatory language. Researchers could also examine whether auditors consider certain types of derivatives usage (i.e. hedging or trading) or instruments (i.e. credit default swaps, commodity derivatives, etc.) as riskier than others, and if so, determine how auditors compensate for the additional risk.

Additionally, Krishnan (2003) and Balsam, Krishnan, and Yang (2003) examine the association between specialist auditors and earnings quality. The studies find that clients of specialist auditors have lower discretionary accruals and higher earnings response coefficients, which suggest that these specialist auditors are associated with higher earnings quality. Given that derivative use has significantly increased, audit firms may attempt to differentiate their services by specializing in fair value accounting and/or derivative valuation. As a result, researchers could examine, (1) if auditors actually specialize in fair value and/or derivative valuation, and if so, (2) whether use of such a specialist is associated with higher earnings quality, relative to non-specialists, and (3) if these specialists charge a premium for their services.

Finally, Lim and Tan (2008) find that audit quality increases with the level of non-audit services acquired from industry specialist auditors, compared to non-specialist auditors. Prior literature also suggests that the provision of non-audit services may impair the independence of auditors and thus may reduce audit quality (Tepalagul & Lin, 2015). As a result, future research could address whether audit firms are capitalizing on the complexity of accounting for derivatives by providing more non-audit services, such as valuation engagements, to derivative users, and how these services affect audit independence and earnings quality.

4.2. Differences in accounting for derivatives under U.S. GAAP and IFRS

Campbell (2015) and Campbell et al. (2015) call for more detailed and uniform derivative disclosures in order to reduce information asymmetry between firms using derivatives and investors. The comparability of derivative disclosures is not only an issue for U.S. firms but also for international firms. As more companies operate and participate in the global economy, it is increasingly important that financial statement users are able to compare the potential risks associated with derivative usage between firms under different accounting regimes. This sentiment has also been echoed by both the FASB and IASB in their efforts to make accounting standards more uniform between U.S. GAAP and IFRS.

In 2005, the FASB and IASB, entered into a joint project to revise and improve their standards on accounting for financial instruments. The objective of the Accounting for Financial Instruments project was to significantly improve the decision usefulness of financial instrument reporting for users of financial statements. The project aimed to replace the FASB's and IASB's financial instruments standards with a common standard (FASB, 2010; IASB, 2008). In order to achieve this outcome, one of the Boards' primary objectives was to simplify or eliminate the need for special hedge accounting requirements (FASB, 2014a, 2014b).

However, this project did not result in a common standard issued jointly by the IASB and FASB. While the FASB believed that the costs to overhaul the current GAAP framework for hedge accounting exceeded the benefits, the IASB committed to a phased approach of replacing their financial instruments requirements. In 2013, Both the FASB and IASB issued their respective Exposure Drafts. Considering the feedback received, the FASB decided to address only some of the key differences between the standards.[20] The FASB also stated that their objective was to develop accounting standards that represent an improvement to U.S. financial reporting. As such, changes that may be considered an improvement in jurisdictions with less developed financial reporting systems that use IFRS may not be considered an improvement in the U.S. (FASB, 2010). These factors and timetables contributed to the Boards reaching different conclusions on many technical issues in accounting for financial instruments. These conclusions resulted in the FASB making only targeted improvements to GAAP and

[20] For example, the FASB decided not to proceed with the contractual cash flow characteristics test and business model test that was jointly developed with the IASB (FASB, 2010). The IASB and FASB also developed and issued separate impairment models.

retaining their current framework for accounting for financial instruments (FASB, 2017), while the IASB pursued a complete overhaul of their respective standard.

Ultimately, U.S. GAAP and IFRS use alternative paths to achieve the same goal of improving the decision usefulness of derivative accounting information in their most recently released standards. Accounting for derivatives is a particularly interesting area to compare differences between IFRS and U.S GAAP because this is one area in which both accounting frameworks have a significant volume of detailed implementation guidance, considering that IFRS is generally viewed as less rules-laden than U.S. GAAP (PWC, 2014). In addition, given the recent changes to accounting for derivatives under both regimes, an opportunity exists for researchers to compare the financial reporting quality implications of targeted improvements to hedge accounting implemented by the FASB to the complete overhaul implemented by the IASB. Examining the differences between the two standards may support the more cost-effective approach of the FASB, or the comprehensive approach of the IASB. Although most of derivatives literature reviewed herein suggests that standard setters should work within the current mixed attribute accounting model to improve derivative accounting, the IASB has taken the opposite approach from the FASB in a comprehensive modification of the derivative accounting system. This presents researchers with an opportunity to compare IFRS and U.S. GAAP accounting for derivatives and determine which modification has a more significant effect on financial reporting quality.

Currently, IFRS provides opportunities to qualify for hedge accounting treatment that are not available under U.S. GAAP (PWC, 2014). For example, under IFRS, an entity can achieve hedge accounting treatment in relation to the foreign currency risk associated with a firm commitment to acquire a business in a business combination; whereas U.S. GAAP would not permit hedge accounting in this situation (PWC, 2014). IFRS also allows firms to use a single hedging instrument to hedge more than one risk in two or more hedged items, which is not allowed under U.S. GAAP. These differences between hedge accounting under IFRS and U.S. GAAP are particularly interesting as many of the FASB's amendments in ASU 2017-12 relate to relaxing and expanding the hedge accounting requirements. As a result, both sets of standards may better reflect the economic realities of firms' derivative programs, which may be more value relevant to financial statement users. Researchers could consider examining the comparability of derivative accounting before and after the issuance of the FASB and IASB standards to determine if the regimes have come closer or moved further away from their ultimate goal of a common standard accounting for financial instruments.

However, there are also areas where IFRS is more restrictive than U.S. GAAP including the nature, frequency, and methods of measuring and assessing hedge effectiveness (PWC, 2014). Specifically, U.S. GAAP provides for a shortcut method that allows firms to assume no ineffectiveness and bypass an effectiveness test and the need to measure quantitatively the amount of hedge ineffectiveness. IFRS does not have a similar shortcut method equivalent and requires hedge ineffectiveness to be measured and reported in income in all instances. Given that prior literature suggests that investors have difficulty interpreting information related to hedge ineffectiveness included in OCI, the shortcut method for U.S. GAAP may provide the necessary simplification to allow investors to interpret derivative outcomes and result in more accurate earnings forecasts. As such, the key differences between these standards provides an opportunity for researchers to develop a more comprehensive determination of how derivative regulation influences financial reporting quality.

5. Conclusion

Although other literature reviews have been conducted on derivatives, those reviews do not focus on accounting issues, or the financial reporting issues surrounding derivative instruments. In contrast to prior literature reviews, this survey of the academic literature focuses on the effect of derivative regulation on financial reporting quality. Specifically, we review the empirical evidence on the effectiveness of derivative regulations in improving financial reporting quality as defined by the FASB and IASB. We examine the implications of this literature for standard setters, practitioners, and accounting academics; we also identify potential areas for future academic research on derivative accounting.

The literature suggests that over time derivative regulations have improved the decision usefulness of information provided to investors, but there is still much room for improvement. While the literature suggests that current regulation has reduced firms' ability to use derivative positions for earnings management (Choi et al., 2015; Kilic et al., 2013), most studies continue to call for more detailed and uniform derivative disclosures to reduce information asymmetry between firms using derivatives and investors (Campbell, 2015; Campbell et al., 2015). This suggests that there are still many opportunities for researchers to make significant contributions to this stream of literature. Specifically, future research could address the relationships between derivatives and audit quality, as well as, differences between U.S. GAAP and IFRS accounting practices.

Our review of the academic literature may be useful to three groups: standard setters, practitioners, and accounting academics. As accounting for financial instruments continues to be a primary concern for the FASB and IASB, it is important for standard setters, practitioners, and accounting academics to consider the implications of academic research in their deliberation on issues related to improving derivative accounting. As such, this review should be useful in providing a synthesis of the derivatives literature to support recommendations to standard setters on current and future derivative regulation to improve financial reporting quality. Finally, the review is also useful to accounting academics in identifying potential areas for future research on derivative accounting.

Conflict of interest statement

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

We confirm that we have given due consideration to the protection of intellectual property associated with this work and that there are no impediments to publication, including the timing of publication, with respect to intellectual property. In so doing we confirm that we have followed the regulations of our institutions concerning intellectual property.

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