# THE FAIR VALUE OF CASH FLOW HEDGES, FUTURE PROFITABILITY AND STOCK RETURNS

by

John Leslie Campbell

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and recommend that it be accepted as fulfilling the dissertation requirement for the Degree of Doctor of Philosophy

_____ Date: 4/14/2010
Dan S. Dhaliwal

_____ Date: 4/14/2010
Dan A. Bens

_____ Date: 4/14/2010
Mark A. Trombley

_____ Date: 4/14/2010
Sandy Klasa

_____ Date: 4/14/2010
William C. Schwartz, Jr.

Final approval and acceptance of this dissertation is contingent upon the candidate's submission of the final copies of the dissertation to the Graduate College.

I hereby certify that I have read this dissertation prepared under my direction and recommend that it be accepted as fulfilling the dissertation requirement.

_____ Date: 4/14/2010
Dissertation Director: Dan S. Dhaliwal

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SIGNED: John Leslie Campbell

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## ABSTRACT

I examine the information content of unrealized cash flow hedge gains/losses for future profitability and stock returns. An unrealized gain on a cash flow hedge suggests that the price of the underlying hedged item (i.e. commodity price, foreign currency exchange rate or interest rate) moved in a direction that negatively affects the firm. Based on this inverse relation, I find that unrealized cash flow hedge gains/losses are negatively associated with future gross margin. This association is weaker for firms that have the ability to pass input price changes through to customers. Finally, I find that investors do not immediately price the information conveyed by cash flow hedges. Instead, investors appear surprised by future realizations of gross margin, consistent with the view that a lack of transparent disclosure on future hedged transactions leads to a delay in pricing. These results may inform current policy decisions of both the FASB and SEC.

# 1. INTRODUCTION

Financial Accounting Standards Board (FASB) Statement No. 133 (FAS 133) was adopted in 2001 and established the accounting concept of a cash flow hedge. A cash flow hedge is a derivative instrument which hedges a firm's exposure to variability in expected future cash flows (FASB 1999). Under FAS 133, the firm records changes in the fair value of cash flow hedges in accumulated other comprehensive income (AOCI), a component of shareholders' equity on firms' balance sheets.[1] Cash flow hedges usually protect firms from adverse price changes in commodities, foreign currencies or interest rates. Consequently, an unrealized gain on a cash flow hedge (the accounting effect) suggests that the price of the underlying hedged item (i.e. commodity price, foreign currency exchange rate or interest rate) moved in a direction that would negatively affect the firm (the economic effect). Similarly, an unrealized loss on a cash flow hedge (the accounting effect) suggests that the price of the underlying hedged item moved in a direction that would positively affect the firm (the economic effect).

Eight years after the adoption of FAS 133, the information content of derivatives disclosures and market participants' ability to understand and price this information remains unclear. Prior studies have documented that firms hedge in order to reduce the *volatility* of cash flows ($\sigma_{CF}$) (Froot, Scharfstein and Stein 1993; Geczy, Minton and Schrand 1994; Tufano 1996; Minton and Schrand 1999; Guay 1999). However, the literature is silent as to whether derivative disclosures provide information about future

[1] Items in AOCI arise because assets or liabilities are recorded at fair value on firms' balance sheets, but associated changes in these fair values are not recorded currently in net income. Besides cash flow hedges, other common components of AOCI include (1) unrealized gains/losses on available-for-sale securities, (2) unrealized gains/losses on defined benefit pension plans, and (3) foreign currency translation adjustments arising from assets/liabilities domiciled in a foreign country.

*levels* of cash flows ($\mu_{CF}$) and stock returns. Cash flow hedges are an ideal setting in which to consider these questions because they specifically relate to future commodity, foreign currency or interest rate transactions of the firm.

Southwest Airlines recently received a significant amount of business press for its use of cash flow hedges to protect itself from rising jet fuel costs, culminating in an $890 million unrealized gain on cash flow hedges at December 31, 2005. At that time, Southwest had fuel costs of 17.7 percent of net sales. In 2007, after these hedges had largely expired, fuel costs were 27.3 percent of net sales.[2] For Southwest Airlines, unrealized cash flow hedge gains provided a signal of declines in future profitability once it became exposed to the economic effect of rising fuel costs.

In this study, I examine whether unrealized cash flow hedge gains/losses provide information about future cash flows, and how market participants incorporate this information into their pricing of equity securities. Specifically, I examine three research questions. First, are unrealized cash flow hedge gains/losses negatively associated with future gross margin? Second, is the association between unrealized cash flow hedge gains/losses and future gross margin weaker for firms which are better able to pass along input price changes to their customers? Finally, are unrealized cash flow hedge gains/losses negatively associated with future stock returns?

Understanding the information conveyed by cash flow hedges is important for regulators, investors, and academics, as derivatives that are commonly designated as cash flow hedges represent a significant portion of economic activity. For example, the

[2] Section 2, Institutional Setting, and Appendix A provide additional details on the use of and accounting for cash flow hedges.

aggregate fair value of global commodity derivatives at December 31, 2007 was $1.9 trillion, or four percent of global equity market capitalization (Bank 2007). Both the Securities and Exchange Commission (SEC) and the FASB have taken positions recently which suggest that investors may not be able to fully understand and impound the implications of unrealized cash flow hedge gain/losses into firms' stock price under the existing reporting framework. Specifically, the SEC recently recommended that unrealized cash flow hedge gains/losses should be included on the income statement in order to increase their prominence.[3] Similarly, the FASB is evaluating whether the accounting model for cash flow hedges leads to confusion for investors across time periods. Cash flow hedges are recorded at fair value each period, while the future hedged transaction is neither recorded nor disclosed until it occurs (known as the "mixed attribute" model).[4] As noted by Gigler, Kanodia, and Venugopalan (2007), "surprisingly little research has been done to formally analyze the implications of providing market value information through a mixed attribute model."

Based on an analysis of the accounting and economic effects of price movements in the underlying hedged item, I predict a negative association between unrealized cash flow hedge gains/losses and future profitability. Specifically, a gain on a cash flow hedge (the accounting effect) suggests that the price of the underlying hedged item moved in a

[3] In the SEC's report to Congress on the role of fair value accounting in the financial crisis, they concluded that "the prominence of other comprehensive income (OCI) could be enhanced by requiring its display on the income statement" (SEC 2008).

[4] More generally, the mixed attribute model occurs when some items "are measured based on historical cost, some at lower of cost or market, and some at fair value" (SEC 2000). In the case of cash flow hedges, the forecasted transaction is recorded under historical cost (and thus is not recorded or disclosed until it occurs in the future), while the derivative which hedges the transaction is recorded currently at fair value. Prior to the forecasted transaction, financial statements include changes in the fair value of derivatives recorded in OCI, but do not include changes in the fair value of the forecasted transaction. Consequently, cash flow hedges are "an extreme example of this mixed attribute problem" (Gigler et al. 2007).

direction that would negatively affect the firm (the economic effect). Similarly, a loss on a cash flow hedge suggests that the price of the underlying hedged item moved in a direction that would positively affect the firm. If a firm's exposure is not fully hedged, it is exposed to the price movements which created the gain/loss on the un-hedged portion of the forecasted transaction (which usually occurs within twelve months). Additionally, once the hedge protection expires when the forecasted transaction occurs, the firm is fully exposed to the price movements which created the gain/loss on any future transactions related to the underlying hedged item.[5]

The accounting and disclosure rules for cash flow hedges are likely to make it difficult for investors to price them. As previously mentioned, the derivative position is recorded each period at fair value while the future hedged transaction is not recorded or disclosed until it occurs. Therefore, it is difficult for investors to assess both the percentage of the future transaction which is hedged, and the length of time over which the hedging position provides protection. These difficulties make it "unclear how outsiders would interpret any reported gains or losses on [cash flow hedge] derivatives in assessing a firm's financial viability" (Gigler et al. 2007).

My research is the first to empirically examine the information conveyed by unrealized cash flow hedge gains/losses and offers several important results. First, I find that unrealized cash flow hedge gains/losses are negatively associated with future gross margin. A one standard deviation increase in unrealized hedging gains in the current year is associated with a reduction in gross margin two years later of 147 basis points. This

[5] The firm could purchase additional cash flow hedges. However, subsequent hedges only protect the firm from price fluctuations which occur in the future and do not protect the firm from the price movements which created the current gain/loss.

suggests that the fair value of cash flow hedges provides information about the level of future cash flows. Second, I find that the negative association between unrealized cash flow hedge gains/losses and future gross margin is weaker for firms in less competitive industries. I use the top quintile of the Herfindahl-Hirschman index to proxy for firms with pricing power in less competitive industries. This result suggests that firms which are better able to pass price changes through to their customers are less affected by the adverse economic effects which are signaled by unrealized cash flow hedge gains/losses.

Third, I find that unrealized cash flow hedge gains/losses are unrelated to contemporaneous stock returns, but are negatively related to future stock returns measured over the subsequent two years for firms without pricing power. Finally, a zero net-investment trading strategy which goes long (shorts) firms with the largest derivative losses (gains) yields positive returns of between 6 and 10 percent a year. These returns cannot be explained by market returns, size, growth opportunities, or stock price momentum. The results suggest that market participants do not fully impound the information conveyed by unrealized cash flow hedge gains/losses into current stock prices. Instead, investors appear surprised by future realizations of gross margin, consistent with the view that the mixed attribute model and lack of transparent disclosure on future hedged transactions lead to a delay in pricing.[6] Overall, my results suggest that the fair values of cash flow hedges reliably predict future profitability and stock returns,

[6] An alternative explanation for the delay in stock price reaction is that investors rationally wait to see if the price movement in the underlying hedged item is structural or transitory. However, most firms have not fully hedged their exposures (Bodnar et al. 1998; Guay and Kothari 2003) and thus it is not clear that investors should rationally wait. Second, cash flow hedge transactions typically occur within one year (Bodnar et al. 1995). Therefore, large gains or losses in short periods of time are likely to represent, at least in part, structural price movements. Finally, the delay in pricing persists after controlling for the Fama and French (1993) and Carhart (1997) risk factors. See Section 2, Institutional Setting, and Section 4, Tests of Hypothesis Four.

but in the direction opposite to which accounting fair values (the accounting effect) would suggest.

My research makes several contributions to the literature. This is the first study to document that unrealized cash flow hedge gains/losses signal changes in the level of future cash flows (i.e. $\mu_{CF}$). Prior literature focuses on the ability of derivatives to reduce the volatility of cash flows (i.e. $\sigma_{CF}$) (Minton and Schrand 1999; Guay 1999) and on market participants ability to impound this reduced volatility into firm value (Schrand 1997; Wong 2001). As a result, prior studies investigate contemporaneous time periods. This study provides financial statement users with a way in which derivative disclosures could be used in financial statement analysis. Specifically, cash flow hedge amounts can be used to forecast earnings and stock prices.

Second, this study contributes to the literature on fair value. Both the FASB and the International Accounting Standards Board (IASB) state in their Concepts statements that they consider the cost/benefit tradeoff between relevance and reliability when assessing whether specific assets or liabilities should be subject to fair value accounting (Landsman 2007). Fair values are *relevant* if they convey information relevant to asset pricing that is not contained in book values (Barth 2000). Fair values are *reliable* if "changes in fair values are reflected in future performance…measured as cash flows" (Barth 2000). Prior research on fair value accounting generally concludes that fair values are incrementally relevant to book values in determining firm value. However, the prior literature also finds that fair values are measured with error, and in some cases this error renders them unreliable. This is the first study to investigate whether unrealized cash flow hedge

gains/losses are simultaneously *relevant* and *reliable*. I find that the information conveyed by cash flow hedge fair values is *relevant* to future (but not current) asset prices beyond the information contained in net income, and the fair values *reliably* predict changes in future cash flows. The fact that cash flow hedge fair values are relevant to future (but not current) asset prices is consistent with the theoretical predictions of Gigler et al. (2007), which suggest that the combination of fair value accounting and a lack of transparent disclosure requirements may lead to difficulty in pricing fair value information.

Third, this study contributes to the literature on other comprehensive income (OCI).[7] Prior research on the components of OCI is mixed. On the one hand, unrealized gains/losses on marketable securities are positively associated with firm value (Barth et al. 1996; Eccher et al. 1996; Nelson 1996). On the other hand, a positive foreign currency translation adjustment is negatively associated with firm value (Louis 2003).

My study suggests a third alternative for the relation between the accounting and economic effects of OCI components. I find that unrealized cash flow hedge gains/losses are unrelated to firm value during the current period. However, as the firm becomes exposed to the underlying price movements which created the gain/loss in future periods, unrealized cash flow hedge gains/losses are negatively related to firm value. Overall, these three possibilities for how components of OCI affect firm value could be one reason why prior studies have had difficulty interpreting the composite value relevance of OCI (Dhaliwal, Subramanyam and Trezevant 1999) and why managers exhibit a preference

[7] OCI represents the current period effect of items within AOCI.

for not reporting OCI on the face of the income statement (Bamber, Jiang, Petroni and Wang 2009). The SEC and the FASB may wish to consider these differing valuation effects when requiring firms to display OCI on the face of the income statement (SEC 2008).

Finally, the FASB is currently working on a project to simplify the accounting for derivatives. One question that is currently being evaluated is whether the mixed attribute accounting framework for cash flow hedges leads to confusion for investors across future time periods.[8] This study provides the FASB with evidence that the current mixed attribute accounting model for cash flow hedges is associated with a delay in pricing.

The remainder of the paper is organized as follows. Section 2 discusses the institutional setting regarding the accounting for derivatives designated as cash flow hedges. The section then describes empirical and anecdotal evidence, which provide the intuition behind the paper's hypotheses. Section 3 develops the hypotheses tested in the paper. Section 4 explains my research design and presents empirical results. Section 5 offers concluding remarks.

[8] FASB project "Accounting for Financial Instruments" is a project with the IASB that is expected to be completed in 2010 (FASB 2009). One of the primary goals of the FASB project is to "address differences in accounting for derivative instruments and hedged items or transactions."

# 2. BACKGROUND AND MOTIVATION

## 2.1 Institutional Setting

FASB Statement No. 133 (FAS 133) regulates the accounting for firms that hedge the variability in future streams of cash flows (i.e. cash flow hedges). At hedge inception, firms must identify a specific transaction relating to future cash flows which involves price risk that they wish to hedge. At that time, the firm must demonstrate that the designated hedging derivative instrument will effectively offset the risk associated with that future transaction (paragraphs 28-35, FAS 133, FASB 1999). Accordingly, firms are not able to use cash flow hedges to speculate on the direction of commodity prices, foreign currency exchange rates or interest rates.

When a firm purchases a derivative which it designates as a cash flow hedge, it debits "Other Assets" and credits "Cash" for the fair value paid for the derivatives contract at inception. Subsequent changes in the fair value of the instrument are recorded directly to the asset and to unrealized gain/loss in accumulated other comprehensive income (AOCI). Therefore, unrealized cash flow hedge gains/losses in AOCI at any given balance sheet date represent the cumulative gain/loss position of the firm's cash flow hedging activities. When the hedged forecasted transaction occurs and affects the income statement in future time periods, any unrealized gain or loss in AOCI is then recognized in the income statement to offset price changes in the underlying hedged item. Appendix A provides an example of the accounting for cash flow hedges from inception to expiration.

Firms in the airline industry often use derivatives to hedge their exposure to adverse

changes in cash flows related to jet fuel costs. Specifically, airlines sell tickets to flights in advance, but wait to purchase jet fuel until the flight takes place. If the cost of jet fuel increases after the airline has sold tickets to future flights, airlines experience a decline in operating margins. To protect themselves, airlines purchase derivatives which increase in value when the cost of jet fuel increases. The derivative serves as protection from rising jet fuel costs until the specifically designated transaction (i.e. the purchase of fuel for the future flights) takes place. If appropriate derivative instruments exist, the firm can also protect itself from falling prices or to risk exposure related to items other than commodities, including both foreign exchange and interest rates.

There are two important institutional features of cash flow hedges which are particularly relevant to my study: (1) most cash flow hedges are short-term in nature and do not fully hedge the underlying transaction, and (2) a substantial portion of cash flow hedges relate to underlying items which affect gross margin. The 1995 Wharton Survey of Derivatives Usage finds that eighty percent of derivatives users hedge relatively short-horizon future cash flow transactions (Bodnar et al. 1995). Seventy-seven percent anticipated that at least a portion of the hedged transaction will occur within one year. Additionally, prior studies have found that firms do not hedge 100 percent of their exposure to underlying transactions (Bodnar et al. 1998; Guay and Kothari 2003).[9] Consequently, the protection provided by derivative instruments which are designated as

[9] According to Bodnar et al. (1998)'s survey, non-financial firms hedge an average of 42 percent of anticipated transactions occurring within one year. This percentage has likely increased as of 2007, as global commodities derivative fair values have grown over 43 times the amount in 1998, to $1.9 trillion, or 4 percent of global market capitalization, in 2007 (Bank 2007). For instance, Southwest Airlines had hedged over 70 percent of its 2006 fuel requirements as of December 31, 2005 (SEC 2009).

cash flow hedges is relatively short-term in nature and is not complete.[10] This is important to my study for three reasons. First, my empirical tests assume that the hedges in existence at each balance sheet date will mostly expire within one year. Second, to the extent that the hedging protection has not fully expired, firms' gross margin and stock returns will still be exposed to the portion of the future transaction which is not hedged, as long as the transaction occurs within two years. Finally, my hypotheses are most likely to hold when the unrealized cash flow hedge gains/losses represent structural underlying price movements rather than transitory shocks. Since cash flow hedges usually cover a period less than one year, I expect the largest gains/losses to signal, at least in part, structural price changes.

The second institutional feature that is important to my study is that a substantial portion of cash flow hedges relate to underlying items which affect gross profit. As previously mentioned, FAS 133 requires firms to identify an underlying transaction which is being hedged. This prohibits firms from taking speculative derivative positions and recording unrealized gains and losses in AOCI. There are three primary future transactions for which derivatives are designated as cash flow hedges: (1) commodity purchases or sales, (2) sales and purchases denominated in a foreign currency and (3) cash flows from variable-rate interest instruments. Of these activities, the only one which would unambiguously fail to affect gross profit would be cash flows from variable-rate

[10] An exception is interest rate swaps, where the term can be much longer than one year depending on the term of the hedged item.

interest instruments for non-financial firms.[11] According to Fitch (2005), approximately 70.0 percent of the notional amount of hedging derivatives relate to commodity (35.0 percent) and foreign currency activities (35.0 percent).[12] Overall, the data suggests that a substantial portion of unrealized cash flow hedge gains and losses will ultimately affect gross profit. This is important to my study because my hypotheses specifically examine the information conveyed by these unrealized cash flow hedge gains/losses for future gross margin.

## 2.2 Prior Literature

Eight years after the adoption of FAS 133, there is very little evidence on the information conveyed by cash flow hedge disclosures and market participants' ability to understand and price that information. This is likely due to two reasons. First, FAS 133 created the concept of a cash flow hedge and it was not adopted by firms until 2001. Consequently, any prior empirical analysis on cash flow hedges would have been limited to a short number of years and this is problematic when trying to determine the informational effects of current disclosures on future time periods. As a result, most of the prior literature on derivatives is from pre-FAS 133 time periods and focuses more generally on all types of derivatives rather than cash flow hedges in particular.[13] Second,

[11] For commodity or foreign currency activities not to affect gross profit, they would have to (1) hedge transactions that affect selling, general or administrative expenses, and (2) pertain to expenses that are sufficiently large to create exposure worthy of entering into hedging activities.

[12] These percentages are calculated using notional amounts of all derivatives in Fitch's (2005) sample. This calculation is based on the assumption that half of all interest-rate derivatives relate to variable rate risk exposures (and are thus cash flow hedges).

[13] The other common hedge activity under FAS 133 is referred to as a fair value hedge. Under a fair value hedge, the firm owns a specific asset or liability whose value is subject to market risk and the firm takes an opposite position through a derivative instrument. Unlike cash flow hedges, changes in the fair value are recognized immediately in net income. Consequently, the informational effects of fair value hedge gains/losses on future performance and stock returns are likely to be different.

the data to analyze unrealized cash flow hedge gains/losses was not available from traditional machine-readable sources until 2008.[14] For this reason, prior studies on derivatives generally focused on smaller, hand-collected samples related to specific industries such as gold mining (Tufano 1996), banking (Barth et al. 1995; Venkatachalam 1996; Schrand 1997), manufacturing (Wong 2001) or airlines (Carter et al. 2006).

Prior research on derivatives has primarily focused on the reasons that firms choose to hedge. For instance, Smith and Stulz (1985) provide theoretical arguments why firms would benefit from the reduced volatility of cash flows provided by hedging activities. They argue that firms with high cash flow volatility should experience reduced future investment levels, higher tax burdens and a higher likelihood of default on debt instruments. Smith and Stulz hypothesize that firms could avoid these problems through the use of derivative instruments. Other work on derivatives has produced similar hypotheses (Stulz 1990; Froot, Scharfstein and Stein 1993).

Guay (1999) examines whether firms use derivatives to speculate or to reduce risk exposures. He uses a sample of firms who hold derivatives investments in the current year and did not hold them in the prior year to investigate how the use of derivatives affects common risk measures such as stock return volatility. He finds that the average risk reduction for new derivatives users is approximately 5 percent of stock return volatility. Guay concludes that the use of derivatives reduces firm risk rather than increases it.

[14] The data item for unrealized gains and losses on derivatives in AOCI (Compustat item AOCIDERGL) was only first available in Compustat Xpressfeed, which became available in 2008.

Minton and Schrand (1999) investigate the relation between cash flow volatility, the cost of capital and investment levels. They find evidence that cash flow volatility is negatively associated with investment, and that this association is stronger for firms with higher costs of debt and equity. Minton and Schrand conclude that their findings support the earlier theoretical predictions that cash flow volatility reduces future investment levels and increases the likelihood of default on debt instruments. They also conclude that firms using derivatives could reduce cash flow volatility and therefore reduce the effects of these negative outcomes.

Prior research has also examined whether market participants impound the effects of reduced cash flow volatility into stock prices. Schrand (1997) examines a sample of publicly traded savings and loan associations with off-balance sheet interest rate derivative instruments. She finds that the stock prices of these firms are less sensitive to market-wide fluctuations in interest rates. Schrand concludes that investors incorporate the risk reductions from derivative instruments into firm value. Similarly, Wong (2001) investigates a sample of manufacturing firms with foreign currency exchange rate derivative instruments. He finds that the stock prices of these firms are less sensitive to market-wide fluctuations in exchange rates and concludes that investors incorporate the risk reductions from derivative instruments into firm value.[15]

In sum, the prior literature has largely focused on the impact of derivatives on the second moment of cash flows (i.e. $\sigma_{CF}$) and its effect on firm value. However, the

[15] In addition, prior risk management literature finds that firms which hedge have higher contemporaneous market values than firms which do not hedge (Allayannis and Weston 2001, among others). I do not review that literature because my sample only includes firms which hedge.

literature is silent as to the impact that derivative disclosures may have in forecasting future levels of the first moment of cash flows (i.e. $\mu_{CF}$) and whether market participants impound this information into stock prices. By investigating unrealized cash flow hedge gains/losses, this study is a first attempt to fill this gap in our understanding of the information conveyed by the fair value of derivative instruments.

The intuition behind my study is similar to Louis (2003). Louis hypothesizes and finds an inverse relation between the accounting and economic effects of the foreign currency translation adjustment recorded in OCI. When the value of a foreign currency appreciates relative to the US dollar, the value of assets domiciled in that country increase. The accounting effect is that these firms recognize a positive foreign currency translation adjustment. However, the economic effect is that the relative costs to operate the plant (i.e. labor and wage costs) increase as well. Louis (2003) documents a negative association between the foreign currency translation adjustment recorded in OCI and current and future levels of stock returns and foreign net income.

There is an important difference between my study and the findings of Louis (2003). Like a significant portion of cash flow hedges, the amount of the foreign currency translation adjustment depends explicitly on movement in foreign exchange rates. However, unlike cash flow hedges, the asset or liability to which the foreign currency translation adjustment relates is recorded on the financial statements. Therefore, the foreign currency translation adjustment does not follow a mixed attribute reporting

model.[16] Louis finds that the foreign currency translation adjustment immediately affects the firm's stock returns. However, my evidence suggests that financial markets do not immediately price the information contained in unrealized cash flow hedge gains/losses.

In sum, the unrealized cash flow hedge gains/losses component of AOCI exhibits significantly different value relevance characteristics than the foreign currency translation adjustment component. This distinction is important. It suggests that the mixed attribute model, and its lack of transparent disclosure regarding the amount and timing of the underlying hedged transaction, creates difficulties for investors when pricing the effects of price movements related to commodity prices, foreign currency exchange rates, or interest rates.

## 2.3 Anecdotal Evidence

Anecdotal evidence suggests that analysts recognize the inverse relation between the accounting and economic effects of unrealized cash flow hedge gains/losses, but that investors are unable to immediately price this information. Fitch (2005) recommends removing balance sheet derivative amounts when calculating credit ratios because it finds that hedge accounting and economic effects are "counterintuitive." According to Roger W. Merritt of Fitch Ratings, "it is often appropriate, for analytical purposes, to consider the core ratios…with and without the effects of hedge accounting adjustments if the adjustments are material." The counterintuitive relation between hedge accounting and

[16] Specifically, the change in the fair value of the foreign exchange rate is recorded in AOCI at the same time that the change in the fair value of the asset or liability is recorded. This is in direct contrast to cash flow hedge accounting. As previously mentioned, the change in the fair value of a cash flow hedge is recorded in AOCI currently, while the change in the fair value of the hedged forecasted transaction is not recorded until the transaction occurs in future time periods.

credit analysis is highlighted in the following examples using Fitch's (2005) adjustments. Amerada Hess Corp. had total debt of $3.91 billion and shareholder's equity of $5.34 billion at December 31, 2003. Shareholder's equity included unrealized cash flow hedge losses of $357 million (Fitch 2005). Removing the effects of hedging losses from equity causes the firm's debt to equity ratio to fall from 0.74 to 0.69, or 7 percent. In this example, the accounting effect is an unrealized loss on the cash flow hedge, but the economic effect on credit analysis is lower risk.

A similar example can be made for a firm with unrealized derivative gains in shareholder's equity. Southwest Airlines had total debt of $2.0 billion and shareholder's equity of $6.67 billion at December 31, 2005. Shareholder's equity included unrealized cash flow hedge gains of $890 million. Removing the effects of hedging gains from equity causes the firm's debt to equity ratio to increase from 0.30 to 0.34, or 15 percent. In this example, the accounting effect is an unrealized gain on the cash flow hedge, but the economic effect on credit analysis is higher risk.

In addition to credit analysts, industry analysts recognize the inverse relation between the accounting and economic effects of unrealized cash flow hedge gains/losses. As the price of fuel increased in 2003-2005, Southwest Airlines experienced large unrealized cash flow hedge gains. Industry analysts warned that the price protection would not last forever:

> "'The benefit on their earnings will diminish over time,' says [Goldman Sachs analyst] Glenn Engel." (Wall Street Journal 2005)

> "'They're living on borrowed time, and they know that,' [aviation expert Michael] Boyd says about Southwest." (USA Today 2006)

At December 31, 2005, Southwest Airlines had $890 million of unrealized cash flow hedge gains in AOCI. During that year, Southwest reported fuel costs of 17.7 percent of net sales. As the forecasted transactions occurred and hedges expired over the coming two years, Southwest was exposed to the underlying economic effects of rising fuel prices. For the year ended December 31, 2007, Southwest Airlines reported fuel costs of 27.3 percent of net sales.

Despite recognizing the inverse relation between accounting and economic effects associated with cash flow hedges, investors are unable to understand both the percentage of the future transaction which is hedged and the length of time over which the hedging position provides protection due to the current accounting and disclosure framework. Indeed, the anecdotal evidence suggests that investors do not price the information conveyed by unrealized cash flow hedge gains/losses in a timely manner. Southwest Airlines' stock price declined from $16.35 per share at December 31, 2005 to $12.17 per share at December 31, 2007, or 25.6 percent. In sum, while prior academic literature does not examine the informational effects of unrealized cash flow hedge gains/losses, anecdotal evidence is consistent with the view that the accounting effect of unrealized cash flow hedge gains/losses is inversely related to their economic effects on future profitability and stock returns.

# 3. HYPOTHESIS DEVELOPMENT

## 3.1 Effect of cash flow hedge derivative gains on future gross margin

Unrealized gains/losses on cash flow hedges are an ideal setting in which to investigate whether derivative disclosures convey information about future levels of profitability because they relate to future commodity, foreign currency or interest rate transactions. An inverse relationship exists between the accounting effect of unrealized cash flow hedge gains/losses, and the economic effect of the underlying risk moving in the opposite direction. Cash flow hedge gains/losses are recognized in income when the underlying forecasted transaction occurs and affects the income statement (usually within twelve months (Bodnar et al. 1995)). At that time, the current hedge expires. If a firm's exposure is not fully hedged, it is exposed to the price movements which created the gain/loss on the un-hedged portion of the transaction. Additionally, the firm is fully exposed to the underlying price movements which created the gain/loss on any future transactions associated with the underlying hedged item. The firm could enter into additional cash flow hedges at this time. However, subsequent hedges only protect the firm from price fluctuations which occur in the future and do not protect the firm from the price movements which created the current gain/loss.

For example, if the underlying hedged item is a component of the firm's costs, increases in the price of the underlying hedged item (i.e. commodity price, foreign currency exchange rate or interest rate) entail: (1) an increase in AOCI through the recognition of unrealized hedging gains (the accounting effect), and (2) an increase in the firm's future operating costs both on the un-hedged portion of the forecasted transaction

and on all future transactions associated with the underlying hedged item after the current hedges expire. This would lead to a decrease in the firm's future profitability (the economic effect). If instead the price of the underlying hedged item decreases, then the firm experiences hedging losses and a decrease in future operating costs (i.e. an increase in future gross margin). The same logic also applies if the underlying hedged item is a component of the firm's revenues.[17] Accordingly, my first hypothesis:

HYPOTHESIS 1: *Unrealized cash flow hedge gains/losses are negatively associated with future gross margin.*

If a firm has pricing power, then it has the ability to change the price it charges to customers without substantial changes in sales volume or gross margins. Firms with pricing power are likely to have already set their profit margins to an economically maximum level. Consequently, these firms have more stable profit margins relative to firms in industries with little or no pricing power (Allayannis and Ihrig 2001). Firms are likely to have pricing power when they belong to industries with lower levels of competition. As a result, the information conveyed by unrealized cash flow hedge gains/losses for future levels of gross margins will be weaker for firms in less competitive industries.[18] Investigating a sample of multinational manufacturing firms which are exposed to fluctuations in foreign exchange rates, Allanyannis and Ihrig (2001) find that firms in industries with higher gross margins (i.e. less competition) have less exposure to changes in exchange rates. This leads to my second hypothesis:

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[17] Increases (decreases) in the price of the underlying hedged item result in unrealized hedging losses (gains), and an increase (decrease) in the firm's future revenues after the current hedges expire.

[18] Consistent with the findings of Allayannis and Ihrig (2001), the second hypothesis should hold regardless of the direction in which prices have moved. To the extent that prices move in a favorable direction, one might argue that firms will experience an increase in gross profit regardless of the level of competition in their industry. However, firms with pricing power can increase profit margins at any time and would not need to wait for changes to input prices in order to increase profit margins.

HYPOTHESIS 2: *The association between unrealized cash flow hedge gains/losses and future gross margin will be weaker for firms in less competitive industries.*

3.2 Effect of cash flow hedge derivative gains on future stock returns

The accounting and disclosure rules for cash flow hedges are likely to make it difficult for investors to price them. Specifically, changes in the fair value of the cash flow hedge derivative position are recorded each period at fair value while changes in the fair value of the underlying hedged item are not recorded or disclosed until the future transaction occurs (the "mixed attribute" accounting model). Consequently, it is difficult for investors to assess the percentage of the future transaction which is hedged, or the length of time over which the hedging position provides protection. These difficulties make it "unclear how outsiders would interpret any reported gains or losses on the derivatives in assessing a firm's financial viability" (Gigler et al. 2007).

Due to proprietary costs, firms do not have an incentive to voluntarily provide disclosure which would help investors price the unrealized gains/losses. Specifically, such disclosure would provide competitors with information to help infer the firm's future cost structure and expected sales/production volumes. Additionally, FAS 133 does not require firms to disclose such information. It is unclear whether this information is available through avenues other than financial statement disclosure (i.e. other forms of private information such as equity or debt analyst reports or other forms of public information such as earnings conference calls). To the extent that investors are unable to obtain sufficient information regarding the firm's hedging activities, investors may not be able to fully understand the implications of expiring hedges on future gross margins.

Consequently, investors will likely be surprised by future realizations of gross margin.

This leads to my third and fourth hypotheses:

HYPOTHESIS 3: *Unrealized cash flow hedge gains/losses are negatively associated with future stock returns.*

HYPOTHESIS 4: *A zero net-investment trading strategy which invests in (sells) the bottom (top) deciles of unrealized cash flow hedge gains/losses yields positive returns.*

# 4. RESEARCH DESIGN AND EMPIRICAL RESULTS

## 4.1 Sample Selection

As I am interested in the effects of unrealized cash flow hedge gains/losses in accumulated other comprehensive income (AOCI), I begin my sample selection with firms that engage in cash flow hedge activity (i.e., with nonzero Compustat Item AOCIDERGL). FAS 133, which mandated that firms recognize unrealized cash flow hedge gains/losses in AOCI, was not issued until 1999 and was not effective until the year ended December 31, 2001. Accordingly, my initial sample of firms covers the years 2001 to 2007. I begin with the overall universe of Compustat firms with valid data for unrealized cash flow hedge gains/losses in AOCI and with assets greater than zero. I remove firm-year observations that do not have an industry classification or lack necessary gross margin information. Finally, I truncate all necessary data at the top and bottom 1 percent to mitigate the influence of outliers. The final sample consists of 5,976 firm-year observations. Details concerning the sample selection for my main empirical tests are described in Panel A of Table 1.

## 4.2 Descriptive Statistics

Panel B of Table 1 presents an annual breakdown of my sample firms. Annual concentration of sample firms does not appear to be a problem. Specifically, each of the five years covered in my sample represents approximately 20 percent of the overall sample. There is a slight underrepresentation of observations in the year 2003 (18.5 percent), but this likely relates to the previously mentioned fact that the FAS 133

adoption date occurred in the middle of 2001, and my sample requires two-year lagged unrealized cash flow hedge gains/losses.

Panel C of Table 1 presents an industry breakdown of my sample into 48 industry groupings (see Fama and French 1997). There is a large concentration of firms in the Utilities (10.7 percent) and Banking industries (9.3 percent). No other industry represents more than 5.7 percent of the sample. It is not surprising that derivatives usage would be concentrated in these two industries. For instance, utilities firms are likely to be either purchasers or sellers of energy. As a result, their profit margins will be sensitive to fluctuations in energy commodity prices. Similarly, banks are heavily involved in making loans and taking bank deposits. A majority of their assets and liabilities are sensitive to interest rate changes. As a result, banks' net interest income will be highly sensitive to fluctuations in interest rates. To alleviate any concerns regarding the effects of industry concentration, I use industry fixed effects in my multivariate models.[19]

Table 2 presents descriptive statistics for my sample. Panel A shows that my sample firms are diverse in terms of profitability, size and unrealized cash flow hedge values. Specifically, the mean gross profit of sample firms is 38.2 percent of net sales, while the distribution of gross profit ranges from 22.0 percent of net sales at the first quartile to 51.6 percent of net sales at the third quartile. Similarly, average total net sales are $4.1 billion, while the distribution of this variable ranges from $368 million at the first quartile to $3.8 billion at the third quartile. Finally, the mean unrealized cash flow hedge gain/loss is -40 basis points of net sales.

[19] I do not include industry fixed effects in the tests of industry pricing power, as industry variation is exactly the construct I am trying to capture.

Figure 1 partitions the sample into deciles based on the level of unrealized hedging gains/losses as a percentage of net sales. The levels of unrealized hedging fair values are fairly sizable for the bottom decile (190 basis points of sales) and the top decile (50 basis points of sales). However, deciles four through nine exhibit very small levels of hedging gains/losses (10 basis points of sales or less). Taken together, the data suggests that, on average, firms have relatively small unrealized gains/losses and that the largest unrealized gains (losses) are concentrated in the top (bottom) deciles of sample firms.

As previously mentioned, financial services firms represent a large portion of my sample. Panel B of Table 2 excludes firms from the financial services industry (SIC codes 6000 to 6999) from the sample. Prior research suggests that these firms are likely to have gross profit and valuation characteristics which differ from the rest of the sample. As expected, financial services firms have reliably larger gross margin, asset, and leverage levels. Accordingly, I tabulate whether my results are sensitive to the inclusion of financial services throughout the paper.[20]

### 4.3 Effect of unrealized gains/losses on future gross margin

To examine the relation between unrealized cash flow hedge gains/losses and future gross margin (H1), I follow the prior literature on the information content of AOCI components (Louis 2003) and model gross margin as a function of lagged gross margin and my variable of interest:

$$GP_{i,t} = \alpha_0 + \beta_1 AOCI\_HEDGE_{i,t-2} + \beta_2 GP_{i,t-2} + \beta_j Controls_{i,t} + \varepsilon_{i,t} \quad (1)$$

[20] I include financial services firms in the primary tests throughout because (1) financial firms are likely to be large users of cash flow hedges, and (2) I consider the policy implications for the SEC and FASB associated with the mixed attribute accounting framework for cash flow hedges.

where GP is gross profit scaled by contemporaneous net sales and AOCI_HEDGE is the unrealized hedging gain/loss amount in AOCI at year *t-2* scaled by net sales at year *t-2*.[21] My model assumes a two-year lag for the informational effect of unrealized cash flow hedge gains and losses on future gross margin to manifest itself. As previously mentioned, 77% of derivatives users are hedging transactions expected to occur with the next twelve months (Bodnar et al. 1995). Accordingly, unrealized cash flow hedge gains/losses should largely be reclassified into the income statement in the first year after the balance sheet date. Consequently, the firm would be exposed to the adverse (beneficial) price changes which created the hedging gain (loss) in the second year after the balance sheet date.[22]

I also include controls for size at year *t*, industry fixed effects using the Fama and French 48 industry classifications, and year fixed effects. I use industry and year fixed effects primarily to control for differences in gross margin between industries as well as to more generally control for macroeconomic changes which may have occurred during my sample period. To control for size, I scale the income statement variables by net sales and also include the natural logarithm of total assets. In order to control for heteroscedasticity as well as serial dependence of error terms, I use White (1980)

[21] Scaling by net sales allows for an easier economic interpretation of the coefficient, as it is expressed in terms of gross margin percentage. Results are unchanged when scaling by lagged market value of equity or total assets.
[22] As previously mentioned, as long as the forecasted transaction affects the income statement within two years, the firm will at least be exposed to the economic effect of price fluctuations on the portion of the forecasted transaction which is un-hedged.

standard errors clustered at the firm level.[23] If unrealized cash flow hedge gains/losses are negatively associated with future gross margin (H1), then I expect that $\beta_1 < 0$.

To examine whether the relation between unrealized cash flow hedge gains/losses and future gross margin is weaker for firms with pricing power (H2), I augment equation (1) to include an interaction term which is designed to proxy for industries with pricing power:

$$GP_{i,t} = \gamma_0 + \gamma_1 PRICEPASS_{i,t} + \gamma_2 AOCI\_HEDGE_{i,t-2} + \gamma_3 PRICEPASS_{i,t} * AOCI\_HEDGE_{i,t-2} + \gamma_4 GP_{i,t-2} + \gamma_j Controls_{i,t} + \varepsilon_{i,t} \quad (2)$$

where GP and AOCI_HEDGE are as defined in Equation (1) and PRICEPASS is a dummy variable equal to 1 if the firm's industry is in the top quintile of Herfindahl-Herschmann index based on the Fama and French (1997) 48 industry classifications, and zero otherwise. Recent work such as Bamber and Cheon (1998), Harris (1998), and Defond and Park (1999) that links accounting issues with the level of industry competitiveness use Herfindahl-Hirschman index to measure industry competition (Hirschman 1945; Herfindahl 1950).[24] Thus, I use this measure in my analysis to proxy for the level of product market competition. The Herfindahl-Herschmann index is calculated by summing the squares of the individual company market shares for all the companies in a given industry classification and is calculated as follows:

[23] Given that my sample only spans five years, I do not tabulate my findings using two-way cluster robust standard errors (Petersen 2009; Gow, Ormazabal and Taylor 2009). However, the results throughout the paper are unchanged when using robust standard errors that are clustered by firm and year.

[24] Ali, Klasa and Yeung (2008) find that using Compustat to calculate the Herfindahl-Hirschman index may lead to biased inferences because Compustat does not include private firms within a given industry. They suggest that U.S. Census data, which includes both public and private firms, is a more accurate measure for market concentration. As a sensitivity check, I use the U.S. Census measures as a proxy for market concentration. See Section 4, Tests of Hypothesis Two.

$$H_T = \sum_{i=1}^{N} s_i^2 \qquad \forall T \in \{1,2,3,...48\} \tag{3}$$

where:

$$s_i = \frac{NetSales_i}{\sum_{i=1}^{N} NetSales_i} \tag{4}$$

Higher values of the Herfindahl-Hirschman index indicate that firms in that industry are more likely to have pricing power. Accordingly, I partition the 48 industries in my sample into quintiles according to their Herfindahl-Hirschman index value and assume that firms in the top quintile of industries have the strongest ability to demand sales price changes from their customers. As before, I use robust standard errors clustered by firm. If the association between unrealized cash flow hedge gains/losses and future gross margin is weaker for firms with greater pricing power (H2), then I expect $\gamma_3 > 0$. If there is no association between unrealized cash flow hedge gains/losses and future gross margin for firms with pricing power, then I expect $\gamma_2 + \gamma_3 = 0$.

## 4.4 Results on effect of unrealized gains/losses on future gross margin

### 4.4.1 Tests of Hypothesis One

My first hypothesis predicts that unrealized cash flow hedge gains/losses are negatively associated with future gross margin. Figure 2 presents univariate descriptive evidence regarding H1. The first two columns compare the mean change in gross margin from year *t-2* to year *t* between firms with unrealized hedging losses and firms with unrealized hedging gains. If unrealized cash flow hedge gains are associated with future gross margin declines, then the change in gross margin should be more negative for firms

with unrealized hedging gains than for firms with unrealized hedging losses. As expected, Figure 2 shows that firms with unrealized cash flow hedge gains experience an average gross margin decline of 25 basis points, while firms with unrealized cash flow hedge losses experience virtually no change in gross margin.[25]

The second two columns of Figure 2 compare the mean change in gross margin from year *t-2* to year *t* between the bottom decile of AOCI_HEDGE (i.e. firms with the largest unrealized hedging losses) and the top decile of AOCI_HEDGE (i.e. firms with the largest unrealized hedging gains). As expected, Figure 2 shows that firms with unrealized cash flow hedge gains experience an average gross margin decline of 40 basis points, while firms with unrealized cash flow hedge losses experience an increase of 20 basis points. In sum, the univariate descriptive evidence in Figure 2 is consistent with H1, suggesting that levels of unrealized cash flow hedge gains/losses have predictable informational effects on future gross margin levels.

Table 3 presents univariate regression analysis regarding H1. Panel A presents results from estimating equation (1) for all sample firms. To control for changes in gross profit due to macroeconomic factors, the last column of Panel A uses both industry and year fixed effects in the univariate estimation. I find a negative and significant association between AOCI_HEDGE and GP ($\beta_1$ = -1.02, *t*-statistic = -4.26). This suggests that a one standard deviation increase in unrealized hedging gains is associated with a reduction in

[25] It is possible that macroeconomic conditions caused all firms to decline in gross margin, while AOCI_HEDGE loss firms experienced no decline. My univariate and multivariate regressions control for macroeconomic conditions by including industry and year fixed effects.

gross margin two years later of 147 basis points.[26] The results are unchanged in Panel B when I exclude financial services firms. Taken together, these results suggest that unrealized cash flow hedge gains/losses are negatively associated with future gross margin.

Table 4 presents multivariate evidence regarding H1.[27] As before, Panel A presents results from estimating my multivariate model for all sample firms. I continue to find a negative and significant association between AOCI_HEDGE and GP ($\beta_1$ = -0.349, *t*-statistic = -2.61). Again, this result is consistent with H1 and suggests that unrealized cash flow hedge gains/losses are negatively associated with future gross margin. As expected, gross margin in year *t-2* is positively associated with gross margin in year *t*. This suggests that gross margin levels are persistent. Additionally, the natural logarithm of total assets in year *t* is positively associated with gross margin in year *t*. This suggests that, on average, larger firms have higher gross margins.

The results are unchanged in Panel B when I exclude financial services firms. The collective evidence from Figure 2 and Tables 3 and 4 supports my first hypothesis. Specifically, unrealized cash flow hedge gains/losses are negatively associated with future gross margin.

### 4.4.2 Tests of Hypothesis Two

[26] For financial firms, gross margin refers to interest income less interest expense, scaled by interest income (net interest margin).

[27] Throughout the empirical analysis, I evaluate and report the effects of multi-collinearity with the condition index (Belsley, Kuh and Welsch 1980). According to Belsley et al., multi-collinearity is only a concern when the condition index is greater than 20. The results indicate that multi-collinearity is not a concern in any of my multivariate regressions. Thus, for expositional purposes, I do not discuss these results for each table.

My second hypothesis predicts that the negative association between unrealized cash flow hedge gains/losses and future gross margin is weaker for firms in less competitive industries. I test H2 using equation (2) and examine whether the coefficient on the interaction term between AOCI_HEDGE and PRICEPASS (i.e. $\gamma_3$) is positive. Results regarding H2 are presented in Table 5. Panel A presents results from estimating the model from equation (2) across all sample firms. The third column of Panel A uses all control variables and year fixed effects in the estimation. As before, I continue to find a negative and significant association between AOCI_HEDGE and GP ($\gamma_2$ = -0.397, *t*-statistic = -2.86). More importantly, I find a positive and marginally significant association between the interaction term PRICEPASS*AOCI_HEDGE and GP ($\gamma_3$ = 0.644, *t*-statistic = 1.62). In fact, I find that the sum of these two coefficient estimates is insignificantly different from zero (i.e., I fail to reject the null hypothesis that $\gamma_2 + \gamma_3 = 0$ with a *p*-value of $p = 0.506$). This result is consistent with H2 and suggests that the association between unrealized cash flow hedge gains/losses and future gross margin is weaker for firms which have the ability to pass price fluctuations through to their customers.

It is possible that firms with true pricing power do not engage in cash flow hedge activities, as they can immediately pass any price changes through to their customers.[28] Therefore, tests of H2 might be more powerful if they include all firms in Compustat. Column four of Panel A adds firms with zero unrealized cash flow hedge gains/losses to

[28] Firms with pricing power would use hedges if they are able to change prices with their customers, but only at discrete intervals due to contracting. For example, local utility firms generally are able to charge market rates for power, but may only be able to set these rates annually. Therefore, hedges help "lock-in" margins until the contract which specifies the annual rates is renewed.

my sample. The inferences are unchanged. I continue to find a negative association between AOCI_HEDGE and GP ($\gamma_2$ =-2.19, *t*-statistic = -2.54). Additionally, I continue to find a positive association between the interaction term PRICEPASS*AOCI_HEDGE and GP ($\gamma_3$ = 3.22, *t*-statistic = 2.19).[29]

The results are unchanged in Panel B when I exclude financial services firms.[30] The evidence from Table 5 supports H2. Specifically, the association between unrealized cash flow hedge gains/losses and future gross margin is weaker for firms in less competitive industries.

4.5 Effect of unrealized gains/losses on contemporaneous and future stock returns

To examine the relation between unrealized cash flow hedge gains/losses and stock returns (H3), I follow the prior literature on value relevance of OCI components (Dhaliwal, Subramanyam and Trezevant 1999; Louis 2003; among others) and model returns as a function of net income and my variable of interest:

$$R_{i,t} = \omega_0 + \omega_1 NI_{i,t} + \omega_2 AOCI\_HEDGE_{i,t} + \varepsilon_{i,t} \quad (5)$$

where R is the buy and hold return using monthly stock return data from CRSP in year *t*, NI is net income in year *t* scaled by the market value of equity at the end of year *t-1*, and

[29] In untabulated results, I employ a Heckman (1979) selection model where the first stage is a probit regression of the decision to hedge on size, leverage, growth opportunities, liquidity and foreign income (Nance et al. 1993; Geczy et al. 1997). The second stage for H1 and H2 is Equations (1) and (2), respectively, with the addition of the Inverse Mills Ratio and a dummy variable for the decision to hedge. The results regarding H1 and H2 are unchanged. Specifically, for H1 the coefficient on AOCI_HEDGE is -0.495 (*t*-statistic = -2.14). For H2, I fail to reject the null hypothesis that the sum of AOCI_HEDGE and PRICEPASS*AOCI_HEDGE is zero (*F*-statistic = 0.05, *p*-value = 0.823).

[30] As mentioned in footnote 25, an alternative measure for industry concentration uses U.S. Census based data. However, this measure is only available for manufacturing firms and consequently significantly reduces the sample size (2,263 firm-years). Nevertheless, the inferences are unchanged. Specifically, I find that the interaction term PRICEPASS* AOCI_HEDGE is positive and significantly associated with GP in the reduced sample ($\gamma_3$ = 3.68, t-statistic = 1.75). When including non-hedging manufacturing firms, the sample size increases to 8,434 firms and the results are stronger ($\gamma_3$ = 13.49, t-statistic = 4.56).

AOCI_HEDGE is the unrealized hedging gain amount in AOCI at year *t* scaled by the market value of equity at the end of year *t-1*. The intercept is also scaled by market value of equity at the end of year *t-1*. I also include controls for industry fixed effects using the Fama and French 48 industry classifications and use robust standard errors that are clustered by firm.

Following Louis (2003), I vary the holding period over which the return is calculated in order to investigate the association between AOCI_HEDGE and R over time. Specifically, I estimate equation (5) using a Current Year Horizon, 1-Year Horizon and 2-Year Horizon return.[31] The Current Year Horizon return is the continuously compounded stock return during year *t*. The 1-Year Horizon return is the continuously compounded stock return starting at the beginning of year *t* and ending at the end of year *t+1*. The 2-Year Horizon return is the continuously compounded stock return starting at the beginning of year *t* and ending at the end of year *t+2*. If unrealized cash flow hedge gains/losses are negatively associated with future stock returns (H3), then I expect that $\omega_2$ becomes increasingly negative as the holding period increases (i.e. $\omega_2 < 0$).

To examine whether a zero net-investment trading strategy which invests in (sells) the bottom (top) deciles of unrealized cash flow hedge gains/losses yields positive returns (H4), I form portfolio deciles on unrealized cash flow hedge gains/losses (AOCI_HEDGE in year *t-2*) as in Figure 1. I calculate portfolio returns for each decile as a two-year buy and hold return assuming purchase in the fourth month of year *t-1* and holding through the third month of year *t+1*. The fourth month of year *t-1* is selected

[31] I examine these three holding periods to be consistent with my tests regarding H1 and H2.

since this is the first month during which the unrealized hedging amount in AOCI is made public through firms filing their Form 10-K. Delisting returns are included when available from CRSP. If a firm is delisted but the delisting return is missing, I assume a -30 percent delisting return (Shumway 1997). Consistent with prior research (Sloan 1996; Zhang 2006; Zhang 2007), I do not truncate prior to forming portfolios.[32]

I calculate the trading strategy returns as the difference between the return on the bottom decile and the return on the top decile. Equivalently, this is the total two-year return if an investor purchased the sample firms with the largest unrealized hedging losses in AOCI and sold short an equal dollar value of the sample firms with the largest unrealized hedging gains in AOCI. If unrealized cash flow hedge gains/losses predict future stock returns as predicted by H4, then this return should be significant and positive.

## 4.6 Results on effect of unrealized gains/losses on future stock returns

### 4.6.1 Tests of Hypothesis Three

My third hypothesis predicts that the association between unrealized cash flow hedge gains/losses and stock returns becomes increasingly negative over time as the protection provided by the hedge expires. I test H3 using equation (3) and examine whether $\omega_2$ is increasingly negative over time. Results regarding H3 are presented in Table 6. Panel A presents results from estimating my multivariate model across all sample firms with

[32] Kraft, Leone and Wasley (2006) present evidence which suggests that the accruals anomaly is driven by outliers. All tests throughout my paper use samples which are truncated, except for the trading strategy of H4. In untabulated results, I truncate my H4 sample at the top and bottom 1 percent and my results are quantitatively and qualitatively unchanged.

CRSP returns. I find no association between AOCI_HEDGE and stock returns during contemporaneous time periods ($\omega_2$ = 87.63, *t*-statistic = 0.75).[33] However, as I extend the holding period of the stock return, the association between AOCI_HEDGE and stock returns becomes increasingly negative. Specifically, I find a negative and significant association between AOCI_HEDGE and stock returns from a 2-Year Horizon which continuously compounds monthly stock returns during the contemporaneous and following two years ($\omega_2$ = -1,405.48, *t*-statistic = -2.90).[34] Taken together, the data is consistent with H3 and suggests that the information conveyed by unrealized cash flow hedge gains/losses is not contemporaneously impounded into firm value. Instead, the result suggests that current period unrealized cash flow hedge gains/losses are negatively associated with future stock returns. The results are unchanged in Panel B when I exclude financial services firms. As expected and consistent with prior literature, net income is positively associated with stock returns during all return horizons.

Panel C of Table 6 examines whether the 2-Year Horizon regression findings from Panels A and B differ for firms in less competitive industries. In both cases, I find no association between unrealized cash flow hedge gains/losses and future stock returns for firms with pricing power (i.e. fail to reject the null hypothesis that $\omega_2 + \omega_4 = 0$ with *p*-value = 0.772). Taken together, the results in Table 6 support my third hypothesis and

[33] Prior risk management literature finds that firms which hedge have higher contemporaneous market values than firms which do not hedge (a "hedging premium") (Allayannis and Weston 2001, among others). My regressions only includes firms which hedge. If I include nonhedging firms in Table 6 with a dummy variable equal to 1 if the firm hedges, the dummy variable is positive and significant. This suggests that the hedging premium exists when my sample firms are compared to nonhedging firms.

[34] This suggests that a one standard deviation increase in unrealized hedging gains is associated with a reduction in annual stock returns of 4.63 percent.

suggest that equity investors do not immediately price the information conveyed by unrealized cash flow hedge gains/losses.

### 4.6.2 Tests of Hypothesis Four

My fourth hypothesis predicts that a zero net-investment trading strategy which invests in (sells) the bottom (top) deciles of unrealized cash flow hedge gains/losses yields positive returns. However, I first investigate whether all firms with unrealized cash flow hedge losses are associated with higher future stock returns and whether all firms with unrealized cash flow hedge gains are associated with lower future stock returns. Figure 3 compares the two-year buy and hold raw returns of these sample firms to the two-year buy and hold raw returns of the CRSP universe of firms with zero unrealized cash flow hedge activity. As expected, firms with unrealized hedging losses have higher two-year stock returns than firms without cash flow hedges. Similarly, firms with unrealized hedging gains have lower two-year stock returns than firms without cash flow hedges.

Panel A of Table 7 presents whether the returns documented in Figure 3 are statistically different for firms with hedging losses as compared to firms with hedging gains. The annualized return from investing in firms with unrealized losses and selling short firms with unrealized gains is 6.87 percent (*p*-value = <0.0001). The results are unchanged when excluding financial services firms from the sample. Taken together, the results in Figure 3 and Panel A of Table 7 suggest that unrealized cash flow hedge losses are associated with higher future stock returns, while unrealized cash flow hedge losses are associated with lower future stock returns.

Panel B of Table 7 partitions the sample firms into deciles based on the level of unrealized cash flow hedge gains/losses. The annualized return from investing in the bottom decile (i.e. firms with the largest unrealized losses) and selling short the top decile (i.e. firms with the largest unrealized gains) is 10.63 percent (*p*-value = 0.0001). The results are unchanged when excluding financial services firms from the sample. These results provide support for H4. Specifically, a zero net-investment trading strategy which invests in (sells) the bottom (top) deciles of unrealized cash flow hedge gains/losses yields annualized returns of between 6 and 10 percent.

I next consider whether these trading strategy returns can be explained by common risk factors such as market returns, firm size, firm growth opportunities and firms' stock price momentum. I examine this question in two ways. First, I calculate equal-weighted market-adjusted returns for each portfolio decile.[35] The results are presented in Panel A of Table 8. The annualized return from investing in the bottom decile (i.e. firms with the largest unrealized losses) and selling short the top decile (i.e. firms with the largest unrealized gains) is 11.02 percent (*p*-value = 0.0002). The results are unchanged when excluding financial services firms.

Second, I examine whether the top and bottom decile returns are statistically different through a Fama and French (1993) abnormal returns regression, including a factor for momentum (Carhart 1997). The results are presented in Panel B of Table 8. The abnormal returns of the firms with the largest unrealized cash flow hedge losses remain statistically larger than the abnormal returns of the firms with the largest unrealized cash

[35] I present equal-weighted market-adjusted returns because they are most similar to the equal-weighted returns of firms within each decile. In untabulated results, I also examine size-adjusted returns and value-weighted market-adjusted returns. The results are quantitatively and qualitatively unchanged.

flow hedge gains (HEDGE = 0.63, *t*-statistic = 3.94). Again, the results are unchanged when excluding financial services firms from the sample.

In all, the cumulative evidence in Figure 3 and Tables 6, 7 and 8 suggest that investors do not immediately impound the information conveyed by unrealized cash flow hedge gains/losses into stock prices. In addition, the results suggest that this delay in pricing is not associated with factors related to firm risk. Instead, investors appear surprised by future realizations of gross margin, consistent with the view that the mixed attribute accounting model and lack of transparent disclosure on future hedged transactions lead to a delay in pricing.

# 5. CONCLUSION

This study documents the information content of unrealized cash flow hedge gains/losses for future profitability and stock returns. First, I find that unrealized cash flow hedge gains/losses are negatively associated with future gross margin. Second, this association is weaker for firms that have the ability to pass price changes through to customers. Finally, financial markets do not immediately price the information conveyed by unrealized cash flow hedge gains/losses into stock price. Instead, investors appear surprised by future realizations of gross margin, consistent with the view that the mixed attribute accounting model and lack of transparent disclosure on future hedged transactions lead to a delay in pricing. Overall, my results suggest that the fair values of cash flow hedges reliably predict future profitability and stock returns, but in the direction opposite to which accounting fair values (the accounting effect) would suggest. In other words, cash flow hedge accounting is a case where accounting values are inversely related to economic effects, similar to the accounting for the foreign currency translation adjustment (Louis 2003) and the accounting for credit impairments to debt (Barth, Hodder, and Stubben 2008).

The FASB recently adopted FASB Statement No. 161, *Disclosures about Derivative Instruments and Hedging Activities* (FAS 161) (FASB 2008). FAS 161, effective in 2009, was adopted in order to improve disclosure of derivative instruments both within and across firms. Although FAS 161 did not change the mixed attribute reporting framework, future research could examine whether the mispricing documented in this paper is reduced the post-FAS 161 time periods. Future research may also consider if and when

equity analysts' forecasts incorporate the information conveyed by unrealized cash flow hedge gains/losses. Additionally, as previously mentioned, Fitch (2005) recommends removing balance sheet derivative amounts when calculating credit ratios. Whether credit ratings, debt analysts' recommendations and bond prices reflect the economic effects of unrealized cash flow hedge gains/losses in a timely manner is an empirical question. Finally, if the accounting effects of unrealized cash flow hedge gains/ losses signal changes in risk as measured by balance sheet ratios, then the gains/losses should be positively related to firms' cost of capital, and negatively related to future investment levels.

# APPENDIX A: JOURNAL ENTRIES RELATED TO CASH FLOW HEDGE OPTION INVESTMENT

This appendix provides an example of the journal entries associated with an investment in an option derivative which is designated as a cash flow hedge. The journal entries associated with investments in other derivative instruments (i.e. swaps, forwards and futures contracts) would work analogously in the context of this example where underlying prices move in an adverse direction. The primary difference between option derivatives and other types of contracts is that, in general, option contracts only provide protection from adverse price changes. Additionally, this example assumes that the firm hedged 100 percent of its exposure to the underlying hedged item. To the extent that this is not the case, the cost of the inventory recognized in the income statement at t=3 would be higher than $5,000 but less than $6,500.

**Time t=0**

Firm buys option hedge for $1,000 cash to cover a future inventory purchase currently worth $5,000

| | | | | |
|---|---|---|---|---|
| Dr | Investment in Option | | 1,000 | |
| Cr | Cash | | 1,000 | |

| Balance Sheet | Amount | Income Statement | Amount |
|---|---|---|---|
| Cash | (1,000) | | |
| Investment in Option | 1,000 | | |

APPENDIX A, continued
JOURNAL ENTRIES RELATED TO CASH FLOW HEDGE OPTION INVESTMENT

**Time t=1**

Underlying price goes up and hedge increases in value by $1,500

| | | | |
|---|---|---|---|
| Dr | Investment in Option | 1,500 | |
| Cr | AOCI - derivative gain | | 1,500 |

| Balance Sheet | Amount | Income Statement | Amount |
|---|---|---|---|
| Cash | (1,000) | | |
| Investment in Option | 2,500 | | |
| AOCI - derivatives | (1,500) | | |

**Time t=2**

Firm sells hedge for $2,500 and purchases materials for current value of $6,500 ($5,000 + $1,500 increase)

| | | | |
|---|---|---|---|
| Dr | Cash | 2,500 | |
| Cr | Investment in Option | | 2,500 |
| Dr | Inventory | 6,500 | |
| Cr | Cash | | 6,500 |

| Balance Sheet | Amount | Income Statement | Amount |
|---|---|---|---|
| Cash | (5,000) | | |
| Investment in Option | - | | |
| Inventory | 6,500 | | |
| AOCI - derivatives | (1,500) | | |

**Time t=3**

Firm sells materials and releases hedging gain from AOCI, resulting in total income statement cost of $5,000

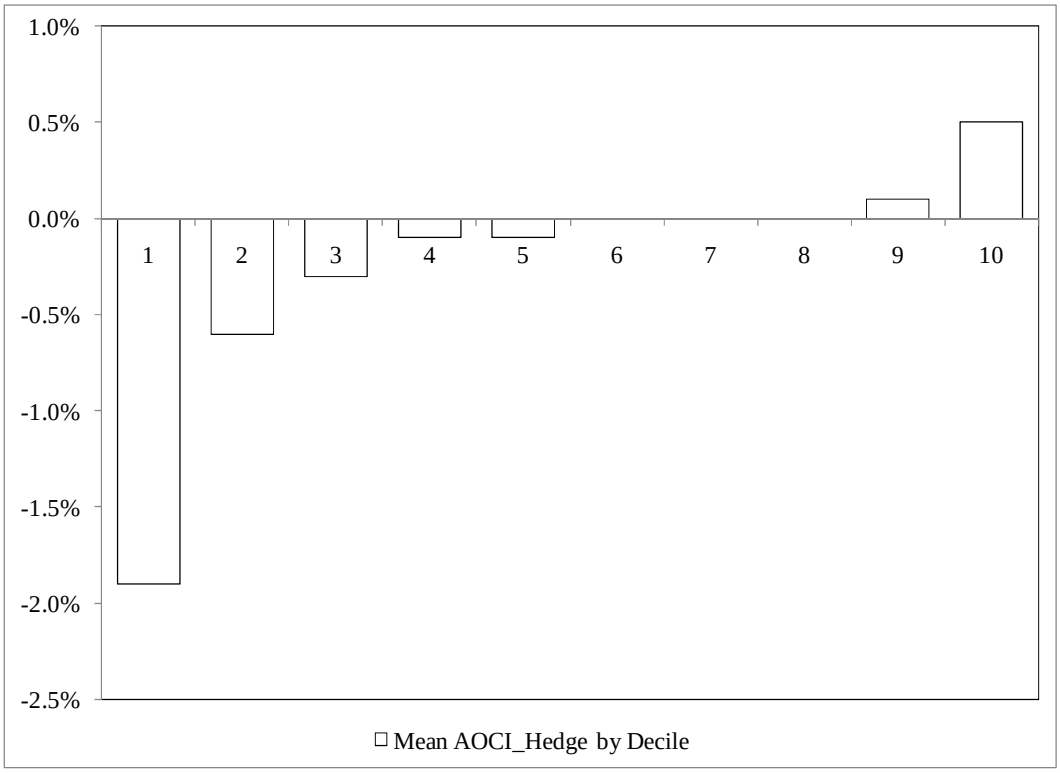
| | | | |
|---|---|---|---|
| Dr | Cost of Goods Sold | 6,500 | |
| Cr | Inventory | | 6,500 |
| Dr | AOCI - derivatives | 1,500 | |
| Cr | Cost of Goods Sold | | 1,500 |

| Balance Sheet | Amount | Income Statement | Amount |
|---|---|---|---|
| Cash | (5,000) | | |
| Investment in Option | - | | |
| Inventory | - | Cost of Goods Sold | 6,500 |
| AOCI - derivatives | - | Cost of Goods Sold | (1,500) |
| | | Net cost of inventory: | 5,000 |

# APPENDIX B

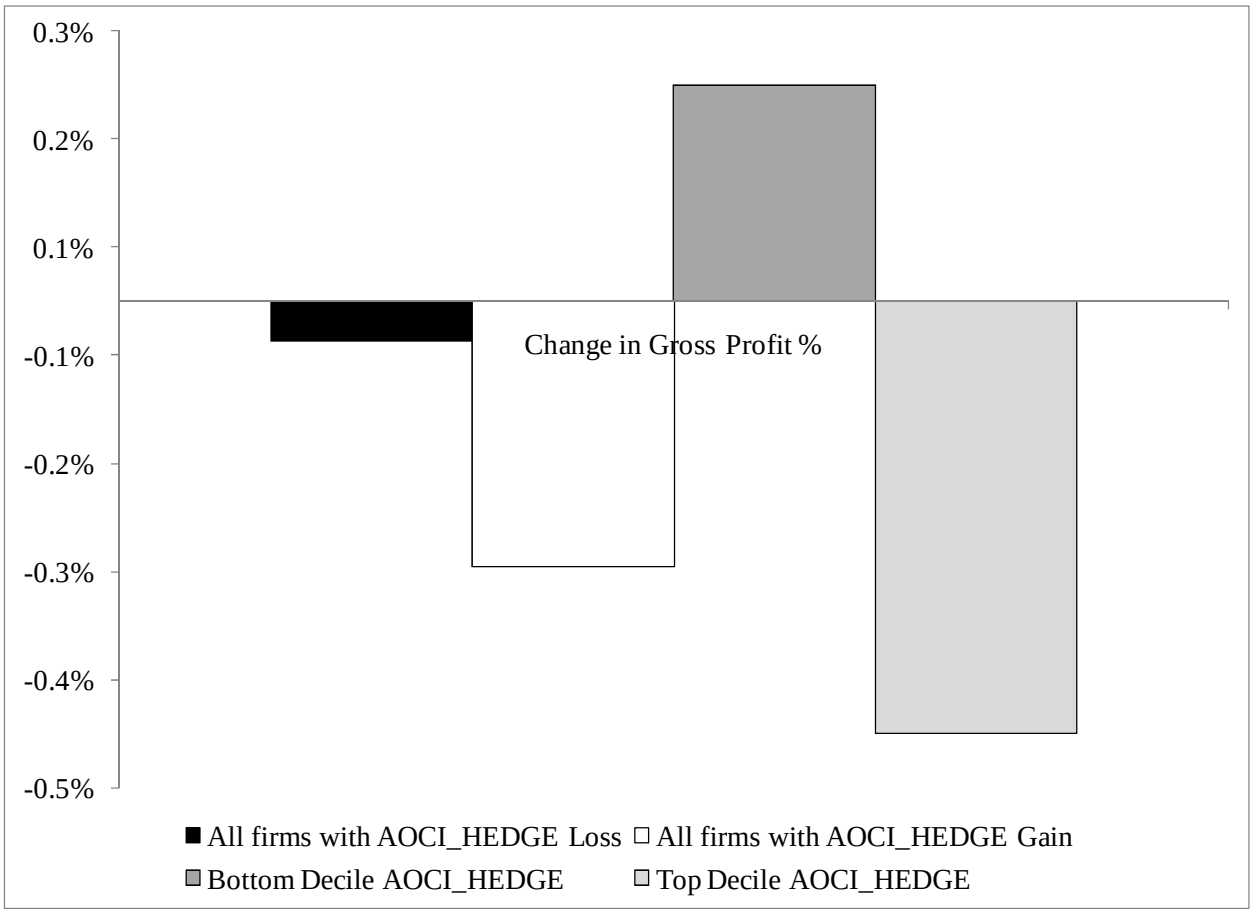
## FIGURES

FIGURE 1
Mean of AOCI_Hedge by Portfolio/Decile Ranking




Amounts above represent the mean by decile across the 5,976 sample firms in Compustat Xpressfeed for the years 2001 through 2005. Deciles are formed on the sample based on the level of AOCI_HEDGE. AOCI_HEDGE is the level of unrealized hedging gains/losses in AOCI scaled by the contemporaneous year's net sales.

FIGURE 2
Change in Two-year Ahead Gross Margin for Sample Firms
using Unrealized Hedging Gains as a Partitioning Variable




Amounts above represent the change in gross margin from year *t-2* to year *t* for four partitions of sample firms during the sample years beginning in 2003 through 2007 for all COMPUSTAT Xpressfeed firms as identified in Table 1. The first two partitions compare the average change in gross margin for the sample firms with unrealized hedging losses in accumulated other comprehensive income (AOCI) to the average change in gross margin for the sample firms with unrealized hedging gains in AOCI. The second two partitions compare the average change in gross margin for the decile of sample firms with the highest level of unrealized hedging losses in AOCI scaled by net sales to the average change in gross margin for the decile of sample firms with the highest level of unrealized hedging gains in AOCI scaled by net sales. Deciles are formed on the sample after removing nonzero AOCI_HEDGE firms. AOCI_HEDGE is the level of unrealized hedging gains/losses in AOCI scaled by the contemporaneous year's net sales.

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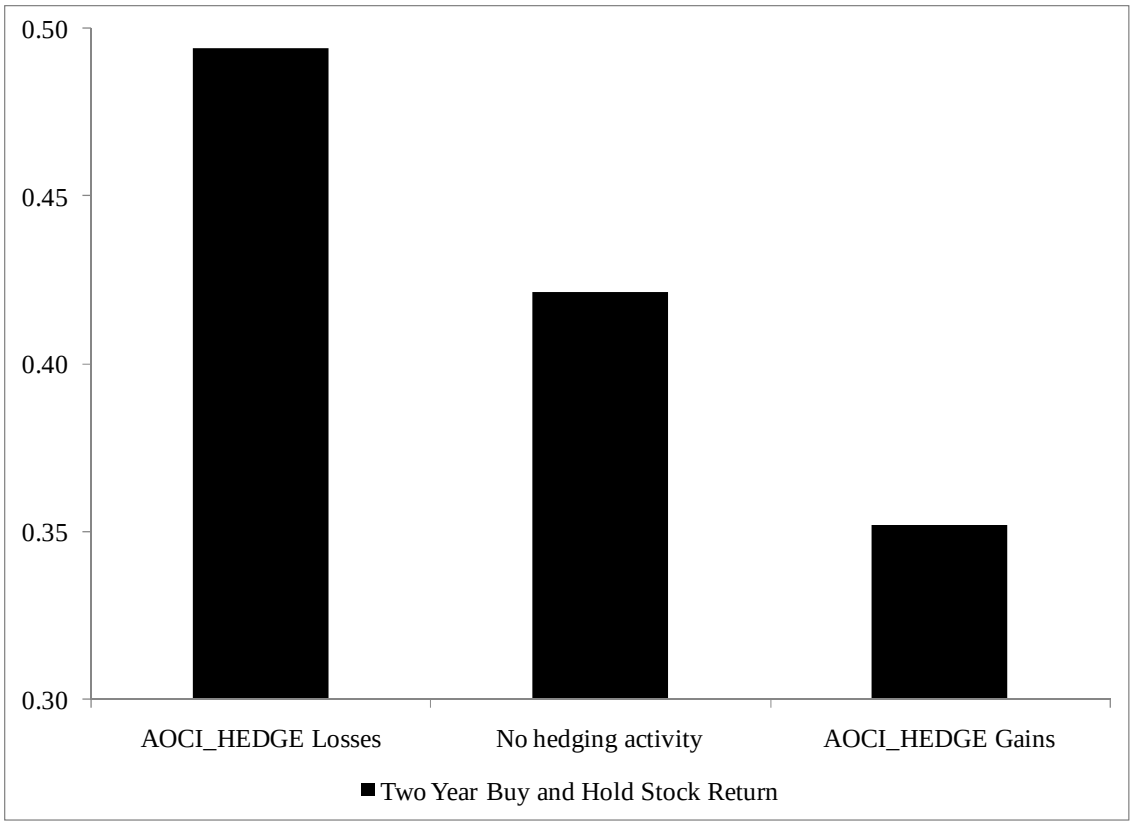
FIGURE 3
Change in Two-year Ahead Stock Returns for Sample Firms
using Unrealized Hedging Gains/Losses as a Partitioning Variable




Amounts above represent the change in stock price from year *t-2* to year *t* for sample firms with stock return data available in CRSP during the sample years beginning in 2003 through 2007. Three sets of returns are presented. The first column represents the mean two year buy and hold return for all sample firms with unrealized hedging losses in accumulated other comprehensive income (AOCI). The second column represents the mean two year buy and hold return for all firms in the CRSP universe which are not included in my sample. The third column represents the mean two year buy and hold return for all sample firms with unrealized hedging gains in AOCI.

# APPENDIX C

## TABLES

# TABLE 1
## Sample Selection and Industry Classification

**Panel A:** Sample Construction

| | |
|---|---|
| Number of firms in Compustat Xpressfeed with nonmissing derivatives data and total assets > 0 and nonmissing, nonzero levels of AOCIDERGL_LAG2 | 6,548 |
| Missing SIC code classification | (96) |
| Missing GP | (18) |
| Missing GP_LAG2 | (9) |
| Truncate GP, GP_LAG2, AOCIDERGL_LAG2 and LOGASSETS at 1% and 99% by year | (449) |
| Final Sample | 5,976 |

**Panel B:** Distribution by year

| | Number | Percentage |
|---|---|---|
| 2003 | 1,107 | 18.5% |
| 2004 | 1,216 | 20.3% |
| 2005 | 1,224 | 20.5% |
| 2006 | 1,206 | 20.2% |
| 2007 | 1,223 | 20.5% |
| | 5,976 | |

TABLE 1, Continued
Sample Selection and Industry Classification

**Panel C:** Industry Classification (Fama and French 48 industry classification)

| | Number | Percent |
|---|---|---|
| Utilities | 640 | 10.7% |
| Banking | 556 | 9.3% |
| Trading | 339 | 5.7% |
| Petroleum and Natural Gas | 305 | 5.1% |
| Business Services | 255 | 4.3% |
| Machinery | 242 | 4.0% |
| Retail | 240 | 4.0% |
| Transportation | 228 | 3.8% |
| Electronic Equipment | 208 | 3.5% |
| Chemicals | 183 | 3.1% |
| Insurance | 177 | 3.0% |
| Wholesale | 162 | 2.7% |
| Food Products | 161 | 2.7% |
| Communication | 158 | 2.6% |
| Consumer Goods | 132 | 2.2% |
| Steel Works Etc | 126 | 2.1% |
| Business Supplies | 116 | 1.9% |
| Computers | 110 | 1.8% |
| Measuring and Control Equipment | 109 | 1.8% |
| Automobiles and Trucks | 109 | 1.8% |
| Apparel | 107 | 1.8% |
| Electrical Equipment | 102 | 1.7% |
| Pharmaceutical Products | 100 | 1.7% |
| Medical Equipment | 97 | 1.6% |
| Restaurants, Hotels, Motels | 83 | 1.4% |
| Construction Materials | 83 | 1.4% |
| Personal Services | 79 | 1.3% |
| Entertainment | 68 | 1.1% |
| Healthcare | 53 | 0.9% |
| Industries with less than 1% | 648 | 10.8% |
| | 5,976 | |

TABLE 2
Descriptive Statistics

**Panel A - All sample firms**

| | Obs. | Mean | Standard Deviation | 25% | Median | 75% |
|---|---|---|---|---|---|---|
| GP | 5,976 | 0.382 | 0.203 | 0.220 | 0.343 | 0.516 |
| AOCI_HEDGE | 5,976 | -0.004 | 0.014 | -0.003 | -0.001 | 0.001 |
| GP_LAG2 | 5,976 | 0.383 | 0.204 | 0.223 | 0.345 | 0.516 |
| SALES | 5,976 | 4,080.930 | 8,342.830 | 367.787 | 1,121.880 | 3,733.600 |
| LOGASSETS | 5,976 | 7.811 | 1.748 | 6.622 | 7.754 | 8.986 |
| LEVERAGE_LAG2 | 5,976 | 0.662 | 0.278 | 0.503 | 0.651 | 0.804 |
| NI_LAG2 | 5,976 | 0.025 | 0.157 | 0.008 | 0.029 | 0.059 |

(continued)

TABLE 2, continued
Descriptive Statistics

**Panel B - Sample firms excluding financial services (SIC Codes 6000 to 6999)**

| | Obs. | Mean | | Standard Deviation | 25% | Median | | 75% |
|---|---|---|---|---|---|---|---|---|
| GP | 4,882 | 0.359 | *** | 0.189 | 0.213 | 0.322 | *** | 0.473 |
| AOCI_HEDGE | 4,882 | -0.003 | *** | 0.012 | -0.003 | -0.001 | *** | 0.001 |
| GP_LAG2 | 4,882 | 0.357 | *** | 0.187 | 0.215 | 0.321 | *** | 0.469 |
| SALES | 4,882 | 4,274.900 | *** | 8,531.730 | 444.056 | 1,297.560 | *** | 4,061.000 |
| LOGASSETS | 4,882 | 7.583 | *** | 1.638 | 6.459 | 7.582 | *** | 8.710 |
| LEVERAGE_LAG2 | 4,882 | 0.632 | *** | 0.286 | 0.477 | 0.622 | *** | 0.745 |
| NI_LAG2 | 4,882 | 0.026 | | 0.173 | 0.008 | 0.035 | *** | 0.066 |

(continued)

TABLE 2, continued
Descriptive Statistics

All variables are truncated at 1% and 99% to avoid the influence of outliers on statistical inference. Panel A provides descriptive statistics for all firms in the sample. Panel B provides descriptive statistics for sample firms excluding financial services firms (SIC codes 6000 to 6999). Data definitions are as follows: Gross profit (GP) is the gross profit in year *t* (Compustat variable GP), scaled by the net sales in year *t* (Compustat variable SALE). AOCI_HEDGE is the level of unrealized derivative gains or losses in AOCI in year *t-2* (Compustat variable AOCIDERGL), scaled by the net sales in year *t-2*. GP_LAG2 is gross profit in year *t-2*, scaled by net sales in year *t-2*. SALES is net sales (Compustat variable SALE) in year *t*. LOGASSETS is the natural logarithm of total assets in year *t* (Compustat variable AT). LEVERAGE_LAG2 is total liabilities in year *t-2* (Compustat variable LT), scaled by total assets in year *t-2*. NI_LAG2 is net income before extraordinary items in year *t-2* (Compustat variable NI), scaled by total assets in year *t-2*. *, ** and *** next to the mean (median) indicate a 10%, 5% and 1%, respectively, significant difference between financial services firms and the rest of the sample using a two-tailed test.

TABLE 3
Univariate Regression of Gross Profit on Lagged AOCI
Unrealized Cash Flow Hedge Gains/Losses

Model: $GP_{i,t} = \alpha_0 + \beta_1 AOCI\_HEDGE_{i,t-2} + \varepsilon_{i,t}$.

**Panel A - All sample firms**

| | Predict | | | | |
|---|---|---|---|---|---|
| Intercept | ( ? ) | 0.38 | 0.72 | 0.36 | 0.61 |
| | | (69.74)*** | (8.56)*** | (17.43)*** | (6.30)*** |
| AOCI_HEDGE | ( - ) | -1.91 | -1.91 | -1.05 | -1.02 |
| | | (-6.88)*** | (-6.82)*** | (-4.70)*** | (-4.57)*** |
| Year Fixed Effects | | No | Yes | No | Yes |
| Industry Fixed Effects | | No | No | Yes | Yes |
| Adj. $R^2$ | | 0.02 | 0.02 | 0.45 | 0.45 |
| N | | 5,976 | 5,976 | 5,976 | 5,976 |
| Economic Magnitude: | | | | | |
| Mean | | -0.0036 | -0.0036 | -0.0036 | -0.0036 |
| Std Dev | | 0.0144 | 0.0144 | 0.0144 | 0.0144 |
| Change in Margin for a SD increase in Hedging Gains | | -2.74% | -2.74% | -1.51% | -1.47% |

(continued)

TABLE 3, continued
Univariate Regression of Gross Profit on Lagged AOCI
Unrealized Cash Flow Hedge Gains/Losses

**Panel B - Sample excluding financial firms**

| | Predict | | | | |
|---|---|---|---|---|---|
| Intercept | ( ? ) | 0.35 | 0.72 | 0.36 | 0.61 |
| | | (68.37)*** | (8.52)*** | (16.46)*** | (6.30)*** |
| AOCI_HEDGE | ( - ) | -2.48 | -2.48 | -1.58 | -1.58 |
| | | (-6.47)*** | (-6.43)*** | (-5.28)*** | (-5.25)*** |
| Year Fixed Effects | | No | Yes | No | Yes |
| Industry Fixed Effects | | No | No | Yes | Yes |
| Adj. $R^2$ | | 0.03 | 0.03 | 0.40 | 0.41 |
| N | | 4,882 | 4,882 | 4,882 | 4,882 |
| Economic Magnitude: | | | | | |
| Mean | | -0.0028 | -0.0028 | -0.0028 | -0.0028 |
| Std Dev | | 0.0124 | 0.0124 | 0.0124 | 0.0124 |
| Change in Margin for a SD increase in Hedging Gains | | -3.07% | -3.07% | -1.95% | -1.95% |

This table provides univariate regression results of gross profit in year *t* on the level of unrealized cash flow hedge gains or losses in year *t-2*. Panel A presents results for all sample firms, while Panel B presents results for a sample which excludes financial services firms (SIC codes 6000 to 6999). The dependent variable is gross profit in year *t* scaled by net sales in year t and the independent variable is the level of unrealized derivative gains in other comprehensive income (AOCI) in year *t-2* scaled by net sales in year *t-2*. All variables are truncated at 1% and 99% to avoid the influence of outliers on statistical inference. Industry fixed effects, where included, are based on Fama and French (1997) 48-industry classifications. *T*-statistics presented in parentheses are calculated using White (1980) standard errors which are clustered by firm in order to control for both heteroscedasticity and serial correlation. *, ** and *** next to the *t*-statistic indicate a 10%, 5% and 1%, respectively, significance level using a one-tailed test if a directional prediction is made, two-tailed otherwise.

TABLE 4
Multivariate Regression of Gross Profit on
Lagged AOCI Unrealized Cash Flow Hedge Gains/Losses

Model: $GP_{i,t} = \alpha_0 + \beta_1 AOCI\_HEDGE_{i,t-2} + \beta_2 GP_{i,t-2} + \beta_3 SALES_{i,t} + \beta_4 SIZE_{i,t} + \varepsilon_{i,t}$.

**Panel A - All sample firms**

| | Predict | | | |
|---|---|---|---|---|
| Intercept | ( ? ) | 0.09 | 0.09 | 0.058 |
| | | (9.39)*** | (9.27)*** | (5.07)*** |
| AOCI_HEDGE | ( - ) | | -0.35 | -0.349 |
| | | | (-2.62)*** | (-2.61)*** |
| GP_LAG2 | ( + ) | 0.87 | 0.86 | 0.863 |
| | | (75.56)*** | (74.45)*** | (74.04)*** |
| LOGASSETS | ( ? ) | | | 0.003 |
| | | | | (4.18)*** |
| Year Fixed Effects | | Yes | Yes | Yes |
| Industry Fixed Effects | | Yes | Yes | Yes |
| Condition Index | | 3.32 | 6.79 | 14.37 |
| Adj. $R^2$ | | 0.86 | 0.86 | 0.86 |
| N | | 5,976 | 5,976 | 5,976 |
| Economic Magnitude: | | | | |
| Mean | | | -0.0036 | -0.0036 |
| Std Dev | | | 0.0144 | 0.0144 |
| Change in Margin for a SD increase in Hedging Gains | | | -0.50% | -0.50% |

(continued)

TABLE 4, continued
Multivariate Regression of Gross Profit on
Lagged AOCI Unrealized Cash Flow Hedge Gains/Losses

**Panel B - Sample excluding financial firms**

| | Predict | | | |
|---|---|---|---|---|
| Intercept | ( ? ) | 0.08 | 0.08 | 0.051 |
| | | (8.46)*** | (8.43)*** | (4.45)*** |
| AOCI_HEDGE | ( - ) | | -0.42 | -0.427 |
| | | | (-2.48)*** | (-2.49)*** |
| GP_LAG2 | ( + ) | 0.88 | 0.88 | 0.879 |
| | | (74.55)*** | (72.12)*** | (71.49)*** |
| LOGASSETS | ( ? ) | | | 0.003 |
| | | | | (3.53)*** |
| Year Fixed Effects | | Yes | Yes | Yes |
| Industry Fixed Effects | | Yes | Yes | Yes |
| Condition Index | | 6.30 | 6.42 | 14.22 |
| Adj. $R^2$ | | 0.88 | 0.88 | 0.88 |
| N | | 4,882 | 4,882 | 4,882 |
| Economic Magnitude: | | | | |
| Mean | | | -0.0028 | -0.0028 |
| Std Dev | | | 0.0124 | 0.0124 |
| Change in Margin for a SD increase in Hedging Gains | | | -0.52% | -0.53% |

Panel A provides multivariate regression results on the full sample of firms. Panel B provides multivariate regression results on the sample of firms excluding financial services firms (SIC codes 6000 to 6999). Variables are defined in Table 2. All variables are truncated at 1% and 99% to avoid the influence of outliers on statistical inference. *T*-statistics presented in parentheses are calculated using White (1980) standard errors which are clustered by firm in order to control for both heteroscedasticity and serial correlation. *, ** and *** next to the *t*-statistic indicate a 10%, 5% and 1%, respectively, significance level using a one-tailed test if a directional prediction is made, two-tailed otherwise.

TABLE 5
Multivariate Regression of Gross Profit on Lagged AOCI
Unrealized Cash Flow Hedge Gains/Losses interacted with Herfindahl Index

Model: $GP_{i,t} = \gamma_0 + \gamma_1 PRICEPASS_{i,t} + \gamma_2 AOCI\_HEDGE_{i,t-2} + \gamma_3 PRICEPASS_{i,t} * AOCI\_HEDGE_{i,t-2} + \gamma_j CONTROLS_{i,t} + \varepsilon_{i,t}$.

**Panel A - All sample firms**

| | Predict | | | | |
|---|---|---|---|---|---|
| Intercept | ( ? ) | 0.76 | 0.07 | 0.052 | 0.03 |
| | | (9.10)*** | (8.04)*** | (4.28)*** | (0.38) |
| PRICEPASS | ( + ) | -0.04 | 0.00 | -0.001 | 0.04 |
| | | (-3.49) | (-0.79) | (-0.43) | (2.44)*** |
| AOCI_HEDGE | ( - ) | -1.96 | -0.40 | -0.397 | -2.19 |
| | | (-6.64)*** | (-2.92)*** | (-2.86)*** | (-2.54)*** |
| PRICEPASS*AOCI_HEDGE | ( + ) | 2.66 | 0.68 | 0.644 | 3.22 |
| | | (2.40)*** | (1.69)** | (1.62)* | (2.19)** |
| GP_LAG2 | ( + ) | | 0.92 | 0.914 | 0.44 |
| | | | (132.25)*** | (131.45)*** | (12.15)*** |
| LOGASSETS | ( + ) | | | 0.002 | 0.03 |
| | | | | (3.20)*** | (7.05)*** |
| HEDGE | ( ? ) | | | | -0.01 |
| | | | | | (-0.96) |
| F-test: $\gamma_2 + \gamma_3 = 0$ | | 0.70 | 0.28 | 0.25 | 1.03 |
| F-statistic | | (0.43) | (0.54) | (0.44) | (1.36) |
| P-value | | (0.512) | (0.463) | (0.506) | (0.244) |
| Year Fixed Effects | | Yes | Yes | Yes | Yes |
| Industry Fixed Effects | | No | No | No | No |
| Condition Index | | 1.80 | 4.50 | 11.73 | 7.10 |
| Adj. $R^2$ | | 0.03 | 0.85 | 0.85 | 0.23 |
| N | | 5,976 | 5,976 | 5,976 | 24,086 |

(continued)

TABLE 5, continued
Multivariate Regression of Gross Profit on Lagged AOCI
Unrealized Cash Flow Hedge Gains/Losses interacted with Herfindahl Index

**Panel B - Sample excluding financial services firms**

| | Predict | | | | |
|---|---|---|---|---|---|
| Intercept | ( ? ) | 0.74 | 0.06 | 0.039 | 0.03 |
| | | (8.86)*** | (4.95)*** | (2.68)*** | (0.48) |
| PRICEPASS | ( + ) | -0.02 | 0.00 | -0.003 | 0.07 |
| | | (-1.41) | (-1.45) | (-1.34) | (4.00)*** |
| AOCI_HEDGE | ( - ) | -2.54 | -0.53 | -0.520 | -2.85 |
| | | (-6.40)*** | (-3.10)*** | (-3.04)*** | (-2.43)*** |
| PRICEPASS*AOCI_HEDGE | ( + ) | 3.66 | 1.13 | 1.060 | 5.52 |
| | | (2.57)*** | (2.46)*** | (2.25)** | (2.88)*** |
| GP_LAG2 | ( + ) | | 0.94 | 0.939 | 0.44 |
| | | | (117.06)*** | (117.83)*** | (11.86)*** |
| LOGASSETS | ( + ) | | | 0.002 | 0.02 |
| | | | | (2.37)** | (5.31)*** |
| HEDGE | ( ? ) | | | | 0.01 |
| | | | | | (0.96) |
| F-test: $\gamma_2 + \gamma_3 = 0$ | | 1.12 | 0.60 | 0.54 | 2.67 |
| F-statistic | | (0.86) | (1.94) | (1.53) | (2.25) |
| P-value | | (0.354) | (0.164) | (0.216) | (0.134) |
| Year Fixed Effects | | Yes | Yes | Yes | Yes |
| Industry Fixed Effects | | No | No | No | No |
| Condition Index | | 1.81 | 4.56 | 1.34 | 6.85 |
| Adj. $R^2$ | | 0.03 | 0.87 | 0.87 | 0.23 |
| N | | 4,882 | 4,882 | 4,882 | 19,227 |

(continued)

TABLE 5, continued
Multivariate Regression of Two-year Ahead Gross Profit on
AOCI Hedging Gains interacted with Herfindahl Index

The specific models estimated are the same as in Table 4. PRICEPASS is a dummy variable equal to 1 if the firm's industry is in the top quintile of Herfindahl index calculated based on the Fama and French (1997) 48 industry classifications and zero otherwise. HEDGE is a dummy variable equal to 1 if a firm has nonzero unrealized hedging gains or losses in AOCI and zero otherwise. All continuous variables are truncated at 1% and 99% to avoid the influence of outliers on statistical inference. *T*-statistics presented in parentheses are calculated using White (1980) standard errors which are clustered by firm in order to control for both heteroscedasticity and serial correlation. *, ** and *** next to the *t*-statistic indicate a 10%, 5% and 1%, respectively, significance level using a one-tailed test if a directional prediction is made, two-tailed otherwise.

# TABLE 6
## Value Relevance Regression of Returns on Unrealized Hedging Gains/Losses and Net Income

Model: $R_{i,t} = \omega_0 + \omega_1 NI_{i,t} + \omega_2 AOCI\_HEDGE_{i,t} + \varepsilon_{i,t}$.

**Panel A - All firms**

| | Current Year Horizon | 1 Year-Horizon | 2 Year-Horizon |
|---|---|---|---|
| Intercept | 5.69 | 6.62 | 10.42 |
| | (5.13)*** | (3.93)*** | (4.08)*** |
| NI | 0.92 | 0.99 | 0.98 |
| | (11.25)*** | (7.42)*** | (4.88)*** |
| AOCI_HEDGE | 87.63 | -182.29 | -1,405.48 |
| | (0.75) | (-0.79) | (-2.90)*** |
| Industry Fixed Effects | Yes | Yes | Yes |
| N | 4,878 | 4,801 | 4,771 |
| R2 | 0.08 | 0.04 | 0.04 |

**Panel B - Sample Excluding Financial Firms**

| | Current Year Horizon | 1 Year-Horizon | 2 Year-Horizon |
|---|---|---|---|
| Intercept | 5.78 | 6.08 | 9.18 |
| | (4.94)*** | (3.43)*** | (3.34)*** |
| NI | 0.85 | 0.85 | 0.83 |
| | (10.52)*** | (6.44)*** | (4.10)*** |
| AOCI_HEDGE | 245.89 | -171.76 | -1,721.07 |
| | (1.60) | (-0.55) | (-2.52)*** |
| Industry Fixed Effects | Yes | Yes | Yes |
| N | 3,902 | 3,831 | 3,804 |
| R2 | 0.08 | 0.04 | 0.04 |

(continued)

TABLE 6, continued
Value Relevance Regression of Returns on
Unrealized Hedging Gains/Losses and Net Income

Model: $R_{i,t} = \omega_0 + \omega_1 NI_{i,t} + \omega_2 AOCI\_HEDGE_{i,t} + \omega_3 PRICEPASS_{i,t} + \omega_4 PRICEPASS_{i,t} * AOCI\_HEDGE_{i,t} + \varepsilon_{i,t}$

**Panel C - Market pricing power relationship with stock returns**

| | | 2-Year Horizon | |
|---|---|---|---|
| | Predict | All Firms | Excl. Fin. Srvcs. |
| Intercept | ( ? ) | 22.18 | 20.06 |
| | | (4.93)*** | (4.30)*** |
| NI | ( + ) | 2.39 | 2.01 |
| | | (8.64)*** | (7.10)*** |
| AOCI_HEDGE | ( - ) | -2,434.01 | -2,860.80 |
| | | (-4.09)*** | (-3.36)*** |
| PRICEPASS*Intercept | ( + ) | 13.44 | 14.99 |
| | | (1.67)** | (1.76)** |
| PRICEPASS*AOCI_HEDGE | ( + ) | 2,480.02 | 3,336.44 |
| | | (1.78)** | (1.84)** |
| F-test: $\omega_2 + \omega_4 = 0$ | | 46.01 | 475.64 |
| F-statistic | | (0.00) | (0.08) |
| P-value | | (0.972) | (0.772) |
| Industry Fixed Effects | | No | No |
| N | | 4,771 | 3,804 |
| R2 | | 0.05 | 0.05 |

R is the annual buy and hold return for each firm using monthly stock return data from CRSP and its holding period varies based on the time period examined. Current-Year Horizon is the continuously compounded return during year *t*. 1-Year Horizon is the continuously compounded return starting at the beginning of year *t* and ending at the end of year *t+1*. 2-Year Horizon is the continuously compounded return starting at the beginning of year *t* and ending at the end of year *t+2*. NI is net income in year *t* (Compustat variable NI), scaled by market value of equity at the end of year *t-1*. AOCI_HEDGE is the level of unrealized derivative gains or losses in AOCI in year *t* (Compustat variable AOCIDERGL), scaled by the market value of equity at the end of year *t-1*. For consistency, the intercept is also scaled by market value of equity at the end of year *t-1*. All models in panels A and B include industry fixed effects using the Fama and French (1997) 48 industry classification. Panel C examines whether the 2-Year Horizon regression results in Panels A and B differ for firms with pricing power. PRICEPASS is a dummy variable equal to 1 if the firm's industry is in the top quintile of Herfindahl index calculated based on the Fama and French (1997) 48 industry classifications and zero otherwise. All variables are truncated at 1% and 99% to avoid the influence of outliers on statistical inference. *T*-statistics presented in parentheses are calculated using White (1980) standard errors which are clustered by firm in order to control for both heteroscedasticity and serial correlation. *, ** and *** next to the *t*-statistic indicate a 10%, 5% and 1%, respectively, significance level using a one-tailed test if a directional prediction is made, two-tailed otherwise.

TABLE 7
Raw Returns from Investment in Unrealized Cash Flow Hedge Gain and Loss Firms

**Panel A - Hedging Gains and Losses, using raw returns**

| Full Sample | | | | Excluding Financial Services Firms | | | |
|---|---|---|---|---|---|---|---|
| AOCI_HEDGE | N | BH_RET | | AOCI_HEDGE | N | BH_RET | |
| No hedge | 13,798 | 0.4213 | | No hedge | 10,581 | 0.4578 | |
| Losses | 3,551 | 0.4941 | | Losses | 2,825 | 0.5288 | |
| Gains | 1,845 | 0.3521 | | Gains | 1,450 | 0.4043 | |
| | 5,396 | 0.1420 | Return of (Losses - Gains) | | 4,275 | 0.1245 | Return of (Losses - Gains) |
| | | <0.0001*** | P-value | | | 0.0017*** | P-value |
| | | 6.87% | Annualized Profit Per Year | | | 6.05% | Annualized Profit Per Year |

(continued)

TABLE 7, continued
Raw Returns from Investment in Unrealized Cash Flow Hedge Gain and Loss Firms

**Panel B - Hedging Decile Portfolios, using raw returns**

| Full Sample | | | | Excluding Financial Services Firms | | | |
|---|---|---|---|---|---|---|---|
| AOCI_HEDGE | N | BH_RET | | AOCI_HEDGE | N | BH_RET | |
| 1 | 538 | 0.6478 | | 1 | 426 | 0.7366 | |
| 2 | 539 | 0.4392 | | 2 | 427 | 0.4595 | |
| 3 | 541 | 0.4157 | | 3 | 428 | 0.4221 | |
| 4 | 540 | 0.4022 | | 4 | 428 | 0.4348 | |
| 5 | 539 | 0.3845 | | 5 | 427 | 0.4354 | |
| 6 | 541 | 0.4155 | | 6 | 430 | 0.4210 | |
| 7 | 540 | 0.4331 | | 7 | 428 | 0.4463 | |
| 8 | 541 | 0.4458 | | 8 | 427 | 0.4684 | |
| 9 | 539 | 0.4586 | | 9 | 428 | 0.4819 | |
| 10 | 538 | 0.4140 | | 10 | 426 | 0.5616 | |
| | 5,396 | 0.2338 | Return of (1 - 10) | | 4,275 | 0.1750 | Return of (1 - 10) |
| | | 0.0001*** | P-value | | | 0.0233** | P-value |
| | | 10.63% | Annualized Profit Per Year | | | 8.40% | Annualized Profit Per Year |

Panel A partitions the non-financial sample firms into three categories: (1) firms with unrealized hedging losses in accumulated other comprehensive income (AOCI), (2) firms with no hedging activity in AOCI, and (3) firms with unrealized hedging gains in AOCI. Panel B partitions the sample into deciles based

(continued)

TABLE 7, continued
Raw Returns from Investment in Unrealized Cash Flow Hedge Gain and Loss Firms

on AOCI_HEDGE (as defined in Table 4), where decile 1 represents the largest unrealized hedging losses and decile 10 represents the largest unrealized hedging gains. N is the number of firms in each partition. BH_RET is the two-year buy and hold return for the partition assuming purchase in the fourth month of year *t-1* and holding through the third month of year *t+1*. The fourth month of year t-1 is selected since this is the first month during which the unrealized hedging amount in AOCI is made public through firms filing their Form 10-K. Delisting returns are included when available from CRSP. If a firm is delisted but the delisting return is missing, I assume a -30 percent delisting return in the month of delisting and then the portfolio return thereafter (Shumway 1997). Return is the total two-year return if an investor purchased all sample firms with unrealized hedging losses in AOCI and sold short an equal dollar value of all sample firms with unrealized hedging gains in AOCI. Annualized Profit Per Year is the imputed annualized return from this strategy. *P*-values presented are calculated based on difference-in-means tests. *, ** and *** next to the *p*-value indicate a 10%, 5% and 1%, respectively, significance level using a one-tailed test since a positive return is predicted.

TABLE 8
Risk Adjusted Returns from Investment in Unrealized Cash Flow Hedge Gain and Loss Firms

**Panel A - Hedging Decile Portfolios, using equal weighted market adjusted returns**

| Full Sample | | | | Excluding Financial Services Firms | | | |
|---|---|---|---|---|---|---|---|
| AOCI_HEDGE | N | BH_RET | | AOCI_HEDGE | N | BH_RET | |
| 1 | 538 | 0.2117 | | 1 | 426 | 0.2982 | |
| 2 | 539 | -0.0026 | | 2 | 427 | 0.0187 | |
| 3 | 541 | -0.0148 | | 3 | 428 | -0.0181 | |
| 4 | 540 | -0.0369 | | 4 | 428 | -0.0067 | |
| 5 | 539 | -0.0514 | | 5 | 427 | -0.0094 | |
| 6 | 541 | -0.0058 | | 6 | 430 | -0.0167 | |
| 7 | 540 | -0.0072 | | 7 | 428 | 0.0113 | |
| 8 | 541 | 0.0111 | | 8 | 427 | 0.0284 | |
| 9 | 539 | 0.0278 | | 9 | 428 | 0.0435 | |
| 10 | 538 | -0.0209 | | 10 | 426 | 0.1283 | |
| | 5,396 | 0.2326 | Return of (1 - 10) | | 4,275 | 0.1699 | Return of (1 - 10) |
| | | 0.0002*** | P-value | | | 0.0209** | P-value |
| | | 11.02% | Annualized Profit Per Year | | | 8.16% | Annualized Profit Per Year |

(continued)

# TABLE 8, Continued
# Risk Adjusted Returns from Investment in Unrealized Cash Flow Hedge Gain and Loss Firms

Model: $R_{i,t} - R_{f,t} = \alpha_0 + \alpha_1 HEDGE_{i,t} + b_{i,M}(R_{M,t} - R_{f,t}) + s_i SMB_t + h_i HML_t + m_i UMD_t + \varepsilon_{i,t}$.

**Panel B - Fama French (1993) abnormal return regressions for the top and bottom deciles**

| | | Full Sample | Excl. Fin. Srvcs. Firms |
|---|---|---|---|
| Intercept | | 0.00 | 0.28 |
| | | (0.00) | (1.96) |
| HEDGE | ( + ) | 0.63 | 0.55 |
| | | (3.94)*** | (2.70)*** |
| MKTRF | | 0.99 | 1.15 |
| | | (25.01)*** | (25.15)*** |
| SMB | | 0.50 | 0.47 |
| | | (11.28)*** | (8.42)*** |
| HML | | 0.52 | 0.49 |
| | | (9.83)*** | (7.12)*** |
| UMD | | -0.12 | -0.07 |
| | | (-3.02)*** | (-1.44) |
| Adj. $R^2$ | | 0.13 | 0.13 |
| Sample Size | | 25,824 | 20,448 |

.

Panel A partitions the sample firms into deciles based on AOCI_HEDGE as defined in Table 4. N is the number of firms in each partition. BH_RET is the two-year buy and hold return for the partition assuming purchase in the fourth month of year *t-1* and holding through the third month of year *t+1*. The fourth month of year t-1 is selected since this is the first month during which the unrealized hedging amount in AOCI is made public through firms filing their Form 10-K. Delisting returns are included when available from CRSP. If a firm is delisted but the delisting return is missing, I assume a -30 percent delisting return in the month of delisting and then the portfolio return thereafter (Shumway 1997). Return is the total two-year return if an investor purchased all sample firms with unrealized hedging losses in AOCI and sold short an equal dollar value of all sample firms with unrealized hedging gains in AOCI. Annualized Profit Per Year is the imputed annualized return from this strategy. *P*-values presented in Panel A are calculated based on difference-in-means tests. *, ** and *** next to the *p*-value in Panel A indicate a 10%, 5% and 1%, respectively, significance level using a one-tailed test since a positive return is predicted.

Panel B uses the top and bottom deciles from Panel A in a Fama-French (1993) abnormal returns regression.

(continued)

TABLE 8, Continued
Risk Adjusted Returns from Investment in
Unrealized Cash Flow Hedge Gain and Loss Firms

The number of observations represents the number of firms in the top and bottom deciles from Table 7, multiplied by the 24 month holding period. The dependent variable is monthly excess stock return, EXRET, which is defined as the monthly raw return for a firm less the monthly risk free rate factor from Fama and French (1993). HEDGE is a dummy variable equal to 1 if the observation is in decile 1 and zero if the observation is in decile 10. MKTRF, SMB and HML are as defined in Fama and French (1993) and UMD is as defined in Carhart (1997). *T*-statistics presented in Panel B are calculated using White (1980) standard errors clustered by firm in order to control for both heteroscedasticity and serial correlation. *, ** and *** next to the *t*-statistic in Panel B indicate a 10%, 5% and 1%, respectively, significance level using a one-tailed test if a directional prediction is made, two-tailed otherwise.

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