

AN EMPIRICAL EXAMINATION OF THE RELATIVE
INFORMATION CONTENT OF DERIVATIVES
DISCLOSURE AS REQUIRED BY SEC
FINANCIAL REPORTING
RELEASE NO. 48

By

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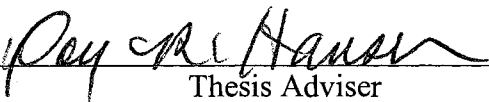
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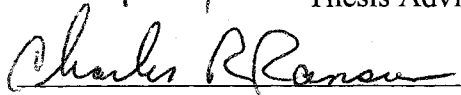
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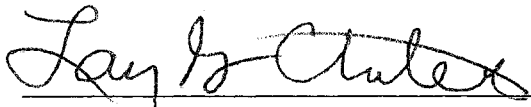
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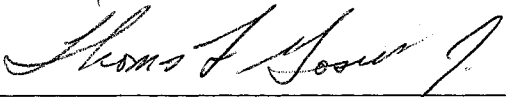
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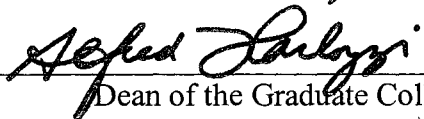
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CHAPTER 1

INTRODUCTION

The dramatic increase in the use of derivative financial instruments, derivative commodity instruments, and other similar financial instruments (hereafter referred to as derivatives) and losses resulting therefrom during the 1990s created a need for their disclosure. According to the Basle Committee on Banking Supervision, the notional (contract) amounts of derivatives increased from \$7.1 trillion in 1989 to \$118 trillion in 2001. Significant losses were also reported by several entities during this same period. These losses caught investors and the public by surprise because these derivatives had not been previously reported in the financial statements. These large losses, the general public outcry, and recommendations from several interest groups prompted the Securities and Exchange Commission (SEC) to take action.

In January 1997 the SEC, in its position as the “watch dog” for investors, issued Financial Reporting Release No. 48, *Disclosure of Accounting Policies for Derivative Financial Instruments and Derivative Commodity Instruments and Disclosure of Quantitative and Qualitative Information about Market Risk in Derivative Financial Instruments, Other Financial Instruments and Derivative Commodity Instruments* (hereafter referred to as FRR No. 48), requiring companies to disclose market risk¹ inherent in these financial instruments.

FRR No. 48 allows firms to choose from three alternative disclosure formats: tabular presentation, value at risk or sensitivity analysis. Of the three alternatives, the

¹ Market risk is defined in FRR No. 48 as “the risk of loss arising from adverse changes in market rates and prices, such as interest rates, foreign currency exchange rates, commodity prices, and other relevant market rate or price changes (e.g., equity prices).”

tabular format is the most disaggregated (Wong, 1999; Linsmeier and Pearson, 1997). The disclosure involved in the value at risk format and sensitivity analysis format results in a summary figure. According to the SEC, these three disclosure formats were provided for flexibility in accommodating the different types of firms with varying degrees of market risk and alternative ways of measuring market risk.

A large body of financial accounting research on disclosure has provided evidence supporting the proposition that disaggregated information is more value relevant than aggregated information (Sorter, 1969; Feltham, 1977; Ijiri, 1995). Based on this proposition, this study investigates the relative information content of the SEC derivative disclosure requirements. Specifically, this study examines the value relevance of aggregated (sensitivity analysis format or value at risk format) versus disaggregated (tabular format) disclosure of derivative information under FRR No. 48.

Since the derivative disclosures are provided as supplementary information to the financial statements collectively, they could be seen as providing incremental information. However, given that the alternative formats involve varying levels of aggregation, the disclosure formats required by the SEC provide an opportunity for comparing the relative information content of the alternative disclosure formats. The difference between incremental and relative information content is set forth in Biddle et al. (1995). Studies regarding incremental information content examine whether one accounting measure provides information content *beyond* what is provided by another accounting measure, and it relates to situations in which one accounting measure is given and assessment is desired regarding the incremental contribution of another measure. Relative information content applies to situations in which multiple, mutually exclusive

choices are available and comparison of the magnitude of the information content of the various disclosure formats is desired.

1.1 Purpose of the Study

This study examines whether the tabular format (as defined by FRR No. 48) has greater relative information content than either the value at risk format or the sensitivity analysis format. Thus, the research question to be examined is:

Does derivatives disclosure reported using the disaggregated alternative (the tabular format) have greater relative information content than disclosure reported using the aggregated disclosure alternatives (either the value at risk format or the sensitivity analysis format)?

The findings of this study are important for several reasons. First, prior research has provided evidence to support the notion that information asymmetry can result in adverse economic consequences; hence, management would want to choose the more informative accounting method. The findings of this study will provide evidence to determine which derivatives disclosure method reduces information asymmetry. Second, the evidence from this study will provide justification for such regulatory bodies as the SEC and Financial Accounting Standards Board (FASB) for issuing regulations that provide either aggregated or disaggregated disclosures. The findings will also aid the SEC in determining whether the disclosure methods provided by the SEC improve users' understanding of derivatives since one of the complaints set forth by interest groups was the lack of the public understanding of derivatives. Fourth, the findings will aid practitioners in determining which derivatives disclosure method has more relative information content.

The remainder of this study is organized as follows. Chapter 2 provides background information on derivatives. Chapter 3 presents the literature review and hypothesis development. The methodology is presented in Chapter 4 and research design is discussed in Chapter 5. The empirical results are provided in Chapter 6. The conclusions are presented in Chapter 7.

CHAPTER 2

BACKGROUND

2.1 Derivatives

A derivative is a financial instrument whose value depends on another financial instrument of security (stock, stock index, foreign currency, commodity, bond, etc). There are several types of derivatives and they include: forward contracts, futures contracts, options, and swaps. Complex instruments are created from a combination of these four types of derivatives. Depending on whom you talked to, derivatives can be seen as useful or destructive tools. Warren Buffet referred to them as “financial weapons of mass destruction” and Alan Greenspan was quick to respond that “The benefits of derivatives, in my judgment, have far exceeded their costs” (*The Daily Oklahoman*, May 9, 2003). Mr. Greenspan said that derivatives have enabled financial market participants to lessen the severity of the 2001 recession. Derivatives are used for risk management, speculation, trading efficiency (market liquidity), and for market completeness.²

A forward contract is an agreement between two parties to buy and sell an asset at a certain time in the future and for a certain price. The contract has a zero value at the time of the agreement and there is no cost to enter the contract. Forward contracts are not traded on an exchange; hence, they are not standardized. Forward contracts can be customized to suit the needs of both parties. A futures contract is similar to a forward contract, but it is standardized and the underlying assets are financial instruments and commodities. Options give the holder a right to buy or sell the underlying asset. There

² Market completeness is one in which all identifiable payoffs can be obtained by trading the securities available in the market.

are two types of options: call and put. A call option gives the holder the right to purchase the underlying asset and a put option gives the holder the right to sell the underlying asset. An option is standardized. There is a cost to enter into an option contract unlike a forward or futures contract. A swap is the exchange of cash flows between two parties. A swap is not standardized and it is usually an exchange of interest rates between two parties. Exhibit 1 illustrates examples of the four types of derivatives.

Exhibit 1 – Illustration of Derivatives*

Forward Contract

“JKL Co sells MNO Co. a forward interest rate agreement at an interest rate of 10% that will apply to a \$100,000 principal. The time period is one year with quarterly settlement dates. The reference rate is based upon the specific index, e.g., the LIBOR rate. At the first settlement date, the LIBOR rate is greater than 10%. Therefore JKL will have to pay MNO a value equal to the present value of the difference between the cash flows of the LIBOR rate and the 10% rate”.

Futures Contract

“On April 5, 1995 PQR Co. contracts to buy 200 ounces of gold at \$400 per ounce for September 1995 delivery. The total contract price is \$80,000. If on April 6 gold is trading at \$405 per ounce, PQR has effectively made \$1,000 (200 x [405-400]). But if the price had dropped to \$390 per ounce, PQR would have lost \$2,000 (200 x [400-390])”.

Swaps

“STU Co. agrees to make payments to VWX Co. at a fixed interest rate of 8% for the next two years. VWX agrees to make payments to STU at a variable rate of interest equal to a specific index + 1%. If the index rate goes up, VWX will make payments to STU. But if the index rate goes down, STU will make payments to VWX”.

Option Contract

ABC Co. common stock is currently trading at \$12 a share. An option contract that costs \$10 is available to buy 100 shares of the stock at \$14 a share. The option contract expires in three months. If the stock fails to exceed \$14 a share, the holder will not exercise the option. But if the price rises above the option price, e.g., \$16 a share, the holder would choose to exercise the option and make a profit of \$100 (100 x [16-14] - 10)”.
* Williams and Eaton (1995)
The CPA Journal; Oct 1995

2.2 FASB Response

The FASB piecemeal approach to solving accounting problems is evident in the development of standards concerning derivatives disclosure. The evolution of developing accounting standards for derivatives disclosure began with Financial Accounting Standard (FAS) # 105, *Disclosure of Information about Financial Instruments with Off-Balance Sheet Risk and Financial Instruments with Concentration of Credit Risk*, was issued in March 1990. Disclosure requirements of this standard included the face amount or contract (notional) amount, the nature and terms of the instruments, the loss due to nonperformance of either party or parties, the cash requirements, type of collateral, and any significant concentration of credit risk. FAS #105 also requires a discussion of the credit and market risk of the instruments. There is no requirement for fair value disclosure of the instruments and it applies only to financial instruments with off-balance sheet risk of accounting loss and concentration of credit risk. The standard excluded several financial instruments that qualify as derivatives (e.g., commodity derivatives, foreign currency type derivatives, etc.). The disclosure requirements were mostly qualitative.

FAS #107, *Disclosure about Fair Value of Financial Instruments*, was issued in December 1991. This standard requires fair value disclosure of financial instruments for both assets and liabilities recognized and not recognized on the balance sheet for which it is practicable to estimate fair value. FAS #107 provides guidance on how to measure the fair value of derivatives. Quoted market prices are to be used to measure the fair value of derivatives, if quoted market prices are not available, then quoted market prices of financial instruments with similar characteristics should be used. If those prices are not

available, a disclosure should be made on how the fair value was determined. This standard also excluded several derivatives and again the disclosure requirements were mostly qualitative.

The next standard issued regarding derivatives was FAS #119, *Disclosure about Derivative Financial Instruments and Fair Value of Financial Instruments*, and it amended #105 because only instruments that were not subject to FAS #105 were covered. FAS #119 requires a distinction between derivatives held for trading and those held for purposes other than trading. A distinction is also required for derivatives held for hedging and those for speculation. The standard requires the description of the anticipated transaction that is hedged, the classes of derivatives used to hedge, the amount of gains and losses resulting from hedging. FAS #119 requires the disaggregation of information such as classes of losses, business activities, or other categories that are consistent with how the instruments are managed. FAS #119 encourages quantitative market risk information, but does not require it.

The above three standards collectively were still considered inadequate in providing information to creditors, regulators, shareholders, and other users regarding derivatives, therefore, the FASB went back to the drawing board to come up with a more comprehensive standard. FAS #133, *Accounting for Derivative Instruments and Hedging Activities*, issued June 1998, requires all derivatives to be recognized as either assets or liabilities on the balance sheet and they should be measured at fair value. This standard supersedes FAS #s 105, and 119 and amends #107. If certain conditions are met, derivatives may be classified as: (a) fair value hedges, (b) cash flow hedges, and (c) foreign currency hedges. Gains and losses from fair value hedges are recognized in the

period of change together with offsetting gains or losses attributable to the risk being hedged. The effective portion of derivative gains and losses from cash flow hedges are initially reported as a component of comprehensive income and later transferred to earnings when the forecasted transaction affects earnings. The ineffective portion of derivative gains and losses are reported in earnings immediately. The derivative gain or loss is effective if the correlation ratio for the derivative and the hedged instrument is between 80% and 125%. Because of the complexity of this standard, the FASB set up a special committee, the Derivatives Implementation Group (DIG), to assist the FASB in resolving issues regarding the implementation of FAS 133. Difficulties encountered by practitioners in implementing FAS #133 caused the effective date to be postponed from June 15, 1999 to June 15, 2000. The standard was also amended by FAS #s 138 issued June 2000 and 149 in April 2003. This standard also requires the disclosure of risk inherent in the use of derivatives. The FASB hopes that the implementation of FAS #133 will provide adequate information about derivatives to the preparers and users of financial statements. Finally the FASB requires the disclosure of market risks inherent in derivatives.

2.3 SEC Response

The rapid growth in derivatives usage and the lack of disclosure by firms in their financial reporting is of concern to accounting regulatory bodies. Derivatives use increased from \$7.1 trillion in 1989 to \$118 trillion in 2001 and derivatives losses tripled to \$6 billion from 1993 to 1994 (Williams and Eaton, 1995). The Basle Committee on Banking reports that unregulated derivatives increased dramatically also during the same

period. See Figure 1 for a graphical depiction of contract (notional) amounts. The SEC observed that market risks associated with these financial instruments were not being clearly disclosed, and in some cases not disclosed at all, in the financial statements. Consequently, users were surprised when several large companies like Proctor & Gamble, Gibson Greeting Cards, Dell Computer, Metallgesellschaft, Barings PLC, and Sumitomo reported heavy losses from dealing in derivatives (Johnson and Swieringa, 1996). See Exhibit 2 for a list of some of the companies and losses incurred. Figure 1 presents a graphical display of the total notional amounts of outstanding derivatives for five periods.

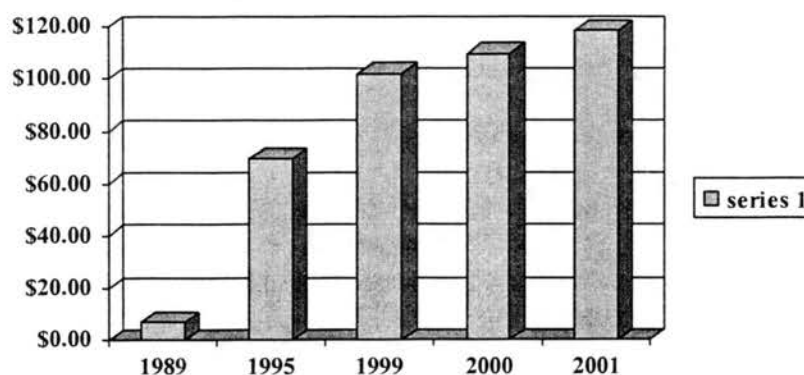
Exhibit 2 - Derivatives Losses in the 1990s

<u>Company/Entity</u>	<u>Amount of Loss</u>	<u>Area of Loss</u>
Air Products	\$ 113,000,000	Leverage and Currency Swaps
Askin Securities	600,000,000	Mortgage-backed Securities
Baring Brothers	1,240,500,000	Options
Cargill (Minnetonka Fund)	100,000,000	Mortgage derivatives
Codelco Chile	200,000,000	Copper & precious metals, futures & forwards
Glaxo Holdings PLC	150,000,000	Mortgage derivatives
Long Term Capital Management	4,000,000,000	Currency and interest rate derivatives
Metallgesellschaft	1,340,000,000	Energy derivatives
Orange County	2,000,000,000	Reverse repurchase agreements and Leveraged structured notes.
Proctor & Gamble	157,000,000	Leverage German Marks and US Dollars

Source: *Derivatives: Valuable Tool or Wild Beast?* By Brian Kettel

After the issuance of FAS #119, the SEC realized that the standard did not provide adequate information for users. This Standard requires only qualitative disclosures such as, the policies, nature, terms, and cash requirements of derivative financial instruments. The definition of derivative financial instruments in this standard does not include derivative commodity instruments and other financial instruments with similar market risk as does FRR No. 48. SFAS No.119 encourages, but does not require, quantitative disclosures about the market risk exposures inherent in market-risk sensitive instruments.

**Figure 1 - Total Notional Amounts of Outstanding Derivatives
(in billions of US dollars)**



Data Source: Basle Banking Committee

The SEC reviewed about 500 financial statements of registrants during 1994 and 1995 and noted that the 1995 derivative disclosures were more informative than the 1994 disclosures. The SEC attributed this improvement in the 1995 derivative disclosures, in part, to the guidance of SFAS No.119 issued in October 1994. However, the SEC decided that SFAS No.119 did not go far enough. Consequently, FFR No. 48 was issued in January 1997. FFR No. 48 requires quantitative disclosures providing users with

information regarding derivative financial instruments and other similar financial instruments. These financial instruments are to be classified into trading and other-than-trading portfolios and certain information related to the portfolios is to be disclosed using one of the three alternative formats: the tabular format, the sensitivity analysis format, or the value at risk format. The disclosure is to be categorized into the following market risks: interest rate risk, foreign currency exchange rate risk, commodity price risk, and any other significant market risk. A registrant can use a different disclosure format for each market risk exposure category. The disclosures are to be made outside of the financial statements and the notes to the financial statements.

The three alternative disclosure formats allowed by the SEC provide flexibility in accommodating different types of firms with varying degrees of market risk and alternative ways of measuring market risk. While the SEC is aware that the use of these three formats might affect comparability, they believe that the effect will be minimal if firms provide the description of the model being used, the assumptions, and parameters.

The tabular disclosure format requires companies to (1) present fair value information and contract terms of derivatives necessary in determining future cash flows for each of the next five years and (2) an aggregated total for all years after the fifth year. This information is to be presented for each market-risk exposure category along with the maturity dates for the trading and other-than-trading portfolios. The derivatives and other similar financial instruments are to be grouped based on their common characteristics. Within price risk and foreign currency risk categories, instruments are disaggregated by the type of commodity and by functional currency. An example of the tabular disclosure format is provided in Exhibit 3. Some respondents to the SEC requirements expressed

concern that the tabular format is so detailed and disaggregated that competitors, suppliers, and market traders could potentially use the information to exploit the registrants' positions in the market. The SEC addressed this concern by recommending the use of either the sensitivity analysis format or value at risk format, either of which results in a summary figure and does not disclose detailed information.

Exhibit 3 – Illustration of the Tabular Disclosure Format

Interest Rate Sensitivity

The table below provides information about the Company's derivative financial instruments and other financial instruments that are sensitive to changes in interest rates, including interest rate swaps and debt obligations. For debt obligations, the table presents principal cash flows and related weighted average interest rates by expected maturity dates. Weighted average variable rates are based on implied forward rates in the yield curve at the reporting date. For interest rate swaps, the table presents notional amounts and weighted average interest rates by expected (contractual) maturity dates. Notional amounts are used to calculate the contractual payments to be exchanged under the contract. The information is presented in U.S. dollar equivalents, which is the Company's reporting currency. The instrument's actual cash flows are denominated in both U.S. (\$US) and German deutschmarks (DMs), as indicated in parentheses.

December 31, 19x1

	<u>Expected Maturity Date</u> -----					There- After	Total	Fair Value
	<u>19x2</u>	<u>19x3</u>	<u>19x4</u>	<u>19x5</u>	<u>19x6</u>			
	(In millions)							
Liabilities								
Long-term Debt Fixed Rate (\$US)	\$XXX	\$XXX	\$XXX	\$XXX	\$XXX	\$XXX	\$XXX	\$XXX
Avg. Interest Rate	X.X%	X.X%	X.X%	X.X%	X.X%	X.X%	X.X%	
Fixed Rate (DMs)	XXX	XXX	XXX	XXX	XXX	XXX	XXX	
Avg. Interest Rate	X.X%	X.X%	X.X%	X.X%	X.X%	X.X%	X.X%	
Variable Rate (\$US)	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
Avg. Interest Rate	X.X%	X.X%	X.X%	X.X%	X.X%	X.X%	X.X%	

	<u>Expected Maturity Date</u> -----					There- After	Total	Fair Value
	<u>19x2</u>	<u>19x3</u>	<u>19x4</u>	<u>19x5</u>	<u>19x6</u>			
	(In millions)							
Interest Rate Derivatives								
Interest Rate Swaps								
Variable to Fixed (\$US)	\$XXX	\$XXX	\$XXX	\$XXX	\$XXX	\$XXX	\$XXX	\$XXX
Avg. pay rate	X.X%	X.X%	X.X%	X.X%	X.X%	X.X%	X.X%	
Avg. receive rate	X.X%	X.X%	X.X%	X.X%	X.X%	X.X%	X.X%	
Fixed to Variable (\$US)	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
Avg. pay rate	X.X%	X.X%	X.X%	X.X%	X.X%	X.X%	X.X%	
Avg. receive rate	X.X%	X.X%	X.X%	X.X%	X.X%	X.X%	X.X%	

*Partial Sample of Tabular Disclosures from the SEC (1997)

The sensitivity analysis format computes the hypothetical gain or loss in future earnings, fair value or cash flows of the derivative financial instruments over a selected period based on hypothetical adverse changes in market rates and prices. A brief discussion of the assumptions underlying the calculations is also to be presented. Unlike the tabular format, where disaggregated information is presented for each market-risk exposure category, the sensitivity analysis format reports aggregate gains or losses across categories. Results of the sensitivity analysis for the foreign currency category and the commodity price category may be one single number for each category. An example of the sensitivity analysis format is presented in Exhibit 4.

Exhibit 4 - Illustration of the Sensitivity Analysis Format

Example of the Sensitivity Analysis format (Time Warner exposure to the risk of changes in interest rates and foreign exchange rates)*

... based on Time Warner's variable-rate debt and related interest rate swap contracts outstanding at March 31, 1996, each 25 basis point increase or decrease in the level of interest rates would respectively increase or decrease Time Warner's annual interest expense and related cash payments by approximately \$16 million, including \$7 million related to interest rate swap contracts. Such potential increases or decreases are based on certain simplifying assumptions, including a constant level of variable-rate debt and related interest rate swap contracts during the period and, for all maturities, and immediate, across-the-board increase or decrease in the level of interest rates with no other subsequent changes for the remainder.

Based on the foreign exchange contracts outstanding March 31, 1996, each 5% devaluation of the U.S. dollar as compared to the level of foreign exchange rates for currencies under contract at March 31, 1996 would result in approximately \$28 million of unrealized losses and \$11 million of unrealized gains on foreign exchange contracts involving foreign currency sales and purchases, respectively. Conversely, a 5% appreciation of the U.S. dollar would result in \$28 million of unrealized gains and \$11 million of unrealized losses, respectively.

*Linsmeier and Pearson (1997)

The value at risk format presents the potential changes in fair values, earnings, or cash flows of derivative financial instruments for each market-risk exposure category and the probability of occurrence over a selected period of time. Basically, this alternative presents a summary statistical measure of the probability of a loss exceeding a particular level of loss over a percentage of the holding period. The minimum loss that would be incurred over a certain percentage of the time is also provided. Like the sensitivity analysis format, the value at risk format also aggregates risk probabilities across different interest rates, exchange rates, or commodity prices. An illustration of the value at risk format is provided in Exhibit 5.

Exhibit 5 – Illustration of the Value at Risk Format

Summary example of the Value at Risk format*

Suppose at the reporting date, a distribution of possible one-day changes in the value of a forward foreign exchange contract is as follows:

The probability the loss will exceed \$130,000 is 2%

The probability the loss is between \$110,000 and \$130,000 is 1%

The probability the loss is between \$90,000 and \$110,000 is 2%, and so on.

Then there is a 5% probability that the loss will exceed \$90,000 (summing the probabilities). If 5% probability is used as a cutoff to determine the loss from normal and abnormal market movements, then \$90,000 is the value at risk.

* Linsmeier and Pearson (1997)

FRR No. 48 implies that one format can be restated into another format if the model and assumptions are known. For example, the tabular format can be restated to the sensitivity analysis format or value at risk format if the assumptions used in preparing

tabular format are known and vice versa. This implication is drawn from the following statement found in FRR No. 48:

“When a registrant changes quantitative disclosure methods from one year to the next, providing two alternatives, rather than one, for disclosing comparative, year-to-year information, *the registrant can reduce cost by employing either one of the following methods*. First, a registrant may restate prior year’s disclosures based on the new alternative that has been selected for the current year. Second, instead of recreating prior records and information in order to prepare restated information, the registrant may report the prior year’s disclosure as originally presented and, in addition, to disclosing the current year’s information in accordance with the new method, disclose the current year’s information under the method used in the prior year” (p. 74-75 emphasis added).

The spirit of this statement is echoed by Linsmeier and Pearson (1997):

“Although the tabular disclosures do not directly state the likely impact of changes in market rates and/or prices on fair values, earnings or cash flows, the information provided about contract terms and cash flows (when combined with other information about possible movements in market rates and prices) will allow readers of the disclosures to prepare ‘back of the envelope’ sensitivity analysis or value at risk estimates” (p. 111).

These two statements support the notion that this issue is one of aggregated versus disaggregated type disclosures where the tabular format represents disaggregated and the sensitivity analysis format or value at risk format represents aggregated information.

The tabular format does not provide a direct measure of the possible changes in market rates and prices and the effect on fair values, earnings or cash flows. The main difference between the sensitivity analysis format and the value at risk format is in the treatment of potential loss and market movements. The sensitivity analysis format discloses the potential losses arising from hypothetical market movements with differing likelihoods of occurrences across instruments and no adjustments are made to correlate potential loss to market movements. The value at risk format discloses potential loss

arising from equally likely market movements across instruments and adjusts the potential loss to reflect the correlations between market movements (FRR No. 48; p. 26).

FRR No. 48 disclosure requirements became effective for all market registrants with market capitalizations on January 28, 1997 in excess of \$2.5 billion is June 15, 1997 and for registrants with market capitalizations of \$2.5 billion or less, the effective date was June 15, 1998.

CHAPTER 3

RELATED LITERATURE AND HYPOTHESIS DEVELOPMENT

3.1 Disclosure

Research examining the effect of accounting disclosures suggests that disclosures should provide useful information to users and potential users of financial statements to aid in decision making (FASB, 1990). Disclosures should provide clarification for existing items in financial statements either by providing new information or additional information about an item (Goldberg et al., 1995). Research indicates that higher levels of disclosure provide more information. In this same vein, studies investigating aggregated disclosures versus disaggregated disclosures provide evidence that disaggregated disclosures have greater relative information than aggregated disclosures.

Historically, accounting standards focused on recognition, however recently there has been a shift toward focusing on disclosure. According to the FASB, there are four major purposes of disclosure: (1) to describe the recognized items and to provide relevant measures of those items other than the measure in the financial statements; (2) to describe unrecognized items and to provide a useful measure of those items; (3) to provide information to help investors and creditors assess risks and potential of both recognized and unrecognized items; and (4) to provide important information in the interim while other accounting issues are being studied more in depth. Johnson (1992) calls for research to validate the distinction between recognition and definition. Barth et al. (1994) responded to this call by providing accounting researchers with a framework for

categorizing, summarizing and analyzing disclosure requirements to be used when investigating disclosure issues more broadly.

According to Lev (1992), disclosure, especially voluntary disclosure, enhances a firm's value. There is information asymmetry between a firm's management and outside interested parties. The role of disclosure is to decrease this asymmetry. Disclosure, or the absence thereof, affects outsiders' perceptions of a firm's economic condition and future prospects. Outsiders' perceptions affect key variables such as cost of capital, and input prices (Lev, 1992). Lev (1992) posits that a negative perception of a firm due to incomplete information (information asymmetry) leads to the undervaluation of a firm's securities and high yields (cost of capital) for new stock and bond issues.

3.1.1 Disclosure and Capital Market Factors

Diamond and Verrecchia (1991) examine the effects of reducing information asymmetry between management and outside interested parties. They demonstrate that, under certain conditions (i.e., limited risk bearing capacity of risk-averse market makers and the interaction of private information), corporate disclosures that reduce information asymmetry, improve future liquidity, and hence, reduce cost of capital. The reduction appears to be larger for larger firms. These findings are consistent with Lev (1992).

Lang and Lundholm (1993) examine the determinants of analysts' ranking of firms' disclosure practices and the effects on firm's performance, security issuance, and the correlation between earnings and returns. They find that expanded disclosures are associated with higher stock returns, larger firms and firms issuing securities. This study also appears to confirm that there is a negative relationship between earnings/returns

correlation and disclosure score. The disclosure score metric captured the level of information asymmetry.

It has also been documented that firms with higher disclosure levels have a larger analyst following, more accurate analyst forecasts, less dispersion among individual forecasts, and less volatility in forecast revisions (Lang and Lundholm, 1996). They used analysts' evaluations of firms' disclosure practices (found in the *Report of the Financial Analysts Federation Corporate Information Committee*) as a comprehensive measure of disclosure in examining the effects on certain capital market factors. Their study also provides indirect evidence that greater levels of disclosure affect factors that have been shown theoretically to reduce firms' cost of capital.

Healy and Palepu (1993) illustrate the dilemma management faces in communicating private information to outsiders. They illustrate that firms' disclosure strategies geared towards reducing information asymmetry affect share prices and reduce the cost of capital.

Healy et al. (1999) examine the benefits of expanded voluntary disclosures as measured by analysts' evaluations documented in the annual *Report of the Association of Investment Management and Research Corporate Information Committee (AIMR Reports)*. They report that when there is an increase in disclosure, stock performance also increases. Further, there are increases in institutional ownership, analyst following, liquidity, and a decrease in investor uncertainty. These findings are similar to Lang and Lundholm (1993)

Dhaliwal et al. (1979), Diamond and Verrecchia (1991), Greenstein and Sami (1994), Welker (1995), Bartov and Bodnar (1996), Botosan (1997) Sengupta (1998) and

Leuz and Verrecchia (2000) find that increased disclosure is associated with lower cost of capital – debt or equity. Bartov and Bodnar (1996) determine that greater information asymmetry among market participants leads to higher transaction costs and lower liquidity, which in turn increase the expected rate of return and lower securities prices.

Empirical research examining disclosure and cost of capital: cost of equity capital (Botosan, 1997), cost of debt capital (Sengupta, 1998) suggests that there is an association between disclosure levels and cost of capital.

In summary, extant research in firms' disclosure provides evidence to support the proposition that disclosure, whether voluntary or mandatory, benefits a firm economically in several ways when it reduces information asymmetry. Reduction in information asymmetry reduces cost of capital, increases stock prices (enhances firm value), reduces analysts' forecast dispersions, and among others, affects the future economic prospects of a firm in a favorable manner.

3.2 Relevant Studies Examining Aggregated versus Disaggregated Information

Research examining the information content of aggregated versus disaggregated information appears to support the notion that the disaggregation of financial disclosures provides greater relative information content than aggregated financial disclosures. Sorter (1969) proposes that presenting financial information in a disaggregated format provides more information to the user than in an aggregated format because it allows the user to weight the various components as he/she sees fit. Sorter (1969) prescribes the events theory which states that the purpose of accounting is to provide information about

relevant economic events which allows the user to develop his own input values for his own decision models. He further suggests that information is lost through aggregation.

Ijiri (1995), in an empirical analysis, extends Sorter (1969) using segment reporting. Ijiri (1995) compares the informativeness of disaggregated segment reporting versus aggregated segment reporting and concludes that disaggregated data is more informative than aggregated data if users apply the appropriate weights to coefficients in the decision models.

Orcutt et al. (1968) investigate the information loss incurred when data are aggregated. In this study, a microanalytic model was developed simulating the U.S. economy and different levels of aggregated national data were entered into the model to determine the information loss at each aggregation level. They measured information loss as the inability of the model to estimate the appropriate coefficients of the different economic indicators such as disposable income, government expenditures, and net financial assets. Results indicate a deterioration in the ability of the model to estimate these economic parameters as the level of aggregation increases.

The ability of decision makers to use aggregated versus disaggregated information was investigated by Barefield (1972). He compares the decision-making abilities of subjects using disaggregated data versus subjects using aggregated data. Barefield (1972) concludes that subjects using disaggregated data performed better than subjects using aggregated data. The subjects with disaggregated data identify the best decision criterion with a greater degree of consistency than their counterparts.

Feltham (1977) compares the expected payoff and predictions of decisions based on aggregated versus disaggregated cost information. He developed a general analytical

model for evaluating the payoff consequences and predictions of alternative information systems. He then uses the model to determine the information loss due to cost aggregation. Feltham (1977) concludes that the expected payoff from decisions based on aggregated information is lower than the expected payoff from decisions based on disaggregated information, ignoring information and analysis costs.

3.3 Summary and Hypothesis

Based on accounting research examining disclosure levels and the information content of disaggregated (versus aggregated) information, I expect the value relevance of FRR No. 48 financial instrument disclosures will be greater for firms using the tabular disclosure format relative to firms using either the sensitivity analysis format or the value at risk format. Hence, the following hypothesis is proposed:

H1: There is no difference in the relative information content between disclosures providing disaggregated derivative data (in the tabular format) and disclosures providing aggregated data (i.e., sensitivity analysis format or value at risk format).

The alternative hypothesis is:

H1A: Disclosures providing disaggregated derivative information (in the tabular format) have greater relative information content than disclosures providing aggregated data (i.e., sensitivity analysis format or value at risk format).

The information content of the derivatives disclosure of both groups of firms will be evaluated to determine which disclosure method is more informative. The null hypothesis assumes that there will be no significant difference in the information content of derivatives disclosure of firms using the tabular format and firms using either the

sensitivity analysis or the value at risk format after the derivatives disclosure methods are revealed.

CHAPTER 4

METHODOLOGY

4.1 Utilizing Bid-Ask Spread to Examine Information Asymmetry

A number of accounting research studies have used bid-ask spreads to measure the effects of information asymmetry on several factors including liquidity (Tinic, 1972; Tinic and West, 1972; Stoll, 1978; Amihud and Mendelson, 1986 and 1989; Lee et al., 1993; and Welker, 1995), stock returns (Amihud and Mendelson, 1989; Stoll, 1989), stock prices (Demsetz, 1968; Copeland and Galai, 1983; and Glosten and Milgrom, 1985), market depths (Copeland and Galai, 1983; Lee et al., 1993), dividends (Venkatesh and Chiang, 1986; Howe and Lin, 1992), and cost of capital (Amihud and Mendelson, 1986; Dhaliwal et al., 1979; Greenstein and Sami, 1994; Bartov and Bodnar, 1996; and Leuz and Verrecchia, 2000).

Bid-ask spread is the difference between a dealer's quoted selling price (the "ask") and the buying price (the "bid") of the same shares of a stock at a point in time (Callahan et al., 1997; Stoll, 1978, 89). The bid-ask spread is the cost of immediacy provided by a dealer. The dealer provides liquidity in the market by being ready to transact with traders at anytime (Demsetz, 1968). The dealer offers a lower bid price and requests a higher ask price to traders who demand an immediate exchange transaction and are willing to buy at a price higher than the equilibrium ("true")³ price and sell lower than the "true" price. The difference between the two prices, the bid-ask spread, covers

³ Equilibrium price is defined by Demsetz (1968) and Barnea and Logue (1975) "as the average of the bid and ask prices". Stoll defines the "true" price as the "the price that would, in the dealer's opinion, exist in the absence of transactions costs." The "true" price is the price that would exist if there were no demand for immediacy and all participants were equally informed, Copeland and Galai (1983).

the dealer's cost and provides a profit. The bid-ask spread is the price of the dealer product, that is, a charge for providing the immediate exchange of titles to securities (Benston and Hagerman, 1974).

Research examining the dealer cost component of bid-ask spreads prescribes that the bid-ask spread is actually composed of three types of costs: inventory holding costs, order processing costs, and adverse selection costs. The dealer has to have the appropriate level of inventory to meet immediate trade demands of traders, and as such, he incurs inventory holding costs. The order costs are incurred by a dealer in arranging trades and serving as a temporal clearinghouse for unequal trades. Unequal trades occur when equal and opposite trades are not executed simultaneously (Demsetz, 1968; Stoll, 1978; Bagehot, 1971; Copeland and Galai, 1983). The cost that is of importance to accounting research is the adverse selection cost component because it reflects information asymmetry. Adverse selection costs are incurred by the dealer and result from transacting with "informed traders" (Bagehot, 1971; Copeland and Galai, 1983).

Adverse selection occurs when two unequally informed persons trade. The more informed party will take advantage of the other's ignorance to trade at a gain. The uninformed party will either demand a higher price to cover his loss or he will demand product warranty for protection against the probability of purchasing a bad product. Akerlof (1970) in his seminal paper introduces the adverse selection problem in terms of the used car market. He posits that used cars sellers are better informed of their product quality than buyers. Used car dealers with bad quality cars ("lemons") will have the incentive to sell their cars since the average price will be attributable to the entire group, both good and bad used car dealers, and not to individual sellers. Buyers will only be

willing to pay a price that reflects the average quality of cars on the market which would be below the fair market value of good quality cars but above the fair market value of poor quality cars. Owners of good quality cars would not be willing to accept the average price and as such, bad cars will drive out good cars, and in extreme cases, shut down the market. The adverse outcome is the probability that bad cars (“lemons”) will be sold at the average price.

Analogous to the securities market, informed traders possess nonpublic information. This enables them to formulate an estimate of the future value of a security that is superior to the estimate of either the dealer or the liquidity-motivated traders. The dealer and liquidity-motivated traders have the same information about a security; however, they are less informed than “informed traders”. Since the informed traders will only trade when it is in their best interest, the dealer will never gain from them. The dealer makes up this loss by trading with liquidity-motivated traders who are willing to pay a fee for immediacy. The liquidity-motivated traders are only interested in exchange transactions – exchanging securities for money or money for securities. The dealer chooses a bid-ask spread that will maximize his profits (Copeland and Galai, 1983). If the spread is too wide, he loses expected revenues from liquidity-motivated traders, but his potential losses to informed traders is reduced. If the spread is too narrow, his expected losses to informed traders increases, but the expected revenues from liquidity-motivated traders increase.

The adverse selection component of the bid-ask spread represents information risk, the probability that the next trader whom the dealer interacts with will be an informed trader (Copeland and Galai, 1983). The greater the risk of losing to informed

traders, the larger the spread (Callahan et al., 1997). Hence, the adverse selection component reflects the degree of information asymmetry risk perceived by the dealer from his transaction with informed traders.

4.1.1 Relevant Studies Using Bid-Ask Spreads

There is a growing body of research using bid-ask spreads to measure the effect of disclosure levels on several capital market factors. Copeland and Galai (1983) develop a model to illustrate the effect of information asymmetry on the bid-ask spread. They find that if the dealer perceives a greater probability of transacting with an informed trader he will widen the spread. The dealer expected costs depend on the probability that he will be trading with an informed trader. This represents information asymmetry between the dealer and the informed trader. Their results, consistent with prior studies, indicate a negative relationship between the bid-ask spread and volume, competition, and risk, and a positive relationship with price and stock variance.

Analytical models estimating components of the bid-ask spread indicate that there is a positive relationship between the adverse selection component and information asymmetry. Glosten and Harris (1985) develop a model showing that there will be a bid-ask spread even if all other costs (inventory holding, order processing, etc.) are all zero. The bid-ask spread can be a “purely informational phenomenon.” Glosten and Harris (1988) develop a two-component (transitory and adverse selection) asymmetric information model. They illustrate that permanent price change is related to the adverse selection component (information asymmetry) while temporary price change corresponds to the transitory component (inventory holding and order processing costs). The

conclusion reached is that the bid-ask spread is determined to some extent by information asymmetry.

Venkatesh and Chiang (1986) examine the effect of earnings announcements and dividend payments on information asymmetry as measured by the bid-ask spread. The study investigates the proposition that there is greater information asymmetry prior to firm-specific events that have the potential for revealing important information and the predictability of date of occurrence. The study examines three groups of announcements: (1) joint earnings and dividend announcements on the same day, (2) initial (first) announcement, either earnings or dividend announcements that were not preceded by another announcement in the prior thirty days, and (3) second announcements which follow the first by at least ten days but no more than thirty days. The results reveal that bid-ask spreads were larger before second announcements and smaller before first and joint announcements. The results provide support for the proposition that dealers suspect non-routine announcements whenever the second announcement is delayed from the first by at least ten days and dealers react by widening bid-ask spreads.

Howe and Lin (1992) investigate the effect of dividends on information asymmetry as measured by the bid-ask spread. The results suggest that on average, firms that pay no dividends have wider bid-ask spreads than firms that do pay dividends. The results also show that the bid-ask spread declines as the dividend yield increases.

Lee et al. (1993) use the bid-ask spread and depth to measure the effect of information asymmetry around earnings announcements. Depth is the number of shares available at each price – the bid and ask price. Lee et al. posit a relationship between bid-ask spread and depth: wide spreads are accompanied by low depths, and narrow bid-ask

spreads by high depths. Lee et al. (1993) indicate that prior studies use only the bid-ask spread in making inferences about market liquidity, however, both the bid-ask spread and the depth are needed to make inferences about market liquidity since market liquidity has both a price dimension (the spread) and a quantity dimension (the depth). The study provides evidence to support the conclusion that dealers protect themselves immediately after earnings announcements because dealers believe that they could be trading with informed investors or investors with expertise in analyzing earnings data.

Greenstein and Sami (1994) investigate the effect of accounting disclosure on the relative bid-ask spread by examining the effect of the SEC's segment disclosure requirements. Greenstein and Sami (1994) observe that the relative bid-ask spread decreased significantly for firms reporting segment disclosure for the first time in 1970 while firms reporting segment disclosure prior to 1970 did not exhibit a decrease in bid-ask spread.

Krinsky and Lee (1996) investigate the behavior of the three components of the quoted bid-ask spread surrounding earnings announcements. Their results suggest an increase in information asymmetry among market participants during the event period. This is perhaps because the dealer assumes that there are information processors who have superior ability in assessing firms' performance from the announcements. The results also show a decrease in both inventory and holding costs for the event and predisclosure periods suggesting that the risk of holding excessive inventory is decreased because of increased trading activity as supported by prior research.

Leuz and Verrecchia (2000) use bid-ask spread to test for information asymmetry. They also include trading volume and share price volatility as proxies for the information

asymmetry component of cost of capital. They compare two groups of German firms – one group electing International Accounting Standards (IAS) or U.S. GAAP and the other group using German GAAP. Results indicate that firms electing IAS or U. S. GAAP had lower bid-ask spread and higher trading volume than firms electing German GAAP, but there were no significant results for share price volatility among firms. Coller and Yohn (1997) investigate whether the decision to issue management forecasts is related to information asymmetry and whether the forecasts reduce information asymmetry. Coller and Yohn (1997) predict that if management forecasts reduce information asymmetry then firms issuing management forecasts will have smaller bid-ask spreads than firms that do not issue management forecasts. The forecasts provide information that is held by a subset of investors, and therefore reduce information asymmetry. Results are consistent with prior studies. Firms issuing management forecasts have smaller bid-ask spreads than firms that do not issue management forecasts and thus management issues forecasts in order to reduce information asymmetry.

Based on the extant accounting research employing the bid-ask spread to measure the effect of information asymmetry on several factors, it will be used to measure the difference in information asymmetry between firms using the tabular format and firms using either the sensitivity analysis or the value at risk format.

4.2 Measuring the Information Effect

4.2.1 Variable Description

The variables, except for SPREAD, are defined similarly as in Coller and Yohn (1997). The variable SPREAD for each of the five days of the Pre-SEC period is calculated as the absolute difference of bid-ask spreads of the current day and the previous day divided by the average of the bid-ask spreads of the Pre-SEC five days. For example, the SPREAD of day one is calculated as the absolute difference of day one and day two bid-ask spreads divided by the average bid-ask spreads of day one through day five. The SPREAD for day two is calculated as the absolute difference of day two and day three divided by the average bid-ask spreads of day one through day five. The SPREAD for day three is calculated as the absolute difference of day three and day four bid-ask spreads divided by the average bid-ask spreads of day one through day five. The SPREAD for day four is computed similarly as prior days. SPREAD for the Day of the SEC filing period is calculated as the absolute difference of day six and day five bid-ask spreads divided by the day five bid-ask spread.

SPREAD for each of the five days after the SEC filing date, the Post-SEC period, is calculated as the absolute difference of the current day and the previous day bid-ask spreads divided by the average bid-ask spreads of day six through day ten. For example, the SPREAD for day six is calculated as the absolute difference of the day six and day seven bid-ask spreads divided by average bid-ask spreads of day six through day ten. SPREAD for days seven, eight, and nine are calculated the same way as day six. These

computations would result in nine SPREAD data for each firm. The formulas below describe the computations for the three periods:

Pre-SEC SPREADS (Day 1 through Day 4)

$$\text{Day 1 SPREAD} = \frac{\text{SPREAD}_t - \text{SPREAD}_{t-1}}{\text{Avg}(\text{SPREAD}_t + \dots + \text{SPREAD}_{t5})} \quad (1)$$

SPREADS for Day 2 through Day 4 are computed as in (1)

Day of SEC filing

$$\text{Day 5 SPREAD} = \frac{\text{SPREAD}_{t6} - \text{SPREAD}_{t5}}{\text{Avg}(\text{SPREAD}_t + \dots + \text{SPREAD}_{t5})} \quad (2)$$

Post-SEC (Day 7 through Day 10)

$$\text{Day 1 SPREAD} = \frac{\text{SPREAD}_t - \text{SPREAD}_{t-1}}{\text{Avg}(\text{SPREAD}_7 + \dots + \text{SPREAD}_{t11})} \quad (3)$$

SPREADS for Day 7 through Day 10 are computed as in (3),
Where t starts at day seven.

The bid-ask spread is the difference between the *ask* and the *bid* prices. Prior research has shown that inventory holding costs and order processing costs affect the bid-ask spread, thus to measure the information asymmetry portion of the bid-ask spread, variables representing these costs have to be included. Prior research (Demsetz, 1968; Tinic, 1972; Stoll, 1978; and Coller and Yohn, 1997) finds a negative relationship between bid-ask spread and trading activity. *TRANS* is the control variable in the model for trading activity; it measures the number of transactions in a firm's stock each day. The order processing costs are the costs the dealer incurs in processing orders for firms'

stock. Variability of returns has been shown by prior research (Barnea and Logue, 1975; Stoll, 1978) to affect inventory holding cost. The dealer has to keep inventory to meet investors' buy and sell demands. The longer inventory is held on hand, the less liquid the firm's stock is and as such, the difference between buy and sell prices will increase as time goes on. *VAR* is the variable measuring the variance of a stock returns each day. Price has also been shown by prior research (Demsetz, 1968; Tinic, 1972; Tinic and West, 1972; and Coller and Yohn, 1997) to affect bid-ask spreads. *PRICE*, the average of all individual buy and sell transactions prices is included in the model as the control variable for price. Prior research has shown that price is positively related to spreads. The more orders are made for a firm's stock the narrower the spread. Quoted depth, *DEP*, is also included in the model because Lee et al (1993) concludes that a complete quote should include the number of shares in all quotes. *DEP* is number of shares available at the ask price plus the number of share available at bid price during each day. *FORMAT* is the indicator variable; it is set to one for tabular format firms, zero otherwise. *FORMAT* is used to capture the difference in bid-ask spread between the tabular format firms and the sensitivity analysis format and value at risk format firms. Since *FORMAT* takes on the value of zero for the sensitivity analysis format firms and value at risk format firms, the value of the coefficient on *FORMAT* is the excess over or below zero which is attributed to the tabular format firms. Similarly to previous research, the natural logarithm of variables except for the *FORMAT* variable is used in the regressions.

With the above defined variables, the regression model was estimated as shown below:

$$\text{SPREAD}_{i,t} = \beta_0 + \beta_1 \text{DEP}_{i,t} + \beta_2 \text{PRICE}_{i,t} + \beta_3 \text{VAR}_{i,t} + \beta_4 \text{TRANS}_{i,t} + \beta_5 \text{FORMAT}$$

The regression analysis was conducted on the three period samples to test whether the tabular format firms experienced a significant difference in bid-ask spreads than the sensitivity analysis or value at risk format firms. The expected signs for the variables are as follows: DEP (-), PRICE (+), VAR (+), TRANS (-), and FORMAT (-, +).

4.2.2 The Information Effect

Prior research utilizing the bid-ask spread to measure the effect of disclosure levels on capital market factors documented in this study show that these specific disclosures serve as positive signals to the market. Venkatesh and Chiang (1986), Howe and Lin (1992), Greenstein and Sami (1994), Krinsky and Lee (1996), Coller and Yohn (1997) and Leuz and Verrecchia (2000) examine the effects of issuing dividends, segment disclosure, management forecasts, and firms using more transparent accounting methods. These studies show that in comparison to nondisclosure firms, these firms experienced smaller bid-ask spreads. These disclosures send positive signals of better financial conditions for these firms, and the market reacted favorably through smaller bid-ask spreads. In this study, it is expected that the disaggregated derivatives disclosure, the tabular format would result in a significant percentage change in bid-ask spreads for firms using the tabular format than for firms using either the sensitivity analysis format or the value at risk format. The tabular format could produce favorable or unfavorable bid-ask spreads since this format is expected to have greater relative information content. The difference will be reflected in the magnitudes of the bid-ask spreads of both groups of firms.

It is anticipated that on the Day of the SEC filing the percentage change of bid-ask spreads for tabular format firms would be larger, but there would be no change in bid-ask spreads for either group of firms during the Pre-SEC period. This result is expected because the derivatives disclosure method will be known after the SEC filing date. The Post-SEC period results will confirm whether the reaction observed during the Day of SEC filing period is sustained during the five days after the annual report is filed.

CHAPTER 5

RESEARCH DESIGN

5.1 Sample Design and Data Collection

Firms for the samples were retrieved from 10K wizard.com. 10K wizard.com is an internet database composed of all SEC filings. It was established in 1999 to enable users to have direct access to the various items of a firm's filings without having to read through the entire annual report. The innovative technology of 10K wizard.com made it possible to access Item 7A, "Quantitative and Qualitative Disclosures about Market Risks", from the outline of a firm's annual report (10K) filed with the SEC.

Item 7A reports the method or methods, as mandated by the SEC, employed by a firm in disclosing the market risks associated with the use of derivatives. This section of the annual report discloses the dollar amounts, types of derivatives used by a firm, and whether the derivatives were used for trading or for risk management. Item 7A is a subsection of Item 7, "Management Discussion and Analysis of Financial Condition and Results of Operations" (MD & A), which discloses management's view of matters that have had and will have an impact on a firm's operations. Item 7 is an unaudited section of the annual report and an SEC required disclosure.

The SEC requires registrants to file their annual reports within ninety days of their fiscal year-end. One of the criteria for selecting a firm for the sample is a December 31 year-end which means that for a firm to be in compliance it should file by March 31. SEC filings from February 15 through April 15 of 1998, 1999, and 2000, were retrieved from 10K wizard.com to ensure that early and late filers were included in the samples.

The financial statements under examination were for the years, 1997, 1998, and 1999. The first year of 1997 was chosen because the SEC mandate for disclosing derivatives use went into effect June 15, 1997.

The criteria for sample selection were: (1) December 31 year-end, (2) non-regulated firms (utilities and financial firms were excluded), (3) firms using only one method of disclosing derivatives not a combination of methods and (4) there should be at least twenty-five days between earnings announcements and SEC filing date to filter out earnings announcements effects. Sample firms were selected from several industries and from the three major exchanges: New York Stock Exchange (NYSE), American Stock Exchange (AMEX), and the National Association of Securities Dealers and Quotation (NASDAQ). These inclusions would increase the generalization of the results.

The tabular format firms were matched within $\pm 10\%$ of market capitalizations with sensitivity analysis or value at risk format firms as of December 31, 1997, 1998, and 1999. Firms using a combination of two or all of these formats are eliminated. Firms are matched to control for size effects. Prior research indicates that firm size is associated with disclosure levels. Evidence has been provided to support the conclusion that large firms provide higher levels of disclosure, which in turn affect liquidity, information asymmetry, and cost of capital. Using matched firms spreads the size effects across the two groups of firms so that a major proportion of the variation in the dependent variable is explained by the independent variables in the model other than size.

The SEC required firms with market capitalizations in excess of \$2.5 billion to use one or a combination of the three methods in disclosing the use of financial derivatives for periods ending June 15, 1997, and firms with market capitalizations of

\$2.5 billion or less should make the disclosure for fiscal periods ending June 15, 1998. Because of this requirement, small sample sizes are expected for 1997 matched firms.

5.2 Test of Hypothesis

There is a large body of research examining the bid-ask spreads that indicates that there is a positive relationship between the level of information asymmetry and the magnitude of the bid-ask spread. In this study it is expected that, since the tabular format provides disaggregated, detailed information (and thus reduces information asymmetry), the bid-ask spread will be smaller for companies using the tabular format than the bid-ask spread for companies using either the sensitivity analysis format or the value at risk format.

Accounting research provides evidence that information asymmetry affects the size of bid-ask spreads. In several studies, the bid-ask spread is used to measure the effects of information asymmetry on various capital market factors (e.g., liquidity and returns, Amihud and Mendelson, 1986; stock returns, stock prices, trading volume, risk, dealer competition, Demsetz, 1968; Tinic, 1972; Tinic and West, 1972; Stoll, 1978; Barnea and Logue, 1975; and Amihud and Mendelson, 1986, 1989). Studies have also used the bid-ask spreads to capture market reaction to certain disclosures in financial reporting (i.e., Coller and Yohn, 1997).

The research design of this study is similar to that of Coller and Yohn (1997). Coller and Yohn (1997) investigate whether the market reacts to management efforts to reduce information asymmetry through the issuance of management earnings forecasts. They examine the proposition that management issues management earnings forecasts to

reduce information asymmetry. The results provide evidence to support the conclusion that firms with greater information asymmetry before the issuance of management earnings forecasts experienced smaller information asymmetry as measured by bid-ask spreads than non-issuing firms.

In the spirit of Collier and Yohn (1997), the bid-ask spreads will be regressed on the format variable and the control variables. In this cross-sectional analysis, the regression coefficient of the format variable will capture the differences in the bid-ask spreads between the firms using the tabular format and firms using the sensitivity analysis format or the value at risk format.

Also, similarly to Wilson (1987) the SEC filing date is used as the initial date when the annual report is available to the public. This is when derivatives disclosure methods are available to the public. There is at least twenty-five days between the SEC filing date and the earnings announcement dates for the sample firms. Bid-ask spreads are analyzed over three windows: four days prior to the SEC date (Pre-SEC), the Day of (SEC filing date), and four days after the SEC date (Post-SEC). The Pre-SEC samples consists of data for the four days prior to the SEC filing date for each of the three years – 1997, 1998, and 1999. The Day of and the Post-SEC samples also consist of data for the day of the SEC filing and four days after the SEC filing respectively for each of the three years.

It is expected that there would be no significant differences between the two groups of firms prior to the filing of the annual report with the SEC. The derivatives disclosure method is not known until after the issuance of the annual report and as such, there should be no significant differences between the two groups of firms. On the other

hand, the test for differences between the two groups of firms on the Day of SEC filing should show a significant difference in bid-ask spreads for the tabular firms. If the tabular format firms provide greater relative information content then the percentage change in bid-ask spreads should be larger for the tabular format firms. The null hypothesis assumes that there is no difference in the relative information content between both groups of firms after the issuance of derivatives disclosure information. A rejection of the null hypothesis could provide support for the hypothesis if the percentage change in bid-ask spreads for the tabular format firms are larger than the sensitivity analysis or value at risk format firms. We can conclude that the tabular format is more informative and reduces information asymmetry. If the results of the Day of SEC filing continue during the Post-SEC period we can conclude that the reaction is sustained during the five days after the SEC filing.

CHAPTER 6

EMPIRICAL RESULTS

6.1 Sampling Results

Table 1 illustrates the process used to select samples for this study. The total initial sample size for both groups of firms for 1997 was one hundred and thirty-five firms. Ninety-seven were eliminated because they could not be matched, leaving a total of 38 matched firms. Six utilities and financial firms were eliminated because these are specially regulated firms. Six firms were also removed because of incomplete data and having made filings with the SEC within twenty-five days of earnings announcements. The final samples consist of a total of 26 firms: thirteen firms for the tabular format firms and thirteen sensitivity analysis format or value at risk format firms. Smaller sample sizes were expected for the 1997 firms because it is the first year of implementation of the SEC's mandate for firms with market capitalizations in excess of \$2.5 billion.

Larger sample sizes are obtained for 1998 and 1999 since all firms are required to report the use of derivatives employing one or a combination of the three methods set forth by the SEC for fiscal periods ending or after June 15, 1998. The total initial number of firms for both groups for 1998 consisted of five hundred and seventeen firms. Three hundred and three firms were eliminated because they could not be matched, leaving two hundred and fourteen matched firms. Twenty-four utilities and financial firms were eliminated. Sixty-eight had incomplete data and filings were within twenty-five days of SEC filings and earnings announcements. The final total sample is comprised of one hundred and twenty-two firms: Sixty-one firms for each group.

The total initial 1999 sample consisted of five hundred and eighty-six firms. Three hundred and thirty-eight firms were unmatched. Twenty-six utilities and financial firms were eliminated along with seventy-two firms for incomplete data and filings within twenty-five days of SEC filing and earnings announcements. The final sample is comprised of one hundred and fifty firms: seventy-five firms for each group.

Table 2 provides the distribution of sample firms for 1997, 1998, and 1999 by industry. The results show that no one industry dominates the samples. Table 3 shows the distribution of the samples by exchange listing. The New York Stock Exchange (NYSE) dominates with the most number of firms. For 1997, NYSE listing is twelve out thirteen firms or ninety-two percent; for 1998, it is 35 to 38 firms out of sixty-one, or fifty-seven to sixty-two percent; and for 1999, there are fifty-five firms out of seventy-five, or seventy-three percent. The distribution of the sample firms on NASDAQ for 1997, 1998, and 1999 for the tabular format firms were 1, 17, and 16, respectively. For the sensitivity analysis and value at risk format firms for the same period were 1, 23, and 18, respectively. For the AMEX the distribution of the tabular format firms for 1997, 1998, 1999 were 0, 6, and 4, respectively. The sensitivity analysis and value at risk format firms were 0, 3, and 2, for 1997, 1998, and 1999, respectively.

6.2 Descriptive Statistics

6.2.1 Market Capitalizations

The descriptive statistics of the market capitalizations for each group of firms for the three years are shown in Table 4. Panel A provides the descriptive statistics for 1997 for the tabular format and the sensitivity analysis format and value at risk format firms.

The means for market capitalizations for the sensitivity analysis and value at risk format firms of \$11.5 billion are slightly higher than the tabular format firms of \$10.5 billion, but the difference is not statistically significant. Because of the small sample, the Wilcoxon Rank Sum test was applied to determine if there is a significant difference between the means of the two groups of firms.

SPSS statistics software package and Microsoft Excel were used to analyze the data. The means of market capitalization data of the samples for all three years were compared using the *t*-test and the Wilcoxon Rank Sum test to ensure that the sample firms were not significantly different in size.

Small sample sizes do not approximate normal distribution and as such the *t* test for comparing means is not applicable because one of its criteria of normality is usually violated. A nonparametric test which does not depend on the assumption of normality should be used. One such nonparametric test is the Wilcoxon Rank Sum test or the Mann-Whitney U test, both give similar results. The Wilcoxon Rank Sum test or the Mann-Whitney U test compares the means of two independent samples. The observations of the samples are combined and ranked. The ranks are then separated into the two original sample groups. The Z approximation formula is used for samples exceeding ten. The null hypothesis of equal means is rejected if the Z-test statistic exceeds +1.96 or is less than -1.96.

Results reported in Table 4, Panel A show the Z-test statistic of -.231 exceeds the critical value of -1.96 with a p-value of .817. The decision is to accept the null hypothesis of equal means because the *p-value* is not significant and the Z-test statistic

exceeds -1.96. The conclusion is that there is no significant difference in the market capitalizations of the 1997 sample firms indicating that the matching was appropriate.

The mean of \$3.8 billion of the 1998 tabular format firms in Panel B exceeds the mean of \$3.4 billion of the 1998 sensitivity analysis format and value at risk format firms. The results in Panel B also reveal that there is no significant difference between the market capitalizations of the 1998 groups of firms. The *t* value is .165 with a *p-value* of .869 indicates that there is no significant difference between market capitalizations of the two groups of samples. These results also indicate that the matching of the firms is appropriate. The 1999 sample firms also reveal similar results as the 1997 and 1998 groups of firms. There is no significant difference between the means of both groups of firms, as shown in Panel C of Table 4. The *t*-value is .349 with a *p*-value of .727 also indicating that the matching was appropriate. The mean of tabular format firms of \$3.6 billion exceeds that of the sensitivity analysis format and value at risk format firms of \$3.2 billion.

The means of both groups of sample firms are larger in 1997 than the 1998 and 1999 samples because 1997 is the first year of implementation of FRR No. 48 and the Release requires that firms with market capitalizations in excess of \$2.5 billion should comply for fiscal periods ending after June 15, 1997. Firms with market capitalizations of \$2.5 billion dollars or less should comply for periods endings after June 15, 1998, hence only large firms were included in the 1997 samples. The 1998 and 1999 samples include both large and small firms, which makes means of both years smaller than 1997 samples.

The data for the samples were retrieved from the Center for Research in Security Prices (CRSP), COMPUSTAT, the New York Stock Exchange Trade and Quote (NYSE TAQ), and the SEC Edgar databases. The December 31 year-end market capitalizations for a firm in each sample for the years 1997, 1998, and 1999 were obtained from CRSP. Stock returns, the bid and ask prices, and the daily number of transactions in a firm's stock were retrieved from the New York Stock Exchange Trade and Quote database (NYSE TAQ). Earnings announcement dates were taken from the December 31 quarterly earnings reports from COMPUSTAT. The annual report filing dates were retrieved from the SEC Edgar database off the internet.

6.2.2 Variables

The descriptive results provided in Table 6 suggest that the means of the bid-ask spreads for the tabular format firms are slightly larger than sensitivity analysis format and value at risk format firms but not statistically significant during the Pre-SEC and Post-SEC periods as shown by Panels A and C of Table 5. Panel B reveals that the difference in the means is statistically significant only during the SEC filing date period. The means of the bid-ask spreads for the tabular format firms are larger than the sensitivity analysis and value at risk firms at the .05 level with a *t-statistic* of 2.450 during the SEC filing date. The difference of .35476 in the means of both groups of firms during the Day of SEC filing period is larger than the differences of .05004 and .03122 of both the Pre-SEC and Post-SEC periods respectively. The large difference in means documented on the Day of SEC filing period indicates that users reacted to the derivatives disclosure methods.

Panel A, B, and C of Table 5 reveal that the means of DEP for the tabular format firms exceed the sensitivity analysis and value at risk firms. The differences in DEP is significant at the .005, .05, and .15, respectively. DEP is significantly larger for the tabular firms indicating that the tabular firms experienced greater liquidity than the sensitivity analysis or value at risk firms. Lee et al (1993) posits that depth is a measure of liquidity. This study states, "... market liquidity has both a price dimension (the spread) and a quantity dimension (the depth)". Lee et al (1993) propose that liquidity can easily be detected in depths rather than bid-ask spreads and they assert that depth is an important empirical proxy for market liquidity. The depth is the number of shares available at both purchases (the ask) and sales (the bid) prices. Leuz and Verrechia (2000) define liquidity as the willingness of some investors who hold firm shares to sell and the willingness of others to buy. TRANS for tabular firms is slightly larger than the sensitivity analysis and value at risk firms. Bartov and Bodnar (1996) and Leuz and Verrechia (2000) use annual share turnover as a proxy for information asymmetry and they both concluded that higher share turnover reflects smaller information asymmetry. Greater share turnover implies a greater number of transactions in firms' shares; hence, the tabular format firms with the greater number of transactions implies more liquidity and smaller information asymmetry. Panels A, B, and C of Table 5 also show that the means of PRICE is smaller for the tabular firms than for the sensitivity analysis and value at risk firms. The differences in PRICE for both groups of firms are statistically significant for the PRE-SEC and Post-SEC periods at the .01 level with *t*-statistics of -2.806 and -2.655 respectively, but the difference between both groups of firms is not significant during the Day of the SEC filing period. On the other hand there are no

significant statistically differences in the means of VAR and TRANS for both groups of firms for all three periods, but the differences (.08341 and .04017) between the groups of firms for these variables during Day of the SEC filing period are larger than the Pre-SEC and Post-SEC periods.

In summary, the results of Table 5 suggest that the tabular format firms provide greater relative information content and smaller information asymmetry as evidenced by the larger percentage change in bid-ask spreads and larger depths after the derivatives disclosure methods were revealed on the SEC filing date. No significant differences in the means of the bid-ask spreads were expected during the Pre-SEC period because no derivatives disclosure methods would have been revealed. The results of Panel A provide support for this notion. There is no significant difference in the means of both groups of firms during the Post-SEC period, which suggests that the results of the Day of the SEC filing were not sustained during the Post-SEC period.

6.3 Regression Analysis

Prior research provides evidence to support the notion that when a firm's stock is actively traded (increase in the number of transactions, TRANS) there is an increase in the number of shares that are traded at the bid and ask prices (DEP). When dealers do not have to keep a firm's shares in inventory for a long period of time before they are traded, inventory costs are reduced and the difference in the bid and ask prices (spreads) become smaller, hence bid-ask spread is inversely related to DEP and the number of transactions in a firm's stock (Demsetz, 1968; Tinic, 1972; Stoll, 1978, Coller and Yohn, 1997, and Leuz and Verrechia, 2000). A dealer will request relatively higher prices if

inventory of a firm's shares is kept for a long period of time, the wider the spread, the higher the price. Price is positively related to bid-ask spread (Demsetz, 1968; Tinic, 1972; Tinic and West, 1972; Benston and Hagerman, 1974; and Coller and Yohn, 1997). It has been demonstrated that variability in stock returns affects the inventory carrying cost component of the bid-ask spread (Barnea and Logue, 1975; and Stoll, 1978). Higher variability increases the bid-ask spread, therefore, SPREAD will be positively related to VAR.

Table 6, Panel A, reports the regression results of the five-day period prior to the SEC filing date, the Pre-SEC period. The coefficient on the FORMAT variable is close to zero (-.01166) indicating that there is not a significant difference in the bid-ask spreads of both groups of firms. The *t-value* of -.169 and a *p-value* of .866 for FORMAT support this conclusion. The indicator variable, FORMAT, captures the difference in bid-ask spread between both groups of firms. Since FORMAT takes on the value of zero for the sensitivity analysis format and value at risk format firms and the value of one for tabular format firms, the coefficient on FORMAT in excess of or below zero is attributed to the tabular format firms. DEP is significant at the .05 level with a *t-statistic* of 2.416 indicating greater depths for the tabular format firms. TRANS is also significant at the .001 level with a *t-statistic* of -3.679 indicating that the tabular format firms had greater number of transactions than the sensitivity analysis format and value at risk format firms. The tabular format firms also experienced larger variances in stock returns as evidenced by the *t-statistic* of 8.365 for VAR with a *p-value* of .000. VAR is positively related to SPREAD which is consistent with prior research results. The statistic on TRANS is -2.545 with *p-value* of .011 indicating a significant difference between both groups of

firms. TRANS is negatively related to SPREAD which is also consistent with the results of prior research. The results of Panel A support the notion that during Pre-SEC period, there is no significant difference in the percentage change in bid-ask spreads of both groups of firms. Before the issuance of information there should be no difference in the bid-ask spreads of the two groups of firms. The adjusted R^2 is .071 which suggests that independent variables explain approximately seven percent of the variation in SPREAD.

The results of Panel B, Table 6, show that the percentage change in bid-ask spreads for the tabular format firms are larger than the sensitivity analysis format and value at risk format firms. The coefficient on FORMAT is positive (.344) and significant at the .05 level with a *t-statistic* of 2.375 indicating that the percentage change in bid-ask spreads are larger for the tabular format firms also indicating that there was a market reaction to the tabular format. This result suggests that the tabular format firms provided greater relative information content than the sensitivity analysis format or value at risk format firms. The reaction to the tabular format rejects the null hypothesis of no difference in the relative information content between the disclosures providing disaggregated derivative data (the tabular format) and disclosures providing aggregated data (the sensitivity analysis or value at risk format). DEP is not significant even though the coefficient is positive. PRICE is significant at the .005 level with a *t-statistic* of -3.181 suggesting that the difference in stock prices between the two groups of firms is significant. The negative *t-statistic* indicates that stock prices for the tabular format firms are smaller. VAR is also positively related to SPREAD, which is consistent with the results of prior research, and statistically significant at the .001 level. The coefficient on VAR is .316 with a *t-value* of 3.711 which suggests that the variance in stock returns is

greater for the tabular format firms. The coefficient on TRANS is .09567, which is close to zero, with a *t*-statistic of 1.444 (*p*-value = .150), indicating no significant difference in the number of stock transactions between the two groups of firms. The adjusted R² for this period is .077 indicating that independent variables explain approximately eight percent of the variation in the dependent variable, SPREAD.

The results of Panel B of Table 6 provide support for the hypothesis of a larger percentage change in bid-ask spreads for the tabular format firms after the release of the annual reports filed with the SEC. This paper sets forth the notion that after the disclosure of derivatives methods, the disaggregated derivatives disclosure method (i.e., tabular format) will result in a larger change in spreads than the aggregated derivatives disclosure methods (i.e., sensitivity analysis format and value at risk format). The results suggest that disaggregated disclosure (the tabular format) does provide greater relative information content than the aggregated disclosure (i.e., sensitivity analysis format or the value at risk format) as reflected by the bid-ask spreads of both groups of firms. The results indicate that the tabular format firms experienced smaller information asymmetry even though DEP is not significant, but PRICE is significant after the release of the annual reports which was anticipated. The results suggest that users reacted to the information provided by the derivatives disclosure methods revealed in the annual reports filed with the SEC.

Panel C of Table 6 shows that there is no significant difference in the bid-ask spreads of both groups of firms. The coefficient of .01116 on FORMAT is close to zero with a *t*-statistic of .156 and a *p*-value of .876, indicating no significant difference in the bid-ask spreads of both groups of firms. This result suggests that the reaction of the Day

of the SEC filing was not sustained during the Post-SEC period. DEP is significant at the .05 level with *t-statistic* of 2.031, indicating that the tabular format firms experienced greater depths than the sensitivity analysis format and value at risk format firms. PRICE is also significant at the .001 level with a *t-statistic* of -4.509 indicating that tabular format firms experienced smaller stock prices. The coefficient on PRICE is negative (-.242) which supports the conclusion of smaller stock prices for the tabular format firms. The coefficient on VAR is positive (.153) and significant at the .001 level with a *t-statistic* of 4.885. VAR is positively related to SPREAD which is consistent with results of prior research. The coefficient on TRANS is negative and close to zero (-.04562) indicating that there is no significant difference between the two groups of firms in the number of transactions in firms' stocks. The *t-statistic* of TRANS is -1.482 with a *p-value* of .139. The result of the differences in bid-ask spreads of both groups experienced during the Day of SEC filing period was expected to be seen during the Post-SEC period. No significant difference in bid-ask spreads was seen during the Post-SEC period.

The coefficient matrices shown in Table 7 for the three periods indicate that there is no problem of multicollinearity. Multicollinearity is the condition where some of the independent variables are highly correlated with each other. This condition exists if the correlation coefficient is .70 or above. Multicollinearity makes it difficult to separate the individual effects of the independent variables on the dependent variable. The coefficients of correlated independent variables fluctuate widely making inferences invalid. During all three periods no correlation coefficient exceeded .55. The highest correlation is between PRICE and TRANS for all three periods which is expected because prior research suggests that there is a relationship between price and the number

of transactions in a firm's stock. Price and the number of transactions of a firm's stock are associated with liquidity.

Before running the regression model the assumptions of the model are examined to determine if they have been met. The three major assumptions of a regression model are: (1) normality of the error terms, (2) homoscedasticity of error terms, and (3) independence of the error terms. The assumption of normality requires that the error terms are normally distributed for each value of the independent variable around the regression line. The homoscedasticity assumption requires constant variance of the error terms for all values of the independent variables. The independence of error terms requires that the error terms are not correlated at each value of the independent variables. A violation of any of these assumptions makes inferences about the regression invalid. The regression results revealed that these assumptions were not violated.

In summary, the regression results provide support for the hypothesis. The disaggregated tabular format disclosing derivatives provide greater relative information content than the aggregated sensitivity analysis or the value at risk format. The results suggest that the disaggregated disclosures format reduce information asymmetry and provide greater relative information content than aggregated disclosure format as proposed by this study. The regression results demonstrate that DEP and TRANS are significant for the tabular format firms suggesting that these firms experienced greater liquidity than the sensitivity analysis format and value at risk format firms. The variables DEP and TRANS could also be capturing the difference in information asymmetry between both groups of firms. These variables, or variations thereof, have been used as

proxies for information asymmetry in accounting research (Lee et al., 1993; Bartov and Bodnar, 1996; and Leuz and Verrechia, 2000).

In summary, the results support the conclusion that disaggregated derivatives disclosure method, the tabular format, provides greater relative information content than the aggregated derivatives disclosure methods, namely the sensitivity analysis and the value at risk formats. The results also indicate that tabular format reduces information asymmetry because these firms are more liquid than the aggregated format firms.

CHAPTER 7

CONCLUSIONS

Prior accounting research suggests that disaggregated accounting information has greater relative information content than aggregated accounting information. Accounting research also suggests that disclosure levels are associated with information asymmetry, particularly disaggregated information reduces information asymmetry. Thus, the purpose of this paper is to provide evidence to support the proposition that of the three methods mandated by the SEC in disclosing derivatives, the disaggregated method (the tabular format) has greater relative information content than the aggregated disclosure methods (i.e., the sensitivity analysis format or value at risk format). This paper sought to provide evidence to support the proposition that the tabular format reduces information asymmetry in comparison to the sensitivity analysis format or the value at risk format.

Regression analyses were conducted for three periods: five days prior to filing of annual reports with the SEC (Pre-SEC), the day of the SEC filing (Day of), and five days subsequent to the SEC filing (Post-SEC). It was expected that during the Pre-SEC period there would be no significant difference in the bid-ask spreads of both groups because the methods of disclosing derivatives would be unknown. As expected during this period no significant difference was documented in the bid-ask spreads of the tabular format firms and the sensitivity analysis format and value at risk format firms since no information regarding derivatives was disclosed. During the Day of the SEC filing period, the tabular format firms exhibit larger percentage change in bid-ask spreads which provide support for the hypothesis of greater relative information content for the disaggregated disclosure

method. The results from the regression analysis indicate that information is provided by the derivatives disclosure methods. The brevity of the sensitivity analysis and value at risk formats could have been seen as not providing all the information necessary to understand derivatives. No significant difference was documented in the bid-ask spreads of both groups during the Post-SEC period which means that information effect observed during the Day of the SEC filing was not sustained during the five days after filing of the annual report.

The SEC, in Financial Reporting Release No. 48, assumes that the tabular format would provide greater relative information content since the method provides detailed disaggregated information. It appears that the results of this study support the SEC's assumption which means that the summary disclosure methods (i.e., the sensitivity analysis and value at risk formats) did not meet all of users' information needs on derivatives. Also, the results seem to indicate that the tabular format could be providing necessary information which users consider relevant in making economic decisions regarding derivatives. The SEC should note that the public is responding to information in the derivatives disclosure methods. Users do utilize the information provided by the derivatives disclosures.

The findings of this study are important because practitioners can choose the derivatives disclosure method that will reduce information asymmetry and thereby reduce some of the adverse economic consequences of high cost of capital, illiquidity, and market inefficiency. The findings also provide justification for regulatory bodies for issuing regulations that provide either aggregated or disaggregated disclosures since it was assumed that tabular format (disaggregated disclosure) had greater relative

information content than the sensitivity analysis format or value at risk format (aggregated disclosure). One of the complaints lodged by interest groups was the lack of understanding of the public on derivatives. The findings will help the SEC in determining which derivatives disclosure method improves the public's understanding of derivatives. It seems as if the disaggregated methods do provide greater relative information than the aggregated disclosure methods.

The SEC, FASB and other regulatory organizations are concerned about ensuring that the public has all the information necessary to make informed economic decisions. Information asymmetry creates inequity in the capital markets because certain individuals have more information than others and consequently unwanted conditions like illiquidity and market inefficiency can occur. An extension of this study would be investigating whether firms are fully complying with FRR No. 48. Roulstone (1999) finds that most firms using either one or a combination of the disclosure methods were not fully complying with the SEC's mandate. Roulstone (1999) examines 1997 (early) filers, but an investigation of filings after 1997 could tell a different story. Another area for investigation could be in terms of analysts' ratings of the alternative methods provided in Financial Reporting Release No. 48. Which ones do analysts consider to be more informative? It would be interesting to examine the reason why firms would choose to change from one format to the other.

The results of this study are not generalizable to firms using a combination of the three disclosure formats required by FRR No. 48. The SEC allows firms to use either one or a combination of disclosure formats in reporting derivatives of different market risk categories (interest rate risk, foreign currency exchange rate risk, commodity price risk,

and any other significant market risk). Only firms with year-end of December 31 were included in the samples. Compliance with FRR No. 48 by firms is improving the public's knowledge of derivatives and market risk.

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APPENDIXES

APPENDIX A

TABLE 1

Sample Selection Procedure^a

	<u>1997</u>	<u>1998</u>	<u>1999</u>
Total Initial Firms ^b	135	517	586
Unmatched Firms ^c	(97)	(303)	(338)
atched Firms	38	214	248
Utilities and Financial Firms ^d	(6)	(24)	(26)
Incomplete data and filings within Twenty-five days	(6)	(68)	(72)
Total Final Firms ^e	<u>26</u>	<u>122</u>	<u>150</u>
Final Sets of Firms ^f	<u>13</u>	<u>61</u>	<u>75</u>

^a Sample firms were retrieved from 10Kwizard.com, an internet database that provides the entire SEC filings. Firms were selected only if one derivatives disclosure method were used (either the tabular, or the sensitivity analysis, or the value at risk format) not a combination of methods, and December 31 year-end.

^b Includes all firms that satisfy the requirements in *a*.

^c These are sensitivity analysis or value at risk that could not be matched with tabular format firms.

^d Utilities and financial firms were deleted because these are regulated firms. Also included are railroad firms.

^e These are the total firms for both groups.

^f Total firms in *e* separated into both groups: 13 tabular firms and 13 sensitivity analysis or value at risk firms for 1997; 61 firms per group for 1998; and 75 firms for 1999.

TABLE 2

Sample Distribution by Industry^a

Panel A			
<u>Industry</u>	<u>SIC</u>	<u>1997 – Tabular*</u>	<u>1997 – SA/VAR**</u>
Drilling Oil/Gas	1381	2	
Wood House Furniture	2511	1	
Industrial Inorganic Products	2810		1
Pharmaceutical	2834		2
Miscellaneous Chemical Products	2890		1
Petroleum Refining	2911	1	3
Metal Cans	3411	1	
Bolts, Nuts, Screws	3452	1	
Engines/Turbines	3511	1	
Farm Machinery	3523		1
Computers	3573	1	
Vehicle Parts & Accessories	3714	1	
Aircraft Engines	3724		1
Orthopedic Prosthetics	3842		1
Photographic Equipment	3861		1
Radiotelephone Communications	4810	2	
Telephone Communications	4813	1	
Refuse Systems	4953	1	
Wholesale-metals	5052		1
Services-Advertising	7311		1
Total		13	13

TABLE 2 (continued)

Sample Distribution by Industry^a

Panel B

<u>Industry</u>	<u>SIC</u>	<u>1998 – Tabular*</u>	<u>1998 – SA/VAR**</u>
Crude Petroleum	1311	2	4
Drilling Oil/gas	1381	2	
Paper Mills	2621	2	
Converted Paper	2670		2
Plastic materials	2821	2	
Special Industrial Machinery	3550	2	
Electronic Components	3670	2	
Trucking/Trucking Courier	4210/4213	2	3
Radiotelephone Communications	4812	2	1
Telephone Communications	4813	3	
Radio Stations	4832		2
Retail Auto Dealers	5500	2	
Computer Services	7370		3
Auto Rental	7510	2	
Others ^b	Various	<u>38</u>	<u>46</u>
Total		<u>61</u>	<u>61</u>

TABLE 2 (continued)

Sample Distribution by Industry^a

Panel C

<u>Industry</u>	<u>SIC</u>	<u>1999 – Tabular*</u>	<u>1999 – SA/VAR**</u>
Crude Petroleum	1311	5	5
Drilling Oil/Gas	1381	2	1
Malt Beverages	2082		2
Cigarettes	2111		2
Paper Mills	2621	3	
Industrial Inorganic Chemicals	2810	2	
Plastic Materials	2821		2
Pharmaceutical	2834		3
Biological Products	2836	2	
Petroleum Refining	2911	2	
Tires/Inner Tubes	3011		2
Plastic Products	3089		2
Footwear (no rubber)	3140		3
Rolling Drawing	3350		2
Farm Machinery	3523		2
Radio/TV Broadcast	3663	2	
Vehicle Parts	3714		2
Photographic Equipment	3861		2
Radiotelephone Communications	4812	2	
Telephone Communications	4813	2	
Retail – Grocery Store	5411	2	
Retail – Auto Dealers	5500	2	
Hotels/Motels	7011	2	
Services – Misc. Equip Rental	7350		2
Others ^b	Various	47	43
		-----	-----
Total		75	75
		-----	-----

^a The Standard Industrial Classification Codes (SIC) were retrieved from the SEC website database, EDGAR.

^b Firms in this category had only one firm in other types of business.

* This is the tabular format firms and ** SA/VAR represent the sensitivity analysis and value at risk format firms.

TABLE 3

Sample Distribution by Exchange Listing^a

	<u>1997</u>		<u>1998</u>		<u>1999</u>	
	<u>Tab*</u>	<u>SA/VAR**</u>	<u>Tab*</u>	<u>SA/VAR**</u>	<u>Tab*</u>	<u>SA/VAR**</u>
NYSE ^a	12	12	38	35	55	55
NASDAQ ^b	1	1	17	23	16	18
AMEX ^c			6	3	4	2
	----	----	----	----	----	----
Total	13	13	61	61	75	75
	----	----	----	----	----	----

^{a,b,c} Exchange data were retrieved from CRSP database.

* Tabular format firms

** Sensitivity analysis format firms/Value at risk firms

TABLE 4

Descriptive Statistics of Firms' Market Capitalizations^a

Panel A				
	<u>1997 – Tabular (000's)</u>	<u>1997 – SA / VAR (000's)</u>	<u>Z-Stat</u>	<u>p-value</u>
Mean ^b	\$ 10567740	\$ 11546803	-.231	.817
Standard Deviation	14215748	14662173		
Minimum	2516435	2510097		
Maximum	55839982	56624813		
Count	13	13		

Panel B				
	<u>1998 – Tabular (000's)</u>	<u>1998 – SA / VAR (000's)</u>	<u>T-Stat</u>	<u>p-value</u>
Mean ^c	\$ 3776765	\$ 3390136	.165	.869
Standard Deviation	13088504	12760992		
Minimum	7598	7256		
Maximum	97535450	97735838		
Count	61	61		

Panel C				
	<u>1999 – Tabular (000's)</u>	<u>1999 – SA / VAR (000's)</u>	<u>T-Stat</u>	<u>p-value</u>
Mean ^d	\$ 3642779	\$ 3160073	.349	.727
Standard Deviation	8901005	8001104		
Minimum	22767	22614		
Maximum	61146508	62252053		
Count	75	75		

^a Data for market capitalizations were retrieved from the Center for Research in Security Prices (CRSP).

^b The Wilcoxon Rank Sum test results indicate no significant difference between 1997 tabular format and the sensitivity analysis or value at risk format firms: Z statistic = $-.231 > -1.96$ supports the null hypothesis of equal means (p-value = .840).

^c The t-test for the 1998 groups of firms indicate no significant difference: $t = .165$ with p-value = .869.

^d t-test shows no significant difference in means of the two groups of firms: $t = .349$ with p-value = .727.

TABLE 5

Sample Means of Variables^a

Panel A – Four Days Prior to SEC Filing (Pre SEC)^b

			<u>Difference^e</u>	T	<u>p-value</u>	St. Deviation	
	<u>Tabular</u>	<u>SA/VAR</u>		<u>Statistic</u>		<u>Tab</u>	<u>SA/VAR</u>
SPREAD	-2.33367	-2.38371	.05004	.718	.473	1.184	1.219
DEP	3.05904	2.89265	.16639	3.458	.001	1.052	.786
PRICE	2.91712	3.05319	.13607	-2.806	.005	1.057	.796
VAR	-5.30704	-5.34105	.03401	.586	.558	1.185	1.018
TRANS	4.89187	4.89100	.00087	.010	.992	1.730	1.576

Panel B – Day of SEC Filing^c

			<u>Difference^e</u>	T	<u>p-value</u>	St. Deviation	
	<u>Tabular</u>	<u>SA/VAR</u>		<u>Statistic</u>		<u>Tab</u>	<u>SA/VAR</u>
SPREAD	-2.12890	-2.48366	.35476	2.450	.015	1.238	1.253
DEP	3.06581	2.83784	.22797	2.057	.041	1.094	.796
PRICE	2.92579	3.05481	.12839	-1.185	.237	1.052	.801
VAR	-5.31128	-5.22787	.08341	-.666	.506	1.093	1.037
TRANS	4.91141	4.87124	.04017	.205	.838	1.699	1.679

Panel C – Four Days After SEC Filing (Post SEC)^d

			<u>Difference^e</u>	T	<u>p-value</u>	St. Deviation	
	<u>Tabular</u>	<u>SA/VAR</u>		<u>Statistic</u>		<u>Tab</u>	<u>SA/VAR</u>
SPREAD	-2.40231	-2.43353	.03122	.436	.633	1.235	1.226
DEP	2.97564	2.89843	.00866	1.619	.106	1.027	.799
PRICE	2.91867	3.05355	.13488	-2.655	.008	1.066	.887
VAR	-5.11688	-5.19175	.07487	1.086	.277	1.360	1.259
TRANS	4.88619	4.88140	.00479	.054	.957	1.775	1.627

^a Log of sample data for each of the three periods: 4 days prior to SEC filing (Pre-SEC); Day of SEC filing; and 4 days after SEC filing (Post-SEC) with 13 firms, 61 firms, and 75 firms respectively for 1997, 1998, and 1999.

^b 4 Days prior to SEC filing date consists of a total of 596 observations for each group: 1997 (52); 1998 (244); and 1999 (300).

^c Day of SEC filing consists of 149 observations for each group of firms: 1997 (13); 1998 (61); and 1999 (75).

^d 4 Days after SEC filing date consists of 596 observations as Pre-SEC period.

^e Absolute difference in means of variables of the two groups of sample firms.

TABLE 6

Coefficient Estimates of Tabular Format Firms and Matched Sensitivity Analysis and Value at Risk Format Firms ^a

Model: $SPREAD_{i,t} = \beta_0 + \beta_1(DEP_{i,t}) + \beta_2(PRICE_{i,t}) + \beta_3(VAR_{i,t}) + \beta_4(TRANS_{i,t}) + \beta_5FORMAT$

Panel A - Four Days Prior to SEC Filing^b

	β_0	β_1	β_2	β_3	β_4	β_5
Coeff	-.115	.122	-.193	.311	-.07813	.01166
t-stat	-.430	2.416	-3.679	8.365	-2.545	-.169
p-value	.667	.016**	.000****	.000****	.011**	.866
$R^2 = .075$		Adjusted $R^2 = .071$		F = 18.733	Sig. = .000	

Panel B – Day of SEC Filing^c

	β_0	β_1	β_2	β_3	β_4	β_5
Coeff	-.421	.07544	-.360	.316	.09567	.344
t-stat	-.735	.709	-3.181	3.711	1.444	2.375
p-value	.463	.479	.002***	.000****	.150	.018**
$R^2 = .093$		Adjusted $R^2 = .077$		F = 5.784	Sig. = .000	

Panel C – Four Days After SEC Filing^d

	β_0	β_1	β_2	β_3	β_4	β_5
Coeff	-.984	.101	-.242	.153	-.04562	.01116
t-stat	-3.878	2.031	-4.509	4.885	-1.482	.156
p-value	.000****	.042**	.000****	.000****	.139	.876
$R^2 = .052$		Adjusted $R^2 = .048$		F = 12.563	Sig. = .000	

^a This table provides the regression results for differences in bid-ask spreads of tabular format firms and sensitivity analysis and value at risk format firms using the natural logarithm of all variables except *FORMAT*.

SPREAD is the relative bid-ask spread for each day. The relative bid-ask spread for each day of the Pre-SEC period is the difference between the bid-ask spreads of day two and day one divided by the average of the Pre-SEC period bid-ask spreads (day two spread is the difference between day two and day three divided by the average of Pre-SEC days' bid-ask spreads). The Day of SEC period is computed as the difference of day five and day six divided by the bid-ask spread of the day five. The relative bid-ask spread for day six of the Post-SEC period is the difference between day six and seven divided by the average of the bid-ask spreads of the Post-SEC period.

PRICE is the average of all transaction prices during each day

TRANS is the number of transactions per day
VAR is the daily variance of returns

DEP is the average number of shares in all quotes during the day

*, **, *** and ****, Significant at .10, .05, .005 and .001 levels respectively.

The *FORMAT* variable takes the value of one for tabular format firms and 0 otherwise.

^b 4 Days prior to SEC filing date consists of a total of 596 observations for each group: 1997 (52); 1998 (244); and 1999 (300).

^c Day of SEC filing consists of 149 observations for each group of firms: 1997 (13); 1998 (61); and 1999 (75). 1999.

^d 4 Days after SEC filing date consists of 596 observations as Pre-SEC period.

TABLE 7

Correlation Coefficients for Regression Analysis^a

Panel A – Four Days Prior to SEC Filing

	SPREAD	DEP	PRICE	VAR	TRANS	FORMAT
SPREAD	1.0000	-.025 (.195)	-.115 (.000)***	.169 (.000)***	-.116 (.000)***	.023 (.216)
DEP		1.0000	-.312 (.000)***	-.488 (.000)***	.215 (.000)***	.097 (.000)***
PRICE			1.000	.402 (.000)***	.549 (.000)***	-.080 (.003)**
VAR				1.000	.160 (.000)***	.023 (.221)
TRANS					1.000	-.006 (.424)
FORMAT						1.000

Panel B – Day of SEC Filing

	SPREAD	DEP	PRICE	VAR	TRANS	FORMAT
SPREAD	1.000	.039 (.252)	-.118 (.023)**	.138 (.010)**	.023 (.351)	.157 (.004)**
DEP		1.000	-.310 (.000)***	-.537 (.000)***	.247 (.000)***	.125 (.017)*
PRICE			1.000	.409 (.000)***	.538 (.000)***	-.093 (.059)*
VAR				1.000	.121 (.020)**	-.039 (.253)
TRANS					1.000	.002 (.488)
FORMAT						1.000

TABLE 7 (continued)

Panel C – Four Days After SEC Filing

	SPREAD	DEP	PRICE	VAR	TRANS	FORMAT
SPREAD	1.000	.050 (.045)**	-.177 (.000)***	.052 (.038)**	-.119 (.000)***	.023 (.223)
DEP		1.000	-.317 (.000)***	-.436 (.000)***	.219 (.000)***	.035 (.117)
PRICE			1.000	.385 (.000)***	.537 (.000)***	-.075 (.005)*
VAR				1.000	.137 (.000)***	.015 (.303)
TRANS					1.000	.019 (.257)
FORMAT						1.000

This table is the correlation matrices for regression coefficients of the tabular format firms and the sensitivity analysis and value at risk format firms, using the natural logarithm of variables except *FORMAT*. *SPREAD* is the average of all bid-ask spreads quoted during each day. *PRICE* is the average of all transaction prices during each day. *TRANS* is the number of transactions per day. *VAR* is the daily variance of returns. *DEP* is the average number of shares in all quotes during the day. *, **, ***, Significant at .05, .005 and .001 levels respectively. *FORMAT*, the indicator variable, takes the value of one for tabular format firms and 0 otherwise.

#2

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