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Evaluating earnings management with derivatives and the use of accounting accruals: A quasi experimental approach

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ABSTRACT

Evaluating Earnings Management with Derivatives and the use of Accounting Accruals: A Quasi Experimental Approach

by

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M.B.A., Marylhurst University, 2003
M.P.A., Portland State University, 2002
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Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree of
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ABSTRACT

Most companies listed on the S&P 500 index have reported smoothed earnings since the 1990s inspiring questions from regulators about the accuracy of financial statements. In 1998, the Financial Accounting Standards Board issued SFAS No. 133 (Accounting for Derivative Instruments and Hedging Activities) to establish accounting and reporting standards for derivative instruments. In 2002, the Sarbanes-Oxley Act (SOX) was issued to eradicate earnings management activities and improve transparency in financial reporting. Although many studies have been conducted to evaluate changes in reporting requirements, much less is known about the effectiveness of these regulations on earning smoothing with discretionary accruals (DA) and derivative hedge reporting (DHR). Accordingly, this study was an investigation of the effectiveness of SOX and SFAS No. 133 on DA, and DHR. The research questions were used to examine DA, and to evaluate the transparency of DHR for the years 1997 through 2007. This study is a quasi-experimental research design where 30 companies from the high technology industry segment were randomly drawn to form 330 observations. The modified Jones model was used to separate DA and repeated measures analyses of variance were used to assess differences in levels before and after the issuance of SOX. A Quality Disclosure Index (QDI) was used to assess the transparency of DHR and repeated measures of variance were used to evaluate the QDI scores before and after the issuance of SFAS No. 133. The findings suggest DA activities are decreasing but represent over 50% of total net accruals for all years and the QDI for DHR is decreasing. Improved financial regulation is needed. The study contributes to positive social change by providing regulators and investors with new information about accruals for income conservative firms by segmenting DA and investigating the level of transparency in DHR that could be used to formulate appropriate financial regulation and improve the quality of our financial reporting system.

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DEDICATION

This dissertation is lovingly dedicated to my husband, Patrick. You are my soul mate and have always stood by me with love, support, and understanding. Your encouragement and guidance has helped me complete this enriching and wonderful scholastic journey.

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INTRODUCTION TO THE STUDY

Within the finance discipline, the analysis of earnings management through the use of discretionary accruals is in the early stages of development. Axioms and standards for a model to evaluate the degree of discretionary activities have not yet been established. Several divergent attempts have been made to explore management choices through the use of accounting accruals and the results of these peer-reviewed studies have been mixed. To date, the high technology industry segment within the U.S. has not been isolated from other industry sectors in the evaluation of discretionary accruals. Firms in the technology industry segment differ from other industry segments in that they engage in income conservative practices more frequently and are exposed to higher levels of risk to shareholder litigation (Lobo, Zhou, 2006). In addition, high tech industry companies are also affected to a greater degree by conservative accounting standards on research and development costs (Uday, Wasley, & Waymire, 2004). This study fills the knowledge gap of earnings management evaluation through the use of discretionary accruals within the income conservative high technology industry segment.

Watts (2003) defined income conservatism as a higher verification standard applied to favorable information resulting in lower cumulative earnings and net asset. The presence of income conservatism is illustrated in significantly higher proportions of losses and lower average profitability levels for technology firms relative to non-technology firms (Kwon, Yin, & Han, 2006). These differences mainly surface from differences in operating cash flow levels attributable to research and development (R&D) expenses. The financial reporting of technology firms also confirms the evidence of an increase in negative non-operating accruals (Uday, et. al., 2004).

Earnings smoothing as defined by the act of minimizing earnings volatility is achieved through the accounting treatment of transactions and or through the use of derivative contracts forged to create a hedged financial position in situations where a significant amount of risk exists (Bartov, Givoly, & Hayn, 2002). Managers utilize derivatives and accounting accruals to minimize cash flow volatility, often referred to as earnings smoothing. In 1998, the Financial Accounting Standards Board (FASB) issued a mandate (SFAS No. 133 Accounting for Derivative Instruments and Hedging Activities), restricting firms from simultaneously recording all offsetting gains and losses on items being hedged. Many critics (e.g., Bowen, Rajopal, & Venkatchalam, 2004; Carter, Lynch, & Zechman, 2006; Cohen, Dev, & Lys, 2004; Liu, 2004) assert SFAS No. 133 stimulates earnings volatility. However, in 2004 Stammerjohan conducted a study of Fortune 500 firms to determine if derivative use either minimized in the face of the new FASB mandate or whether cash flow volatility increased after of this new regulation. From his study results, Stammerjohan (2004) concluded that although earnings volatility did increase shortly after the release of the SFAS No. 133, this increase may be systemic of other factors outside of the scope of the issuance of SFAS No. 133.

Earnings smoothing is a strategy used to deliberately manipulate the company's earnings so that the figures match pre-determined targets (Glaum, Lichtblau, & Lindemann, 2004). This practice is carried out for income smoothing; thus, rather than having years of exceptionally good or bad earnings, companies will attempt to keep the figures relatively stable by adding and removing cash from reserve accounts (Beattie, Brown, Manson, 1994). Although managers use divergent methods to smooth earnings and these models can be complex, in-depth and convoluted, the fundamental objective of these strategies is to meet pre-specified targets (Tucker, & Zarowin, 2006).

Generally Accepted Accounting Principles (GAAP) are a set of widely accepted rules, standards, and procedures for reporting financial information as established by the Financial Accounting Standards Board. Under GAAP, firms are authorized to exercise discretion in financial reporting in order to communicate managers' information about performance (Zeff, 2005). This implies that managers can choose whether and how they will disclose information in their financial reports.

A major concern of regulators and investors is that the accounting standards for financial derivatives are still in the early stage, which cannot address all aspects of the multifaceted financial derivatives market (International Monetary Fund Country report No 05/216). SFAS No. 133 (Accounting for Financial Derivatives and Hedging Activities) requires all financial derivatives be reported at their fair value. The changes in fair value are either recognized as earnings or deferred to future periods to offset the changes in the value of items being hedged. The SFAS No. 133 standards provide discretions for earnings management (Singh, 2004). The determination of the fair value of most derivative instruments are subject to many assumptions such as those related to credit and liquidity risk resulting from the exclusion of derivative trading from the trading market (Kawaller, 2004). Most derivative instruments are simply contracts between a derivative dealer and the user firm, such as interest rate swaps (Leander, 1997).

Because derivative contracts are not actively traded in the market,their value has no market reference (Dubofsky, & Miller, 2003). With no market reference, the value of the derivative becomes variable and is largely based on the assumptions used in the analysis of the fair market value (Naor, 2006) such as assumptions in the determination of the fair value of derivatives and credit risk. The deferred derivative gains or losses to be reclassified into current earnings are also subject to firms' discretion, because the gains or losses of the items hedged do not need to be reported separately under SFAS No. 133 (Kawaller, 2004).

Empirical research on earnings management and the valuation of earnings is heavily researched in accounting journals; however, the approach to evaluate earnings management through the use of discretionary accruals is still in the development phase. In 1996 (and revised in 1998), Dechow, Jowell Sabino, and Richard Sloan developed a model of non-discretionary accruals that builds on related models in Jones (1991), Dechow (1994) and Dechow, Kothari and Watts (1996). In 2003, Da Silva Rosa, Sheung, and Walter conducted a study to evaluate whether bidding firms that offer shares as consideration engage in earnings management prior to takeover announcements (Da Silva Rosa, Sheung, & Walter, 2000). The findings of their study show no evidence of managing earnings upward.

Accruals are defined as the difference between cash flow from operations and net income (Anderson, Caldwell, & Needles, 1994). A fundamental property of accruals is that they reverse over time. The self-reversing property of accruals reduces the effecctiveness of any planned or unplanned earnings management strategies when viewed in the aggregate over a long period of time (Anderson, et.al., 1994). The characteristics of the reversing properties of accounting accruals suggests that managers who utilize accruals through manipulation cannot rely on accruals alone to report strong earnings and when the build-up accrual items invariably start to unwind over time, they suppress future earnings and stock prices (Skinner, & Sloan, 2002).

Manipulation of accruals comes in many forms, from estimating earnings based on a rolling average of a previous period such as a quarter to booking several prior months of accruals in one period to reflect the number of months outstanding (Collins, & Hribar, 2000). Either approach introduces uncertainty and skews the financial history of earnings for a firm, even if reversals of these entries follow (Das, & Shroff, 2002). As a result, over time, managers may be forced to make up earnings shortfalls with real cash earnings (Beattie, et al., 1994). Much of the research focused on earnings management has investigated earnings management decisions

during particular events such takeover announcements (Da Silva Rosa, et.al., 2000), a shift in tax laws (Mills and Newberry, 2001), or debt covenants (Dechow, 1996). Some managers may use these extraneous occurances as justification for an increase in accruals (Mills et. al., 2001). Accruals are used daily and are part of the operational expense structures of any firm that utilizes accrual based accounting (Anderson, et.al., 1994); due to the use of accounting accruals in firms who do now function under a cash basis, it is imperative that the use of accruals during standard or regular periods of operation is investigated.

Previous literature based on eanrings management is based on the assumption that accounting accruals and derivatives are used as tools in financial smoothing and earnings management (Barton, 2001; Barton, & Simko, 2002; Bruns, & Merchant, 1990; Carter, Lynch, & Zechman, 2006). However, Nissim and Penman (2003) claim that after the issuance of the Sarbanes-Oxley Act (SOX) in 2002 by the Financial and Accounting Standards Board (FASB), accrual models are ineffective in detecting earnings management and Cohen, Dey, and Lys (2005) asserted firms tend to refer to actual transactions rather than accruals in earnings smoothing. These arguments introduce questions about the accounting treatment of operational activities. These assertations stimulate questions about the impact of the accounting methodology on earnings management strategies. In addition, the assumptions in much of the research surrounding earnings smoothing is grounded on the notion that derivatives are used to hedge risk and are always present in earnings smoothing strategies (Guay, & Kothari, 2003; Hentschel, & Kothari, 1999; Kawaller, 2004). However, it is uncertain that derivates are part of all earnings management strategies. Although derivatives have demonstrated hedging capabilities, understanding and managing the risks of exotic options, complex swaps, warrants, and other synthetic derivative contracts can be difficult and novice financial planners may forego risk hedging with insturments they do not understand (Hentschel, & Kothari, 1999).

Problem Statement

Most firms in the S&P 500 index have been reporting smoothed earnings since the late 1990s (Henock Louis, Huddart Steven J., 2008), inspiring questions from regulators, investors, and stakeholders about the accuracy of real economic earnings. The use of earning smoothing practicies is a problem because these activities introduce uncertainty in the accuracy and validity of the financial statements of publically traded firms (Epps, & Guthrie, 2007). The lack of clarity in financial reporting skews tax requirements of firms and reduces government tax liabilities, which results in a government subsidy that impacts all tax paying U.S. citizens (Boynton, Charles, E., Paul S. Dobbins, Paul, S., & Plesko, George, A. , 1992). Reporting smoothed earnings also distorts the financial position of companies traded on financial markets and impacts investors and employees who are invested in these companies and are reliant on the financial solvency of these companies (Aono, J.Y., & Guan, L., 2007). Earnings smoothing is a widely used tool that most firms use to minimize earnings volatility and it is possible for two fundamental reasons (Barton, J., 2001). GAAP standards do not address all possible situations, and other times, financial managers are faced conflicting standards. These facts make it difficult to determine which standard to follow. (Ball, & Brown, 1968). Regulation and mandates must be general enough to address all possible situations and therefore the accounting standards must have some flexibility to allow the standards to keep up with changes in business practices (Wallison, & Hassett, 2004). The another weakness in GAAP is that, under conditions where GAAP does provide a framework of accounting standards, managers still have some degree of discretion over how the rules are applied. For example, when reporting financials and compliant with GAAP, managers may select the type of financial model they wish to implement for the measurement of the fair value of financial derivatives, or they may exercise discretion in the designation of a derivative hedge (Wallison & Hassett, 2004).

Pubilc firms are primary users of financial derivatives because derivatives can be used to hedge risks, reduce expenses, and improve earnings (GAO Report, 1996). The problem with the existing regulation is the provision for the exercise of subjective descretion in the utilization of fair value models. The existance of this provision stimulates the issue of divergent models across firms and leads to the abuse of derivative instruments (Financial Economists Roundtable, 1994).

A survey conducted by the National Investor Relations Institute (2006), reported that since 2005, there has been an increase in publications on the lack of earnings guidance (Hagart, & Knoepfelon, 2006). Prior research (Jones, 1991; DeGeorge, 1999; & Barton, 2001) refers to accounting accruals in the detection of earnings management. However, after the issuance of the Sarbanes-Oxley Act (SOX) in 2002, a study conducted by Nissim and Penman (2003) revealed findings that did not support the existence of accrual modeling for earnings management.

From an earnings management perspective, this study differs from prior research in two ways. First this study's reference to earnings management reflects a firm's ongoing operating activities, whereas prior studies' references to earnings management reflected debt covenant violations (Dechow, 1996), management bonus incentives (Gaver, Austin, & Gaver, 1995), and changes in tax laws (Newberry, 2001). In addition, this investigation of earnings management activities includes an examination of earnings smoothing through the use of accounting accruals then compares these results to real cash earnings whereas prior studies focus on accounting accruals exclusively (Bartov, & Gul, 2001; Collins, & Hribar, 2000; Hribar, & Collins, 2002; & Subramanyam, 1996).

The examination of total cash earnings contrasted with total net accruals is conducted for two reasons. According to Nissim and Penman (2003), after SOX implementation, accrual models are ineffective in the detection of earnings management activities and according to Cohen, firms tend to use real financial transactions instead of accounting accruals in smoothing earnings.

(Cohen et al., 2004). The focus of this study is on the high technology industry segment exclusively due to the income conservative practices of the firms in this industry segment (Uday, Wasley , & Waymire, 2004). Conservatism is defined as the higher verification standard applied to favorable information that results in lower cumulative earnings and net assets (Watts, 2003). The presence of income conservatism is realized in significantly higher proportions of losses and lower average profitability levels for technology firms relative to non-technology firms (Kwon, Yin, & Han, 2006). High technology firms confront higher degrees of risks in shareholder litigation than firms in other industries (Lobo, & Zhou, 2006) and are also affected to a greater degree by conservative accounting standards on research and development costs (Uday, Wasley, & Waymire, 2004).

Nature of the Study

This is a descriptive, comparative, and correlational research study that uses quantitative methods to describe phenomena, as they exist. The data used in this analysis is not manipulated or controlled. The nature of this study is to investigate earnings management (earnings smoothing) and transparency in financial reporting. Earnings smoothing is achieved through the use of accounting accruals and derivative hedging. The focus of this evaluation begins with a comparative evaluation of the aggregate differences in means of total cash earnings and total accounting accruals for the periods 1997 through 2007. The intent is to determine if a statistically significant difference exists between total cash earnings and total net accruals. The degree of earnings management through the use of discretionary accruals is conducted with a correlational evaluation of the average total assets, sales, accounts receivable, plant property and equipment, and total net accruals. The correlational examination used in this study follows a modified Jones model and takes the form of multiple regression evaluation. The correlational relationships

between the independent variables (a) average total assets, (b) sales, (c) accounts receivable, (d) plant, property, and equipment, (e) and total net accruals are analyzed. The evaluation includes an examination of the explanatory power of the regression model. Estimated regression equations are developed to model non-discretionary accruals and discretionary accruals are determined for all firms for the period 1997 through 2007.

Once the aggregate discretionary components of total net accruals have been determined for all firms in periods 1997 through 2007, the proportion of the use of discretionary accruals is evaluated by comparing population proportions of discretionary accrual levels in 2000 with those of 2005. This discretionary accrual comparison illustrates the levels of earnings management activities defined by the use of discretionary accruals before and after the issuance of SOX in 2002.

The impact of derivative hedging is investigated by comparing the variance in the rate of change in total cash earnings with the variance of the rate of change in total cash earnings without derivative hedging. The level of transparency in financial reporting is investigated by the development of an un-weighted index measure that is used to evaluate the disclosure quality of published financial statements and annual reports. Firms who reported the use of derivative hedging in their financial statements and annual reports are evaluated with the use of a quality disclosure index score (QDI). A population proportion test is used to investigate the proportional differences in QDI scores of firms who reported the use of derivative hedging in 1998 and 2002. The objective of this evaluation is to analyze the proportional differences of derivative reporting before and after FASB issued SFAS No. 133.

This study is an empirical study with a quantitative methodology. From a branch in philosophy, epistemology is used to investigate the basic nature of knowledge, including its sources and validation (AERA, 2006). The focus of this study is on the nature of concepts and the

relation between abstractions and concrete particulars in earnings management and financial reporting. A traditional ex post facto research approach (Heiman, 1995) is used in this analysis due to reference to published financial statements and annual reports.

Simple random assignment of participants is used to maximize study controls. This evaluation takes the form of a quasi experimental design because, although random assignment is used to obtain the data, the order control of the levels of the independent variable in a random design cannot be satisfied (AERA, 2006). A posttest-only design with two or more treatment levels is used. In this case, as the intervention have two or more levels; one group for each condition is used as:

1. Total cash earnings for the years 1997 - 2007
2. Total net accruals for the years 1997 - 2007
3. Discretionary accruals for year 2000
4. Discretionary accruals for year 2005
5. Total cash earnings with derivative hedging for years 1997 – 2007
6. Total cash earnings without derivative hedging for years 1997 – 2007
7. Quality of derivative hedge reporting score for year 1998
8. Quality of derivative hedge reporting score for year 2002

There is similarity of the groups in financial reporting requirements and SIC code definitions. This similarity is instrumental for making valid conclusions (Seaver, 1973). This study requires the registration of the values of an independent variable and afterwards, measuring the dependent variable and therefore the methodology follows a prospective design (Dunham, 1988). More than one independent variable is referenced for evaluation and therefore this

prospective design is factorial in nature. To satisfy this requirement, participants are selected because of a particular combination of characteristics (Dunham, 1988). In this case, all firms randomly selected for the sample must have complete data for the entire period 1997 – 2007. Once independent variables are identified (for the modified Jones model regressions), their effect (the dependent variable, i.e., discretionary accruals) is measured.

This is a single-subject experiment because in this analysis, only one subject is an experimental object (firms classified by SIC code as high technology firms with financial data for the entire period 1997 - 2007) and I as the researcher, serves as the control. This investigation can also be defined as a no-reversal design (AB). In a no-reversal design, it is impossible to stop treatment (Dunham, 1988). In this evaluation, it is impossible to stop treatment because, although the modified Jones model is used for analysis and allows the breakout discretionary accruals from non-discretionary accruals, the original values reported in financial statements remain intact and unchanged. The modified Jones model simply draws out hidden values imbedded in reported values.

Research Questions

There are five research questions in this study. The research questions addressed in this evaluation are:

1. What is the difference, if any, in the average earnings between total net accruals and total cash earnings?

The structure of research question 1 is:

Table 1 Research Question 1: Research Approach

	Null Hypothesis	Alternative Hypothesis	Objective	Analysis
Descriptive, comparative	There is a difference in earnings stability between total cash earnings and total net accruals	There is a no difference between average total cash earnings and average total net accruals.	The objective is to determine if a statistical significant difference exists between the aggregate total cash earnings and total net accruals for periods 1997 through 2007. A t test is conducted to investigate the difference in means of total cash earnings and total net accruals.	T test
	H_1: $\mu_1 \neq \mu_2$ Where:	H_0: $\mu_1 = \mu_2$		
	μ_1 = total cash earnings	Where:		
	μ_2 = total net accruals	μ_1 = total cash earnings		
		μ_2 = total net accruals		

Research question 2 is:

2. What is the relationship among the average total assets, the change in sales, the change in accounts receivable, gross property plant, and equipment and total net accruals among high tech industry firms?

The structure of research question 2 is:

Table 2 Research Question 2: Research Approach

Research Type	Null Hypothesis	Alternative Hypothesis	Objective	Analysis
correlational	There is a relationship among average total assets, sales, accounts receivable, plant property and equipment, and total net accruals.	There is a no relationship between average total assets, sales, accounts receivable, plant property and equipment, and total net accruals.	The objective is to determine if a statistically significant correlation exists among average total assets, sales, accounts receivable, plant property and equipment, and total net accruals. The intent is to estimate aggregate regression equations for non-discretionary accruals for the periods 1997 through 2007 using the modified Jones model.	Multiple Regression

Research question 3 is:

3. What is the difference, if any, between the proportion of discretionary accruals used in 2000 and the proportion of discretionary accruals used in 2005 (before and after SOX implementation)?

The structure of research question 3 is:

Table 3 Research Question 3: Research Approach

Research Type	Null Hypothesis	Alternative Hypothesis	Objective	Analysis
descriptive, comparative	The proportion of firms with more than 50% of discretionary accruals embedded in total net accruals in year 2000 is not equal to the proportion of firms with more than 50% of discretionary accruals embedded in total net accruals in year 2005 H_1: $p_1 \neq p_2$ Where: p_1= number of firms who reported more than 50% of discretionary accruals in year 2000 p_2 = number of firms who reported more than 50% of discretionary accruals in year 2005	The proportion of firms with more than 50% of discretionary accruals embedded in total net accruals in year 2000 is equal to the proportion of firms with more than 50% of discretionary accruals embedded in total net accruals in year 2005. H_0: p1 = p2 Where: p_1= number of firms who reported more than 50% of discretionary accruals in year 2000 p_2 = number of firms who reported more than 50% of discretionary accruals in year 2005	The objective is to determine if the proportional differences in discretionary accruals exist and are statistically significant for years 2000 and 2005.	T test

Research question 4 is:

4. What is the difference, if any, in the rate of change in total cash earnings with derivative hedging and the rate of change in total cash earnings without derivative hedging?

The structure of research question 4 is:

Table 4 Research Question 4: Research Approach

Research Type	Null Hypothesis	Alternative Hypothesis	Objective	Analysis
descriptive, comparative	The variance of the rate of change in total cash earnings of firms without derivative hedging is equal to or greater than the variance of the rate of change in total cash earnings of firms with derivative hedging. The equal condition is accounted for by measuring the standard deviation of the rate of change in total cash earnings with and without derivative hedging. $H_0 : \sigma^2/_1 \geq \sigma^2/_2$ Where: $\sigma^2/_1$ = rate of change in TCE without derivative hedging $\sigma^2/_2$ = rate of change in TCE with derivative hedging	The variance of the rate of change in total cash earnings of firms without derivative hedging is less than the variance of the rate of change in total cash earnings of firms with derivative hedging. The equal condition is accounted for by measuring the standard deviation of the rate of change in total cash earnings with and without derivative hedging. $H_1 : \sigma^2/_1 < \sigma^2/_2$ Where: $\sigma^2/_1$ = rate of change in TCE without derivative hedging $\sigma^2/_2$ = rate of change in TCE with derivative hedging	The objective is to determine if the rate of change in total cash earnings of firms without derivative hedging is greater than the rate of change in total cash earnings of firms who do use derivative hedging.	F- test

Research question 5 is:

5. What is the proportional difference, if any, in the transparency of derivative reporting between firms who used derivative hedging in 1998 and those who used derivative hedges in 2002?

The structure of research question 5 is:

Table 5 Research Question 5: Research Approach

Research Type	Null Hypothesis	Alternative Hypothesis	Objective	Analysis
descriptive, comparative	The proportion of firms in 1998 with quality disclosure index scores above 80% is greater than or equal to the proportion of firms in 2002 with quality disclosure index scores above 80%.	The proportion of firms in 1998 with quality disclosure index scores above 80% is less than the proportion of firms in 2002 with quality disclosure index scores above 80%.	The objective is to determine if the proportion of quality disclosure index scores (QDI) of firms in 1998 is greater than the proportion of quality QDI scores in 2002 (before and after SFAS No. 133).	T test
	H_0: $p_1 \geq p_2$	H_1: $p_1 < p_2$	The QDI is a measure of the quality of reporting transparency.	
	Where:	Where:		
	p_1= number of firms with QDI scores above 80% in 1998 p_2 = number of firms with QDI scores above 80% in 2002	p_1= number of firms with QDI scores above 80% in 1998 p_2 = number of firms with QDI scores above 80% in 2002		

A more detailed discussion of the application of this framework is provided in chapter 3.

Purpose of Study

The purpose of this quantitative study is to determine if earnings smoothing is increasing in the high technology industry segment and to determine if public firms in the high technology industry segment have shifted away from accounting accruals and towards real earnings management activities in the post-SOX period (following highly publicized accounting scandals). SFAS No. 133 establishes accounting and reporting standards for derivative instruments, including certain derivative instruments embedded in other contracts and for hedging activities

(Guay, & Kothari, 2003). Released in June 1998, SFAS No.133 represents the culmination of the US Financial Accounting Standards Board's effort to develop a comprehensive framework for derivatives and hedge accounting (Hentschel, & Kothari, 1999). The Financial Accounting Standards Board establishes generally accepted accounting principles for most companies operating in the United States or requiring financial statements meeting GAAP requirements. The intent of this regulation is to provide transparency, consistency, and stability to financial reporting for derivative hedges. The SFAS No. 133 is myriad of layers of amended accounting regulation and standards (Huang, Ryan, & Wiggins, 2007). The language of SFAS No. 133 allows flexibility in fair value accounting and some of the regulation dates back to SFAS 52. In this evaluation, an analysis of derivative hedging activities includes an investigation of transparency in derivative hedge reporting before and after SFAS No. 133.

Theoretical Framework

The Jones model was created in 1991 by Dechow, Sloan, and Sweeney and modified by adding the change in receivables in 1995. The modified Jones model is an evaluation methodology used to segment discretionary accruals from non-discretionary accruals. The model uses a multiple regression to estimate the non-discretionary accrual proxy and provides a more robust framework of analysis for measuring accounting accruals. The regression used in the Jones model references independent variables that have some relationship to non-discretionary accruals. Normal accruals are driven by sales, PP&E, expected sales growth and current operating performance, and are used for the independent variables of the Jones model. The model proposes normal accrual components can be used to predict the non-discretionary component of total accruals. The difference between total accruals and non-discretionary accruals yields the discretionary accruals. The intent is to determine how to what degree specific factors in normal

accruals influence the level of non-discretionary accruals. The modified Jones model is used in this evaluation to segment non-discretionary accruals from discretionary accruals for the sample firms in periods 1997 through 2007.This model has been used by many researchers (Bartov, et.al., 2001) in the area of earnings management. In 1992, Boynton, Dobbins and Plesko utilized the modified Jones model and incorporated working capital accruals (Boynton, Dobbins, & Plesko, 1992). In 1999, Navissi used the modified Jones model to evaluate accruals but used a time series rather than a cross-sectional framework of analysis (Bowman, Navissi, & Burgess, 1991). Many researchers have referenced the modified Jones model (Subramanyam, 1996; Guay, Kothari, & Watts, 1996; Collins, & Hribar, 1999; Peasnell, & Pope, 2000; & Gaver, Austin, & Gaver, 1995). but have altered the independent variables by incorporating factors that reflect cash flow accruals and working capital such as sales and accounts receivable. In 1994, Hiemstra and Jones used the modified Jones model to determine if the incremental information content in discretionary accruals reflects management decisions to smooth earnings.

Earnings management activities during initial public offerings have also been conducted with the use of a modified Jones model (Roosenboom, Goot, & Mertens, 2003); Shen and Chih (2005) based the Burgstahler and Dichev (1997), Degeorge, Patel and Zeckhauser (1999) and Leuz, Nanda and Wysocki (2003) approaches to their studies about the banking sector in 48 countries. In their study, Shen and Chih (2005) calculated the discretionary accruals with three models. Their first model included 42 countries, the second model included 47 countries and the last model included 48 countries, all of which revealed discretionary accruals possessed an average different than zero.

In recent years, accrual models have been used to investigate earnings management activities in a particular area such as sales and book value of assets (Xie, Davidson, & DaDalt, 2003). Similarly, Myers, Meyers and Omer explored the term of the *auditor-client relationship*

defined by the length of time the auditor spends with the client and used earnings quality in the dispersion and sign of both the absolute Jones model abnormal accruals and absolute current accruals as proxies for earnings quality (Myers, Myers, & Omer, 2003). In 2004, Louis and Park investigated the relationship between earnings management and market performance with the sales and receivable items, while Shin researched the effect of the board of director's composition on the earnings management in Canada by using the sales and leverage rate in 2004 (Henock, 2004). Coppens and Peek (2005) researched the earnings management activities by incorporating variables such as working capital, depreciation, and receivables.

The quality of reporting in financial statements is a major concern for investors, regulators, and stakeholders. A number of previous studies have investigated the quality of corporate disclosure as measured by information disclosed in the annual reports and other media (Imhoff, 1992; Sengupta, 1998; Riahi-Belkaouhi, 2001; Heflin, Shaw & Wild, 2001; & Shaw, 2002). This study also measures transparency and overall quality of reporting by developing an un-weighted reporting index. All firms who reported the use of derivative hedging are investigated with an un-weighted scoring index. The results of the scoring are then tested with a population proportion test to investigate the proportional differences the quality disclosure reporting of firms in 1998 and 2002 (before and after SFAS No. 133).

Discretionary Accrual Modeling

Although there are many different approaches to estimate this non-discretionary accrual proxy, estimating the non-discretionary component of accruals typically involves a linear regression model (Dechow, Sloan & Sweeney, 1995). The first step is to identify the dependent variable and the independent variables and to determine whether to use a cross-sectional model or

a time-series model for the data analysis. For a more detailed explanation of the proposed research approach, refer to chapter 3.

Definition of Terms

A complete list of definitions and references provided in this section will explain the meaning of these references. Other references clearly defined in the text are not duplicated in this section.

Accounting Accrual: the difference between operating earnings and operating cash flow, which represents the element of earnings subject to management discretion under the generally accounting *principles (GAAP).* (Anderson, Caldwell, & Needles, 1994, p.565).

Accounting Actual: the actual value of items sold or purchased by a firm. (Anderson, Caldwell, & Needles, 1994).

Derivative: a financial contract whose value is derived from the price of another asset (the underlying asset) (Barton, 2001).

Earnings: the reported earnings before extraordinary items, which represents the earnings of a firm after all expenses, income taxes, and minority interest, but before preferred dividends, extraordinary items and discontinued operations (Philbrick & Ricks, 1991).

Earnings Management: an effort "to satisfy consensus earnings estimates and project a smooth earnings path" (Levitt, 1998). Earnings management is defined in the accounting literature as "distorting the application of generally accepted accounting principles." (Dechow et al., 2003).

Earnings Smoothing: a unique case of earnings management, it tries to make earnings appear less volatile over time (Dechow et al., 2003). This is consistent with SEC's definition of earnings management.

Hedging: taking a derivative position that results in a gain (loss) in the contract and a loss (gain) in the asset or liability. (Barton, 2001).

Operating Cash Flow: the cash generated by the operation of business. (Anderson, Caldwell, & Needles, 1994).

*Operating Earnings***:** the earnings from continuing operation of the business. (Anderson, Caldwell, & Needles, 1994,).

Limitations and Delimitations

The high technology industry segment is selected for this study where income conservatism has been the rule of practice (Kwon, Yin, & Han, 2006). A limitation of this study is that the inferences and generalizations only apply to the high technology industry segment. In addition, by restricting the sample to include only U.S. companies, the study inferences and generalizations are limited to publically traded U.S. companies. Non-profit and government organizations are outside the scope of this analysis.

Significance of the Study

This research fills the gap in the earnings management literature including the transparency of financial reporting. This study provides evidence to managers, investors, and legislators that earning smoothing activities are increasing. The accounting treatment of operational activities and their impact on the stability of reported earnings in the high technology industry segment are addressed. Regulations specifically passed by Congress to address transparency in financial reporting (SOX) and to address derivative hedging (SFAS No. 133) are investigated. A literature review of research conducted in the area of earnings management is provided in chapter 2. This research improves upon previous research by studying earnings

management without preference to use of accruals or actual transactions. Few studies on earnings smoothing have focused on actual financial transactions and others on accrual transactions (Brown, & Caylor, 2005; & Coppens & Peek, 2005); however none have attempted to compare the two approaches. In addition, the transparency in financial reporting of firms who use derivative hedging is explored and augments existing literature in the area of earnings management. The research approach is explained in chapter 3, with the findings in chapter 4, and the inferences and conclusions in chapter 5.

CHAPTER 2:

LITERATURE REVIEW

Research on earnings management through the use of discretionary accruals and derivative hedging is the focus of this literature review. In this section, a review of related research is provided, including an evaluation of existing regulation formulated by FASB. The strategy used for searching the literature is grounded on the existence of financial regulation under the Sarbanes-Oxley Act (SOX) and Generally Accepted Accounting Principals (GAAP), which were created to minimize earnings management activities and to enhance the transparency in financial reporting. An extensive exploration of discretionary accruals is conducted and includes an evaluation of peer reviewed research studies that focused on alternative approaches to earnings management detection and evaluation. The first section of this chapter addresses the structure of existing financial directives and investigates the financial implications of areas not addressed with existing regulation. The calculations of accruals are explained and the estimation of abnormal accruals is evaluated. Derivative hedging and systematic risk is explored and incentives to hedging against risk are presented. The chapter ends with an evaluation of derivative hedging under SFAS No. 133 for accounting discretion and the implications to the transparency in financial reporting for derivative hedging.

The practice of earnings manipulation in financial reporting has existed as long as financial documents have been used as a tool for evaluation. Earnings management is defined by the practice of manipulating reported earnings so that the financial peaks and troughs are smoothed out. In essence, earnings "…do not accurately represent economic earnings at every point in time" (McKee, 2005, p. 112). Jin (2005) asserted earnings management practices have always existed.

Earnings management is extensively documented in financial literature (Bannister & Newman, 1996; Beidlerman, 1973; Subramanyam, 1996; Moses, 1987). Collingwood (2001) examined the intricacies of the earnings smoothing and explored the reasons companies employ this type of financial manipulation. In this study, Collingwood asserted changes in executive practices is needed to improve the accuracy of financial reporting.

Review of Related Research

When investors, regulators, and other stakeholders reference financial information of publically traded firms, they are generally confident that those reported numbers are reliable (Burgstahler & Dichev, 1997). The reliability of the reported numbers are exposed to a degree of risk as a result of the discretion allowed in performance modeling and reporting under GAAP (Gerry, 2003). Burgstahler and Dichev demonstrate the implications of risk exposure in their 1997 study that revealed some managers manage earnings to avoid reporting a loss and to meet analysts' expectations. Chaney et al., also illustrates this notion in a study conducted of accruals and income smoothing published in 1996. As Chaney stated, managers seeking to lower the perceived risk of the financial stability do so by reducing the variation of inter-period earnings (earnings smoothing) which in turn reduces the cost of capital for the firm (Chaney, Jeter, & Lewis, 1998). These practices create artificially inflated stock prices and reduce the number of price decreases, which signifies financial stability and allows the firm to sell stock at a higher price. This simulated financial position provides managers justification to collect bonuses and exercise options (Healy, 1985). Earnings smoothing strategies are also used to stabilize financial reporting required for government funding and project subsidies (Jones, 1991).

In this section, earnings smoothing through the utilization of discretionary accruals and derivative hedging is explored. The discretionary accrual section of the literature review includes

an examination of the implications of SOX on earnings smoothing and financial reporting. The accounting treatment of operational activities is also examined by evaluating earning volatility and stability in financial reporting. The derivative hedging section includes an examination of hedging practices and implications. This section also includes an examination of the research on the quality of derivative reporting and the transparency of financial statements.

Discretionary Accruals Activity under SOX

Epps and Guthrie (2007) investigated the material weakness of the Sarbanes-Oxley Section 404 [SOX 404] that allows managers of firms to manipulate earnings to a greater extent using discretionary accruals than managers of firms with no SOX 404 material weaknesses. The Epps and Guthrie study focused on companies that disclosed at least one material weakness in internal controls within their 2004 SEC filings. In this investigation, the discretionary accruals of companies with material weaknesses were paired with companies with no reported material weaknesses during the same period. The focus of the study examined the relationship of reported SOX 404 weaknesses with the behavior of discretionary accruals for the companies and for discretionary accruals partitioned by the greatest magnitudes (both positive and negative). The accruals were then categorized by degree of discretionary accrual performance. The findings suggested the presence of SOX 404 material weaknesses stimulated a moderate negative effect on discretionary accruals. However, when the accruals were stratified into high positive, negative, and low accruals, the overall findings of the research suggests that the existence of material weaknesses allows for greater manipulation of financial earnings using discretionary accruals regardless of income increasing or income decreasing (Epps, & Guthrie, 2007).

Cohen, Dey and Lys (2004) evaluated discretionary accruals under SOX regulations in 2004. This analysis revealed an increase in accounting accruals in the two years before SOX and

during major financial scandals and a sharp decrease following the issuance of SOX Lobo and Zhou (2006) reported lower discretionary accruals after SOX than in the period preceding SOX. In the Lobo and Zhou study, firms incorporated losses more quickly into their earnings in the post SOX period. This study provided further evidence of the impact of corporate governance on managers' discretionary accounting decisions. The research findings of the success of SOX in the minimization of discretionary accrual activities are inconclusive. Specifically, in 2005 Cohen, Dey, and Lys reported firms engage in less earnings management post-SOX, yet in 2006, Lobo and Zhou find that firms report earnings more conservatively. However, reporting more conservatively may be consistent with an increase in earnings management activities

Earnings Management through GAAP Discretions

An example of GAAP discretions can be found in the authorization of varying inventory models and depreciation schedules. Regulations in these particular areas are vague (Zeff, 2005) because the language used in these regulations allow for managerial discretion in its' application and allow alternative accounting treatment that permits companies to adapt their reporting methods to reflect their perspective of the firm's financial position. For example, two companies experiencing the exact same economic events may use different inventory methods (such as FIFO, LIFO, or JIT) and depreciation schedules (straight line, step-down, or accelerated) and thus report different quarterly and annual earnings figures. In addition, under GAAP, firms can choose alternative methods to account for company performance that result in a distortion of financial performance (Zeff, 2005). With few exceptions, GAAP requires research and development costs to be expensed as they are incurred. The costs are reconciled against revenues of the current period, not against future revenue streams they are formulated to generate. This reporting

structure results in understated earnings in current periods and overstated earnings in future periods (Gerry, 2003).

In 2003, Gerry argued that the GAAP provided discretions for firms to practice earnings management and in 2003; Tarpley identified patterns of earnings management with a study of 515 earnings management attempts obtained from a survey of 253 auditors. In 2006, Lobo and Zhou examined changes in discretionary accruals following SOX. In their evaluation, they found that firms reported lower discretionary accruals after SOX than in the period preceding SOX. Earnings smoothing is still a common practice and will continue to be as long as value is linked to earnings stability.

Discretionary Accruals

There is a long history of regulation forged to minimize earnings manipulation and enhance transparency in financial reporting (Mills, & Newberry, 2001; Wallison, & Hassett, 2004; Zhou, 2007). The interest of analysts, regulators, and investors in general about techniques that can identify earnings manipulation by the firm's management has been the focus of existing financial literature dedicated to earnings management since the early 1970s. Most research methods focused on the evidence of earnings management rely on the calculation of accounting accruals and their separation from non-discretionary accruals (Bartov, & Gul, 2001). Discretionary accruals are considered abnormal or unexpected whereas the non-discretionary components are considered the expected accrual values stimulated by business cycles (Guay, Kothari, & Watts, 1996). After the discretionary accrual component is separated, statistical tests are used to determine if the discretionary accruals of the firm differ from zero, the normal, or expected value.

Despite all the generated interest and abundant literature in earnings management, a consensus about superiority in the estimation of discretionary accruals does not exist. Guidelines or axioms about how to estimate these models in order to improve the power of the tests are in their early stages and there have been few attempts to develop recommendations (Guay, 1995, Dechow, 1995; Jones, 1991) for evaluation in this area of study. An evaluation of the existing literature in discretionary accruals is explored.

A New Approach to Evaluating Accruals

Some early attempts to develop standards for analyzing discretionary accruals can be found in the works of Guay et al (1995) and Dechow et al (1995) and in Young (1999). These early studies concentrate on models created by Healy in 1985, DeAngelo in 1986, and the Jones model in 1991. There have been several attempts to account for the relation between accruals and cash flows such as Hunt in 1997, which augmented the Jones model with the addition of a cash flow variable (Hunt, Moyer, & Shevlin, 1997).

In 1996, Shivakumar augmented the Jones model by adding five cash flow variables. An alternative model was introduced in 2000 by Garza-Gómez that was based on cash flow from operations, which they named the Accounting Process (AP) model. The AP model uses the term $(1/A_t\text{-}1)$ as an explanatory variable and is estimated without intercept. The discretionary accrual component shows a large bias when the $(1/A_t\text{-}1)$ is used (Garza-Gómez, Okumura, & Kunimura, 2000) and concerns about the methodology of discretionary accruals remains.

Evaluating Abnormal Accruals

Segmenting total accruals into a discretionary and a non-discretionary component is a difficult task. The discretion exercised by management is unobservable and there are economic events that stimulate changes in total accruals from one year to the next (Jeter, & Shivakumar,

1999). When a researcher estimates discretionary accruals, they are forcing an expectation model of the expected behavior of accruals in relation to economic events (Kothari, Leone, & Wasley, 2005). Most of the models require the estimation of one or more parameters (Guay, Kothari, & Watts, 1996). Two methodologies can be found in the literature of earnings management and accrual evaluation. The time-series approach includes the estimation of parameters for each firm in the sample by referencing data from periods prior to the current period under review. In contrast, the cross-sectional approach provides estimates for each period for each firm in the event sample referencing data of firms in the same industry (Guay, Kothari, & Watts, 1996).

DeChow and Guay utilize the time-series approach in their discretionary accrual evaluations. The disadvantage of using a time-series approach is that it introduces survivorship bias as well as selection bias, since the time-series model requires the existence of at least N + 1 years of data (where N is the number of explanatory variables used n the model) (Dechow, Sloan, & Sweeney, 1995). This limitation inherent in the time-series model reduces the explanatory power of short series financial data. The time-series approach is effective only when firms in the sample possess a long series of financial data. Guay requires 15 years of data in their evaluation of time-series discretionary accruals.

In 1994, Defond and Jiambavolo introduced the cross-sectional method of discretionary accruals analysis. In this analysis, firms are separated by SIC code and the normal accruals are estimated using yearly cross sections (DeFond, & Jiambalvo, 1994). The assumption of this approach is that the situation for each year will affect the firms in the industry in a similar way. The cross-sectional approach is gaining stability in this area of research and is becoming the standard approach to estimate accrual models (Dechow, Sloan, & Sweeney, 1995).

In 1996, Subramanyam estimated the Jones model and the modified Jones model proposed by Dechow et al., (1995) and reported better a fit for the cross-sectional version than for

the time-series version of the model (Dechow, Sloan, & Sweeney, 1995). Subramanyam's findings suggest the cross-sectional approach generates lower standard errors for the coefficients, fewer outliers, and coefficients that better fit the predicted signs as measured against the time-series approach (Shivakumar, 1996). Jeter and Shivakumar also argued in favor of the cross-sectional estimation method over the time-series approach. Jeter and Shivakumar (1999) contend industry-relative abnormal accruals can be a useful tool for researchers attempting to detect the average unconditional earnings management found in the industry.

Discretionary Accrual Modeling

In Jones model introduced in 1991, is a regression-based expectation model that controls for variations in non-discretionary accruals associated with the depreciation charge as well as changes in economic activities (Dechow, Sloan, & Sweeney, 1995). The Jones model is expressed as:

$$\sum [TA_t / A_{t-1}] = NDA_t = \alpha_1(1/A_{t-1}) + \beta_1(\Delta REV_t/A_{t-1}) + \beta_2(PPE_t/A_{t-1}) \quad (1)$$

Where; ΔREV_t = change in revenue from period t-1 to t

NDA_t = non-discretionary accruals

A_t = assets

ΔREV = change in revenue

PPE_t = gross plant property and equipment

Jones (1991) argued that the change in revenue (ΔREV) and property plant and equipment (PPE) terms are used as a control for the non-discretionary component of total accruals associated with changes in operating activity and level of depreciation. Dechow et al (1995)

argued the assumption that all revenue changes in the Jones models are non-discretionary; the resulting measure of discretionary accruals does not reflect the impact of sales based manipulation. As a result, Dechow attempted to capture revenue manipulation and altered the Jones model by subtracting the change in receivables (ΔREC) from ΔREV for each sample firm. The modified Jones model becomes:

$$\sum [TA_t/A_{t-1}] = NDA_t = \alpha_1(1/A_{t-1}) + \beta_1(\Delta REV_t/A_{t-1} - \Delta REC_t/A_{t-1}) + \beta_2(PPE_t/A_{t-1}) \quad (2)$$

Calculation of Accruals

The literature to date that focuses on accruals includes two main approaches to calculate the accrual components of earnings. The balance sheet approach, estimates accruals as:

$$TA_{bst} = (\Delta CA_t - \Delta Cash_t) - (\Delta CL_t - \Delta STD_t) - DEPTN_t) \quad (3)$$

Where; ΔCA_t = change in current assets during period t

$\Delta Cash$ = change in cash

ΔCL_t = change in current liabilities during period t

ΔSTD_t = the current maturities of long term debt and other short-term debt included in current liabilities during period t

$DEPTN_t$ = depreciation and amortization expense during period t

The total accruals are subtracted from earnings to estimate cash flow from operations (CFO_t) as follows:

$$CFO_t = EBXI_t - TA_{tbs} \quad (4)$$

Where; $EBXI_t$ = net income before extraordinary items and discontinued operations

TA_{tbs} = total accruals

CFO_t = cash flows from operations

The Balance Sheet approach is used to evaluate accruals by DeChow in 1994; Guay, Kothari and Watts in 1995, and Subramanyam in 1996.

The balance sheet approach to evaluating accrual activity has come under criticism by Hansen, Collins and Hribar who argue bias is introduced into the estimates of discretionary accruals under discounted operations, investments and disinvestments in capital expenditures and other activities that skew the financial statements during the year (Collins, & Hribar, 2000). In 2002, Collins and Hribar introduced an alternative approach to discretionary accrual evaluation. Under this approach, the researcher can calculate accruals directly from the statement of cash flows using the formula (Collins, & Hribar, 2002):

$$TA_{cf} = EBXI - CFO_{cf} \quad (5)$$

Where; TA_{cf} = the total accrual adjustments provided on the cash flow statement under the indirect method

EBXI = earnings before extraordinary items and discontinued operations

CFO_{cf} = operating cash flows (from continuing operations) taken directly

This method of calculating accruals by referencing the statement of cash flows is used in this evaluation of discretionary accruals.

Accrual Modeling and Statistical Distribution Methodology

Prior research on earnings management takes the form of two research designs: those based on accounting accruals (aggregate accruals, Jones, 1991; or specific accruals, DeGeorge et

al., 1999) and those based on the statistical distribution of earnings (Burgstahler, & Dichev, 1997). The first design, also called "accrual model," and is extensively used in earnings management literature (Bartov, et.al., 2001). Jones (1991) conducted a study on earnings management by establishing the normal accruals of a company and comparing them to the actual accruals reported. The premise behind this evaluation is grounded on the notion that the difference between discretionary accruals and normal accruals provides the evidence that an earnings management strategy is employed.

The advantage of this design is that earnings management is easily detected under this definition of earnings management (Jones, 1991). The disadvantage is that accrual models (aggregate and specific) lack the theoretical foundation of other statistical models and can not reliably reflect the exercise of discretion (Nissim, & Penman, 2003). Nissim and Penman (2003), and Kothari (2005) also claimed that Jones's and DeGeorge's models (also called modified Jones model) could not detect earnings management after SOX. Cohen et al. (2004) found evidence of a decrease in accruals after the introduction of SOX in 2002 while Lobo and Zhou (2006) examined changes in discretionary accruals following SOX. The implementation of SOX introduces significantly greater penalties on CEO/CFOs; therefore, risk adverse managers are likely to be more conservative in their financial reporting, and report lower discretionary accruals following SOX (Liu, 2004) Firms with earnings manipulation by excessive accruals also face the risk of being sued by the SEC. So there are many penalties in place to deter earnings smoothing however, these regulations do not eliminate earnings smoothing strategies they merely make it more difficult to identify them. Empirical findings suggest that accruals models that do not consider long-term earnings growth are potentially undefined and may result in erroneous inferences about earnings management behavior. This makes it extremely difficult to establish sound estimates of discretionary accruals that capture discretion exercised by management and it

also introduces challenges in evaluating the appropriate research designs for earnings management research. Collins and Hribar (2000) provided an example of the gap between empirical procedures and knowledge of the behavior of reported financial statements. The measurement error in discretionary accrual estimates may lead the researcher to conclude that earnings management exists when it does not.

The second approach to evaluate earnings management is to examine the statistical properties of earnings to identify behavior that influences earnings, as developed by Burgstahler and Dichev (1997) and Degeorge et al., (1999). This is referred to as the Earnings Distribution Model. Earnings Distribution Models focus on the behavior of earnings around a specified benchmark, such as zero or a prior quarter's earnings. These types of tests attempt to evaluate whether the values of cash flows or accruals lie above or below an assigned benchmark and to determine if they are distributed smoothly and reflect volatility created by the use of management discretion.

Burgstahler and Dichev (1997) also found volatility in the distribution of reported earnings around zero and around prior year's earnings. While Degeorge et al., (1999) used analyst's forecasts as a benchmark. Both these studies suggest that if firms had greater incentives to achieve earnings above a benchmark, then the distribution of earnings after management publishes the incentives would have fewer observations than expected for earnings amounts just below the benchmark, and more observations than expected for earnings just above the set benchmark. Both studies found significantly more observations than expected in the range above zero earnings, and in the range above the prior period's earnings.

Gore et al. (2001) used 10,000 observations to study the distribution of earnings and found that fewer companies than expected reported earnings just below zero, and more companies than expected reported earnings just above zero. Similarly, fewer companies than expected

reported earnings just below last year's figure, and more companies than expected reported earnings just above last year's figure. However, it is unclear that this empirically indicates earnings management strategies are utilized. For example, a firm that reports higher earnings each year relative to earnings in the prior year would be viewed as a safe firm. On the other hand, under Gore's theory; firms that report an increase in earnings in some years and decreases in others would be viewed as risky. Therefore it could be argued earnings management evaluations should target earnings decreases exclusively rather than increases in reported numbers.

In 2002, Gore concluded that accruals are a significant part of the earnings management mechanisms used to boost reported earnings so as to just achieve target (Gore, Pope, & Singh, 2002). The advantage of this method is that researchers can avoid the estimation of discretionary accruals. The disadvantage is that researchers can not tell the form and magnitude of earnings management. A noteworthy feature of this design is that the power of this approach comes from the specificity of their predictions regarding which group of firms will manage earnings, rather than from a better measure of discretion over earnings (Gore, Pope, & Singh, 2002).

The Earnings Distribution Model is a powerful tool in the earnings management arsenal in that it identifies contexts in which large numbers of firms appear to manage earnings (Dechow, Sloan, & Sweeney, 1995). The approach also highlights the frequency of manipulation, though this rests on an assumption about the distribution of earnings without earnings manipulation. Myers and Skinner (1999), in the spirit of the Earnings Distribution Model, tested whether the frequency of increases in consecutive quarterly earnings were greater than would be expected by chance, and found that it was. In 2008, Allayannis, Roundtree, and Weston conducted an evaluation of cash flow volatility as valued by investors. The findings of this study are consistent with a preference by the market for less volatile cash flows and thus, suggesting that managers'

efforts to generate smooth financial statements add value, but only through the cash component of earnings (Allayannis, Rountree, & Weston, 2008).

A study conducted by the University of Illinois at Urbana Champaign (Department of Accountancy), found a negative relationship between risk aversion and the volatility of earnings and operating cash flows. In this investigation, CEO incentives to reduce earnings volatility were explained by the under diversified investment position in their companies' stock. The risk of negative valuations inspired the creation of hedging devices to reduce earnings volatility (Abdel-khalik, 2006).

Direct Cash Flow Earnings Management Methodology

Currently, few studies focus on earnings manipulation via cash flows and real financial transactions as a means to manage earnings. In 2006, Tucker and Zarowin used a new approach to breakup earnings into two categories--cash flows and accruals (Tucker, & Zarowin, 2006). In 2006, Tucker and Zarowin measured earnings management activities by evaluating the negative correlation of the change in accruals with the change in pre-managed earnings. According to Tucker and Zarowin, the volatility of earnings is the combination of the volatilities of cash flow and accruals. Under this theory, the following relationship holds:

Var (earnings) = Var (cash flow) + Var (accruals) + 2 Covar (cash flow x accruals) (6)

This formula suggests managers can change the outcome of their reported earnings by either manipulating the stability of accruals or by altering the level of cash flows (or both) (Tucker, & Zarowin, 2006). Under these conditions, a firm whose cash flow and earnings are exposed to interest rate risk can alter their reported earnings by exercising a derivative (cash flow).

Derivative Hedging and Systematic Risk

Economic theory explains that the value of equity is equal to the present value of the expected risk-adjusted dividend, calculated using the risk-free rate of interest. Since interest rate risk can be hedged by using derivatives, the most important factor that impacts a firm is the value of future dividends (earnings). Theoretically, higher earnings that are consistently stable will stimulate dividend growth and increase firm value. Market imperfections increase systematic risk, which refers to inherent risk in the market and created by the movements of the entire economy (Emery, & Finnerty, 1997). Systematic risk cannot be diversified away but can be hedged with financial derivatives (Melumad, Weyns, & Ziv, 1999). If earnings volatility is costly to a firm, then the firm is faced with incentives to reduce its exposures to risks by reducing the volatilities of its earnings and may choose to utilize derivative hedges to minimize risk exposure (Emery, Douglas, & Finnerty, 1997).

Beaver et al. (2000) examined the earnings management incentives of public and private property and casualty insurance firms, and found that they both avoid losses by using hedging derivatives. Similarly, Kasznik and McNichols (2002) provided evidence that firms that meet or beat analysts' earnings forecasts consistently were valued higher than firms that failed to do so. Bruns et al., (1990) provided evidence that "…in practice, it appears that a majority of managers use at least some methods to manage short-term earnings." (Bruns, & Merchant, 1990).

Derivative Hedging Incentives

DeGeorge et al., (1999) hypothesized that firm managers had various incentives to avoid reporting a decline in earnings. In fact, the theoretical value of a company's stock is the present value of its future earnings and increased earnings represent an increase in shareholder value

(Degeorge, Patel, & Zeckhauser, 1999). Beatty et al., (2002) also found that the number of publicly-held firms reporting continuous increases in earnings per share was unusually high, and the number was low in privately-held firms. They asserted the cause for this earnings behavior was the result of required reporting and argued that public firms were more concerned about firm value, while private firms were more concerned about income tax burdens (Beatty, Ke, & Petroni, 2002). Burgstahler and Eames (2003), Degeorge et al., (1999), and Dechow et al. (2003) illustrated the same empirical regularity of earnings smoothing however, provided little empirical evidence to explain this pattern. While Hong and Kyonghee examined management incentives to smooth earnings (Hong, Keejae & Kyonghee, 2009), Lapointe-Antunes, Magnan, and Gray-Angers, examined the voluntary disclosure patterns made by Swiss firms with constrains on the use of discretionary accruals to smooth earnings. In their analysis they explored the effect of voluntary disclosure on the value relevance of earnings (Lapointe-Antunes, Cormier, Magnan, & Gray-Angers, 2006).

A survey conducted in 2004 indicated that a majority of firms were willing to forfeit economic value in exchange for stable earnings (Graham, Harvey, & Rajgopal, 2004).Kirschenheiter and Melumand studied a model of financial reporting where investors infer the precision of reported earnings. They found reporting a larger earnings surprise reduces the inferred earnings precision, dampening the impact on firm value of reporting higher earnings, and providing a natural demand for smoother earnings (Kirschenheiter, & Melumad, 2002). This is the main force that is driving earnings management practice of managers.

Liu and Yao (2003) asserted that the market value was higher for earnings-stable stocks than for earnings-volatile stocks. Based on their sample firms, from 1985 to 2000, earnings-stable stocks significantly outperformed earnings-volatile stocks in returns (Liu, & Yao, 2003). McKee (2005) claimed that firms with lower earnings volatility were being valued higher than the firms

with higher earnings volatility (McKee, 2005). However, given the current market and the inherent volatility and consumer uncertainty, Collingwood asserted there is no financial benefit for earnings smoothing (Collingwood, 2001).

Derivative Hedging

The use of financial derivatives is widespread, particularly among large publicly traded firms. Derivatives are to speculate or to hedge against risk (Emery, & Finnerty, 1997). As described in chapter 1, this study is concerned with hedging rather than speculating with derivatives however it is important to note that derivative contracts are used for speculating purposes as well as hedging against risk. Derivative transactions, because of their complex and obscure nature, attract attention from regulators, accounting standard setters and researchers. (Naor, 2006).

In most cases, large firms are the predominant users of derivatives (Mian, 1996). In 1996, Mian proved that firm size was positively correlated to derivative use (as firm size increased, so did the use of derivatives). In a survey of the Wharton School, Bodnar and Günther found that German firms are more likely to use derivatives than US firms, with 78% of German firms using derivatives compared to 57% of US firms. However, the financial markets are international and foreign currency derivative hedging can affect domestic firms that trade in these markets (Bodnar, & Gebhardt, 1998). In this survey, almost half of the respondents considered stable cash flows and earnings stability their primary objective.

In 2005, McKee argued the reduction of earnings volatility may be the goal of many firms and minimized the need for total earnings volatility elimination (McKee, 2005). It is conceivable that if derivatives can reduce risk, they are also useful in stabilizing earnings trends. For example, if a firm is faced with a variable-interest rate on a debt obligation, and a financial

manager believes that interest rates will increase in the next quarter, the manager may consider hedging this interest rate with an interest rate swap. To hedge the floating rate exposures, the manager can enter into a pay-fixed receive-variable interest rate swap, which will stabilize reported earnings simply by exercising a hedging derivative (Singh, 2004). Guay conducted a study to evaluate the role of derivatives in firms initiating derivatives use. The results are consistent with firms using derivatives to hedge (Guay, 1999), and minimize entity risk.

Bodnar, Hayt, and Marston (1998), explored selective hedging in their study conducted in 1998. In this study, Bodnar, Hayt, and Marston found 66 percent of the firms in their sample timed their interest rate hedges based on their perception of anticipated interest rate volatility in the market (Bodnar, & Gebhardt, 1998).

Based on McKee's study conducted in 2005, derivatives offer many opportunities to manage earnings because firms are free to exercise discretion in the timing of derivative contracts (McKee, 2005). As explained above, the timing of a derivative option contract provides an opportunity to manage earnings by timing when a contract that will be exercised as well as reducing the risk being hedged or un-hedged. Barton (2001) claimed that firms with recorded derivative use were more likely to engage in earnings management than companies without reported derivative use (p.24).

While all these papers provide evidence that the use of derivatives is consistent with incentives to hedge a firm against associated risk (Bodnar, et.al., 1998), none of these papers directly test whether the use of derivatives reduces earnings volatilities resulting in smoother earnings.

Derivatives and SFAS No.133 Accounting Discretion

To prove that derivative use captures basic attributes of hedging, Barton (2001) used the correlation between the notional amount and the hedge ratios. He also provided evidence that suggested that derivative users tend to have less volatile operating cash flows and total accruals than nonusers (Barton, 2001). In 2002, Pincus and Rajgopal concluded that managers of oil and gas producing firms first established the extent to which they would use derivatives to hedge commodity volatility and then managed earnings volatility by trading off discretionary accruals and hedging to smooth earnings (Pincus, & Rajgopal, 2002). While their results showed no evidence that the extent of hedging was a significant determinant of hedging, they did find however that the extent of hedging was a considerable building block for earnings management strategies.

Nissim and Penman (2003) proved that firm value was positively related to earnings and inversely related to interest rates. According to Stulz (1996), a derivative is the most powerful tool in reducing interest costs (Nissim, & Penman, 2003). Stulz pointed out that hedging increased firm value only if managers believed they had informational advantages. Stulz (1996) embraced behavioral finance in his conclusions—an area still in its infancy phase of academic finance.

Earnings Management with Derivative Hedging

Derivative hedging involves taking a financial position that results in a gain or a loss to offset a loss or gain in the underlying asset or liability being hedged (Stulz, 2003). Hedging will reduce the volatility of a firm's earnings by trading off potential gains against potential losses.

Therefore, it can be argued that derivatives provide an effective and efficient means to reduce cash flow and earnings volatility (Stulz, 2003).

Hedging is a common practice among public firms. Huang, Ryan and Wiggins contend managers are risk averse. In their study of the use of nonlinear derivatives (options), they found nonlinear cash flow characteristics in investment opportunity, debt, and executive compensation all relate positively to nonlinear derivative usage (Huang, Ryan, & Wiggins, 2007). It is logical therefore, that the reduction in risk exposure would be desirable by all risk-averse stakeholders. In 2009, Minton, Stulz, and Williamson conducted a study to examine the use of credit derivatives by US bank holding companies with assets in excess of one billion dollars from 1999 to 2005. They found that in 2005 the gross notional amount of credit derivatives held by banks exceeds the amount of loans on their books. Their research confirmed only 23 large banks out of 395 used credit derivatives and most of their derivatives positions are held for dealer activities rather than for hedging of loans. They contend the findings suggest that the use of credit derivatives by banks to hedge loans is limited by the adverse selection and moral hazard problems and because of the inability of banks to use hedge accounting when hedging with credit derivatives. This study raises important questions about the extent to which the use of credit derivatives provides financial stability in the banking industry. (Minton, Stulz, & Williamson, 2009)

Hedging the fair value of assets and liabilities is a financially fundamental process that one could define as simple in application (Emery, Douglas, & Finnerty, 1997). The assumptions used in the models created for the fair value calculations introduce complexity. The complexity in derivative hedging models begin with the imbedded assumptions that (a) markets are efficient, (b) behavioral financial factors are irrelevant, (c) asset returns are normally distributed random variables, (d) volatility can be stabilized, (e) prices follow a normal distribution, (f) investors are risk averse (g) return on investment is directly related to risk exposure, and (h) transaction costs

are excluded (Guay, 1999). Hedging cash flows is more difficult to accomplish because the cash flow and the hedging derivatives are changing at different rates (Myers, & Skinner, 1999). In addition, most derivative contracts have no market reference because they are not actively traded in the secondary market and as a result, the hedge is not always completely effective.

It is important to note, derivatives and other innovative financial maneuvering serve legitimate business and investment objectives (Guay, 1999). The ability to shift, replace, or transfer risks with financial derivatives is an essential tool for today's businesses. However, derivatives also present a number of serious challenges for the entire financial reporting system regardless of industry sector (Sheedy, 1997). Although derivatives have been used for many years, the way in which they are used today is new; complex; and somewhat vague in their application (Guay, 1999). As a result, detecting earnings management through the manipulation of derivatives is difficult to identify. (McKee, 2005). Tucker (2006) contends exercising a hedging derivative targeted at interest rate risk, a firm can minimize the exposure to interest rate volatility and decrease the interest rate cost while decreasing its cash flow (by capturing the cost associated with exercising the hedging derivative).

By timing the utilization of hedging derivatives, a firm can alter their current earnings (Tucker, & Zarowin, 2006). For example, suppose managers of a firm believe additional earnings are needed on the financials to meet pre-determined targets. Under this scenario, a manager can terminate a hedging derivative that carries an unrealized gain. Then, according to the GAAP rules, the unrealized gain will be added to current earnings immediately--thus increase earnings. On the other hand, suppose the manager believes it is necessary to reduce earnings on reported financials, under this scenario a manager can terminate a hedging derivative that carries an unrealized loss. Terminating a financial derivative can result in a stop of payment streams under the derivative contract, thus reducing reported earnings (Tucker, & Zarowin, 2006).

Disclosure Quality of Derivative Reporting

The transparency in financial reporting and the disclosure quality of derivative hedging is a major concern for stakeholders and regulators. Since 1990, the Financial Accounting Standards Board (FASB) has issued seven accounting pronouncements pertaining to financial instruments. The approach employed by FASB has been to issue addendums to existing regulation and piece together a complete reporting regulation package (Blankey, & Schroeder, 2000). The development of the regulation for derivative instruments under SFAS No. 133 has taken the FASB 10 years to complete. Prior to the issuance of SFAS No. 133, the FASB issued SFAS No. 119 Disclosure about Derivative Financial Instruments and Fair Value of Financial Instruments. The intent of SFAS No. 119 is to improve the previous standards. In 2000, the FASB issued SFAS No. 138 as an amendment to SFAS No. 133 and is to be used when certain technical changes from SFAS No. 133 are introduced (Tombley, 2003). Prior studies have been conducted to investigate disclosure quality associated with derivative hedging such as Sengupta in 1998, Blankey & Schroeder in 2000, and Riahi-Belkaouhi in 2001. Prior studies indicate a correlation exists between disclosure quality and firm specific characteristics.

In a study conducted by Ashmed and Courtis, an association between quality disclosure in financial reporting and firm specific characteristics has been to explanatory variables from the research on agency costs, political costs, corporate governance and information asymmetry (Ahmed, & Courtis, 1999). Lobo and Zhou examined the relationship between earnings management and disclosure quality in 2001. This evaluation is focused on identifying the relationship between (a) information asymmetry and disclosure quality and (b) earnings management and information asymmetry (Lobo, & Zhou, 2001).

Malone, Fries, and Jones examined the association between the extent of corporate disclosure with firm specific characteristics within the oil and gas industry. In this study, a weighted disclosure index is created by referencing industry analysts' reports for the associated weights (Malone, Fries, & Jones, 1993). The analysts were asked to weight 129 factors according to the relative importance of each factor in the overall investment decision. The total actual scores of the index were reported as a percentage of total possible scores. The findings suggest firms listed on major stock exchanges with high debt-to-equity ratios report more financial information if they have a larger number of shareholders.

CHAPTER 3:

RESEARCH METHOD

In this chapter, the research design and approach are explained and the setting and sample is provided. The treatment used to evaluate the five research questions is described and the data collection and analysis is defined. The measures taken for the protection of participants' rights are summarized and the chapter ends with a summary of the topics explained.

The focus of this study is on earnings management through the utilization of derivative hedges and accounting treatment of operational activities of a firm in the high technology industry segment. The main question is whether the accounting methodology affects the firm's ability to smooth earnings and if earnings management through the use of discretionary accruals has decreased after the issuance of SOX. The quality of disclosure and financial transparency in reporting of derivative hedging is addressed by the creation of a disclosure quality index to investigate transparency in derivative reporting before and after SFAS No. 133.

The purpose of the analysis in the accounting treatment of operational activities is to evaluate the differences between the properties of accrual earnings and cash earnings in such a way as to clarify the different ways in which the accounting treatment of operational activities may account for any differences in earnings smoothing. In much of the literature on earnings smoothing, it is assumed that accruals are used to manage earnings (Bartov, et. al., 2001). However, Nissim and Penman (2003) claimed that after the implementation of SOX, accrual models have become ineffective in the detection of earnings smoothing. As Cohen, Dey, and Lys (2005) contend, firms use actual transactions rather than accruals in earnings smoothing.

Research Design and Approach

The high tech industry segment is selected for this study to maximize the opportunity to investigate firms engaged in income conservatism, since these types of firms confront greater risks of shareholder litigation than other industries (Lobo, Zhou, 2006). High tech industry companies are also affected to a greater degree by conservative accounting standards on research and development costs (Uday, Wasley, & Waymire, 2004). Conservatism defined as the higher verification standard applied to favorable information that results in lower cumulative earnings and net assets (Watts, 2003). The presence of income conservatism is materialized in significantly higher proportions of losses and lower average profitability levels for technology firms relative to non-technology firms (Kwon, Yin, & Han, 2006). These differences arise primarily from differences in operating cash flow levels attributable to R&D expenses. Technology firms also show evidence of more negative non-operating accruals (Uday, Wasley, & Waymire, 2004).

The data mining process included online data retrieval from the published financial reports of high technology firms for the years 1997 – 2007. The Mergent database was used to extract data files for each company randomly selected for the sample. Only U.S. firms were included in the study and all dollar values were converted into millions for consistency in comparison. The total cash earnings and the total net accruals were determined with adjustments to the raw reported financial statements explained in chapter 1 (Anderson, Caldwell, & Needles, 1994). Data was collected, descriptive statistics are explained and graphical depictions of total cash earnings, and total net accruals are provided. An aggregate *t* test of all years ranging from 1997 to 2007 is conducted to test the difference in means between total cash earnings and total net accruals.

The modified Jones model is referenced to separate discretionary accruals from non-discretionary accruals. The process includes the implementation of a linear regression model

where the independent variables are identified with a proxy for non-discretionary accruals. The proxy is created by categorizing total accruals into non-discretionary and discretionary accruals. The non-discretionary component reflects business conditions (such as firm growth and length of the operating cycle) that create and destroy accruals, while the discretionary component highlights management choices (Jones, 1991). After the cross-sectional discretionary accruals are identified for all firms for the years 1997 – 2007, a test of proportion means is conducted using a binomial distribution to test the proportion of discretionary accruals in 2000 with discretionary accruals in 2005. The intent of this investigation is to evaluate the proportion of discretionary accrual activities before and after SOX implementation (SOX was implemented in 2002).

The modified Jones model is employed by regressing accrual data from many firms in the same industry for a single time period (cross-sectional) or by regressing accrual data from the same firm across several time periods (time-series). There are disadvantages to both methods but the cross-sectional analysis is considered a better method for the following technical reasons:

1. Time-series analysis may not have enough observations in the estimation period to obtain reliable parameter estimates for a linear regression.
2. The coefficient estimates on ΔSales and GPPE may not be stationary over time.
3. The self-reversing property of accruals may result in serially correlated residuals.

Since the coefficient estimates on the change in sales and gross property plant and equipment are not stationary over time, it is impossible to make valid statistical inferences from the linear regression results obtained with time-series analysis (Nissim, & Penman, 2003). Because making valid statistical inferences is paramount in this study, the cross-sectional approach is used.

Cross-Sectional Analysis

The cross-sectional model used in this evaluation requires a two-stage process for calculations. To accomplish this, the results from the first part of the analysis are used in the next stage of analysis to reach the needed estimate (Peasnell, & Pope, 2000). To estimate the non-discretionary accrual amounts, firm-specific amounts for each independent variable are used for a particular period across several different firms. In essence, each data item [(TNA), (ATA), (ΔSales – ΔRec), and (GPPE)] is coming from the same period with the next data set originating from a different firm. The data set of 30 different firms with accounting data for the year ending 2007 yields one estimated regression equation. Since the period range in this study is from 1997 to 2007, ten regression equations are estimated for the 30 firms—one for each fiscal year.

The difference in the rate of change in total cash earnings with derivative hedging and the rate of change in total cash earnings without derivative hedging is investigated with an *F* test. Two groups are created for this analysis. One group includes the calculated rate of change of total cash earnings of firms who did not report the use of derivative hedging during the period 1997 to 2007 and the other group includes the calculated rate of change in total cash earnings of firms who did report the use of derivative hedging during the period 1997 to 2007. The rate of change for all firms is aggregated across 10 years and the *F* test is used to investigate the variances in the rate of change of both groups. The difference in the quality of derivative reporting of firms who reported the use of derivative hedging is evaluated by aggregating un-weighted index scores of quality disclosure for the periods 1997 to 2007. All companies who reported the use of derivative hedging in their annual reports are evaluated. The focus of this test is on the quality of financial statements and annual reports and is based on accounting policy information, anticipated hedging activities, risk assessment, and net fair value information. All firms who reported the use of derivative hedging are evaluated in these 4 areas of reporting transparency. Each area of

transparency contains a select number of questions (policy information = 4 questions; anticipated hedging activities = 5 questions; risk assessment = 3 questions; and net fair value = 7 questions). Each firm is scored a 1 for reporting and a 0 if otherwise. Then all scores are summed and divided by the possible score. For example, the risk area includes 3 questions so a firm could score a 3 if they reported in each area and in which case, 3 would be divided by the 3 (possible score) resulting in a total score of 1. The objective is to yield one quality disclosure score for all firms. After descriptive depictions of each individual quality factor is presented for all derivative hedging firms, each individual firm score is summed and divided by the possible score of 4 (policy information, anticipated hedging activities, risk assessment and net fair value). For example if a firm scored a 3 out of the possible 4 in the transparency test (Risk, Accounting, Hedging, and Fair Value) then the 3 is divided by 4 (3/4 = .75) resulting in a .75 overall quality disclosure score (referenced as QDI score from this point on). The final QDI scores of all firms who reported derivative hedging in 1998 and 2002 is investigated with a population proportion test. The intent is to evaluate the proportion of QDI scores of firms who reported the use of derivative hedging before and after the implementation of SFAS No. 133.

Setting and Sample

In the later half of 2001, the U.S. financial market experienced crashes and frauds of Enron, WorldCom and other companies that required the U.S. Congress to regulate corporate governance. These financial crises were addressed with the Congressional issuance of the Sarbanes-Oxley Act of 2002, which attempted to restore confidence in the securities markets (Ribstein, 2002). A study of the mitigating effects of the SOX Act conducted by Aono and Guan (2007) found earnings manipulative behavior to round earnings result in an upward bias. Early findings are inconclusive on the success of the Act (Zhou, 2007). Cohen, Dey and Lys (2004)

asserted firms engage in less earnings management post-SOX, but Lobo and Zhou (2006) find that firms report earnings more conservatively. Reporting more conservatively could be consistent with greater earnings management Cohen, Dey, & Lys, (2004). In the high tech industry, companies are affected to a significant degree by conservative accounting standards such as SFAS 2 on R&D costs (Uday, Wasley, & Waymire, 2004).

The Statement of Financial Accounting Standard No. 133 passed in 1998, established accounting and reporting standards for derivative instruments and hedging activities (Wallison, & Hassett, 2004). The decision to use derivatives for hedging is contigent on existing exposure factors (i.e. foreign sales and foreign trade) and on variables associated with theories of optimal hedging (i.e., size and R&D expenditures). In addition, the level of derivatives used depends only on a firm's exposure through foreign sales and trade (Allayannis, & Ofek, 1997). Empirical evidence suggests that managers are averse to reporting earnings volatility introduced by SFAS 133 (Barton, 2001). From these findings, it is evident that firms seeking to smooth earnings volatility have been using discretionary accruals and or derivative hedging (Barnes, 2003). Data were randomly drawn from listings of all U.S. companies traded on U.S. markets. The high technology industry segment is the target of this study due to income conservatism characteristics. The high technology segment drawn for the sample is defined by SIC (Standard Industrial Classification) codes which refer to a four-digit number assigned to U.S. industries and their products. The specific SIC codes used in this analysis can be found in Table 6 in Appendix A. All firms classified by these SIC codes are drawn and thirty companies are randomly drawn from to form the sample. The simple random sample is generated by listing all firms in the sample in Microsoft Excel and using the rand function to generate 30 random companies. If a company in the sample has not reported financials for the entire period under review (1997 – 2007) they are dropped from the sample and another firm from the population described by SIC

code is randomly selected to yield 30 companies in the sample. Annually reported data is used for all calculations and dollar values of all firms are translated into millions. The significance level for all tests in this study is set to .05.

The sample size is 30 the Type I and Type II errors are analyzed to ensure sampling error is not introduced in this study as a result of a small sample size. A sample size of 30 is selected due to the arduous research involved in the analysis of these firms for the period 1997 through 2007. Figure 1 in Appendix B reports the Type I and Type II errors.

The observed effect size (Cohen's d) defined as the difference between two means divided by a standard deviation for the data is used to measures the observed difference and is also used to analyze the meaning of the data (the larger the effect, the more meaningful). The *d* is defined as the difference between two means divided by the pooled standard deviation for those means. In Figure 1, the Type I error reflects the level of significance for testing. In this analysis, all tests are evaluated with a level of significance of .05. The Type II errors are measured by beta. The Type II errors are all below the standard .20 (Cohen, 1992). The measured effects are medium to large. The Type I and Type II errors for the linear regression analysis are presented in Figure 2 within Appendix B:

The Type II errors are low and the thresholds for the Cohen's *d* are large for all periods. The post-hoc statistical power of the regression models are strong. The R^2 which measures the model are all high (68% or higher) indicating the model effectively fits the data.

Treatment

Research question 1 is measured by using an aggregate approach to calculate the total cash earnings and the total net accruals of all the firms in the sample. The total net accruals are

calculated to investigate the difference in earnings volatility between total net accruals and total cash earnings, the total cash earnings is calculated as:

$$TCE = (\Delta C - CI - STK + EI) \quad (7)$$

Where: TCE = total cash earnings

ΔC = change in cash

CI = cash dividends

STK = stock repurchases

EI = equity issuance

The total net accruals are calculated:

$$TNA = NI - \Delta C - CI - STK + EI \quad (8)$$

Where: TNA = total net accruals

NI = net income

ΔC = change in cash

CI = cash dividends

STK = stock repurchases

EI = equity issuance

Research Question 1

An aggregate *t* test of all years ranging from 1997 to 2007 is conducted to test the difference in means between total cash earnings and total net accruals. The objective is to investigate the difference in the means of reported numbers in total net accruals and total cash earnings. In theory, total cash earnings minus total net accruals should equal zero (Anderson, Caldwell, & Needles, 1994). However, accruals are used to reduce timing and mismatching

problems in underlying cash flows (Bartov, et.al., 2001). Accruals therefore accomplish this benefit at the cost of making assumptions and estimates about future cash flows, (Collins, & Hribar, 2000) this implies that accruals include errors of estimation or noise. Estimation noise inherent in accruals reduces the beneficial role of accruals and therefore total accruals are expected to be greater than total cash earnings. For a comprehensive examination, a two-way hypothesis is tested. The hypothesis is that the total accruals activity equals the total discretionary accrual activity. The stated hypothesis assumes unequal variances and is defined as:

H_0: $\mu_1 = \mu_2$
H_1: $\mu_1 \neq \mu_2$

Where: μ_1 = total cash earnings
μ_2 = total net accruals

Research Question 2

Research question 2 is investigated by determining the discretionary accrual amount of each firm using the modified Jones model (Jones, 1991). Under the modified Jones model, the independent variables are used as a proxy for activities that reflect a relationship to non-discretionary accruals. The independent variables (IV) reflect normal accruals driven by sales, plant property and equipment, expected sales growth, and current operating performance (Jones, 1991). The total net accruals (TNA) calculation is used for a linear regression analysis and is set as the dependent variable (DV). The independent variables are (a) net income, (b) change in cash, (c) cash dividends, (d) stock repurchases, and (e) equity issuance. Once β_0, β_1, β_2 and β_3 are estimated for the cross-section of firms for all the periods (calculated by running a linear regression equation), the cross-sectional coefficients along with the firm specific data for each of

the identified independent variables are used to estimate the individual firm's non-discretionary accruals for the period. The non-discretionary accruals is estimated by:

$$NDA = \beta\ 0 + \beta\ 1(ATA) + \beta\ 2(\Delta Sales - \Delta Rec) + \beta\ 3(GPPE) + \varepsilon \quad (9)$$

Where: NDA= non discretionary accruals

ATA = Average total assets

ΔSales = Change in sales

ΔRec= Change in accounts receivable

GPPE = Gross PP&E

The average total assets calculated for each firm in the sample and derived from the balance sheets of all firms. The average total assets calculated as, average total assets = (prior years total assets) + (current years total assets / number of periods). The total discretionary accruals are the difference between the individual firm's total net accruals (TNA) and its estimated total non-discretionary accrual amount, calculated as TDA = TNA – NDA.

Research Question 3

A test of population proportions is conducted to investigate the proportional differences of discretionary accrual usage in 2000 with discretionary accruals usage in 2005 (before and after SOX implementation). The hypothesis is that the proportion of discretionary accruals in 2000 is equal to the proportion of discretionary accruals in 2005. The hypothesis is stated as:

$H_0: p_1 = p_2$
$H_1: p_1 \neq p_2$

Where: p_1= number of firms who reported DA that represented over 50% of TNA in 2000

p_2 = number of firms who reported DA that represented over 50% or more of TNA 2005

Research Question 4

Research question 4 is analyzed by aggregating the calculated rate of change in total cash earnings of all firms. Then two groups are created, one group for derivative hedging firms and the other for non-derivative hedging firms. An *F* test is used to investigate the variances in the rate of change in total cash earnings of firms without derivative hedging and the rate of change in total cash earnings of firms with derivative hedging. The hypothesis is stated as:

$$H_0 : \sigma^2/_1 \geq \sigma^2/_2$$
$$H_1 : \sigma^2/_1 < \sigma^2/_2$$

Where: $\boldsymbol{\sigma^2/_1}$ = rate of change in TCE without derivative hedging
$\boldsymbol{\sigma^2/_2}$ = rate of change in TCE with derivative hedging

Research Question 5

Research question 5 is analyzed by referencing an un-weighted quality disclosure index for financial reporting and testing the population proportions QDI scores of firms before and after SFAS No. 133. All companies who reported the use of derivative hedging in their annual reports are evaluated. The financial statements and annual reports are analyzed in terms of the accounting policy information, anticipated hedging activities, risk assessment, and net fair value information. (Myers, James, Myers, & Omer, 2003) each area of transparency has a select number of questions.

Policy Information Questions
1. Are the accounting policies and the method adopted explained in the financial statements or annual reports?
2. Are the uncertainties of future cash flows explained?
3. Are the objectives for holding or issuing derivative financial instruments explained?
4. Are the objectives for holding or issuing derivative financial instruments explained?

Figure 3. This figure shoes the index scoring for policy information. All firms are assigned a "1" for providing the data in their financial statements or annual reports and a "0" if otherwise. The depth of policy information reported is not included in the scoring index. This scoring is only concerned with whether the firm reported this information or not.

Hedges of Anticipated Transactions
1. Is a description of the anticipated hedging transaction provided?
2. Is a description of the period until the hedge is expected to occur reported in the financial statements or annual reports?
3. Is a description of the hedging instrument reported?
4. Is the amount of any deferred or un-recognized gain or loss reported?
5. Is the expected timing of recognition as revenue or expense reported?

Figure 4. This figure shoes the index scoring for hedges of anticipated transactions. All firms are assigned a "1" for providing the data in their financial statements or annual reports and a "0" if otherwise. The depth of anticipated hedging transaction information reported is not included in the scoring index. This scoring is only concerned with whether the firm reported this information or not.

Risk Information
1. Are the contractual re-pricing or maturity dates for interest rate risk reported?
2. Are the effective interest rates or weighted averages reported?
3. Are the maximum amounts of credit risk exposure at the reporting date provided?

Figure 5. This figure shows the index scoring for risk information. All firms are assigned a "1" for providing the data in their financial statements or annual reports and a "0" if otherwise. The depth of risk reported information is not included in the scoring index. This scoring is only concerned with whether the firm reported this information or not.

Net Fair Value Information
1. Are the aggregate net fair values of the reporting date provided?
2. Does the reporting show separately in aggregate net fair value of those financial assets or financial liabilities, which are not readily traded on organized markets?
3. Is the method used for determining net fair value explained?
4. Are any significant assumptions made in the determination of net fair value provided?
5. Is the carrying amount and the net fair value of either the individual asset or appropriate groupings of those individual assets reported?
6. Are the reasons for not reducing the carrying amount provided?
7. Is the nature of the evidence that provides the basis for management's belief that the carrying amount will be recovered explained?

Figure 6. This figure shows the index scoring for net fair value. All firms are assigned a "1" for providing the data in their financial statements or annual reports and a "0" if otherwise. The depth of net fair value information reported is not included in the scoring index. This scoring is only concerned with whether the firm reported this information or not.

Disclosure Quality					
Policy Information Questions	Hedges of Anticipated Transactions	Risk Information	Net Fair Value Information	Total Possible Scores	Total Disclosure Quality Score
1 or 0 Score	1 or 0 Score	1 or 0 Score	1 or 0 Score	4 Scores	Sum of Scores divided by possible scores

Figure 7. This figure shows the scoring for QDI scores. All firms are assigned a "1" for providing the data in their financial statements or annual reports and a "0" if otherwise. The depth of reported information in each disclosure quality category is not included in the scoring index. This disclosure quality index is only concerned with whether the firm reported this information or not.

After each firm is scored a 1 for reporting and a 0 if otherwise, all scores are summed and divided by the possible score (for example the Risk area includes 3 questions so a firm could score a 3 if they reported in each area so if they scored a 3 then the 3 would be divided by the 3 (possible score) resulting in a 1). Under this scoring, all reporting is ranked and ranges from 0 to 1 with 0 equal to poor quality disclosure in financial reporting and 1 equal to superior quality disclosure in financial reporting. Only 1 score of disclosure quality is needed to test the population proportion so the measure is used again by summing up all final scores for each area of transparency and dividing by the possible score. Then the population proportion of the final quality disclosure scores of all firms who reported derivative hedging in 1998 and 2002 are evaluated. The hypothesis is that the proportion of the QDI scores above 80% in 1998 is greater than the proportion of the QDI scores above 80% in 2002. The hypothesis is stated as:

H_0: $p_1 \geq p_2$
H_1: $p_1 < p_2$

Where: p_1= number of firms with QDI scores above 80% in 1998
p_2 = number of firms with QDI scores above 80% in 2002

Instrumentation and Materials

In research question 1, an aggregate *t* test of all years ranging from 1997 to 2007 is conducted to test the difference in means between total cash earnings and total net accruals. The objective is to investigate the difference in the means of total net accruals and total cash earnings for all years. The hypothesis is that the means of accounting accruals is equal to the means of cash earnings for all firms. This is a comparative research question and is investigated with inferential statistics. This test is a parametric test and the data is ratio scaled.

In research question 2 is a correlational evaluation and is conducted to generate a more robust framework of analysis for total accruals. This is a comparative study that includes correlational analysis of, discretionary accruals that are segmented away from non-discretionary accruals (Kothari, Leone, & Wasley, 2005). To accomplish this separation, the modified Jones model introduced in 1991 is used. The modified Jones model is a multiple linear regression model that regresses the total net accruals to estimate the coefficients for discretionary accruals once a cross-sectional or a time-series approach has been established (Hribar, & Collings, 2002; Kothari, Leone, & Wasley, 2005, & Tucker, & Zarowin, 2006). This is a correlational analysis and is a descriptive analysis. The data is ratio scaled. This is a parametric analysis that takes the form of a linear multiple regressions. In this analysis, there are 4 independent variables that are continuous (average total assets, change in sales, change in accounts receivable, gross plant property and equipment), and one dependent variable (TNA) that lie on a continuum. Each independent variable is obtained from the published annual financial statements of each firm in the sample. The total net accrual (TNA) is calculated from the total net accruals equation while NDA is determined with the regression of total net accruals. This regression correlational analysis is used to determine the discretionary component of total accruals.

Research question 3 is a comparative test conducted to evaluate the proportion of discretionary accruals used before and after the issuance of SOX. Once the discretionary components are determined for each firm in the sample for all periods 1997 – 2007 in research question 2, a test of population proportions is conducted to investigate the proportion of discretionary accruals utilized before and after the implementation of the SOX Act. This is a parametric test and the data used in this investigation is ratio scaled. The hypothesis is that the proportion of discretionary accruals is less before the issuance of SOX than it is after.

Research question 4 is a comparative test to investigate the rate of change in total cash earnings with derivative hedging and the rate of change in total cash earnings without derivative hedging. This *F* test is a parametric test and the data in is ratio scaled. In this test, the hypothesis is that the rate of change in total cash earnings of firms with derivative use is be less volatile than the rate of change in total cash earnings of firms without derivative use. The focus of this test is on the volatility of earnings and an *F* test for equality of two population variances is performed to determine if the standard deviations of two populations are equal (in this case, the rate of change in total cash earnings with derivative hedging and the rate of change in total cash earnings without derivative hedging).

Research question 5 is a comparative research question and is addressed with inferential statistics. The data is ordinal scaled. An un-weighted quality disclosure index is created to evaluate firms who reported the use of derivative hedging in four categories of financial transparency (Risk, Hedging, Fair Value, and Accounting). Each area of transparency has a select number of questions and each firm is scored a 1 for reporting and a 0 if otherwise. Although it seems as though nominal data is used, these scores are used to rank the quality of disclosure (0 to 1) and are ordinal in nature. A test of population proportions is then conducted to investigate the

proportional differences between quality disclosure in financial reporting before and after the implementation of SFAS No. 133. This population proportion test is a parametric statistical test.

Measures Taken for the Protection of Participants' Rights

The data used in this investigation is derived from publically published financial reports submitted to the Securities and Exchange Commission. All data is pulled by SIC code, saved to a password protected file, and ordered by company ticker code number. No human subjects were used in this research study.

Summary

The data used in this research is obtained from public financial data and is accessed using Mergent Online database. The financial statements and annual reports of the firms in the sample are analyzed to determine the difference in means of total cash earnings and total net accruals. The financial statements include, (a) balance sheets, (b) income statements, (c) statements of cash flows, (d) statements of retained earnings and (e) annual reports. Discretionary accruals are separated from total accruals for all years 1997 – 2007 using a cross-sectional modified Jones model. The proportions of discretionary accrual usage are investigated with a test of population proportions before and after the issuance of the SOX Act. The rate of change in total cash earnings with derivative hedging is tested against the rate of change in total cash earnings without derivative hedging using an *F* test to investigate the differences in variances. The quality of disclosed derivative hedging is analyzed by an un-weighted quality transparency index. The quality of disclosure in derivative hedging is then tested with a population proportion test to investigate financial reporting before and after SFAS No. 133.

CHAPTER 4:

RESULTS

The findings of the evaluations are provided in this section. The statistical test summaries are included in the Appendix and the interpretations of findings and recommendations are provided in chapter 5. The impact to positive social change in the area of financial management is explained in chapter 5.

The economic crisis that began during the late 20th century resulted in dramatic losses in equity values within international financial markets. Between June 2007 and November 2008, Americans lost more than one quarter of their net worth. By early November 2008, the S&P 500 was down 45 percent from its 2007 high. Housing prices had dropped 20% from their 2006 peak, with futures markets signaling a 30-35% potential drop. Total home equity in the United States, which was valued at $13 trillion at its peak in 2006, had dropped to $8.8 trillion by mid-2008, and was still falling in late 2008. Total retirement assets, Americans' second-largest household asset, dropped by 22 percent, from $10.3 trillion in 2006 to $8 trillion in mid-2008. During the same period, savings and investment assets (apart from retirement savings) lost $1.2 trillion and pension assets lost $1.3 trillion. Taken together, these losses total $8.3 trillion (Minton, Stulz, & Williamson, 2009). The crisis of the financial system has resulted in a crisis in the entire economical system (Minton, Stulz, & Williamson, 2009). It has been argued by Crutchley, Jensen, and Marshal (2007) that this financial anomaly is a full market correction directly attributable to the lack of international regulation and consistency in domestic regulation standards within financial markets.

One of the most significant factors in financial markets that have lead to this economic convergence is rooted in the lack of reporting requirements for derivative hedging and speculating (Huddart & Louis, 2008). Derivatives are off the balance sheet items and are not

reported in the same manner as other assets and liabilities (Barton, & Simko, 2002). In addition, these financial instruments have no true value reference and do not accurately reflect market value (Hentschel & Kothari, 1999). Therefore, any unreported gains or losses not reflected in published financial statements or annual reports cannot be captured with the use of the modified Jones model or the quality disclosure index are excluded from this study. In this chapter, the results of the quantitative analysis are reported. The instrumentation, data preparation, statistical analysis, and summary of the findings are provided in this section.

Problems Encountered

Only firms that published complete financial information for the entire period 1997 through 2007 are included. Two firms (ticker codes MXIM and JDSU) are excluded from the sample because they do not possess financial information for the entire period under review. Two firms (ticker codes LSCC and CTXS) are randomly drawn from the population to yield a sample of 30 firms.

Quantitative Data Analysis

As described in chapter 3, this study is designed to investigate the impact of the accounting treatment on earnings smoothing and to evaluate the impact of derivative hedging on real cash earnings. The transparency of derivative reporting has also been investigated to explore the disclosure quality of derivative hedging. There is an established, literature-based need for understanding in the presence of regulation, earnings smoothing through the use of discretionary accruals and derivative hedging. The theoretical foundations of this study employed a systematic, analysis-based study, utilizing the modified Jones model and a quality disclosure index (Lapointe-Antunes, Cormier, Magnan, & Gray-Angers, 2006), similar to the index used by

Lapointe –Antunes to measure the relationship between voluntary disclosure, earnings smoothing, and the value-relevance of earnings.

Total Cash Earnings and Total Net Accruals

Research question 1 is a comparative investigation conducted to addresses the impact of accounting treatment on reported earnings. Generally speaking, total cash earnings should equal total net accruals. In empirical data, accruals use estimates to help reduce timing and mismatching problems in underlying cash flows. The overall benefit of accruals is achieved at the cost of making assumptions and estimates about future cash flows. As a result, accruals possess a fundamental estimation error. Since the errors in estimation reduce the beneficial role of accruals, they should be more volatile than real earnings. To examine this relationship, total cash earnings and total cash accruals are calculated for all firms using an aggregate testing approach for periods 1997 to 2007. The statements of cash flows of the firms are referenced to calculate the total cash earnings for all the firms in the sample for years 1997 through 2007 using the following formula:

$$TCE = \Delta\ Cash + Cash\ Dividends + Stock\ Repurchases - Equity\ Issuances \quad (10)$$

The total net accruals are calculated for all firms using the following formula:

$$TNA = Net\ Income - TCE \quad (11)$$

The average total cash earnings are significantly greater than the average total net accruals as depicted in Figure 2 located in Appendix C.

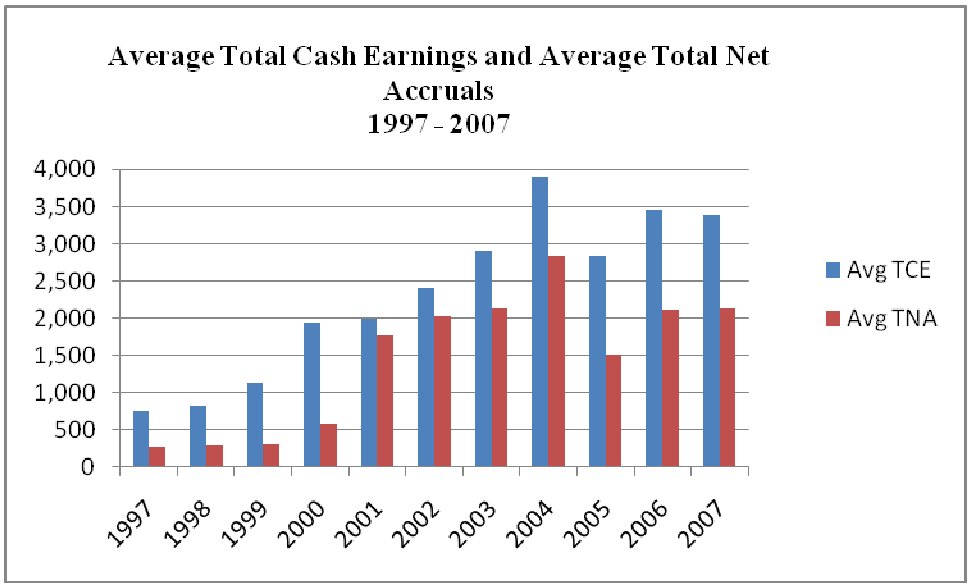

Figure 8. Average total cash earnings and average total net accruals: 1997 – 2007

An, aggregate evaluation and *t* test is conducted for all firms in the sample during periods 1997 through 2007. The hypothesis:

$H_0 : \mu_1 = \mu_2$
$H_1 : \mu_1 \neq \mu_2$

Where: μ_1 = average total cash earnings
μ_2 = average total net accruals

The test is conducted as a two-way *t* test. The results of the aggregate *t* tests for all years 1997 through 2007 depicted in table 8 provide the aggregate results of the t test. The null hypothesis that total cash earnings are equal to total net accruals is rejected and is statistically significant for all years. These results are provided in table 8. In addition, a *t* test for all years 1997 through 2007 is conducted to test the sensitivity of the aggregate *t* tests. The result of the sensitivity *t* test for all years is also statistically significant.

Table 7 Aggregate t tests Results for Total Cash Earnings and Total Net Accruals

Aggregate *t* tests							
Year	*n*	*df*	*TCE M*	*TCE SD*	*TNA M*	*TNA SD*	*p*
1997	30	58	758	1,789	(273)	532	0.00
1998	30	58	820	1,911	(284)	735	0.01
1999	30	58	1,139	2,550	(315)	1,169	0.01
2000	30	58	1,933	3,522	(575)	1,116	0.00
2001	30	58	1,985	6,063	(1,772)	4,759	0.01
2002	30	58	2,400	7,546	(2,022)	6,084	0.02
2003	30	58	2,896	9,338	(2,123)	7,483	0.03
2004	30	58	3,889	10,567	(2,833)	8,937	0.01
2005	30	58	2,840	5,687	(1,504)	3,183	0.00
2006	30	58	3,443	8,654	(2,120)	6,264	0.01
2007	30	58	3,381	8,084	(2,134)	5,386	0.00
Sensitivity t test							
Year	n	df	TCE M	TCE SD	TNA M	TNA SD	p
1997 - 2007	330	658	2,317	6,659	(1,450)	5,022	0.00

Note. n = number of firms in the sample; *df* = degrees of freedom; *TCE M* = total cash earnings mean; *TCE SD* = total cash earnings standard deviation; *TNA M* = total net accruals mean; *TNA SD* = total net accruals standard deviation; *p* = associated *p* value.

The means for total cash earnings are greater than the means for total net accruals for all years 1997 through 2007. The degree of dispersion around the mean, measured by the standard deviation is greater for total net accruals than for total cash earnings with the exception of periods 1997, 1998, and 2000. Full statistical summaries for all aggregate *t* tests and sensitivity tests are provided in Appendix C.

Research question 2 is a correlational test conducted to addresses the impact of discretionary accruals on the accounting treatment on reported earnings. To analyze discretionary accruals, non-discretionary accruals are separated from total accruals (Kothari, Leone, & Wasley, 2005). The modified Jones model is used to create the dichotomy between discretionary and non-discretionary accruals. The analysis includes the use of a multiple linear regression model that regresses the total net accruals to estimate the coefficients for discretionary accruals (Hribar, &

Collings, 2002; Kothari, Leone, & Wasley, 2005; & Tucker, & Zarowin, 2006). This study uses a cross-sectional research approach. Total net accruals (TNA) are calculated from the total net accruals equation while NDA is determined with the regression of total net accruals. A regression correlational analysis is used to determine the discretionary component of total accruals. Once the discretionary components are determined for each firm in the sample for all periods 1997 – 2007, a *t* test is conducted to investigate discretionary usage of firms before and after the issuance of SOX.

Analysis of Discretionary Accruals

The total net accruals are regressed using the following formula:

$$NDA = \beta_0 + \beta_1 (ATA) + \beta_2 (\Delta Sales - \Delta Rec) + \beta_3 (GPPE) + \varepsilon \qquad (12)$$

The resulting coefficients for discretionary accruals identified in table 9, are used to construct the estimated regression equations for non-discretionary accruals provided in table 10. For aggregate statistical summaries, refer to Appendix D.

Table 8 Estimated Regression Coefficients

Year	Intercept	ATA	ΔSales – ΔRec	GPPE
1997	13.17	0.15	(0.15)	(0.08)
1998	92.19	0.12	0.12	(0.10)
1999	135.45	0.05	(0.07)	0.16
2000	(90.85)	0.19	0.10	0.01
2001	(761.52)	0.36	(0.13)	(0.24)
2002	(530.76)	0.47	0.67	(0.48)
2003	(881.76)	0.34	4.18	(0.62)
2004	(1,021.52)	0.58	(0.50)	(0.53)

2005	77.50	0.20	(0.32)	(0.11)
2006	(1,226.39)	0.45	(0.31)	(0.44)
2007	376.67	(1.27)	3.23	(0.05)

Note. The table shows the regression coefficients for the aggregate non-discretionary accruals for periods 1997 through 2007.

Table 9 Estimated Regression Equations

Year	Estimated Regression Equation	R^2	Adjusted R^2
1997	$\hat{y} = 13.168 + 0.147x - 0.148x - 0.079x$	*0.82*	*0.80*
1998	$\hat{y} = 92.193 + 0.122x + 0.124x - 0.102x$	*0.70*	*0.66*
1999	$\hat{y} = 135.452 + 0.045x - 0.066x + 0.161x$	*0.88*	*0.87*
2000	$\hat{y} = -90.851 + 0.189x + 0.101x + 0.012x$	*0.83*	*0.81*
2001	$\hat{y} = -761.518 + 0.358x - 0.130x - 0.238x$	*0.73*	*0.70*
2002	$\hat{y} = -530.757 + 0.472x + 0.674x - 0.483x$	*0.86*	*0.84*
2003	$\hat{y} = -881.759 + 0.343x + 4.176x - 0.618x$	*0.86*	*0.84*
2004	$\hat{y} = -1,021.520 + 0.584x - 0.504x - 0.528x$	*0.91*	*0.90*
2005	$\hat{y} = 77.502 + 0.196x - 0.315x - 0.113x$	*0.83*	*0.82*
2006	$\hat{y} = -1,226.387 + 0.447x - 0.306x - 0.435x$	*0.80*	*0.78*
2007	$\hat{y} = 376.669 - 1.272x + 3.225x - 0.049x$	*0.68*	*0.64*

Note. In a multiple linear regression model, the adjusted R^2 measures the proportion of the variation in the dependent variable accounted for by the explanatory variables. Unlike r square, the adjusted R^2 allows for the degrees of freedom associated with the sums of the squares. Therefore, even though the residual sum of squares decreases or remains the same as new explanatory variables are added, the residual variance does not. The adjusted R^2 is generally considered a more accurate goodness-of-fit measure than R^2; nevertheless, both the R^2 and the adjusted R^2 are reported in this table (Aczel, & Sounderpandian, 2002).

The adjusted R^2 for each year are above .80 with the exception of year 2001 (.70), and 2007(.64). The adjusted R^2 allows for the degrees of freedom associated with the sums of the squares. Therefore, even though the residual sum of squares decrease or remain the same as new explanatory variables are added, the residual variance does not. For this reason, the adjusted R^2 is considered an accurate goodness-of-fit measure and this linear regression was used on the assumption that the independent variables possess strong explanatory power. These equations

were used to predict the aggregate non-discretionary accruals of all firms for periods 1997 – 2007. The cross-sectional coefficients along with a specific firm's data are used to estimate the firm specific non-discretionary accruals for the period 1997 through 2007.

Discretionary Accruals Activity

Discretionary accruals have steadily increased from 1997 to 2007. Figure 2 provides a visual depiction of discretionary and non-discretionary accrual activities for this period.

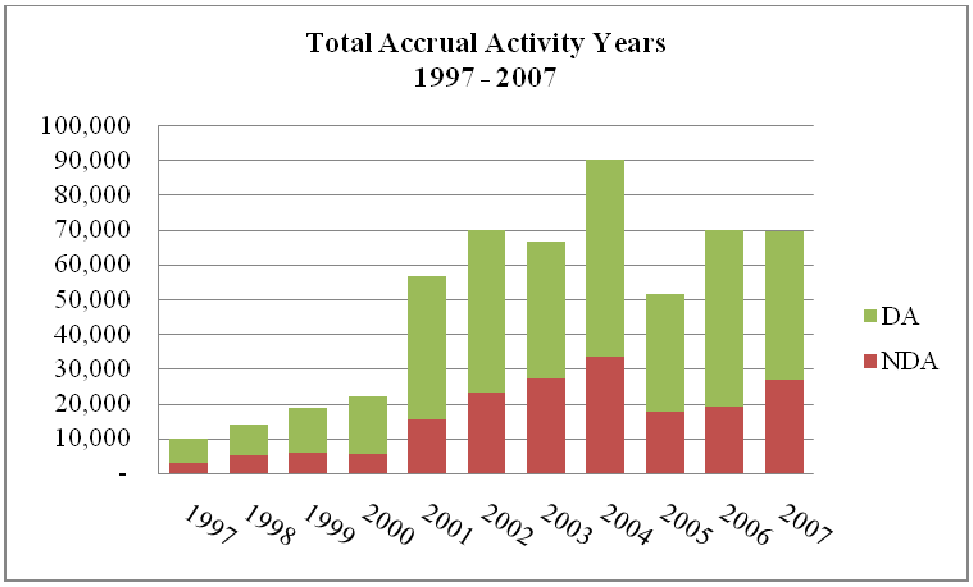

Figure 9. Total accrual activity years: 1997 - 2007

As illustrated by the histogram of total accruals, the discretionary accruals represent a significant portion of total accruals. A breakout of total net accruals is provided in Table 11. For full statistical summaries, refer to Appendix D.

Table 10 Discretionary Accruals Activity: Years 1997 – 2007

Year	TNA	NDA	DA	DA as a % of TNA
1997	10,044	3,061	6,982	70%
1998	13,839	5,226	8,613	62%
1999	18,688	5,879	12,809	69%
2000	21,951	5,596	16,355	75%
2001	56,637	15,583	41,054	72%
2002	69,921	23,074	46,847	67%
2003	66,384	27,217	39,166	59%
2004	90,184	33,368	56,816	63%
2005	51,508	17,488	34,020	66%
2006	69,750	19,216	50,534	72%
2007	69,415	26,868	42,547	61%
Average DA as a % of TNA periods (1997 - 2002)				67%

Note. TNA = total net accruals; NDA = non-discretionary accruals; DA = discretionary accruals

SOX Impact on Discretionary Accruals

Research question 3 is a comparative investigation conducted to evaluate the population proportion of discretionary accruals used before and after the issuance of SOX. The average percentage of discretionary accruals as a percentage of total accruals for all years 1997 through 2007 is 67%. The intent of this test is to investigate the proportion of firms who reported financials with discretionary accruals representing more than the average discretionary accruals as expressed as a percentage of total net accruals for years 1997 through 2007 (67%). This is a two-way population proportion test and the hypothesis is:

H_0: $p_1 = p_2$
H_1: $p_1 \neq p_2$

Where: p_1= number firms with DA representing more than 67% of TNA in 2000
p_2 = number of firms DA representing more than 67% of TNA in 2005

The test statistic is 2.43 and the null hypothesis is rejected at $p = .014$. The results are statistically significant. The sample sizes are 30 for both samples.

Evidence	2000	2005	
Size	30.00	30.00	*n*
# of firms w/over 67% of DA in TNA	24.00	15.00	*x*
Proportion	0.8000	0.5000	*p-hat*

Hypothesis Testing

Hypothesized Difference Zero

Pooled *p*-hat	0.6500	
Test Statistic	2.4360	*z*

Null Hypothesis	***p*-value**	**At an □ of** 5%
H_0: $p_1 - p_2 = 0$	0.0149	**Reject**
H_0: $p_1 - p_2 >= 0$	0.9926	
H_0: $p_1 - p_2 <= 0$	0.0074	**Reject**

Figure 10. This figure shows the proportion of discretionary accruals in 2000 and 2005. The p-hat is the proportion of individuals having the characteristic when the two samples are lumped together.

In 2000, 80% of firms used discretionary accruals that represented more than 67% of the total net accruals. In 2005, the number of firms reduced to 50% of firms who used discretionary accruals that represented more than 67% of the total net accruals. The findings suggest the use of accruals are increasing but the percentage of discretionary accruals is decreasing.

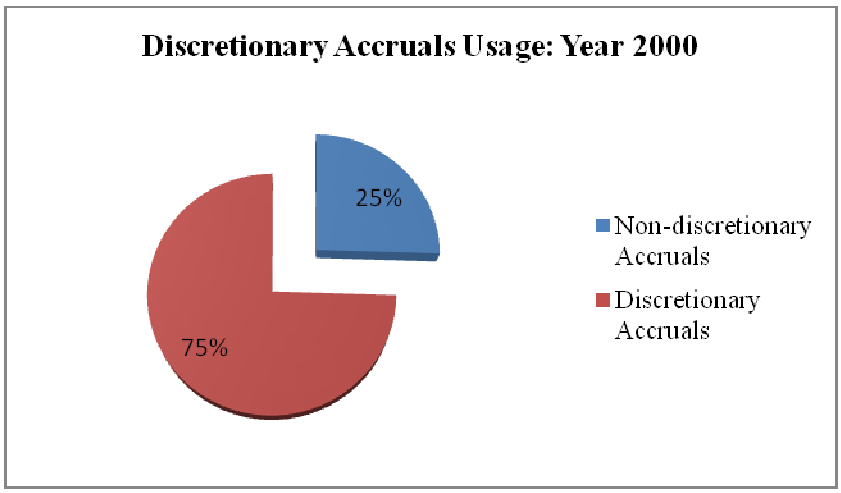

Figure 11. Discretionary Accrual Usage: Year 2000

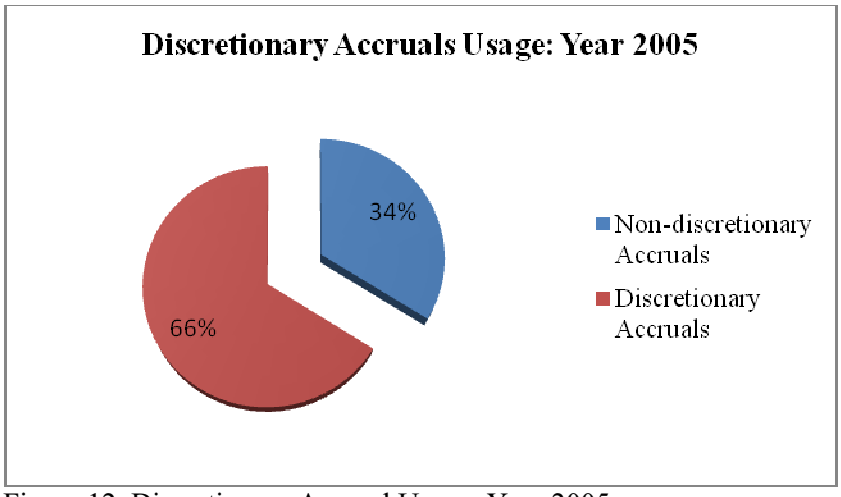

Figure 12. Discretionary Accrual Usage: Year 2005

Discretionary accruals represented 75% of total net accruals in year 2000 and 66% in 2005. The use of discretionary accruals has decreased 12% from year 2000 to 2005 for high technology firms.

Analysis of Derivative Hedging

Research question 4 is a comparative investigation conducted to analyze the variance of the rate of change in total cash earnings of firms who use derivative hedging and compare these earnings to firms who do not use derivative hedging. Using an aggregate analysis approach, the rate of change in total cash earnings is calculated across 10 years (using the rate of change calculation reduces the sample size from 11 to 10) and an *F* test is conducted to evaluate the rate of change in total cash earnings with derivative hedging against the rate of change in total cash earnings without derivative hedging. The expectation is that the rate of change in total cash earnings with derivative hedging is less than the rate of change in total cash earnings without derivative hedging. The stated hypothesis is:

$H_0 : \sigma^2/_1 \geq \sigma^2/_2$
$H_1 : \sigma^2/_1 < \sigma^2/_2$

Where: $\sigma^2/_1$ = rate of change in total cash earnings without derivative hedging
$\sigma^2/_2$ = rate of change in total cash earnings with derivative hedging

	TCE without derivatives	TCE with derivatives	
Size	10	10	***n***
Variance	1,230,487.18	64,274,955.28	***s2***
Std Dev	1,109.27	8,017.17	***SD***

Test Statistic	0.0191	***F***
df1	9	
df2	9	

Null Hypothesis	***p-value***	**At an α of** 0.05
H_0: $\sigma^2_1 - \sigma^2_2 = 0$	0.00	Reject
H_0: $\sigma^2_1 - \sigma^2_2 >= 0$	0.00	Reject
H_0: $\sigma^2_1 - \sigma^2_2 <= 0$	1.00	

Figure 13. This figure shows the statistical summary of the rate of change in derivative hedging.

The null hypothesis is rejected with a test statistic of .02 and a $p = <.000$. The degree of dispersion as measured by the standard deviation is greater for the rate of change in total cash earnings with derivative hedging (*SD* = 8,017) than it is in the rate of change in total cash earnings without derivative hedging (*SD* = 1,109). For a full statistical summary, refer to Appendix E.

Disclosure Quality Analysis

Research question 5 is a comparative investigation conducted to analyze the quality of disclosed financial statements of firms who reported the use of derivative hedges. All companies who reported the use of derivative hedging in their financial statements and annual reports are examined. The financial statements and annual reports are measured by the quality of disclosed financial information in the areas of accounting policy information, anticipated hedging activities, risk assessment, and net fair value information. The firms are evaluated in these four areas of

transparency (Risk, Hedging, Fair Value, and Accounting). Each area of transparency has a select number of questions. Each firm is scored a "1" for reporting the information and a "0" if otherwise. Then all scores are summed and divided by the possible score (for example the Risk area includes 3 questions so a firm could score a 3 if they reported in each area. If they score a 3 then the 3 would be divided by the 3 (possible score) resulting in a 1). The averages of disclosed quality scores have been determined for all firms who reported the use of derivative hedging for the periods 1997 through 2007.

Table 11 Average QDI Scores: Years 1997 - 2007

Year	Policy Information	Hedges of Anticipated Transactions	Risk Information	Net Fair Value Information	Disclosure Quality
1997	0.81	0.65	0.73	0.63	0.70
1998	0.77	0.62	0.63	0.56	0.65
1999	0.81	0.62	0.65	0.59	0.67
2000	0.80	0.64	0.78	0.63	0.71
2001	0.88	0.67	0.76	0.69	0.75
2002	0.90	0.75	0.87	0.71	0.81
2003	0.88	0.72	0.79	0.68	0.77
2004	0.90	0.71	0.81	0.68	0.78
2005	0.93	0.74	0.86	0.67	0.80
2006	0.94	0.80	0.86	0.71	0.83
2007	0.90	0.75	0.87	0.71	0.81

Note. A score of 1 = superior disclosure quality in financial reporting and a score of 0 = poor disclosure quality in financial reporting.

There is some volatility in the QDI scores for firms who reported derivative hedging.

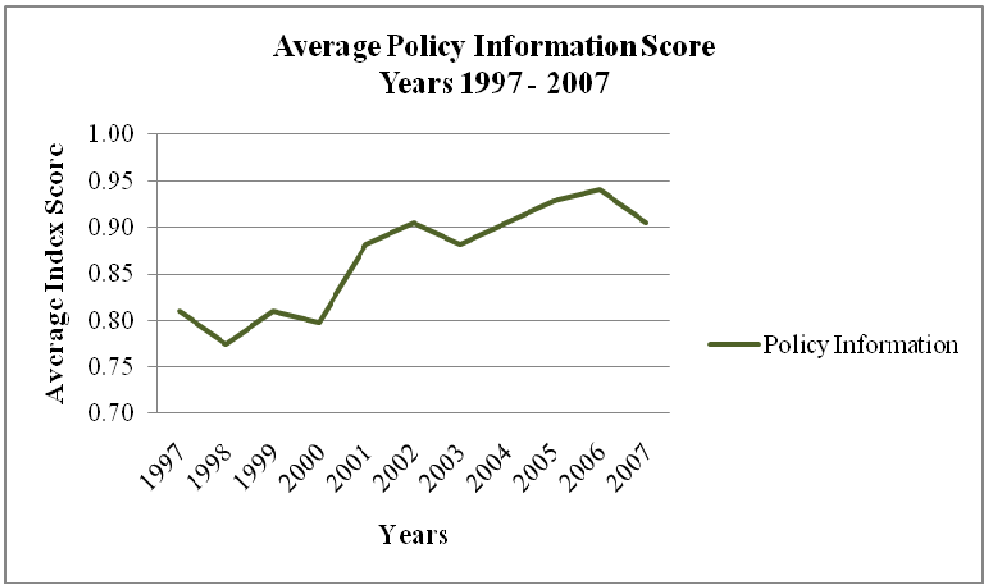

Figure 14. This figures shows a graphical depiction of the average policy information score for years 1997 – 2007.

The overall average policy information score for firms who reported the use of derivative hedging is increasing from year 2000 to 2006 with a drop in 2007.

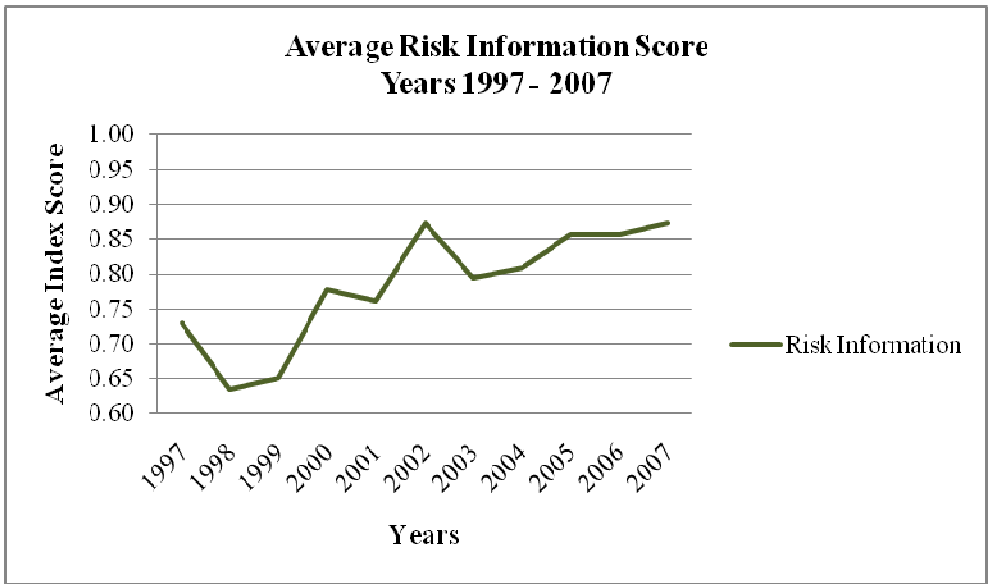

Figure 15. This figure shows the average risk information score for years 1997 - 2007

The average risk information score for firms who reported the use of derivative hedging has experienced volatility in years 1997 through 2002, however the quality of disclosing risk information is steadily improving in years 2003 through 2007.

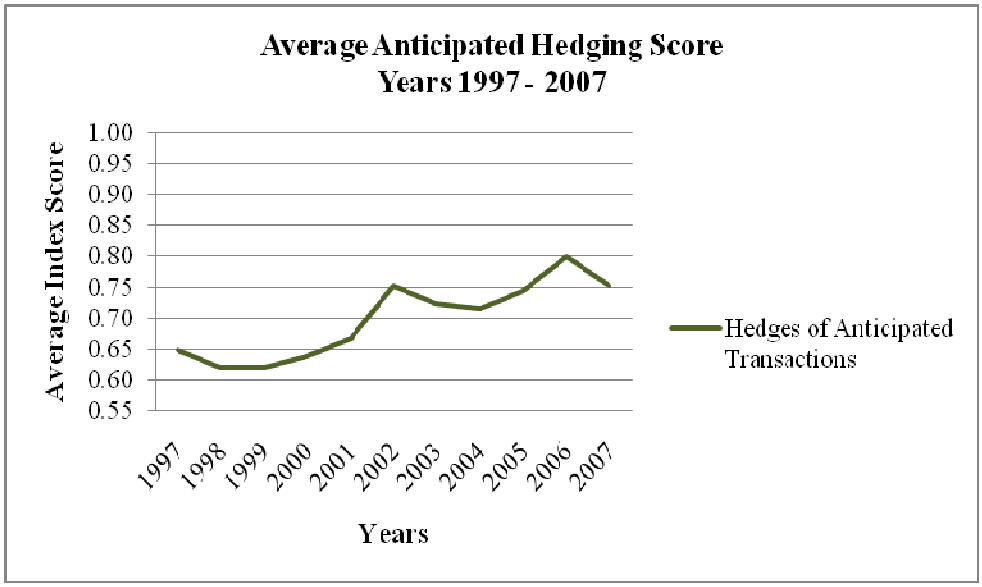

Figure 16. This figure shows the average anticipated hedging score for years 1997 - 2007.

Although there are some drops in the average anticipated hedging score of firms who reported the use of derivative hedging, the overall progression of derivative hedge reporting is improving.

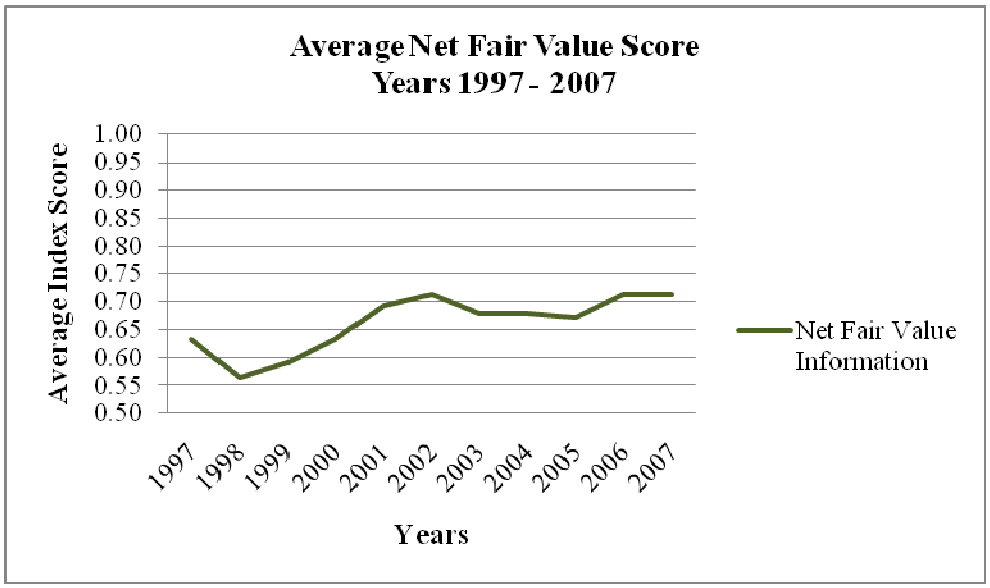

Figure 17. This figure shows a graphical depiction of the average net fair value scores for years 1997 – 2007.

The average net fair value score for firms who reported the use of derivative hedging in years 1997 – 2007 is steady and is marginally improving.

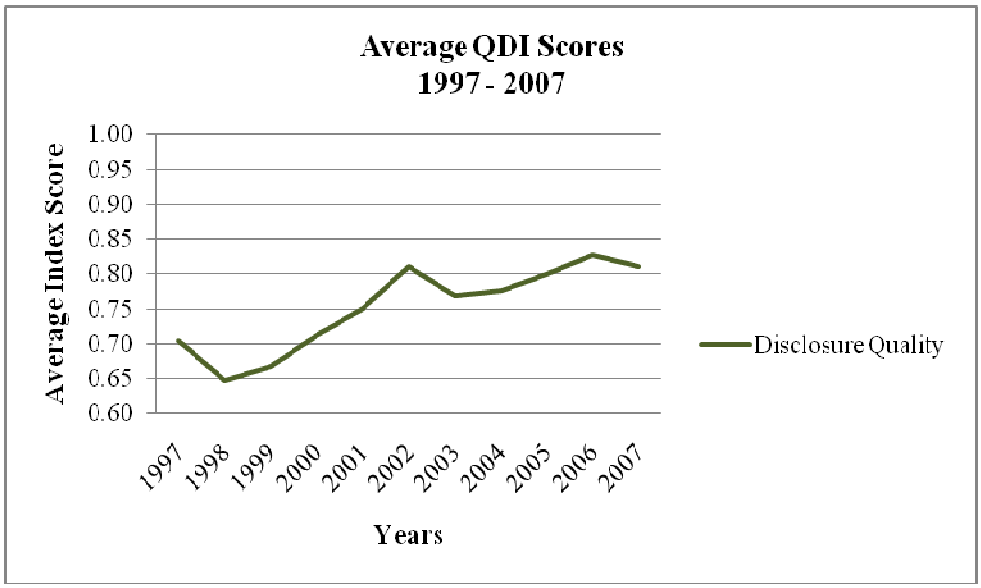

Figure 18. This figure shows the graphical depiction of the average QDI scores for years 1997 - 2007

The average QDI score is a composite of all other transparency categories for the annual reported years 1998 through 2007. The annual QDI score was below 80% for all firms in the sample for seven of the eleven years in the data range. The highest annual QDI score of 83% occurred in 2006 with a slight drop (down to 81%) in 2007. However, the overall disclosure quality of financial reporting is significantly improving. An evaluation of the proportion of QDI scores in 1998 and 2002 is conducted (before and after SFAS No. 133). The QDI scores of firms who reported the use of derivative hedging are presented in figure 8 and 9.

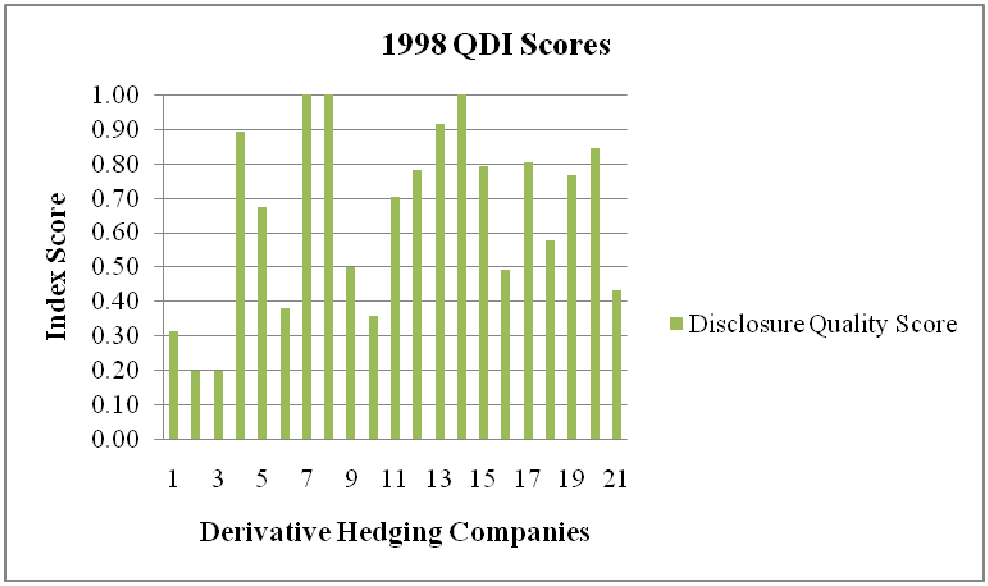

Figure 19. This figure shows the graphical depiction of the QDI scores for year 1998.

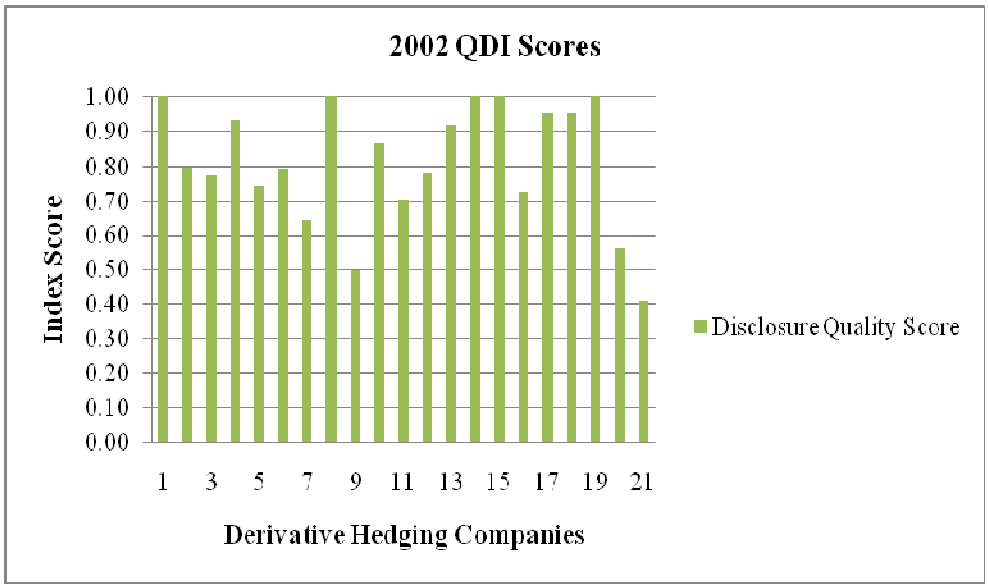

Figure 20. This figure shows the graphical depiction of QDI scores for year 2002.

Of the firms who reported derivative hedging, 67% scored less than 80% on the disclosure quality index for the year 1998. However, in 2002 the firms with a QDI score less than 80% reduced to 48% of total firms in the sample. The mean QDI score in 1998 is 65% while the mean QDI score in 2002 is 81%. The proportion of QDI scores above 80% in 1998 is 33% and the proportion of QDI scores above 80% in 2002 is 57% with a test statistic of -1.550. The hypothesis is:

H_0: $p_1 \geq p_2$
H_1: $p_1 < p_2$

Where: p_1= number o firms with QDI scores above 80% in 1998
p_2 = number of firms with QDI scores above 80% in 2002

The null hypothesis that the number of firms with QDI scores above 80% in 1998 is greater than the number of firms with QDI scores above 80% in 2002, with a p = .061. The number of firms with QDI scores above 80% is greater before the issuance of SFAS than it is after.

Evidence	**1998**	**2002**	
Size	21	21	*n*
# of QDI Scores above 80%	7	12	*x*
Proportion	0.33	0.57	*p-hat*

Hypothesis Testing
Hypothesized Difference Zero

Pooled p-hat	0.452	
Test Statistic	-1.550	z

Null Hypothesis	p-value	At an α of 0.05
H_0: $p_1 - p_2 = 0$	0.121	
H_0: $p_1 - p_2 >= 0$	0.061	
H_0: $p_1 - p_2 <= 0$	0.939	

Figure 21. This figure shows the summary statistics for the QDI population proportion for years 1998 – 2002. The p-hat is the proportion of individuals having the characteristic when the two samples are lumped together.

Summary

Research question 1 is a comparative investigation of total cash earnings and total net accruals. Aggregate t tests are conducted to examine the difference in means of total cash earnings and total net accruals for the periods 1997 through 2007 with a sensitivity test conducted for all periods 1997 – 2007. The results are statistically significant and indicate the means for total cash earnings are greater than the means for total net accruals for all years 1997 through 2007. The degree of dispersion around the mean, measured by the standard deviation is greater for total net accruals than for total cash earnings with the exception of periods 1997, 1998, and 2000. These findings suggest total cash earnings are greater than total net accruals however, total net accruals are more volatile reflective of dispersion around the mean.

Research question 2 is a correlational investigation of the discretionary component of total net accruals. The modified Jones model is used to stratify non-discretionary accruals from total net accruals and the difference is calculated to yield the total discretionary accrual activity. The analysis includes the use of a multiple regression model that is used to regress the total net

accruals to estimate the coefficients for discretionary accruals. A cross-sectional approach is used to analyze the data. The R^2 and adjusted R^2 is provided to evaluate the effectiveness of the regression model.

The adjusted R^2 for each year are above .80 with the exception of year 2001 (.70), and 2007(.64). The adjusted R^2 allows for the degrees of freedom associated with the sums of the squares. Therefore, even though the residual sum of squares decrease or remain the same as new explanatory variables are added, the residual variance does not. For this reason, the adjusted R^2 is considered an accurate goodness-of-fit measure and this linear regression was used on the assumption that the independent variables possess strong explanatory power. These equations are used to predict the aggregate non-discretionary accruals of all firms for periods 1997 – 2007. The cross-sectional coefficients along with a specific firm's data are used to estimate the firm specific non-discretionary accruals for the period 1997 through 2007.

Research question 3 is a comparative investigation of the proportional differences of discretionary accruals before and after the issuance of SOX (periods 2000 and 2005). The average percentage of discretionary accruals as a percentage of total accruals for all years 1997 through 2007 is 67%. The intent of this test is to investigate the proportion of firms who reported financials with discretionary accruals representing more than the average discretionary accruals as expressed as a percentage of total net accruals for years 1997 through 2007 (67%). The findings suggest the proportion of discretionary accruals is greater before the issuance of SOX than after the issuance.

Research question 4 is a comparative investigation of the rate of change in total cash earnings with derivative hedging and the rate of change in total cash earnings without derivative hedging. The findings suggest the rate of change in total cash earnings with derivative hedging is less than the rate of change in total cash earnings without derivative hedging.

Research question 5 is a comparative investigation conducted to investigate the proportion of the quality of disclosed financial statements of firms who reported the use of derivative hedges. Each firm in the sample is evaluated in terms of risk, hedging, fair value, and accounting information provided in annual reports and financial statements. The quality disclosure index score (QDI) is calculated by assigning a 1 for reporting the information and a 0 if otherwise. Then all scores are summed and divided by the possible score. The findings suggest the proportion of firms with QDI scores of 80% or above for firms who used derivative hedging were greater in 1998 than they were in 2002 (greater before the issuance of SFAS No. 133 than after).

In the next chapter, the interpretation of findings, inferences from study results are provided, the impacts to positive social change are explained, and recommendations for further research are introduced.

CHAPTER 5:

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

Earnings management activities through the use of discretionary accruals and derivative hedging are a central concern because of the financial impact on society as a whole and the widening financial exposure of mispricing assets (Bartov, Givoly, & Hayn, 2002). The U.S. Congress and the Financial Accounting Standards Board has introduced regulation with the efforts to minimize ambiguity in derivative hedging and to enhance transparency in financial reporting. The Statements of Financial Accounting Standards No. 133, Accounting for Derivative Instruments and Hedging Activities (SFAS No. 133) was created in 2001 in response to significant hedging losses involving derivatives (Dubofsky, & Miller, 2003). The intent of SFAS No. 133 was to control and manage corporate hedging as risk management not earnings management activities (Barton, 2001). However, based on the events that have lead to the convergence of financial markets in 2007, it is evident that earnings management activities have found a place in derivative hedging (Minton, Stulz, & Williamson, 2009). The Sarbanes- Oxley Act issued in 2002, was created to strengthen corporate accounting controls. Yet, earnings smoothing through the use of discretionary accruals is increasing in the high technology industry sector—a sector regarded as income conservative (Uday, Wasley & Waymire, 2004).

Problems Encountered

Only U. S. firms identified as high technology firms by SIC code and possess reported financial data for years 1998 through 2007 were included in this study. To satisfy this requirement, two firms were dropped from the sample (firms with ticker codes MXIM and JDSU) and two firms were randomly drawn from the population defined by SIC code (firms with ticker codes LSCC and CTXS) to yield 30 companies. This analysis is based on the published financial

statements and annual reports of firms in the sample therefore the accuracy of this study is limited to financial information reported to the Securities and Exchange Commission during years 1997 through 2007.

The economic crisis of 2007-08 that contributed to the meltdown of the of the U.S. sub-prime housing market had a variety of implications for the economy. The crisis stifled international business, spiked global oil and food prices, and brought consumer credit to a halt. It also created a great deal of uncertainty surrounding the reporting and regulation of financial markets. In this section, the quantitative findings from the tests conducted in this study are explained. Each individual research question is answered and a final interpretation of research findings is provided. The overall contribution to positive social change is presented and recommendations to existing policy will be presented. The final section lays the groundwork for future research and includes recommendations for future areas of research.

Interpretation of Findings

Research question 1 focused on the differences between total cash earnings and total net accruals for high technology firms. The question was addressed with an aggregate *t* test that is used to evaluate the difference in means of total cash earnings and total net accruals for all years 1997 through 2007. The intent of this test is to identify differences between these two populations. The null hypothesis that total cash earnings are equal to total net accruals is rejected for all years 1997 – 2007 and is statistically significant. The sensitivity *t* test that evaluates total cash earnings and total net accruals is also statistically significant with a $p < .000$. The means of total cash earnings are greater than the means for total net accruals for all years 1997 through 2007. The findings from the aggregate *t* test of all years ranging from 1997 to 2007 suggest firms

are using estimates that are significantly lower than actual cash earnings. The findings are consistent with the study conducted by Uday, Wasley, and Waymire in 2004.

The firms in the sample represent the high technology industry segment. The high technology industry segment has been described as an income conservative practicing environment (Lobo, & Zhou, 2006). High technology firms face greater risks of shareholder litigation than other industries (Lobo, Zhou, 2006). High tech industry companies are also affected to a greater degree by conservative accounting standards on research and development costs (Uday, Wasley, & Waymire, 2004). The means of total cash earnings are greater than the means of total accruals for this industry segment; this finding suggests that risk adverse managers are likely to be more conservative in their financial reporting.

Research question 2 focused on the discretionary accruals calculated by referencing the modified Jones model to breakout discretionary accruals from non-discretionary accruals. The estimated regression equations are used to determine the discretionary component of total net accruals. An evaluation of discretionary accruals activity is conducted.

Research question 3 focused on the proportional differences between discretionary accruals in 2000 and 2005. The number firms with discretionary accruals representing more than 67% of total net accruals in 2000 is greater than the number of firms with discretionary accruals representing more than 67% of total net accruals in 2005 (after SOX) ($p = .007$). In 2000, discretionary accruals represented 75% of total net accruals and in 2005; discretionary accruals represented 66% of total net accruals (just 1% less than the average for all years 1997 through 2007). Although the use of discretionary accruals appears to be shrinking in the high technology industry segment, the discretionary percentage remains high.

Research question 4 focused on the variances in the rate of change in total cash earnings with derivative hedging and the variances in the rate of change in total cash earnings without

derivative hedging. The findings suggest the rate of change in total cash earnings of firms who use derivative hedging (M = 232.54, SD = 1,109) is less volatile than the rate of change in total cash earnings of firms who do not use derivative hedging (M = 3,701.91, SD = 8,017). Derivative hedging therefore minimizes earnings volatility for firms in the high technology industry segment.

Research question 5 focused on the quality of disclosed financial statements particularly with regard to derivative hedging. Firms who reported the use of derivative hedging were evaluated with the use of a quality disclosed index (QDI) to reflect the transparency of financial reporting in the area of risk, accounting, hedging, and fair value. In the quality disclosure analysis, 67% of the firms who reported the use of derivative hedging scored less than .80 on the QDI in 1998. In 2002, 48% of firms who reported the use of derivative hedging scored less than .80 on the QDI. These findings suggest a 20% increase in the quality of financial transparency reporting between year 1998 and 2002. However, 55% of firms who reported the use of derivative hedging in 2007 scored less than .80 on the QDI. A population proportion test was conducted to test the proportion of quality disclosure reporting between 1998 and 2002. The descriptive statistics suggest disclosure quality of high technology firms is increasing. However, the null hypothesis that the number of firms in 1998 with QDI scores above 80% is greater than the proportion of the firms with QDI scores above 80% in 2002 cannot be rejected (p = .06). This suggests the quality of disclosure in derivative reporting in 1998 is superior to the quality of disclosure in derivative reporting in 2002. These findings suggest the QDI scores of firms were higher before SFAS No. 133 than after the issuance of SFAS No. 133.

The QDI scores dropped from .70 in 1997 to .65, in 1998. The largest drop in quality disclosure scores of firms who reported the use of derivative hedging between 1997 and 1998 is in the risk information (9.5% decrease) and net fair value information (6.8% decrease) categories. These findings are consistent with FASB's response to the significant hedging losses involving derivatives and the issuance of SFAS No.133. The intent of SFAS No. 133 was to control and manage corporate hedging as risk management (Barton, 2001).

Conclusions and Implications for Social Change

The accounting treatment of operational activities has a definite impact on reported earnings. It has been argued firms in the high technology industry segment exercise income conservatism (Kwon, Yin, & Han, 2006). Total accrual usage has increased and the discretionary component of accruals has slightly decreased. The proportion of discretionary accruals in 2000 is greater than the proportion of discretionary accruals in 2005, but the proportion of discretionary accruals in 2005 is just 1% less than the average discretionary proportion for all years 1997 through 2007. This suggests that management choices (discretionary accruals) represent a significant portion of financial reporting. It is evident SOX implemented in 2002 has minimized earnings smoothing through the use of discretionary accruals in the high technology industry segment.

In addition, the use of derivative hedging is increasing; over 70% of the firms in the sample reported the use of derivative hedging during the period 1997 through 2007. Derivative hedging allows firms to establish a leveraged position with minimal margin requirements (sometimes no collateral required) resulting in an increase in price exposure (Financial Economists Roundtable. 1994). They are off-balance sheet activities that are not reported with the same clarity and detail as other securities, loans, or other assets or liabilities (Guay, 1999).

The quality disclosure of financial reporting was investigated to examine the transparency of financial reporting for derivative hedging. The findings suggest the quality of financial reporting is increasing. The QDI scores of firms were higher before SFAS No. 133 than they were after the issuance of SFAS No. 133. However, 55% of firms who reported the use of derivative hedging in 2007 scored less than .80 (out of 1.0) on the QDI. For the aggregate years 1997 through 2007, 51% of firms scored less than .80 on the QDI: hedges of anticipated transactions category. In addition, 58% of firms scored less than .80 on the QDI: net fair value category for the aggregate years 1997 through 2007. These findings suggest that 51% of firms in the high technology industry segment who used derivative hedging during the period 1997 through 2007, did not fully report activities that exposed the firm to market and credit risk.

Derivative hedging does have an impact on a firm's ability to report stable earnings in the high tech industry segment. When a firm uses derivative hedging, the variance in the annual rate of change in total cash earnings is reduced suggesting derivative hedging minimizes real earnings volatility (Barton, 2001). These findings support Barton's conclusion that derivative hedging provides significant value in risk management.

It is clear that earning smoothing activities represent a large portion of reported earnings in the high technology industry segment. Mixed results follow regulations such as SOX and FASB 133 with regard to the use of discretionary accruals and derivative hedging. The increase in earnings management defined by discretionary accruals is alarming considering the lack of transparency in financial reporting.

Challenges to Neo-Classical Economic Theory

Under the Efficient Market Theory, a perfectly competitive market is a well-functioning market, where the prices of capital assets (securities) reflect predictions based on all relevant and

available information (Anderson, Caldwell, & Needles, 1994). This concept holds that securities prices established in financial markets, fully reflect all the available and relevant information to investors. The assumption is that security prices follow a random walk (Basu, 1977). The premise is that if all relevant information is reflected in the current market price, then only meaningless noise is left to explain price movements. However, these rules can not apply to a financial instrument that presents no market reference for pricing or lies outside the reporting requirements of other securities.

Another axiom of efficient market theory is that investors cannot systematically beat the performance of the market because all relevant market information is used to determine the price and any future changes in price are sporadic (Laffont, & Maskin, 1990). Any price that does reflect the perfectly informed fundamentals creates the possibility of arbitrage trading that will drive the price back to the level thus reflecting informed fundamentals resembling a price correction (Brenner, 1979). However, from the findings of this study and from the examples illustrated in the collapse of Enron in 2001, and the onslaught of government financial bail outs of 2009; it is evident that financial markets are imperfect as a result of information asymmetry. It is apparent that a significant level of disparity exists between actual characteristics of financial markets and the assumptions of neo-classical economic theory.

Under the Capital Asset Pricing Model (CAPM created by William Sharpe and John Lintner), market behavior can be explained by pricing risk in financial markets (Jagannathan, & Wang, 1996). The premise of the CAPM is that securities are efficiently priced by financial markets according to their relative risk (beta) compared to the inherent risk in the market as a whole. Under this model, risk is determined by the degree of volatility (Sharpe, 1964). The greater the degree of variation measured by beta, the lower the price of the security. This premise suggests the market rewards lower risk securities with a higher price and higher risk securities

with a greater return on investment (Harris, & F., 2001). However, this efficient-risk-reward relationship applies only to the direct ownership of the security. When a firm uses derivatives for hedging (or speculating) they are diverting the risk to others. This risk shifting stimulates risk exposure to outside counterparties (Jagannathan, & Wang, 1996). For example, Enron's collapse drove natural gas prices down across the U.S. after its counterparties lost their positions which required them to replace their short-hedge position on the NYMEX or selling its inventory (Benston, & Hartgraves, 2002). It is apparent that hedging risk can result in a rippling effect to individuals with no direct exposure to the defaulting party. Therefore, current markets conditions cannot address all the aspects of risk hedging. Due to these market imperfections formulated by the lack of transparency in derivative reporting and the intent of risk diverting; the establishment of market equilibrium and the creation of efficient markets cannot be achieved (Niranjan, Quan, & Meenakshi, 2007). These market imperfections, short-comings and other failures result in externalities that all individuals in the economy must bear.

Contributions to Positive Social Change

This study provides evidence to managers, investors, and legislators that earning management activities represent a significant portion of total accruals. It has been shown that the accounting treatment of operational activities has an impact on the ability to stabilize reported earnings. The evidence also indicates regulation such as SOX and SFAS No. 133 has not eliminated earning management activities through the use of discretionary accruals or derivative hedging in the high technology industry segment.

This analysis contributes to positive social change by highlighting the significance of these findings and by introducing externalities that have surfaced as a result of the lack of transparency in financial reporting. It is essential that government regulation play a leading role in setting reporting standards. Free and competitive markets cannot exist with these types of

financial instruments. The rippling effects of these instruments extend beyond neo-classical economics of market discipline. In some cases, market competition actually drives participants to hold less and less capital relative to their risk exposure (Abdel-khalik, 2006). The linkages of these externalities are clearly demonstrated by the collapse of the Enron Corporation in 2001 when the effects of the bankruptcy spread beyond stock and bond holders, employees and immediate creditors (Benston, & Hartgraves, 2002). To enhance financial markets and contribute to positive social change, I make the following suggestions for regulation modification:

1. Require disclosure of all derivative activities on balance sheet reports and mandate the reporting of prices and other critical market information. Improve market transparency by increasing the quantity and quality of available information to investors.
2. Supervise and examine financial institutions and report on their condition.
3. Collect and help disseminate data. Government regulators should collect accurate and unbiased information (enforceable by law) with a consistent methodology to provide price data over a long periods of time, and should distribute the information in a timely, fair and affordable manner.

Recommendations for Future Study

In the fall of 2008, a severe market correction occurred in the financial sector that stemmed in large part to the real estate market. As Lehman Brothers filed for bankruptcy, Bank of America acquired Merrill Lynch and companies ranging from Washington Mutual to AIG were tendering on the edge of bankruptcy (Hong, Keejae & Kyonghee, 2009). In response to this financial crisis, Congress passed the Emergency Stabilization Act of 2008. This Act provided the authority for the Federal Government to purchase and ensure certain types of troubled assets for

the purposes of providing stability to and preventing disruption in the economy and financial system as well as protecting taxpayers.

Most companies in the economy will experience a rippling effect of the market adjustment (Minton, Stulz, & Williamson, 2009). It is conceivable that the high tech sector may be partially sheltered from the brunt of the financial crisis as firms try to spend more on technology in order to reduce the operational costs. More in depth research in the area of earnings smoothing prior to and after the financial crisis of 2008 is needed. Areas for future research include derivative hedging in the financial markets, earnings smoothing and management discretion in the financial sector, and financial impacts of the Emergency Stabilization Act of 2008.

Summary

It is time to reconsider the assumptions of the feasibility of a truly capital driven financial market. The assumptions embedded in the academic areas of finance must be re-evaluated to include human behavioral traits. From this study, it is evident the assumptions that participants act rationally and that the market is efficient is no longer valid. Under the Efficient Market Theory, a perfectly competitive market is a well-functioning market, where the prices of capital assets (securities) reflect predictions based on all relevant and available information (Anderson, Caldwell, & Needles, 1994); however, if all relevant information is not available (and in most cases it is not available) the assumptions of the Efficient Market Theory no longer hold. In addition, the rules of efficient markets can not apply to financial instruments that present no market reference for pricing or for financial instruments that are unreported and thus reside outside the reporting requirements of other securities.

Assumptions that are inherent in the Capital Asset Pricing Model (CAPM) must also be re-examined as a result of the findings of this study. The premise of the CAPM is that securities are efficiently priced by financial markets according to their relative risk (beta) compared to the risk of the market as a whole. Under this model, risk is determined by the degree of volatility (Sharpe, 1964). The greater the degree of variation measured by beta, the lower the price of the security. This premise suggests the market rewards lower risk securities with a higher price and higher risk securities with a greater return on investment (Harris, & F., 2001). However, this efficient-risk-reward relationship applies only to the direct ownership of the security and excludes the utilization of derivative hedges. When a firm uses derivatives for hedging (or speculating), they are diverting the risk to others. This risk shifting stimulates risk exposure to outside counterparties (Jagannathan, & Wang, 1996). It is apparent that hedging risk can result in a rippling effect to individuals with no direct exposure to the defaulting party. The current markets conditions cannot address all the aspects of risk hedging. Due to these market imperfections formulated by the lack of transparency in derivative reporting and the intent of risk diverting, the establishment of market equilibrium and the creation of efficient markets cannot be achieved. These market imperfections, short-comings, and other failures result in externalities that all individuals in the economy will bear.

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APPENDIX

APPENDIX A: high technology firms defined by industry SIC code

Table 6 High Technology Industry Defined by Sic Code

Industry Description	SIC Code
Communications Equipment	3660
Communications Equipment, nec	3669
Semiconductor and related	3674
Computer and data processing services	7370
Computer programming services	7371
Prepackaged software	7372
Computer integrated systems design	7373
Data processing and preparation	7374
Informational retrieval services	7375
Computer facilities management	7376
Computer rental and leasing	7377
Computer maintance and repair	7378
Computer related services	7379

Source: SIC code lookup table available by selecting the Prim. SIC option.
Note. The firms randomly drawn for this study must be defined by these SIC codes.

APPENDIX B: type I and type II sampling errors

t tests for Total Net Accruals and Total Cash Earnings

Years	Type I Error	Type II Error For a One-Tailed (Directional) Hypothesis	*ß* Threshold Met	Observed Effect Size	Thresholds for Cohen's d (Cohen, J. 1977)
1997	*0.05*	*0.04*	*below threshold*	*0.89*	*Large effect*
1998	*0.05*	*0.06*	*below threshold*	*0.83*	*Large effect*
1999	*0.05*	*0.09*	*below threshold*	*0.78*	*Large effect*
2000	*0.05*	*0.01*	*below threshold*	*1.08*	*Large effect*
2001	*0.05*	*0.16*	*below*	*0.69*	*Medium effect*

			threshold		
			below		
2002	*0.05*	*0.20*	*threshold*	*0.65*	*Medium effect*
			below		
2003	*0.05*	*0.13*	*threshold*	*0.73*	*Medium effect*
			below		
2004	*0.05*	*0.17*	*threshold*	*0.68*	*Medium effect*
			below		
2005	*0.05*	*0.03*	*threshold*	*0.94*	*Large effect*
			below		
2006	*0.05*	*0.11*	*threshold*	*0.75*	*Medium effect*
			below		
2007	*0.05*	*0.07*	*threshold*	*0.82*	*Large effect*
			below		
1997 - 2007	*0.05*	*0.00*	*threshold*	*0.64*	*Medium effect*

Thresholds for Cohen's d (Cohen, 1992)			
Effect	*d*	α and ß Thresholds	
Small	≥ *0.2*	α:	0.05
Medium	≥ *0.5*	ß:	0.02
Large	≥ *0.8*		

**all t tests conducted were one tailed t tests (where $\mu 1 < \mu 2$)*

Figure 1. Figure showing possible type I and type II errors. Data retrieved from Mergent Online database, http://0 www.mergentonline.com.catalog.multcolib.org/compsearch.asp.

Multiple Regression for Discretionary Accruals

Years	Type I Error	R^2 Model	Type II Error For a Multiple Regressions	Observed Effect Size	Thresholds for Cohen's d	Observed Power
1997	*0.05*	*0.82*	*0.00*	*4.56*	*Large effect*	*1.00*
1998	*0.05*	*0.69*	*0.00*	*2.23*	*Large effect*	*1.00*
1999	*0.05*	*0.88*	*0.00*	*7.33*	*Large effect*	*1.00*
2000	*0.05*	*0.83*	*0.00*	*4.88*	*Large effect*	*1.00*
2001	*0.05*	*0.72*	*0.00*	*2.57*	*Large effect*	*1.00*
2002	*0.05*	*0.85*	*0.00*	*5.67*	*Large effect*	*1.00*
2003	*0.05*	*0.86*	*0.00*	*6.14*	*Large effect*	*1.00*
2004	*0.05*	*0.91*	*0.00*	*10.11*	*Large effect*	*1.00*
2005	*0.05*	*0.85*	*0.00*	*5.67*	*Large effect*	*1.00*

2006	*0.05*	*0.80*	*0.00*	*4.00*	*Large effect*	*1.00*
2007	*0.05*	*0.68*	*0.00*	*2.13*	*Large effect*	*1.00*

Figure 2. Type I and type II errors for linear regression models. Data retrieved from Mergent Online database, http://0 www.mergentonline.com.catalog.multcolib.org/compsearch.asp

Appendix C: Aggregate Total Cash Earnings and Total Net Accruals t test

1997 t-test: Two-Sample Assuming Unequal Variances

	TCE	*TNA*
Mean	757.83	-272.82
Variance	3200598.85	282570.11
Observations	30	30
Hypothesized Mean Difference	0	
df	34	
t Stat	3.025	
P(T<=t) one-tail	0.002	
t Critical one-tail	1.691	
P(T<=t) two-tail	0.005	
t Critical two-tail	2.032	

1998 t-test: Two-Sample Assuming Unequal Variances

	TCE	*TNA*
Mean	819.56	-283.98
Variance	3650134.26	540657.05
Observations	30	30
Hypothesized Mean Difference	0	
df	37	
t Stat	2.953	
P(T<=t) one-tail	0.003	
t Critical one-tail	1.687	
P(T<=t) two-tail	0.005	

t Critical two-tail	2.026

1999 t-test: Two-Sample Assuming Unequal Variances

	TCE	*TNA*
Mean	1139.15	-315.46
Variance	6504949	1366543
Observations	30	30
Hypothesized Mean Difference	0	
df	41	
t Stat	2.840	
P(T<=t) one-tail	0.003	
t Critical one-tail	1.683	
P(T<=t) two-tail	0.007	
t Critical two-tail	2.020	

2000 t-test: Two-Sample Assuming Unequal Variances

	TCE	*TNA*
Mean	1932.77	-575.16
Variance	1.2E+07	1245107
Observations	30	30
Hypothesized Mean Difference	0	
df	35	
t Stat	3.718	
P(T<=t) one-tail	0.000	
t Critical one-tail	1.690	
P(T<=t) two-tail	0.001	
t Critical two-tail	2.030	

2001 t-test: Two-Sample Assuming Unequal Variances

	TCE	*TNA*
Mean	1984.59	-1771.8
Variance	3.7E+07	2.3E+07
Observations	30	30
Hypothesized Mean Difference	0	
df	55	
t Stat	2.669	
P(T<=t) one-tail	0.005	
t Critical one-tail	1.673	
P(T<=t) two-tail	0.010	
t Critical two-tail	2.004	

2002 t-test: Two-Sample Assuming Unequal Variances

	TCE	*TNA*
Mean	2399.71	-2021.7
Variance	5.7E+07	3.7E+07
Observations	30	30
Hypothesized Mean Difference	0	
df	56	
t Stat	2.498	
P(T<=t) one-tail	0.008	
t Critical one-tail	1.673	
P(T<=t) two-tail	0.015	
t Critical two-tail	2.003	

2003 t-test: Two-Sample Assuming Unequal Variances

	TCE	*TNA*
Mean	2895.58	-2122.5
Variance	8.7E+07	5.6E+07
Observations	30	30
Hypothesized Mean Difference	0	
df	55	
t Stat	2.297	

P(T<=t) one-tail	0.013
t Critical one-tail	1.673
P(T<=t) two-tail	0.025
t Critical two-tail	2.004

2004 t-test: Two-Sample Assuming Unequal Variances

	TCE	*TNA*
Mean	3888.70	-2832.73
Variance	1.1E+08	8E+07
Observations	30	30
Hypothesized Mean Difference	0	
df	56	
t Stat	2.660	
P(T<=t) one-tail	0.005	
t Critical one-tail	1.673	
P(T<=t) two-tail	0.010	
t Critical two-tail	2.003	

2005 t-test: Two-Sample Assuming Unequal Variances

	TCE	*TNA*
Mean	2840.41	-1504.49
Variance	3.2E+07	1E+07
Observations	30	30
Hypothesized Mean Difference	0	
df	46	
t Stat	3.651	
P(T<=t) one-tail	0.000	
t Critical one-tail	1.679	
P(T<=t) two-tail	0.001	
t Critical two-tail	2.013	

2006 t-test: Two-Sample Assuming Unequal Variances

	TCE	*TNA*
Mean	3442.50	-2120.15
Variance	7.5E+07	3.9E+07
Observations	30	30
Hypothesized Mean Difference	0	
df	53	
t Stat	2.852	
P(T<=t) one-tail	0.003	
t Critical one-tail	1.674	
P(T<=t) two-tail	0.006	
t Critical two-tail	2.006	

2007 t-test: Two-Sample Assuming Unequal Variances

	TCE	*TNA*
Mean	3380.79	-2133.76
Variance	6.5E+07	2.9E+07
Observations	30	30
Hypothesized Mean Difference	0	
df	51	
t Stat	3.109	
P(T<=t) one-tail	0.002	
t Critical one-tail	1.675	
P(T<=t) two-tail	0.003	
t Critical two-tail	2.008	

t-test: Two-Sample Assuming Unequal Variances: Years 1997 - 2007

	TCE	*TNA*
Mean	2316.51	-1450.41

Variance	44347539.39	25222379.93
Observations	330	330
Hypothesized Mean Difference	0	
df	612	
t Stat	8.204	
P(T<=t) one-tail	0.000	
t Critical one-tail	1.647	
P(T<=t) two-tail	0.000	
t Critical two-tail	1.964	

APPENDIX D: Statistical Data Tables for Estimated Regression Equations

1997 Statistical Summary

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.906784685
R Square	0.822258465
Adjusted R Square	0.801749826
Standard Error	219.7655248
Observations	30

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	5809140.793	1936380.264	40.093274	6.75646E-10
Residual	26	1255719.033	48296.88588		
Total	29	7064859.826			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept	13.16848472	49.95308889	0.263617026	0.7941531	-89.51155904

ATA	0.146520567	0.018999269	7.711905321	3.494E-08	0.10746701
ΔSales – ΔRec	-0.147845307	0.083976192	-1.760562167	0.090072 8	-0.32046084
GPPE	-0.078630479	0.030276976	-2.597038672	0.015272 9	-0.140865694

	Upper 95%	*Lower 95.0%*	*Upper 95.0%*
Intercept	115.8485285	-89.51155904	115.8485285
ATA	0.185574124	0.10746701	0.185574124
ΔSales – ΔRec	0.024770227	-0.32046084	0.024770227
GPPE	-0.016395263	-0.140865694	-0.016395263

1998 Statistical Summary

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.836055057
R Square	0.698988058
Adjusted R Square	0.66425591
Standard Error	368.2747514
Observations	30

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	8188479.527	2729493.2	20.12510351	5.91566E-07
Residual	26	3526283.605	135626.29		
Total	29	11714763.13			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept	92.19335028	82.36271296	1.1193579	0.273222275	-77.1056292
ATA	0.122349795	0.024296051	5.0357893	3.05776E-05	0.072408547
ΔSales – ΔRec	0.12400943	0.12387637	1.0010741	0.326017314	-0.130622092
GPPE	-0.101920287	0.036249553	-2.8116288	0.009250534	-0.176432309

	Upper 95%	*Lower 95.0%*	*Upper 95.0%*
Intercept	261.4923298	-77.1056292	261.49233
ATA	0.172291043	0.072408547	0.172291
ΔSales – ΔRec	0.378640953	-0.130622092	0.378641
GPPE	-0.027408265	-0.176432309	-0.0274083

1999 Statistical Summary

Regression Statistics	
Multiple R	0.940242584
R Square	0.884056116
Adjusted R Square	0.870677976
Standard Error	371.6492938
Observations	30

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	27382428.44	9127476.148	66.0821376	2.70474E-12
Residual	26	3591203.137	138123.1976		
Total	29	30973631.58			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept	135.4524248	80.94589163	1.673369976	0.106245675	-30.93423679
ATA	0.04469326	0.024244648	1.843427848	0.076694504	-0.005142328
ΔSales – ΔRec	-0.065946653	0.126311563	-0.522095139	0.606024144	-0.325583786
GPPE	0.160601381	0.031702416	5.06590348	2.82434E-05	0.095436132

	Upper 95%	*Lower 95.0%*	*Upper 95.0%*
Intercept	301.8390863	-30.93423679	301.8390863
ATA	0.094528848	-0.005142328	0.094528848
ΔSales – ΔRec	0.19369048	-0.325583786	0.19369048
GPPE	0.22576663	0.095436132	0.22576663

2000 Statistical Summary

Regression Statistics	
Multiple R	0.908938724
R Square	0.826169603
Adjusted R Square	0.806112254
Standard Error	1131.336857
Observations	30

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	158161476.5	52720492.18	41.19036	5.070377E-10
Residual	26	33278000.16	1279923.083		
Total	29	191439476.7			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept	-90.8511	249.9046	-0.3635	0.7191	-604.5373
ATA	0.1889	0.0284	6.6562	0.0000	0.1305
ΔSales – ΔRec	0.1010	0.1480	0.6827	0.5008	-0.2031
GPPE	0.0118	0.0605	0.1952	0.8468	-0.1126

	Upper 95%	*Lower 95.0%*	*Upper 95.0%*
Intercept	422.8351	-604.5373	422.8351
ATA	0.2472	0.1305	0.2472
ΔSales – ΔRec	0.4052	-0.2031	0.4052
GPPE	0.1362	-0.1126	0.1362

2001 Statistical Summary

SUMMARY OUTPUT

Regression Statistics

Multiple R	0.856447174
R Square	0.733501761
Adjusted R Square	0.702751965
Standard Error	2569.410076
Observations	30

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	472440381.5	157480127	23.85387346	1.24138E-07
Residual	26	171648571.6	6601868.1		
Total	29	644088953.1			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept	-761.5180935	574.6507213	-1.3251843	0.196638394	-1942.729557
ATA	0.358093657	0.052489498	6.8221963	3.05713E-07	0.250199951
ΔSales – ΔRec	-0.129689135	0.406406222	-0.3191121	0.752191256	-0.965069081
GPPE	-0.23757426	0.135269771	-1.7562997	0.090811694	-0.515625253

	Upper 95%	*Lower 95.0%*	*Upper 95.0%*
Intercept	419.6933695	-1942.729557	419.69337
ATA	0.465987364	0.250199951	0.4659874
ΔSales – ΔRec	0.70569081	-0.965069081	0.7056908
GPPE	0.040476734	-0.515625253	0.0404767

2002 Statistical Summary

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.925317838
R Square	0.856213102
Adjusted R Square	0.839622306
Standard Error	2409.705392
Observations	30

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	899008508.6	299669502.9	51.60771715	4.37388E-11
Residual	26	150973681.9	5806680.075		
Total	29	1049982191			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept	-530.7565169	525.7523857	-1.00951804	0.322029527	-1611.45601
ATA	0.471822744	0.039219732	12.03023882	3.9641E-12	0.391205431
ΔSales – ΔRec	0.674418032	0.495520525	1.36102946	0.185185337	-0.34413898
GPPE	-0.483420504	0.083470406	-5.79151973	4.2222E-06	-0.65499638

	Upper 95%	*Lower 95.0%*	*Upper 95.0%*
Intercept	549.9429787	-1611.456012	549.9429787
ATA	0.552440057	0.391205431	0.552440057
ΔSales – ΔRec	1.692975048	-0.344138984	1.692975048
GPPE	-0.311844629	-0.65499638	-0.31184463

2003 Statistical Summary

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9276225
R Square	0.8604835
Adjusted R Square	0.8443854
Standard Error	2941.2167
Observations	30

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	1.387E+09	462405598.5	53.45262475	2.96238E-11

Residual	26	224919648	8650755.705		
Total	29	1.612E+09			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept	-881.75872	631.85887	-1.395499468	0.174670764	-2180.563226
ATA	0.3432068	0.0557855	6.152262274	1.66437E-06	0.228538169
ΔSales – ΔRec	4.1760537	0.9999854	4.176114678	0.000294956	2.120554315
GPPE	-0.6182182	0.0971368	-6.364406311	9.68199E-07	-0.817885827

	Upper 95%	*Lower 95.0%*	*Upper 95.0%*
Intercept	417.04578	-2180.5632	417.0457808
ATA	0.4578755	0.2285382	0.45787552
ΔSales – ΔRec	6.2315532	2.1205543	6.231553162
GPPE	-0.4185506	-0.8178858	-0.418550622

2004 Statistical Summary

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.955281106
R Square	0.912561992
Adjusted R Square	0.902472991
Standard Error	2772.562658
Observations	30

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	2085922698	695307566.1	90.45117559	7.00415E-14
Residual	26	199864696.1	7687103.695		
Total	29	2285787394			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*

Intercept	-1021.519817	635.2848874	-1.607971223	0.119918872	-2327.366592
ATA	0.584184789	0.046574439	12.54303423	1.56188E-12	0.488449658
ΔSales – ΔRec	-0.504481638	0.716209871	-0.704376829	0.487459869	-1.976672098
GPPE	-0.527781104	0.090699055	-5.819036394	3.93125E-06	-0.71421568

	Upper 95%	*Lower 95.0%*	*Upper 95.0%*
Intercept	284.3269581	-2327.366592	284.3269581
ATA	0.679919919	0.488449658	0.679919919
ΔSales – ΔRec	0.967708822	-1.976672098	0.967708822
GPPE	-0.341346527	-0.71421568	-0.341346527

2005 Statistical Summary

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.913243949
R Square	0.83401451
Adjusted R Square	0.814862338
Standard Error	1321.027929
Observations	30

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	227982141.5	75994047.16	43.54673262	2.79381E-10
Residual	26	45372984.55	1745114.79		
Total	29	273355126			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept	77.50218887	288.726343	0.268427841	0.790488375	-515.983303
ATA	0.19621025	0.019843618	9.887826233	2.68003E-10	0.155421109
ΔSales – ΔRec	-0.314843772	0.492585507	-0.639165725	0.528306632	-1.327367772
GPPE	-	0.047659317	-	0.02525916	-

	0.113149304		2.374127675	1	0.211114433

	Upper 95%	*Lower 95.0%*	*Upper 95.0%*
Intercept	670.9876808	-515.983303	670.9876808
ATA	0.236999392	0.155421109	0.236999392
ΔSales – ΔRec	0.697680228	-1.327367772	0.697680228
GPPE	-0.015184175	-0.211114433	-0.015184175

2006 Statistical Summary

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.894430582
R Square	0.800006066
Adjusted R Square	0.776929843
Standard Error	2922.759995
Observations	30

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	888456387	296152129	34.66798104	3.09198E-09
Residual	26	222105675.7	8542525.987		
Total	29	1110562063			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept	-1226.386821	701.7241313	-1.747676568	0.092322238	-2668.801417
ATA	0.44724083	0.066023571	6.773956991	3.44816E-07	0.311527438
ΔSales – ΔRec	-0.305512643	1.007947838	-0.303103624	0.764222908	-2.377379076

GPPE	-0.435135087	0.127910072	-3.401882888	0.00217444	-0.698058004

	Upper 95%	*Lower 95.0%*	*Upper 95.0%*
Intercept	216.0277743	-2668.801417	216.0277743
ATA	0.582954223	0.311527438	0.582954223
ΔSales – ΔRec	-1.76635379	-2.377379076	-1.76635379
GPPE	-0.17221217	-0.698058004	-0.17221217

2007 Statistical Summary

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.825
R Square	0.681
Adjusted R Square	0.644
Standard Error	3,167.285
Observations	30

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	556303234	185434411.3	18.48485108	1.25317E-06
Residual	26	260824103	10031696.25		
Total	29	817127337			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept	376.67	667.40308	0.564380165	0.577332343	-995.1976044
(ATA)	(1.27)	0.4814359	-2.641471315	0.013784742	-2.261304968
ΔSales – ΔRec	3.22	0.4560181	7.071997482	1.64641E-07	2.287600095

GPPE	(0.05)	0.0845859	-0.584680604	0.563802262	-0.223324527

	Upper 95%	*Lower 95.0%*	*Upper 95.0%*
Intercept	1748.535724	-995.1976	1748.535724
(ATA)	-0.28209349	-2.261305	-0.282093488
ΔSales – ΔRec	4.162317219	2.2876001	4.162317219
GPPE	0.124413063	-0.2233245	0.124413063

APPENDIX E: derivative hedging: F test two sample variance

F-test Two-Sample for Variances

	TCE without derivatives	*TCE with derivatives*
Mean	232.54	3701.91
Variance	1,230,487.18	64,274,955.28
Observations	10	10
df	9	9
F	0.0191	
P(F<=f) one-tail	0.0000	
F Critical one-tail	0.3146	

CURRICULUM VITAE

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PROFILE

This is a profile of a high caliber finance and economic professional with strong a strong background in financial analysis, econometrics, and statistics.

EDUCATION

Ph.D. Walden University, Applied Management Decision Sciences
Major: Finance
Support Area: Strategic Finance
Dissertation Title: *Earnings Management with Derivatives and the use of Accounting Accruals*
Dissertation Chairman: Dr. Thomas Spencer

M.B.A. Marylhurst University Graduate School, June 2003.
Thesis Title: *An Analytical Approach to Valuing Human Capital Investments with Real Options*
Concentration: Finance

M.P.A. Portland State University Hatfield School of Government, August 2002.
Thesis Title: *Performance Measurement in the Public Sector: Evaluating the Subjective Benefits of Public Service*
Concentration: Program Evaluation

M.F.M. Portland State University Hatfield School of Government (Masters Endorsement), August 2002.
Thesis Title: Disincentives to Efficiency: *Public Sector Budgeting Structure*
Concentration: Public Sector Financial Management
B.A. Western New Mexico University, School of Management, May 1982.
Received dual degrees in magazines and marketing management
Concentration: Business Administration: Finance

TEACHING EXPERIENCE

Adjunct Professor of Economics, Warner Pacific University, School of Business, Summer and Fall Sessions 2005.
Adjunct Professor of Finance, Warner Pacific University, School of Business, Summer and Fall Sessions 2005.
Undergraduate Teaching: Microeconomics, Macroeconomics & Corporate Finance,
Primary teaching areas: Introduction to Business, Introduction to Management course. Average class size of 40.

HIGHLIGHTS OF WORK EXPERIENCE

Business Strategist, Silver City Trading Company, 1994-1999
Managed operational staff and reduced operational costs by 32% by creating operational policies.
Created financial statements and capital budgeting modules for financial reporting and planning.
Created mission based budgeting standards

Cost Accounting Manager, *Compact Controls*, *1999-2004*
Supervised the Accounting Department and implemented cost rollups for manufactured and purchased materials. Prepared trial balances for months end and closed the books for all accounts. Problem solved variances between the general ledger and subsidiary ledgers.
Reduced process times by 17% by performing time studies and establishing manufacturing standards.

Financial Consultant, Nike, 2001-2002
Formulated Descriptive Statistical Standards for Cost Accounting Created an Economic Order Quantity Standard for Purchasing: Team Sports Reduced the cost of inventory moves through all associated inventory accounts by 27%.

Financial Consultant, Oregon Health Sciences University: Cancer Institute, 2002-2003
Provided financial consulting for the Bioinformatics Core Assisted in the formulation of the 2003-2008 Master NIH Grant Created Funds Flows Statements for Clinical Trials

Cost Accountant III, Regence Blue Cross Blue Shield of Oregon, 2005-2008.
Created Medical, Dental, and Drug statistics for Claims, Contracts, Members, and Groups for all Regence Plans and TRG [The Regence Group] Analyzed and managed Plan and TRG Operational Accounts. Performed Analysis and Problem Solved Accounting Discrepancies in Operational Activities for 5 divisions [Actuarial, Underwriting, Finance, Human Resources, and Membership Services]

MEMBERSHIPS & AFFILIATIONS
Professional:
Member of the Emerging Markets Advisory Board for Regence BCBS
Member of the American Finance Association
Member of the American Statistical Association: Oregon Charter

RESEARCH
Hedging in International Markets, 2004
Abstract:

In this explorative study, an investigation of theoretical options models used in international finance is evaluated to acquire knowledge that explains why global firms support decisions to employ financial hedges. The findings of this study suggest International investing through the utilization of derivative contracts may minimize the firm's exposure to systematic risk. An illustration of markets conversion is presented in this study to provide an explanation of the inherent volatility of international markets and the increased level of systematic risk.

Application Errors of Financial Derivatives, 2005

Abstract:

The premise of this study is grounded on an in-depth evaluation of finance strategies from the context of current international financial risk management. The scope includes the analysis of financial derivatives that are valued on the performance of other underlying investment

instruments. The range of this analysis includes derivatives such as (a) options; (b) futures; (c) swaps, and (d) commodity futures. In this evaluation, each derivative design has been analyzed in terms of inherent strengths and weaknesses when applied to real life situations of uncertainty.

Capital Budgeting Theory in Practice, 2006

Abstract:

An investigation of theoretical finance models used in capital budgeting is presented in this research study. This analysis is completed to elucidate the rationale of the twenty-first century financial manager attempting to make vital corporate decisions based on educated guesses and corporate rules of thumb. Capital budgeting decisions involve the largest tangible investments of any firm and require a more robust framework of analysis. The evaluation approach of this study is established by critically analyzing capital budgeting theories, and through the assessment of existing theoretical propositions and hypotheses that comprise strategic capital budgeting.

Implications of Derivative Applications, 2006

Abstract:

The implications of derivative applications can be devastating and can create risk barriers within international markets. This study provides an in-depth evaluation widely accepted financial models including (a) Black-Scholes model; (b) the stochastic-interest-rate option model created by Merton; (c) Amin and Jarrow's discrete path-independent model, and (d) the Cox and Ross jump and diffusion processes model. The objective of this investigation is to identify the best hedging strategy by evaluating each derivative model with the intent to expose the effectiveness of each model in terms of pricing errors.

Capital Budgeting Misconceptions in the Workplace, 2007

Abstract:

Capital Budgeting is a tremendously vital aspect of a firm's financial structure. Many business professional may neglect the importance of this particular area of business due in large part to the total proportion of capital assets this area represents. It is true, capital assets usually represent a smaller portion of a firm's total assets however, unlike current assets; capital assets are long-term investments that require long-term commitments. When a firm purchases a capital asset, the firm exposes itself to risks associated with a long-term investment. If for example, the firm makes a mistake in purchasing a capital asset the firm must live with that mistake for a long period of time. It is clear capital budgeting is of the utmost importance to any firm.

The objective of this study is to provide an in-depth knowledge base of the most widely used asset pricing models in strategic capital budgeting including the (a) payback method; (b) net present value; (c) internal rate of return, and (d) capital asset pricing model (CAPM). In exploration, each variable that embodies the theory of the CAPM has been analyzed in terms of inherent strengths and weaknesses when applied to real life situations of uncertainty.

Capital Rationing with Real Options and Linear Programming, 2007

Abstract:

This investigation explores the implications of capital budgeting theory and the implementation of widely used budgeting models utilized for capital rationing, mutually exclusive and independent investment projects. Particular models include the internal rate of return (IRR); modified IRR; net present value; profitability index technique; and capital asset pricing model.

Real options; linear programming; and optimization models are introduced as models that maximize capital asset allocations more effectively in situations of uncertainty. The alternative models introduced in this study have been tested in financial applications. Recommendations are provided based on the findings of the study that include the elimination of obsolete financial models introduced in most business schools.

Residencies
Winter Session, Dallas, TX 2006
Spring Session, Los Angeles, CA 2005
Summer Session, Seattle, WA 2004