"SUBJECT TO" QUALIFIED OPINIONS AND THE SIGNALLING OF RISK SHIFTS

By

CINDY SEIPEL

Bachelor of Business Administration

University of Texas, Arlington

Arlington, Texas

1983

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF PHILOSOPHY
December, 1990

"SUBJECT TO" QUALIFIED OPINIONS AND

THE SIGNALLING OF RISK SHIFTS

Thesis Approved:

Janet A. Kimbrell
Thesis Advisor

Charles R Ronson

John R. Wingender

P. Larry Claypool

Norman N Durham
Dean of the Graduate College

ACKNOWLEDGEMENTS

I wish to extend my thanks to Dr. Janet Kimbrell for all the time that she invested in me during my graduate program. For her advice, encouragement, and constant willingness to help, I am very grateful. Sincere appreciation is also extended to Dr. Charles Ransom, Dr. John Wingender and Dr. Larry Claypool, members of my dissertation committee, for their helpful suggestions and constant support throughout this process.

I wish to express appreciation to my parents, Kenneth and Rose Marie Seipel for raising me to believe in my abilities, to strive for high goals, and to understand the importance of education. To my husband, Larry Tunnell, who went through the program at the same time I did, I extend special thanks for always being there to offer moral support, reassurance and helpful suggestions. Thanks also go to fellow students Dave Nichols and Cheryl Fulkerson for their friendship which made the time spent in the program much more enjoyable. To my former professor, Dr. Larry Walther, I also wish to express my gratitude for encouraging me to obtain my doctorate and enter the teaching profession.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

THE RESEARCH PROBLEM

Introduction

The importance of qualified opinions to the stock market has been the subject of a number of prior studies which have obtained conflicting results. Most of these studies tested the relationship between a "subject to" qualification and market returns. However, three studies addressed the relationship between the opinion and a company's risk. These risk studies were plagued by methodological problems, which suggests that the question of whether a relationship exists may not have been adequately addressed by previous research. The purpose of this study is to avoid the methodological problems of the earlier risk studies and to determine whether "subject to" qualifications are associated with a change in the risk of a company.

The "subject to" qualification, issued when material uncertainties affect the financial statements, was recently eliminated by the American Institute of Certified Public Accountants' Audit Standards Board. Statement of Auditing Standards (SAS) 58 and 59 eliminated the "subject to" wording and the qualification of the audit report for loss contingencies and questionable going concern status. However, these two new standards still call for specific modifications of audit reports. The audit report now contains a paragraph explaining the uncertainty, stating that the outcome is unknown, and referring the reader to the appro-

priate financial statement footnotes. Under the new standards, the wording of the opinion is the same for companies with and without material uncertainties, resulting in the issuance of a "clean" opinion for both. However, the presence of an explanatory paragraph should act as a signal to notify statement users that a material difference exists. Theoretically, this signal should convey information identical to the information previously conveyed by the "subject to" wording. Therefore, even though the "subject to" wording has been changed, the new treatment should not change the effect of such uncertainties on the market. The difference appears to be only one of the location of the disclosure in the statements. Due to data availability, this study necessarily includes only those companies with "subject to" opinion wording.

Research Objective

The "subject to" qualification was the topic of a number of studies after its recommended elimination by the Commission on Auditors' Responsibilities (also known as the Cohen Commission) [Commission on Auditors' Responsibilities, 1977]. Some studies looked at risk shifts, while others looked at market returns. In the early return studies, researchers attempted to find abnormal returns at the time of the issuance of the opinion. For example, Ball, Walker and Whittred [1979] found no significant returns around the opinion issuance date. Others (such as Banks and Kinney [1982] and Dodd, Dopuch, Holthausen and Leftwich [1986]) measured the abnormal returns over a longer event window, from thirty-nine weeks to two years around the issuance. In one of these studies, Brown and Levitan [1986] found an indication that companies receiving qualifications had lower cumulative

average residuals (CARS) than those which did not receive qualified opinions.

Craswell [1985] and Bailey [1982] criticized the return studies for measuring the effects of more than just the qualified opinion on the market. These studies intended to determine the information content of qualified opinions and the events that caused them, but failed to segregate this effect from the effects of other differences on the market. This failure may be the cause of the inconsistent results obtained in the return studies. The various differences between the control and experimental groups may be causing offsetting effects in some cases, resulting in no abnormal returns over the period investigated. In addition, Craswell [1985] criticized the methodologies of the early return studies for the use of event windows which were too short to capture the total effect of the qualified opinion release.

Two of the early risk studies were also subject to the criticism of Craswell [1985] regarding the use of short event windows, Alderman [1977] which found no change in the systematic risk of a company, and Shank, Murdock and Dillard [1982] which noted a change in systematic risk after the issuance of a qualified opinion. Each of these studies utilized a short event window and therefore may have missed some or all of the risk reaction to the events causing the qualification. The only other risk study, Finnerty and Oliver [1985], which noted a significant change in beta (a measure of systematic risk), is subject to other methodological criticisms regarding the event periods selected and the lack of a control group.

The purpose of this paper is to investigate whether "subject to" qualifications, issued for questionable going concern status and for

loss contingencies, are associated with a change in the risk of a company. This study improves upon the previous risk studies by using an observation period that surrounds the possible times that the market may have obtained knowledge regarding the events resulting in the qualified opinion. In addition, this study selects a control group with more similarities to the experimental group than other studies. In only one of these studies, Brown and Levitan [1986], was an appropriate control group used. However, other methodological improvements on the Brown and Levitan study are made while focusing on the change in risk instead of abnormal returns.

Importance of the Problem

This study helps to answer an important question in auditing, whether an auditor's report containing a "red flag", such as the "subject to" qualified opinion, serves a purpose in financial reporting. As stated earlier, many studies have addressed this problem with questionable success.

If no purpose is served by its usage, then there is a basis for the discontinuance of opinions containing "red flags" for cases of uncertainty and questionable going concern. The discontinuance of such an opinion would make the auditor's job easier and less costly as the auditor would no longer have to use resources to convince the client that a special opinion is necessary.

If, on the other hand, the answer to the above question is positive, more research needs to be performed. Future testing of post- SAS 58 and SAS 59 data should be carried out to ensure that the change from the "subject-to" wording causes no differences in risk effects. Addi-

tionally, behavioral studies should be conducted to test individual reaction to the new opinion types, as well as to other possible "red flag" reports, and compare them to the reaction to the "subject to" opinion in order to determine which is the more effective signal for investors.

As is evidenced by the number of studies published in this area, much discussion and research have been focused on this question, suggesting the importance of the subject. A study which eliminates the methodological problems present in earlier studies should provide more reliable evidence concerning the relationship between "subject-to" opinions and risk.

The remainder of this dissertation contains five chapters. Chapter II consists of a review of the relevant literature. The theoretical framework underlying this study is developed in Chapter III, as well as a statement of the hypotheses. Following that, in Chapter IV, is a discussion of the methodology used to conduct the research. A presentation and analysis of the results obtained in the research is contained in Chapter V. Finally, the conclusions reached and the limitations inherent in the study are summarized in Chapter VI.

CHAPTER II

REVIEW OF LITERATURE

Introduction

The question of what relationship exists between "subject to" qualified opinions, the returns of companies, and risk shifts has not been answered adequately in past research. Most of the studies conducted have tested for a relationship between stock market returns and qualified opinions and have obtained conflicting results. These conflicts may be due to either: (1) the use of event windows which are too short to capture the effects of the qualification; or (2) the use of methodologies which include the impact of other events as well as the impact of the qualified opinion and the events leading to it.

The risk studies have also been subject to varying results. These inconsistencies may also be caused by methodological problems. Two of the studies suffer from the use of a short event period while the third has other methodological problems, such as selection of inappropriate beta calculation periods.

The first section of this chapter discusses both the results and the methodological limitations of the return studies. The ten return studies are divided by type (length of their event window) for this discussion. Next, the results of the risk studies and their methodological problems are addressed. A summary of these studies and their results is presented in Table I at the end of this chapter.

Return Study Results

Many of the studies concerning qualified opinions have attempted to find a relationship between the issuance of the opinion and stock market returns. The logic used to justify this research is as follows: if the qualified opinion has information content for the market, then abnormal stock market returns should be observed at the time the market becomes aware of the nature of the opinion. Furthermore, since "subject to" qualified opinions are related to uncertainties which should be viewed as "bad news" by the market, negative abnormal returns should, in general, be noted if the qualification has information content.

The ten studies conducted to test the relationship between qualified opinions and returns may be divided into three groups. One of these groups consists of those studies which actually attempted to measure the market effect caused by the opinion when it is issued by using a short event window. Next, others studied the return characteristics for a relatively long period of time up to the opinion issuance, sometimes continuing beyond the issuance itself. Another group included more than one time period in their studies and fits in both of the above categories.

Short Event Window Studies

The first group consists of the two earliest return studies, both of which used short event windows (about one month on either side of the opinion issuance date), Firth [1978] and Ball, Walker, and Whittred [1979]. The stated purpose of these two studies was to identify a market reaction to the qualified opinion when it was released.

The authors obtained conflicting results. Firth [1978] found, in a study of United Kingdom companies, significant abnormal negative returns associated with the release of certain opinions; e.g., those which stated that the financial statements did not present a "true and fair view" and those with going concern and asset valuation qualifications. On the other hand, in an Australian study, Ball, Walker, and Whittred [1979] examined the market effects of opinions that mentioned a reservation about the "truth and fairness" of the financial statements and found no significant abnormal negative returns. Although the two studies included different categories of qualifications, in both cases some of the opinions studied would fit into the American definition of the "subject to" qualification (i.e., litigation and asset valuation) as well as those which would have been considered to be "except for" opinions in the United States.

Craswell [1985] pointed out that the major methodological flaw in these studies is the impossibility of determining when the market learns about the qualification or the events leading to it. By using a short event window and testing for a reaction at the time of the opinion issuance, the researchers may have missed much (or all) of the reaction to the event. This is compounded by the results of Whittred [1980] who found that first time qualified opinions delay the release of financial statements and noted that, in general, the delay grew as the reasons for the qualification became more serious. He concluded that with knowledge of a company's usual reporting habits, the market would be able to predict the qualified opinion. This finding strengthened the argument that the market sometimes anticipates the information contained in the qualified opinion and therefore studies utilizing

short event windows may miss the market effect.

Longer Event Window Studies

The researchers involved in the next group of studies recognized the timing problem inherent in the early studies. Instead of measuring the market reaction just for a short period of time when the opinion is issued (or when the announcement of it was made in the Wall Street Journal), they investigated the behavior of the market for a much longer period of time surrounding the event. This group of studies includes Banks and Kinney [1982], Shank, Murdock and Dillard [1982], Brown and Levitan [1986], Dodd, Dopuch, Holthausen and Leftwich [1984] and Dopuch, Holthausen and Leftwich [1986]. The event window used in these studies ranged from about thirty-nine weeks to two years.

Again, these return studies reported conflicting results. Banks and Kinney [1982] found significantly lower returns for those companies with opinions qualified because of loss contingencies than they found for those with clean opinions. Likewise, in a study of going concern qualifications, Brown and Levitan [1986] observed significant abnormal returns on the stocks of companies with qualifications. Dopuch, Holthausen and Leftwich [1986] also found abnormal returns around the time of the announcement of the issuance of a "subject-to" qualification (e.g., litigation, asset valuation, going concern) in the Wall Street Journal. However, two of the studies did not achieve such significant results. Shank, Murdock and Dillard [1982] noted negative abnormal returns only for contingency qualifications issued for litigation uncertainties. Qualified opinions for asset valuation and going concern did not lead to abnormal returns. Dodd, Dopuch, Holthausen and

Leftwich [1986], on the other hand, concluded that "subject to" reports contain no information content after obtaining no significant results in their study.

These studies did not necessarily measure just the market reaction to the qualification itself or the events causing it, but measured the market effects of everything that occurred during that period of time. As Craswell [1985] pointed out, self selection is involved in determining which companies receive qualified opinions, and as Bailey [1982] stated, the financial statements of companies receiving qualifications and their components are inherently different than those of other companies. Therefore, unless an extremely careful matching process is employed, any number of other events could contribute to these differences, all of which cannot be attributed to the qualified opinion or the events leading to it.

The previous studies, with the exception of Brown and Levitan [1986], used either no control group or a control group selected on the basis on size, industry, etc., but with no regard to the presence of contingencies in the financial statements of the control companies (for asset valuation and litigation matches) or to the existence of different financial statement characteristics (for going concern matches). Not all contingencies result in qualification. If the amount of the contingent loss is estimable, no qualification is necessary. If no control group is used, the impact on the market caused by both (1) the uncertainty that the loss will occur and (2) the uncertainty regarding the amount of the possible loss, is attributed to the presence of the qualification. The existence of a contingency for which no qualification is issued should have some impact on risk. As discussed in

Chapter III, loss contingencies by definition involve the uncertainty of future returns, even if the amount of the possible loss is known. Therefore, by using no control group, too much impact is attributed to the presence of the qualification when just the incremental impact should be measured (the impact that occurs because the amount of the possible loss is unknown). The same is true when using no control group for companies with questionable going concern status. Not all companies in financial difficulty receive "subject to" opinions. If no control group is used, the incremental impact on the market of the events resulting in the "subject to" opinion is not measured.

If control companies, with clean opinions, are selected based upon industry, size, etc. and no effort is made to ensure that the companies selected have contingencies in their financial statements (for asset valuation and litigation) and similar financial characteristics (for going concern), the best possible match is probably not being utilized. As stated, companies which receive qualifications are inherently different than other companies. These companies may have managers that make different choices than those made in companies without qualifications and/or they may be affected differently by events that occur. The closest match which minimizes these differences is one in which the control company has a contingency of the same nature as the experimental company or as similar financial characteristics as possible to the experimental company. In addition, too much market impact is attributed to the qualification because the control group does not mitigate the portion of the market effect that is not unique to the experimental group.

Therefore, due to inadequate control procedures, the previous

research did not measure the impact of the qualification on the market but rather tested whether a significant difference in the returns of the two companies was noted, regardless of the source. Other events may be causing offsetting market reactions in some cases which could result in the insignificant findings noted in some of the studies. This point also applies to those studies with short event windows. Due to self selection, the difference in the returns found at the time of the opinion release may be caused by other differences between the control and experimental groups.

Combination Studies

The last group of studies covers those which carried out research over both short and long event windows, and again conflicting results were found. Chow and Rice [1982] found lower returns over a three month period, including the month of report release, for companies with qualified opinions as compared to a control group. They did not, however, find a large difference when comparing the returns over a corresponding twelve month period. In addition, they noted that certain types of qualifications, such as asset valuation, were associated with greater differences than others, such as those they categorize as "uncertainty qualifications". In fact, the asset valuation contingencies were the only ones with statistically significant results. This contrasts with the findings of Davis [1982], who obtained significant results over a 241 day period prior to the opinion, which is similar in length to Chow and Rice's twelve month period, but not for a shorter twenty-one day period. In the other study of this type, Elliott [1982] observed significant differences between the cumulative

average residuals of the qualification and control groups for asset valuation and going concern qualifications over a forty-five week period prior to the release date of the opinion. In addition, in a test for abnormal returns occurring during the fourteen weeks after the issuance of the qualification, Elliott [1982] found no significant results.

The studies performed by Elliott [1982], Chow and Rice [1982] and Davis [1982] used data obtained over both long and short event windows. Therefore, the points made for each of the other two return study categories apply to these three studies.

Conclusion

Due to the methodological limitations discussed - the lack of knowledge regarding when the market obtains information about the qualification and the lack of control for the impact of other events - the question of a relationship between the qualified opinion and market returns is difficult to determine. All that can be surmised from the studies discussed is that the results obtained (five studies found abnormal returns for at least one type of "subject-to" qualification, two found no abnormal returns, and three with differing results depending upon the time period used) may not be inconsistent with the idea that shares of companies which receive qualifications have different market behavior than shares of companies which obtain clean opinions. Many of the return studies show a difference in returns over the period, and it is possible that those which do not are a result of offsetting market reactions to other events.

Risk Studies

Risk is an important parameter in the pricing of stocks and impacts the preferences of investors. Therefore, a study which determines whether the qualified opinion is associated with a change in risk would be beneficial. Beaver [1972] recognized the importance of systematic risk and discussed the role of relative risk in the determination of security prices. He also recognized that investors would be concerned with assessing the risk of securities in order to select portfolios which would meet their risk preferences. Therefore, systematic and total risk are important parameters, and the relationship between risk and qualified opinions is worthy of study.

Results and Methodological Problems

Prior studies of the relationship between risk and this type of qualification have also been subject to conflicting results. Alderman [1977] found no significant increase in systematic risk after the issuance of a "subject to" opinion. On the other hand, for litigation related qualifications, Shank, Murdock and Dillard [1982] observed significant changes in systematic risk. Another study of the relationship between the systematic portion of risk and qualified opinions, Finnerty and Oliver [1985], noted a significant increase in systematic risk for some of the companies in their sample which received "subject to" opinions. The only study to address the question of changes in the unsystematic portion of risk, Alderman [1977], found no significant results.

These diverse findings have resulted in an inability to determine the actual relationship between "subject to" opinions and market

returns and risk measures. Methodological problems of the studies presented are a possible reason for the diversity of the above listed results.

The existence of a relationship is not properly addressed by the studies conducted by Alderman [1977] and Shank, Murdock and Dillard [1982] as they used short event windows and encountered the same methodological problem as did the first group of return studies. The event windows were so small in these studies that one can not determine whether or not any change in systematic risk, resulting from the qualification or the events causing it, was captured.

Finnerty and Oliver [1985], the only other study involving risk, is still subject to methodological problems, although an event window of fourteen months is used. First, the event window selected did not include all of the possible points of time where the market could have learned about the opinion or events causing it. By starting the event window with the ninth month of the year (approximately the sixth month after the previous year's opinion is issued), and not investigating publication sources to help rule out the possibility that the event occurred during this six month period, the authors may have missed some of the beta effects, (the only risk measure included in the study). In addition, by waiting until seven months after the opinion release to calculate the second beta, the authors did not recognize the possibility that the event which caused the qualification may have been resolved by then.

Further, the researchers estimated beta over two twenty-four month periods. This long parameter estimation period could introduce instability into the beta calculation as well as possibly dampening the

effects of the qualification on beta. By using such a long time period to calculate beta, the authors may have erroneously included in the beta calculation period the effects of many other events occurring in other accounting periods. In addition, as mentioned above, the event which resulted in the qualification may be resolved during the second beta calculation period. This could result in improperly measured betas since, as theorized, beta should be reduced when such a contingency no longer exists. By including time periods in the calculation of beta where the company no longer has a contingency, beta would likely be understated.

Finally, the last criticism of Finnerty and Oliver is one which was discussed earlier in the chapter which also applies to all of the studies except for Brown and Levitan [1986]. Finnerty and Oliver used no control group in their study resulting in too much uncertainty being attributed to the qualification and biasing the outcome in favor of finding results.

Improvements

Since this research concerns risk shifts over a period of time, the question addressed does not require the segregation of the impact of the qualification or the events causing it from the aggregate signal received by the market. In fact Bailey [1982] stated that it is impossible to do so except in the context of a behavioral experiment. This study looks for a relationship between the existence of a qualified opinion and a change in the risk of a company over the period in question. This does not result in the determination of causality but may suggest that the qualified opinion signals to the market that a

risk shift has occurred.

In order to overcome the shortcomings of earlier papers, this study uses a control group with characteristics as similar as possible to the experimental group. Companies chosen for the control group must not only be in the same industry and be of the same size as the experimental companies, but they must also have a contingency in the same category (for controls of loss contingency companies) or have similar financial characteristics (for controls of going concern companies). Brown and Levitan [1986] used a similar matching technique in their study of going concern qualifications. In addition, the event window includes all possible times that the market could have become aware of the opinion. The periods over which systematic and total risk are calculated are shorter. Because it is possible that the event could be resolved during the second period of risk calculation, publication indices are investigated to make sure this did not occur. This results in risk calculation periods in which the company retains the same contingency situation throughout and is less prone to confounding events.

Summary

Conflicting results were obtained by the previously conducted studies. These differing results may have been caused by methodological problems, mainly the selection of inappropriate event windows and the lack of control for the impact of other events.

This study improves upon the methodologies used in the previous studies by including in the event window all possible times that the market could have learned of the qualified opinion or the underlying

event. The control group selection used in this study provides a closer match for the experimental companies than did the methodologies of the previous studies. Details of the methodology used to conduct the research are presented in Chapter IV. The next chapter, Chapter III, presents the theoretical framework upon which this study is based.

TABLE 1

SUMMARY OF RISK AND RETURN STUDIES

AUTHORS	DATA TYPE	METHODOLOGY	EVENT WINDOW	MATCHING CRITERIA	RESULTS
RETURN STUDIES SHORT EVENT WINDOW					
Ball, Walker, and Whittred, 1979	Australian equivalent of "subject to", disclaimer and adverse	excess returns calculated from a market model	from three weeks before to three weeks after the annual report release	no control group	no significant abnormal returns noted
Firth, 1978	U.K. equivalent of "subject to", "except for", disclaimer, adverse	cumulative average residuals	40 days surrounding the release of the qualified opinion	industry, size (market capitalization), clean opinion	small effect for some qualification types
RETURN STUDIES LONGER EVENT WINDOW					
Banks and Kinney, 1982	loss contingencies resulting in "subject to" and clean opinions	cumulative average residuals	twelve months prior to the annual report release	industry, sign of unexpected earnings, clean opinion	CARS more negative for companies with "subject to" opinions
Brown and Levitan, 1986	going concern "subject to" opinions	cumulative average residuals	from nine weeks prior to thirty after year end	industry, financial position (based upon Altman's Z), clean opinion	CARS more negative for companies with qualifications
Dodd, Dopuch, Holthausen and Leftwich, 1986	"subject to" opinions and disclaimers	average prediction errors	from 125 days before to 60 days after event, event is first of the 10K or report release	no control group	no reaction to "subject to" opinions, disclaimer sample too small to determine
Dopuch, Holthausen and Leftwich, 1986	Wall Street Journal disclosures of "subject to" opinions	average prediction errors	from 300 days prior to the announcement to 50 days after it	no control group	negative abnormal returns found at the time of the WSJ announcement
Shank, Murdock and Dillard, 1982	disclaimer, "subject to" opinions	excess returns calculated on ex-post CAPM	from twelve months before to eleven after release of audit report	industry, size (total size), beta, clean opinion	only significant for litigation contingencies

TABLE 1 (Continued)

AUTHORS	DATA TYPE	METHODOLOGY	EVENT WINDOW	MATCHING CRITERIA	RESULTS
RETURN STUDIES COMBINATION					
Chow and Rice, 1982	asset valuation and uncertainty types of "subject to" opinions	abnormal performance index	three months and twelve months ending the month after the opinion	size (sales), industry, auditor, clean opinion	significant relationships for three month API's for asset realization
Davis, 1982	asset valuation and uncertainty types of "subject to" opinions	abnormal performance index and non-parametric tests	21 days around earnings and opinion releases, and from 241 days prior to ten days after each	industry, earnings forecast errors (favorable or unfavorable), beta, clean opinion	significant results found for the longer periods but not for the shorter time periods
Elliott, 1982	"subject to" opinions	excess returns calculated from an ex-post CAPM and a market model	from 45 weeks prior to the Wall Street Journal earnings release until 14 weeks after	industry and magnitude of unexpected earnings, clean opinion	significant results for going concern and asset valuation contingencies for the 45 week period
RISK STUDIES SHORT EVENT WINDOW					
Alderman, 1977	"subject to" and "except for" opinions	frequency and level of both components of risk (systematic and unsystematic)	betas calculated over two three year periods, both before and after the report release	clean opinion	no significant impact found
Shank, Murdock and Dillard, 1982	disclaimer, "subject to" opinions	results from change in beta test compared with non-parametric tests	betas calculated 24 months before and 24 months after the annual report release	industry, size, beta, clean opinion	change in beta positive for the experimental group, negative for the control group
RISK STUDIES LONGER EVENT WINDOW					
Finnerty and Oliver, 1985	"subject to" and "except for" opinions	beta change results compared with Chow test, Hollander's nonparametric test	betas calculated over two 24 month periods, ending 6 months before the opinion and starting seven months after	no control group	more significant beta changes than expected for tax, litigation and one "except for" opinion

CHAPTER III

THEORETICAL FRAMEWORK

Concerning Causality

The observation of a change in the risk of a stock over the period of qualification does not result in the ability to determine causality. It does, however, allow one to say whether the qualified opinion is associated with a change in one of the parameters and may therefore signal such a change to the investor. Therefore the theoretical framework developed in this section does not address causality.

Relationship with Total and Systematic Risk

Risk is defined by Lorie and Hamilton (1973) as a measure of the degree of uncertainty concerning the future returns on an investment. However, it is difficult to determine which is the appropriate measure of risk. According to portfolio theory, the only relevant measure of risk in the pricing of an asset is the systematic risk or the extent to which the returns on the investment move in relation to market returns [Fama and Miller, 1972]. Even though the value of the investment does not seem to depend directly upon unsystematic risk, total risk (made up of both systematic and unsystematic components) is also an important characteristic in this case. When the auditor is investigating the financial statements of a company containing a loss contingency, he/she is issuing an opinion solely about the financial statements of the

company in question and not about its relationship to other companies in the market. Since the auditor issues his or her report to all stockholders and not just those holding efficient, diversified portfolios, the relationship of total risk to loss contingencies and qualified opinions is an important one. Therefore, it seems that both systematic and total risk are important parameters and are worthy of investigation in relation to qualified opinions. Studies, such as Shank, Murdock, and Dillard [1982] and Finnerty and Oliver [1985], which investigated the relationship between risk and qualified opinions only looked at systematic risk and did not include the unsystematic component of risk. Only Alderman [1977] considered the unsystematic component and as mentioned earlier, Craswell [1985] criticized the study for using an event window which was too short to capture the effects of a change.

By definition, loss contingencies involve the uncertainty of future returns. When a loss contingency arises, there is uncertainty involving whether or not the loss will actually occur at some future date. Evidence of this is provided by the definition of a loss contingency, given by the Financial Accounting Standards Board (FASB) in Statement of Financial Accounting Standards (SFAS) No. 5, where it is described as a "possible loss". Therefore, it seems reasonable that a relationship exists between loss contingencies and the total risk of the company.

The amount of risk for a company may differ when a qualified opinion, instead of a clean opinion, is issued because of the presence of a loss contingency (as discussed previously, SAS 58 and SAS 59 recently changed the form of the opinion issued in this case - the

wording of this analysis is based upon the rules in effect at the time the companies in this study experienced such uncertainties). Ceteris paribus, a clean opinion is issued if the amount of the loss contingency is estimable, whereas a qualified opinion is issued if the amount of the loss contingency is not estimable and the contingent loss is probable or reasonably possible. If the amount of the possible loss can be estimated, investors can obviously make a better determination of the cash flow effect of the loss than if they cannot estimate the amount. However, in accordance with efficient markets theory, it seems likely that the market will make its best estimate of the amount of the cash flow effect even in the absence of a loss estimate from the company. This will result in a change in the estimated return on the company's stock whether or not the amount is known. A greater effect on the company's total risk should occur when the amount cannot be estimated (when the qualified opinion is issued). As an efficient market revises its beliefs regarding the estimate of the possible loss, the amount of expected future cash flows may also change, resulting in positive or negative returns to stockholders. As stated above, there is some uncertainty inherent in a loss contingency, but the additional component of an unknown amount should increase the amount of uncertainty caused by the contingency and result in a greater change in the total risk of the company.

The events giving rise to a questionable going concern status should also be associated with an increase in the total risk of a company. A company whose ability to continue is questionable should have future returns which are more uncertain than a similar company which is more likely to continue in existence. The relationship

between total risk and "subject to" opinions, caused by both loss contingencies and questionable going concern status, is addressed in this study. In addition to total risk, the relationship between systematic risk and "subject to" qualified opinions is also studied. This relationship is an important one because of the effects of systematic risk on the pricing of stocks and the preferences of investors [Beaver, 1979].

It is not possible to make a general statement as to whether "subject to" opinions result in the increased covariance of the individual security's returns with those of the market. The theoretical link between a qualification and the systematic component of risk depends upon the underlying reasons for the qualification involved. For example, litigation and income tax issues are company specific events because the amount of the possible effect on the company is determined independently of the economy or general business environment. On the other hand, uncertainties relating to asset valuation or realization tend to make the company more susceptible to changes in the general economy, making the company's returns more volatile than before in relation to changes in the economic conditions. Questionable going concern status may also tend to make the company more easily affected by swings in the general economy than experienced by the company previously. Therefore, any relationship between systematic risk and the issuance of a qualified opinion will also depend upon the reason for the "subject to" qualified opinion.

Statement of Hypotheses

The empirical evaluation of the relationship between the "subject

to" qualified audit opinion and the systematic portion of risk is one of the purposes of this study. For qualifications issued for asset valuation contingencies and questionable going concern status, systematic risk is hypothesized to increase over the period of interest, as discussed earlier in this chapter. Therefore, for companies with these types of qualification, the following null hypothesis is tested:

$H1_0$: There is no increase in systematic risk over the period of time for which a "subject to" opinion is issued for asset valuation contingencies or questionable going concern status.

The rejection of this null hypothesis would indicate that systematic risk has increased over the period of time in question and that there is a relationship between the type of opinion studied and systematic risk.

For qualifications issued for litigation contingencies, as discussed earlier, no increase in systematic risk is expected. Therefore, no evidence is expected to be found which will result in the rejection of the following null hypothesis:

$H2_0$: There is no increase in the systematic component of risk over the period of time for which a "subject to" opinion is issued for a litigation contingency.

A second purpose of the study is to determine empirically whether a relationship exists between the "subject to" opinion and total risk. For all of the types of qualifications discussed, a relationship is theorized to exist. Accordingly, the following null hypothesis is also tested for all of the qualification types:

$H3_0$: There is no increase in total risk over the period of time for which a "subject to" opinion is issued.

If this null hypothesis is rejected, it would indicate that a relationship exists between total risk and the "subject to" qualified opinion.

A possibility exists that the rejection of one null hypothesis may be coupled with the failure to reject the other for a given qualification type. In the case where $H1_0$ or $H2_0$ is not rejected but $H3_0$ is rejected, the indication would be that only the unsystematic portion of risk is related to this type of opinion. On the other hand, it is not expected that the first null hypothesis be rejected and the other fail to be rejected. This would indicate that the unsystematic portion of risk decreased over the period in question. Since there is no theoretical support for this occurrence, the indication may be that the instrument used to test for a change in systematic risk is more sensitive than those used to test for a change in total risk.

This study will attempt to find a relationship between the "subject to" qualified opinion and the risk of a company, both the systematic component and total risk, while avoiding the methodological problems of the other risk studies. This research will not address causality, instead, it will study whether the qualification may "signal" to the market that a risk shift has occurred during the period covered by the audit opinion. This question is of interest as many have called for the discontinuance of the "subject to" opinion in the past, and previous studies which have examined the relationship between the qualification and the market have obtained conflicting results. The methodology described in the next chapter was designed to avoid the problems which may have contributed to those conflicting results.

CHAPTER IV

METHODOLOGY

Introduction

The purpose of this research is to determine whether the issuance of a "subject-to" opinion is related to a change in systematic and total risk. Systematic risk is measured by beta, obtained from a version of the familiar market model. Total risk is measured by two methods: (1) variance and (2) the dispersion of returns, which includes skewness and kurtosis in addition to variance.

Experimental companies with "subject to" opinions were selected from the NAARS data base and divided into portfolios by type of qualification (i.e. asset valuation, litigation, going concern). In order to mitigate the confounding factors discussed in Chapter II, control companies which matched the experimental companies as closely as possible were selected. The method of selection depended upon the type of "subject to" qualified opinion received by the experimental company. For experimental companies with asset valuation and litigation qualifications, the control group selected was made up of companies with footnoted contingencies, but with clean opinions. For the going concern experimental companies, the control group consisted of companies with similar financial characteristics, as measured by Ohlson's model, again with clean opinions.

The familiar market model with dummy variables representing group

(experimental or control) and period (pre- or post-qualification) was used to test for a change in beta. A change in total risk was tested using two methods: (1) an F-test for change in the variance of returns was applied to both individual company and portfolio data, and (2) stochastic dominance, a nonparametric test.

Data Collection

Sample Group

Experimental sample companies were selected from the NAARS data base. All of the going concern and loss contingency qualifications were selected from the most recent NAARS information available, which contained annual report information for companies with fiscal years ending from July 1, 1983 to December 31, 1987. All of the audit reports containing "subject to" opinions in a given year were obtained by using the key words "REPRT", to select the auditor's report, and "CONTG", to list only those with a contingency qualification. Out of the companies located in this step, only those which had the actual words "subject to" in the opinion were selected. In addition, the number of companies was further limited as banks and utilities were eliminated from the sample because of their required adherence to accounting procedures which are distinctly different from those of the other industries and because the impact of regulatory activity may influence their market returns.

These companies were divided into categories based upon the reason for qualification. Those companies with audit reports listing more than one reason for the qualification were deleted, as these companies would not fit into one specific category for testing. A large number

of companies with questionable going concern status remained, therefore a sample of these companies was selected for use in the study. Due to limited data, all of the companies with litigation and asset valuation qualifications meeting the previously discussed criteria were used in the study.

Segregation of qualifications by type is a procedure followed in many of the previous studies (such as Firth [1978], Ball, Walker and Whittred [1979], Davis [1982], and Finnerty and Oliver [1985]) which allows the researcher to determine whether the different qualified opinions have different relationships with market returns. The division is an important one to this study because the events causing the issuance of "subject to" qualifications vary widely. Segregation of this nature also addresses the point made by Craswell [1985] that audit qualifications should be partitioned by type because some types of events which result in qualification have a more serious impact on a company's business than others. For this study, all qualifications of a particular type make up one portfolio, which is used in both the change in systematic risk and the change in total risk tests.

To reduce confounding information, only companies which received clean opinions in the previous year were included in the experimental sample. Previous year opinions were obtained from NAARS. If NAARS did not contain the previous year's report, microfiche at Oklahoma State University (OSU), the University of Oklahoma (OU) and the University of Texas at Austin (UT) were searched. If the report was found to be qualified or no report was found from any of the above sources, the company was deleted from the sample and, if possible (i.e., for the going concern group) another company was selected.

The issuance date of each experimental company's audit reports was also needed in order to determine the last possible date that the market could have heard about the qualification. This information was needed so that the second data collection period could begin seven days after the report was made public. The Securities and Exchange Commission (SEC) stamps the date of receipt on the front page of the 10K. For the purposes of this study, if this date was available on the microfiche at OSU, OU, or UT for the companies in the sample, it was the one used as the date of the report release. However, it was not always possible to observe the SEC receipt date on the microfiche. In this case, the date used was the one stamped on the front page by the microfiche company (Disclosure), the stock exchange, or NASDAQ. By reviewing a number of 10K's for which the SEC stamp and one of the other stamps were present, it appeared that these other dates were generally only one or two days after the SEC receipt date. Therefore, the use of the dates from these other stamps appeared to be a reasonable and conservative estimate of when the information became available to the public.

For the loss contingency qualifications (asset valuation and litigation), all of the experimental companies located were used. Table II lists the total number located and those which had to be deleted from the group. A large number of companies with going concern qualifications was available for use in this study. Therefore, a sample of fifty companies was selected from those available. The fifty companies included in the sample were obtained as shown in Table III. For all of the qualification types, Appendix A contains a list of the companies included in the portfolio.

TABLE II

NUMBER OF COMPANIES IN LOSS CONTINGENCY SAMPLES

	Asset Valuation	Litigation
Total without banks and utilities	60	105
less: those with previous year qualifications or for which no previous year opinion could be found	30	44
less: those for which no control matches could be found	5	19
less: those deleted for other reasons, such as mergers, no return data, or contingency resolved during test period	2	4
Total number in experimental groups	23	38

TABLE III

SELECTION OF COMPANIES IN GOING CONCERN SAMPLE

Total without banks and utilities	239
Total selected with random number generator	134
less: those with previous year qualifications or for which no previous year opinion could be found	56
less: those for which no control matches could be found	5
less: those for which no return data could be found for the periods of interest	18
less: those deleted for other reasons, such as no SEC receipt date could be found, or contingency was resolved	5
Total number in experimental group	50

Control Group

The method of selecting a control group depended upon the type of qualification. The selection was done in order to obtain control companies which were as similar to the experimental companies as possible, with the exception of the type of opinion received.

Uncertainty Qualifications. For uncertainty qualifications, the selection process involved choosing a control group which was similar to the sample not only in size, industry, and year end, but which also had uncertainties in the financial statements. This served to more effectively isolate the relationship between the risk of the company and the qualification, as more company characteristics which may be related to risk can be controlled.

The control group for uncertainty qualifications was selected from those companies with uncertainty footnotes but with clean opinions. The control group had the same type of uncertainty as the experimental group with which it is matched (i.e. asset valuation or litigation) and also had a clean opinion for the previous year. Size, industry, and year end were also matched as closely as possible.

For a particular sample observation, this matching was accomplished by searching NAARS for the period in which the qualified opinion was issued. All companies were listed that had the same two-digit SIC industry code as the sample observation and had a footnote referencing the same type of uncertainty as stated in the qualified opinion. Litigation footnotes were obtained by searching the contingency footnote information in NAARS using the following terms: lawsuit, suit, legal, litigation, defendant, sue, claim, complaint,

damages and class action. Asset valuation contingencies were generated by the use of the following terms: write down, write off, value, revalue, valuation, realize, investment, security, bankruptcy, impair and reduce.

Those companies which had year ends within one week of the sample company's year end were eligible to be chosen as control companies. In addition, due to a data limitation, those companies which had year ends three to four months prior to the year end of the sample company were also considered as potential control companies. These companies had year end dates which were close to those of the experimental companies and by excluding those companies which had year end dates one to two months prior to the experimental companies, companies which issued their annual reports during the forty-day data collection periods (a source of confounding information) were not included in the control group. The company closest in size, as measured by the amount of relative total assets, to the sample observation was chosen as a control. Relative total assets was measured by dividing the total assets of the potential control company by the total assets of the sample company. The control company with the relative total asset measure closest to one was chosen as the best match.

Finally, the prior year financial statements were checked to determine that the contingency in question occurred during the current year. If this contingency existed on the previous year's financial statements, a different company was selected.

One control company was selected for each experimental company for use in all but one of the tests. As discussed in the stochastic dominance section of this chapter, five control companies (the primary

control company used in the other tests and four additional control companies, if available) were selected for each experimental company for use in the test involving stochastic dominance. The same methods discussed above were used to select all of the companies.

The primary control group consists of the same number of companies as does the experimental group: 23 for asset valuation and 38 for litigation. The total number of control companies found, additional and primary controls, was 74 for the asset valuation group and 107 for litigation. Appendix B contains a listing of the companies which make up the primary control group, while Appendix C contains a listing of the additional control group companies.

Going Concern. Going concern qualifications, on the other hand, were matched with companies that had similar financial statement characteristics, as well as size, industry, and year end, but did not receive qualifications. This method was an improvement over matching done without considering the financial condition of the company. The result is a control group which is more like the experimental sample in all ways, except for the type of opinion issued.

Matching on financial condition was accomplished by using a method developed by Ohlson [1980]. This is similar to Altman's [1968] procedure used by Brown and Levitan [1986] to obtain matches for a sample of companies with going concern qualifications. Ohlson's model was chosen because its development was based upon firms with levels of financial distress which are similar to those firms included in this study. Ohlson's method to predict bankruptcy in one or two years, developed by conditional logit analysis, contains the variables listed in Table IV. A value was generated from the model by inserting a company's financial

characteristics into an equation (1) containing the parameter values presented in the table below.

$$\text{Ohlson's value} = -.4878(\text{SIZE}) + 5.29(\text{TLTA}) - .99(\text{WCTA}) + 0.062(\text{CLCA}) - 1.91(\text{OENEG}) - 4.62(\text{NITA}) - 2.25(\text{FUTL}) - 5.21(\text{INTWO}) + 0.212(\text{CHIN}) \quad (1)$$

TABLE IV

OHLSON'S MODEL VARIABLES

Variable	Estimate	Calculation of Variable
SIZE	-0.4878	ln(total assets/GNP price-level index)
TLTA	5.2900	Total liabilities/total assets
WCTA	-0.9900	Working capital/total assets
CLCA	0.0620	Current liabilities/current assets
OENEG	-1.9100	1 if total liabilities > total assets, 0 otherwise
NITA	-4.6200	Net income/total assets
FUTL	-2.2500	Funds from operations/total liabilities
INTWO	-0.5210	1 if net income was negative for the past two years, 0 otherwise
CHIN	0.2120	$(NI_t - NI_{t-1})/(\lvert NI_t \rvert + \lvert NI_{t-1} \rvert)$, where NI_t is net income for the most recent period

The control sample was selected in a manner similar to that used by Brown and Levitan [1986] and provides an even closer match because

Ohlson's procedure, unlike that of Altman, takes into account the size of the companies involved. For a particular observation from the experimental sample, the value was calculated according to the model. COMPUSTAT was used to obtain the information for all of the companies with the same two-digit SIC code and same year end as that of the experimental company. Ohlson's model was applied to all of these potential control companies. The company with the value closest to that of the experimental company was tentatively selected and both the current and previous years' audit opinions were checked to ensure that they were unqualified. If either the current or the prior year's opinion was not a clean opinion, the company with the next closest model value was chosen.

In order to check the validity of the results, the same test used in Brown and Levitan [1986] was used to compare the values for the two groups to indicate the closeness of the match on financial condition. The test used was a paired t-test, applied to the differences between Ohlson's model value for each experimental companies and the model value for each of the matched control companies. The test was run once for each portfolio to determine that no significant differences in the model values of the experimental and control companies were found for the portfolio. The test statistic which is distributed as a student's t is as follows:

$$t = \frac{\bar{d}}{(S_d / n)} \qquad (2)$$

where $\bar{d}$ is the mean difference between the experimental and control model values

S_d is the standard deviation of the differences

and n is the number of matched pairs in the portfolio

This test statistic measured whether the values obtained from Ohlson's model were significantly different between the experimental and control companies. A t-value of 0.1427 with fifty degrees of freedom was obtained, which gives a p-value of .8871, indicating that no significant difference between the model values exists.

As discussed under loss contingencies, one control company (called the primary control) was selected for each experimental company for use in all of the tests except for the stochastic dominance test. When possible, four more control companies (called additional control companies) were selected for this test, resulting in, at most, a total of five control companies. For going concern, the primary control group contains 50 companies while the additional control group consists of another 178 companies. Lists of the companies which make up the primary control group are presented in Appendix B, while the additional control group companies are contained in Appendix C.

Data Collection Periods

There are two time periods over which the returns for the experimental companies are measured and the tests conducted (Figure 1). First, the returns were obtained for the forty trading days starting at the beginning of the fiscal year. The second time period consisted of forty trading days beginning one week after the qualification was made public (i.e. received by the SEC). The returns for the control companies were calculated over the same time periods as for the experimental company to which they were matched.

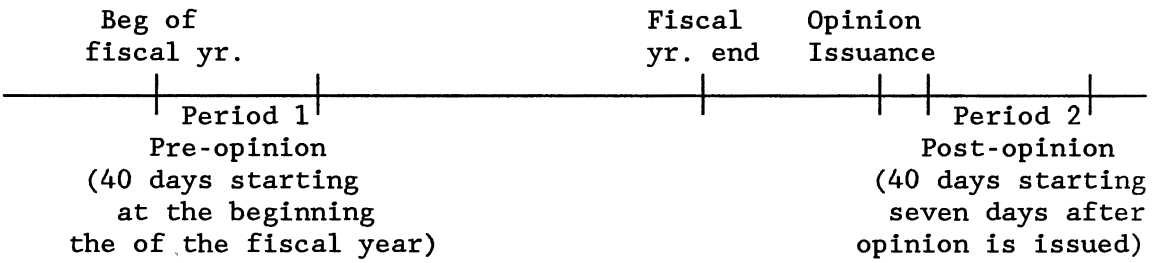

Figure 1. Risk Measurement Periods

Since annual financial data are not due until three months after the fiscal year end, using the first data collection period discussed above resulted in the exclusion of annual report release dates and the related market reaction from the measurement periods. The second data collection period is chosen to begin after the annual report (and the opinion) is released for the fiscal year of interest because the market may not yet be aware of the circumstances resulting in the contingency until they are disclosed in the report.

For the experimental companies, in order to provide assurance that information regarding the contingency was not resolved by the market during the second calculation period, the Wall Street Journal Index was searched for evidence of stories pertaining to the resolution of the events leading to the qualification. In the event that such evidence was found, the company in question was removed from the sample and, for the going concern group, another was chosen to replace it.

In the case of control companies, the indices were also searched. The Wall Street Journal Index was again reviewed for resolution of the loss contingency for asset valuation or litigation matches for the period after the financial statements were released, up until the end

of the second data collection period. The same review was applied to the precarious financial status of the company in the case of going concern matches. In addition, for those loss contingency controls with year ends three to four months prior to their experimental company, a search of the indices was made for the period between their previous year's financial statement release (without the contingency in the footnotes) and the end of the first return collection period. This was done to determine that the contingency did not arise prior to, or during, the first return collection period.

Collection of Returns

In general, returns for the experimental and control sample companies which were listed on either the New York Stock Exchange (NYSE) or the American Stock Exchange (AMSE) were obtained from the daily CRSP tapes. When the company was not listed on the CRSP tape, for whatever reason, the Standard and Poors Corporation NYSE Daily Stock Price Record and AMSE Daily Stock Price Record were consulted. If the information on the company's stock price, as well as any dividends received, was listed for the period in question, the stock returns were calculated using the following formula:

$$\frac{\text{(closing price at day t) - (closing price at day t-1) + dividends}}{\text{closing price at day t-1}} \qquad (3)$$

where the prices are adjusted for any stock dividends or stock splits. All of the information needed to calculate the returns for over-the-counter (OTC) stocks in either sample were obtained from the Standard and Poors Corporation OTC Daily Stock Price Record. The average of the bid and ask quotes was used when no single quote was provided. The

CRSP value-weighted return (VWRETD) which includes all distributions was chosen as the market return variable.

Statistical Tests

The statistical tests were performed to measure the change in two types of risk, systematic and total risk. The first test is a market model regression with dummy variables, designed to measure a change in beta, a measure of systematic risk. To measure a change in total risk, stochastic dominance and the variance change F-test were used.

Measuring the Change in Systematic Risk

In order to test the first two hypotheses developed in Chapter III, the relationship of "subject to" qualified opinions to a change in systematic risk was investigated. Like the other studies concerning the relationship between systematic risk and qualified opinions (Alderman [1977], Shank, Murdock and Dillard [1982] and Finnerty and Oliver [1985]), beta was used as the measure of systematic risk.

The stability of beta over the two time periods was tested using a linear regression equation with dummy variables representing period (pre- or post-qualification) and group (experimental or control). This is similar to the analysis of covariance procedure commonly referred to as the "Chow test" [Chow, 1960] which was used by Finnerty and Oliver [1982] in their test of beta changes. One important advantage of the dummy variable method is that the "Chow test" measures any change in intercept in addition to the change in beta while dummy variables can be used to measure the impact of both parameters separately .

In order to perform this test, the regression equation (4) was

applied to portfolio level data. One portfolio exists for each type of qualified opinion (the method of selecting the companies in these portfolios was discussed earlier in the chapter). For each company in the experimental portfolio, there was one matched company in the control portfolio. Portfolio return data were obtained by averaging all of the company and market returns for each of the forty days in each period, resulting in an equally weighted value per day. The following regression equation was fit to all of the data for both of the data calculation periods:

$$R_t=ß_0+ß_1G+ß_2P+ß_3GP+ß_4R_{mt}+ß_5GR_{mt}+ß_6PR_{mt}+ß_7GPR_{mt}+\epsilon \quad (4)$$

where G=0 if the data is from the control portfolio
G=1 if the data is from the experimental portfolio
P=0 if the data is from the first period
P=1 if the data is from the second period
R_{mt} is the market return on day t
and R_t is the return of the portfolio on day t

The breakdown of this equation into the four possible combinations of dummy variable values is as follows:

Control Portfolio, period 1: (G=0, P=0)

$$\hat{R}_t=\hat{ß}_0+\hat{ß}_4R_{mt} \quad (5)$$

Control Portfolio, period 2: (G=0, P=1)

$$\hat{R}_t=(\hat{ß}_0+\hat{ß}_2)+(\hat{ß}_4+\hat{ß}_6)R_{mt} \quad (6)$$

Experimental Portfolio, period 1: (G=1, P=0)

$$\hat{R}_t=(\hat{ß}_0+\hat{ß}_1)+(\hat{ß}_4+\hat{ß}_5)R_{mt} \quad (7)$$

Experimental Portfolio, period 2: (G=1, P=1)

$$\hat{R}_t=(\hat{ß}_0+\hat{ß}_1+\hat{ß}_2+\hat{ß}_3)+(\hat{ß}_4+\hat{ß}_5+\hat{ß}_6+\hat{ß}_7)R_{mt} \quad (8)$$

If the two portfolios have a significantly different change in beta for R_{mt} over the two estimation periods, an F-test performed on parameter $ß_7$, which measures the difference in change in beta between the experimental and control groups over the two periods, will be found to be significant, and $H1_0$ and $H2_0$ will be rejected.

In summary, in order to test for a shift in systematic risk, beta was calculated over two time periods, one at the beginning of the accounting period and one after the opinion is issued. The stability of beta over the two time periods was tested using a linear regression equation, containing dummy variables for group as well as period.

Measuring the Change in Total Risk

The third hypothesis, developed in Chapter III, was tested using two methods: stochastic dominance and a variance change test utilizing an F-statistic. Stochastic dominance is presented first, followed by a discussion of the application of the variance change test to company and portfolio data.

Stochastic Dominance. Stochastic dominance was one of the methods used to measure a change in the total risk of the sample. Stochastic dominance (SD) compares the cumulative distributions of two sets of returns, taking into account the first four moments of the distribution of returns. This method has two advantages over methods using only two moments, the mean-variance (M-V) approach, in some cases: (1) when both the return and the risk of one investment are higher (or lower) than another, the M-V approach alone cannot determine the efficient investment [Porter and Carey, 1974]; and (2) the M-V approach assumes normality of returns while SD makes no assumptions regarding the return

distribution [Levy and Kroll, 1978].

There are three types of stochastic dominance, first-degree (FSD), second-degree (SSD) and third-degree, the first two of which relate to this study [Levy and Sarnat, 1984]. For all types of stochastic dominance, investment F is preferred to investment G if and only if the utility obtained by receiving the returns of F is greater than the utility of receiving the returns of G. The only assumption needed for FSD is that the first derivative of the investor's utility function is positive, or that more return is preferred to less. Then for all investors meeting this requirement, regardless of their attitude towards risk, F can be said to be preferred to G (or dominates G) if $F(R) \leq G(R)$ for all returns R provided that for at least one value of R, $F(R) < G(R)$. An example of this is shown in Figure 2. The investor can always be expected to select F over G if there is always a higher probability of receiving a smaller return with investment G than with F.

In order to use SSD, an additional assumption must be made. If investors are assumed to be risk averse (or equivalently, the second derivative of the investors' utility function is assumed to be negative), a preference can be determined for F over G in some cases even if their cumulative probability distributions intersect. SSD states that the area under the cumulative probability distribution of F must be smaller than or equal to the area under the cumulative probability distribution of G for all possible values of R, provided that for at least one value of R, the area under the distribution of F must be absolutely smaller. This can be stated mathematically as follows:

$$\int_{-\infty}^{R} F(t)dt \leq \int_{-\infty}^{R} G(t)dt \qquad (9)$$

An example of the dominance of F over G is given in Figure 3.

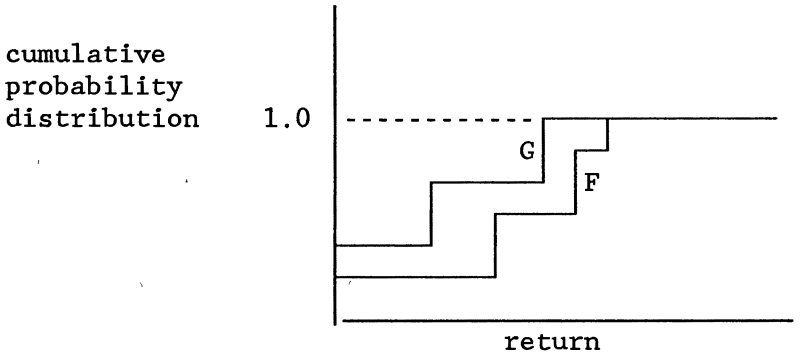

Figure 2. An Example of First-Degree Stochastic Dominance of F Over G

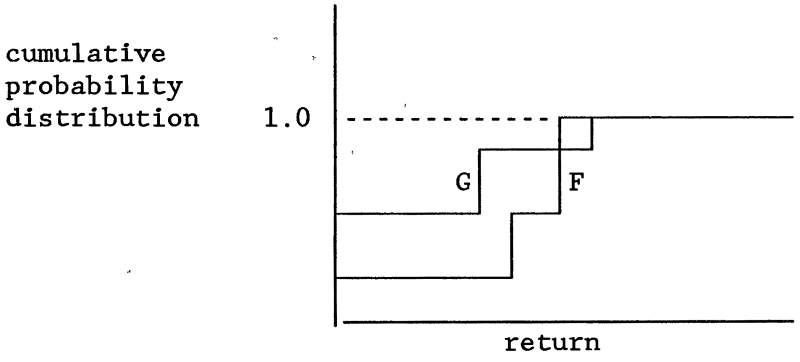

Figure 3. An Example of Second-Degree Stochastic Dominance of F Over G

Under FSD, since it is assumed that more return is preferred to less and no assumptions are made about risk preferences, the dominant investment is determined based only on the amount of return and not on the amount of risk involved. The dominant investment has at least as high an expected return as the dominated investment. Risk aversion by investors is assumed under SSD in addition to the assumption that more return is preferred to less. This additional assumption is generally regarded to be realistic in terms of observed human behavior. As stated by Schall and Haley [1983],

> The words 'risk' and 'uncertainty' convey negative feelings to most people. In their financial affairs, as in most aspects of life, both individuals and business managers try to avoid risk whenever they can, and they minimize risk when it can not be avoided.

When using SSD it is still true that the dominant investment must have at least as high an expected return. Unlike FSD, however, the opposite does not always hold - that the one with the higher return is always dominant. It is true that the investment with the higher return can not be dominated by the other investment, however the two can be neutral (if the investment with the higher return is more risky). In addition, when two investments have the same expected return, the one with the least risk is the dominant one [Levy and Sarnat, 1984].

Because SSD is based upon the assumption that less risk is preferred to more, it can be used to measure whether a company has incurred a change in total risk relative to that of another company. If two companies retain the same relative return over two periods (i.e. both increase or decrease by about the same amount), any change in dominance between the two companies is due to a change in the riskiness of their returns relative to one another.

It was expected that since total risk is hypothesized to increase, the companies in the experimental sample would more frequently become dominated by the companies in the control group over the two periods, provided that their expected returns do not increase. Because beta is related to return, if there is no comparative change in beta for the experimental company over and above any change in the control company, then the difference in the returns between the experimental and control companies should remain about the same. In this case, a change in the proportion of dominated companies to those which are dominant or neutral would indicate a change in the total risk. As the total risk increases in the experimental sample, the proportion of those experimental sample companies which dominate should decrease and the proportion which are dominated by the control companies should increase.

In the case where a significant change occurs in a company's beta, since returns are based upon beta (the higher the beta, the higher the return required), it is likely that the return would also change. If the returns of the experimental companies increase relative to that of the control companies, it is likely that the experimental companies will become less dominated (more will be found to be neutral or dominant) and vice versa. Stochastic dominance may, therefore, not be an effective tool to test for a change in the total risk if there is a statistically significant increase in beta. Therefore, if the dummy variable test results indicate that the experimental companies have experienced a change in beta, the stochastic dominance test results may be driven by the beta change and may not be reliable as a test of change in total risk. If no significant change in beta is found for the experimental group over and above any change in the control group,

the test for a change in beta using linear regression with dummy variables (as described in the previous section) applied to individual company data provides additional information about the extent of beta changes. A small number of experimental companies exhibiting a beta change, when matched with their primary control company, would provide assurance that there are not a large number of matches in the stochastic dominance test that are affected by beta changes. In addition, an indication that these changes occur in both directions (betas increased for some of the experimental companies and decreased for others) would suggest that the effects are randomized within the sample and do not affect the results in a significant way. The experimental companies for which a significant change in beta was found (0.05 level), as compared to its primary control company, is listed in Appendix E along with the direction of the beta change. Chapter V includes a discussion of these findings and their implications.

To apply SSD to this data for the first test period, each experimental company with a given contingency was paired with each of the control companies with that same contingency. For each experimental company in the sample, up to five control companies were selected, as discussed earlier in this chapter. Therefore, for each of the experimental companies, the number of resulting pairs was equal to the number of control companies found for that entire portfolio. This matching of an experimental firm with each of the control firms in the portfolio, which was necessary due to a data limitation, is expected to bias against finding significant results. It is expected that more companies will be neutral to one another in both periods of interest because dissimilar companies tend to have different return characteristics,

indicating no change in the characteristics of interest for this test.

Next, the returns for each of the companies were arranged from smallest to largest and the cumulative distributions of each of the return series were determined. The SSD algorithm (equation 9) was then run on each pair. This algorithm determined whether a given experimental company dominated a given control company. Experimental company dominance was found if the area under the experimental company's cumulative distribution was smaller than, or equal to, the area under the cumulative distribution of the control company for each possible return, for at least one return the area must be absolutely smaller. Control company dominance was found if the exact opposite was true - the area under the control company's cumulative distribution is smaller. The two companies were found to be neutral if neither of the above were found (i.e. the area under the cumulative distribution was found to be smaller for the experimental company in some cases and smaller for the control company in some cases). The number of times that each company in the experimental group dominates, is dominated by, or is neutral to the control company was determined for the first data collection period. This procedure was again carried out for the second period in the study. The comparison of one experimental company to the whole control portfolio distinguishes this test from all of the other tests conducted, which only pair one control company with a specific experimental company.

The results obtained over the two periods were compared using a Kolmogorov-Smirnov two-sample test. This measure provided a nonparametric test of whether the dominance characteristics (the number of times the experimental companies are dominated, dominant, or neutral,

as compared to the control companies), changed significantly over the two periods. For each portfolio, the test was applied three times to the data obtained from the stochastic dominance tests to determine whether changes occurred in the following: (1) dominant experimental companies; (2) dominated experimental companies; and (3) neutral experimental companies.

To test for a change in the number of dominant companies, the experimental companies within each of the three portfolios were ranked (lowest to highest) by the number of times experimental company dominance occurred. The cumulative distribution functions were calculated from the rankings for each of the two periods. For each observation, the second period's cumulative distribution value is subtracted from the first period's cumulative distribution value at the same point. The largest of all of the differences between the cumulative distributions is then compared to the critical value for the Kolmogorov-Smirnov two-sample test from the appropriate table in order to test hypothesis $H3_0$. The results from this test are considered to be conservative [Hollander and Wolfe, 1973].

Variance Change Test. The variance of the returns was calculated over the same time periods as beta. This test was applied to both individual company and portfolio data.

The null hypothesis of no difference between the variances of the first and second time periods ($H3_0$) company was tested using the following F-statistic obtained from Steel and Torrie [1980]:

$$F = \frac{\text{variance of the second period returns}}{\text{variance of the first period returns}} \qquad (10)$$

The variances used in this test were standardized by dividing the variance of the company's returns by the variance of the market's returns over the same time period. This standardization was performed because a change in market variance over the two periods should have an impact upon the experimental or control company variances. According to Anderson, e.t. al., standardization should be used when comparisons of different times or populations are being made [Anderson, e.t. al., 1980].

To apply this test to individual company data, the number of experimental companies with significant changes in variance was compared to the number of control companies with significant changes using a Pearson chi-square test. A significant chi-square test would indicate that the null hypothesis, $H3_0$, would be rejected for the particular type of qualification being tested.

In addition to performing this test on individual company data, portfolio data were also used. The above F-statistic was applied to the company and market returns for each of the three portfolios: asset valuation, litigation and going concern. This was accomplished by subtracting the average control group return for each day in the two data calculation periods from the average experimental group return for that same day. The F-test was applied to the differences between these two amounts.

In summary, to test for a change in total risk, both the second degree stochastic dominance and the Kolmogorov-Smirnov test were applied to the data. The F-test for change in variance was conducted using both individual company and portfolio level data. The results of

these tests are contained in the following chapter with any limitation and implication of those results in the final chapter.

CHAPTER V

RESULTS

Introduction

The relationship of both beta and total risk to the issuance of a "subject to" qualified opinion was the focus of this study. The related hypotheses and the detailed methodology were presented in Chapters III and IV, respectively. The tests were for changes in systematic risk and for changes in total risk.

A market model regression equation, containing dummy variables for group and data period, was estimated for each of three portfolios to determine whether a change in systematic risk occurred in the experimental sample (beyond any change in the control group) over the two periods of interest. No significant change in systematic risk was observed for any of the three portfolios, asset valuation, litigation and going concern.

Three methods were utilized to test for a change in total risk. First, an F-test for change in variance was applied to the portfolio level data and a significant increase in total risk was noted for each of the portfolios, except for litigation. The same F-test was applied to individual company data and the resulting numbers of companies with significant changes were tested using a chi-square analysis. For this test, only the going concern sample indicated significance. Finally, stochastic dominance was applied to the data for each of the opinion

types, and the changes in the dominance characteristics were compared over the two periods using a Kolmogorov-Smirnov two-sample test. A significant change in the dominance characteristics was observed for only the asset valuation and going concern samples. Taken as a whole, the total risk tests strongly indicate a change for the going concern sample, and suggest that the asset valuation sample may have also experienced such a change. No shift was noted for the litigation group.

The presentation of these results begins with the beta shift test results, presented by type of qualification. Next, the tests for a change in total risk are presented with the discussion of the F-tests preceding that of stochastic dominance. The presentation is again structured by type of qualification.

Beta Change Tests

In order to test for a shift in beta, a dummy variable regression was estimated for the portfolio-level data, as discussed in Chapter IV. This test was run three times, once for each of the portfolios: asset valuation, litigation and going concern. As discussed previously, each portfolio contains those companies which incurred a certain type of contingency.

Asset Valuation

As discussed in Chapter III, one may expect a positive relationship between the issuance of a "subject to" opinion for asset valuation and an increase in the beta of a stock. The market model regression, equation (4), with dummy variables for group (i.e. experimental and control) and for period (pre- and post-qualification), allowed the

regression parameters to vary over groups and periods in order to test for such a relationship. The parameter of interest is β_7, the last one listed in Table V, G*P*MKT, which measures the difference in the beta change between the experimental and control groups. As can be seen from the table, the parameter estimate is of the same sign (positive) as hypothesized. However, the probability value for $|t| \geq 0.44$, occurring by chance is 0.6580, indicating that the increase in beta for the experimental group is not significant at the desired 0.05 level of significance. It is also evident from the table that the standard error of the estimate for this last parameter is the largest of the eight, indicating more uncertainty regarding the estimation of this parameter than the others.

The division of these parameter estimates into the four possible regression equations, equations (5) through (8), is presented in Table VI. Slope and intercept values, obtained when the appropriate dummy variable values are inserted into the regression equation, are presented along with the formulas for obtaining those values. It is apparent that although the beta for the experimental sample decreased over the periods, it decreased less than did the control group for that same period of time.

TABLE V

PARAMETER ESTIMATES AND SIGNIFICANCE TESTS
ASSET VALUATION SAMPLE

PARAMETER	NAME	ESTIMATE OF COEFFICIENT	T FOR HO: COEFFICIENT=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	$ß_0$	0.00053250	0.36	0.7204	0.00148519
G	$ß_1$	0.00129452	0.62	0.5386	0.00210038
P	$ß_2$	-0.00030680	-0.14	0.8852	0.00212203
G*P	$ß_3$	-0.00057559	-0.19	0.8482	0.00300101
MKT	$ß_4$	0.64550577	1.33	0.1870	0.48698665
G*MKT	$ß_5$	0.59609551	0.87	0.3881	0.68870313
P*MKT	$ß_6$	-0.88119856	-0.91	0.3633	0.96649647
G*P*MKT	$ß_7$	0.60626578	0.44	0.6580	1.36683242
MODEL			DF=152	R-SQUARE	0.069867

TABLE VI

INTERCEPT AND SLOPE PARAMETERS
ASSET VALUATION SAMPLE

SAMPLE (G)	PERIOD (P)	INTERCEPT	SLOPE
CONTROL G=0	FIRST P=0	0.00053250 $ß_0$	0.64550577 $ß_4$
CONTROL G=0	SECOND P=1	0.00022570 $ß_0+ß_2$	-0.23569279 $ß_4+ß_6$
EXPERIMENTAL G=1	FIRST P=0	0.00182702 $ß_0+ß_1$	1.24160128 $ß_4+ß_5$
EXPERIMENTAL G=1	SECOND P=1	0.00094463 $ß_0+ß_1+ß_2+ß_3$	0.96666850 $ß_4+ß_5+ß_6+ß_7$

Litigation

Unlike the case for the asset valuation companies, no change in beta was hypothesized to occur when a litigation contingency resulting in qualification arises. Chapter III presented the argument that a litigation contingency is company specific because its result is solely based upon information and events surrounding the company, the court, and the other party to the suit. The outcome of the suit, therefore, should not be affected by those things which affect the market as a whole, resulting in no determinable relationship between the issuance of such a qualification and a change in beta.

Table VII below displays the parameter estimates from the dummy variable regression test for a change in beta using the litigation contingency portfolio data. The parameter of interest is the last one listed in table, G*P*MKT, which has a t-value of -0.78 and a PR > |T| of 0.4391. As was hypothesized, this t-value is not significant and no statistically significant change in beta was noted from these test results.

Table VIII breaks down the information given in Table VII into the intercept and slope estimates for each of the four possible combinations of dummy variable values. It can be noted that the slope value for the second period of the experimental group is below zero, far from the average beta value often seen in portfolio data. This may be due to the large standard error of each of $ß_6$ and $ß_7$ (2.08435459 and 2.9478115 respectively, from Table VII) which makes up part of this slope coordinate. The large standard error suggests that the data do not provide an accurate estimate of this parameter.

TABLE VII

PARAMETER ESTIMATES AND SIGNIFICANCE TESTS
LITIGATION SAMPLE

PARAMETER	NAME	ESTIMATE OF COEFFICIENT	T FOR HO: COEFFICIENT=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	$ß_0$	0.00072713	0.26	0.7975	0.00282914
G	$ß_1$	2.13416E-05	0.01	0.9958	0.00400101
P	$ß_2$	-1.51594E-05	-0.00	0.9970	0.00399522
G*P	$ß_3$	0.00589282	1.04	0.2986	0.00565009
MKT	$ß_4$	0.85708235	0.93	0.3522	0.91841226
G*MKT	$ß_5$	0.76097353	0.59	0.5588	1.29883116
P*MKT	$ß_6$	-0.27662081	-0.13	0.8946	2.08425459
G*P*MKT	$ß_7$	-2.28668673	-0.78	0.4391	2.94758115
MODEL			DF=152	R-SQUARE	0.040971

TABLE VIII

INTERCEPT AND SLOPE PARAMETERS
LITIGATION SAMPLE

SAMPLE (G)	PERIOD (P)	INTERCEPT	SLOPE
CONTROL G=0	FIRST P=0	0.00072713 $ß_0$	0.85708235 $ß_4$
CONTROL G=0	SECOND P=1	0.00071197 $ß_0+ß_2$	0.58046154 $ß_4+ß_6$
EXPERIMENTAL G=1	FIRST P=0	0.00074847 $ß_0+ß_1$	1.61805588 $ß_4+ß_5$
EXPERIMENTAL G=1	SECOND P=1	0.00662613 $ß_0+ß_1+ß_2+ß_3$	-.94525166 $ß_4+ß_5+ß_6+ß_7$

To test for the possible influence of outliers on these results, the same regression was applied to individual company data (run on each experimental company and its matched control). This test only indicated two companies with significant $ß_7$ values, both of which showed significant increases in beta for the experimental company as compared to the control company. Therefore, neither of these companies have beta values which could have contributed to the negative slope value.

An additional analysis was performed on the data to determine whether any of the companies in the litigation sample had extremely large variances in their return data which could cause the unusual parameter value and large parameter variance. To locate companies with large variances, the F-test for a change in variance was applied to individual company data within the litigation sample. This test is also used elsewhere in the study. It was described in Chapter IV and is discussed later in this chapter along with the other instruments used to test for a shift in total risk. The results of the test, contained in Appendix D, indicate that for one experimental company, Excel Energy, the F-value was 671.7345, while the next highest F was under 20.

Based upon these results, Excel Energy and its primary match, Cibola Energy were removed from the sample and the dummy variable regression was rerun. The new regression parameters are stated in Table IX, and the new intercept and slope coordinates are presented in Table X. As shown in Table IX, while $ß_7$ is still negative, suggesting that the beta of the experimental portfolio decreased more than did the control group, the t-value is not significant at the 0.05 level. The slope coordinates seem more reasonable after the removal of the outlier

with the slope of the experimental portfolio during the second equal to 0.38692238. Therefore, even with the removal of the outlier, no significant results were noted for this portfolio, as was hypothesized in Chapter III.

TABLE IX

PARAMETER ESTIMATES AND SIGNIFICANCE TESTS
LITIGATION SAMPLE WITHOUT OUTLIER

PARAMETER	NAME	ESTIMATE OF COEFFICIENT	T FOR HO: COEFFICIENT=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	$ß_0$	0.00098095	0.73	0.4661	0.00000055
G	$ß_1$	-0.00018528	-0.10	0.9224	0.00021193
P	$ß_2$	-0.00021973	-0.12	0.9075	0.00188758
G*P	$ß_3$	-0.00123846	-0.46	0.6434	0.00266944
MKT	$ß_4$	0.95227180	2.08	0.0391	0.46766244
G*MKT	$ß_5$	0.80074914	1.24	0.2179	0.64723249
P*MKT	$ß_6$	-0.50137589	-0.53	0.5995	0.95268280
G*P*MKT	$ß_7$	-0.86472267	-0.64	0.5220	1.34729697
MODEL			DF=152	R-SQUARE	13.7005

TABLE X

INTERCEPT AND SLOPE PARAMETERS
LITIGATION SAMPLE W/O OUTLIER

SAMPLE (G)	PERIOD (P)	INTERCEPT	SLOPE
CONTROL G=0	FIRST P=0	0.00098095 $ß_0$	0.95227180 $ß_4$
CONTROL G=0	SECOND P=1	0.00076122 $ß_0+ß_2$	0.45089591 $ß_4+ß_6$
EXPERIMENTAL G=1	FIRST P=0	0.00079567 $ß_0+ß_1$	1.75302094 $ß_4+ß_5$
EXPERIMENTAL G=1	SECOND P=1	-0.00066252 $ß_0+ß_1+ß_2+ß_3$	0.38692238 $ß_4+ß_5+ß_6+ß_7$

Going Concern

Beta for a questionable going concern with a "subject to" qualification was hypothesized to increase in Chapter III because it was assumed that the financially unstable company would be more susceptible to swings in the general economy, which would also affect the market in general. However, the results of this test, as presented in Table XI, do not indicate that this occurred.

The last parameter estimate listed in the table, again the parameter of interest, is not significant (t-value of -0.37) as the probability of a larger value occurring by chance is 0.7148. However, the sign is opposite of that expected, indicating a decrease in beta over the two periods.

A decrease in slope, or beta, is noted in Table XII, for both the control and experimental groups; however, a larger decrease is evident

for the experimental sample. The slope values, as listed in the table, are close to the expected value of one for all but the second period experimental group. This slope is close to zero, indicating that the movement of the portfolio's returns are mostly unrelated to that of the market. While the standard error of $ß_7$ is again the largest of all of the parameter estimates, it is only about half of what the standard error was for the litigation portfolio and not much larger than the standard error of $ß_6$. A possible explanation for this result is that the companies selected for testing were doing so poorly that they were experiencing mostly negative returns, no matter what the market was incurring. For companies in extremely severe financial trouble, even an upturn in the market may not translate into positive returns.

TABLE XI

PARAMETER ESTIMATES AND SIGNIFICANCE TESTS
GOING CONCERN SAMPLE

PARAMETER	NAME	ESTIMATE OF COEFFICIENT	T FOR HO: COEFFICIENT=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	$ß_0$	0.00630342	5.05	0.0001	0.00124734
G	$ß_1$	0.00307354	1.74	0.0835	0.00176400
P	$ß_2$	0.00083690	0.48	0.6299	0.00173346
G*P	$ß_3$	0.00357112	1.46	0.1473	0.00245148
MKT	$ß_4$	0.97637895	2.09	0.0387	0.46822958
G*MKT	$ß_5$	-0.22073761	-0.33	0.7393	0.66217662
P*MKT	$ß_6$	-0.21416310	-0.26	0.7960	0.82694405
G*P*MKT	$ß_7$	-0.42816546	-0.37	0.7148	1.16947550
MODEL			DF=152	R-SQUARE	0.174950

TABLE XII

INTERCEPT AND SLOPE PARAMETERS
GOING CONCERN SAMPLE

SAMPLE (G)	PERIOD (P)	INTERCEPT	SLOPE
CONTROL G=0	FIRST P=0	0.00630342 $ß_0$	0.97637895 $ß_4$
CONTROL G=0	SECOND P=1	0.00714032 $ß_0+ß_2$	0.76221585 $ß_4+ß_6$
EXPERIMENTAL G=1	FIRST P=0	0.00937696 $ß_0+ß_1$	0.75564134 $ß_4+ß_5$
EXPERIMENTAL G=1	SECOND P=1	0.01378498 $ß_0+ß_1+ß_2+ß_3$	0.11331278 $ß_4+ß_5+ß_6+ß_7$

Summary of Systematic Risk Change Test

None of the portfolios tested indicated a significant change in systematic risk, or beta. For the asset valuation contingency and questionable going concern status portfolios, it was expected that this test would show an increase in beta over the period of interest. While an increase was noted for the asset valuation sample, the amount was not significant. The going concern portfolio, on the other hand, indicated an unexpected decrease in beta over the period. In both cases, the insignificant results led to the failure to reject $H1_0$, which stated that there was no increase in beta over the period of interest.

Litigation contingency companies were expected to show no increase in beta because the events surrounding the contingency were hypothesized to be company specific. The test results indicated no signifi-

cant increase (or decrease) in beta over the two data calculation periods. Therefore, $H2_0$ cannot be rejected for the litigation portfolios.

Total Risk Change Tests

In Chapter III, the hypothesized relationship between total risk and all three types of "subject to" qualifications was discussed. It was theorized that an increase in total risk would occur over the period for which such a qualification is received. Three different methods were used to test for such a change in total risk. The first two both utilized an F-statistic, but were applied to different levels of data - the first to portfolio data and the second to individual company data. A chi-square analysis was used to test the individual company results for significance. Stochastic dominance, a nonparametric procedure, was then performed on all of the companies, within each portfolio. The Kolmogorov-Smirnov two-sample test, also nonparametric, was used to test for a change in the dominance characteristics obtained from the stochastic dominance procedure.

Variance Change Test

The variance change test, as described in Chapter IV, is performed by dividing the variance of the portfolio data for the second data collection period by the variance for the first data collection period. In order to mitigate any effects caused by changes in the market variance over these periods, the variances were standardized by dividing each by the market variance for that period. The value resulting from the division is an F-statistic which is compared to the tables

[Steel and Torrie, 1980] for significance. In this case, a one-sided test was used because the second period variance was hypothesized to be higher than the first.

Portfolio Level Application. To apply this test to the portfolio data, the average return for the control group for a given day was subtracted from the average return for the corresponding experimental group for that same day. This created a set of forty differences for each of the two data collection periods. The variance of these differences (Var_d) was then computed for each period and the F-statistic calculated.

For each of the three qualification types, the variance of the difference between the experimental and control companies is presented in Table XIII, as well as the market variance for each of the periods. A standardized variance is calculated by dividing the sample variance by the market variance and the F-value is calculated by dividing the standardized variance for the first period by that for the second period.

As shown in the table, the F-value for the asset valuation portfolio is 3.4688. This F-value for forty degrees of freedom gives a p-value of 0.001. This result indicates that a significant increase in variance was found for the experimental companies over and above any change in the control companies for the asset valuation group.

The F-value for the going concern portfolio, 6.5816. The related p-value for forty degrees of freedom is 0.001 which indicates that a significant increase in total variance occurred for the experimental companies beyond the increase in the control companies for the going concern companies.

TABLE XIII

F-TEST FOR CHANGE IN VARIANCE (VARd)- PORTFOLIO LEVEL DATA
ALL QUALIFICATION TYPES

PORTFOLIO	PERIOD	SAMPLE VAR	MARKET VAR	F	P-value
ASSET VALUATION	1	0.000156716	0.00000899667		
	2	0.000184954	0.00000306132	3.4688	0.001
LITIGATION *	1	0.000150825	0.00000712664		
		(0.000158693)	(0.00000800796)		
	2	0.000063861	0.00000213809	1.411	0.135
		(0.000846851)	(0.00000192952)	(22.142)	(0.001)
GOING CONCERN	1	0.000038652	0.00000483640		
	2	0.000120043	0.00000228225	6.5816	0.001

* The results for the tests conducted on the litigation group with the outlier included are presented in parentheses below the results for the sample with the outlier excluded.

There are two sets of information included in Table XIII concerning the litigation portfolio. The results presented in parentheses are those of the test run on the entire group of companies in the sample. As one can note from the table, the F-value for this data is quite large. Due to the information regarding the presence of an outlier gained during the beta shift test, the F-test was also run on the portfolio data with the outlier excluded. This data is presented as the primary results in the table. With the outlier deleted, the F-value is a more reasonable 1.411 for which the p-value is 0.135. The result of the F-test on the litigation portfolio data indicates no significant change in variance, or total risk. As is discussed at the end of this chapter, this result is more in line with the results

obtained from the total risk change tests conducted on individual company data.

Individual Company Application. The same F-test was applied to individual company data within each of the three portfolios. This test, when applied to experimental and control samples, indicated which companies had either: (1) a larger variance during the first data collection period, (2) a larger variance during the second period, or (3) no significant change in variance over the periods. Appendix D contains a listing of the F-test results by individual company (all have forty degrees of freedom for both the numerator and the denominator) and the frequencies calculated from these results are contained in Table XIV. A chi-square analysis was utilized in order to compare the numbers obtained for the experimental companies with the numbers obtained for the control companies within the same portfolio.

The frequencies for the asset valuation portfolio are portrayed in the top portion of Table XIV. For the experimental and control groups, the same number of companies shows a significantly larger variance in the first period. However, the results for the second period show almost twice as many experimental companies with a larger variance. These results indicate a shift in total risk in the direction hypothesized, as the experimental group has more companies with a significant increase in risk than does the control group.

However, as Table XV indicates, the difference in the variance changes between these two groups is not significant. A chi-square statistic of 2.941, which has an associated probability of 0.230, was calculated from the frequencies in Table XIV for the asset valuation portfolio. These results do not indicate significance at the desired

0.05 level.

The center section of Table XIV contains the variance change numbers for the litigation group. As indicated, the control group has four more companies with larger first period variances, while the experimental group has six more companies with larger second period variances. As theorized, these results again indicate that more of the experimental companies have experienced risk increases.

As was the case with the asset valuation portfolio, the chi-square statistic applied to the litigation group does not indicate significance. The numbers in Table XV show a chi-square of 2.489 (probability of 0.288), which is less than needed to indicate significance at the 0.05 level desired for this test.

TABLE XIV

FREQUENCY OF SIGNIFICANT VARIANCE CHANGES
ALL QUALIFICATION TYPES

QUALIFICATION TYPE	GROUP	FREQUENCY AND PERCENT		
		PERIOD 1 LARGER	NO CHANGE	PERIOD 2 LARGER
ASSET VALUATION	CONTROL	6 26.09%	11 47.83%	6 26.09%
	EXPERIMENTAL	6 26.09%	6 26.09%	11 47.83%
LITIGATION	CONTROL	13 34.21%	17 44.74%	8 21.05%
	EXPERIMENTAL	9 23.68%	15 39.47%	14 36.84%
GOING CONCERN	CONTROL	15 30.00%	22 44.00%	13 26.00%
	EXPERIMENTAL	3 6.00%	20 40.00%	27 54.00%

TABLE XV

CHI-SQUARE STATISTIC FOR VARIANCE CHANGE TEST
ALL QUALIFICATION TYPES

PORTFOLIO TYPE	DF	VALUE	PROBABILITY
ASSET VALUATION	2	2.941	0.230
LITIGATION	2	2.489	0.288
GOING CONCERN	2	12.995	0.002

Data on the application of the test to those companies with questionable going concern status are located at the bottom of Table XIV. The frequencies in the table - the control group with twelve more companies with larger first period variances and the experimental group with fourteen more companies with larger second period variances - show movement in the same direction as did the previously discussed two portfolios.

The statistical analysis of these frequencies obtained for the going concern portfolio, located in Table XV, indicates a statistic of 12.995. In this case, the chi-square value is significant at the 0.002 level.

An F-test for a change in variance was applied to each of the companies within the three qualification types. For the asset valuation and litigation portfolios, the change in variance was found to occur in the direction hypothesized, however, the results were not significant at the desired level. The questionable going concern companies, on the

other hand, were found to have an increase in variance which was significant at the 0.002 level.

For the going concern companies, the application of the variance change test to both the portfolio and individual company data indicates a significant shift in variance over the two periods. The results for the asset valuation companies differed between the applications, the portfolio test indicated significance while the individual company test did not. Neither of the tests was significant at the 0.05 level when applied to the litigation companies.

Stochastic Dominance

Stochastic dominance, a nonparametric procedure, was applied to all of the experimental companies and the dominance characteristics were determined. As discussed in the previous chapter, stochastic dominance is not an effective tool to test for a change in the total risk of a group of companies if one of the groups experiences statistically significant increases in beta as compared to the other. The dummy variable regression (equation 4) results from the systematic risk change test indicated that the experimental companies did not experience a change in beta over and above the control companies for any of the three qualification types. To provide additional information, this equation was also applied to individual company data. These results, which are presented in Appendix E provide additional information about the extent of beta changes. Only a small number of experimental companies were found to exhibit a beta change, when matched with their primary control company (i.e., one for asset valuation, two for litigation and six for going concern). These results provide assurance that a

large number of matches in the stochastic dominance test are not affected by changes in systematic risk. In addition, as indicated in Appendix E, these changes occur in both directions (betas increased for some of the experimental companies and decreased for others) which would suggest that the effects are randomized within the sample and should not affect the results in a significant way.

Each of the experimental companies, within a qualification type, was paired with each of the control companies in that same portfolio. As discussed earlier, the stochastic dominance test is distinguished from all of the other tests carried out in this study in that each of the experimental companies is matched with all of the controls, not just with one control company. For example, as stated at the beginning of this chapter, a total of 74 asset valuation control companies was obtained, stochastic dominance was run 74 times for each of the 23 experimental companies.

The results obtained from running stochastic dominance, called dominance characteristics, consist of the number of times the experimental company dominated the control companies, the number of times the experimental company was dominated by the controls, and the number of times neither dominated (neutral results). These dominance characteristics were obtained for both the first and the second data collection periods for each of the applicable experimental companies within the qualification type. The dominance characteristics for the three portfolios are listed in Appendix F. As hypothesized in Chapter IV, if the experimental companies increase in risk over the two periods, the experimental companies are expected to be dominant over the controls less often (dominated by the controls more often) during the second

period than the first. It is not possible to make a determination about the direction of change in the number of neutral companies.

A statistical comparison between the results for the two periods was obtained using a Kolmogorov-Smirnov two-sample test, also nonparametric. This test was run three times for each qualification type, to compare the following results for the first period to those for the second period: (1) the number of experimental companies which dominated the controls; (2) the number of controls which dominated the experimental; and (3) the number of experimental and control companies which were neutral. The results of the Kolmogorov-Smirnov test are presented in Table XVI.

For the asset valuation group, the number of experimental companies which dominated the controls changed significantly over the two periods, according to the D-value in Table XVI. This suggests that from the first period to the second period the risk increased for a significantly larger number of companies in the experimental group than for the control group, as was hypothesized (Hl_0). The numbers of neutral companies and those for which the control dominated did not change significantly over this period of time. However, the dominance characteristics indicated that the number of times the control company dominated the experimental company increased over the two periods, as theorized.

TABLE XVI

D VALUE FOR KOLMOGOROV-SMIRNOV TWO SAMPLE TEST
ALL QUALIFICATION TYPES

PORTFOLIO TYPE	DF	SIGN. D-VALUE (0.05)	DOMINANCE CHARACTERISTIC	FREQ PRE	FREQ POST	D VALUE
ASSET VALUATION	22	.3478	EXPERIMENTAL DOMINATES	416	256	0.347826
			CONTROL DOMINATES	333	467	0.217391
			NEUTRAL	953	979	0.173913
LITIGATION	36	.2631	EXPERIMENTAL DOMINATES	668	605	0.184211
			CONTROL DOMINATES	1057	1453	0.236842
			NEUTRAL	2341	2008	0.236842
GOING CONCERN	44	.2447	EXPERIMENTAL DOMINATES	3883	3040	0.300000
			CONTROL DOMINATES	2201	3409	0.220000
			NEUTRAL	5316	4951	0.180000

The results for the litigation contingency companies are listed in Table XVI. They do not indicate that the dominance characteristics have significantly changed at the 0.05 level. However, the movement in the number of dominant and dominated experimental companies was in the direction predicted.

Finally, for the questionable going concern companies, the D-value for the number of times the experimental company dominates the control is 0.3 which is greater than 0.2447, the threshold for significance at the 0.05 level. Therefore, a significant decrease in number of experimental companies which dominate the controls is found for the going concern group. Neither the number of dominant control companies nor the number of neutral companies is significant for the questionable going concern group. Therefore, the overall results of the application

of stochastic dominance to the samples indicate evidence that an increase in total risk occurred for the asset valuation and going concern samples only. No significant change was found for the litigation group.

Summary of Total Risk Change Tests

Two tests were applied to the data in order to test for a shift in total risk. One of these tests, the F-test for a change in variance, was applied to both portfolio and individual company data. The other procedure, stochastic dominance, was performed by determining the dominance characteristics of each experimental company as compared to each of the control companies in its group.

For the asset valuation companies, the results suggest that a shift in total risk may have occurred and therefore, the null hypothesis of no change, $H3_0$, is rejected. Both the F-test applied to portfolio data and the chi-square analysis applied to the dominance characteristics indicated significance. The only test which did not have significant results was the F-test applied to individual company data, which achieved a probability of 0.230. Therefore, while the results for the asset valuation group are not conclusive, it seems that a total risk shift may have taken place for that category of companies.

None of the tests on the litigation companies was found to be significant after the outlier company and its related control were removed from the sample. Due to these results, the null hypothesis of no shift in total risk, $H3_0$, cannot be rejected for the litigation group.

The strongest indication of a change in total risk occurred for the going concern sample. All of the tests performed were found to

have significant results when applied to the going concern portfolio. Therefore, the null hypothesis of no total risk change is rejected for this group of companies.

Summary

The results for the total risk change tests, when taken together with the results for the beta shift test, indicate whether the portfolios experienced changes in unsystematic risk, as well as shifts in total risk and beta. A shift in total risk, coupled with no change in beta, indicates that only the unsystematic portion of risk changed.

Two of the total risk change tests were found to have significant results for the asset valuation qualification type, while no significant results were obtained in the dummy variable regression test. This indicates that the only type of risk that may have experienced change over the period of the study was unsystematic risk.

On the other hand, none of the tests conducted on the litigation contingency companies was found to have results which were significant at the 0.05 level. The indication from these tests is that neither the systematic nor the unsystematic portion of risk changed during the period of interest.

Finally, the results of the tests on those companies with questionable going concern status suggested that a total risk shift occurred. All of the total risk tests were found to have significant results. This change in total risk, coupled with no findings at the desired level of significance for the beta shift test, suggests that only a change in the unsystematic portion of risk was experienced by this group of companies.

CHAPTER VI

CONCLUSION

Overview

The purpose of this study was to determine whether a relationship exists between the issuance of a "subject to" qualified opinion and a shift in the risk of a company. If a relationship of this nature was found, it may suggest that the "subject to" opinion does have a purpose in financial reporting, the opinion may "signal to the market" that a risk shift has occurred. Since both systematic and total risk are important to the auditors' duties, both were studied.

Companies were selected and stock market return data were studied in order to address this question. The experimental group consisted of those companies which received qualified opinions and were divided into portfolios according to the reason for qualification. The control companies were selected differently depending upon the type of qualification its match had received. This was done in order to minimize the differences between the experimental company and its control. Returns were observed over two periods, forty days at the beginning of the fiscal year and forty days after the fiscal year end, when the opinion was made public.

To test for a change in the systematic portion of risk, a market model regression equation was applied to the portfolio data. This equation contained dummy variables representing the period of data

collection (pre- and post-qualification) and the sample, experimental or control. It was designed so that one of the parameters in the regression equation measured the difference in the change in beta between the experimental and control companies.

Next, an F-statistic, which indicated shifts in variance, was used to test for total risk changes. This test was applied first to portfolio level data. The change in portfolio variance was measured by subtracting the returns for the control group from the returns from the experimental sample and testing the variance of these differences. Individual company data, within each type of qualification was also used in this test. The results obtained for the companies were compared using a chi-square analysis.

Stochastic dominance was the last procedure carried out on the data. The dominance characteristics of each company were obtained by applying this procedure to the individual company data. A Kolmogorov-Smirnov two sample test was then used to determine whether there was a change in the dominance characteristics over the two data periods.

All of the total risk change tests indicated that a significant risk shift occurred for those companies which received qualifications for questionable going concern status. Two of the three tests were also significant for the asset valuation portfolio, suggesting that a shift in total risk may have occurred for this group. No significant results were obtained for the litigation portfolio from the total risk tests.

No change in beta was observed for any of the three qualification types. These results indicate that the total risk changes noted for

the asset valuation and going concern group were caused by changes in the unsystematic portion of total risk.

For the asset valuation and going concern companies, these results indicate that the auditors' opinions act as a "red flag" to warn investors that the company has become more risky. Since only the unsystematic portion of risk was found to have changed, this signal would be more useful for those investors with undiversified portfolios. Those holding diversified portfolios would be able to filter out this portion of risk and would not be affected by the change.

Three previous studies have addressed the relationship between the issuance of a "subject to" qualified opinion and a shift in risk, Alderman [1977], Shank, Murdock and Dillard [1982] and Finnerty and Oliver [1985]. Two of the studies, Shank, Murdock and Dillard as well as Finnerty and Oliver, found some evidence of an increase in systematic risk. Alderman investigated the relationship with both systematic and total risk and found no significant change in either type.

The results of this present study, which indicated a change in total risk for the going concern and asset valuation groups, are therefore different than those of the previously conducted research. However, due to the methodological improvements contained in the present study, the differing results are not unreasonable.

This study found no support for the continuance of a special opinion in the case of litigation. The issuance of a qualification requires the expenditure of resources by both the auditor and the company receiving the opinion. If the opinion is not found to serve a purpose in the case of litigation, it should be discontinued.

Although SAS 58 ended the use of the words "subject-to" in audit opinions issued for those companies with this type of contingency, a signal to the financial statement user remains through the use of different wording in the report addressing the contingency. The present study did not indicate support for the inclusion of such a "red flag" in the audit report.

This research provided support for the continuance of an opinion containing a "red flag" for asset valuation contingencies and questionable going concern status and support for the discontinuance in the case of litigation contingencies.

Departures From Prior Research

Unlike some of the earlier tests conducted in the area, this study intentionally measures the effect of the aggregate signal (that caused by both the opinion and any other events) on the market. It is necessary to measure the aggregate signal because it has been shown that the market effect of the opinion or the events causing it may be impossible to segregate. Therefore, this study cannot make a statement of causality, only the presence of a relationship can be determined.

In addition, this study looks for a change in the risk of a company over a much longer time frame than some of the earlier studies. This overcomes some of the problems discussed by Craswell [1985]. The methods used in the study, linear regression with dummy variables and stochastic dominance, as well as the test for a change in the variance, are effective to use over a long event period.

One other important improvement over most of the previous research in this area was the use of a control group which more closely resem-

bles the experimental sample. This improvement was achieved by selecting control companies which themselves have either loss contingencies of the same type as the experimental company (to match with loss contingency qualification companies) or which have similar financial characteristics (to match with the questionable going concern status companies).

Limitations

Some limitations are inherent in this study. It is possible that even if a significant risk shift is discovered in the returns of the companies receiving "subject to" opinions, the shift is caused by events unrelated to those which resulted in the issuance of a qualified opinion. However, even if the significant shift is caused by some unconsidered variable, the conclusion that the opinion may "signal" a risk shift to the market is still valid. This study does not attempt to determine causality.

In addition, as may have occurred with the return studies, the change in beta or total risk resulting from the events causing the qualification may be completely offset by changes in risk resulting from other unrelated occurrences in some cases leading to the insignificant results seen in some of the tests. However, this is not considered to be as large a problem as experienced by the return studies for two reasons. First, the described control procedures should be more effective than those used in the other studies. Two groups are used that are more similar, resulting in less confounding events than in the other studies. Second, many unrelated events that occur only effect the stock returns. This type of occurrence causes one-time-only

adjustments in the stock price and should have no effect on beta or total risk.

Finally, the impact of the opinion itself on the market is not determined. The market may already have incorporated all of the information contained in the opinion by the time it is issued. The opinion then may only officially verify the market's reaction. However, since auditors do not determine their reporting standards based upon the market's interpretation of information contained in the items reported, the question of a relationship between risk shifts and "subject to" qualified opinions still has importance for the field of auditing.

Significance and Suggestions For Future Research

This study helps to answer an important question in auditing, whether an auditor's report containing a "red flag", such as the "subject to" qualified opinion or the explanatory paragraph (SAS 58 and SAS 59), serves a purpose in financial reporting.

Results from the total risk studies suggested that, for companies receiving two types of qualifications, a risk shift did occur. For those companies obtaining going concern qualifications, all of the tests indicated that a change in total risk had occurred. This result was a significant finding because no risk shift was noted by the only previous study which addressed total risk [Alderman, 1977]. In addition, two of the three tests suggested that the asset valuation companies also experienced a change in total risk. Again, no previous study has presented as much evidence that such a shift may have occurred.

The litigation portfolio was the only one for which no change in total risk was found. None of the tests conducted on this data indi-

cated that a shift occurred. Therefore, the litigation company results are identical to those obtained by Alderman [1977] in his study.

Finally, none of the portfolios indicated a change in beta. The parameter of interest in the dummy variable regression was not found to be significant in any of the three cases. These findings are in line with those found in the portion of Alderman's study in which he addressed beta changes. However, this finding is different from the results of both of the other two studies addressing this issue, Shank, Murdock, and Dillard [1982] and Finnerty and Oliver [1985], which found beta shifts.

For the asset valuation and going concern companies, these results indicate that the only shift which occurred was a result of changes in the unsystematic portion of risk. Therefore, for companies with these types of contingencies, it seems as though the auditors' opinions provide a service to the investor, acting as a "red flag" to warn of increases in the level of total risk. As no changes in either total or systematic risk were noted for the litigation cases, this study found no support for the continuance of a special opinion under those circumstances.

Additional research could provide further insights into the impact of this type of opinion on investors. Behavioral research needs to be conducted to determine whether the risk changes noted in the tests were the result of reaction to the opinion itself or to the underlying events. In addition, behavioral research could indicate whether the new audit report format provides a more effective signal to the market than that containing the "subject to" opinion did. Perhaps new, more efficient wording could be devised. Testing also needs to be conducted

in order to provide more support for the continuance or discontinuance of the qualification in the cases of litigation contingencies. These studies could take the form of either behavioral or empirical tests.

BIBLIOGRAPHY

Alderman, C. W., "An Empirical Analysis of the Impact of Selected Audit Opinion Qualifications on the Market Risk Components" D.B.A. dissertation, University of Tennessee (1977).

Altman, E. I., "Financial Ratios, Discriminant Analysis and the Predic tion of Corporate Bankruptcy," Journal of Finance (September, 1968) pp. 589-609.

Anderson, S., A. Auquier, W. W. Hauck, D. Oakes, W. Vandaele, and H. I. Weisberg, Statistical Methods for Comparative Studies. New York, N.Y.: Wiley, 1980.

Bailey, W. T., "An Appraisal of Research Designs Used to Investigate the Information Content of Audit Reports," The Accounting Review (January, 1982) pp. 141-146.

Ball, R., R. G. Walker, and G. P. Whittred, "Audit Qualifications and Share Prices," Abacus (June, 1979) pp.23-34.

Banks, D. W., "The 'Subject-To" Qualified Opinion," The CPA Journal (March, 1985) pp. 26-32.

Banks, D. W., and W. R. Kinney, Jr., "Loss Contingency Reports and Stock Prices: An Empirical Study," Journal of Accounting Research Spring, 1982) pp.240-254.

Beaver, W., "The Behavior of Security Prices and Its Implication for Accounting Research (Methods)," Supplement to the Accounting Review (1972), pp.407-437.

Brown, B. C., and A. S. Levitan, "An Investigation into the Effect of 'Going Concern' Qualifications on the Stock Market," The Woman CPA, (July, 1986) pp.10-13.

Chow, C., and S. Rice., "Qualified Audit Opinions and Share Prices- An Investigation," Auditing, A Journal of Practice and Theory (Winter, 1982) pp. 25-53.

Chow, G. C., "Tests of the Equality Between Two Sets of Coefficients in Two Linear Regressions," Econometrica (July, 1960) pp.561-605.

The Commission on Auditors' Responsibilities: Report of Tentative Conclusions (New York: AICPA, 1977).

Craswell, A. T., "Studies of the Information Content of Qualified Audit Reports," Journal of Business, Finance and Accounting (Spring, 1985) pp. 93-115.

Davis, R., "An Empirical Evaluation of Auditors' 'Subject To' Opin ions," Auditing, A Journal of Practice and Theory (Fall, 1982) pp. 12-32.

Dodd, P., N. Dopuch, R. Holthausen, and R. Leftwich, "Qualified Audit Opinions and Stock Prices," Journal of Accounting and Economics (April 1984) pp. 3-38.

Dopuch, N., R. Holthausen, and R Leftwich, "Abnormal Stock Returns Associated With Media Disclosures of 'Subject to' Qualified Audit Opinions," Journal of Accounting and Economics (June 1986) pp. 93-118.

Elliott, J. A., "'Subject to' Audit Opinions and Abnormal Security Returns: Outcomes and Ambiguities," Journal of Accounting Research (Autumn 1982-Part II) pp. 617-638.

Fama, E. F., and M. Miller, The Theory of Finance. Hinsdale, Ill.: Dryden Press, 1972.

Financial Accounting Standards Board Statement No. 5, Accounting for Contingencies (Stamford, Conn.: FASB, 1975).

Finnerty, J. E., and T. W. Oliver, "The Impact of Qualified Audit Opinions on Systematic Risk," Advances in Financial Planning and Forecasting (Vol. 1, 1985) pp.293-305.

Firth, M., "Qualified Audit Reports: Their Impact On Investment Decisions," The Accounting Review (July, 1978) pp 642-650.

Hollander, M., and D. A. Wolfe, Nonparametric Statistical Methods. New York, N. Y.: Wiley, 1973.

Levy, H., and Y. Kroll, "Ordering Uncertain Options With Borrowing and Lending," Journal of Finance (May, 1978) pp. 553-574.

Levy, H., and M. Sarnat, Portfolio and Investment Selection: Theory and Practice. Prentice Hall International, 1984.

Lorie, J. H., and M. T. Hamilton, The Stock Market: Theories and Evidence. Homewood: Irwin, 1973.

Ohlson, J. A., "Financial Ratios and the Probabilistic Prediction of Bankruptcy," Journal of Accounting Research (Spring, 1980) pp. 109-131.

Porter, B. A., and K. Carey, "Stochastic Dominance and Mean-Variance Portfolio Selection Criteria," Journal of Decision Sciences (January, 1974) pp. 10-21.

Schall, L. D., and C. W. Haley, Introduction to Financial Management. New York, N.Y.: McGraw-Hill Book Company, 1983.

Shank, J. K., Murdock, R. J., and J. F. Dillard, "'Subject To' Opinions and Security Prices," Working Paper, Ohio State University (1982).

Standard and Poors Corporation, AMSE Daily Stock Price Record. New York, New York, various issues.

Standard and Poors Corporation, NYSE Daily Stock Price Record. New York, New York, various issues.

Standard and Poors Corporation, OTC Daily Stock Price Record. New York, New York, various issues.

Steel, R. G. D., and J. H. Torrie, Principles and Procedures of Statistics. New York, N.Y.: McGraw-Hill Book Company, 1980.

Whittred, G. P., "Audit Qualification and the Timeliness of Corporate Annual Reports," The Accounting Review (October, 1980) pp. 563-577.

APPENDIXES

APPENDIX A

EXPERIMENTAL FIRMS

ASSET VALUATION

COMPANY NAME	MATCH #	YEAR END
ACRO ENERGY	1	3/31/85
ADVANCED COMPUTER TECHNIQUES	2	12/31/83
ALLEGHENY BEVERAGE	3	3/20/85
CMI CORP	4	12/31/85
CONTROL LASER INTERNATIONAL	5	12/31/87
CURTISS-WRIGHT CORP	6	12/31/84
EARTH SCIENCES	7	12/31/86
FAIRCHILD IND	8	12/31/85
FUQUA	9	12/31/86
IDLE WILD FOODS	10	8/31/85
KAISER CEMENT	11	12/31/83
KINARK	12	12/31/86
MICRODYNE	13	10/28/84
MINERALS ENGINEERING	14	12/31/84
NORLIN CORP	15	12/31/84
OVERMYER CORP	16	12/31/83
PARTNERS OIL AND GAS	17	12/31/83
PHELPS DODGE	18	12/31/84
RATLIFF DRILLING AND EXPLORATION	19	9/30/84
SAVIN CORP	20	4/30/84
SEA GALLEY STORES	21	12/29/85
TECHTRAN IND	22	8/31/84
TOPSY'S INTERNATIONAL	23	7/26/86

LITIGATION

COMPANY NAME	MATCH #	YEAR END
ALAMCO	1	12/31/86
ALPHA INDUSTRIES	2	3/31/86
AMERICAN SOLAR KING	3	7/31/84
ARGONAUT ENERGY	4	3/31/85
AVX CORP	5	12/31/84
COMMODORE INTERNATIONAL	6	6/30/85
COMPUTER MEMORIES	7	3/31/86
COMPUTERVISION	8	12/31/83
CONSOLIDATED OIL AND GAS	9	11/30/84
ENTRE' COMPUTERS	10	8/31/86
EQUIPMENT COMPANY OF AMERICA	11	12/31/87
EXCEL ENERGY	12	12/31/83
FLOATING POINT SYSTEMS	13	10/31/86
GENERAL DEVICES	14	12/31/83
GENERAL NUTRITION	15	2/31/85
GENISCO TECHNOLOGY	16	9/30/87
GOOD TACO	17	3/04/85
HELM RESOURCES	18	12/31/83
INFO DESIGNS	19	12/31/85
INTECOM	20	12/31/85
IOMEGA	21	12/31/86
KLEER VU	22	12/31/83
K-TRON	23	12/28/85
MC DOWELL ENT	24	12/31/83
MCDERMOTT INTERNATIONAL	25	3/31/85
MONOCLONAL ANTIBODIES	26	3/31/87
NEWPORT PHARM	27	4/30/86
PERCEPTRONICS	28	3/31/85
PITTSBURGH DES MOINES	29	12/31/83
SIERRACIN CORP	30	12/31/85
SPECTRA PHYSICS	31	9/30/83
SUPERIOR CARE	32	3/30/84
TEXACO	33	12/31/85
TEXAS INTERNATIONAL	34	12/31/85
UNITED STATES SURGICAL	35	12/31/83
USR INDUSTRIES	36	12/31/84
WINNERS CORP	37	12/31/86
WM E WRIGHT CO	38	6/30/86

GOING CONCERN

COMPANY NAME	MATCH #	YEAR END MONTH	YEAR END YEAR
ALLEGHENY INT'L	1	12	86
AMERICAN HEALTHCARE MGT	2	12	86
ANGLO ENERGY	3	9	83
BARTON VALVE	4	9	86
BERRY IND	5	12	83
BIW	6	12	87
BROCK HOTEL CORP	7	12	84
BUTTES OIL AND GAS	8	12	84
COLECO IND	9	12	87
COMTECH	10	7	84
CONTROL DATA	11	12	85
CRAWFORD ENERGY	12	8	84
CRUTCHER RESOURCES	13	12	85
DAMSON OIL	14	9	86
DATAPOWER	15	3	86
DELTAUS	16	12	87
EASTMET	17	12	84
ELECTRONICS MISSILES	18	3	85
FAFCO	19	12	83
FLAKEY JAKES	20	12	85
GALVESTON HOUSTON	21	12	84
GENEX CORP	22	12	86
GLOBAL MARINE	23	12	85
GOLDFIELD CORP	24	12	84
HEI	25	8	86
HELIONETICS	26	12	85
HOLLYWOOD PARK REALTY	27	12	86
KANEB SERVICES	28	12	86
KENAI	29	1	85
KRATOS	30	12	83
LITTLEFIELD ADAMS	31	12	86
LTV CORP	32	12	86
MANGOOD	33	12	85
MARCADE GROUP	34	1	85
MEDAR	35	12	87
NCA	36	12	85
PENRIL	37	7	86
PERSONAL DIAGNOSTICS	38	9	86
PORTEC	39	12	87
READING & BATES	40	12	87
RONSON CORP	41	12	84
SCIENTIFIC RADIO	42	6	84
STANDARD LOGIC	43	10	86
STRATA	44	12	85

GOING CONCERN cont.

COMPANY NAME	MATCH #	YEAR END MONTH	YEAR END YEAR
STRUTHERS WELLS	45	11	85
TEXFI IND	46	10	84
THORATEC	47	12	85
THOUSAND TRAILS	48	12	86
WEAN INC	49	12	87
WILTON	50	7	85

APPENDIX B

PRIMARY CONTROL FIRMS

ASSET VALUATION

COMPANY NAME	MATCH #	YEAR END
SCHWAB SAFE	1	12/31/84
FOOTE, CONE & BELDING	2	12/31/83
MAPCO	3	12/31/84
THERMO ELECTRON	4	12/28/85
VICON IND	5	9/30/87
A.O. SMITH	6	12/31/84
FOOTE MINERAL CO	7	12/31/86
GATES LEARJET	8	12/31/85
AERO SERVICES	9	9/30/86
THORN APPLE VALLEY	10	5/31/85
SUSQUEHANNA CORP	11	12/31/83
HEALTH-CHEM	12	12/31/86
MAGNETIC CONTROLS	13	10/31/84
HECLA MINING	14	12/31/84
AMEDCO	15	12/31/84
ZENTEC CORP	16	12/31/83
RATLIFF DRILLING	17	12/31/83
ASARCO INC	18	12/31/84
BARNWELL	19	9/30/84
AMFAC	20	12/31/83
MR STEAK	21	9/29/85
CORVUS SYSTEMS	22	5/31/84
MERET (FORMERLY CALIBRE)	23	7/27/86

LITIGATION

COMPANY NAME	MATCH #	YEAR END
ENERGY VENTURES	1	12/31/86
LYNCH COMMUNICATIONS	2	12/31/85
REPUBLIC CORP	3	7/31/84
GREAT AMERICAN RESOURCES	4	12/31/84
CONTROL LASER	5	12/31/84
SEAGATE	6	6/30/85
REUTER	7	12/31/85
PACIFIC LUMBER	8	12/31/83
PARKER DRILLING	9	8/31/84
DIODES	10	4/30/86
TRIANGLE INDUSTRIES	11	12/31/87
CIBOLA ENERGY	12	12/31/83
TELEVIDEO SYSTEMS	13	10/31/86
MICHAEL BAKER CORP	14	1/01/84
GREAT ATLANTIC AND PACIFIC TEA	15	2/23/85
BOWMAR INSTRUMENT	16	9/30/87
MORTRONICS	17	2/28/85
BARUCH FOSTER	18	12/31/83
UNIFORCE TEMPORARY PERSONNEL	19	12/31/85
LYNCH COMMUNICATIONS	20	12/31/85
MINISCRIBE	21	12/28/86
GREAT AMERICAN INDUSTRIES	22	12/31/83
DEVELCON ELECTRONICS	23	8/31/85
ENSTAR CORP	24	12/31/83
TRANSTECHNOLOGY	25	3/31/85
GENENTECH	26	12/31/86
BOLAR PHARM	27	12/31/85
SCIENCE MANAGEMENT	28	12/31/84
REPCO	29	12/31/83
PACIFIC SCIENTIFIC CO	30	12/31/85
COHERENT	31	10/01/83
FORUM GROUP	32	3/31/84
TEXAS AMERICAN ENERGY	33	12/31/85
DAMSON OIL	34	9/30/85
COBE LAB	35	12/31/83
RMS ELECTRONICS	36	12/31/84
SKIPPER'S	37	12/31/86
UNIFI	38	6/29/86

GOING CONCERN

COMPANY NAME	MATCH #	YEAR END MONTH	YEAR END YEAR
LYNCH CORP	1	12	86
DATATAB	2	12	86
SEISCOM DELTA	3	9	83
RAGEN CORP	4	9	86
AMERICAN MOTORS	5	12	83
OREGON METALLURGICAL	6	12	87
SERVICO	7	12	84
HENDERSON PET	8	12	84
TRANS LUX CORP	9	12	87
GENERAL AUTOMATION	10	7	84
LSB IND	11	12	85
PETX PET	12	8	84
CIBLOA	13	12	85
GEO INT'L	14	9	86
LORAL CORP	15	3	86
GTS CORP	16	12	87
ATHLONE	17	12	84
UNIVERSAL SECURITY INSTRUMENT	18	3	85
ENERSERV	19	12	83
FUDDRUCKERS	20	12	85
VARCO INT'L	21	12	84
IROQUOIS BRANDS	22	12	86
SAXON OIL	23	12	85
GULF RESOURCES	24	12	84
ADVANCE CIRCUITS	25	8	86
A T & E CORP	26	12	85
RESORT INT'L	27	12	86
PYRO ENERGY	28	12	86
GEARHART IND	29	1	85
BIO RAD	30	12	83
KAY CORP	31	12	86
ATHLONE IND	32	12	86
INMED	33	12	85
MANHATTAN IND	34	1	85
TENNEY ENG	35	12	87
MICKELBERRY	36	12	85
TECHNODYNE	37	7	86
ANACOMP	38	9	86
TENNEY ENG	39	12	87
GTS	40	12	87
ACTON	41	12	84
CRAIG CORP	42	6	84
HURCO	43	10	86
CIBOLA ENERGY	44	12	85

GOING CONCERN Cont.

COMPANY NAME	MATCH #	YEAR END MONTH	YEAR END YEAR
J L CLARK MFG	45	11	85
J P STEVENS	46	10	84
AT & E CORP	47	12	85
RESORTS INT'L	48	12	86
TENNEY ENG	49	12	87
UNA CORP	50	7	85

APPENDIX C

ADDITIONAL CONTROL FIRMS

ASSET VALUATION

COMPANY NAME	MATCH #	YEAR END
ANDERSON, GREENWOOD & CO	1	12/31/84
BUTLER MFG	1	12/31/84
BRADFORD NATIONAL CORP	2	12/31/83
BRENCO	4	12/31/85
CHICAGO PNEUMATIC TOOL	4	1/03/86
COMPUTERVISION	4	12/31/85
NORTH ATLANTIC IND	4	12/28/85
COMPUTER PRODUCTS	5	12/31/87
KUHLMAN CORP	5	12/31/87
MICRODYNE CORP	5	12/31/87
PORTA SYSTEMS	5	12/31/87
D.A.B. IND	6	12/31/84
FAIRCHILD IND	6	12/31/84
GRUMMAN CORP	6	12/31/84
GULFSTREAM AEROSPACE	6	12/31/84
HELCA MINING	7	12/31/86
M A HANNA	7	12/31/86
NORTHGATE EXPLORATION CO	7	12/31/86
SUNSHINE MINING	7	12/31/86
AERONCA	8	12/31/85
AMERICAN STANDARD	8	12/31/85
UNITED TECHNOLOGIES	8	12/31/85
ZIMMER CORP	8	12/31/85
FMC CORP	12	12/31/86
GILLETTE	12	12/31/86
SHAKLEE CORP	12	12/31/86
SHERWIN-WILLIAMS	12	12/31/86
INTEGRATED CIRCUITS	13	10/31/84
AMAX	14	12/31/84
ASARCO INC	14	12/31/84
COMINCO LTD	14	12/31/84
INCO	14	12/31/84
COLECO	15	12/31/84
GALVESTON HOUSTON	16	12/31/83
GENERAL BINDING	16	12/31/83
MODULAR COMPUTER SYSTEMS	16	12/31/83
ROBBINS & MYERS	16	8/31/83
BURTON/HAWKS	17	12/31/83
HENDERSON PETROLEUM	17	12/31/83
STANDARD OIL CO - OHIO	17	12/31/83
TEXAS INTERNATIONAL	17	12/31/83
AMAX	18	12/31/84
COMINCO LTD	18	12/31/84
HECLA MINING	18	12/31/84

ASSET VALUATION Cont.

COMPANY NAME	MATCH #	YEAR END
INCO	18	12/31/84
PEABODY INTERNATIONAL	19	9/30/84
PRODUCTION OPR CORP	19	9/30/84
HORN & HARDART	21	12/28/85
MOHAWK DATA SCIENCES	22	4/30/84
CHI-CHI'S	23	4/30/86
COLLINS FOODS INTERNATIONAL	23	4/30/86

LITIGATION

COMPANY NAME	MATCH #	YEAR END
BARNWELL INDUSTRIES	1	9/30/86
CENERGY CORP	1	12/31/86
MCFARLAND ENERGY	1	12/31/86
COMPRESSION LABS	2	12/31/85
HCC	2	3/29/86
RMS ELECTRONICS	2	12/31/85
TRANSDUCER SYSTEMS	2	12/31/85
GLOBAL NATURAL RESOURCES	4	12/31/84
INEXCO OIL	4	12/31/84
KN ENERGY	4	12/31/84
TRANSCO EXPLORATION PARTNERS	4	12/31/84
KLOSS VIDEO	5	12/31/84
RMS ELECTRONICS	5	12/31/84
COMPUTER MEMORIES	6	3/31/85
EMULEX CORP	6	6/30/85
KEY TRONICS	6	6/30/85
PRIAM CORP	6	6/30/85
ADAGE	7	12/31/85
AUTOMATIX	7	12/31/85
BETHLEHEM CORP	7	12/31/85
LYNCH CORP	7	12/31/85
AMERICAN PRECISION	8	12/30/83
BROWN AND SHARPE	8	12/31/83
MILTON ROY	8	12/31/83
STORAGE TECHNOLOGIES	8	12/30/83
BARUCH FOSTER	12	12/31/83
ENERGY VENTURES	12	12/31/83
SUNDANCE OIL	12	12/31/83
WAINOCO	12	12/31/83
AM INTERNATIONAL	13	7/31/86
APPLIED MATERIALS	13	10/31/86
SEAGATE TECHNOLOGY	13	7/31/86
ACME-CLEVELAND	16	9/30/87
DAISY SYSTEMS	16	9/30/87
OUTBOARD MARINE	16	9/30/87
CIBOLA ENERGY	18	12/31/83
ENERGY VENTURES	18	12/31/83
SUNDANCE OIL	18	12/31/83
WAINOCO	18	12/31/83
AMERICAN MANAGEMENT SYSTEMS	19	12/31/85
MICROPRO INTERNATIONAL CORP	19	8/31/85
NETWORK SECURITY	19	12/31/85
SCIENCE MANAGEMENT CORP	19	12/31/85
EECO INC	20	12/29/85
RMS	20	12/31/85

LITIGATION Cont.

COMPANY NAME	MATCH #	YEAR END
TRANSDUCER	20	12/31/85
MONOLITHIC MEMORIES	21	9/28/86
M/A-COM	21	9/27/86
COMPRESSION LABS	23	12/31/85
EECO INC	23	12/29/85
ENTRE COMPUTER	23	8/31/85
LEXICON	23	8/31/85
P & F	25	12/31/84
BINDLEY WESTERN	27	12/31/85
PENNWALT CORP	27	12/31/85
ROHM AND HAUS	27	12/31/85
ARTHUR D. LITTLE	28	12/31/84
A O SMITH	30	12/31/85
ECHLIN	30	8/31/85
CAM-OR	33	12/31/85
MACMILLAN RING-FREE OIL	33	12/31/85
BOGERT OIL	34	9/30/85
MAY ENERGY	34	12/31/85
PARLIAMENT HILL	34	8/31/85
TRANSCO EXPLORATION	34	12/31/85
POLAROID	35	12/31/83
XEROX	35	12/31/83
CONTROL LASER	36	12/31/84
KLOSS VIDEO	36	12/31/84
FAMOUS RESTAURANTS	37	12/31/86

GOING CONCERN

COMPANY NAME	MATCH #	YEAR END MONTH	YEAR END YEAR
AUTO TROL TECH	1	12	86
CTI CORP	1	12	86
ISOMET	1	12	86
SUPERIOR ELECTRIC	1	12	86
BERKEY	2	12	86
HI PORT	2	12	86
MARKET FACTS	2	12	86
QUESTECH	2	12	86
BARNWELL IND	3	9	83
DAMSON	3	9	83
ICO	3	9	83
RATLIFF DRILLING	3	9	83
NUCLEAR METALS	4	9	86
SIFCO IND	4	9	86
AERONCA	5	12	83
CHAMPION PARTS REBUILDERS	5	12	83
FREHAUF	5	12	83
KYSOR INDUSTRIAL	5	12	83
ARMADA	6	12	87
HANDY & HARMAN	6	12	87
LINDBERG	6	12	87
METALLURGICAL IND	6	12	87
HILTON HOTELS	7	12	84
HOLIDAY CORP	7	12	84
KAHLER	7	12	84
ARGO PET	8	12	84
BEARD OIL	8	12	84
HARKEN OIL & GAS	8	12	84
TEXAS INTERNATIONAL	8	12	84
ALLEN ORGAN CL B	9	12	87
BIC CORP	9	12	87
CROSS (AT) & CO CL A	9	12	87
GOODY PRODUCTS	9	12	87
DATAPOINT	10	7	84
ELECTRO AUDIO DYNAMICS	10	7	84
HERLEY MICROWAVE	10	7	84
ICOT	10	7	84
HESSTON	11	12	85
LODGE & SHIPLEY	11	12	85
SELAS	11	12	85
WEAN UNITED	11	12	85
PETRO LEWIS	12	8	84
PRESIDO OIL	12	8	84
ROYAL RESOURCES	12	8	84

GOING CONCERN Cont.

COMPANY NAME	MATCH #	YEAR END MONTH	YEAR END YEAR
SAGE ENERGY	12	8	84
ALAMCO	13	12	85
BURTON HAWKS	13	12	85
GALAXY	13	12	85
HERSHEY	13	12	85
ATWOOD OCEANICS	14	9	86
BARNWELL	14	9	86
CABOT CORP	14	9	86
PRODUCTION OPERATORS	14	9	86
KRM PET	16	12	87
MAY PET	16	12	87
UNIT	16	12	87
WILSHIRE OIL	16	12	87
ANDAL	17	12	84
ARMADA	17	12	84
LINDBERG	17	12	84
TRIANGLE IND	17	12	84
ADVANCED MICRO DEVICES	18	3	85
BARON DATA SYSTEMS	18	3	85
LEE DATA	18	3	85
LORAL CORP	18	3	85
ALLIED PRODUCTS	19	12	83
ARTRA	19	12	83
DRIVER HARRIS	19	12	83
TRIANGLE	19	12	83
EL TORITO	20	12	85
PIZZA INN	20	12	85
SHONEY'S SOUTH	20	12	85
WINNERS	20	12	85
BETHLEHEM CORP	21	12	84
HEIN-WERNER	21	12	84
MANGOOD	21	12	84
SELAS	21	12	84
DDI PHARM	22	12	86
KLEER VU	22	12	86
NL IND	22	12	86
TECHAMERICA GROUP	22	12	86
DELTAUS	23	12	85
ENSOURCE	23	12	85
HERSHEY OIL	23	12	85
WAINOCO OIL	23	12	85
EASTERN GAS & FUEL	24	12	84
KANEB SERVICES	24	12	84
PITTSTON	24	12	84
PYRO ENERGY	24	12	84

GOING CONCERN Cont.

COMPANY NAME	MATCH #	YEAR END MONTH	YEAR END YEAR
ROBBINS & MYERS	25	8	86
SHELDAHL	25	8	86
WASHINGTON SCIENTIFIC	25	8	86
COMPUTER CONSOLES	26	12	85
INTERNATIONAL POWER MACHINES	26	12	85
TELECONCEPTS	26	12	85
ZENTEC CORP	26	12	85
GOLDEN NUGGET	27	12	86
RAMADA	27	12	86
SANTA ANITA REALTY	27	12	86
AMAX INC	28	12	86
GULF RES & CHEM	28	12	86
PITTSTON	28	12	86
MITCHEL ENERGY	29	1	85
NAHOMA & WENGANT	29	1	85
HORIZON RESOURCES	30	12	83
INSTRON	30	12	83
MARK CONTROLS	30	12	83
USR	30	12	83
CULBRO	31	12	86
HELM RESOURCES	31	12	86
HOWELL CORP	31	12	86
INTERCITY GAS	31	12	86
ARMADA	32	12	86
FOOTE MINERAL	32	12	86
METALLURGICAL IND	32	12	86
OVERMYER	32	12	86
GENRAD	33	12	85
HORIZON RESEARCH	33	12	85
INSTRON	33	12	85
MARK CONTROLS	33	12	85
ANGELICA CORP	34	1	85
PHILLIPS VAN HEUSEN	34	1	85
RAVEN IND	34	1	85
RUSS TOGS	34	1	85
BIRD	35	12	87
CMI	35	12	87
HEIN WERNER	35	12	87
LYNCH CORP	35	12	87
DOYLE DANE	36	12	85
ISS INT'L	36	12	85
JOHN BLAIR	36	12	85
MARKET FACTS	36	12	85
CONOLOG	37	7	86
HERLEY MICROWAVE	37	7	86

GOING CONCERN Cont.

COMPANY NAME	MATCH #	YEAR END MONTH	YEAR
PICO PRODUCTS	37	7	86
SYSTEM IND	37	7	86
BOOLE & BABBAGE	38	9	86
GENERAL EMPLOY	38	9	86
ROBOTIC VISION	38	9	86
STERLING SOFTWARE	38	9	86
BIRD INC	39	12	87
CMI	39	12	87
HEIN WERNER	39	12	87
LYNCH	39	12	87
APACHE CORP	40	12	87
KRM	40	12	87
UNIT	40	12	87
WILSHIRE OIL	40	12	87
AUTOMATIX	41	12	84
DATA SWITCH	41	12	84
DOCUTEL OLIVETTI	41	12	84
TELECONCEPTS	41	12	84
CASABLANCA IND	42	6	84
KLOSS	42	6	84
RAMTEK	42	6	84
SCI SYSTEMS	42	6	84
CONCHEMCO	43	10	86
INTERMEDICS	43	10	86
POWELL	43	10	86
SFE	43	10	86
ALAMCO	44	12	85
BURTON HAWKS	44	12	85
GALAXY OIL	44	12	85
HERSHEY OIL	44	12	85
COMPUTER CONSOLES	47	12	85
INT'L POWER MACHINES	47	12	85
TELECONCEPTS	47	12	85
ZENTEC	47	12	85
GOLDEN NUGGET	48	12	86
RAMADA	48	12	86
SANTA ANITA REALTY	48	12	86
BIRD INC	49	12	87
CMI	49	12	87
HEIN WERNER	49	12	87
LYNCH	49	12	87
ANIXTER BROS	50	7	85
BASTIAN IND	50	7	85
LD BRINKMAN	50	7	85

APPENDIX D

VARIANCE TEST RESULTS BY COMPANY

ASSET VALUATION EXPERIMENTAL COMPANIES

NAME	MATCH #	STD VARIANCE PERIOD 1	STD VARIANCE PERIOD 2	F-VALUE
ACRO ENERGY	1	15.5815	408.7283	26.2317
ADV COMPUTER TECHNIQUES	2	58.8936	25.4840	2.3110
ALLEGHENY BEVERAGE	3	14.1074	15.5633	1.1032
CMI CORP	4	15.8365	21.5418	1.3603
CONTROL LASER INT	5	49.2859	35.3049	1.3960
CURTISS-WRIGHT CORP	6	0.9116	4.3362	4.7568
EARTH SCIENCES	7	14.6642	29.1749	1.9895
FAIRCHILD IND	8	8.7171	5.7235	1.5230
FUQUA	9	6.6755	2.8097	2.3758
IDLE WILD FOODS	10	0.9687	23.6904	24.4546
KAISER CEMENT	11	1.6053	5.9446	3.7031
KINARK	12	18.2193	14.1477	1.2878
MICRODYNE	13	14.6730	32.0765	2.1861
MINERALS ENGINEERING	14	19.9176	42.1383	2.1156
NORLIN CORP	15	9.7034	11.0242	1.1361
OVERMYER CORP	16	5.7281	30.5293	5.3297
PARTNERS OIL AND GAS	17	7.7879	938.1267	120.4601
PHELPS DODGE	18	5.8428	11.6091	1.9869
RATLIFF DRILLING	19	29.3347	216.2159	7.3707
SAVIN CORP	20	39.7772	15.0243	2.6475
SEA GALLEY STORES	21	26.5951	14.6229	1.8187
TECHTRAN IND	22	282.6896	14.8604	19.0230
TOPSY'S INTERNATIONAL	23	392.1901	10.5522	37.1665

ASSET VALUATION CONTROL COMPANIES

NAME	MATCH #	STD VARIANCE PERIOD 1	STD VARIANCE PERIOD 2	F-VALUE
SCHWAB SAFE	1	18.4529	3.4582	5.3360
FOOTE, CONE & BELDING	2	0.7736	1.6890	2.1833
MAPCO	3	7.7844	3.0657	2.5392
THERMO ELECTRON	4	11.2292	14.7325	1.3120
VICON IND	5	11.8005	15.7376	1.3336
A.O. SMITH	6	8.0034	22.2308	2.7777
FOOTE MINERAL CO	7	4.4664	6.1351	1.3736
GATES LEARJET	8	17.0772	14.6254	1.1676
AERO SERVICES	9	23.2320	13.1803	1.7626
THRON APPLE VALLEY	10	23.1319	27.3154	1.1809
SUSQUEHANNA CORP	11	6.3144	19.2405	3.0471
HEALTH-CHEM	12	12.9914	4.3041	3.0184
MAGNETIC CONTROLS	13	34.9547	21.5481	1.6222
HECLA MINING	14	17.3816	18.4613	1.0621
AMEDCO	15	17.5744	56.9777	3.2421
ZENTEC CORP	16	5.8042	65.0647	11.2100
RATLIFF DRILLING	17	14.3914	23.7182	1.6481
ASARCO INC	18	9.6976	16.1113	1.6614
BARNWELL	19	5.5289	4.9926	1.1074
AMFAC	20	3.8852	4.9704	1.2793
MR STEAK	21	30.1448	10.9177	2.7611
CORVUS SYSTEMS	22	19.4457	71.5254	3.6782
MERET (FORMERLY CALIBRE)	23	181.0379	12.6984	14.2567

LITIGATION EXPERIMENTAL COMPANIES

NAME	MATCH #	STD VARIANCE PERIOD 1	STD VARIANCE PERIOD 2	F-VALUE
ALAMCO	1	243.7231	86.8300	2.8069
ALPHA INDUSTRIES	2	38.1882	3.4530	11.0592
AMERICAN SOLAR KING	3	34.9784	33.4653	1.0452
ARGONAUT ENERGY	4	321.5878	104.0379	3.0911
AVX CORP	5	15.0211	42.4731	2.8276
COMMODORE INT	6	23.3687	68.9350	2.9499
COMPUTER MEMORIES	7	411.7461	23.0899	17.8323
COMPUTERVISION	8	11.1599	19.9392	1.7867
CONSOLIDATED O & G	9	15.3286	8.8607	1.7300
ENTRE' COMPUTERS	10	48.2840	30.2846	1.5943
EQUIPMENT COMPANY OF AM	11	35.4880	24.2285	1.4647
EXCEL ENERGY	12	32.1404	21589.8100	671.7345
FLOATING POINT SYSTEMS	13	7.5100	9.1313	1.2159
GENERAL DEVICES	14	14.0957	11.4145	1.2349
GENERAL NUTRITION	15	10.2459	54.3947	5.3089
GENISCO TECHNOLOGY	16	10.9640	15.4222	1.4066
GOOD TACO	17	15.3119	96.0589	6.2735
HELM RESOURCES	18	24.1590	39.2270	1.6237
INFO DESIGNS	19	138.6822	20.4832	6.7695
INTECOM	20	16.4912	67.7762	4.1098
IOMEGA	21	11.4054	12.0793	1.0591
KLEER VU	22	27.9045	50.4948	1.8096
K-TRON	23	44.9465	67.0613	1.4921
MC DOWELL ENT	24	7.8107	23.7161	3.0364
MCDERMOTT INT	25	5.7426	7.1520	1.2454
MONOCLONAL ANTIBODIES	26	14.4676	53.8568	3.7226
NEWPORT PHARM	27	96.5614	63.5139	1.5203
PERCEPTRONICS	28	45.3115	76.7345	1.6935
PITTSBURGH DES MOINES	29	5.5847	2.4097	2.3176
SIERRACIN CORP	30	15.1303	13.1427	1.1512
SPECTRA PHYSICS	31	7.4865	6.7339	1.1118
SUPERIOR CARE	32	34.9973	191.5295	5.4727
TEXACO	33	2.3465	4.9190	2.0963
TEXAS INTERNATIONAL	34	250.3752	52.0085	4.8141
UNITED STATES SURGICAL	35	5.3497	10.0298	1.8748
USR INDUSTRIES	36	44.8715	56.5947	1.2613
WINNERS CORP	37	18.2998	14.8513	1.2322
WM E WRIGHT CO	38	6.2116	1.2197	5.0928

LITIGATION CONTROL COMPANIES

NAME	MATCH #	STD VARIANCE PERIOD 1	STD VARIANCE PERIOD 2	F-VALUE
ENERGY VENTURES	1	3.1529	5.0898	1.6143
LYNCH COMMUNICATIONS	2	21.9915	24.0261	1.0925
REPUBLIC CORP	3	7.5971	0.7852	9.6752
GREAT AMERICAN RESOURCES	4	6.9323	24.8418	3.5835
CONTROL LASER	5	117.3700	91.9060	1.2771
SEAGATE	6	47.7517	9.1977	5.1917
REUTER	7	25.7372	9.0700	2.8377
PACIFIC LUMBER	8	5.8527	6.7613	1.1552
PARKER DRILLING	9	19.5357	13.2979	1.4691
DIODES	10	20.8779	21.9278	1.0503
TRIANGLE INDUSTRIES	11	10.2961	1.7646	5.8347
CIBOLA ENERGY	12	22.4979	13.5574	1.6595
TELEVIDEO SYSTEMS	13	110.0057	16.8270	6.5370
MICHAEL BAKER CORP	14	2.3484	3.3116	1.4101
GREAT ATL AND PAC TEA CO	15	10.9786	11.2172	1.0217
BOWMAR INSTRUMENT	16	14.9260	71.8865	4.8162
MORTRONICS	17	91.0548	140.2110	1.5399
BARUCH FOSTER	18	10.7024	3.9662	2.6984
UNIFORCE TEMP PERSONNEL	19	0.5260	10.6364	20.2222
LYNCH COMMUNICATIONS	20	13.6335	20.5207	1.5052
MINISCRIBE	21	396.0897	10.9481	36.1789
GREAT AMERICAN IND	22	3.2447	1.6075	2.0185
DEVELCON ELECTRONICS	23	15.1991	8.9789	1.6928
ENSTAR CORP	24	6.4328	8.3448	1.2972
TRANSTECHNOLOGY	25	10.8878	20.2901	1.8636
GENENTECH	26	277.0137	12.8694	21.5249
BOLAR PHARM	27	23.2830	23.0960	1.0081
SCIENCE MANAGEMENT	28	50.5780	21.7848	2.3217
REPCO	29	3.2538	19.8042	6.0864
PACIFIC SCIENTIFIC CO	30	7.5909	2.8456	2.6676
COHERENT	31	9.8169	17.8929	1.8227
FORUM GROUP	32	15.2605	20.7606	1.3604
TEXAS AMERICAN ENERGY	33	16.9757	22.9934	1.3545
DAMSON OIL	34	24.9786	41.2369	1.6509
COBE LAB	35	2.9923	146.9024	49.0939
RMS ELECTRONICS	36	8.2836	19.5319	2.3579
SKIPPER'S	37	6.1305	6.1649	1.0056
UNIFI	38	19.6845	11.0497	1.7814

GOING CONCERN EXPERIMENTAL COMPANIES

NAME	MATCH #	STD VARIANCE PERIOD 1	STD VARIANCE PERIOD 2	F-VALUE
ALLEGHENY INT'L	1	6.4828	7.9464	1.2258
AMERICAN HEALTHCARE MGT	2	23.8417	97.4506	4.0874
ANGLO ENERGY	3	19.1482	65.7532	3.4339
BARTON VALVE	4	43.7435	88.8127	2.0303
BERRY IND	5	27.8519	142.0326	5.0996
BIW	6	23.9479	7.2424	3.3066
BROCK HOTEL CORP	7	9.3823	69.7468	7.4339
BUTTES OIL AND GAS	8	7.1306	106.9920	15.0047
COLECO IND	9	24.9093	25.4439	1.0216
COMTECH	10	10.0681	140.3850	13.9436
CONTROL DATA	11	6.2150	5.8404	1.0641
CRAWFORD ENERGY	12	12.4869	109.8625	8.7982
CRUTCHER RESOURCES	13	121.4965	329.2880	2.7103
DAMSON OIL	14	80.1523	171.9008	2.1447
DATAPOWER	15	149.9201	299.8524	2.0001
DELTAUS	16	123.2655	55.1435	2.2354
EASTMET	17	11.3231	148.3914	13.1053
ELECTRONICS MISSILES	18	27.3403	21.0257	1.3003
FAFCO	19	16.1924	25.0169	1.5450
FLAKEY JAKES	20	20.0023	43.1386	2.1567
GALVESTON HOUSTON	21	11.9468	41.6730	3.4882
GENEX CORP	22	36.3539	29.0383	1.2519
GLOBAL MARINE	23	21.1192	94.2706	4.4637
GOLDFIELD CORP	24	46.6071	64.7362	1.3890
HEI	25	48.4378	43.6593	1.1095
HELIONETICS	26	119.0723	77.8621	1.5293
HOLLYWOOD PARK REALTY	27	0.5677	5.6002	9.8639
KANEB SERVICES	28	7.8629	39.0567	4.9672
KENAI	29	7.8405	183.3493	23.3850
KRATOS	30	8.8065	30.2276	3.4324
LITTLEFIELD ADAMS	31	11.2169	150.7846	13.4426
LTV CORP	32	23.9335	21.5633	1.1099
MANGOOD	33	13.0691	49.5270	3.7911
MARCADE GROUP	34	35.7003	222.1319	6.2221
MEDAR	35	9.8042	10.0421	1.0243
NCA	36	12.3179	32.5903	2.6458
PENRIL	37	16.0209	12.3443	1.2978
PERSONAL DIAGNOSTICS	38	25.6441	11.0353	2.3238
PORTEC	39	10.0592	43.3310	4.3067
READING & BATES	40	60.2951	39.3155	1.5336
RONSON CORP	41	50.2145	68.2180	1.3585
SCIENTIFIC RADIO	42	4.8616	6.3975	1.3159
STANDARD LOGIC	43	97.0172	527.2291	5.4344
STRATA	44	7.5595	7.1751	1.0536

GOING CONCERN EXPERIMENTAL COMPANIES, Cont.

NAME	MATCH #	STD VARIANCE PERIOD 1	STD VARIANCE PERIOD 2	F-VALUE
STRUTHERS WELLS	45	66.6368	60.9405	1.0935
TEXFI IND	46	36.4300	26.7090	1.3640
THORATEC	47	20.5390	108.9362	5.3039
THOUSAND TRAILS	48	10.1535	15.5598	1.5325
WEAN INC	49	53.7986	34.7573	1.5478
WILTON	50	10.0512	185.6160	18.4671

GOING CONCERN CONTROL COMPANIES

NAME	MATCH #	STD VARIANCE PERIOD 1	STD VARIANCE PERIOD 2	F-VALUE
LYNCH CORP	1	21.1125	2.4005	8.7952
DATATAB	2	0	0	err
SEISCOM DELTA	3	12.9594	13.8265	10.6691
RAGEN CORP	4	42.1598	35.2967	1.1944
AMERICAN MOTORS	5	12.7334	18.4522	1.4491
OREGON METALLURGICAL	6	10.5407	7.1084	1.4828
SERVICO	7	9.2754	16.4309	1.7714
HENDERSON PET	8	5.0624	588.3076	116.2115
TRANS LUX CORP	9	3.7694	2.8529	1.3213
GENERAL AUTOMATION	10	31.0602	18.6292	1.6673
LSB IND	11	76.1559	20.4074	3.7318
PETX PET	12	0	204.8972	err
CIBLOA	13	20.5700	63.4943	3.0868
GEO INT'L	14	70.1002	46.7228	1.5003
LORAL CORP	15	10.9017	2.1446	5.0833
GTS CORP	16	110.6087	4.1796	26.4642
ATHLONE	17	5.8530	6.2480	1.0675
UNIVERSAL SECURITY INST	18	14.6026	35.2197	2.4119
ENERSERV	19	22.9961	48.3236	2.1014
FUDDRUCKERS	20	21.7213	8.8906	2.4432
VARCO INT'L	21	22.9572	34.7612	1.5142
IROQUOIS BRANDS	22	15.1442	1.7511	8.6484
SAXON OIL	23	20.6049	207.7182	10.0810
GULF REOURCES	24	5.3650	33.4716	6.2389
ADVANCE CIRCUITS	25	18.3418	45.0718	2.4573
A T & E CORP	26	52.9342	8.1724	6.4772
RESORT INT'L	27	7.9067	2.1682	3.6467
PYRO ENERGY	28	16.7971	3.8020	4.4179
GEARHART IND	29	10.9838	8.9877	1.2221
BIO RAD	30	8.3344	1.3337	6.2490
KAY CORP	31	10.2049	10.6209	10.4077
ATHLONE IND	32	5.4790	5.7404	10.4771
INMED	33	1.9814	3.9832	2.0103
MANHATTAN IND	34	6.7657	7.8980	1.1674
TENNEY ENG	35	20.6762	23.0381	1.1142
MICKELBERRY	36	31.7822	9.8193	3.2367
TECHNODYNE	37	65.1528	89.5085	1.3738
ANACOMP	38	46.1630	34.9533	1.3207
TENNEY ENG	39	20.6762	8.3079	2.4887
GTS	40	110.6087	4.1796	26.4642
ACTON	41	10.7388	69.7090	6.4913
CRAIG CORP	42	4.5805	6.4665	1.4118
HURCO	43	41.5868	70.9197	1.7053
CIBOLA ENERGY	44	20.5700	65.0622	3.1630

GOING CONCERN CONTROL COMPANIES Cont.

NAME	MATCH #	STD VARIANCE PERIOD 1	STD VARIANCE PERIOD 2	F-VALUE
J L CLARK MFG	45	1.1032	0.6655	1.6577
J P STEVENS	46	13.9814	18.7383	1.3402
AT & E CORP	47	52.9342	8.2201	6.4396
RESORTS INT'L	48	7.9067	4.4351	1.7828
TENNEY ENG	49	20.6762	12.6949	1.6287
UNA CORP	50	5.9572	111.4471	18.7080

APPENDIX E

COMPANIES WITH BETA SHIFTS

PORTFOLIO	COMPANY	MATCH #	DIRECTION OF BETA CHANGE
ASSET VALUATION	FAIRCHILD INDUSTRIES	8	decrease
LITIGATION	GOOD TACO	17	increase
	NEWPORT PHARM	27	increase
GOING CONCERN	BUTTES O & G	8	decrease
	GENEX CORP	22	increase
	HELIONETICS	26	decrease
	KENAI	29	increase
	PORTEC	39	increase
	RONSON CORP	41	decrease

APPENDIX F

DOMINANCE CHARACTERISTICS BY COMPANY

ASSET VALUATION PORTFOLIO

COMPANY NAME	MATCH #	FIRST PERIOD			SECOND PERIOD		
		SDC	CDS	NEUT	SDC	CDS	NEUT
ACRO ENERGY	1	9	21	44	0	71	3
ADVANCED COMPUTER TECH	2	3	0	71	4	21	49
ALLEGHENY BEVERAGE	3	8	23	43	10	21	43
C M I CORP	4	22	8	44	0	62	12
CONTROL LASER	5	7	1	66	1	58	15
CURTISS WRIGHT CORP	6	10	1	63	29	0	45
EARTH SCIENCES	7	16	0	58	0	0	74
FAIRCHILD IND	8	36	2	36	38	0	36
FUQUA INDS INC	9	44	2	28	17	7	50
IDLE WILD FOODS	10	30	0	44	4	35	35
KAISER CEMENT CORP	11	21	4	49	7	17	50
KINARK CORP	12	4	53	17	12	0	62
MICRODYNE	13	18	10	46	1	25	48
MINERALS ENGINEERING	14	4	38	32	1	51	22
NORLIN	15	28	6	40	4	18	52
OVERMYER	16	44	0	30	6	9	59
PARTNERS OIL	17	58	0	16	0	0	74
PHELPS DODGE CORP	18	29	4	41	23	6	45
RATLIFF DRILLING & EXPL CO	19	2	61	11	0	2	72
SAVIN CORP	20	11	1	62	48	1	25
SEA GALLEY STORES	21	11	19	44	5	29	40
TECHTRAN	22	1	7	66	45	0	29
TOPSY'S	23	0	72	2	1	34	39

SDC - experimental company dominated the control
CDS - control company dominated the experimental company
NEUT - neither company dominated

LITIGATION PORTFOLIO

COMPANY NAME	MATCH #	FIRST PERIOD			SECOND PERIOD		
		SDC	CDS	NEUT	SDC	CDS	NEUT
ALAMCO INC	1	0	10	97	0	44	63
ALPHA INDUSTRIES	2	13	42	52	17	26	64
AMERICAN SOLAR KING	3	0	94	13	12	24	71
ARGONAUT ENERGY	4	0	90	17	3	87	17
A V X CORP	5	7	66	34	13	39	55
COMMODORE INT'L LTD	6	6	45	56	2	74	31
COMPUTER MEMORIES	7	0	106	1	10	56	41
COMPUTERVISION CORP	8	26	1	80	38	7	62
CONSOLIDATED OIL & GAS	9	42	6	59	39	13	55
ENTRE COMPUTER	10	7	67	33	4	75	28
EQUIPMENT CO OF AM	11	14	3	90	4	19	84
EXCEL ENERGY	12	3	89	15	0	0	107
FLOATING POINT SYS	13	58	5	44	24	20	63
GENERAL DEVICES	14	11	12	84	9	50	48
GENERAL NUTRITION INC	15	17	23	67	4	79	24
GENISCO TECHNOLOGY	16	31	8	68	19	18	70
GOOD TACO	17	5	66	36	3	91	13
HELM RES INC	18	7	18	82	8	51	48
INFO DESIGNS	19	1	55	51	33	2	72
INTECOM	20	20	36	51	23	0	84
IOMEGA	21	42	0	65	5	80	22
KLEER VU INDS INC	22	14	0	93	5	60	42
K TRON INT'L	23	11	6	90	10	4	93
MC DOWELL ENTERPRISES	24	29	18	60	3	79	25
MCDERMOTT INT'L	25	14	19	74	30	16	61
MONOCLONAL ANTIBODIES	26	19	21	67	3	86	18
NEWPORT PHARM	27	7	3	97	5	65	37
PERCEPTRONICS	28	7	59	41	28	0	79
PITT DES MOINES INC	29	29	14	64	45	3	59
SIERRACIN CORP	30	46	7	54	20	9	78
SPECTRA PHYSICS INC	31	20	1	86	20	27	60
SUPERIOR CARE	32	17	1	89	0	89	18
TEXACO INC	33	50	1	56	61	2	44
TEXAS INT'L CO	34	1	0	106	5	42	60
UNITED STATES SURGICAL	35	29	0	78	37	10	60
U S R INDS INC	36	13	1	93	6	61	40
WINNERS CORP	37	9	57	41	10	42	55
WRIGHT WM E	38	43	7	57	47	3	57

GOING CONCERN PORTFOLIO

COMPANY NAME	MATCH #	FIRST PERIOD			SECOND PERIOD		
		SDC	CDS	NEUT	SDC	CDS	NEUT
ALLEGHENY INT'L INC	1	37	50	141	0	168	60
AMERICAN HEALTHCARE	2	26	43	159	1	99	128
ANGLO ENERGY INC	3	6	22	200	6	35	187
BARTON VALVE	4	221	0	7	17	0	211
BERRY INDS CORP	5	3	134	91	0	156	72
BIW CABLE	6	95	2	131	134	4	90
BROCK HOTEL	7	211	0	17	130	0	98
BUTTES OIL & GAS	8	53	40	135	0	202	26
COLECO INDS INC	9	49	21	158	0	197	31
COMTECH TECH	10	213	0	15	28	0	200
CONTROL DATA CORP DEL	11	55	26	147	82	17	129
CRAWFORD ENERGY INC	12	13	103	112	0	207	21
CRUTCHER RES CORP	13	0	55	173	0	26	202
DAMSON OIL CORP	14	9	60	159	0	46	182
DATAPOWER	15	0	209	19	0	228	0
DELTAUS	16	7	0	221	18	1	209
EASTMET CORP	17	147	3	78	221	0	7
ELECTRONICS MISSILES	18	220	0	8	204	4	20
FAFCO	19	131	2	95	121	8	99
FLAKEY JAKES	20	136	2	90	57	1	170
GALVESTON HOUSTON CO	21	45	53	130	10	142	76
GENEX	22	102	2	124	96	0	132
GLOBAL MARINE INC	23	48	46	134	1	62	165
GOLDFIELD CORP	24	3	101	124	6	120	102
HEI INC	25	42	2	184	226	0	2
HELIONETICS	26	3	26	199	2	80	146
HOLLYWOOD PARK REALTY	27	128	2	98	212	4	12
KANEB SVCS INC	28	1	92	135	2	64	162
KENAI	29	26	86	116	0	207	21
KRATOS	30	222	0	6	152	0	76
LITTLEFIELD ADAMS & CO	31	43	36	149	1	99	128
L T V CORP	32	28	65	135	37	16	175
MANGOOD	33	31	86	111	11	39	178
MARCADE GROUP INC	34	3	178	47	0	212	16
MEDAR	35	168	2	58	163	4	61
NCA CORP	36	192	0	36	226	0	2
PENRIL CORP	37	32	59	137	13	118	97
PERSONAL DIAGNOSTICS	38	218	1	9	136	5	87
PORTEC	39	27	95	106	0	188	40
READING & BATES CORP	40	18	12	198	1	195	32
RONSON	41	16	44	168	7	142	79
SCIENTIFIC RADIO	42	116	7	105	187	6	35
STANDARD LOGIC	43	5	130	93	9	6	213
STRATA CORP	44	78	9	141	188	6	34
STRUTHERS WELLS CORP	45	4	56	168	1	136	91

GOING CONCERN PORTFOLIO, Cont.

COMPANY NAME	MATCH #	FIRST PERIOD			SECOND PERIOD		
		SDC	CDS	NEUT	SDC	CDS	NEUT
TEXFI INDS INC	46	22	106	100	31	48	149
THORATEC LABS	47	214	0	14	78	0	150
THOUSAND TRAILS	48	220	0	8	219	4	5
WEAN INC	49	1	132	95	1	107	120
WILTON ENT	50	195	1	32	5	0	223

VITA

Cindy L. Seipel

Candidate for the Degree of

Doctor of Philosophy

Thesis: "SUBJECT TO" QUALIFIED OPINIONS AND THE SIGNALLING OF RISK SHIFTS

Major Field: Business Administration

Biographical:

Personal Data: Born in Wichita, Kansas, February 25, 1961, the daughter of Kenneth F. and Rose Marie Seipel; married to Larry Tunnell.

Education: Graduated from Lamar High School, Arlington, Texas, in June 1979; received Bachelor of Business Administration Degree in Accounting from the University of Texas at Arlington in May, 1983; completed requirements for the Doctor of Philosophy degree at Oklahoma State University in December, 1990.

Professional Experience: Auditor, Coopers and Lybrand, Dallas, August, 1983, to December, 1985; Teaching Assistant, Oklahoma State University, August, 1986, to May, 1987, and August, 1988, to May, 1989; Assistant Professor, New Mexico State University, August, 1990, to present.