DIFFERENTIAL INFORMATION, DIVERGENCE OF OPINION, AND SECURITY RETURNS IN AN EFFICIENT MARKET

by

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(ABSTRACT)

Although there is ample evidence of the heterogeneity of investors' expectations of security returns (Cragg and Malkiel, 1982), few studies have attempted to relate this divergence of investor opinion directly to security returns.

Barry and Brown (1984) argue that divergence of investor opinion results from differing levels of estimation risk across securities. Furthermore, their model shows that the OLS estimate of beta, used in most empirical studies requiring excess returns, underadjusts for a security's systematic risk when investors' expectations are highly dispersed and overadjusts when such divergence of opinion is low. This hypothesis is tested in the present study using various measures of divergence of analysts' forecasts of earnings per share for individual firms. The results of exhaustive data analysis strongly reject the notion of such a bias in the OLS derived excess returns or in actual returns.

Market reaction to revisions in the mean and standard deviation of analysts' firm-specific forecasts of earnings per share is also examined. Security prices do not appear to react in a systematic manner to revisions in the standard deviation of analysts' forecasts. However, there is evidence of a reaction to revisions in the mean of such forecasts both before and after the publication of this information suggesting that new information is contained in consensus forecasts of earnings per share when released to subscribers.

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Chapter I

INTRODUCTION

1.1 PURPOSE OF THIS STUDY

Empirical studies of the Capital Asset Pricing Model, hereafter CAPM, are typically characterized by the assumption of homogeneous expectations derived from historical data. Some recent studies (Cragg and Malkiel, 1982; Barry and Brown, 1984a; E. Miller, 1977) have raised some serious questions about the validity of the homogeneous expectations assumption.[1] Furthermore, the remarkable success of subscription services providing statistical profiles of analysts' earnings per share forecasts on a firm-by-firm basis suggests that investors believe it is important to know "consensus" opinion concerning future earnings per share and hence, the expected rate of return for a stock and the quality of the opinion i.e., the heterogeneity of expected earnings per share.

In this study I address two major questions about the relationships between common stock information, divergence of opinion, and risk. Specifically, do investors require

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[1] Specifically, this assumption refers to the rate of return distribution associated with a given security.

compensation for the level of diversity in the market's expectations of a security's future earnings, and when, if ever, does the market incorporate changes in divergence of opinion into security prices?

1.2 THE CONSENSUS ANALYST FORECAST SERVICE

Investors spend millions of dollars to gain access to the increasingly sophisticated forecasting services of professional security analysts. Among the more popular service vendors providing periodic reports are Institutional Brokers' Estimate System (IBES), Standard and Poor's Earnings Forecaster, and Zacks Investment Research. IBES, which has rapidly increased in popularity in recent years, provides summary statistics of analysts' earnings per share forecasts on a firm-by-firm basis. Included are various statistics about analysts' difference of opinion of such forecasts. A single, firm-specific observation includes mean, or consensus, earnings forecasts for the current and subsequent fiscal years, the standard deviation of the analysts' forecasts, and other descriptive information including the number of analysts providing forecasts.

Several empirical studies (reviewed in more detail in Chapter II) underscore the importance of divergence of opinion among security analysts. Cragg and Malkiel (1970, 1982) examined the relationship between expectations and security returns. They conclude that: (i) consensus (mean) earnings forecasts are highly inaccurate, (ii) considerable and persistent evidence indicates that analysts' expectations are heterogeneous, and (iii) the variance of analysts' long-term growth estimates is statistically significance in explaining security rates of return, serving as a proxy for the firm's unsystematic risk.

Elton, Gruber, and Gultekin (1981) find that a portfolio of the top 20 securities, ranked by the revision of the consensus (mean) earnings per share forecast from one month to the next, and formed on release of the new consensus data, is unable to consistently generate abnormal excess returns. They conclude that any information captured in revision of consensus earnings forecasts is (as predicted by the Efficient Markets Hypothesis) already reflected in security prices by the day the consensus is made public.

Thus, two damaging pieces of information about the value of earnings per share forecasting services exist: the mean forecasts are not very accurate, and by the time investors receive their periodic updates, the information is too old to earn excess returns. There must be some reason that investors subscribe. Perhaps, the new information contained in such updates is not in the mean earnings per share forecasts. Indeed, the distinguishing aspect of these services may be the information about the divergence of analysts' forecasts. If divergence of opinion is important to investors and the measures provided accurately reflect divergence of opinion, then the initial public awareness of the information should be reflected in stock prices.

1.3 RELEVANCE OF DIVERGENCE OF OPINION AND DIFFERENTIAL INFORMATION

The theoretical literature concerning divergence of opinion and equilibrium security returns generally concludes that "consensus" beliefs concerning individual firms determine prices and returns (Lintner, 1969; Gonedes, 1976; Williams, 1977). That is, the existence of divergence of opinion influences the equilibrium, but the equilibrium itself is identical to one in which all investors hold homogeneous expectations about the future prospects of individual securities. In such models, investors form portfolios that they believe are efficient. Although each portfolio is different and some are not truly efficient in the mean-variance sense, the signal provided by additional price observations leads some investors to adjust their holdings until the average portfolio held is identical to the true and unique market portfolio.

The introduction of a prohibition or penalty to short selling in the presence of divergence of opinion results in a positive relationship between divergence of opinion and return (E. Miller, 1977; Peterson and Peterson, 1982). If expectations concerning a security's future cash flows become more diverse, then a larger proportion of investors consider the security underpriced. A larger proportion of investors also consider the security overpriced but they are prohibited or otherwise restricted from taking a short position.[2] Thus, optimists dominate the market and security prices rise with an increase in divergence of opinion. Unfortunately, these models are not sufficiently robust to allow for a relaxation of the short selling restriction.

A cogent explanation for the existence of divergence of opinion and its impact on security returns is provided by Barry and Brown (1984a). These authors suggest that divergence of opinion is inversely related to the amount of information shared by investors. Consider the following hypothetical case. Suppose a risk-averse investor is evaluating two securities, A and B. There are 100 historical monthly return observations for A, but only 5 for B. In addition, the OLS derived estimate of systematic risk, beta, is identical for the two securities. Will the

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[2] Miller assumes that investor opinion is distributed symmetrically.

investor exhibit a preference for one over the other? If the different levels of estimation risk, or parameter stability, are recognized, then the investor can make a qualitative distinction between the two betas. Predictions made with the beta from A are more reliable and thus the investor considers A to be less risky.

Empirical tests of the CAPM typically do not recognize that the sensitivity with a common factor (i.e. beta) is itself an estimate and not the true parameter. Using a Bayesian approach to the determination of expected returns, Barry and Brown (1984a) show that for two classes of securities (high information securities, and low information securities) the predictive distribution formed by investors will display the following properties:

1. The estimate of the variance of any portfolio's return including all assets and incorporating differential information is greater than the estimate of variance for the same portfolio in the absence of differential information. Since the estimate of variance is the sum of estimates of covariance between all pairs of security returns, the recognition of increased estimation risk between pairs of low information securities increases the estimate of portfolio variance.

2. The estimate of beta for any high (low) information security incorporating differential information is less than (greater than) the estimate of beta for the same security in the absence of differential information. Again, this results from incorporation of different levels of estimation risk in the derivation of beta.

In other words, using an ex-post beta exclusive of estimation risk, the CAPM overadjusts for systematic risk in high information (low estimation risk) securities and underadjusts for systematic risk in low information (high estimation risk) securities. Therefore, the CAPM, ceteris paribus, predicts negative excess returns for high information securities and positive excess returns for low information securities.

This functional relationship resulting from the Bayesian approach to risk offered by Barry and Brown (1984a) is written as

$$XR = f(I), \qquad (1.1)$$

where XR represents excess returns and I is information. The function f(I), with $f'<0$, is monotonic and continuous. It is further defined in Chapter III.

In addition, if the amount of information commonly available to determine a security's risk is increased (reduced), then investors will have more (less) similar expectations of future returns.

$$DO = g(I), \qquad (1.2)$$

where DO is divergence of opinion. Again, g(I), with $g'<0$, is monotonic, continuous, and further defined in Chapter III.

The two functions, (1.1) and (1.2), can be combined to yield[3]

$$XR = f(g^{-1}(DO)) = I(DO). \qquad (1.3)$$

[3] The inverse of the relationship between divergence of opinion and information is proposed by Grossman and Stiglitz (1980). They argue that since information is not free, investors will incur costs to procure more of it only if they expect to outperform those investors who have not incurred such costs.

If this function is also monotonic and continuous, application of the chain rule results in $I'>0$, thus predicting that excess returns are positively related to divergence of opinion. That is, if there is considerable disagreement about a security's future prospects, then the information currently available is considered deficient by some investors. On the other hand, little dispersion among investors' forecasts of future returns, implies that the available information is considered sufficient by investors.

1.4 HYPOTHESES

I present two hypotheses for testing. The first hypothesis is a test of the relationship proposed by Barry and Brown in their differential information/divergence of opinion model. If divergence of opinion is consistently high (low) over a period of time due to the abundance (scarcity) of information, then excess returns generated by a model which does not recognize differential information or divergence of opinion as a source of risk should be negative (positive) over the same period of time. This relationship should hold for all securities in the presence of differential information.

The second hypothesis examines the timing of market reaction to changes in divergence of opinion. The market may adjust to such changes prior to publication of the consensus analyst earnings forecast. However, if this service is to be useful to investors, evidence of a market reaction after its release to the public must be documented.

Formally stated, the two hypotheses are:

- H1: A positive relationship exists between divergence of investor opinion concerning a firm's future returns and the risk premium required by investors. This risk premium is compensation for expected future fluctuations in security returns as proxied by a beta inclusive of estimation risk or differential information.

- H2: New and relevant information is contained in published divergence of opinion measures.

1.5 PROXIES FOR DIVERGENCE OF INVESTOR OPINION

The notion that the intrinsic value of a security is the present value of its future dividends is commonly accepted. Investors, therefore can be expected to analyze all information with regard to its impact on the dividend stream. Define expected returns as:

$$E_i(R_j) = E_i(d_j) + E_i(p_j)$$

where $E_i(d_j)$ and $E_i(p_j)$ are investor i's expectation of firm j's dividend yield and percentage price change, respectively.

If dividend policy is relatively predictable, then there will be little divergence of opinion concerning d_j. However, the expected price change, determined by expected changes in the future dividend stream, is a positive function of future earnings per share, and it is this overwhelming preoccupation with future earnings per share that is exploited by the consensus earnings forecast services.

A direct link, therefore, exists between the expected changes in earnings per share and the expected rate of return for a particular security. The divergence of security analysts' opinions concerning future earnings per share can thus serve as a proxy for divergence of investors' expectations of future returns.

1.6 OVERVIEW OF THE TESTS OF THE HYPOTHESES

Tests of H1 and H2 are conducted using several methods. The initial stage of the study investigates the relationship between divergence of opinion and excess returns as described in H1. I examine both returns and excess returns for periods in which specified divergence of opinion measures are stable. Relating cumulative returns or excess returns to levels of divergence of opinion during stable periods of divergence of opinion, permit a direct test of H1.

It is fully recognized, however, that changes in the parameters of the distribution of analysts' forecasts influence excess returns. The significance of shifts in the mean and standard deviation of analysts' forecasts in explaining returns and excess returns will reveal how important investors believe these parameters to be.

The second stage of the study examines H2 and requires a broader sample of observations. The sample used for H1 is restricted to observations exhibiting no change in the distribution of analysts' forecasts (i.e., the level of divergence of opinion is stable for an individual firm but differs across firms). All observations for which revisions of the standard deviation and mean of earnings per share forecasts are computed are included in the tests of H2, allowing for periods of accumulated returns both before and after the release of the revised forecasts. Several scenarios are possible:

- Prices adjust to changes in divergence of opinion prior to the public disclosure of such measures;
- Prices change abruptly upon the disclosure of these measures;
- Two adjustments occur combining the previous two outcomes;
- No discernible price adjustment emerges.

If no discernible adjustment occurs then H2 is not supported but H1 is not precluded (i.e., it is still possible that excess returns generated over a similar period are determined by the level of divergence of opinion).

1.7 WHY THIS STUDY IS UNIQUE

This study represents an improvement over the few empirical examinations of the relationship between divergence of opinion and expected return in the following ways:

i) Sample sizes in the past have been relatively small due to the unavailability of complete data for a large number of firms.

ii) Shifts in divergence of opinion are accurately determined. Extended periods of stable divergence of opinion proxies are distinguished from periods of unstable behavior facilitating the comparison of returns and excess returns of securities exhibiting different levels of divergence of opinion.

iii) The arrival of information concerning divergence of opinion is examined around the date of publication to determine when any price adjustment occurs.

Distinction iii questions the usefulness of published proxies for divergence of opinion. Elton, Gruber, and Gultekin (1981) were unable to generate abnormal returns by forming portfolios of securities with large shifts in the mean EPS forecast from one month to the next. However, they did find that perfect knowledge of the forthcoming revisions could be used to generate consistent abnormal portfolio returns. Thus, they conclude that information contained in the published revisions is nil; it is second hand information. It remains to be seen whether the same can be said for divergence of opinion measures.

1.8 OUTLINE OF CHAPTERS

In this chapter, I have introduced the concepts of divergence of opinion and differential information and their hypothesized relationship to excess returns. Chapter II reviews the extant literature directed at empirical work involving heterogeneous expectations. A brief survey of work concerning the usefulness of analysts' forecasts is also provided. The two hypotheses introduced in this chapter are fully developed in Chapter III along with a detailed description of the statistical procedures I use to test them. Results of the empirical analysis are documented in Chapter IV followed by a summary of these results along with their implications for the hypotheses in Chapter V.

Chapter II

REVIEW OF LITERATURE

In this chapter I review the theoretical and empirical literature of differential information and divergence of opinion. An historical review of models of security prices is presented emphasizing the link between earnings forecasts and expected rates of return. Dozens of empirical studies exist that examine the accuracy and usefulness of future earnings forecasts and other determinants of security prices in an efficient market. An overview of the principal forecasting literature is presented.

2.1 DEFINITIONS

Several concepts central to this work appear in varying contexts in the financial literature. Therefore, I will provide definitions of (i) differential information, (ii) divergence of opinion, and (iii) consensus as they are used here.

A state of differential information between two or more securities exists when the available information specific to a single security differs in a quantitative or qualitative manner from information available for another security. For example, differential information is extreme when comparing a newly listed firm with a blue chip firm having an informational history spanning decades. Conversely, two firms with very similar, although not identical, informational histories, are not in a state of significant differential information with respect to one another. Barry and Brown (1984a) employ a similar definition.[4]

Divergence of opinion is synonymous with heterogeneous expectations. The opinions referred to belong to individual investors and pertain to expectations of future returns. Barry and Brown (1984a) refer to divergence of opinion as the dispersion of the means of investors' prior distributions of future security returns.

The concept of a consensus forecast is synonymous with the arithmetic mean of several individuals' forecasts. This definition is used by Cragg and Malkiel (1982) and by Elton, Gruber, and Gultekin (1981).

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[4] This definition contrasts with differential information as employed by Dybvig and Ross (1985). These authors are referring to the different information sets available to analysts and individual investors, a concept referred to as asymmetric information elsewhere. This issue is not addressed in this study.

2.2 DIVERGENCE OF OPINION AND ASSET PRICES

The basic assumptions of the CAPM include homogeneity of investors' expectations and an abundance of costless information available to all market participants.[5] These assumptions are important in that the derivation of the CAPM obtains a relatively simple solution conducive to empirical testing. The CAPM has been reformulated without these assumptions, but with somewhat unwieldy results.

The concepts of heterogeneous expectations and differential information access are very much intertwined. For example, two investors who have access to different sets of information concerning a security will likely disagree on the subjective probability distributions that they associate with the firm's future earnings. On the other hand, it is very possible for investors with access to the same information to arrive at entirely different conclusions concerning a firm's future prospects. If expectations are homogeneous, then it is difficult to presume that investors have access to different information sets.

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[5] The Arbitrage Pricing Theory (Ross, 1976) was originally derived with these assumptions as well.

2.2.1 Edward Miller (1977): An Intuitive Model

Edward Miller (1977) argues that investor expectations cannot be homogeneous. He reasons that if the future is presumed to be uncertain, why will everyone agree about what will happen to each individual firm? He proceeds on an intuitive argument that, given a fixed supply of a firm's stock, the market price is not set by all participants, but by those who are most optimistic about the firm's future prospects. In addition, riskier stocks are associated with even greater diversity of expectations of future performance. Thus, high-risk stocks tend to sell at higher prices than low-risk stocks because of the more optimistic forecasts of the subset of investors who absorb the supply of the security. If divergence of opinion changes, the market price will change as well reflecting increased optimism or pessimism implying that if investors' expectations are unbiased, then the market price exceeds the willingness to pay for any investor with perfect foresight. Therefore, firms attempting to maximize share price are basing their investment decisions on the opinions of optimists.

Jarrow (1980) disagrees with Miller's argument that high-risk stocks tend to have high prices. He counters that the presence of a widely dispersed set of expected returns across investors may simply correspond to a widely dispersed set of variance-covariance matrices relating securities to one another. This may counterbalance the relative optimism of some individuals and the market price will become more of a pure consensus across all investors rather than a consensus among optimists.

2.2.2 Peterson and Peterson (1982): Short Selling Constraint

Peterson and Peterson (1982) provide a model of demand for a firm's securities that refines the analysis of Miller. They examine demand for a single risky security among investors with heterogeneous expectations under various rules governing short selling.

If the supply of the risky security is fixed, the model shows that a change in the variance of investors' expectations of returns from this asset will result in a change in the equilibrium price if (i) the mean, or consensus, of those expectations also changes, and/or (ii) there is a restriction or prohibition on short sales. Suppose the variance of investor expectations increases, but the mean expected return remains the same. If there are no restrictions on short selling, the equilibrium price will remain the same. The new extremes of optimism and pessimism will result in symmetric changes in short and long positions only. However, if short sales are restricted or prohibited, then the marginal pessimists (short sellers) may take no position resulting in a market dominated by optimists. Hence, we're back to Edward Miller's world.

2.2.3 Lintner (1969) and Williams (1977): CAPM with Heterogeneous Expectations

Lintner (1969) provides the earliest version of the CAPM to relax the assumption of homogeneous expectations. In this model, investors have different subjective probability distributions of returns and differing degrees of risk aversion. The result of these generalizations is that the variance-covariance matrix and expected prices become weighted averages of investors' expectations as opposed to the simple averages found in the derivation of the traditional CAPM. Another result of these new assumptions is that investors no longer agree on a single market portfolio. Each investor holds a different set of risky assets. Although the derivation of the CAPM is changed substantially, the properties displayed by the resulting model remain quite similar to the traditional CAPM.

Williams (1977) reasons that, if investors possess homogeneous expectations, then the CAPM tells us how they will form their initial portfolios, all of which have an amount of M , the mean-variance efficient combination of all risky assets (assuming the existence of a risk free asset). Once this is achieved, no individual will have further motivation to trade since expectations are homogeneous.

To avoid this situation, the author uses a continuous time CAPM and restricts the opportunity set for some subset of investors. This results in differential information to investors. Expected returns, variances, and covariances of returns on risky assets can no longer be derived; they must be estimated. Expected returns will differ across individuals due to estimation error and this will result in heterogeneous beliefs.

The CAPM or security market line (SML) resulting from these assumptions represents a consensus estimate of the risk-return relationship derived from a weighted average of all individual investors' estimates. Unlike the traditional CAPM, the "consensus beta" may no longer be the correct measure of risk. Over time, however, the "consensus SML" should converge to the true SML since informed investors will outperform uninformed investors. This presumes that uninformed investors can interpret the time series of price observations as a signal of future value and will adjust their expectations of future returns accordingly. Williams concludes that homogeneous expectations are a sufficient but not a necessary condition for the CAPM to hold.

2.2.4 Divergence of Opinion -- Empirical Studies

There are few empirical examinations of the hypothesis that a direct relationship exists between divergence of opinion and return. The most striking result in Cragg and Malkiel's (1982) comprehensive examination of earnings forecasts collected from individual analysts over the decade of the 60's is that expectations are persistently heterogeneous. These authors also find a significant positive relationship between security returns and the variance of analysts' long term growth estimates. They speculate that the variance of long term growth estimates may represent a security's "own", or unsystematic risk.

Peterson and Peterson (1982), use the percentage change in the standard deviation of analysts' forecasts of earnings from one year to the next as a proxy for changes in divergence of opinion. They find that the percentage change in the standard deviation of earnings forecasts is positively related to return. However, the relationship is significant in only two of four years during the period they examined. In addition, the percentage change in the mean earnings forecast is a far more powerful explanatory variable.

Bart and Masse (1981) attempt to test Miller's hypothesized relationship between divergence of opinion and risk directly. They conduct a survey of buyers, sellers, and owners of three heavily traded securities during a 20 day period to develop measures of divergence of opinion. This measure was determined from the standard deviation of the distribution of participants' expectations of price appreciation. When compared with ex-post risk as measured via the standard deviation of prior monthly holding period returns, the association between divergence of opinion and risk is inconsistent. Thus, the study presents little evidence in support of the Miller hypothesis even though the data base used is quite specific.

In a study primarily concerned with the explanation of forecast errors, Elton, Gruber, and Gultekin (1984) provide empirical evidence of a relationship between divergence of opinion and available information. They examine the cross-sectional mean standard deviation of analyst forecasts of annual earnings per share for each month of the fiscal year. These mean divergence of opinion measures decrease as the fiscal year progresses.[6]

Neustel (1984) examines the relationship between excess returns and divergence of opinion by first calculating the standard deviation of analysts earnings forecasts per dollar of their mean forecast (std.dev./mean) and then ranking these measures into percentiles.

If excess returns are generated by a model which does not account for divergence of opinion, then the variation in these residuals should be explained by the divergence of opinion proxy. The empirical results of this study fail to support the significance of divergence of opinion as a determinant of risk.

2.3 DIFFERENTIAL INFORMATION AND ASSET PRICES

Most theoretical articles dealing with the concept of differential information are concerned, as was the Williams model, with the signal that price provides to the uninformed investor.

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[6] The authors do not account for the decline in the proportion of annual EPS being forecasted. It is not surprising that a group of analysts displays lower divergence of opinion when all forecasts have impounded any actual quarterly EPS figures into their estimates of annual EPS (i.e., there is less to forecast as the fiscal year progresses).

2.3.1 Information and Efficient Markets

Grossman (1976) and Radner (1979) provide models where each trader brings a "piece" of information to the market. If equilibrium price resulting from the collection of this diverse information is observed by all traders, then it is possible that the current equilibrium price is a sufficient estimator of future price. That is, an individual investor may look at the future price estimates derived with his "piece" of information and determine, over time, that the current price itself is a superior forecast of the future price. Hence, this investor will fail to collect his information and to impound it into the current price. In other words, the information gathering activities of all traders insures market efficiency, but individual traders can forecast prices just as well using the price determined by everyone else's information. As individuals stop forecasting on their "piece" of information, markets will become inefficient.

Grossman argues that if information is costly, then there must be noise in the pricing system. Otherwise, traders can not get a fair return on their information gathering expenses. If the price system is noisy, then the signal given by current equilibrium price is no longer a sufficient estimator of future price, and the influence of costly information on price is "masked" to all but the individual who traded on it.

The concept of a noisy price signal is extended in Grossman and Stiglitz (1980). In this model, traders can collect costly information in order to reduce their own perspective of noise. However, as more traders become informed, the price signal becomes less noisy to the uninformed traders as well. Traders have incentive to buy information until there is no advantage to the marginal trader to become better informed. The authors offer this paradigm as a replacement for the typical informationally efficient market which they contend can not reach an equilibrium state.

2.3.2 Klein and Bawa (1977): Estimation Risk and the Ex-Ante CAPM

Klein and Bawa (1977) examine the differential information which results from estimation of risk parameters over a number of securities that is larger than the number of observation periods per security, leading to estimation risk similar to that discussed in Williams (1977). However, Klein and Bawa suggest that investors may now perceive more risk, ex-ante, than the ex-post CAPM measure would suggest.

Another finding by the authors recommends that an investor with information about only a subset of stocks, will be better off to diversify entirely within that subset. This result agrees with the Lintner (1969) model. He suggested that investors may be unable or unwilling to evaluate all securities and voluntarily restrict themselves to a subset of securities. Prices for securities within this subset are shown to be solely determined by the subset of investors who evaluate them.

2.3.3 Barry and Brown (1984a): Ex-Ante Versus Ex-Post CAPM

Barry and Brown (1984a) note that the empirical tests of the CAPM typically fail to acknowledge that the parameter (i.e., beta) used to generate excess returns is not a "true" value, but an estimate of the "true" value. They argue that investors know this and adjust the parameters to reflect the level of estimation risk or available information concerning a security. Using a Bayesian approach that allows for recognition of differential estimation risk (i.e., differential information) across securities, the authors show that conventional beta estimates are misspecified.

Barry and Brown assume that there are two classes of securities, those in the high information group and those in the low information group. Since any portfolio is subject to estimation risk, the sample variance of portfolio returns will always exceed the true variance:

$$Var(W, N, N) > Var(W, \infty, \infty) \quad (2.1)$$

where W represents the vector of weights of individual securities comprised in the portfolio, and N represents the number of observations available for securities in the high and low information groups (denote H and L respectively). With the introduction of different numbers of observations for these groups, it can be shown that

$$Var(W, N, n_2) > Var(W, N, N) \quad (2.2)$$

where n_2, the number of observations for securities in the low information group is less than N.

The covariance of an individual asset, i, with the portfolio depends upon its membership in H or L. If i is a member of H, then the ratios of covariance to portfolio variance, or betas, can be shown to have the following relationship:

$$\beta_i(W, N, n_2) < \beta_i(W, N, N) = \beta_i(W, \infty, \infty). \qquad (2.3)$$

Thus, any estimate of beta for a high information security is reduced due to the presence of differential information. The equality allows that estimation risk does not matter in the absence of differential information. Low information securities reverse the inequality since the average of betas for the market portfolio must equal 1.

Barry and Brown extend the analysis to show that divergence of opinion is reduced for securities in either H or L by expanding the sample size. This results from an increase in the proportion of information available to all investors and implies that any proxy for divergence of opinion is also a measure of the effects of differential information.

2.3.4 Differential Information -- Empirical Studies

Empirical studies examining the effects of differential information on security returns are virtually nonexistent. However, the Bayesian approach to risk undertaken by Barry and Brown (1984b) implies that positive excess returns will accrue to "low information" securities as a result of estimation risk. They find a negative relationship between excess returns and period of listing on a major exchange, their proxy for differential information. Although the authors contend that this is a possible explanation for the "small firm effect", it also provides additional evidence of a link between differential information and return.

Neustel (1984) also examines the empirical relationship between differential information and excess returns derived without recognition of estimation risk. The results of this study suggest that differential information, as proxied by the number of analysts providing forecasts of a firm's earnings per share, displays a significant negative correlation with excess returns. In addition to this study, which may be the only one to examine differential information directly, the implications of Barry and Brown's (1984a) link between differential information and divergence of opinion suggests that all evidence relating divergence of opinion to return can be considered as support for the differential information explanation as well.

2.4 EARNINGS FORECASTS AND SHARE VALUE

The literature of financial theory is filled with various models of common stock valuation. It is difficult to find any that do not, at least implicitly, incorporate expectations of some future variable to generate an expected price.

2.4.1 Historical Developments

Some of the earliest work in the modeling of share valuation was done by Williams (1938). He formalized the mathematics of present value and proposed that the investment value of a stock is equal to the present value of all future dividends. Williams also provided adaptations in his basic model to allow for growth, contraction, or a leveling off of the dividend stream. He also distinguished the role of earnings in the valuation process by declaring them "a means to an end, and the means should not be mistaken for the end". Earnings must be reinvested in order to maintain the dividend stream.

To clarify the importance of the role expectations play in any present value model, many authors have attempted to reduce the burden on the investor by reducing the number of estimates required. Consider the Williams present value model:

$$P_0 = \sum_t (d_t/(1+r)^t) \quad \text{for } t = 1 \text{ to } \infty . \quad (2.4)$$

In order to generate a price, the investor must provide estimates of future dividends, future growth rates, and discount rates, ad infinitum. Who can place much confidence in estimates of dividend growth five or ten years into the future?

Perhaps the ultimate simplification in the present value method of share valuation is provided by Gordon (1959). His model requires forecasts of only two variables: the growth rate and the discount rate.

$$P_0 = D_0(1+g)/(r-g). \quad (2.5)$$

where D_0 is the most recent dividend, g is the expected growth rate, and r is the appropriate discount rate for a stock of the given level of risk. It is the expectation of growth that causes the greatest consternation within such a model. Future growth is very difficult to predict. In addition, this formulation still infers that growth will continue indefinitely at this single estimated rate.

Two attempts to qualify the perpetual growth inferred by the Gordon model are provided by Holt (1962) and Malkiel (1963). Holt is primarily concerned with the valuation of growth stocks relative to non-growth stocks of similar risk. He questions the accuracy of any forecast of high growth, even when the duration of such growth is specified. Thus, rather than forecast the growth rate and its duration directly, Holt derives a minimum duration of the present growth level necessary to attain the same level of earnings as a non-growth firm of similar risk. The minimum duration for the current growth rate derived by this method becomes a measure of the appropriateness of the current price of the growth stock. It also serves as a check on the reasonableness of the expected growth estimate used.

The approach used by Malkiel is also concerned with valuation of growth stocks. Rather than using the present value of an infinite stream of discounted dividends, Malkiel suggests that any finite horizon will suffice for valuation. The price of the stock is now simply the present value of a finite stream of dividends plus the end of holding period value of the stock itself. The dividends and the stock price are assumed to grow at the same rate throughout the finite period. This model is commonly written in P/E form:

$$\frac{P_0}{E_0} = \frac{D_0\,(1+g)^i}{E_0\,(1+r)^i} + (m_s)_0 \frac{(1+g)^N}{(1+r)^N} \qquad (2.6)$$

where P_0, E_0, and D_0 are the price, earnings, and dividend per share at time 0. Growth is represented by g, the appropriate discount rate by r, and the overall P/E of the market as m_s.

2.4.2 A Link Between Expected Earnings and Return

Putting the problems of accounting for growth aside, the present value models serve as very appealing definitions of the value of a common share of stock. It is difficult to argue with the premise that share price is the present value of all cash flows to be received by the shareholder. However, these models require an estimate of growth and, more importantly, some way of determining the market price for a security's risk.

The Capital Asset Pricing Model (CAPM) developed by Sharpe (1964), Lintner (1965), and Mossin (1966) was the first widely accepted market equilibrium model of security prices. The insight brought forth in the CAPM was that the returns to individual securities were related to one another through their dependence on the common factor, market return. By exploiting these dependencies, it can be shown that a portion of an individual security's risk can be "diversified away", suggesting that the security's price is dependent upon the risk it brings to the well diversified portfolio and not the total risk, or variance, inherent in the security's returns when viewed in isolation. Only risk reflected through the common factor requires compensation. The expected return to a security based on the CAPM is:

$$E(r_j) = r_f + \beta_j \, (E(r_m) - r_f). \qquad (2.7)$$

where $E(r_j)$ is the expected return on j, r_f is the risk-free rate of return, $E(r_m)$ is the expected return on the market portfolio, and β_j is the measure of relevant risk:

$$\beta_j = Cov(r_j, r_m)/Var(r_m). \qquad (2.8)$$

The CAPM provides an appropriate discount rate to be used in evaluating a security's cash flows. However, this benefit is not achieved without cost. Investors are assumed to have homogeneous expectations of the distributions from which returns are generated. The relaxation of this assumption causes difficulties which were discussed in the previous section.

Viewing the value of a firm (or share price) as the sum of future earnings has been roundly criticized in the literature for its callous overstatement of what the investor actually receives. Miller and Modigliani (1961), however, argue that, with proper modification, the stream of earnings approach is valid.

The earnings stream will not perpetuate itself without additional capital investment. If the additional investment required to generate earnings into the future is accounted for, then the method of discounting future earnings is appropriate. It is immaterial whether these additional funds are raised internally (from retained earnings) or externally (from issuance of new securities), the opportunity cost of all funds is the same.

This relationship can be expressed as

$$V_0 = \sum_t (X_t - I_t)/(1+p)^{t+1} \quad \text{for } t = 1 \text{ to } \infty . \qquad (2.9)$$

V_0 represents the value of an unlevered firm, p is the required rate of return for a security of given risk, X_t is the net income at time t, and I_t is the investment required to maintain a return of p in the future.

The equation is easily modified to a per share basis by dividing each side by the number of shares outstanding at time 0. Thus, a shift in the expected future earnings per share of the firm will directly impact the expected future share price and expected future return.[7]

2.5 MARKET REACTION TO EARNINGS AND GROWTH FORECASTS

The empirical work relating expectational or forecast data to share price is abundant. The bulk of this work represents tests of market efficiency. Additional studies examine the accuracy of earnings forecasts.

2.5.1 Accuracy of Earnings Forecasts

The primary finding of empirical analysis of the accuracy of earnings forecasts can be summarized in one statement: analysts' forecasts are not very accurate. A Barrons article (June 4, 1984) reported that the ten Dow Jones Industrial Average securities with the worst expected earnings have outperformed the ten securities with the best expected earnings in 7 of the ten years from 1974 through

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[7] Cragg and Malkiel (1982) also provide a link between expected earnings per share and expected return via the APT.

1983. The average (beginning of year) earnings forecast error for (end of year) 1983 earnings was 56.2% as reported by the Institutional Brokers Estimate System (IBES). Elton, Gruber, and Gultekin (1981) reported forecast errors of similar magnitude.

To examine the accuracy of forecasts Cragg and Malkiel (1982) use Thiel's measure.

$$T = (P_i - R_i)^2/R_i^2$$

where P_i is the consensus estimate of growth of firm i's earnings for a given year and R_i is the realized growth over the same period. Note that T = 0 for perfect foresight and T = 1 for a naive (no-growth) prediction. Cragg and Malkiel suggest that forecasters do not always outperform the naive prediction for the short term (1 year) growth measure and only slightly outperform it for the long term (5 year) growth measure. Partitioning the numerator of the Thiel measure, enabled Cragg and Malkiel to attribute most of the prediction error to the forecaster's inability to forecast earnings growth of individual firms within their industries. Forecasters are much more successful in predicting industry wide earnings growth leading the authors to the general conclusion that analysts aren't very accurate, but are more accurate than any naive model.

Brown and Rozeff (1981) compare analysts' forecasts of earnings from Value Line to forecasts generated via mechanical Box-Jenkins methods. They use an absolute percentage error as a measure of accuracy and find that the analysts' forecasts were generally more accurate, but did not outperform the mechanical model in all periods. The authors also report that forecasts of quarterly earnings improved in accuracy as the time to the realized earnings announcement is reduced.

Another aspect of the empirical analysis of analysts' forecasts concerns rational expectations. Cragg and Malkiel (1982) provide the only test to date on rationality of earnings forecasts. Their tests are limited due to the incomplete data set used. Typically, tests for rationality require time series analysis. Cragg and Malkiel were forced to use cross-sectional methods as firms seldom remained in the sample for the entire nine year period being examined. To use a cross-sectional test for unbiasedness, it must be assumed that forecasts for different firms are independent and identically distributed. This assumption is problematic as it ignores any differential impact of economy wide disturbances on individual firms and it ignores differences in correlation between realizations and forecasts for individual firms.

The result for the long term (5 year) growth estimates suggest that estimates are biased for most periods examined and residuals for the subsequent short term (1 year) growth models are correlated. Thus, the authors conclude that analysts' expectations of growth do not appear rational.

Another topic of empirical interest is the accuracy of valuation models using historical versus expectational data. Malkiel and Cragg (1970) tested the valuation model derived in Malkiel (1963) and stated in P/E form. They found that expectational surrogates for growth provided a better fit than did their historical counterparts. Similar results are produced by Bell (1974) using a larger sample and substituting Value Line forecasts of growth for the consensus estimates used by Malkiel and Cragg.

Virtually no empirical studies have examined parameters of the distribution of analysts' forecasts other than the mean. Peterson and Peterson (1979) use earnings forecast data from IBES over the period from 1976 through 1980. They monitor the change in consensus earnings forecast parameters of mean, standard deviation, and skewness from December of one year to November of the following year. Use of these variables as regressors indicates that changes in mean and standard deviation are positively related to return. Changes in the skewness parameter are consistently insignificant.

Cragg and Malkiel (1982) test single and multiple factor models of expected return. The estimate of traditional beta is most highly correlated to expected return within the class of single index models. However, in multiple factor models, the variance of analysts' estimates of long term growth enhances the models' explanatory power. The authors suggest that it may proxy for unique risk in expectational data.

Use of a linear approximation of Malkiel's P/E model described earlier provides additional support for use of variance of long term growth estimates as a risk proxy.

2.5.2 Impact of Earnings Forecast Announcements and Revisions

Although proceeded by a number of studies, Foster's (1973) examination of market reaction to earnings per share announcements is a good starting point in a review of market efficiency studies. Foster examines returns generated by numerous trading strategies and the volume of shares traded upon announcement of earnings per share made by company officials at fiscal year end. The sample consists of 68 firms with a December fiscal year end, appearing on CRSP, and having no confounding dividend announcement during the week of the EPS announcement. The period examined covers 1968 through 1970. An initial finding is that the average daily percentage of shares traded is 51% higher during the announcement week than the average of the 16 prior weeks. Hence, the announcement appears to have information content.

Foster then provides EPS estimates from ten different models and estimates of change in EPS from another ten models. If a model provides an EPS estimate lower than the EPS announcement, then the stock is "bought". If the estimate is higher than the announced value, the stock is sold short. Two holding periods, one starting 5 days prior to the official EPS announcement, and one starting on the announcement day fail to generate significant excess returns. Hence, the author considers the market efficient with respect to EPS announcements.

In a series of studies, Cragg and Malkiel (1968, 1970, 1982) examine analysts' expectations of earnings per share and growth. These studies represent the first attempt to combine forecasts from a number of analysts. Data is collected from 17 investment firms during the 1960s. The sample comprises 178 firms. However, not all firms remain in the sample for the entire period of the study. To be included in any analysis, a firm must be followed by at least 3 analysts. Specific information collected includes predicted growth rates (1 year and 5 year), and predicted EPS.

The strongest conclusion made by the authors is that expectations are not homogeneous. Considerable disagreement is apparent, especially among the estimates of short term (1 year) growth.

With respect to market efficiency, Cragg and Malkiel found that perfect foresight in choosing high growth firms is profitable during the period studied but use of growth forecasts provides profits in some years but not in others. There is no apparent pattern to the profitability of investing in stocks with high growth forecasts. Thus, the authors conclude that whatever information is in analysts' forecasts is quickly impounded in share prices.

Elton, Gruber, and Gultekin (1981) also examine the issue of capital market efficiency with respect to consensus forecasts of EPS and growth. These authors used monthly forecasts of end of year EPS for December fiscal year firms followed by at least 3 analysts. A combined sample of 919 firms is assembled for the period from 1973 through 1975. Firms are ranked into deciles based on each of the following variables: predicted one-year growth rate, actual one-year growth rate (perfect foresight), growth forecast error (perfect foresight), earnings forecast error (perfect foresight), and revision of earnings forecast (perfect foresight). Excess returns are then calculated on a monthly basis for all stocks using the Scholes-Williams (1977) technique. The results suggest that high predicted growth does not provide consistent positive excess returns, but high actual growth does correspond to positive excess returns. Positive forecast errors for growth and for earnings also produce positive excess returns. An interesting finding is that the largest excess returns of any criterion are generated by choosing stocks that will have a large positive revision in their forecast of earnings over the next year. This, of course, would require perfect foresight, but it argues for the importance of expectational data as a determinant of share price.

The authors found no evidence that an investor could "beat the market" using the consensus forecasts of earnings or growth. Excess returns are generated only using measures requiring perfect foresight.

At this point, it may appear that services providing forecasts of growth or earnings have little value to the investor. However, several authors report results contrary to the efficiency of financial markets.

Givoly and Lakonishok (1979) examine revisions in analysts' forecasts of earnings for 49 firms in 3 industries (Chemical, Petroleum Refining, Transportation Equipment). Data is collected from Standard and Poor's Earnings Forecaster for the period from 1967 through 1974. The authors reject use of the consensus forecast as it is sensitive to a change in the number of analysts providing forecasts, is insensitive to offsetting forecasts, and does not reflect any "forecast leadership" of a particularly insightful analyst. They instead use the most active forecaster's (the one with the most frequent revisions) estimates. Excess returns are calculated using the market model. Abnormal returns for several monthly holding periods surrounding and following the revisions are examined. Upward (downward) revisions appear to produce positive (negative) abnormal returns. The abnormal returns are also positively correlated with revision size.

Thus, it appears to the authors that changes in analysts' forecasts have information content. However, the abnormal returns persist in the months beyond the revision disclosure although they decrease in size. Givoly and Lakonishok use this result to maintain that markets are not semi-strong form efficient.

A similar result is provided by Jones and Latane (1974, 1977, 1979; see also Rendleman, Jones, and Latane, 1982, 1984). In these studies, "standardized unexpected earnings" (SUEs) are calculated as follows:

$$SUE = \frac{\text{Actual Earnings} - \text{Expected Earnings}}{\text{Std. Error Expected Earnings}}$$

Expected earnings are computed via OLS regression which adjusts for growth and seasonality patterns in earnings over the past 20 quarters.

The authors repeatedly show that persistent excess returns are generated by purchase of securities with very high or very low SUEs. The excess returns continue for several months beyond the earnings announcement month. This result causes particular consternation as it not only suggests market inefficiency, but it is the result of a mechanical selection procedure.

Brown (1978) also finds evidence of short term and long term market inefficiency in its reaction to earnings changes. His model selects stocks using a measure similar to SUE, but excess returns are produced on a daily basis. The results suggest that an investor could earn substantial profits in the three day period surrounding the date of the actual earnings announcement.

In a study that has further implications for efficient markets, Lloyd-Davies and Canes (1978) examine the market reaction to publication of "second-hand" information. These authors monitor security prices around the publication of analysts' recommendations in the "Heard on the Street" column in the Wall Street Journal during 1970 and 1971. Since analysts have already passed their recommendations on to their clients and employers, the usefulness of subsequent publication is highly questionable.

However, the average abnormal return of the 597 buy recommendations is a significant .923% on the day of publication. The corresponding figure for the sample of 188 sell recommendations is -2.374%. Thus, the authors conclude that, not only are analysts' recommendations valuable, but the subsequent publication of these forecasts is worthwhile as well.

So, there is clear evidence, although not plentiful, supporting the usefulness of analysts' forecasts as a method of selecting stocks. This support must be tempered with the apparent success of the "naive" SUE selection procedure which does not require analysts' forecasts. Most important, the evidence casts doubt on the efficient markets hypothesis.

Chapter III

METHODOLOGY AND DATA

3.1 OVERVIEW OF CHAPTER

The chapter begins with a discussion of the information set used by investors to assess a security's risk. The definition of information provided by Barry and Brown (1984a) is restated in a more general framework. Next, the motivation for each of the hypotheses is presented, followed by descriptions of statistical tests that are used to support or refute each of the hypotheses. Descriptions of measures of divergence of opinion and excess returns are included. Finally, sources of data are detailed along with criteria for inclusion of individual observations.

3.2 A DEFINITION OF INFORMATION

The formal derivations of Barry and Brown (1984a) rely solely upon a quantitative definition of the information set. An historical rate of return observation for a specified interval of time is a unit of information in their model. The reader may conclude that the information set for a given security can only expand with an extension of the vector of historical returns.

This restrictive interpretation is unwarranted. Suppose that two securities, C and D, have the following attributes. We have 100 historical monthly rate of return observations for C, but it is a privately held firm, its officers are highly secretive and release no other information. In other words, the set of previous rates of return represent the entire information set for C. On the other hand, D can provide only 20 historical monthly rates of return. However, its officers provide considerable and detailed information about this firm's financial health and future prospects. It is quite possible that a risk-averse investor will consider D to be informationally superior to C. Barry and Brown allude to this qualification through the concept of "equivalent sample information".

An alternative explanation of the concept of differential information can be derived in the following manner. Suppose two securities, E and F, have the same number of historical rate of return observations with which to generate an OLS beta. However, additional information provided by the management of E is vague or contradictory whereas additional information provided by F's management is clear and unambiguous. If these differences are now examined in the context of "equivalent sample information", then investors will perceive the true beta for E to be greater than the OLS beta. The reverse holds for F's true beta.

Thus, it is appropriate to restate the measure of risk, β, as a function of available information

$$\beta = \beta(I). \quad (3.1)$$

β is the "true", or information determined measure of risk and depends upon all available information, not just historical rates of return. The information variable, I, is a measure of firm-specific information gathered from all sources. Available information (I) for any firm can be mapped onto the continuous interval:

$$\underset{I_{MIN}}{|} \text{———————} \underset{I^*}{|} \text{———————} \underset{I_{MAX}}{|}$$

where I^* reflects the information contained in the historical rate of return vector alone, I_{MIN} represents the poorest possible level of information, and I_{MAX} is the best possible level of information. Therefore,

$$\beta(I_{MIN}) > \beta(I^{*}) > \beta(I_{MAX}). \quad (3.2)$$

3.3 EXCESS RETURNS AND DIVERGENCE OF OPINION (H1)

(H1) A positive relationship exists between divergence of investor opinion concerning a firm's future returns and the risk premium required by investors. This risk premium is compensation for future fluctuations in returns as proxied by a beta inclusive of estimation risk or differential information.

The Sharpe-Lintner-Mossin capital asset pricing model (CAPM), predicts that the risk of an individual security requires compensation to the extent of the covariance of its returns with returns on the market. Furthermore, the CAPM permits the decomposition of risk into two parts: systematic risk and variability in a security's return that is not explained by covariance with the market return. However, the indicator of systematic risk, beta, is unknown and must be estimated from available information. It is precisely this available information that, ceteris paribus, determines the quality or stability of the estimated beta. The fact that betas for different securities are determined from very different information sets is ignored by the OLS estimate, and investors form predictive security betas using all relevant information available.

Barry and Brown (1984a) provide a formal derivation of such a predictive, or informationally complete beta, by assuming that estimation risk, or available information, differs across securities. They suggest that firms about which little (much) is known are associated with high (low) levels of divergence of investor opinion. Ordinary least squares computation of beta does not account for these differences. Empirical examinations of expected returns based on the CAPM typically rely upon a linear relationship of the form

$$E(R_j) = R_f + \beta(I^*)(R_m - R_f). \qquad (3.3)$$

where R_j, R_m, and R_f are the returns on security j, the market, and the risk-free asset respectively.

However, if investors determine a security's risk by incorporating information other than historical returns, the actual return is

$$R_{A_j} = R_f + \beta(I)(R_m - R_f) + \varepsilon_j. \qquad (3.4)$$

where ε_j is an error term with $E(\varepsilon_j)=0$.

In Figure 1, the effect of this misspecification of β is shown graphically.

Assume R_f is constant. Beginning with the line determined by I^*, an information set consisting solely of historical rates of return, supplementary information of a vague or ambiguous nature reduces I and results in increased divergence of investor opinion. This causes the linear function to rotate upward to some level between the lines determined by $\beta(I^*)$ and $\beta(I_{MIN})$. If supplementary information is specific and relevant, I is increased, investors can better specify the appropriate measure of risk, and divergence of opinion relating to future returns is reduced. In this case, the function pivots downward to a level between the lines determined by $\beta(I^*)$ and $\beta(I_{MAX})$. Excess returns (XR) generated using $\beta(I^*)$ have the following properties

$$XR = R_A - E(R) \quad (3.5)$$

$$E(XR) = (R_f + \beta(I)(R_m-R_f))-(R_f + \beta(I^*)(R_m-R_f)) \quad (3.6)$$

$$E(XR) = (\beta(I) - \beta(I^*))(R_m-R_f). \quad (3.7)$$

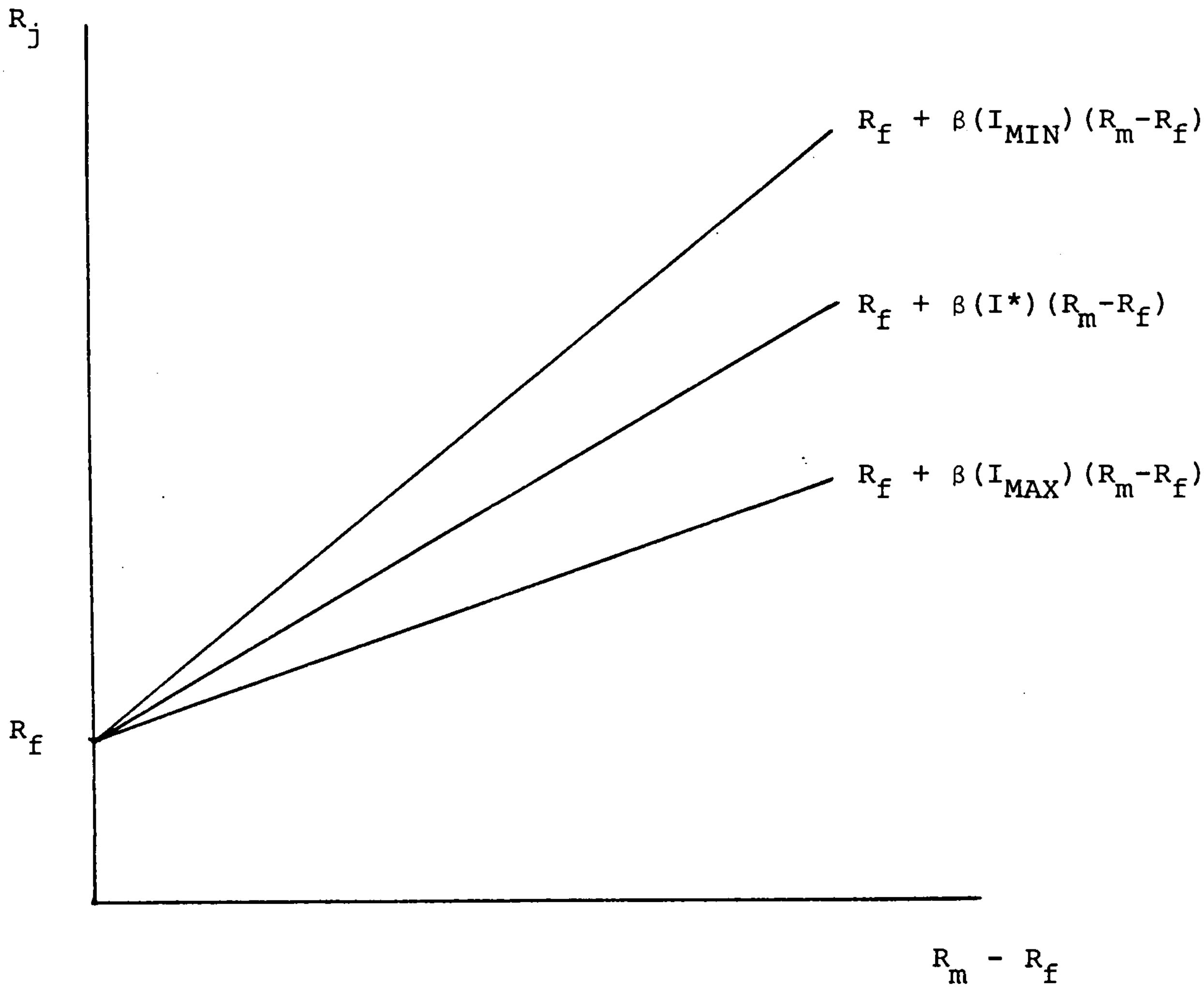

Figure 1: The Effect of an Information Specific Beta

A positive excess return (XR) generated with $\beta(I^*)$ actually represents the higher level of compensation required by investors who believe the true risk is indicated by an information set inferior to I^*. Conversely, a negative excess return generated with $\beta(I^*)$ is due to the lower compensation required by investors who perceive the true risk, $\beta(I)$, to be less than $\beta(I^*)$. As shown in Figure 2, excess returns generated by $\beta(I^*)$ are inversely related to the true level of information,

$$\partial XR/\partial I < 0. \quad (3.8)$$

Several studies have examined the relationship between the level of information and excess returns derived solely from historical rates of return. Barry and Brown (1984b) found a significant negative relationship between the period of time a security has been listed on the New York Stock Exchange and the monthly excess returns generated by that security. Neustel (1984) produced similar results and was also able to establish an inverse relationship between the number of security analysts following a security and its excess returns.

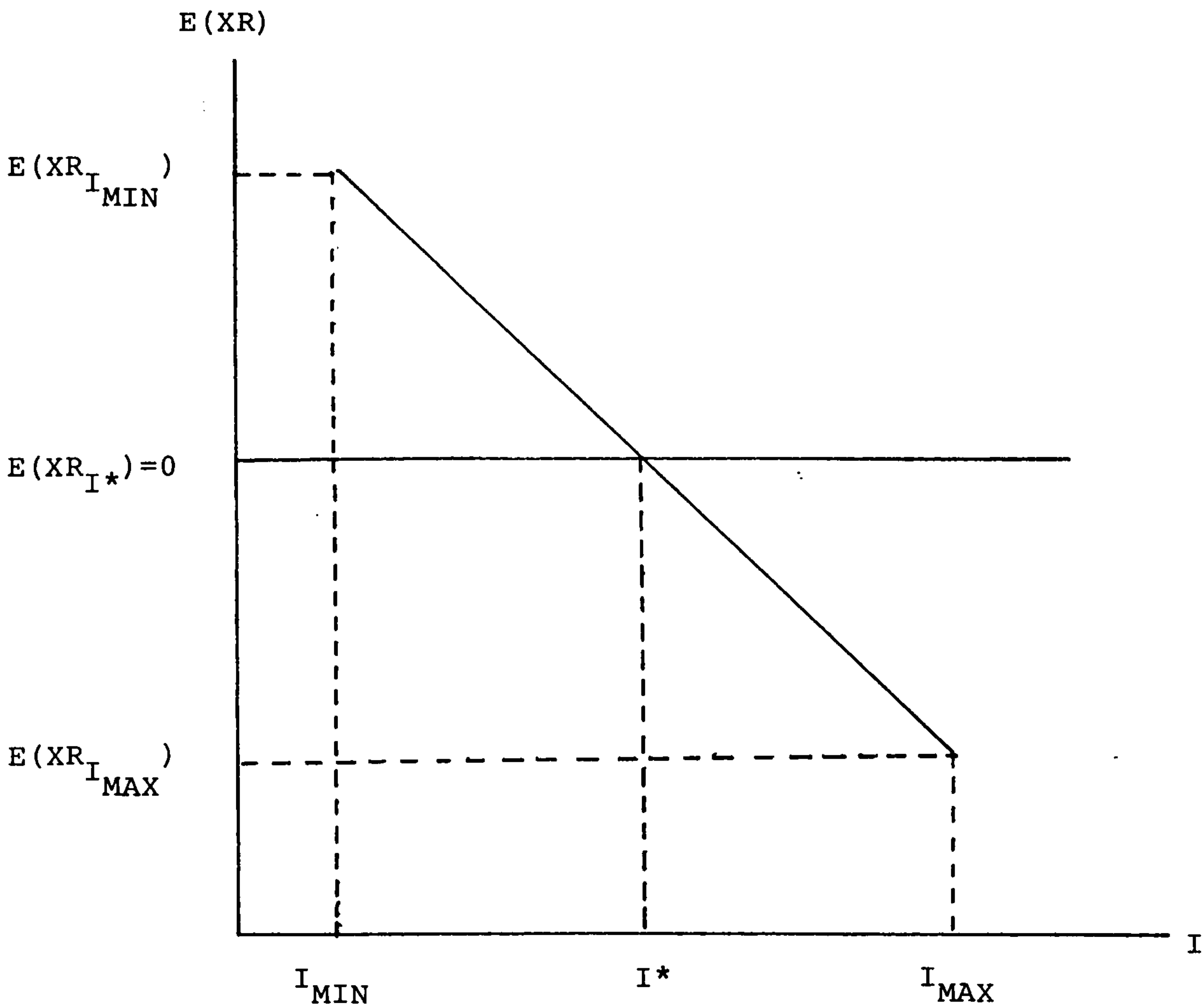

Figure 2: Bias in XR Due to Differential Information

These studies lend support to the relationship between information and risk described here and in Barry and Brown (1984a). Each of these examinations limits the description of the level of information to a specific quantitative measure (i.e., period of listing, number of analysts). It is possible that these measures do not exploit other relevant aspects of the information set. Therefore, while my primary interest is the relationship between information, divergence of opinion, and risk, it is possible that other measures provided by consensus earnings forecast services such as the change in the mean earnings forecast, improve the level of information or enhance the accuracy of any single proxy for differential information directly.

Barry and Brown (1984) argue that if divergence of opinion across investors is measured by the variance of their forecasts of returns, then divergence of opinion is a monotonically decreasing function of information. In other words, in the absence of significant, relevant information, there will be a high degree of disagreement among investors. If a large amount of important information is available, then the level of divergence of investor opinion (DO) will be low. Stated functionally:

$$DO = g(I), \quad (3.9)$$

Since g is monotonically decreasing in I, its inverse[8] exists over the interval from I_{MIN} to I_{MAX}

$$I = g^{-1}(DO), \quad \text{where} \qquad (3.10)$$

$$\partial I/\partial DO < 0. \qquad (3.11)$$

Hence, excess returns will tend to be positive for low information/high divergence of opinion securities and negative in the reverse situation. If divergence of opinion is a true proxy for the qualitative and quantitative attributes of available information, then

$$XR = I(DO), \text{ and,} \qquad (3.12)$$

$$\partial XR/\partial DO = (\partial XR/\partial I)(\partial I/\partial DO). \qquad (3.13)$$

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[8] Grossman and Stiglitz (1980) propose this inverse relationship given costly information. See Chapter II.

The primary hypothesis (H1) is thus complete in functional form by recognizing that $\partial XR/\partial DO > 0$.

Three studies to date examine this relationship. Cragg and Malkiel (1984) find a strong, positive relationship between returns and the variance of analysts' long-term growth rates. Peterson and Peterson (1982) find a positive relationship between annual returns and annual changes in divergence of opinion. Neustel (1984) examined the relationship between divergence of opinion and excess returns on a monthly basis but was unable to support the relationship.

3.4 THE VALUE OF PUBLISHED DIVERGENCE OF OPINION MEASURES (H2)

H1 questions the theoretical relationship between information, divergence of opinion, and risk. If security prices adjust rapidly to new information, then the reporting of changes in the distribution of analysts' forecasts of earnings may be as timely as the box scores of yesterday's baseball games. For consensus analyst forecast services to have value, the process of summarizing analysts' opinions must be an information creating activity. Thus, my second hypothesis:

(H2) New and relevant information is contained in published divergence of opinion measures.

If a security's excess returns are measured with respect to the expected returns generated by (3.3), and the true level of information at time 0 is $I_0 < I^*$, then

$$XR(I_0) = (\beta(I_0) - \beta(I^*))(R_m - R_f) > 0. \quad (3.14)$$

At time 1, new information (ΔI) arrives to shift the measure of information to I_1; $I_0 < I_1 < I^*$, then

$$XR(I_1) = (\beta(I_1) - \beta(I^*))(R_m - R_f) > 0. \quad (3.15)$$

The change in excess returns generated before and after the change in I is

$$\Delta XR = XR(I_1) - XR(I_0) = (\beta(I_1) - \beta(I_0))(R_m - R_f) < 0. \quad (3.16)$$

If the new information is quickly incorporated into prices, then the shift in expected and excess returns should occur upon release of ΔI. Likewise, divergence of opinion should shift when ΔI is disclosed. Thus, the subsequent publication of new divergence of opinion measures will not affect security prices. The published measure is old news.

But this is information that many investors are paying for! If this (or any other) aspect of the consensus analyst forecast service represents useful information, it must clarify ΔI, or reveal ΔI for the first time to a portion of the market. If newly published divergence of opinion measures are themselves new information, then the relationship expressed in (3.16) applies and excess returns should adjust accordingly.

Evidence of a prior adjustment to revision of the mean earnings forecast is provided by Elton, Gruber, and Gultekin (1981). These authors were unable to formulate a successful trading strategy based upon monthly revisions of analysts' published estimates of earnings growth. However, excess returns were revealed when the revised estimates were assumed available one month prior to their publication (i.e., the consensus opinion is already reflected in market prices at the time of publication).

If the mean earnings forecast from consensus earnings forecast services is of no value to subscribers, then why subscribe? Perhaps there is information in other parameters of the distribution of earnings forecasts, namely divergence from the mean. Individual analysts' forecasts are typically acted upon by individual clients or employers. This results in price adjustments prior to the publication of consensus information. Yet, the degree of divergence of opinion among analysts is not known until publication of consensus information.

Even if divergence of opinion is well estimated by individual analysts and investors prior to publication, there is still the possibility of a "second-hand" information effect. In a study of securities recommended by analysts in the "Heard on the Street" column in the Wall Street Journal, Lloyd-Davies and Canes (1978) found evidence that the market also reacts to "second-hand" information. So it is also possible that prices are affected by divergence of opinion as it changes and again as such changes are confirmed or clarified via publication.

3.5 OUTLINE OF EMPIRICAL TESTS

My tests of the relationship between divergence of opinion and excess returns (H1) require a method of relating an observed divergence of opinion measure with a specific interval of time. Once this is achieved, the relationship between excess returns and divergence of opinion is examined using various statistical procedures.

From equation (3.12), I estimate the following linear statistical equation

$$XR_{tm} = A + B(DO_m) + \varepsilon_{tm} , \quad (3.17)$$

where the OLS derived estimate of B using an excess return during time period t for month m, is expected to be positive. Proxies for DO are described later in this chapter.

A similar statistical equation

$$R_{tm} = A + B(DO_m) + \varepsilon_{tm} , \quad (3.18)$$

where R_{tm} represents the unadjusted return during time period t for month m, is also examined. If the risk associated with divergence of opinion is accounted for in the premium provided by the CAPM, unadjusted returns may be positively related to divergence of opinion even though excess returns are not. Hence, I again expect the estimate of B to be positive.

It is possible that these relationships are not strongly linear, but are monotonic and positive. Therefore, comparisons of mean excess returns and actual returns are undertaken using analysis of variance (ANOVA) and Duncan's multiple range test where appropriate.

Next, market reaction to the publication of divergence of opinion measures (H2) is examined. Careful scrutiny of the association of excess returns before and after publication of new measures to revisions in the measures themselves will disclose any common pattern of price adjustment specifically associated with publication revisions of divergence of opinion. Market reaction to revisions in the mean earnings forecast are also examined.

3.6 MEASUREMENT OF EXCESS RETURNS AND DAILY RETURNS

Excess returns are generated using the Scholes-Williams beta technique (Scholes, Williams; 1977). Securities are ranked by their Scholes-Williams betas. Next, this statistic is used to assign the security to one of ten "market portfolios". The excess rate of return provides an adjustment for ex-post variability in the security's return and is computed for security i during time period t as

$$XR_{it} = R_{it} - R_{pt} \quad (3.19)$$

where R_{it} and R_{pt} are the respective returns on security i and its related market portfolio for time t.

Cumulative excess returns are computed as

$$CXR_{(t_1,t_2)} = \sum_t XR_t \quad \text{for } t = t_1 \text{ to } t_2.$$

and are referred to hereafter as XR. The beginning and ending points of the accumulation of excess returns (t_1 and t_2) vary with individual tests.

3.7 MEASUREMENT OF DIVERGENCE OF OPINION

I assume that individual investors perceive different levels of risk on an ex-ante basis. Specifically, I assume that the level of available information differs across securities, even if such securities possess identical estimates of sensitivity to market-wide factors. Hence, "low information" (high estimation risk) securities are perceived as more risky than "high information" (low estimation risk) securities.

I measure divergence of opinion with data similar to that employed by Cragg and Malkiel. Given the distribution of earnings forecasts for an individual firm, on a particular date, proxies for divergence of opinion are defined as:

$CV1_m$ = standard deviation of earnings estimates divided by the mean of all estimates for the current fiscal year as of month m,

$SPREAD1_m$ = difference between the high earnings forecast and the low earnings forecast in month m divided by the mean of all estimates,

An increase (decrease) in these measures represents an increase (decrease) in divergence of opinion. The use of mean based measures adjusts for both magnitude and variation in the consensus forecast. The measures can be interpreted and compared on a per dollar of earnings per share basis.

These measures are also calculated and analyzed using information concerning the subsequent fiscal year i.e., CV2, SPREAD2.

3.8 MEASUREMENT OF OTHER DISTRIBUTIONAL PARAMETERS

As previously mentioned, it is possible that a shift in divergence of opinion matters more to investors than the absolute level of divergence of opinion. Changes in divergence of opinion are measured by the percentage change in the standard deviation of analysts' forecasts from one month to the next,

$$REVSD_m = (STD_m - STD_{m-1})/STD_{m-1}.$$

The absolute mean of the distribution of earnings forecasts is not of interest in this study. However, shifts in the mean earnings forecast over time can give a useful indication of the content of new information. The direction of a revision in the mean earnings forecast for an individual firm may signal improved or diminished prospects for the future. Thus, the percentage change in the mean earnings forecast,

$$REVEPS_m = (MEAN_m - MEAN_{m-1})/MEAN_{m-1} ,$$

is used as a good news/bad news proxy.

3.9 TESTS OF H1

I now discuss the method of matching particular divergence of opinion measures with specific periods of time. This discussion is followed by an outline of statistical techniques used to test H1.

If individual analysts generate forecasts of earnings per share at various times during the calendar month, and available information changes as well, then the measures of divergence of opinion will contain a component reflecting the differing information sets that prevail as the month progresses in addition to the divergence of opinion that would be generated by a static information set. To minimize this information disparity, only consecutive monthly observations with (i) the same number of analysts, (ii) identical divergence of opinion measures, and (iii) the same mean forecast enter the sample. That is, if the distribution of forecasts has not changed from one month to the next, then available information is constant during the period between the publication of these measures.

Simple linear models of the form:

$$XR = A + B(CV) + \varepsilon \qquad (3.20)$$

$$XR = A + B(SPREAD) + \varepsilon \quad (3.21)$$

are estimated using cumulative excess returns of 5, 10, and 15 trading days and beginning on the release date of the initial consensus earnings forecast. The divergence of opinion measures of CV and SPREAD have been defined elsewhere in this chapter.

Observations are pooled by calendar month across years resulting in a total of twelve regressions for each divergence of opinion proxy examined. The number of regressions to be run is increased significantly using this construct but the problems of comparing divergence of opinion measures from month to month is avoided.[9] If H1 is correct, the estimates of B from all such regressions are expected to be positive.

In the absence of a significant, or well-defined linear relationship, mean excess returns are grouped by divergence of opinion measures and ANOVA and Duncan's multiple range tests are undertaken. The analysis is repeated in its entirety using unadjusted rates of return.

[9] See footnote 6.

3.10 EMPIRICAL TESTS OF H2

Regardless of H1, investors may find useful information in divergence of opinion revisions. It is also possible that such revisions are important only when coupled with a particular shift in the mean forecast (REVEPS). For example, investors may be concerned about movement in divergence of opinion coupled with a large increase in the mean earnings forecast.

Shifts in the mean and standard deviation of forecasts are initially examined by estimation of the following equations:

$$XR = A + B(REVSD) + \varepsilon \quad (3.22)$$

$$XR = A' + B'(REVSD) + C'(REVEPS) + \varepsilon \quad (3.23)$$

The expected signs of B and B' are positive since this is an extension of the relationship implied in H1. If the mean earnings forecast tends to rise upon the arrival of good news and fall on the arrival of bad news, then C' should be positive.

Two major differences exist between the observations used for these tests and those used to examine H1 directly. First, the sample must be redefined to include all observations for which REVSD and REVEPS can be calculated.[10] This expands the number of observations greatly from the previous tests of H1. Second, the periods for accumulation of excess returns must be changed to examine the significance of the proposed relationships both before and after the publication of revised consensus estimates.

An estimate of B, B', or C' which differs significantly from zero for a model using excess returns generated prior to publication suggests that an adjustment has already taken place. Although such an adjustment is related to revisions in the consensus forecast, it represents price movement that can not be exploited using the published consensus figures. If these same coefficients are significantly different from zero for a model using post-publication excess returns, and if these coefficients have the hypothesized signs, then there is evidence in support of H2.

[10] The number of analysts providing forecasts must also remain constant over the period of revision for inclusion in this sample.

3.11 DATA

Information concerning the distribution of analysts' earnings forecasts is published by Institutional Brokers Estimate Service (IBES). Subscribers to this service receive monthly updates of these distributional parameters. Therefore, IBES data is well suited for monitoring divergence of opinion and is used throughout this study. An individual IBES observation contains descriptive data concerning the distribution of earnings forecasts for a given firm during a given month.

Scholes-Williams daily excess returns are obtained from the CRSP Daily Excess Return File. Actual daily returns are found on the CRSP Daily Return File. These files provide daily actual and excess returns described in section 3.6 for all securities listed on the New York or American stock exchanges.

Analysts' earnings forecasts from January 1976 through June 1984 are used for most of the study.

Observations must meet the following criteria for inclusion in the sample:

i) The firm has a fiscal year ending in December.

ii) The most recent price quoted in the IBES report is the closing price two days prior to the release of the monthly report. This is the last closing price prior to production of the monthly update, and it permits a standard period of active trading for each included security.

iii) At least 3 analysts provide earnings forecasts in a given month. According to Elton, Gruber, and Gultekin (1984), this reduces the influence of "idiosyncrasies of one or two analysts".

iv) The mean earnings forecast is positive. Omission of negative mean earnings forecasts avoids the possible ambiguity in some measures when the mean forecast changes sign from one month to the next.

v) Excess returns are available on CRSP for the period of interest.

vi) Excess returns are computed using historical data only. If a security has traded in less than half of the trading days of the previous calendar year, returns from the current year are used to compute its Scholes-Williams beta. These firms are deleted from the sample.

vii) For tests of H1, the published divergence of opinion measure is identical to the measure published in the previous month. This validates the assumption that all analysts have generated earnings forecasts for the current month using the same information set.

Chapter IV

RESULTS OF TESTS

4.1 OVERVIEW OF CHAPTER

Results reported here do not support H1. There is no support when equations (3.17) and (3.18) are estimated by ordinary least squares regression and there is no support when excess and actual returns are grouped into quintiles by divergence of opinion measures and the means (and ranked means) are compared using ANOVA and Duncan techniques.

Results are reported in the following sequence: OLS estimates, Analysis of Variance, and Duncan's test. Divergence of opinion is measured by CV1, SPREAD1, CV2, and SPREAD2 as defined in Chapter III. All combinations of these measures and tests are reported for analysis of excess returns. Analysis of actual returns is limited to ANOVA and Duncan techniques.

Additional tests examine the relationship between excess returns and revisions in the mean and standard deviation of analysts' forecasts of earnings per share. The results of these tests fail to support H1 or H2. Excess returns are, however, significantly associated with the REVEPS variable for periods both before and after the publication of revisions.

4.2 IMPACT OF SCREENS ON NUMBER OF OBSERVATIONS

The IBES Historical Tape contains 215,550 observations. I first standardize the time remaining in the fiscal and calendar year across all firms by including only the 116,089 observations with fiscal years ending in December. Next, I require that a firm trade two days prior to the publication of an IBES monthly report reducing the sample to 103,891 observations. IBES requires a minimum of two days to produce their update and have it in the hands of their subscribers.

Elton, Gruber, and Gultekin (1984) suggest that only observations comprising estimates from three or more analysts be included. The "idiosyncrasies of one or two analysts" are avoided, but at the expense of reducing the sample to 70,202 observations. Furthermore, Elton, Gruber, and Gultekin also suggest that only observations with positive mean earnings per share estimates be retained in order to avoid ambiguity in ranking by CV, SPREAD, or REVSD measures.[11] 68,567 observations remain after applying these screens to the divergence of opinion data.

[11] It is possible that an negative CV measure actually represents higher divergence of opinion than many positive measures. Taking the absolute value of the CV measure would alleviate this problem, but would impose the assumption that a given value of CV, positive or negative, would affect excess returns similarly.

To assure the availability of excess returns, firms must also appear on the CRSP return and excess return files for the period of interest. Furthermore, since Barry and Brown (1984a) argue that misspecification exists in the ex-post beta, only those excess returns from CRSP derived entirely from ex-post returns are included. The final sample contains 54,503 observations.[12]

4.3 STABLE DIVERGENCE OF OPINION SAMPLE

Each of these observations represents a period of time during which the distribution of earnings forecasts is stable. An observation is included in the stable divergence of opinion sample if (1) the mean forecast, (2) the standard deviation of forecasts, and (3) the number of analysts reporting remain unchanged between the current monthly observation and the subsequent observation for the same firm. Therefore, the period of time bounded by the two consecutive IBES report dates, and excess or actual returns generated during that period, can be associated with a specific level of divergence of opinion. The resulting data set contains 7494 monthly observations pertaining to the

[12] If a security has traded on less than half of the trading days in the previous year, CRSP includes all returns from the current calendar year in its computation of excess returns.

current fiscal year (i.e., CV1 and SPREAD1) and 4263 observations pertaining to the subsequent fiscal year (i.e., CV2 and SPREAD2). A statistical profile of the divergence of opinion measures in this sample is provided in Table 1.

4.4 RESULTS OF TESTS OF H1 USING CV1 AND SPREAD1 VIA OLS ESTIMATION -- EXCESS RETURNS

The estimated parameters of equations (3.20) and (3.21) with CV1 and SPREAD1 respectively, as the independent variable are reported in Tables 2 and 3. The dependent variable, excess return, is a cumulative return beginning on the date of publication of the divergence of opinion measure and accumulated for either 5, 10, or 15 days (denoted XR5, XR10, and XR15). The longest period of accumulation, 15 days, covers nearly the entire period until the subsequent, identical divergence of opinion measure is published.

The results of these regressions include two interesting findings. First, there is virtually no support for H1. The CV1 coefficient is significant at the 5% level for at least one XR period in May, August, October, November, and December. However, the sign on the coefficient is negative in October. In fact, of the 36 regressions, only 14 estimated coefficients are positive.

TABLE 1

SUMMARY STATISTICS -- STABLE DIVERGENCE OF OPINION SAMPLE

(Standard Deviation of Each Variable is Below the Mean)

MONTH	N	CV1	SPREAD1	N	CV2	SPREAD2
JAN	621	0.06190 (0.17278)	0.15276 (0.35553)	550	0.11838 (0.44366)	0.28510 (1.01460)
FEB	435	0.07141 (0.18177)	0.17458 (0.38636)	367	0.11757 (0.48876)	0.27342 (0.97553)
MAR	465	0.07972 (0.17692)	0.19579 (0.35326)	41	0.16586 (0.15621)	0.36704 (0.33467)
APR	641	0.12667 (0.84285)	0.30313 (1.78459)	71	0.12498 (0.16825)	0.25388 (0.33193)
MAY	587	0.09524 (0.77497)	0.22540 (1.52884)	138	0.09510 (0.09843)	0.20088 (0.20728)
JUN	573	0.09433 (0.28390)	0.22370 (0.59029)	121	0.11097 (0.12963)	0.25325 (0.32297)
JUL	758	0.10785 (0.41311)	0.27273 (1.06360)	276	0.10048 (0.14334)	0.23385 (0.29671)
AUG	566	0.06604 (0.14366)	0.15875 (0.29437)	256	0.08545 (0.07907)	0.19867 (0.17220)
SEP	770	0.12475 (0.91773)	0.28675 (1.79850)	459	0.09560 (0.10411)	0.23881 (0.26170)
OCT	901	0.07814 (0.48553)	0.19655 (1.02420)	680	0.09007 (0.17573)	0.22101 (0.36740)
NOV	521	0.10059 (0.63236)	0.22900 (1.22239)	568	0.11286 (0.41420)	0.28900 (1.17863)
DEC	656	0.08068 (0.46370)	0.19451 (0.95730)	736	0.10643 (0.26862)	0.26015 (0.61416)

TABLE 2

XR = A + B(CV1) -- OBSERVATIONS POOLED ACROSS YEARS

MONTH	XR	EST. OF B	PROB>|T|	EST. OF A	PROB>|T|	RSQUARE
Jan	5	-.011657	.2956	-.006405	.0034	.0026
	10	-.014982	.3444	-.011716	.0002	.0021
	15	-.010951	.5693	-.016943	.0001	.0008
Feb	5	-.003871	.7062	-.003340	.0889	.0003
	10	.002655	.8487	-.007928	.0035	.0001
	15	-.022129	.1287	-.004409	.1193	.0050
Mar	5	.000622	.7207	-.000949	.5225	.0002
	10	-.001482	.5222	-.000411	.8351	.0007
	15	-.001047	.6958	-.000339	.8818	.0002
Apr	5	-.003218	.0960	-.000449	.7656	.0048
	10	-.003824	.1316	-.001762	.3728	.0039
	15	-.005681	.0757	-.003077	.2173	.0054
May	5	-.004604	.3506	-.003844	.0094	.0015
	10	.007572	.3228	-.003737	.1032	.0017
	15	.019190	.0395	-.007237	.0095	.0075
Jun	5	-.001810	.5898	-.002784	.0523	.0004
	10	.000319	.9423	-.004171	.0272	.0000
	15	-.002685	.6133	-.005269	.0204	.0003
Jul	5	-.020389	.0755	-.000902	.6184	.0057
	10	-.014088	.3536	-.003519	.1430	.0016
	15	-.005121	.7715	-.002481	.3737	.0002
Aug	5	.002635	.0802	-.004866	.0005	.0040
	10	.006285	.0020	-.007747	.0001	.0125
	15	.005140	.0444	-.009418	.0001	.0053
Sep	5	-.002210	.3537	.000012	.9920	.0010
	10	-.003465	.2558	-.000322	.8297	.0015
	15	-.003167	.3985	-.001081	.5579	.0008
Oct	5	-.006077	.0280	-.002032	.2500	.0095
	10	.000721	.8478	-.003802	.1142	.0001
	15	-.002169	.6432	-.006153	.0403	.0004
Nov	5	.007648	.0244	-.006033	.0002	.0081
	10	.002741	.5623	-.009660	.0001	.0005
	15	.002144	.6881	-.008843	.0005	.0003
Dec	5	.000832	.9193	-.002590	.0865	.0000
	10	-.000301	.9777	-.014729	.0001	.0000
	15	.034641	.0118	-.024784	.0001	.0105

TABLE 3

XR = A + B(SPREAD1) -- OBSERVATIONS POOLED ACROSS YEARS

MONTH	XR	EST. OF B	PROB>|T|	EST. OF A	PROB>|T|	RSQUARE
Jan	5	-.003980	.4480	-.006543	.0034	.0014
	10	-.003694	.6204	-.012141	.0001	.0006
	15	-.002625	.7719	-.017267	.0001	.0002
Feb	5	-.000193	.9701	-.003670	.0781	.0000
	10	.002652	.7037	-.008236	.0036	.0003
	15	-.009173	.2088	-.004377	.1381	.0035
Mar	5	.000156	.8493	-.000917	.5377	.0001
	10	-.000759	.4876	-.000368	.8523	.0008
	15	-.000546	.6661	-.000307	.8935	.0003
Apr	5	-.001595	.1036	-.000396	.7932	.0046
	10	-.001875	.1448	-.001704	.3904	.0037
	15	-.002764	.0883	-.002995	.2314	.0050
May	5	-.001255	.5969	-.003998	.0078	.0005
	10	.004692	.2026	-.004073	.0800	.0029
	15	.009554	.0331	-.007565	.0076	.0080
Jun	5	-.000463	.7224	-.002853	.0466	.0002
	10	.000448	.7938	-.004259	.0239	.0001
	15	-.001040	.6142	-.005274	.0202	.0003
Jul	5	-.010112	.0734	-.000657	.7252	.0058
	10	-.006410	.3871	-.003432	.1665	.0014
	15	-.003307	.7008	-.002294	.4255	.0003
Aug	5	.001379	.0728	-.004933	.0004	.0042
	10	.003269	.0016	-.007900	.0001	.0130
	15	.002718	.0372	-.009557	.0001	.0057
Sep	5	-.001197	.2893	.000074	.9496	.0013
	10	-.001884	.1924	-.000223	.8825	.0019
	15	-.001577	.3751	-.001018	.5829	.0009
Oct	5	-.003060	.0325	-.001942	.2739	.0090
	10	.000330	.8650	-.003805	.1156	.0001
	15	-.001285	.5958	-.006077	.0438	.0006
Nov	5	.003730	.0234	-.006141	.0001	.0082
	10	.001258	.5829	-.009684	.0001	.0005
	15	.001034	.6892	-.008871	.0005	.0003
Dec	5	-.000820	.8372	-.002413	.1191	.0001
	10	-.001733	.7400	-.014482	.0001	.0002
	15	.012385	.0641	-.024533	.0001	.0057

A more careful examination of the theory leading to H1 suggests that since a high (low) level of divergence of opinion is consistently associated with positive (negative) excess returns, the expected sign of each individual daily excess return should be the same. Hence, any noise in the series of daily excess returns should dissipate as the period of accumulation is lengthened. The longest period of accumulation, XR15, is significantly associated with CV1 in May, August, and December. Only the regression run on XR5 is significant in November.

The second interesting feature of this pair of regressions is the similarity of the results across months for CV1 and SPREAD1. The only dissimilarity is the lack of a significant coefficient for SPREAD1 in December. The signs of individual regression coefficients matched in 35 of 36 instances (14 positive, 22 negative for CV1; 13 positive, 23 negative for SPREAD1) suggesting that the independent variables explain the same variation in the excess returns and are redundant.

4.4.1 Additional Tests Omitting Firms with Low EPS

It is possible that these weak results are caused by instability of divergence of opinion as measured by CV1 for firms with very small earnings per share. Elton, Gruber, and Gultekin (1984) adjusted for this problem in their study of forecast accuracy by excluding those firms with earnings per share less than $0.20. They argued that deletion of such observations provided a more reliable sample from which distributional parameters could be examined. Following their suggestion reduces the sample to 7309 observations and produces the parameter estimates in Table 4.

Significant coefficients occur in April, September, and December, but only the coefficients in April and December are positive suggesting that no additional variation in excess returns is explained by the exclusion of firms with small mean earnings forecasts. In fact, the loss of significant parameter estimates in some months confounds any significance in the overall relationship.

4.4.2 Additional Tests -- Individual Years

It is possible that a linear relationship exists between excess returns and divergence of opinion but that the stability and strength of the relationship changes from year to year. I estimate the slope coefficient for each month of each year. If the relationship is significant for any month from January 1976 through November 1983, it will be captured by this analysis. These results are reported in Tables 5 through 12.

TABLE 4

XR = A + B(CV1) -- OBSERVATIONS POOLED ACROSS YEARS (MEAN EPS FORECAST >.20)

MONTH	XR	EST. OF B	PROB>|T|	EST. OF A	PROB>|T|	RSQUARE
Jan	5	-.003929	.8841	-.007406	.0032	.0001
	10	.027862	.4604	-.014492	.0001	.0013
	15	.058184	.2080	-.021166	.0001	.0039
Feb	5	-.010258	.4760	-.002964	.1607	.0011
	10	-.020962	.2816	-.006320	.0272	.0025
	15	-.017872	.3810	-.004699	.1167	.0017
Mar	5	-.016409	.1141	.000127	.9394	.0040
	10	-.015485	.2542	.000427	.8485	.0021
	15	-.008944	.5704	.000083	.9746	.0005
Apr	5	.020658	.2499	-.001952	.2988	.0023
	10	.063155	.0072	-.005979	.0150	.0124
	15	.078134	.0083	-.008354	.0070	.0119
May	5	.007932	.3498	-.004845	.0022	.0015
	10	.004003	.7618	-.003452	.1588	.0002
	15	-.003588	.8226	-.005418	.0682	.0001
Jun	5	-.003934	.3067	-.002537	.0777	.0014
	10	-.000679	.8937	-.004105	.0308	.0000
	15	-.003271	.5924	-.005311	.0201	.0004
Jul	5	-.022379	.1555	-.000723	.7039	.0037
	10	-.028254	.1765	-.002688	.2870	.0033
	15	-.002683	.9119	-.002507	.3920	.0000
Aug	5	-.026700	.0613	-.003192	.0557	.0047
	10	-.035341	.0674	-.004819	.0331	.0044
	15	-.012414	.6109	-.008120	.0045	.0003
Sep	5	-.015245	.1561	.000762	.5656	.0023
	10	-.026909	.0495	-.000943	.5766	.0044
	15	-.047662	.0047	-.001435	.4893	.0091
Oct	5	.003090	.8063	-.002517	.1895	.0001
	10	.011495	.5023	-.004117	.1146	.0009
	15	-.005490	.7974	-.006342	.0517	.0001
Nov	5	.026066	.0796	-.007020	.0001	.0049
	10	.018203	.3758	-.010371	.0001	.0013
	15	.029211	.2130	-.010725	.0002	.0025
Dec	5	-.018108	.1595	-.001837	.2418	.0033
	10	.008172	.6312	-.015229	.0001	.0004
	15	.049277	.0212	-.025505	.0001	.0089

TABLE 5

XR = A + B(CV1) -- FOR 1976

MONTH	XR	N	EST. OF B	PROB>|T|	EST. OF A	PROB>|T|	RSQUARE
JAN	5	42	0.03493	0.5246	-0.025801	0.0089	0.0102
JAN	10	42	-0.01125	0.8893	-0.033374	0.0206	0.0005
JAN	15	42	0.23039	0.0064	-0.058436	0.0001	0.1717
FEB	5	65	0.10994	0.5068	-0.022197	0.0256	0.0070
FEB	10	65	0.42316	0.0265	-0.058390	0.0000	0.0757
FEB	15	65	0.36048	0.0819	-0.053734	0.0000	0.0473
MAR	5	45	0.04170	0.6193	0.004916	0.5220	0.0058
MAR	10	45	-0.00717	0.9382	0.011737	0.1697	0.0001
MAR	15	45	-0.00281	0.9803	0.011655	0.2648	0.0000
APR	5	64	0.12320	0.1128	-0.004995	0.3932	0.0401
APR	10	64	0.08162	0.4103	-0.002963	0.6929	0.0110
APR	15	64	0.20432	0.1110	-0.003462	0.7193	0.0405
MAY	5	45	0.02508	0.7612	0.004031	0.5365	0.0022
MAY	10	45	0.07333	0.5501	0.009910	0.3080	0.0084
MAY	15	45	-0.14704	0.2828	0.022739	0.0387	0.0268
JUN	5	26	-0.14395	0.2846	0.017854	0.1027	0.0475
JUN	10	26	0.16988	0.2966	-0.001197	0.9259	0.0453
JUN	15	26	0.30346	0.1474	-0.017216	0.2991	0.0854
JUL	5	78	0.00557	0.9434	-0.003028	0.6346	0.0001
JUL	10	78	-0.12352	0.2217	0.006080	0.4576	0.0196
JUL	15	78	-0.11785	0.2588	0.009711	0.2521	0.0168
AUG	5	46	-0.03400	0.6681	0.004079	0.4899	0.0042
AUG	10	46	-0.07333	0.4730	-0.003497	0.6448	0.0118
AUG	15	46	-0.11892	0.3770	0.001748	0.8608	0.0178
SEP	5	90	-0.06888	0.2204	0.001985	0.6338	0.0170
SEP	10	90	-0.14763	0.0341	0.004298	0.4020	0.0500
SEP	15	90	-0.20336	0.0122	0.005470	0.3573	0.0693
OCT	5	76	-0.03196	0.6765	-0.000407	0.9359	0.0024
OCT	10	76	-0.03150	0.8031	-0.004997	0.5500	0.0008
OCT	15	76	0.09608	0.5795	-0.013134	0.2533	0.0042
NOV	5	17	-0.12786	0.7762	0.012460	0.5267	0.0056
NOV	10	17	0.02223	0.9647	0.004641	0.8321	0.0001
NOV	15	17	0.31592	0.4967	-0.005693	0.7770	0.0313
DEC	5	34	-0.06916	0.4376	-0.002850	0.7029	0.0189
DEC	10	34	0.14466	0.1610	-0.033318	0.0004	0.0605
DEC	15	34	0.03320	0.8141	-0.042509	0.0010	0.0018

TABLE 6

XR = A + B(CV1) -- FOR 1977

MONTH	XR	N	EST. OF B	PROB>|T|	EST. OF A	PROB>|T|	RSQUARE
JAN	5	48	0.03229	0.7866	-0.007611	0.4872	0.0016
JAN	10	48	-0.03075	0.8065	0.001569	0.8915	0.0013
JAN	15	48	0.06130	0.6853	-0.011817	0.3954	0.0036
FEB	5	90	0.00843	0.8731	-0.003003	0.4746	0.0003
FEB	10	90	0.10346	0.0842	-0.007516	0.1143	0.0335
FEB	15	90	0.08839	0.2108	-0.011885	0.0358	0.0177
MAR	5	41	-0.08634	0.4529	-0.003506	0.5592	0.0145
MAR	10	41	0.18364	0.3135	-0.008020	0.3988	0.0260
MAR	15	41	-0.05364	0.7825	0.008221	0.4199	0.0020
APR	5	80	0.06087	0.0768	-0.002121	0.6136	0.0396
APR	10	80	0.08028	0.0876	-0.004306	0.4539	0.0369
APR	15	80	0.11539	0.0554	-0.008772	0.2339	0.0463
MAY	5	32	-0.11322	0.4780	0.007948	0.3638	0.0169
MAY	10	32	0.02634	0.8908	0.002183	0.8352	0.0006
MAY	15	32	-0.13452	0.6005	-0.003366	0.8103	0.0093
JUN	5	109	0.01615	0.8531	-0.003340	0.4645	0.0003
JUN	10	109	0.07458	0.5291	-0.009946	0.1103	0.0037
JUN	15	109	0.11595	0.4256	-0.016301	0.0338	0.0059
JUL	5	62	-0.00812	0.9311	-0.004445	0.3853	0.0001
JUL	10	62	-0.04434	0.7097	-0.005973	0.3581	0.0023
JUL	15	62	0.05742	0.6760	-0.012754	0.0915	0.0029
AUG	5	27	-0.33423	0.0795	0.011489	0.1584	0.1179
AUG	10	27	-0.26280	0.2763	0.003682	0.7213	0.0472
AUG	15	27	-0.09920	0.7148	-0.011540	0.3294	0.0054
SEP	5	159	-0.05037	0.3227	0.002168	0.4547	0.0062
SEP	10	159	-0.13369	0.0785	0.006453	0.1354	0.0196
SEP	15	159	-0.15632	0.1006	0.002653	0.6233	0.0171
OCT	5	32	-0.05478	0.4285	0.001620	0.7709	0.0210
OCT	10	32	-0.00302	0.9800	-0.013053	0.1858	0.0000
OCT	15	32	0.19332	0.1776	-0.018787	0.1071	0.0597
NOV	5	30	0.20360	0.2726	-0.012420	0.0982	0.0428
NOV	10	30	0.21842	0.4195	-0.024188	0.0309	0.0234
NOV	15	30	0.56947	0.1207	-0.029450	0.0474	0.0838
DEC	5	89	-0.01030	0.8582	0.004404	0.2458	0.0004
DEC	10	90	0.06723	0.4115	-0.006079	0.1342	0.0077
DEC	15	90	0.04013	0.2643	-0.012947	0.0160	0.0141

TABLE 7

XR = A + B(CV1) -- FOR 1978

MONTH	XR	N	EST. OF B	PROB>|T|	EST. OF A	PROB>|T|	RSQUARE
JAN	5	42	0.12962	0.1019	-0.017754	0.0019	0.0655
JAN	10	42	0.23579	0.0614	-0.015910	0.0663	0.0848
JAN	15	42	0.16481	0.1935	-0.022255	0.0131	0.0419
FEB	5	25	0.26849	0.0322	-0.018547	0.0150	0.1843
FEB	10	25	0.12707	0.4622	-0.019325	0.0703	0.0237
FEB	15	25	0.26276	0.1313	-0.026046	0.0164	0.0962
MAR	5	91	0.01691	0.7869	-0.007712	0.1044	0.0008
MAR	10	91	-0.01911	0.8038	-0.012739	0.0301	0.0007
MAR	15	91	-0.07106	0.4179	-0.018002	0.0075	0.0074
APR	5	47	0.23392	0.0029	-0.013156	0.0184	0.1812
APR	10	47	0.35213	0.0026	-0.020926	0.0120	0.1848
APR	15	47	0.25389	0.0780	-0.022420	0.0333	0.0674
MAY	5	68	0.06267	0.1737	-0.012734	0.0056	0.0279
MAY	10	68	0.02899	0.7382	-0.011079	0.1927	0.0017
MAY	15	68	0.12544	0.3083	-0.014077	0.2414	0.0157
JUN	5	9	0.08793	0.6745	-0.005115	0.6690	0.0267
JUN	10	9	-0.11243	0.6897	-0.019079	0.2562	0.0242
JUN	15	9	-0.26622	0.5242	0.012966	0.5856	0.0603
JUL	5	94	-0.03874	0.6425	-0.002643	0.5953	0.0024
JUL	10	94	-0.14507	0.1886	-0.001571	0.8104	0.0187
JUL	15	94	0.15977	0.2403	-0.013543	0.0962	0.0150
AUG	5	99	0.01820	0.8448	-0.016581	0.0105	0.0004
AUG	10	99	-0.22739	0.1082	-0.015136	0.1185	0.0264
AUG	15	99	-0.16837	0.2770	-0.031829	0.0033	0.0122
SEP	5	153	0.07384	0.2365	-0.003194	0.3891	0.0093
SEP	10	153	0.09450	0.2478	-0.004368	0.3690	0.0088
SEP	15	153	0.10012	0.3546	-0.001957	0.7609	0.0057
OCT	5	45	0.03928	0.5691	0.004177	0.5766	0.0076
OCT	10	45	0.02786	0.7726	0.016690	0.1156	0.0020
OCT	15	45	-0.13010	0.2929	0.014440	0.2820	0.0257
NOV	5	117	0.04553	0.4009	-0.005968	0.1222	0.0061
NOV	10	117	-0.04379	0.5371	-0.008608	0.0892	0.0033
NOV	15	117	0.06968	0.3738	-0.011818	0.0351	0.0069
DEC	5	120	0.13184	0.2214	-0.005234	0.2945	0.0126
DEC	10	120	0.00578	0.9653	-0.019275	0.0021	0.0000
DEC	15	120	0.12110	0.4166	-0.028339	0.0001	0.0056

TABLE 8

XR = A + B(CV1) -- FOR 1979

MONTH	XR	N	EST. OF B	PROB>|T|	EST. OF A	PROB>|T|	RSQUARE
JAN	5	65	-0.01870	0.8283	-0.000807	0.8904	0.0008
JAN	10	65	0.06348	0.6108	-0.002907	0.7312	0.0041
JAN	15	65	0.25481	0.0987	-0.010228	0.3256	0.0427
FEB	5	44	-0.18119	0.1219	0.004342	0.5119	0.0560
FEB	10	44	-0.02332	0.8808	-0.001343	0.8800	0.0005
FEB	15	44	-0.05398	0.7229	-0.003466	0.6907	0.0030
MAR	5	55	0.02398	0.8471	-0.002549	0.7395	0.0007
MAR	10	55	0.05050	0.7890	-0.008357	0.4733	0.0014
MAR	15	55	0.05910	0.7193	-0.007445	0.4632	0.0025
APR	5	72	-0.09105	0.1635	0.013112	0.0210	0.0275
APR	10	72	-0.10622	0.2449	0.006313	0.4200	0.0193
APR	15	72	-0.35987	0.0003	0.016725	0.0424	0.1726
MAY	5	97	-0.06612	0.2581	0.001556	0.7463	0.0134
MAY	10	97	-0.04390	0.6245	0.004220	0.5688	0.0025
MAY	15	97	-0.11027	0.3282	0.002390	0.7969	0.0101
JUN	5	94	-0.11207	0.1243	0.009653	0.0951	0.0255
JUN	10	94	-0.09999	0.2946	0.012658	0.0955	0.0119
JUN	15	94	-0.14638	0.1871	0.017119	0.0528	0.0188
JUL	5	42	0.08876	0.6066	-0.001011	0.9128	0.0067
JUL	10	42	-0.15730	0.4741	0.005438	0.6440	0.0129
JUL	15	42	-0.12614	0.6056	0.000914	0.9443	0.0067
AUG	5	104	0.09593	0.2680	-0.006235	0.2569	0.0120
AUG	10	104	0.21483	0.0214	-0.015783	0.0080	0.0508
AUG	15	104	0.16994	0.2958	-0.014060	0.1739	0.0107
SEP	5	157	-0.00147	0.5610	-0.002377	0.3999	0.0022
SEP	10	157	-0.00152	0.6441	-0.009836	0.0083	0.0014
SEP	15	157	-0.00058	0.8764	-0.006019	0.1539	0.0002
OCT	5	73	-0.07097	0.6702	0.005208	0.4037	0.0026
OCT	10	73	0.40512	0.0365	-0.007779	0.2769	0.0602
OCT	15	73	0.37941	0.1328	-0.005151	0.5823	0.0315
NOV	5	96	-0.02734	0.6445	-0.003980	0.3827	0.0023
NOV	10	96	-0.00008	0.9994	-0.001616	0.8244	0.0000
NOV	15	96	0.13771	0.1814	-0.015091	0.0579	0.0189
DEC	5	141	-0.07935	0.1121	-0.004783	0.1470	0.0181
DEC	10	141	-0.06552	0.3671	-0.016813	0.0006	0.0059
DEC	15	141	-0.04132	0.6751	-0.033161	0.0000	0.0013

TABLE 9

XR = A + B(CV1) -- FOR 1980

MONTH	XR	N	EST. OF B	PROB>|T|	EST. OF A	PROB>|T|	RSQUARE
JAN	5	94	0.06768	0.4596	-0.008201	0.1247	0.0060
JAN	10	94	0.13108	0.3586	-0.019964	0.0175	0.0092
JAN	15	94	0.06761	0.7090	-0.028478	0.0079	0.0015
FEB	5	52	-0.00313	0.9786	-0.008209	0.3256	0.0000
FEB	10	52	-0.28179	0.0247	0.008845	0.3126	0.0969
FEB	15	52	-0.28127	0.0718	0.037670	0.0011	0.0634
MAR	5	98	0.02315	0.2883	0.006353	0.1529	0.0117
MAR	10	98	0.00044	0.9886	0.024074	0.0002	0.0000
MAR	15	98	-0.01611	0.6649	0.028627	0.0003	0.0020
APR	5	86	0.00685	0.8903	-0.012058	0.0143	0.0002
APR	10	86	0.14676	0.0277	-0.022700	0.0006	0.0564
APR	15	86	0.16472	0.0961	-0.023454	0.0158	0.0326
MAY	5	68	0.07222	0.1604	-0.005074	0.3113	0.0296
MAY	10	68	0.12473	0.1381	-0.012576	0.1264	0.0330
MAY	15	68	0.04143	0.6539	-0.014001	0.1243	0.0031
JUN	5	110	-0.05373	0.1911	0.002519	0.5721	0.0158
JUN	10	110	0.00518	0.9247	-0.004667	0.4342	0.0001
JUN	15	110	-0.04440	0.5219	-0.005561	0.4611	0.0038
JUL	5	70	0.01877	0.7318	-0.007015	0.2375	0.0017
JUL	10	70	-0.02710	0.7427	-0.013805	0.1245	0.0016
JUL	15	70	0.03306	0.7103	-0.023252	0.0177	0.0020
AUG	5	109	-0.01281	0.4295	-0.010893	0.0020	0.0058
AUG	10	109	-0.00696	0.7274	-0.017418	0.0001	0.0011
AUG	15	109	-0.01710	0.5843	-0.021209	0.0018	0.0028
SEP	5	98	-0.01199	0.4267	-0.005152	0.2476	0.0066
SEP	10	98	-0.03655	0.0321	0.000759	0.8785	0.0470
SEP	15	98	-0.04989	0.0190	-0.005867	0.3435	0.0560
OCT	5	105	0.01287	0.7316	-0.007124	0.1136	0.0011
OCT	10	105	-0.01270	0.8052	-0.005962	0.3328	0.0006
OCT	15	105	-0.06937	0.2237	-0.001650	0.8077	0.0143
NOV	5	101	-0.01642	0.8498	-0.009751	0.1164	0.0004
NOV	10	101	-0.10858	0.3395	-0.005032	0.5334	0.0092
NOV	15	101	-0.22819	0.0717	0.009755	0.2768	0.0324
DEC	5	40	0.03367	0.6467	-0.010856	0.1942	0.0056
DEC	10	40	0.15947	0.1473	-0.021354	0.0868	0.0545
DEC	15	40	0.14751	0.2732	-0.016297	0.2827	0.0315

TABLE 10

XR = A + B(CV1) -- FOR 1981

MONTH	XR	N	EST. OF B	PROB>|T|	EST.OF A	PROB>|T|	RSQUARE
JAN	5	38	-0.18277	0.0345	0.002185	0.7507	0.1183
JAN	10	38	-0.09147	0.4969	-0.004362	0.6922	0.0129
JAN	15	38	-0.05366	0.7583	0.002827	0.8433	0.0027
FEB	5	76	-0.01040	0.5483	0.000894	0.8448	0.0049
FEB	10	76	-0.01734	0.5312	-0.005200	0.4772	0.0053
FEB	15	76	-0.02669	0.3928	-0.011541	0.1633	0.0099
MAR	5	93	-0.00771	0.6886	-0.004703	0.3183	0.0018
MAR	10	93	-0.01676	0.5186	-0.009069	0.1548	0.0046
MAR	15	93	0.03902	0.1767	-0.011522	0.1034	0.0200
APR	5	120	0.00352	0.9593	-0.002942	0.5923	0.0000
APR	10	120	0.05498	0.4944	-0.004480	0.4846	0.0040
APR	15	120	0.09297	0.3495	-0.006291	0.4265	0.0074
MAY	5	77	0.01124	0.5401	-0.014786	0.0016	0.0050
MAY	10	77	0.03297	0.2644	-0.011227	0.1256	0.0166
MAY	15	77	0.03920	0.2458	-0.016785	0.0463	0.0179
JUN	5	170	-0.00432	0.8887	0.000591	0.8700	0.0001
JUN	10	170	0.01395	0.7492	-0.000271	0.9577	0.0006
JUN	15	170	0.06335	0.2152	-0.003492	0.5586	0.0091
JUL	5	82	-0.02848	0.3399	0.004485	0.4277	0.0114
JUL	10	82	-0.00422	0.9056	0.004382	0.5167	0.0002
JUL	15	82	-0.01532	0.7137	0.013535	0.0901	0.0017
AUG	5	164	-0.00055	0.7303	0.001644	0.5112	0.0007
AUG	10	164	0.00434	0.0780	0.002182	0.5696	0.0190
AUG	15	164	0.00045	0.8704	0.004176	0.3359	0.0002
SEP	5	65	-0.03475	0.6497	0.010887	0.1223	0.0033
SEP	10	65	-0.06805	0.4968	0.017165	0.0635	0.0074
SEP	15	65	-0.03591	0.7367	0.011075	0.2582	0.0018
OCT	5	46	0.01181	0.9135	-0.001794	0.8349	0.0003
OCT	10	46	-0.12878	0.4651	0.011951	0.3923	0.0122
OCT	15	46	-0.42653	0.0300	0.029026	0.0602	0.1026
NOV	5	73	0.02355	0.6937	-0.009219	0.0758	0.0022
NOV	10	73	0.10876	0.2459	-0.012263	0.1289	0.0189
NOV	15	73	0.04923	0.6662	-0.011377	0.2477	0.0026
DEC	5	110	-0.00478	0.8757	0.003213	0.3748	0.0002
DEC	10	110	-0.04031	0.3281	-0.007332	0.1339	0.0089
DEC	15	110	-0.04986	0.3643	-0.013268	0.0429	0.0076

TABLE 11

XR = A + B(CV1) -- FOR 1982

MONTH	XR	N	EST. OF B	PROB>|T|	EST. OF A	PROB>|T|	RSQUARE
JAN	5	26	-0.01880	0.2649	0.006791	0.5008	0.0515
JAN	10	26	-0.01128	0.6623	-0.014632	0.3510	0.0081
JAN	15	26	-0.04187	0.1884	-0.011568	0.5412	0.0709
FEB	5	42	0.00850	0.6626	-0.001204	0.8924	0.0048
FEB	10	42	0.00748	0.8168	0.007012	0.6349	0.0014
FEB	15	42	-0.03854	0.1689	0.023906	0.0646	0.0468
MAR	5	74	-0.00641	0.1094	0.000635	0.8879	0.0352
MAR	10	74	-0.00490	0.3157	-0.008277	0.1368	0.0140
MAR	15	74	-0.00351	0.5733	-0.003638	0.6068	0.0044
APR	5	36	0.08280	0.3686	-0.004274	0.6565	0.0238
APR	10	36	0.11729	0.1852	-0.003398	0.7109	0.0510
APR	15	36	0.06571	0.5296	-0.000264	0.9807	0.0117
MAY	5	98	-0.01845	0.3979	-0.000304	0.9387	0.0075
MAY	10	98	-0.02609	0.3967	0.002849	0.6100	0.0075
MAY	15	98	-0.05456	0.1476	0.006601	0.3333	0.0217
JUN	5	85	-0.00459	0.8145	-0.009909	0.0069	0.0007
JUN	10	85	-0.02139	0.4948	-0.006946	0.2280	0.0056
JUN	15	85	-0.02812	0.4253	-0.006683	0.3021	0.0077
JUL	5	70	-0.04219	0.1158	0.005381	0.2880	0.0360
JUL	10	70	-0.06767	0.0769	0.015098	0.0383	0.0453
JUL	15	70	-0.04858	0.2765	0.024489	0.0048	0.0174
AUG	5	84	0.01013	0.0086	-0.008772	0.1370	0.0813
AUG	10	84	0.01311	0.0065	-0.006532	0.3725	0.0869
AUG	15	84	0.01569	0.0006	-0.008446	0.2221	0.1331
SEP	5	92	0.02086	0.4266	0.000991	0.8295	0.0070
SEP	10	92	-0.02026	0.4794	0.000110	0.9826	0.0056
SEP	15	92	0.00699	0.8631	0.000199	0.9777	0.0003
OCT	5	49	-0.02279	0.5819	-0.013480	0.2060	0.0065
OCT	10	49	-0.04532	0.2635	-0.014572	0.1615	0.0265
OCT	15	49	-0.01640	0.7822	-0.032418	0.0369	0.0016
NOV	5	87	-0.04818	0.0463	0.004428	0.4227	0.0459
NOV	10	87	-0.10669	0.0019	-0.000774	0.9200	0.1078
NOV	15	87	-0.01954	0.6184	-0.006458	0.4759	0.0029
DEC	5	69	0.00478	0.6564	-0.007309	0.1711	0.0030
DEC	10	69	-0.00228	0.8621	-0.015956	0.0160	0.0005
DEC	15	69	0.03810	0.0235	-0.026424	0.0018	0.0742

TABLE 12

XR = A + B(CV1) -- FOR 1983

MONTH	XR	N	EST. OF B	PROB>|T|	EST. OF A	PROB>|T|	RSQUARE
JAN	5	67	-0.02190	0.2891	-0.005027	0.3114	0.0173
JAN	10	67	-0.01398	0.6606	-0.021335	0.0067	0.0030
JAN	15	67	-0.00843	0.8334	-0.026866	0.0067	0.0007
FEB	5	65	-0.11798	0.0067	0.017687	0.0183	0.1108
FEB	10	65	-0.06444	0.2245	0.005688	0.5346	0.0233
FEB	15	65	-0.03380	0.4832	0.001605	0.8474	0.0078
MAR	5	135	0.00234	0.2669	-0.001724	0.6118	0.0093
MAR	10	135	-0.00025	0.9200	0.000396	0.9212	0.0001
MAR	15	135	-0.00054	0.8575	-0.003046	0.5300	0.0002
APR	5	78	-0.00375	0.0819	0.003282	0.4691	0.0393
APR	10	78	-0.00457	0.1600	0.000155	0.9819	0.0258
APR	15	78	-0.00603	0.1344	-0.006748	0.4272	0.0292
MAY	5	83	-0.00491	0.4529	-0.006487	0.1581	0.0070
MAY	10	83	0.01002	0.3152	-0.015403	0.0290	0.0125
MAY	15	83	0.02493	0.0333	-0.016346	0.0455	0.0547
JUN	5	144	0.00122	0.7834	-0.011209	0.0084	0.0005
JUN	10	144	0.00324	0.5347	-0.014445	0.0039	0.0027
JUN	15	144	0.00009	0.9887	-0.015958	0.0093	0.0000
JUL	5	55	-0.01765	0.3444	-0.003597	0.5707	0.0169
JUL	10	55	0.01152	0.6009	-0.020043	0.0096	0.0052
JUL	15	55	0.00711	0.7952	-0.023838	0.0132	0.0013
AUG	5	128	-0.00469	0.3731	-0.001157	0.6969	0.0063
AUG	10	128	-0.01648	0.0256	0.004172	0.3132	0.0389
AUG	15	128	-0.01157	0.2274	0.007507	0.1658	0.0115
SEP	5	71	-0.02024	0.3578	0.004413	0.4132	0.0123
SEP	10	71	0.00544	0.8397	0.010703	0.1080	0.0006
SEP	15	71	-0.02259	0.5073	0.014438	0.0869	0.0064
OCT	5	83	-0.00591	0.0233	-0.000082	0.9837	0.0619
OCT	10	83	0.00215	0.5807	-0.007948	0.1932	0.0038
OCT	15	83	-0.00020	0.9655	-0.011499	0.1122	0.0000
NOV	5	108	0.00939	0.0122	-0.008370	0.0426	0.0578
NOV	10	108	0.00684	0.1560	-0.016145	0.0029	0.0189
NOV	15	108	0.00338	0.5459	-0.016596	0.0085	0.0035

I will summarize this mass of additional information by citing the lack of significant results in any single year or for any particular month across years. Several long periods of time are characterized by the absence of a single significant regression coefficient. Furthermore, the signs of coefficients in individual months are often reversed from one year to the next.

4.5 RESULTS OF TESTS OF H1 USING CV1 AND SPREAD1 VIA ANOVA -- EXCESS RETURNS

The results of tests reported thus far do not support the hypothesized positive relationship between excess returns and divergence of opinion. However, it may be possible that while the relationship between divergence of opinion and excess returns exists, the data in continuous form is not sufficiently rich to detect it. In this section, I report the results of a comparison of mean excess returns when excess returns are grouped into quintiles by the measures CV1 and SPREAD1. Quintile means are compared using Duncan's multiple range test.

The variable RNKCV1 (and RNKSP1) is represented by an integer value from 1 to 5. Observations with the lowest CV1 (SPREAD1) values are assigned a RNKCV1 (RNKSP1) value of 1. The highest CV1 and SPREAD1 values are assigned ranks of 5.

Thus, H1 suggests that the mean excess returns for observations with RNKCV1=5 (RNKSP1=5) should be the highest and those with RNKCV1=1 (RNKSP1=1) should be the lowest. Results of the ANOVA and subsequent Duncan's multiple range tests for CV1 are reported in Tables 13 and 14.

The overall results of the analysis of variance do not support H1. Significant differences between the quintile means are found for the months April, May, and September. Duncan's multiple range test controls for the comparisonwise error rate (as opposed to the experimentwise error rate as in ANOVA) and detects additional differences in July and November. In fact, the results for April appear to support H1 as the quintile means are ranked exactly as predicted. However, other differences are not explained by H1. Of the 7 cases (out of 36) where significant differences are found in the ranked means, the high CV1 quintile mean is significantly higher than the low CV1 quintile mean in the April XRs only.

The results of ANOVA and multiple range tests for quintiles of observations ranked by SPREAD1 (Tables 15 and 16) are very similar to those using CV1. Significant overall differences appear in April and November only. Duncan's multiple range test detects differences in April, May, September, and November. Again, only 6 of 36 sets of

TABLE 13

ANOVA RESULTS FOR MEAN EXCESS RETURNS FORMED FROM CV1 QUINTILES

MONTH	XR	N	F	PROB>F
JAN	5	422	0.08	0.9886
JAN	10	422	0.45	0.7720
JAN	15	422	0.85	0.4925
FEB	5	459	0.16	0.9568
FEB	10	459	0.34	0.8525
FEB	15	459	0.82	0.5138
MAR	5	632	0.36	0.8346
MAR	10	632	0.31	0.8690
MAR	15	632	0.47	0.7569
APR	5	583	1.10	0.3540
APR	10	583	2.76	0.0273
APR	15	583	1.71	0.1473
MAY	5	568	0.43	0.7880
MAY	10	568	1.63	0.1649
MAY	15	568	2.59	0.0360
JUN	5	747	1.44	0.2194
JUN	10	747	0.86	0.4864
JUN	15	747	0.90	0.4626
JUL	5	553	0.52	0.7211
JUL	10	553	0.79	0.5330
JUL	15	553	1.91	0.1074
AUG	5	761	0.17	0.9556
AUG	10	761	1.74	0.5679
AUG	15	761	1.55	0.7025
SEP	5	885	0.80	0.5247
SEP	10	885	1.41	0.2288
SEP	15	885	2.64	0.0327
OCT	5	509	1.57	0.1821
OCT	10	509	1.10	0.3570
OCT	15	509	1.10	0.3541
NOV	5	629	1.88	0.1126
NOV	10	629	1.09	0.3627
NOV	15	629	2.02	0.0900
DEC	5	603	0.83	0.5070
DEC	10	604	1.03	0.3931
DEC	15	604	1.53	0.1927

TABLE 14

DIFFERENCES IN MEAN EXCESS RETURNS VIA DUNCAN TEST

(Means connected by dotted line are not significantly different)

MONTH	XR	QUINTILE MEANS (VALUE OF RNKCV1)				
APR	10	0.01005	-0.00197	-0.00457	-0.00505	-0.00905
		(5)	(4)	(3)	(2)	(1)
		--------	--------			
			--------	--------	--------	--------
APR	15	0.00652	0.00089	-0.00595	-0.00807	-0.01146
		(5)	(4)	(3)	(2)	(1)
		--------	--------	--------	--------	
			--------	--------	--------	--------
MAY	10	0.00580	-0.00102	-0.00252	-0.00688	-0.01054
		(4)	(2)	(1)	(5)	(3)
		--------	--------	--------	--------	
			--------	--------	--------	--------
MAY	15	0.00519	-0.00040	-0.00152	-0.01236	-0.01803
		(4)	(1)	(2)	(5)	(3)
		--------	--------	--------	--------	
			--------	--------	--------	--------
JUL	15	0.00671	0.00025	0.00009	-0.00795	-0.01308
		(5)	(3)	(2)	(1)	(4)
		--------	--------	--------	--------	
			--------	--------	--------	--------
SEP	15	0.00507	0.00264	0.00009	-0.00240	-0.01201
		(2)	(1)	(4)	(3)	(5)
		--------	--------	--------	--------	
					--------	--------
NOV	15	0.00285	-0.00502	-0.01168	-0.01182	-0.01770
		(2)	(1)	(4)	(3)	(5)
		--------	--------	--------	--------	
			--------	--------	--------	--------

excess returns show differences in quintile means and of those, only 2 sets (both from April), result in the high SPREAD1 quintile mean being significantly higher than the low SPREAD1 quintile mean.

4.6 RESULTS OF TESTS OF H1 USING CV1 AND SPREAD1 VIA ANOVA -- ACTUAL RETURNS

The positive relationship between divergence of opinion and excess return outlined in H1 has not been supported by the analysis thus far. Perhaps, contrary to Cragg and Malkiel (1982), investors do not require additional compensation for high levels of divergence of opinion. On the other hand, if divergence of opinion is indeed a source of risk, it may already be included in an adjustment for covariance of firm-specific returns with the market.

ANOVA and multiple range comparisons of mean raw returns over intervals corresponding to XR5, XR10, and XR15 are used to examine the relationship between divergence of opinion and rates of return (denoted RET5, RET10, RET15). The results of these analyses on CV1 and SPREAD1 are reported in Tables 17 through 20.

Significant differences in mean returns across quintiles are found in only 2 of 36 instances. These differences occur in the months of April and September. The

TABLE 15

ANOVA RESULTS FOR MEAN EXCESS RETURNS FORMED FROM SPREAD1 QUINTILES

MONTH	XR	N	F	PROB>F
JAN	5	422	0.54	0.7088
JAN	10	422	0.64	0.6376
JAN	15	422	0.88	0.4759
FEB	5	459	1.43	0.2238
FEB	10	459	0.62	0.6464
FEB	15	459	1.54	0.1883
MAR	5	632	0.55	0.7006
MAR	10	632	0.14	0.9681
MAR	15	632	0.57	0.6850
APR	5	583	2.06	0.0852
APR	10	583	2.94	0.0199
APR	15	583	2.28	0.0600
MAY	5	568	1.63	0.1644
MAY	10	568	0.73	0.5723
MAY	15	568	0.23	0.9190
JUN	5	747	1.57	0.1792
JUN	10	747	1.00	0.4081
JUN	15	747	0.73	0.5714
JUL	5	553	0.49	0.7435
JUL	10	553	0.33	0.8597
JUL	15	553	1.44	0.2199
AUG	5	761	0.50	0.7370
AUG	10	761	0.71	0.5836
AUG	15	761	1.40	0.2337
SEP	5	885	0.96	0.4286
SEP	10	885	1.58	0.1779
SEP	15	885	2.07	0.0823
OCT	5	509	1.38	0.2398
OCT	10	509	0.62	0.6500
OCT	15	509	1.26	0.2849
NOV	5	629	1.94	0.1029
NOV	10	629	1.32	0.2605
NOV	15	629	2.42	0.0476
DEC	5	603	0.29	0.8861
DEC	10	604	1.33	0.2563
DEC	15	604	0.78	0.5365

TABLE 16

DIFFERENCES IN MEAN EXCESS RETURNS VIA DUNCAN TEST

(Means connected by dotted line are not significantly different)

MONTH	XR	QUINTILE MEANS (VALUE OF RNKSP1)				
APR	5	0.00599	0.00245	-0.00331	-0.00341	-0.00546
		(5)	(2)	(3)	(1)	(4)
		------	------	------	------	
			------	------	------	------
APR	10	0.01079	-0.00256	-0.00443	-0.00631	-0.00804
		(5)	(2)	(4)	(1)	(3)
		---	------	------	------	------
APR	15	0.00892	0.00005	-0.00645	-0.00800	-0.01254
		(5)	(4)	(2)	(1)	(3)
		------	------	------		
			------	------	------	------
MAY	5	-0.00016	-0.00244	-0.00289	-0.00523	-0.01063
		(5)	(1)	(3)	(2)	(4)
		------	------	------	------	
			------	------	------	------
SEP	15	0.00362	0.00118	0.00098	-0.00105	-0.01136
		(1)	(2)	(3)	(4)	(5)
		------	------	------	------	
					------	------
NOV	15	0.00228	-0.00373	-0.00827	-0.01406	-0.01961
		(4)	(5)	(1)	(3)	(2)
		------	------	------	------	
			------	------	------	------

TABLE 17

ANOVA RESULTS FOR MEAN RETURNS FORMED FROM CV1 QUINTILES

MONTH	RET	N	F	PROB>F
JAN	5	422	0.31	0.8681
JAN	10	422	1.41	0.2302
JAN	15	422	2.26	0.0621
FEB	5	461	0.59	1.6667
FEB	10	461	0.79	0.5352
FEB	15	461	0.97	0.4250
MAR	5	633	0.85	0.4961
MAR	10	633	1.06	0.3745
MAR	15	633	0.51	0.7262
APR	5	583	2.28	0.0593
APR	10	583	2.89	0.0220
APR	15	583	2.15	0.0733
MAY	5	569	0.19	0.9433
MAY	10	569	1.22	0.3006
MAY	15	569	1.80	0.1274
JUN	5	748	1.43	0.2220
JUN	10	748	0.95	0.4339
JUN	15	748	0.80	0.5273
JUL	5	554	0.32	0.8633
JUL	10	554	0.46	0.7683
JUL	15	554	0.75	0.5614
AUG	5	761	0.82	0.5109
AUG	10	761	0.64	0.6351
AUG	15	761	1.45	0.2150
SEP	5	886	0.91	0.4563
SEP	10	886	3.83	0.0043
SEP	15	886	0.41	0.8022
OCT	5	509	0.36	0.8377
OCT	10	509	0.63	0.6404
OCT	15	509	1.12	0.3453
NOV	5	630	0.49	0.7441
NOV	10	630	0.83	0.5094
NOV	15	630	1.46	0.2140
DEC	5	605	0.65	0.6268
DEC	10	605	0.40	0.8109
DEC	15	605	0.17	0.9535

TABLE 18

DIFFERENCES IN MEAN RETURNS VIA DUNCAN TEST

(Means connected by dotted line are not significantly different)

MONTH	RET	QUINTILE MEANS (VALUE OF RNKCV1)				
JAN	15	0.030369	0.00974	0.00757	0.00554	-0.00212
		(5)	(1)	(2)	(4)	(3)
		--------	--------	--------		
			--------	--------	--------	--------
APR	5	0.01698	0.01124	0.00571	0.00538	0.00374
		(5)	(3)	(2)	(4)	(1)
		--------	--------			
			--------	--------	--------	--------
APR	10	0.02210	0.00716	0.00430	0.00257	0.00143
		(5)	(3)	(4)	(2)	(1)
		---	--------	--------	--------	--------
APR	15	0.03159	0.01614	0.01475	0.01077	0.00776
		(5)	(4)	(3)	(2)	(1)
		--------	--------	--------		
			--------	--------	--------	--------
MAY	15	0.02616	0.01996	0.01466	0.00572	0.00366
		(4)	(1)	(2)	(3)	(5)
		--------	--------	--------	--------	
			--------	--------	--------	--------
SEP	10	0.00686	0.00684	0.00460	0.00209	-0.00922
		(2)	(1)	(4)	(3)	(5)
		--------	--------	--------	--------	---

TABLE 19

ANOVA RESULTS FOR MEAN RETURNS FORMED FROM SPREAD1 QUINTILES

MONTH	RET	N	F	PROB>F
JAN	5	422	0.31	0.8743
JAN	10	422	0.91	0.4608
JAN	15	422	1.76	0.1352
FEB	5	461	0.99	0.4133
FEB	10	461	0.46	0.7649
FEB	15	461	0.91	0.4555
MAR	5	633	0.34	0.8518
MAR	10	633	0.69	0.5965
MAR	15	633	1.10	0.3545
APR	5	583	3.40	0.0092
APR	10	583	3.98	0.0034
APR	15	583	3.29	0.0110
MAY	5	569	1.82	0.1234
MAY	10	569	0.52	0.7222
MAY	15	569	0.30	0.8761
JUN	5	748	1.86	0.1150
JUN	10	748	0.91	0.4602
JUN	15	748	0.61	0.6549
JUL	5	554	0.80	0.5245
JUL	10	554	0.96	0.4265
JUL	15	554	1.91	0.1074
AUG	5	761	2.11	0.0773
AUG	10	761	2.01	0.0917
AUG	15	761	2.92	0.0205
SEP	5	886	0.80	0.5239
SEP	10	886	3.81	0.0045
SEP	15	886	0.50	0.7329
OCT	5	509	0.54	0.7068
OCT	10	509	1.09	0.3625
OCT	15	509	1.30	0.2679
NOV	5	630	0.69	0.5956
NOV	10	630	1.91	0.1076
NOV	15	630	2.41	0.0478
DEC	5	605	0.81	0.5203
DEC	10	605	0.64	0.6321
DEC	15	605	0.29	0.8817

TABLE 20

DIFFERENCES IN MEAN RETURNS VIA DUNCAN TEST

(Means connected by dotted line are not significantly different)

MONTH	RET	QUINTILE MEANS (VALUE OF RNKSP1)				
JAN	15	0.02684	0.01429	0.00678	0.00444	-0.00130
		(5)	(2)	(1)	(4)	(3)
		--------	--------	--------	--------	
			--------	--------	--------	--------
APR	5	0.01991	0.00924	0.00551	0.00442	0.00402
		(5)	(2)	(1)	(3)	(4)
		---	--------	--------	--------	--------
APR	10	0.02437	0.00716	0.00504	0.00174	-0.00069
		(5)	(2)	(1)	(4)	(3)
		---	--------	--------	--------	--------
APR	15	0.03487	0.01697	0.01251	0.01215	0.00457
		(5)	(4)	(2)	(1)	(3)
		---	--------	--------	--------	--------
MAY	5	0.00950	0.00631	0.00126	0.00055	-0.00310
		(5)	(3)	(1)	(2)	(4)
		--------	--------	--------	--------	
			--------	--------	--------	--------
JUL	15	0.02437	0.01550	0.01117	0.00400	0.00220
		(2)	(5)	(1)	(4)	(3)
		--------	--------	--------		
			--------	--------	--------	--------
AUG	5	0.00235	0.00081	0.00064	-0.00077	-0.01160
		(3)	(2)	(5)	(1)	(4)
		--------	--------	--------	--------	
					--------	--------
AUG	10	0.01167	0.00925	0.00923	0.00913	-0.00745
		(3)	(2)	(1)	(5)	(4)
		--------	--------	--------	--------	
			--------	--------	--------	--------

TABLE 20

DIFFERENCES IN MEAN RETURNS VIA DUNCAN TEST (continued)

(Means connected by dotted line are not significantly different)

MONTH	RET	QUINTILE MEANS (VALUE OF RNKSP1)				
AUG	15	0.01271 (3)	0.01144 (1)	0.00573 (2)	0.00334 (5)	-0.01633 (4)
		----------	----------	----------	----------	---
SEP	10	0.00700 (1)	0.00540 (3)	0.00460 (4)	0.00369 (2)	-0.00953 (5)
		----------	----------	----------	----------	---
NOV	10	0.02658 (4)	0.02206 (1)	0.01544 (3)	0.01417 (5)	0.00742 (2)
		----------	----------	----------	----------	
			----------	----------	----------	----------
NOV	15	0.01961 (4)	0.01638 (1)	0.00573 (5)	0.00356 (3)	-0.00693 (2)
		----------	----------	----------	----------	
				----------	----------	----------

more powerful Duncan test specifies differences in the months of January, April, May, and September but the high CV1 quintile mean is significantly greater than the low CV1 quintile mean in April only.

The results using SPREAD1 are no more revealing. ANOVA detects differences in the means during April, August, September, and November. However, when these results are examined using Duncan's multiple range test, only April displays the hypothesized property between the high and low SPREAD1 means.

4.7 RESULTS OF TESTS OF H1 USING CV2 AND SPREAD2 VIA OLS ESTIMATION -- EXCESS RETURNS

In this section, I report results of OLS estimation of equations (3.20) and (3.21) using CV2 and SPREAD2 as dependent variables. The major disadvantage to reliance on these measures is the further reduction in sample size to 4263 observations. This number may seem reasonably large but when divided into individual calendar months, there are considerable differences in the number of observations for each month. As before, stable periods of divergence of opinion are determined with these measures and the dependent variable, excess return is computed as before. The results reported in Tables 21 and 22 again provide virtually no support for H1.

The CV2 coefficient is significant during the months of June, September, October, November, and December. However, the relationship is positive in only June, October, and December. A statistically significant coefficient for CV2 occurs for the longest period of accumulation of excess returns (15 days) excess returns in June and December only.

As was the case with CV1 and SPREAD1, the results concerning SPREAD2 are nearly identical to those for CV2, suggesting that the measures of divergence of opinion derived from earnings forecasts for the subsequent fiscal year explain the same variation in excess returns.

4.8 RESULTS OF TESTS OF H1 USING CV2 AND SPREAD2 VIA ANOVA -- EXCESS RETURNS

In this section, I report the results of a comparison of mean excess returns when excess returns are grouped into quintiles by the measures CV2 and SPREAD2. Quintile means are compared using Duncan's multiple range test.

The variables used for classification of ranked observations are RNKCV2 and RNKSP2. Each ranges in value from 1 (lowest values) to 5 (highest values). H1 predicts

TABLE 21

XR = A + B(CV2) -- ACROSS ALL YEARS

MONTH	XR	N	EST. OF B	PROB>|T|	EST. OF A	PROB>|T|	RSQUARE
JAN	5	364	-0.00795	0.1166	-0.006727	0.0083	0.0068
JAN	10	364	0.00524	0.4541	-0.009527	0.0069	0.0015
JAN	15	364	0.00540	0.5003	-0.015524	0.0001	0.0013
FEB	5	41	-0.04839	0.4543	0.021029	0.1551	0.0144
FEB	10	41	-0.12780	0.1895	0.027329	0.2149	0.0437
FEB	15	41	-0.10650	0.2047	0.020835	0.2721	0.0409
MAR	5	71	0.00614	0.8427	-0.007199	0.2670	0.0006
MAR	10	71	-0.02519	0.5364	-0.014839	0.0838	0.0056
MAR	15	71	-0.03262	0.4928	-0.013873	0.1643	0.0068
APR	5	137	-0.01929	0.5892	0.001820	0.7092	0.0022
APR	10	137	0.02012	0.6035	-0.002860	0.5889	0.0020
APR	15	137	0.03670	0.4174	-0.012058	0.0525	0.0049
MAY	5	121	-0.02370	0.3353	-0.003325	0.4269	0.0078
MAY	10	121	-0.06666	0.1511	0.003652	0.6428	0.0172
MAY	15	121	-0.05368	0.2926	0.001377	0.8737	0.0093
JUN	5	275	0.02377	0.1175	-0.008462	0.0016	0.0090
JUN	10	275	0.04219	0.0279	-0.014278	0.0000	0.0176
JUN	15	275	0.08221	0.0008	-0.018839	0.0000	0.0407
JUL	5	255	-0.00583	0.8269	-0.004122	0.1847	0.0002
JUL	10	255	-0.06634	0.0952	-0.000565	0.9026	0.0110
JUL	15	255	-0.04098	0.3937	-0.000406	0.9422	0.0029
AUG	5	458	0.01926	0.2554	-0.006849	0.0043	0.0028
AUG	10	458	0.00313	0.8855	-0.007939	0.0099	0.0000
AUG	15	458	-0.01717	0.5250	-0.008788	0.0216	0.0009
SEP	5	677	-0.00521	0.5245	-0.000669	0.6790	0.0006
SEP	10	677	-0.01609	0.1156	0.000811	0.6878	0.0037
SEP	15	677	-0.04478	0.0004	-0.000477	0.8466	0.0187
OCT	5	565	0.01008	0.0115	-0.002725	0.1106	0.0113
OCT	10	565	0.01469	0.0075	-0.005316	0.0239	0.0126
OCT	15	565	0.00203	0.7678	-0.005686	0.0541	0.0002
NOV	5	732	-0.01221	0.0238	-0.002969	0.0570	0.0070
NOV	10	732	0.00169	0.8278	-0.006817	0.0024	0.0001
NOV	15	732	0.00529	0.5648	-0.009419	0.0004	0.0005
DEC	5	543	0.01297	0.0003	-0.004094	0.0126	0.0239
DEC	10	544	0.02951	0.0000	-0.016760	0.0000	0.0691
DEC	15	544	0.04643	0.0000	-0.025492	0.0000	0.1080

TABLE 22

XR = A + B(SPREAD2) -- ACROSS ALL YEARS

MONTH	XR	N	EST. OF B	PROB>|T|	EST. OF A	PROB>|T|	RSQUARE
JAN	5	364	-0.004000	0.1149	-0.006568	0.0107	0.0069
JAN	10	364	0.002713	0.4388	-0.009653	0.0067	0.0017
JAN	15	364	0.002749	0.4934	-0.015641	0.0001	0.0013
FEB	5	41	-0.032938	0.2733	0.025093	0.0945	0.0307
FEB	10	41	-0.075596	0.0940	0.033878	0.1275	0.0702
FEB	15	41	-0.061170	0.1166	0.025623	0.1813	0.0620
MAR	5	71	0.002667	0.8650	-0.007109	0.2781	0.0004
MAR	10	71	-0.011403	0.5809	-0.015092	0.0821	0.0044
MAR	15	71	-0.014963	0.5349	-0.014151	0.1608	0.0056
APR	5	137	-0.014401	0.3956	0.002878	0.5555	0.0053
APR	10	137	0.007086	0.7002	-0.002370	0.6549	0.0011
APR	15	137	0.015772	0.4632	-0.011736	0.0595	0.0040
MAY	5	121	-0.011231	0.2550	-0.003111	0.4405	0.0109
MAY	10	121	-0.027576	0.1389	0.003239	0.6698	0.0183
MAY	15	121	-0.022425	0.2732	0.001099	0.8954	0.0101
JUN	5	275	0.014918	0.0417	-0.009565	0.0006	0.0151
JUN	10	275	0.021616	0.0196	-0.015096	0.0000	0.0198
JUN	15	275	0.038031	0.0013	-0.019476	0.0000	0.0373
JUL	5	255	-0.006678	0.5851	-0.003292	0.3067	0.0012
JUL	10	255	-0.034183	0.0611	0.000562	0.9066	0.0138
JUL	15	255	-0.022802	0.3013	0.000625	0.9141	0.0042
AUG	5	458	0.007389	0.2727	-0.006773	0.0047	0.0026
AUG	10	458	0.002617	0.7620	-0.008265	0.0071	0.0002
AUG	15	458	-0.002863	0.7900	-0.009746	0.0107	0.0002
SEP	5	677	-0.003236	0.4088	-0.000423	0.8010	0.0010
SEP	10	677	-0.009492	0.0522	0.001460	0.4857	0.0056
SEP	15	677	-0.022458	0.0002	0.000454	0.8592	0.0206
OCT	5	565	0.002794	0.0465	-0.002395	0.1588	0.0070
OCT	10	565	0.003929	0.0421	-0.004793	0.0408	0.0073
OCT	15	565	0.000343	0.8870	-0.005556	0.0581	0.0000
NOV	5	732	-0.005104	0.0308	-0.002941	0.0619	0.0064
NOV	10	732	0.000259	0.9392	-0.006705	0.0031	0.0000
NOV	15	732	0.001596	0.6912	-0.009271	0.0006	0.0002
DEC	5	543	0.006519	0.0000	-0.004418	0.0071	0.0316
DEC	10	544	0.012870	0.0000	-0.016937	0.0000	0.0687
DEC	15	544	0.019759	0.0000	-0.025629	0.0000	0.1022

that the mean excess returns for quintile 5 should be greater than the mean excess return for quintile 1. The results of these analyses are summarized in Tables 23 and 24 for CV2 and in Tables 25 and 26 for SPREAD2.

The overall results of this analysis do not support H1. Significant differences in the mean excess returns appear in February, June, September, November, and December. Duncan's multiple range test also finds significant differences in January and October. However, examination of the ranking of significantly different means reveals that the high CV2 mean is ranked ahead of the low CV2 mean in only June, November, and December.

Comparison of means of SPREAD2 quintiles provide even weaker results than those using CV2. Only September and December provide significant differences in the ANOVA analysis. The more powerful Duncan test detects differences in 8 months (January, February, March, July, August, September, November, and December), but only December provides a high SPREAD2 mean that is significantly higher than the low SPREAD2 mean.

TABLE 23

ANOVA RESULTS FOR MEAN EXCESS RETURNS FORMED FROM CV2 QUINTILES

MONTH	RET	N	F	PROB>F
JAN	5	364	0.91	0.4589
JAN	10	364	1.08	0.3677
JAN	15	364	2.06	0.0849
FEB	5	41	1.15	0.3486
FEB	10	41	2.89	0.0365
FEB	15	41	1.57	0.2057
MAR	5	71	0.86	0.4922
MAR	10	71	0.72	0.5781
MAR	15	71	1.01	0.4073
APR	5	137	0.15	0.9608
APR	10	137	0.32	0.8662
APR	15	137	0.60	0.6612
MAY	5	121	0.64	0.6355
MAY	10	121	0.84	0.5026
MAY	15	121	0.74	0.5639
JUN	5	275	1.17	0.3237
JUN	10	275	1.91	0.1083
JUN	15	275	3.80	0.0051
JUL	5	255	0.33	0.8598
JUL	10	255	1.36	0.2490
JUL	15	255	0.97	0.4239
AUG	5	458	1.18	0.3175
AUG	10	458	0.78	0.5362
AUG	15	458	0.94	0.4379
SEP	5	677	1.89	0.1109
SEP	10	677	4.30	0.0019
SEP	15	677	8.75	0.0001
OCT	5	565	1.10	0.3554
OCT	10	565	1.62	0.1684
OCT	15	565	0.80	0.5274
NOV	5	732	1.11	0.3501
NOV	10	732	2.47	0.0436
NOV	15	732	0.90	0.4629
DEC	5	543	0.53	0.7107
DEC	10	544	2.97	0.0191
DEC	15	544	6.00	0.0001

TABLE 24

DIFFERENCES IN MEAN EXCESS RETURNS VIA DUNCAN TEST

(Means connected by dotted line are not significantly different)

MONTH	RET	QUINTILE MEANS (VALUE OF RNKCV2)				
JAN	15	0.00185	-0.00503	-0.02091	-0.02382	-0.02632
		(5)	(4)	(1)	(2)	(3)
		--------	--------	--------	--------	
			--------	--------	--------	--------
FEB	10	0.06763	0.05176	-0.01220	-0.01393	-0.06010
		(4)	(2)	(1)	(3)	(5)
		--------	--------	--------	--------	
				--------	--------	--------
FEB	15	0.05583	0.01733	-0.00545	-0.01515	-0.03563
		(2)	(4)	(3)	(1)	(5)
		--------	--------	--------	--------	
			--------	--------	--------	--------
JUN	10	0.00085	-0.00760	-0.01001	-0.01053	-0.02287
		(5)	(2)	(4)	(1)	(3)
		--------	--------	--------	--------	
			--------	--------	--------	--------
JUN	15	0.01001	-0.00152	-0.01305	-0.02067	-0.02759
		(5)	(2)	(1)	(4)	(3)
		--------	--------			
			--------	--------	--------	
				--------	--------	--------
SEP	10	0.00915	0.00246	0.00096	-0.00260	-0.01328
		(4)	(2)	(3)	(1)	(5)
		--------	--------	--------	--------	
					--------	--------
SEP	15	0.00509	0.00425	-0.00070	-0.00185	-0.02950
		(4)	(2)	(1)	(3)	(5)
		--------	--------	--------	--------	---

TABLE 24

DIFFERENCES IN MEAN EXCESS RETURNS VIA DUNCAN TEST
(continued)

(Means connected by dotted line are not significantly different)

MONTH	RET	QUINTILE MEANS (VALUE OF RNKCV2)				
OCT	10	0.00329	0.00104	-0.00320	-0.00632	-0.01310
		(1)	(5)	(4)	(2)	(3)
		--------	--------	--------	--------	
			--------	--------	--------	--------
NOV	10	0.00313	-0.00204	-0.00813	-0.01061	-0.01547
		(5)	(4)	(3)	(2)	(1)
		--------	--------	--------	--------	
			--------	--------	--------	--------
DEC	10	0.00030	-0.01242	-0.01602	-0.01878	-0.01940
		(5)	(3)	(2)	(4)	(1)
		--------	--------			
			--------	--------	--------	--------
DEC	15	0.00379	-0.01831	-0.02472	-0.02763	-0.03338
		(5)	(3)	(2)	(4)	(1)
		---	--------	--------	--------	--------

TABLE 25

ANOVA RESULTS FOR MEAN EXCESS RETURNS FORMED FROM SPREAD2 QUINTILES

MONTH	RET	N	F	PROB>F
JAN	5	364	0.90	0.4643
JAN	10	364	1.53	0.1938
JAN	15	364	1.73	0.1428
FEB	5	41	0.79	0.5415
FEB	10	41	1.87	0.1367
FEB	15	41	1.23	0.3165
MAR	5	71	1.52	0.2077
MAR	10	71	0.29	0.8856
MAR	15	71	0.67	0.6178
APR	5	137	0.44	0.7830
APR	10	137	0.71	0.5836
APR	15	137	0.54	0.7070
MAY	5	121	0.56	0.6894
MAY	10	121	0.76	0.5559
MAY	15	121	0.83	0.5074
JUN	5	275	1.21	0.3088
JUN	10	275	0.60	0.6647
JUN	15	275	1.08	0.3679
JUL	5	255	1.54	0.1917
JUL	10	255	2.23	0.0665
JUL	15	255	1.72	0.1467
AUG	5	458	0.48	0.7538
AUG	10	458	2.08	0.0820
AUG	15	458	1.22	0.3022
SEP	5	677	1.43	0.2219
SEP	10	677	3.86	0.0041
SEP	15	677	8.64	0.0001
OCT	5	565	1.21	0.3071
OCT	10	565	0.82	0.5097
OCT	15	565	0.56	0.6895
NOV	5	732	1.11	0.3522
NOV	10	732	2.11	0.0780
NOV	15	732	1.34	0.2536
DEC	5	543	0.93	0.4475
DEC	10	544	2.05	0.0860
DEC	15	544	4.85	0.0008

TABLE 26

DIFFERENCES IN MEAN EXCESS RETURNS VIA DUNCAN TEST

(Means connected by dotted line are not significantly different)

MONTH	RET	QUINTILE MEANS (VALUE OF RNKSP2)				
JAN	15	0.00374	-0.01476	-0.01684	-0.01886	-0.02759
		(5)	(4)	(1)	(3)	(2)
		--------	--------	--------	--------	
			--------	--------	--------	--------
FEB	10	0.04791	0.04281	0.01185	-0.01220	-0.06009
		(2)	(4)	(3)	(1)	(5)
		--------	--------	--------	--------	
				--------	--------	--------
MAR	5	0.01408	-0.00274	-0.00779	-0.01176	-0.02421
		(2)	(4)	(3)	(5)	(1)
		--------	--------	--------	--------	
			--------	--------	--------	--------
JUL	10	0.00385	0.00104	-0.00614	-0.00711	-0.02285
		(2)	(3)	(4)	(1)	(5)
		--------	--------	--------	--------	
				--------	--------	--------
AUG	10	0.00113	-0.00366	-0.00545	-0.01506	-0.01520
		(4)	(1)	(2)	(3)	(5)
		--------	--------	--------		
			--------	--------	--------	--------
SEP	5	0.00344	0.00056	-0.00054	-0.00230	-0.00692
		(4)	(2)	(3)	(1)	(5)
		--------	--------	--------	--------	
			--------	--------	--------	--------
SEP	10	0.00588	0.00502	0.00050	-0.00105	-0.01365
		(4)	(2)	(3)	(1)	(5)
		--------	--------	--------	--------	---
SEP	15	0.00398	0.00179	0.00082	0.00063	-0.02989
		(2)	(3)	(1)	(4)	(5)
		--------	--------	--------	--------	---

TABLE 26

DIFFERENCES IN MEAN EXCESS RETURNS VIA DUNCAN TEST
(continued)

(Means connected by dotted line are not significantly different)

MONTH	RET	QUINTILE MEANS (VALUE OF RNKSP2)				
NOV	15	0.00075 (4)	-0.00844 (3)	-0.00895 (5)	-0.01069 (1)	-0.01696 (2)
		--------	--------	--------	--------	
			--------	--------	--------	--------
DEC	10	-0.00269 (5)	-0.01028 (2)	-0.01740 (4)	-0.01792 (1)	-0.01803 (3)
		--------	--------			
			--------	--------	--------	--------
DEC	15	0.00124 (5)	-0.01776 (2)	-0.02287 (4)	-0.02986 (1)	-0.03093 (3)
		---	--------	--------	--------	--------

4.9 RESULTS OF TESTS OF H1 USING CV2 AND SPREAD2 VIA ANOVA -- ACTUAL RETURNS

The relationship between mean unadjusted returns and the divergence of opinion measures, CV2 and SPREAD2 are examined in this section. ANOVA and Duncan's multiple range test results are given in Tables 27 through 30.

Results of these tests do not support H1. Significant differences in mean returns across quintiles are found in 6 of 36 ANOVA tests for CV2. These results represent the months February, June, September, and December. The ANOVA results for SPREAD2 yield only 3 significant differences in 36 tests (February, September, and December). Subsequent Duncan tests lengthen the list of months during which differences are detected for both measures. However, quintile 5 (high divergence of opinion) is ranked significantly ahead of quintile 1 (low divergence of opinion) for January and December for CV2 and for December only for SPREAD2.

TABLE 27

ANOVA RESULTS FOR MEAN RETURNS FORMED FROM CV2 QUINTILES

MONTH	RET	N	F	PROB>F
JAN	5	364	0.42	0.7925
JAN	10	364	1.01	0.4015
JAN	15	364	1.88	0.1130
FEB	5	41	1.47	0.2330
FEB	10	41	4.49	0.0051
FEB	15	41	3.78	0.0120
MAR	5	71	1.77	0.1465
MAR	10	71	1.24	0.3035
MAR	15	71	1.22	0.3107
APR	5	137	0.08	0.9888
APR	10	137	0.51	0.7312
APR	15	137	0.82	0.5117
MAY	5	121	1.28	0.2801
MAY	10	121	1.36	0.2524
MAY	15	121	1.73	0.1484
JUN	5	276	1.00	0.4090
JUN	10	276	1.45	0.2177
JUN	15	276	3.59	0.0072
JUL	5	256	0.54	0.7046
JUL	10	256	1.55	0.1893
JUL	15	256	0.84	0.4986
AUG	5	458	1.97	0.0985
AUG	10	458	1.10	0.3572
AUG	15	458	1.20	0.3111
SEP	5	678	1.35	0.2508
SEP	10	678	6.07	0.0001
SEP	15	678	2.49	0.0424
OCT	5	565	0.43	0.7885
OCT	10	565	0.73	0.5729
OCT	15	565	0.56	0.6944
NOV	5	732	0.41	0.8051
NOV	10	732	1.41	0.2302
NOV	15	732	0.03	0.9987
DEC	5	544	0.42	0.7972
DEC	10	544	1.13	0.3402
DEC	15	544	6.52	0.0001

TABLE 28

DIFFERENCES IN MEAN RETURNS VIA DUNCAN TEST

(Means connected by dotted line are not significantly different)

MONTH	RET	QUINTILE MEANS (VALUE OF RNKCV2)				
JAN	15	0.02653	0.01597	0.00426	-0.00067	-0.00325
		(5)	(4)	(2)	(3)	(1)
		--------	--------	--------	--------	
			--------	--------	--------	--------
FEB	5	0.05754	0.02132	0.02127	0.01257	-0.02209
		(4)	(2)	(1)	(3)	(5)
		--------	--------	--------	--------	
			--------	--------	--------	--------
FEB	10	0.07941	0.06711	0.02628	0.00820	-0.11276
		(4)	(2)	(1)	(3)	(5)
		--------	--------	--------	--------	---
FEB	15	0.07842	0.03793	0.03509	0.02303	-0.10428
		(2)	(1)	(4)	(3)	(5)
		--------	--------	--------	--------	---
MAR	5	0.02719	0.01127	0.01124	0.00430	-0.01740
		(2)	(4)	(3)	(5)	(1)
		--------	--------	--------	--------	
			--------	--------	--------	--------
MAY	15	0.03040	0.02358	0.00587	0.00454	-0.02572
		(1)	(5)	(2)	(4)	(3)
		--------	--------	--------	--------	
			--------	--------	--------	--------
JUN	15	0.01763	0.00607	0.00121	-0.01729	-0.01863
		(5)	(2)	(1)	(4)	(3)
		--------	--------	--------		
			--------	--------	--------	--------
AUG	5	0.00558	0.00371	0.00244	-0.00284	-0.01141
		(1)	(2)	(5)	(4)	(3)
		--------	--------	--------	--------	
				--------	--------	--------

TABLE 28

DIFFERENCES IN MEAN RETURNS VIA DUNCAN TEST (continued)

(Means connected by dotted line are not significantly different)

MONTH	RET	QUINTILE MEANS (VALUE OF RNKCV2)				
SEP	10	0.01174	0.00285	0.00227	0.00043	-0.01639
		(4)	(2)	(3)	(1)	(5)
		----------	----------	----------	----------	---
SEP	15	0.00942	0.00158	-0.00093	-0.00264	-0.01747
		(2)	(4)	(3)	(1)	(5)
		----------	----------	----------	----------	
				----------	----------	----------
DEC	15	0.04935	0.02066	0.01489	0.00593	-0.00170
		(5)	(3)	(4)	(2)	(1)
		---	----------	----------	----------	----------

TABLE 29

ANOVA RESULTS FOR MEAN RETURNS FORMED FROM SPREAD2 QUINTILES

MONTH	RET	N	F	PROB>F
JAN	5	364	0.35	0.8454
JAN	10	364	1.35	0.2511
JAN	15	364	1.76	0.1357
FEB	5	41	0.87	0.4909
FEB	10	41	3.90	0.0099
FEB	15	41	3.65	0.0136
MAR	5	71	3.76	0.0082
MAR	10	71	0.94	0.4455
MAR	15	71	1.04	0.3950
APR	5	137	0.57	0.6833
APR	10	137	0.37	0.8317
APR	15	137	0.78	0.5377
MAY	5	121	1.68	0.1593
MAY	10	121	1.72	0.1506
MAY	15	121	2.23	0.0696
JUN	5	276	1.31	0.2670
JUN	10	276	0.80	0.5254
JUN	15	276	1.61	0.1717
JUL	5	256	0.62	0.6474
JUL	10	256	1.68	0.1555
JUL	15	256	1.26	0.2859
AUG	5	458	0.77	0.5484
AUG	10	458	1.00	0.4071
AUG	15	458	1.11	0.3521
SEP	5	678	1.72	0.1447
SEP	10	678	5.84	0.0001
SEP	15	678	2.35	0.0528
OCT	5	565	0.56	0.6925
OCT	10	565	0.81	0.5161
OCT	15	565	0.65	0.6294
NOV	5	732	0.33	0.8549
NOV	10	732	1.01	0.3996
NOV	15	732	0.95	0.4317
DEC	5	544	0.64	0.6314
DEC	10	544	1.25	0.2888
DEC	15	544	6.76	0.0001

4.10 SAMPLE CONTAINING PARAMETER REVISIONS

The results of all tests of the relationship between excess or actual returns and divergence of opinion measures provide virtually no support for H1. Yet, the relevance of revisions in divergence of opinion and in the mean earnings per share forecast may relate to movement in security prices since revisions in analysts estimates suggest that new information has become available. New information may result in an adjustment in security prices prior to the publication of these revised parameters. It may also affect security prices after publication if the summary of analysts' earnings estimates produces relevant information.

Any examination of a relationship between excess returns and revisions in divergence of opinion parameters represents an indirect test of H1. More importantly, such tests allow for specification of the timing of the adjustment in security prices commensurate with a revision in divergence of opinion and mean earnings forecast. As such they provide insight into the usefulness of consensus earnings forecast services and a test of H2.

TABLE 30

DIFFERENCES IN MEAN RETURNS VIA DUNCAN TEST

(Means connected by dotted line are not significantly different)

MONTH	RET	QUINTILE MEANS (VALUE OF RNKSP2)				
JAN	15	0.02862	0.00805	0.00747	0.00205	-0.00348
		(5)	(3)	(4)	(1)	(2)
		----------	----------	----------	----------	
			----------	----------	----------	----------
FEB	10	0.06838	0.05455	0.02917	0.02628	-0.11276
		(2)	(4)	(3)	(1)	(5)
		----------	----------	----------	----------	---
FEB	15	0.07509	0.04255	0.03793	0.01934	-0.10428
		(2)	(4)	(1)	(3)	(5)
		----------	----------	----------	----------	---
MAR	5	0.03640	0.01578	0.00640	0.00430	-0.02661
		(2)	(4)	(3)	(5)	(1)
		----------	----------	----------	----------	
				----------	----------	----------
MAY	5	0.01545	0.01046	0.00286	-0.00083	-0.01041
		(1)	(5)	(2)	(4)	(3)
		----------	----------	----------	----------	
			----------	----------	----------	----------
MAY	10	0.02841	0.01568	0.00108	-0.01461	-0.01917
		(1)	(5)	(2)	(4)	(3)
		----------	----------	----------	----------	
			----------	----------	----------	----------
MAY	15	0.03768	0.02724	0.00815	-0.01536	-0.01826
		(1)	(5)	(2)	(3)	(4)
		----------	----------	----------		
			----------	----------	----------	----------
JUL	10	0.00736	0.00562	0.00081	-0.00470	-0.01710
		(2)	(3)	(1)	(4)	(5)
		----------	----------	----------	----------	
			----------	----------	----------	----------

TABLE 30

DIFFERENCES IN MEAN RETURNS VIA DUNCAN TEST (continued)

(Means connected by dotted line are not significantly different)

MONTH	RET	QUINTILE MEANS (VALUE OF RNKSP2)				
SEP	5	0.00240	0.00075	-0.00287	-0.00388	-0.00974
		(4)	(2)	(3)	(1)	(5)
		----------	----------	----------	----------	
			----------	----------	----------	----------
SEP	10	0.00805	0.00630	0.00240	0.00129	-0.01713
		(4)	(2)	(3)	(1)	(5)
		----------	----------	----------	----------	---
SEP	15	0.00665	0.00159	0.00154	-0.00156	-0.01825
		(2)	(3)	(1)	(4)	(5)
		----------	----------	----------	----------	
					----------	----------
DEC	15	0.04953	0.02053	0.01584	0.00642	-0.00312
		(5)	(2)	(4)	(3)	(1)
		---	----------	----------	----------	
				----------	----------	----------

To test H1 using a sample in which divergence of opinion is revised, a new sample, containing all observations satisfying filters (i) through (vi) for which REVSD, the percentage change in the standard deviation of analysts' forecasts, and REVEPS, the percentage change in the mean of those forecasts, can be calculated, is constructed.

The new sample is also restricted to only the three months of April, July, and October since these months follow the closing month of the first three quarters of the fiscal year. Since quarterly earnings reports are commonly released in the later part of April, July, or October, or in the earlier part of the following months, revisions reported in mid-April, mid-July, and mid-October represent the last opportunity for analysts to "beat" the quarterly EPS announcement to the market. Therefore, it is reasonable to conclude that estimates of EPS made in these months represents revisions based on information that may not be available to the general investing public. The resulting sample includes 9202 observations. Summary statistics pertaining to REVSD and REVEPS are reported in Table 31.

TABLE 31

SUMMARY STATISTICS -- SAMPLE WITH PARAMETER REVISIONS

(Standard Deviation of Each Variable is Below the Mean)

MONTH	N	REVSD	REVEPS
APR	3091	0.02287 (0.45895)	-0.00769 (0.12761)
JUL	2897	0.05384 (0.95207)	-0.01236 (0.07601)
OCT	3214	0.02959 (0.57814)	-0.01055 (0.09242)

4.11 RESULTS OF TESTS USING REVSD AND REVEPS VIA OLS ESTIMATION -- TESTS OF H1 AND H2

Results of OLS estimation of equation (3.22) using REVSD as the independent variable and equation (3.23) which includes a second independent variable, REVEPS, are reported in this section. The dependent variables, or excess returns, are also respecified to allow a test of H2. Excess returns are accumulated over five different time intervals. These periods are numbered with respect to the date on which the IBES monthly update is released (Day 0). Three "prior" periods: Day -17 to Day -7, Day -12 to Day -2, and Day -7 to Day -2 and two "post" periods periods: Day 0 to Day +1 and Day 0 to Day +8 are examined.

Results of the simple regression using only REVSD are shown in Table 32 and again do not support H1.

Of the 15 models estimated, none yield results that are significant at the .05 level. Thus, it appears that the market does not react in a systematic manner to revisions in divergence of opinion and neither H1 nor H2 is supported.

The parameter estimates of equation (3.23) are shown in Table 33 and provide some interesting insight into the relevance of parameter revisions. Four of five regressions using April data yield an estimate of the REVEPS coefficient that is significant at the .05 level. The one exception is

TABLE 32

XR = A + B(REVSD)

MONTH	XR	N	EST. OF B	PROB>|T|	EST. OF A	PROB>|T|	RSQUARE
APR	(-17,-7)	3009	-0.00076	0.7303	-0.00226	0.0267	0.0000
APR	(-12,-2)	3009	0.00213	0.3474	-0.00225	0.0319	0.0003
APR	(-7,-2)	3009	0.00275	0.1059	-0.00006	0.9371	0.0009
APR	(0,1)	3007	-0.00194	0.0603	-0.00187	0.0001	0.0012
APR	(0,8)	3011	-0.00386	0.0542	-0.00463	0.0000	0.0012
JUL	(-15,5)	2809	0.00016	0.8896	-0.00500	0.0000	0.0000
JUL	(-12,-2)	2809	-0.00043	0.7048	-0.00386	0.0005	0.0001
JUL	(-7,-2)	2809	-0.00123	0.1621	-0.00283	0.0008	0.0007
JUL	(0,1)	2809	-0.00016	0.7481	-0.00058	0.2225	0.0000
JUL	(0,8)	2809	-0.00199	0.0528	-0.00361	0.0003	0.0013
OCT	(-15,5)	3099	0.00116	0.4830	-0.00509	0.0000	0.0002
OCT	(-12,-2)	3099	-0.00213	0.2167	-0.00220	0.0293	0.0005
OCT	(-7,-2)	3099	-0.00188	0.1763	0.00145	0.0728	0.0006
OCT	(0,1)	3097	-0.00100	0.2215	-0.00003	0.9418	0.0005
OCT	(0,8)	3099	-0.00240	0.2020	0.00650	0.0000	0.0005

the brief "post" period from Day 0 to Day +1. Results for July provide a significant coefficient for revision in earnings per share (REVEPS) for the two "prior" periods from Day -12 to Day -2 and Day -7 to Day -2. In October, 4 of 5 regressions again yield a significant and positive REVEPS coefficient. The only exception is the "post" period from Day 0 to Day +1.

These results suggest that there is a market reaction to revisions in the mean earnings forecast. Furthermore, the adjustment to a revised EPS forecast may continue beyond the publication of IBES data.

A review of the coefficients on REVSD for these regressions yields a positive and significant coefficient for the "prior" period of Day -7 to Day -2 during April. To summarize, it appears that significant information is contained in REVEPS during the months examined. I will refrain from making statements concerning market efficiency, or the profitability of any trading strategy based on REVEPS in this study. However, the REVEPS variable is now used to partition the observations for the three months in the sample to examine the statistical significance of REVSD for a given level of REVEPS.

TABLE 33

XR = A + B(REVSD) + C(REVEPS)

MONTH	XR	EST. OF B	EST. OF C	EST. OF A	PROB>F
APR	(-17,-7)	0.00024	0.01978	-0.00202	.0413
		(.9128)	(.0116)	(.0462)	
APR	(-12,-2)	0.00295	0.03380	-0.00178	.0001
		(.1897)	(.0001)	(.0887)	
APR	(-7,-2)	0.00342	0.03548	0.00036	.0001
		(.0425)	(.0001)	(.6435)	
APR	(0,1)	-0.00188	0.00533	-0.00184	.0565
		(.0693)	(.1517)	(.0001)	
APR	(0,8)	-0.00357	0.02126	-0.00445	.0017
		(.0733)	(.0030)	(.0001)	
JUL	(-17,-7)	0.00028	-0.00380	-0.00539	.9360
		(.8099)	(.7969)	(.0001)	
JUL	(-12,-2)	-0.00015	0.04360	-0.00330	.0094
		(.8927)	(.0024)	(.0031)	
JUL	(-7,-2)	-0.00107	0.03430	-0.00222	.0030
		(.2223)	(.0019)	(.0097)	
JUL	(0,1)	-0.00015	0.00444	-0.00055	.7262
		(.7628)	(.4711)	(.2468)	
JUL	(0,8)	-0.00191	0.02085	-0.00329	.0383
		(.0613)	(.1051)	(.0010)	
OCT	(-17,-7)	0.00218	0.02458	-0.00431	.0391
		(.1987)	(.0175)	(.0001)	
OCT	(-12,-2)	-0.00052	0.05226	-0.00184	.0001
		(.7647)	(.0001)	(.0650)	
OCT	(-7,-2)	-0.00085	0.03015	0.00153	.0010
		(.5442)	(.0004)	(.0551)	
OCT	(0,1)	-0.00077	0.00890	0.00005	.1018
		(.3544)	(.0797)	(.9148)	
OCT	(0,8)	-0.00085	0.04107	0.00732	.0013
		(.6586)	(.0005)	(.0001)	

4.12 RESULTS OF TESTS OF REVSD ON SAMPLE PARTITIONED BY REVEPS -- TESTS OF H1 AND H2

It is possible that investors are concerned with revisions in divergence of opinion only for a subset of EPS revisions. Four partitions of the data are examined using the excess return periods previously described. ANOVA and Duncan multiple range tests are used to examine mean excess returns for quintiles of observations formed via ranking on REVSD. The data set is partitioned into:

I. All observations for which REVEPS>0.
(2569 observations)

II. All observations for which REVEPS<0.
(3749 observations)

III. Top 20% of positive REVEPS observations.
(509 observations)

IV. Bottom 20% of negative REVEPS observations.
(720 observations)

Results of these tests are reported in Tables 34 through 41. In Partition I, significant differences in mean excess returns are documented for two "prior" periods in April. However, the Duncan test fails to distinguish between the high and low REVSD quintile means.

In Partition II, no significant differences are uncovered using ANOVA. The more powerful Duncan test provides several differences among quintile means, but never ranks the high REVSD quintile mean significantly above the low REVSD quintile mean.

In Partition III, only one "prior" excess return period exhibits significant differences in quintile means via ANOVA. Again, the Duncan test is unable to distinguish the high quintile mean from the low quintile mean for any excess return period examined.

In Partition IV, significant differences are found for two "prior" periods in July and one in October. However, the Duncan analysis can not distinguish the high quintile mean from the low quintile mean.

To summarize, no support is provided to indicate the hypothesized relationship between excess returns and REVSD for any of the partitions used here, and I consider H1 to be unfounded.

TABLE 34

ANOVA RESULTS FOR MEAN EXCESS RETURNS FORMED FROM REVSD QUINTILES (REVEPS>0 ONLY)

MONTH	RET	N	F	PROB>F
APR	(-17,-7)	924	1.20	0.3101
APR	(-12,-2)	924	3.26	0.0114
APR	(-7,-2)	924	2.72	0.0286
APR	(0,1)	925	0.39	0.8168
APR	(0,8)	926	0.31	0.8741
JUL	(-17,-7)	778	1.86	0.1150
JUL	(-12,-2)	778	1.21	0.3065
JUL	(-7,-2)	778	2.36	0.0522
JUL	(0,1)	778	0.56	0.6899
JUL	(0,8)	778	0.82	0.5106
OCT	(-17,-7)	866	0.98	0.4187
OCT	(-12,-2)	866	2.11	0.0781
OCT	(-7,-2)	866	1.55	0.1862
OCT	(0,1)	865	1.02	0.3952
OCT	(0,8)	866	0.87	0.4820

TABLE 35

DIFFERENCES IN MEAN EXCESS RETURNS VIA DUNCAN TEST (REVEPS>0 ONLY)

(Means connected by dotted line are not significantly different)

MONTH	RET	QUINTILE MEANS (VALUE OF RNKSD)				
APR	(-12,-2)	0.01270	0.00417	0.00321	-0.00510	-0.00583
		(5)	(1)	(4)	(3)	(2)
		--------	--------	--------		
			--------	--------	--------	--------
APR	(-7,-2)	0.01159	0.00459	0.00402	-0.00053	-0.00288
		(5)	(1)	(4)	(2)	(3)
		--------	--------	--------		
			--------	--------	--------	--------
JUL	(-7,-2)	0.00561	0.00301	-0.00392	-0.00476	-0.00486
		(5)	(4)	(1)	(2)	(3)
		--------	--------	--------		
			--------	--------	--------	--------
OCT	(-12,-2)	0.01387	0.00694	0.06027	0.00439	-0.00292
		(3)	(5)	(2)	(1)	(4)
		--------	--------	--------	--------	
			--------	--------	--------	--------
OCT	(-7,-2)	0.01041	0.00410	0.00454	0.00296	-0.00144
		(3)	(2)	(5)	(1)	(4)
		--------	--------	--------	--------	
			--------	--------	--------	--------

TABLE 36

ANOVA RESULTS FOR MEAN EXCESS RETURNS FORMED FROM REVSD QUINTILES (REVEPS<0 ONLY)

MONTH	RET	N	F	PROB>F
APR	(-17,-7)	1340	1.22	0.3007
APR	(-12,-2)	1340	0.24	0.9147
APR	(-7,-2)	1340	1.77	0.1318
APR	(0,1)	1339	1.09	0.3611
APR	(0,8)	1340	0.59	0.6681
JUL	(-17,-7)	1176	2.08	0.0815
JUL	(-12,-2)	1176	1.58	0.1765
JUL	(-7,-2)	1176	1.13	0.3412
JUL	(0,1)	1176	0.45	0.7753
JUL	(0,8)	1176	0.42	0.7919
OCT	(-17,-7)	1234	0.82	0.5100
OCT	(-12,-2)	1234	1.65	0.1601
OCT	(-7,-2)	1234	1.09	0.3612
OCT	(0,1)	1234	1.45	0.2139
OCT	(0,8)	1234	0.52	0.7204

TABLE 37

DIFFERENCES IN MEAN EXCESS RETURNS VIA DUNCAN TEST (REVEPS<0 ONLY)

(Means connected by dotted line are not significantly different)

MONTH RET	QUINTILE MEANS (VALUE OF RNKSD)				
APR (-7,-2)	0.00317	-0.00151	-0.00380	-0.00501	-0.00559
	(3)	(2)	(5)	(4)	(1)
	--------	--------	--------	--------	
		--------	--------	--------	--------
JUL (-17,-7)	-0.00099	-0.00222	-0.00306	-0.00641	-0.01594
	(1)	(2)	(4)	(3)	(5)
	--------	--------	--------	--------	
				--------	--------
JUL (-12,-2)	-0.00250	-0.00428	-0.00636	-0.01075	-0.01566
	(3)	(4)	(2)	(1)	(5)
	--------	--------	--------	--------	
		--------	--------	--------	--------

TABLE 38

ANOVA RESULTS FOR MEAN EXCESS RETURNS FORMED FROM REVSD QUINTILES (TOP 20% REVEPS>0)

MONTH	RET	N	F	PROB>F
APR	(-17,-7)	182	2.21	0.0696
APR	(-12,-2)	182	2.71	0.0317
APR	(-7,-2)	182	2.22	0.0691
APR	(0,1)	182	0.69	0.5994
APR	(0,8)	182	1.19	0.3165
JUL	(-17,-7)	154	1.02	0.0940
JUL	(-12,-2)	154	1.84	0.1248
JUL	(-7,-2)	154	1.09	0.3616
JUL	(0,1)	154	0.75	0.5610
JUL	(0,8)	154	0.55	0.6991
OCT	(-17,-7)	173	1.34	0.2562
OCT	(-12,-2)	173	0.73	0.5747
OCT	(-7,-2)	173	1.39	0.2405
OCT	(0,1)	173	1.77	0.1381
OCT	(0,8)	173	1.13	0.3461

TABLE 39

DIFFERENCES IN MEAN EXCESS RETURNS VIA DUNCAN TEST (TOP 20% REVEPS>0)

(Means connected by dotted line are not significantly different)

MONTH	RET	QUINTILE MEANS (VALUE OF RNKSD)				
APR	(-17,-7)	0.02825	0.01856	0.00333	0.00262	-0.01709
		(3)	(5)	(4)	(1)	(2)
		----------	----------	----------	----------	
				----------	----------	----------
APR	(-12,-2)	0.03051	0.01367	0.00638	0.00254	-0.02346
		(5)	(4)	(1)	(3)	(2)
		----------	----------	----------	----------	
			----------	----------	----------	----------
APR	(-7,-2)	0.02308	0.01022	0.00974	-0.00492	-0.01432
		(5)	(4)	(1)	(3)	(2)
		----------	----------	----------	----------	
			----------	----------	----------	----------
JUL	(-17,-7)	0.00569	0.00169	0.00160	-0.02638	-0.05651
		(5)	(1)	(2)	(4)	(3)
		----------	----------	----------	----------	
					----------	----------
JUL	(-12,-2)	0.01735	0.00347	0.00084	-0.00412	-0.02838
		(5)	(2)	(4)	(1)	(3)
		----------	----------	----------	----------	
			----------	----------	----------	----------
OCT	(-7,-2)	0.23175	0.01912	0.00732	0.00727	-0.01020
		(2)	(3)	(5)	(1)	(4)
		----------	----------	----------	----------	
			----------	----------	----------	----------
OCT	(0,1)	0.15625	0.00257	0.00059	-0.00211	-0.00753
		(3)	(2)	(5)	(1)	(4)
		----------	----------	----------		
			----------	----------	----------	----------

TABLE 40

ANOVA RESULTS FOR MEAN EXCESS RETURNS FORMED FROM REVSD QUINTILES (LOW 20% REVEPS<0)

MONTH	RET	N	F	PROB>F
APR	(-17,-7)	262	0.12	0.9738
APR	(-12,-2)	262	0.09	0.9855
APR	(-7,-2)	262	0.50	0.7331
APR	(0,1)	262	0.81	0.5178
APR	(0,8)	262	0.72	0.5817
JUL	(-17,-7)	223	1.47	0.2151
JUL	(-12,-2)	223	3.11	0.0163
JUL	(-7,-2)	223	2.65	0.0344
JUL	(0,1)	223	0.24	0.9161
JUL	(0,8)	223	1.05	0.3810
OCT	(-17,-7)	235	0.86	0.4875
OCT	(-12,-2)	235	3.47	0.0089
OCT	(-7,-2)	235	1.78	0.1335
OCT	(0,1)	235	0.70	0.5923
OCT	(0,8)	235	0.89	0.4729

TABLE 41

DIFFERENCES IN MEAN EXCESS RETURNS VIA DUNCAN TEST (LOW 20% REVEPS<0)

(Means connected by dotted line are not significantly different)

MONTH RET	QUINTILE MEANS (VALUE OF RNKSD)				
JUL (-12,-2)	0.02192	0.01738	-0.00616	-0.01768	-0.02389
	(2)	(4)	(3)	(1)	(5)
	----------	----------	----------	----------	
		----------	----------	----------	----------
JUL (-7,-2)	0.01530	0.00822	-0.01336	-0.01428	-0.02228
	(2)	(4)	(3)	(5)	(1)
	----------	----------	----------	----------	
		----------	----------	----------	----------
OCT (-12,-2)	0.00561	0.00260	0.00011	-0.01399	-0.03542
	(4)	(2)	(1)	(3)	(5)
	----------	----------	----------	----------	
			----------	----------	----------

4.13 SUMMARY OF EMPIRICAL FINDINGS

The numerous tests constructed and executed in this study have provided no significant support for a positive relationship between either excess or actual returns and divergence of opinion (H1). In terms of statistical significance, the two measures of divergence of opinion used, CV and SPREAD, are indistinguishable.

The divergence of opinion coefficient was insignificant in the vast majority of monthly periods examined. Further analysis on individual months for specific years also yielded insignificant results. Deletion of firms with "small" forecasts of earnings per share (less than $0.20) did not clarify any pattern nor strengthen the statistical relationship. Use of divergence of opinion measures based on the subsequent fiscal year proved no more helpful in their ability to explain the variance in excess returns.

When running as many regressions as this study contains it is obvious that some will provide significant results due to chance. Even in these sporadic cases, the microscopic R^2 statistic suggests that the models have extremely low predictive ability due to the lack of correlation between divergence of opinion and the excess return measures used.

Neither ANOVA, nor Duncan tests were able to provide sufficient evidence supporting a difference in mean excess returns attributable to their association with high or low divergence of opinion measures. These results were unimproved when mean unadjusted returns were examined in place of excess returns.

Another series of tests examined revisions in the standard deviation of earnings forecasts (REVSD) and the mean earnings forecast (REVEPS). These results underscore the insignificance of divergence of opinion measures, even when the measure shifts from one period to the next. The results for REVEPS were much more promising. As a result, the observations were partitioned into groups using REVEPS. Each group was then divided into subgroups according to REVSD and analyzed using ANOVA. The results again suggested that revisions in the standard deviations of analysts' earnings forecasts are unimportant regardless of the level of revision in the mean of the forecasts.

Chapter V

CONCLUSIONS AND SUGGESTIONS FOR FURTHER STUDY

5.1 CONCLUSIONS

This attempt to explain excess returns with divergence of opinion measures closely follows the theoretical relationship proposed by Barry and Brown (1984a). To quote these authors: "Our model would predict excess returns for securities for which there is considerable divergence of analyst opinion." The results in this study strongly reject the hypothesized relationship between divergence of opinion and excess return. This finding does not directly refute the differential information hypothesis of Barry and Brown (1984a), but suggests an inconsistency in their model relating excess returns, divergence of opinion, and information. The bias in excess returns generated by an ex-post model is attributed to differential information by the authors (Barry and Brown, 1984b) but divergence of opinion should relate to this bias as well. Although Barry and Brown forward the differential information hypothesis as an explanation of the small firm effect, the findings of this study must be reconciled with the predictions of their theoretical model to validate this claim.

Results of tests of the association of revisions in the standard deviation and the mean of analysts' forecasts provide some insight concerning the potential value of IBES data. Revisions in the standard deviation of forecasts are completely devoid of information. No association between this measure and excess returns generated prior to, or following the measure's release can be supported. Evidently investors simply do not care about the level of disagreement among analysts, or at least, they do not consider it a source of risk for which they must be compensated.

The revision of the mean earnings forecast is strongly associated with excess returns both before and after its publication. The positive association between excess returns and REVEPS for periods prior to the release of the IBES report suggests that market prices adjust to new information in disaggregate form (i.e., as individual analysts revise their personal forecasts). However, the significance of the relationship after the publication of the IBES update in 2 of 3 monthly periods studied suggests that the information content of the IBES report may be significant even though it is generated from "second hand" data. Thus, a subscription to the IBES service may be of value if a specific strategy can exploit the apparently sluggish price adjustment.

5.2 POTENTIAL PROBLEMS

The measures of divergence of opinion used in this study do not measure disagreement among investors directly. However, due to the ubiquity of analyst opinion in numerous publications, brokerage houses, and even on television, the use of analyst opinion as a proxy for investor opinion is not unreasonable. These measures, as reported by IBES, certainly contain a noise component as the set of analysts surveyed, their response time to information requiring a revised forecast, and the differential attention they may afford to firms of varying size, varies from month to month and from firm to firm.

The screens placed on the data were designed to minimize many of these problems. The resulting reduction in observations is a cost incurred in order to have more reliable measures of divergence of opinion. However, since at least three forecasts were required for inclusion in the sample, firms with the greatest divergence of investor opinion, may have been ignored. A security which can garner the attention of three security analysts, or achieve listing on a major exchange, may appear sufficiently legitimate to subdue divergence of investor opinion. Small or neglected firms may evoke significantly more divergence of investor opinion, but such measures are difficult to obtain.

The distribution of divergence of opinion measures used in this study display a considerable degree of positive skewness which may explain the weak results of OLS estimation. Yet, neither deletion of firms with small mean earnings per share forecasts, or use of ANOVA and Duncan's tests produced positive results.

5.3 AREAS FOR FURTHER STUDY

i) Available Information. Before the Barry and Brown explanation of the relationship between divergence of opinion and excess return can be completely rejected, the relationship between available information and divergence of opinion must be studied. This may also provide a means of comparing several divergence of opinion measures in order to determine which is the most appropriate.

ii) Increased Horizon. This study relied upon measures of divergence of opinion concerning firm-specific prospects for two years into the future or less. A longer time horizon may produce a more stable measure of divergence of opinion. Such a variable is also suggested by Cragg and Malkiel (1982).

They found the variance of long term growth rate estimates to be a significant explanatory variable for returns, but short term estimates of growth were not as significant.

iii) Event Study. An event study specifically associated with revisions in the mean forecast is necessary to make specific statements concerning the value of the IBES update. Previous studies have ignored the brief period of time surrounding the publication of such updates.

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