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An Empirical Test of a Simple Measure of the Quality of Accounting Earnings

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Comments welcome.
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An Empirical Test of A Simple Measure of the Quality of Accounting Earnings

ABSTRACT: Earnings quality is a topic of interest to both accounting and finance academics and investment professionals. In this study a simple measure of earnings quality is introduced. We measure earnings quality using two proxies based on two components of bottom-line accounting earnings that reflect the degree to which bottom-line earnings are sustainable. Our two proxies for earnings quality are: (1) the difference between current cash flows from operations and the accrual accounting bottom-line measure of earnings, and (2) the difference between earnings before extra-ordinary items and discontinued operations and bottom-line accounting earnings. We test the usefulness of our measures of earnings quality by examining the extent to which they explain cross-sectional differences in price to earnings (P/E) ratios.

The use of cross-sectional differences in P/E's to test our earnings quality measure is warranted given the use made of the price to earnings ratio in investment contexts and the reported security pricing effects called the P/E anomaly. We assume the inadequacies in the accounting earnings number for articulating the fundamental earnings are manifested in what is termed "earnings quality" in the literature.

Supporting the results of previous studies, we find significant relations between E/P ratios and growth, dividend payout, and size. We do not find a significant relationship between E/P and systematic risk or between E/P and inventory method. The hypothesized links between our proxies for earnings quality and E/P ratios are supported at relatively high levels of statistical significance. Our results are robust to the choice of earnings quality surrogate and are not driven by outliers. In addition, our earnings quality measure remains significant in explaining cross-sectional P/E's when the other explanatory variables are included in the analysis.

Our results provide strong evidence that our proxies for earnings quality are manifested in stock prices. We infer from our evidence that our measures of earnings quality have validity and should be used in future research which attempts to explain cross-sectional differences in P/E ratios.

An Empirical Test of

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I. Introduction

Earnings quality is a term used by both practitioners and academics to describe an ill-defined property of accounting measurement. Academics usually refer to earnings quality as some attribute of earnings that has captured the persistence of long-run earnings innovations. This persistence is usually captured in a high earnings response coefficient. Practitioners, on the other hand, usually refer to a much simpler notion of earnings quality. Earnings quality is the extent to which accounting techniques inflate the accounting earnings measure - the accounting earnings are inflated relative to some notion of the fundamental earnings. Practitioners employ numerous approaches involving adjustments for inventory methods, depreciation methods, and revenue recognition methods to adjust low quality earnings measures. However, neither the academic community nor the practitioner community provide rigorous empirical tests of the usefulness of their measures of earnings quality.

The approach to earnings quality introduced and tested in this study is simple and readily determinable from financial statements. It does not involve modeling the time series properties of earnings so as to measure persistence as done in the academic literature. Instead, we use a simple practitioner oriented notion - the portion of accounting earnings supported by operating funds flows.

In our measure of earnings quality we assume that bottom-line earnings that are supported by sustainable basic operations represent higher "quality" earnings. Assuming an efficient market, we expect our earnings quality attribute is manifested in the current stock price. This allows us to empirically test the ability of our earnings quality measures to explain cross-sectional differences in P/E ratios. We hypothesize that our proxy for the quality of the bottom-line earnings will explain a significant portion of the cross-sectional variation in P/E ratios.[1]

We provide evidence on the validity of our earnings quality measures by examining their ability to explain cross-sectional variation in P/E ratios.[2] In addition, this study addresses Lev's [1989] call for more studies identifying the determinants of earnings quality.

Though the efficient market hypothesis suggests that firms' price to earnings (P/E) ratios should have no predictive-ability for future security price movements, P/E ratios are still widely used in investment contexts. Many investment professionals believe that P/E ratios are useful in determining whether a security is under-priced or over-priced. As a result, both accounting and finance academics and investment professionals are interested in an explanation for the cross-sectional variation in firms' price to earnings ratios. This interest is particularly warranted given the reported security pricing effects called the P/E anomaly.

Bernard [1991] notes that if stock prices underreact to earnings information or if there are valuation errors that are corrected over time, P/E ratios can serve to predict abnormal returns. Latane and Tuttle [1967], Latane, Tuttle and Jones [1969], and Basu [1977] provide evidence that low P/E securities (high E/P) generate higher returns than high P/E (low E/P) securities. Jaffe, Keim, and Westerfield [1989] suggest that this effect is not attributable to either a size effect or hindsight bias. These studies do not adequately explain why cross-

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[1] Although the empirical analyses conducted in this study are based on the E/P ratio, our discussion follows the more traditional line which uses the P/E ratio. The use of the E/P ratio in our empirical analysis mitigates the problems associated with earnings approaching zero and is based on the Litzenberger and Rao [1970] model which posits linearity in E/P. This approach was employed by Beaver and Morse [1978], and Craig, et al. [1987].

[2] We acknowledge that we do not have a formal economics-based model linking our surrogates for earnings quality with future cash flows or returns. Instead, we use informal reasoning based on "soft" theory and concepts readily found in discussions with investment practitioners. We believe this to be in the spirit of Bernard's (1991) calling for the academic community to "remain open to unconventional approaches to understanding how prices might deviate from fundamental values in what appear to be extremely competitive markets". Investment professionals readily discuss earnings multipliers and the "quality" of earnings. In private discussions, an investment banker who previously was the chief financial officer for a Fortune 500 firm described the process in which he assessed the quality of earnings by adjusting accrual earnings to what he termed sustainable cash flows.

sectional differences in P/E ratios exist. Instead, they focus on the usefulness of employing these cross-sectional differences to earn abnormal returns.

One explanation for the cross-sectional variability in P/E's is provided by Black [1980]. Black argued that P/E ratios should be relatively constant across firms and, if one assumes market efficiency about security prices, then the variation must be driven by the earnings measure. Black suggested that the cross-sectional variability in P/E's is due to inadequacies in the accounting earnings number. Assuming the earnings numbers that are reflected in prices are the sustainable earning activities of the firm, we concentrate on the proportion of bottom-line accounting earnings that better reflect the sustainable earning activities of the firm. Accordingly, we employ a notion similar to Black's by focusing on the inability of the bottom-line earnings number (used in the P/E computation) to articulate the results of the underlying sustainable earnings process.

Lev [1989] defined earnings quality as the predictive-ability of earnings to infer future cash flows. However, Lev did not indicate which of the many different accounting earnings numbers that are available from a firm's financial statements are to be used. Therefore, two components of bottom-line accounting earnings are considered in this study: (1) funds from operations, and (2) earnings before extraordinary items and discontinued operations. We measure earnings quality using two proxies based on these two components of earnings.[3] The two proxies are: (1) the difference between funds from operations and the accrual accounting bottom-line measure of earnings, and (2) the difference between earnings before extraordinary items and discontinued operations and bottom-line accounting earnings. The first measure portrays the extent to which bottom-line accounting earnings are supported by underlying funds flows from operations (based on working capital). We hypothesize that earnings that are

[3] We do not decompose funds from operations into the accrual and deferral components since we have no apparent interpretation for the components in our representation of earnings quality. In addition, we do not attempt to model the pricing of the accrual and deferral components of earnings (as done in some previous studies). Instead, our intent is to examine the ability of a simple surrogate for earnings quality to explain cross-sectional variation in P/E ratios.

supported by funds from sustainable operating activities are of higher quality than earnings that do not have underlying, supportive operating funds flows. As such, a high quality measure of earnings will have underlying funds flows equal to or greater than the bottom-line accounting income figure. Our second measure of earnings quality is the proportion of bottom-line earnings attributable to basic (sustainable) income activities. We postulate that bottom-line earnings that are predominantly due to normal and sustainable earning activities represent higher quality earnings than do bottom-line earnings that are mostly attributable to temporary activities, such as earnings from extraordinary items and the results from discontinued operations. Earnings from these activities are usually viewed as not being sustainable in the future.

Cross-sectionally, we expect P/E's (E/P's) of firms in which working capital provided by operations exceed bottom-line accounting earnings to be greater (less) than firms in which the bottom-line accounting earnings exceed the working capital provided by operations. Our expectation is based on the intuition that in instances in which funds from operations exceed bottom-line accounting earnings, the bottom-line accounting earnings conservatively measure the underlying income producing phenomena. It is this underlying income producing activity that is priced by the market.

The quality of earnings is high when the underlying funds from operations exceed bottom-line accounting earnings and the market prices the security congruent with these underlying operating funds flows. In instances in which bottom-line accounting earnings exceed operating funds flows, the bottom-line accounting earnings overstate the basic earnings of the firm that is used by the market in security pricing. We define the first case, operating funds flows greater than bottom-line accounting earnings, as an instance of high quality earnings since it is the basic operations of the firm that completely support the bottom-line earnings number. In the second case, the earnings quality is low since it is activities other than the underlying basic operating activities that are supporting the bottom-line accounting earnings number. In essence, this proxy for earnings quality measures the percentage of bottom-line accounting earnings that is supported by the underlying funds flows due to the basic operating activities of the firm.

We expect to observe higher (lower) P/E's (E/P's) for firms in which earnings before extraordinary items and discontinued operations underlie all or more of the bottom-line accounting earnings. This notion of high or low quality earnings is similar to that described above. In instances in which a large proportion of bottom-line accounting earnings is due to extraordinary items and discontinued operations, the quality of the bottom-line accounting earnings number is low since it is made up of a large unstainable component.[4]

Accounting earnings have long been used as a predictor of future cash flows. However, there is evidence that both the current period cash flows (funds from operation) and accounting earnings are used by the market as an indicator of future cash flows (for example, Wilson [1986], and Rayburn [1986]). This study does not intend to compare the information content of the bottom-line accounting earnings figure with that of the funds from operation figure. Instead, we hypothesize that, given the same earnings number, earnings quality is higher (lower) and the future cash flow will be larger (smaller) when the funds from operation are larger (smaller) than bottom-line accounting earnings. Accordingly, the P/E (E/P) ratio will be higher (lower). We also hypothesize that earnings before extraordinary items and discontinued operations better reflects the sustainable earnings that are reflected in the security price. Earnings before extraordinary items and discontinued operations better represents the potential for sustainable earnings since it does not include the temporary shocks due to extraordinary and/or discontinued operating components.

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[4] This is consistent with the notion that the market perceives total (bottom-line) accounting earnings to be noisier than earnings before extraordinary items and discontinued operations and focuses on the less noisy earnings signal in its pricing. This idea is also consistent with the extraordinary items and discontinued operations representing transitory shocks to the earnings stream.

P/E ratios play an important role in investment analysis and much attention has been given to exploring their determinants. Under certain conditions, the Gordon-Shapiro valuation equation states that the P/E ratio is a function of the dividend payout ratio, the growth in earnings per share, and the risk-free interest rate.[5] Empirically, the relations between the P/E ratios and (1) firm size, (2) systematic risk (beta), (3) dividend payout, (4) growth potential, and (5) accounting methods have been previously investigated.[6] However, an empirical assessment of the association between our surrogates for earnings quality and E/P (P/E) ratios is unique to this study.

Supporting the results of previous studies, we find significant relations between the E/P ratio and growth, dividend payout, and size. We do not find a significant relationship between E/P and systematic risk or between E/P and inventory method. The hypothesized links between our proxies for earnings quality and E/P ratios is supported at relatively high levels of statistical significance. In addition, the inclusion of our earnings quality measures almost doubles the explanatory power of regressions using the explanatory variables found significant in previous studies. These results are robust to the choice of quality measure and the deletion of outliers. In our analysis we assess the sensitivity of the reported results for the measure of earnings quality based on funds from operations in explaining the E/P ratio after controlling for earnings from extraordinary items and discontinued operations and find our results to be robust.

The remainder of this paper is organized as follows. Section two contains a brief review of the pertinent literature. Section three describes the research design, the variables, and the hypotheses that are tested. The results are presented in section four. A sensitivity analysis is provided in section five. The sixth section provides a brief summary and discusses the implications of our results.

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[5] See Beaver and Morse [1978] for additional detail. The current interest rate, a macro-economic factor in explaining P/E ratios, is not considered in this study since a cross-sectional regression across firms at a single point in time is employed.

[6] See Beaver and Morse [1978] or Craig, et al. [1987] for additional detail.

II. Previous Studies

This section reviews previous research in three areas related to this study: (a) studies on earnings quality, (b) studies of the determinants of P/E ratios, and (c) the P/E anomaly studies.

Earnings Quality

Lev [1989] calls for more studies on the determinants of earnings quality and notes that research emphasizing accounting issues and the quality of earnings are a promising area. He notes that earnings adjustment is an essential element of the financial statement analysis process and references *Value Line* [1973] and O'Glove [1987] as evidence of financial analysts using various means, such as changes in inventory levels, to assess the quality of earnings. Lev also notes that Imhoff [1989] found that earnings response coefficients differed for firms classified by financial reporting quality. Lev acknowledges that we do not have an adequate understanding of the financial statement analysis process.

Kormendi and Lipe [1987] suggest that earnings quality should be linked to both the ability of earnings to predict future cash flows and the persistence of accounting earnings. Previous research investigating the usefulness of cash versus accrual information and the usefulness of historical cost versus current cost information can be classified into this topical area. However, neither of these two areas of research provide definitive inferences about the quality of various types of accounting earnings information.

Rayburn [1986] and Wilson [1986] both demonstrate that given accounting earnings, cash flow data is incrementally associated with security returns. This evidence suggests that cash flow data provides some additional information to the market about a firm's future cash flow that is not captured in accrual earnings. Alternatively, this evidence may show that cash flow data is associated with earnings quality.

The Determinants of P/E Ratios

Litzenberger and Rao [1970] (hereafter, LR) posit a linear relation between E/P ratios and both systematic risk (beta) and growth. They find empirical evidence consistent with their hypotheses. Beaver and Morse [1978] test the LR model and note that the relation between P/E and growth is positive. However, the sign of the correlation between beta and P/E is expected to vary across economic climates. When the overall market's outlook is good (bad) the firms with higher betas are expected to perform better (worse). Consequently, no particular relation between beta and P/E is expected unless the economic climate is considered. The results reported by Beaver and Morse [1978] are generally consistent with their expectations. Beaver and Morse also conjecture that differential accounting methods may aid in explaining cross-sectional differences in P/E ratios.

Craig, et al., [1987] test the Beaver and Morse [1978] conjecture that differential accounting methods may explain some of the cross-sectional variability in P/E ratios. The Beaver and Morse conjecture is based on the notion that it is the difference in accounting methods that affects the earnings number (the denominator of the P/E ratio) rather than a price effect that states that security prices reflect the adoption of different accounting methods. Craig, et al., hypothesize that firms with more conservative (income-decreasing) accounting methods are associated with higher P/E ratios. However, one potential difficulty in using accounting methods as an explanatory variable is that some accounting methods are not just cosmetic and have real cash flow effects (through taxes) while other accounting methods do not have cash flow effects. This may introduce a confounding variable since one cannot determine whether it is the accounting method that is driving the result by affecting the earnings figure (the denominator of the P/E ratio) or the cash flow effect that is driving the result as reflected in the security price (the numerator of the P/E ratio). Consequently, an empirical relation between accounting methods and P/E ratios may not be observed, and if observed it is very difficult to interpret.

The empirical observation by Craig, et al., shows that the LIFO inventory method and the deferred investment tax credit method are associated with higher P/E ratios but the depreciation method is not associated with P/E ratios. Since the inventory valuation method and the investment tax credit method may have cash flow effects whereas the depreciation method used in financial reporting may be not, their observation is consistent with the notion that the market is picking up the cash flow effects of the accounting methods. Craig, et al., also find firm size and dividend payout to be significant in explaining the cross-sectional variability of P/E ratios.

The P/E Anomaly

The use of P/E ratios as an investment strategy has interested finance researchers and the evidence that one can earn abnormal returns using a P/E ratio based investment strategy indicates market underreaction (Bernard [1991]). One possible explanation for this phenomenon is that stock prices reflect more information about future earnings than do current earnings (for example, Ou and Penman [1989]). Another explanation is mean reversion in prices. Beaver and Morse [1978] document the mean-reversion behavior of P/E ratios; high (low) P/E ratios are followed by low (high) P/E ratios in later years. Ball [1978] suggests a risk-based explanation.

Basu [1983] provides evidence that low P/E ratio stocks earn statistically significant positive risk-adjusted returns. This phenomenon is contradictory to most notions of market efficiency and has been labeled the "P/E effect" or the "P/E anomaly". Basu also finds that firm size and P/E ratios are correlated. Consequently, the well-known small firm effect or anomaly (for example, Schwert [1983]) may be partly related to the P/E effect although Jaffe, Keim, and Westerfield [1989] suggest that this is not what is driving the P/E effect.

Ou and Penman [1989] provide insights into the usefulness of P/E ratios in predicting future earnings. However, the relations among prices, earnings, and P/E ratios are not clear. Ou and Penman show that price changes (as opposed to P/E comparisons) are poor predictors of future earnings when accounting information shows a large transitory component in current earnings.

III. Research Design, Variables and Hypotheses

The cross-sectional regression models employed in this study are similar to those used in previous studies of P/E (E/P) ratios. Based on the results of these previous studies, we hypothesize that the cross-sectional variability in P/E (E/P) ratios can be explained by (1) a firm's beta, (2) a firm's growth potential, (3) firm size, (4) a firm's dividend payout ratio, (5) a firm's inventory valuation method, and (6) a firm's earnings quality. We do not include depreciation methods in our analysis since previous empirical evidence has not supported a linkage. In addition, due to data availability we do not include the effect of alternative investment tax credit methods in our analysis. The two new variables added in this analysis to proxy for earnings quality are: (1) the quality of earnings associated with funds from operations, and (2) the quality of earnings associated with extraordinary items and discontinued operations.

Each of the variables used in the study are defined and discussed below.

(1) Earnings to Price Ratio (E/P) - The E/P ratios in this study are computed using the primary earnings per share divided by year-end closing price. Earnings before extraordinary items and discontinued operations to price ratios (EB/P) are employed in the sensitivity analysis as the dependent variable to concentrate on the relation between E/P ratios and earnings quality associated with funds from operation.

(2) Systematic Risk (BETA) - The beta used in this study is the Standard and Poor's Corporation beta estimated using 60 monthly observations. The expected sign of the relation between beta and the E/P ratio cannot be specified a priori since Beaver and Morse [1978] show that the sign depends on the general economic conditions.

(3) Growth Potential (GR) - Our measure of growth potential is the proxy employed by Titman and Wessels [1988]; annual R&D expense deflated by annual sales. A negative (positive) association between growth and the E/P (P/E) ratio is predicted.

(4) Firm Size (SIZE) - Firm size is measured by the logarithm of the firm's total assets. Based on the small firm effect documented in the literature, a positive (negative) association between size and the E/P (P/E) ratio is predicted.

(5) Dividend Payout Ratio (DIV) - The dividend payout ratio is the annual dividend per share divided by the annual primary earnings per share. A negative (positive) relation between the dividend payout ratio and the E/P (P/E) ratio is expected. This phenomenon is termed the "dividend puzzle" and is widely discussed in the finance literature (for example, Bhattacharya [1979]).

(6) Earnings Quality Based on Funds from Operations (QCF, QCE, QCA) - Three different measures of this variable, based on alternative deflators for the denominator, are employed. The first measure, QCF, assumes that the underlying benchmark for evaluation of earnings quality is the funds from operations. The numerator for QCF is bottom-line accounting earnings minus the funds from operations. The denominator is funds from operations. A large QCF shows that reported bottom-line earnings are greater than the underlying funds from operations - this indicates a lower quality earnings number. The second measure, QCE, uses funds from operations minus bottom-line accounting earnings as the numerator with bottom-line accounting earnings as the denominator. A positive QCE shows that the bottom-line earnings figure is completely supported by underlying funds flows from operations and is of higher quality. In essence, bottom-line earnings conservatively measure funds flows from operations. The third measure of earnings quality, QCA, uses the same numerator as QCE but uses total assets as the denominator.

The use of these three deflators in our earnings quality measures allows us to assess the sensitivity of the results to the different denominators employed in the proxy. As discussed above, a positive association between QCF and the E/P ratio is expected. However, the relation between E/P and QCE (also, QCA) is expected to be negative since the numerator is computed by subtracting bottom-line earnings from funds from operations whereas QCF subtracts funds from operations from bottom-line earnings. One potential problem with QCF and QCE is that, although we believe QCF and QCE are capturing "earnings quality" as explained above, QCF and QCE may be capturing "capital intensity" when the major difference between bottom-line accounting earnings and funds from operations is due to depreciation. QCA uses total assets as the denominator and should be free of this problem.[7]

(7) Earnings Quality Based on Extraordinary items and Discontinued Operations (QEB, QXE, QXA) - Based on the same analogy as in the above discussion, three measures are used. The first measure, QEB, uses bottom-line accounting earnings minus earnings before extraordinary items and discontinued operations as the numerator and earnings before extraordinary items and discontinued operations as the denominator. The other two measures, QXE and QXA, both use earnings before extraordinary items and discontinued operations minus bottom-line accounting earnings as the numerator and employ bottom-line accounting earnings for QXE and total assets for QXA as the denominators. A positive relation between the QEB and E/P, a negative relation between E/P and QCE, and a negative relation between E/P and QCA are hypothesized.

(8) Inventory Valuation Method (INV) - INV is a dummy variable for the choice of inventory method. INV is coded 1 when FIFO is primarily used (as identified by COMPUSTAT) by the sample firm and INV is coded 0 for any other inventory method. The association between inventory method, as coded, and the E/P (P/E) ratio is expected to be positive (negative) given the hypothesis of Beaver and Morse [1978] that conservative (income-decreasing) accounting methods are associated with higher P/E ratios.

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[7] Other pros and cons for these three measures of earnings quality will be discussed later.

Three similar regression models are used in the empirical tests. The first model (M1) is:

$$E/P = \gamma_0 + \gamma_1\, BETA + \gamma_2\, GR + \gamma_3\, DIV + \gamma_4\, SIZE + \gamma_5\, QCF + \gamma_6\, QEB + \gamma_7\, INV + \epsilon;$$

where:

E/P = primary earnings per share divided by year-end closing price;

BETA = Standard and Poor's monthly beta from Compustat CD Plus;

GR = research and development expense divided by sales;

DIV = dividend payout ratio;

SIZE = logarithm of the firm's total assets;

QCF = (bottom-line accounting earnings minus funds from operations) divided by funds from operations;

QEB = (bottom-line accounting earnings minus earnings before extraordinary items and discontinued operations) divided by earnings before extra ordinary items and discontinued operations;

INV = 1 if FIFO is used and 0 if another inventory valuation method is used.

The γ's are regression coefficients and ϵ is an error term.

The second model (M2) uses QCE and QXE to measure earnings quality and is:

$$E/P = \gamma_0 + \gamma_1\, BETA + \gamma_2\, GR + \gamma_3\, DIV + \gamma_4\, SIZE + \gamma_5\, QCE + \gamma_6\, QXE + \gamma_7\, INV + \epsilon;$$

where:

QCE = (funds from operations minus bottom-line accounting earnings) divided by bottom-line accounting earnings;

QXE = (earnings before extraordinary items and discontinued operations minus bottom-line accounting earnings) divided by bottom-line accounting earnings;

all other variables are as defined above.

The third regression model (M3) uses QCA and QXA to measure the quality of accounting earnings. This model is:

$$E/P = \gamma_0 + \gamma_1 \text{ BETA} + \gamma_2 \text{ GR} + \gamma_3 \text{ DIV} + \gamma_4 \text{ SIZE} + \gamma_5 \text{ QCA} + \gamma_6 \text{ QXA} + \gamma_7 \text{ INV} + \epsilon;$$

where:

QCA = (funds from operations minus bottom-line accounting earnings) divided by total assets;

QXA = (earnings before extraordinary items and discontinued operations minus bottom-line accounting earnings) divided by total assets;

the other variables are as defined previously.

The reason for using the three different models identified above is to assess the sensitivity of the results to different deflators used in the earnings quality proxies, and to relieve the spurious correlation problem.[8] This is proper since using earnings as the deflator has two prominent problems. First, since E/P and earnings are likely to be correlated, the observed results could be driven by spurious correlation. Second, there could be outliers in the distribution of the earnings quality variable due to small earnings. Since firm size is also used as explanatory variable in our model, there is the potential for multicollinearity between firm size and our measure of earnings quality that employs size (total assets) as the deflator. The sensitivity of our results to outliers is examined.

The sample firms are collected using the Compustat CD Plus annual file from 1984 to 1987. The following selection criteria are employed.

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[8] One potential problem in the models is that accounting earnings appear in both sides of the equations. Consequently, we use three different deflators (not necessarily earnings) and assess the sensitivity of the results to different deflators in order to mitigate this problem. In addition, we do not believe there is a significant spurious correlation problem since the simple product-moment correlation between E/P and earnings is only .09 (all sample firms pooled across the four sample years).

(1) The firms must be listed on either the New York Stock Exchange or the American Stock Exchange.

(2) The firms must be in the manufacturing or mining industries (1000 < SIC <4000).

(3) Annual data must be available to compute the variables.

(4) The firms must have positive E/P ratios.

These sample selection criteria yield a sample of 1,543 observations; 383 firms in 1984, 394 firms in 1985, 417 firms in 1986, and 349 firms in 1987.

The three regression models previously described (M1, M2, and M3) are estimated using a system of equations approach by way of a seemingly unrelated regression (SUR) across the four sample years. Zellner [1962] points out that the SUR method, which estimates coefficients through a joint generalized least squares technique, will achieve gains in estimation efficiency when correlations between cross-model residuals are not zero. Since some of the firms appear in this sample for several years, it is appropriate to expect some correlation among the error terms.[9] The SUR method requires the same sample of firms across all the years analyzed and decreases the number of sample firms. Only 199 of the originally identified sample of firms meet the selection criteria for all four years.

To test the following seven hypotheses (presented in null form), each of the regression coefficients are tested to determine if it is significantly different from zero:

H_{01}: There is no association between the firm's E/P ratio and systematic risk (beta).

H_{02}: There is no association between the firm's E/P ratio and its growth potential.

H_{03}: There is no association between the firm's E/P ratio and its dividend payout ratio.

H_{04}: There is no association between the firm's E/P ratio and its size.

H_{05}: There is no association between the firm's E/P ratio and its earnings quality proxied by the difference between funds from operations and bottom-line accounting earnings.

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[9] The increase in efficiency of the estimates results in additional power for the tests of the coefficients.

H_{06}: There is no association between the firm's E/P ratio and its earnings quality proxied by the difference between earnings before extraordinary and discontinued operations and bottom-line accounting earnings.

H_{07}: There is no association between the firm's E/P ratio and its inventory valuation method.

The tests of hypotheses 5 and 6 are the major contribution of this research study although tests of the other hypotheses may support the findings of previous studies. The rejection of hypotheses 5 and 6 will show that earnings quality (as proxied by our variables) is considered by the marketplace and is reflected in the stock price.[10] Given our assumptions regarding market efficiency and Black's explanation for cross-sectional differences in P/E ratios, rejection of these hypotheses will lend support for the validity of our earnings quality measures. Consequently, these tests will also enhance our knowledge of the cross-sectional determinants of P/E ratios.

IV. Results

Tables 1-4 provide the descriptive statistics and the correlations among the variables employed for each of the four sample years.

INSERT TABLES 1-4

In general, the signs of all of the correlations between the E/P ratios and the exogenous variables, except QCA and inventory method (INV), are consistent with our expectations. In three of the four years, the correlation between QCA and E/P has the opposite sign. The correlations between E/P and inventory method are not statistically significant in any year and have the opposite sign. When earnings or earnings before extraordinary items and discontinued operations is used as the deflator some extreme observations are observed. To assess the

[10] This inference is based on the assumption that our two proxies for earnings quality, (1) the difference between funds from operations and bottom-line accounting earnings, and (2) the difference between income before extra ordinary and discontinued operations and accounting earnings, are adequate.

sensitivity of our results to these outliers, we drop firms with price-earnings ratios greater than 100 and rerun the analyses.[11] Deletion of the extreme observations trims the sample size to 186 firms.

M1 Results

The results for model M1 are presented in Table 5. These results show that the regression coefficients for growth, dividend payout, size, and quality of earnings based on operating funds flows (QCF), and quality of earnings based on earnings before extraordinary items and discontinued operations (QEB) are statistically significant with the expected sign in all four sample years. The coefficient estimates for growth, dividend payout, size, and quality of earnings based on operating funds flows (QCF) are similar in magnitude for the four years. The magnitudes of the coefficient estimates for quality of earnings based on earnings before extraordinary items and discontinued operations (QEB) are consistent for three of the four years. However, Table 4 reveals that some of the observations for QEB in 1987 may be outliers. Inventory method is not significant in three of the four years and has the opposite sign in all four years. The variable BETA is insignificant and switches sign across the four years. The system R^2 for this model is high; about 48% of the cross-sectional variability in the E/P ratios is explained. The system R^2 is only 25% when our measures of earnings quality are not included in the analysis. For the individual years, earnings quality adds significant explanatory power (measured by the adjusted R^2); around 10% for 1984, 1985, and 1987 and 20% for 1986.

INSERT TABLE 5

To assess the sensitivity of these results to outliers, the analysis is rerun on the trimmed sample. These results are provided in Table 6. The regression coefficient estimates and significance levels for the variables except for QEB in 1987 are similar to those reported in Table 5. The magnitudes of the coefficient estimates for QEB become more consistent across the four years but the significance level drops for 1987. These results suggest that outliers are

[11] Our choice of 100 as the cut-off value for outliers is reasonable but arbitrary.

not driving the results reported in Table 5. The system R^2 increases to about 50% for the trimmed sample of 186 firms while it is 27% without the earnings quality variables. Consistent with the results reported in Table 5, the results in Table 6 show a strong relation between earnings quality and the E/P ratios. In addition, the results for the other variables, except inventory method in model M1, are consistent with previous studies for both samples. The inclusion of the earnings quality variables increases the explanatory for the individual years by 9% (1984), 5% (1985), 21% (1986), and 13% (1987).

INSERT TABLE 6

The results for models M2 and M3 are presented in following sections. The results for variables GR, DIV, and SIZE are similar to those of M1; statistically significant with the expected sign. The inventory method variable continues to be insignificant with the opposite sign for three of the years. Systematic risk, beta, is not statistically significant and switches signs. These results are similar to those for model M1 reported in Tables 5 and 6. Given these similarities, the following discussion focuses only on the two earnings quality measures.

<u>M2 Results</u>

Table 7 provides the regression results using model M2 in which accounting earnings is used as the deflator in the two measures of earnings quality. The coefficient estimates for the two earnings quality measures in model M2, QCE and QXE, have the expected sign for all four years but are not consistently significant. The magnitudes of the coefficient estimates differ widely across the four years. The coefficient estimate for QCE is significant in only one of the four years (1985). The coefficient estimate for QXE is significant in three of the four years (1984, 1985, and 1986). The system R^2 for M2 is 32% when the earnings quality measures are included in the regression; lower than that of M1. However, excluding the earnings quality measures only reduces the system R^2 to 25%. For the individual years, the earnings quality variables only add 3% (1984), 6% (1985), 0% (1986), and 2% (1987).

INSERT TABLE 7

Since using earnings as the deflator for the earnings quality surrogate is likely to produce outliers, the regression results based on the trimmed sample are presented in Table 8. The results for QCE and QXE, reported in Table 8, are more consistent across the four years than the results reported in Table 7. QCE is significant in three of the four years (1985, 1986, and 1987) and QXE is significant in all four years. The system R^2 increases to 37%, but is still below the system R^2 for M1. The incremental explanatory power of the earnings quality variables is 0% for 1984, 4% for 1985, 6% for 1986, and 10% for 1987. The system R^2 is only 27% when the earnings quality variables are omitted from the regression.

INSERT TABLE 8

M3 Results

The regression results for M3, which uses total assets as the deflator in the earnings quality measures, are reported in Table 9. The quality of accounting earnings based on earnings before extraordinary items and discontinued operations (QXA) is highly significant with the expected sign for all four years. In addition, the coefficient estimates are similar across the four years. The earnings quality measure based on funds flow, QCA, is significant in two of the four years (1986, 1987) and has the expected sign for all four years. However, the coefficient estimates for QCA vary significantly across the years (especially 1987, the year of the market crash). The system R^2 is 53% when the earnings quality variables are included versus 25% when they are omitted. For the individual years the adjusted R^2 increases by 24%, 7%, 14%, and 28%.

INSERT TABLE 9

The results from the trimmed sample are presented in Table 10. Since outliers are less likely when total assets is used as the deflator in the earnings quality measures, the results reported in Tables 9 and 10 are very similar. The system R^2 is 50% versus 27% when the earnings quality variables are omitted. The R^2 for the individual years increase by 23%, 6%, 16%, and 10% when the earnings quality variables are included.

INSERT TABLE 10

Our results suggest that Models M1 and M3 have higher explanatory power; 48% and 53% compared to 32% for M2. Since all the variables are the same except for the denominator in the earnings quality measures, these results suggest that using either working capital from operations or total assets as the deflator improves the descriptive validity of the earnings quality measur.

V. Sensitivity Analysis

Our results provide evidence that the two earnings quality measures employed in this study are significantly associated with cross-sectional differences in E/P ratios. This section focuses only on the earnings quality measure based on funds from operations, QCF. To control for the effect of extraordinary items and discontinued operations on E/P ratios, an EB/P ratio is computed based on earnings before extraordinary items and discontinued operations divided by stock price. The model is as follows:

$$EB/P = \gamma_0 + \gamma_1\,BETA + \gamma_2\,GR + \gamma_3\,DIV + \gamma_4\,SIZE + \gamma_5\,QCF + \gamma_6\,INV + \epsilon;$$

where:

EB/P = earnings before extraordinary items and discontinued operations per share divided by year-end stock price;

the rest of the variables are as previously defined.

The results for this regression are presented in Table 11.

INSERT TABLE 11

The coefficient estimates for all the variables except INV are consistent across all four years. The coefficient for QCF, the earnings quality measure based on funds flows, is significant and has the expected sign across all four years. All the estimates and significance levels for the other variables are similar to the results reported in Table 5. However, the system R^2 is somewhat lower, 34.5%.

VI. Summary and Implications

In this study we introduce two simple measures of earnings quality and assess their empirical validity in explaining cross-sectional differences in P/E ratios. The difference between funds from operations and bottom-line accounting earnings and the difference between earnings before extraordinary and discontinued operations and bottom-line accounting earnings are the proxies employed to represent earnings quality. Other variables, which have been significant in explaining cross-sectional variability in P/E ratios in previous studies, are also included in our analysis.

In summary, our results are consistent with the results from previous studies since we observe that growth potential, firm size, and dividend payout are useful in explaining the cross-sectional differences in P/E ratios. The earnings quality measures we employ, based on (1) funds from operations, and (2) earnings before extraordinary items and discontinued operations, are statistically significant in explaining the cross-sectional variability in E/P ratios. These results suggest that the proportion of bottom-line earnings supported by operating funds flows and the proportion of bottom-line earnings due to fundamental operations are manifested in the cross-sectional variability of E/P ratios.[12]

Our results are inconclusive on the role of systematic risk (beta) in explaining cross-sectional differences in P/E's. This result is consistent with the Beaver and Morse [1978]. However, the inventory valuation method is not consistently significant with the expected sign. This result is contradictory to that of Craig, et al., [1987]. Possible reasons for our result include

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[12] It should be noted that the regression coefficients for the earnings quality proxies which are based on the difference between earnings before extraordinary and discontinued operations and bottom-line accounting earnings generally have a higher level of significance and this may be attributed to the ease of observation for market participants.

(1) the effect of inventory valuation methods on E/P ratios is dominated by other variables, and (2) the security price may have reflected the real cash flow effect of the different inventory valuation methods.

The results of this study validate our measures of earnings quality and demonstrate the usefulness of our proxies for earnings quality in explaining cross-sectional differences in P/E (E/P) ratios. Future studies on the longitudinal and cross-sectional determinants of P/E (E/P) ratios should include these variables in the analysis.

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TABLE 1

Descriptive Statistics- Full Sample 1984

	N	Mean	Std Dev	Minimum	Maximum
E/P	199	0.101239	0.054466	0.009663	0.59008
EB/P	199	0.098313	0.044133	0.009663	0.37092
BETA	199	1.059729	0.362889	0.125000	1.93400
GR	199	0.032372	0.029396	0.000000	0.16282
DIV	199	0.360077	0.395722	0.000000	4.50943
SIZE	199	6.459580	1.967152	1.401700	11.0553
QCF	199	-.403180	0.185617	-.965420	0.90861
QEB	199	0.041842	0.288018	-.831900	2.98090
QCA	199	0.055942	0.029781	-.097969	0.23490
QXA	199	-.001799	0.016030	-.148200	0.07829
QCE	199	1.014023	2.143297	-.476060	27.9184
QXE	199	0.007832	0.369491	-.748800	4.94880
INV	199	0.311558	0.464298	0.000000	1.00000

Product Moment Correlations

	E/P	EB/P	BETA	GR	DIV	SIZE	QCF	QEB	QCA	QXA	QCE	QXE	INV
E/P	1.00	0.88	0.00	-.26	-.26	0.18	0.14	0.30	0.09	-.51	-.19	-.18	-.09
EB/P		1.00	-.04	-.31	-.21	0.28	0.08	-.09	0.08	-.08	-.16	0.07	-.09
BETA			1.00	0.16	-.25	-.10	-.02	0.03	-.10	-.04	-.05	-.06	0.10
GR				1.00	-.04	0.03	0.03	-.02	-.05	0.03	0.01	0.00	0.15
DIV					1.00	0.24	-.40	-.16	0.22	0.17	0.82	0.24	-.06
SIZE						1.00	-.30	-.18	0.34	0.13	0.14	0.10	-.14
QCF							1.00	0.05	-.69	-.13	-.51	-.20	-.03
QEB								1.00	0.18	-.90	-.06	-.47	0.00
QCA									1.00	-.15	0.31	0.16	-.09
QXA										1.00	0.11	0.57	0.04
QCE											1.00	0.24	-.00
QXE												1.00	-.03
INV													1.00

Table 1 - Continued

Definitions of Variables

E/P = Primary Earnings Per Share Divided by Year-end Closing Price

EB/P = Earnings Before Extra-ordinary Items and Discontinued Operations Per Share Divided By Year-end Closing Price

BETA = S&P Monthly Beta from COMPUSTAT CD PLUS

GR = Research and Development Expense Divided by Sales

DIV = Dividend Payout Ratio

SIZE = Logarithm of the Firm's Total Assets

QCF = (Accounting Earnings minus Funds from Operations) Divided by Funds from Operations

QEB = (Accounting Earnings minus Earnings Before Extra-ordinary Items and Discontinued Operations (EB)) Divided by EB

QCA = (Funds from Operations minus Accounting Earnings) Divided by Total Assets

QXA = (Earnings before Extra-ordinary Items and Discontinued Operations minus Earnings) Divided by Total Assets

QCE = (Funds from Operations minus Accounting Earnings) Divided by Accounting Earnings

QXE = (Earnings before Extra-ordinary Items and Discontinued Operations minus Earnings) Divided by Accounting EARNINGS

INV = 1 if FIFO is used and 0 if another inventory method is used

TABLE 2

Descriptive Statistics - Full Sample 1985

	N	Mean	Std Dev	Minimum	Maximum
E/P	199	0.075744	0.035966	0.005076	0.30179
EB/P	199	0.074179	0.034344	0.005076	0.30100
BETA	199	1.079251	0.361094	0.231000	2.05400
GR	199	0.034335	0.030943	0.000000	0.15643
DIV	199	0.407037	0.491465	0.000000	5.80640
SIZE	199	6.585601	1.963099	1.329500	11.1442
QCF	199	-.447397	0.203420	-.926950	1.00730
QEB	199	0.038889	0.256875	-.581100	1.97690
QCA	199	0.059703	0.032685	-.099132	0.20499
QXA	199	-.000636	0.007878	-.061700	0.03352
QCE	199	1.212917	1.585116	-.501830	12.6897
QXE	199	-.004042	0.175029	-.664100	1.38740
INV	199	0.316583	0.466316	0.000000	1.00000

Product Moment Correlations

	E/P	EB/P	BETA	GR	DIV	SIZE	QCF	QEB	QCA	QXA	QCE	QXE	INV
E/P	1.00	0.90	-.09	-.32	-.27	0.26	0.17	0.20	0.05	-.27	-.27	-.20	-.08
EB/P		1.00	-.12	-.31	-.21	0.35	0.14	-.15	0.08	0.10	-.21	0.17	-.10
BETA			1.00	0.28	-.08	-.05	-.04	0.11	-.03	-.09	0.06	-.06	0.11
GR				1.00	-.03	0.04	0.02	0.05	-.02	0.01	-.01	-.05	0.14
DIV					1.00	0.26	-.35	-.15	0.12	0.16	0.61	0.18	-.12
SIZE						1.00	-.26	-.15	0.31	0.16	0.19	0.20	-.16
QCF							1.00	-.01	-.70	-.05	-.69	-.09	0.07
QEB								1.00	0.06	-.85	-.03	-.77	0.09
QCA									1.00	-.01	0.35	0.08	-.17
QXA										1.00	0.08	0.86	-.07
QCE											1.00	0.17	-.04
QXE												1.00	-.01
INV													1.00

Table 2 - Continued

<u>Definitions of Variables</u>

E/P = Primary Earnings Per Share Divided by Year-end Closing Price

EB/P = Earnings Before Extra-ordinary Items and Discontinued Operations Per Share Divided By Year-end Closing Price

BETA = S&P Monthly Beta from COMPUSTAT CD PLUS

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QXA = (Earnings before Extra-ordinary Items and Discontinued Operations minus Earnings) Divided by Total Assets

QCE = (Funds from Operations minus Accounting Earnings) Divided by Accounting Earnings

QXE = (Earnings before Extra-ordinary Items and Discontinued Operations minus Earnings) Divided by Accounting EARNINGS

INV = 1 if FIFO is used and 0 if another inventory method is used

TABLE 3

Descriptive Statistics - Full Sample 1986

	N	Mean	Std Dev	Minimum	Maximum
E/P	199	0.066384	0.032394	0.002277	0.29813
EB/P	199	0.065321	0.028001	0.002277	0.25500
BETA	199	1.047673	0.324866	0.212000	2.06500
GR	199	0.035064	0.030623	0.000000	0.13708
DIV	199	0.529256	1.023206	0.000000	9.62500
SIZE	199	6.721212	1.945158	1.356900	11.1926
QCF	199	-.454020	0.214790	-.987760	0.46730
QEB	199	0.061182	0.536066	-.887800	5.14550
QCA	199	0.057850	0.029770	-.014766	0.17270
QXA	199	-.000671	0.013419	-.112500	0.05870
QCE	199	1.760601	5.995240	-.319000	80.6929
QXE	199	0.067725	0.680554	-.837000	7.91410
INV	199	0.336683	0.473767	0.000000	1.00000

Product Moment Correlations

	E/P	EB/P	BETA	GR	DIV	SIZE	QCF	QEB	QCA	QXA	QCE	QXE	INV
E/P	1.00	0.69	0.03	-.21	-.33	0.13	0.29	0.49	-.14	-.45	-.25	-.25	-.11
EB/P		1.00	0.02	-.26	-.30	0.10	0.08	-.19	-.04	0.22	-.22	0.12	-.11
BETA			1.00	0.25	-.06	0.04	0.11	0.03	-.13	-.03	-.02	-.06	-.00
GR				1.00	-.08	0.05	0.03	-.03	0.00	-.00	-.03	-.07	0.17
DIV					1.00	0.14	-.40	-.08	0.28	0.19	0.81	0.39	-.08
SIZE						1.00	-.15	0.00	0.22	-.03	0.08	-.10	-.17
QCF							1.00	0.23	-.71	-.28	-.39	-.29	0.07
QEB								1.00	-.06	-.93	-.05	-.36	-.01
QCA									1.00	0.06	0.33	0.13	-.16
QXA										1.00	0.09	0.59	0.00
QCE											1.00	0.15	-.06
QXE												1.00	-.02
INV													1.00

Table 3 - Continued

<u>Definitions of Variables</u>

E/P = Primary Earnings Per Share Divided by Year-end Closing Price

EB/P = Earnings Before Extra-ordinary Items and Discontinued Operations Per Share Divided By Year-end Closing Price

BETA = S&P Monthly Beta from COMPUSTAT CD PLUS

GR = Research and Development Expense Divided by Sales

DIV = Dividend Payout Ratio

SIZE = Logarithm of the Firm's Total Assets

QCF = (Accounting Earnings minus Funds from Operations) Divided by Funds from Operations

QEB = (Accounting Earnings minus Earnings Before Extra-ordinary Items and Discontinued Operations (EB)) Divided by EB

QCA = (Funds from Operations minus Accounting Earnings) Divided by Total Assets

QXA = (Earnings before Extra-ordinary Items and Discontinued Operations minus Earnings) Divided by Total Assets

QCE = (Funds from Operations minus Accounting Earnings) Divided by Accounting Earnings

QXE = (Earnings before Extra-ordinary Items and Discontinued Operations minus Earnings) Divided by Accounting EARNINGS

INV = 1 if FIFO is used and 0 if another inventory method is used

TABLE 4
Descriptive Statistics - Full Sample 1987

	N	Mean	Std Dev	Minimum	Maximum
E/P	199	0.084084	0.046695	0.003200	0.44360
EB/P	199	0.080366	0.037631	0.000326	0.31362
BETA	199	1.116131	0.287122	0.295000	2.22400
GR	199	0.034288	0.031144	0.000000	0.15129
DIV	199	0.426156	0.853125	0.000000	10.0000
SIZE	199	6.829988	1.951119	1.323600	11.3785
QCF	199	-.384396	0.500161	-.971290	5.12970
QEB	199	0.454022	4.609322	-.880690	59.9729
QCA	199	0.056353	0.062520	-.173400	0.77888
QXA	199	-.003000	0.029783	-.412450	0.02300
QCE	199	1.341970	3.110238	-.836860	33.8286
QXE	199	0.010259	0.539553	-.983600	7.38122
INV	199	0.331658	0.471996	0.000000	1.00000

Product Moment Correlations

	E/P	EB/P	BETA	GR	DIV	SIZE	QCF	QEB	QCA	QXA	QCE	QXE	INV
E/P	1.00	0.74	0.05	-.22	-.18	0.09	0.29	0.12	0.32	-.57	-.27	-.18	-.17
EB/P		1.00	0.07	-.24	-.19	0.10	0.31	-.18	-.23	0.11	-.32	-.03	-.19
BETA			1.00	0.25	-.12	-.05	-.02	-.04	0.01	0.00	0.04	0.05	-.06
GR				1.00	-.15	0.07	-.09	-.04	0.03	0.04	0.09	0.02	0.14
DIV					1.00	0.06	-.09	0.08	0.02	0.03	0.66	0.11	-.04
SIZE						1.00	-.11	0.04	0.13	-.01	0.04	-.10	-.15
QCF							1.00	-.06	-.44	-.08	-.28	-.09	0.06
QEB								1.00	0.34	-.41	0.08	-.18	0.07
QCA									1.00	-.77	0.12	-.07	-.12
QXA										1.00	0.02	0.20	0.02
QCE											1.00	0.38	-.00
QXE												1.00	-.07
INV													1.00

Table 4 - Continued

Definitions of Variables

E/P = Primary Earnings Per Share Divided by Year-end Closing Price

EB/P = Earnings Before Extra-ordinary Items and Discontinued Operations Per Share Divided By Year-end Closing Price

BETA = S&P Monthly Beta from COMPUSTAT CD PLUS

GR = Research and Development Expense Divided by Sales

DIV = Dividend Payout Ratio

SIZE = Logarithm of the Firm's Total Assets

QCF = (Accounting Earnings minus Funds from Operations) Divided by Funds from Operations

QEB = (Accounting Earnings minus Earnings Before Extra-ordinary Items and Discontinued Operations (EB)) Divided by EB

QCA = (Funds from Operations minus Accounting Earnings) Divided by Total Assets

QXA = (Earnings before Extra-ordinary Items and Discontinued Operations minus Earnings) Divided by Total Assets

QCE = (Funds from Operations minus Accounting Earnings) Divided by Accounting Earnings

QXE = (Earnings before Extra-ordinary Items and Discontinued Operations minus Earnings) Divided by Accounting EARNINGS

INV = 1 if FIFO is used and 0 if another inventory method is used

Table 5

Regression results for Model M1
(Full Sample)

$$E/P = \gamma_0 + \gamma_1 BETA + \gamma_2 GR + \gamma_3 DIV + \gamma_4 SIZE + \gamma_5 QCF + \gamma_6 QEB + \gamma_7 INV + \epsilon$$

Coefficient with t-statistic in parentheses

Variable	1984	1985	1986	1987
Intercept (+/-)	0.087 (6.140)*	0.064 (7.063)*	0.067 (7.891)*	0.081 (5.237)*
BETA (+/-)	-0.000 (-0.006)	0.001 (0.130)	0.004 (0.982)	0.011 (1.160)
GR (-)	-0.493 (-4.764)#	-0.405 (-6.405)#	-0.231 (-4.089)#	-0.262 (-2.740)##
DIV (-)	-0.036 (-6.015)#	-0.017 (-5.654)#	-0.008 (-6.288)#	-0.009 (-3.230)#
SIZE (+)	0.010 (5.825)#	0.008 (8.090)#	0.003 (3.604)#	0.003 (2.012)##
QCF (+)	0.055 (4.072)#	0.055 (6.891)#	0.033 (4.780)#	0.033 (6.688)#
QEB (+)	0.047 (6.420)*	0.043 (8.001)#	0.027 (11.395)#	0.002 (3.222)#
INV (+)	-0.000 (-0.063)	-0.003 (-0.675)	-0.005 (-1.418)	-0.015 (-2.535)**
R^2 for full model	.30	.39	.41	.21
R^2 when earnings quality is omitted	.20	.31	.21	.12

System R^2 = .48   System R^2 when earnings quality is omitted = .25

see Tables 1-4 for definitions of the variables
* : significant at .001 level, two tailed test
**: significant at .05 level, two tailed test
#: significant at .001 level, one tailed test
##: significant at .05 level, one tailed test

Table 6

Regression results for Model M1
(Outliers Deleted)

$$E/P = \gamma_0 + \gamma_1 \text{ BETA} + \gamma_2 \text{ GR} + \gamma_3 \text{ DIV} + \gamma_4 \text{ SIZE} + \gamma_5 \text{ QCF} + \gamma_6 \text{ QEB} + \gamma_7 \text{ INV} + \epsilon$$

Coefficient with t-statistics in parentheses

Variable	1984	1985	1986	1987
Intercept (+/-)	0.086 (5.848)*	0.070 (8.047)*	0.065 (7.736)*	0.074 (5.940)*
BETA (+/-)	-0.004 (-0.550)	-0.006 (-1.447)	0.002 (0.360)	0.012 (1.720)
GR (-)	-0.470 (-4.483)#	-0.398 (-6.554)#	-0.265 (-4.697)*	-0.259 (-3.346)#
DIV (-)	-0.054 (-5.369)#	-0.040 (-8.280)#	-0.028 (-7.294)#	-0.008 (-2.232)##
SIZE (+)	0.010 (5.809)#	0.009 (8.205)#	0.005 (4.795)#	0.003 (2.588)##
QCF (+)	0.035 (2.542)##	0.035 (4.569)#	0.022 (3.406)#	0.032 (8.060)#
QEB (+)	0.046 (6.218)#	0.043 (8.761)#	0.028 (12.216)#	0.038 (1.720)##
INV (+)	-0.000 (-0.077)	-0.002 (-0.635)	-0.003 (-0.810)	-0.011 (-2.383)**
R^2 for full model	.31	.42	.40	.23
R^2 when earnings quality is omitted	.22	.37	.19	.10

System R^2 = .50   System R^2 when earnings quality is omitted = .27

see Tables 1-4 for definitions of the variables
* : significant at .001 level, two tailed test
**: significant at .05 level, two tailed test
#: significant at .001 level, one tailed test
##: significant at .05 level, one tailed test

Table 7

Regression results for Model M2
(Full Sample)

$$E/P = \gamma_0 + \gamma_1 \text{ BETA} + \gamma_2 \text{ GR} + \gamma_3 \text{ DIV} + \gamma_4 \text{ SIZE} + \gamma_5 \text{ QCE} + \gamma_6 \text{ QXE} + \gamma_7 \text{ INV} + \epsilon$$

Coefficient with t-statistics in parentheses

Variable	1984	1985	1986	1987
Intercept (+/-)	0.087 (5.670)*	0.047 (5.148)*	0.056 (5.864)*	0.072 (4.292)*
BETA (+/-)	-0.002 (-0.246)	0.004 (0.783)	0.009 (1.601)	0.015 (1.447)
GR (-)	-0.483 (-4.331)#	-0.416 (-6.377)#	-0.273 (-4.028)#	-0.308 (-2.962)##
DIV (-)	-0.041 (-3.451)#	-0.012 (-3.005)##	-0.011 (-3.306)#	-0.005 (-0.995)
SIZE (+)	0.008 (4.299)#	0.008 (7.240)#	0.003 (2.417)##	0.002 (1.411)
QCE (-)	-0.001 (-0.240)	-0.006 (-4.852)#	0.000 (0.401)	-0.002 (-1.502)
QXE (-)	-0.020 (-3.222)#	-0.044 (-5.165)#	-0.008 (-2.645)##	-0.009 (-1.533)
INV (+)	-0.005 (-0.845)	0.000 (0.018)	-0.006 (-1.366)	-0.013 (-2.020)**
R^2 for full model	.23	.37	.21	.14
R^2 when earnings quality is omitted	.20	.31	.21	.12

System R^2 = .32 System R^2 when earnings quality is omitted = .25

see Tables 1-4 for definitions of the variables
* : significant at .001 level, two tailed test
**: significant at .05 level, two tailed test
#: significant at .001 level, one tailed test
##: significant at .05 level, one tailed test

Table 8

Regression results for Model M2
(Outliers Deleted)

$$E/P = \gamma_0 + \gamma_1 \text{ BETA} + \gamma_2 \text{ GR} + \gamma_3 \text{ DIV} + \gamma_4 \text{ SIZE} + \gamma_5 \text{ QCE} + \gamma_6 \text{ QXE} + \gamma_7 \text{ INV} + e$$

Coefficient with t-statistics in parentheses

Variable	1984	1985	1986	1987
Intercept (+/-)	0.094 (6.009)*	0.062 (6.878)*	0.061 (6.624)*	0.072 (5.530)*
BETA (+/-)	-0.009 (-1.091)	-0.005 (-1.118)	0.005 (1.018)	0.014 (1.934)
GR (-)	-0.408 (-3.617)#	-0.380 (-6.085)#	-0.295 (-4.541)#	-0.220 (-2.728)##
DIV (-)	-0.058 (-4.621)#	-0.038 (-6.608)#	0.025 (-4.502)#	-0.007 (-1.807)##
SIZE (+)	0.008 (4.374)#	0.008 (7.531)#	0.004 (3.799)#	0.003 (2.073)##
QCE (-)	-0.001 (-0.190)	-0.004 (-2.358)##	-0.004 (-2.240)##	-0.011 (-5.750)#
QXE (-)	-0.017 (-2.265)##	-0.049 (-5.426)#	-0.025 (-4.094)#	-0.119 (-3.937)#
INV (+)	-0.006 (-0.975)	-0.001 (-0.297)	-0.005 (-1.176)	-0.010 (-2.169)**
R^2 for full model	.22	.41	.25	.20
R^2 when earnings quality is omitted	.22	.37	.19	.10

System R^2 = .37   System R^2 when earnings quality is omitted = .27

see Tables 1-4 for definitions of the variables
* : significant at .001 level, two tailed test
**: significant at .05 level, two tailed test
#: significant at .001 level, one tailed test
##: significant at .05 level, one tailed test

Table 9

Regression results for Model M3
(Full Sample)

$$E/P = \gamma_0 + \gamma_1 \, BETA + \gamma_2 \, GR + \gamma_3 \, DIV + \gamma_4 \, SIZE + \gamma_5 \, QCA + \gamma_6 \, QXA + \gamma_7 \, INV + \epsilon$$

Coefficient with t-statistics in parentheses

Variable	1984	1985	1986	1987
Intercept (+/-)	0.073 (5.707)*	0.052 (5.768)*	0.063 (7.143)*	0.078 (6.291)*
BETA (+/-)	0.001 (0.171)	-0.001 (-0.158)	0.006 (1.257)	0.013 (1.859)
GR (-)	-0.506 (-5.428)#	-0.401 (-6.281)#	-0.266 (-4.445)#	-0.300 (-3.872)#
DIV (-)	-0.029 (-5.092)#	-0.023 (-7.501)#	0.008 (-5.899)#	-0.009 (-3.908)#
SIZE (+)	0.009 (5.688)#	0.008 (7.262)#	0.003 (3.188)#	0.003 (2.754)##
QCA (-)	-0.085 (-1.112)	-0.063 (-1.301)	-0.151 (-2.927)##	-0.322 (-6.590)#
QXA (-)	-1.347 (-10.374)#	-1.426 (-7.581)#	-1.105 (-10.593)#	-1.420 (-13.963)#
INV (+)	-0.002 (-0.287)	-0.003 (-0.688)	-0.006 (-1.675)	-0.014 (-2.987)**
R^2 for full model	.44	.38	.35	.47
R^2 when earnings quality is omitted	.20	.31	.21	.19

System R^2 = .53 System R^2 when earnings quality is omitted = .25

see Tables 1-4 for definitions of the variables
* : significant at .001 level, two tailed test
**: significant at .05 level, two tailed test
#: significant at .001 level, one tailed test
##: significant at .05 level, one tailed test

Table 10

Regression results for Model M3
(Outliers Deleted)

$$E/P = \gamma_0 + \gamma_1 \text{ BETA} + \gamma_2 \text{ GR} + \gamma_3 \text{ DIV} + \gamma_4 \text{ SIZE} + \gamma_5 \text{ QCA} + \gamma_6 \text{ QXA} + \gamma_7 \text{ INV} + \epsilon$$

Coefficient with t-statistics in parentheses

Variable	1984	1985	1986	1987
Intercept (+/-)	0.078 (5.886)*	0.064 (7.365)*	0.064 (7.325)*	0.079 (6.084)*
BETA (+/-)	-0.003 (-0.524)	-0.007 (-1.551)	0.004 (0.841)	0.013 (1.762)
GR (-)	-0.461 (-4.881)#	-0.385 (-6.339)#	-0.285 (-4.812)#	-0.256 (-3.227)#
DIV (-)	-0.054 (-5.983)#	-0.047 (-10.406)#	-0.029 (-6.882)#	-0.008 (-2.130)##
SIZE (+)	0.009 (5.834)#	0.008 (7.550)#	0.005 (4.521)#	0.003 (2.625)##
QCA (-)	-0.016 (-0.218)	-0.022 (-0.502)	-0.151 (-3.124)##	-0.336 (-5.715)#
QXA (-)	-1.230 (-9.599)#	-1.434 (-8.329)#	-1.128 (-11.074)#	-1.375 (-4.006)#
INV (+)	-0.002 (-0.292)	-0.003 (-0.708)	-0.004 (-1.117)	-0.013 (-2.767)**
R^2 for full model	.45	.43	.35	.20
R^2 when earnings quality is omitted	.22	.37	.19	.10

System R^2 = .50 System R^2 when earnings quality is omitted = .27

see Tables 1-4 for definitions of the variables
* : significant at .001 level, two tailed test
**: significant at .05 level, two tailed test
#: significant at .001 level, one tailed test
##: significant at .05 level, one tailed test

Table 11

Regression results for Model M1
(Full Sample, Funds Flow Only)

$$EB/P = \gamma_0 + \gamma_1 BETA + \gamma_2 GR + \gamma_3 DIV + \gamma_4 SIZE + \gamma_5 QCF + \gamma_6 INV + e$$

Coefficient with t-statistics in parentheses

Variable	1984	1985	1986	1987
Intercept (+/-)	0.076 (6.540)*	0.053 (6.112)*	0.062 (7.394)*	0.071 (5.985)*
BETA (+/-)	0.002 (0.282)	0.002 (0.522)	0.007 (1.708)	0.015 (2.213)**
GR (-)	-0.508 (-5.988)#	-0.394 (-6.468)#	-0.284 (-5.051)#	-0.303 (-4.086)#
DIV (-)	-0.021 (-4.179)#	-0.016 (-5.645)#	-0.009 (-6.898)#	-0.009 (-4.524)#
SIZE (+)	0.009 (6.258)#	0.009 (8.483)#	0.003 (2.797)##	0.003 (2.634)##
QCF (+)	0.029 (2.574)##	0.040 (5.328)#	0.013 (2.074)##	0.029 (8.263)#
INV (+)	0.001 (0.173)	-0.001 (-0.374)	-0.003 (-1.015)	-0.010 (-2.310)**
		System R^2	.345	

see Tables 1-4 for definitions of the variables

* : significant at .001 level, two tailed test
**: significant at .05 level, two tailed test
#: significant at .001 level, one tailed test
##: significant at .05 level, one tailed test