A Further Inquiry into the Market Value and Earnings' Yield
Anaomalies

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Working Paper 82-114*

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ABSTRACT

The apparent existence of two stock market anomalies, the earnings' yield (E/P ratio) and the market value (MV) effects, has stimulated considerable research. This study expands the E/P-MV literature by detecting the following: (1) both an E/P and a MV effect exist among a sample of industrial stocks over the 1970–1980 period; (2) using risk-adjusted returns, each of the E/P and MV effects persisted even after controlling the other; (3) an adjustment for a significant time bias in the returns data caused the MV anomaly to disappear after controlling for E/P ratios, but a significant E/P effect remained; and (4) in extreme instances (high E/P's and small MV's combined) the two anomalies appear to be independent and their combined return impact additive.
Researchers have recently detected empirical relationships between earnings' yield, firm market value (size), and common stock returns that are inconsistent with the primary assertions of the one-period, two-parameter capital asset pricing model (CAPM) of Sharpe [23], Lintner [12], and Black [5]. Basu [3] reveals that portfolios of low price-earnings ratio (high earnings' yield) New York Stock Exchange (NYSE) securities yielded "abnormal" absolute and risk-adjusted rates of return over long periods of time. Banz [2] and Reinganum [18] show that portfolios consisting of "small firms" listed on the NYSE and the American Stock Exchange (AMEX) persistently earned returns that were notably higher than implied by the CAPM. Basu attributes his findings to the existence of a market inefficiency, but Banz and Reinganum contend that their results are more likely attributable to a misspecification of the CAPM due to the omission of certain undefined risk factors. Furthermore, Reinganum indicates, and Banz concurs, that the size effect largely subsumes the earnings' yield effect for non-risk-adjusted returns.

The purpose of this study is to "re-open" the controversy surrounding the earnings' yield (E/P ratio) and market value (MV) effects. Section I examines the E/P effect and common stock returns. The findings reveal that portfolios comprised of high E/P securities systematically earned abnormal risk-adjusted returns during the 1970-1980 period. Also, low E/P portfolios considerably underperformed both average and high E/P counterparts. These results coincide with Basu's findings.

The market value anomaly is investigated in Section II. Empirical results indicate that portfolios consisting of low market value firms provided positive abnormal risk-adjusted returns over the same 1970-1980 period. Thus,
these results confirm the findings of Banz and Reinganum -- small market value firms do provide abnormal rates of return.

Section III delves into the relationship between the size and \( E/P \) effects. The application of Reinganum's cross classification control procedure produces the result that might be expected when applying his betas to his excess returns, i.e., both the \( E/P \) and \( MV \) effects are still present. However, Reinganum elects to aggregate \( E/P \) ratios and firm sizes into a single time dimension vector -- leading to a somewhat distorted notion of what actually constitutes an extreme example of an \( E/P \) ratio or firm size. As a result, due to the violent fluctuations in annual \( E/P \) means over the observed time period, a severe bias is introduced into the formation of \( E/P \) groups. \( E/P \) ratios are deemed "low" or "high" relative to the overall multiyear \( E/P \) mean, rather than relative to the \( E/P \) mean for the year from which the observation is taken.

After standardizing \( E/P \) ratios and firm sizes to eliminate significant time-related changes in these variables' mean values, a new classification matrix is created. Reinganum's control procedure is again employed. No longer does the size effect dominate the \( E/P \) effect. In fact, after standardizing \( E/P \)'s and firm sizes, the \( E/P \) ratio emerges as the only statistically significant factor. Therefore, the \( E/P \) effect does not seem to be merely a proxy for the \( MV \) effect. On the contrary, the chain of causation appears to work in the other direction. Finally, some concluding remarks are presented in Section IV.

I. The \( E/P \) Effect and Portfolio Returns

The assertion that high \( E/P \) ratio securities outperform low \( E/P \) counterparts originates with Nicholson [16]. Subsequent studies confirm Nicholson's early findings (see McWilliams [13], Miller and Widmann [14], Breen [6], Breen and Savage [7], and Nicholson [17]. But none of these pioneering efforts
threaten the CAPM's validity because they neglect to adjust returns for risk. However, Basu [4] presents a more robust challenge to the CAPM by demonstrating that high E/P portfolios tend to earn abnormally high rates of return, even after risk-adjustment.

In this section, the findings reveal that high E/P portfolios provide a risk-adjusted return significantly higher than that suggested by the CAPM. Furthermore, low E/P portfolios tend to generate lower risk-adjusted returns than the CAPM warrants.

A. The Data

The data for this study is compiled from the COMPUSTAT monthly price-dividend-earnings (P-D-E) tapes and the COMPUSTAT quarterly industrial files. A sample of 125 randomly-selected industrial companies is chosen subject to the following constraints: (1) the firm's fiscal year ends December 31, (2) the firm's common stock traded continuously from December 31, 1969 to June 30, 1980, and (3) the relevant accounting and return data is available. The Standard & Poor's "400" value-weighted index returns are also obtained from the COMPUSTAT files. Monthly Treasury-bill rates are retrieved from the Federal Reserve Bulletin.

B. Methodology

The earnings' yield for all sample firms is computed quarterly from the beginning of 1970 to mid-year 1980. The numerator of the ratio is the sum of the four most recent quarterly earnings per common share after extraordinary items and discontinued operations (e.p.s.) and the denominator is the closing market price per share at the quarter's end. It is assumed that by the end of a quarter investors are able to correctly anticipate that quarter's actual e.p.s. This assumption is substantiated by Ball and Brown [1] and consistent
with Reinganum [18]. Negative E/P observations are excluded from the E/P portfolios. The stocks are ranked in ascending order by their respective E/P magnitudes and grouped into portfolio quintiles so that the lowest quintile (EP1) includes firms with the lowest E/P ratios and the highest quintile (EP5) consists of the highest E/P firms. The quarterly mean portfolio return for each quintile is then calculated, assuming an equal initial investment in each stock.1 This procedure is repeated at the end of each quarter, thus providing 42 consecutive quarters of return data for each of the five E/P portfolios. In this manner, the composition of each portfolio is adjusted quarterly to reflect shifts in E/P rankings.

The above return calculations, however, do not compensate for differences in systematic risk among the E/P portfolios. The CAPM postulates that if capital markets are influenced by risk-averse investors and are in equilibrium, returns must incorporate a risk premium. When the assumptions of the CAPM are met, a security's risk premium may be estimated by the following variation of the asset pricing equation:

\[
 r_{i,t} - r_{f,t} = \hat{\alpha}_i + \hat{\beta}_i [r_{m,t} - r_{f,t}] + e_{i,t}
\]

where \( r_{i,t} \) = return on security \( i \) in period \( t \).
\( r_{f,t} \) = return on the "risk-free" asset in period \( t \).
\( r_{m,t} \) = return on the "market" portfolio in period \( t \).
\( \hat{\alpha}_i \) = "abnormal" return for security \( i \) measured by the estimated OLS intercept.
\( \hat{\beta}_i \) = systematic risk (beta) for security \( i \), measured by the estimated OLS slope.
\( e_{i,t} \) = security specific disturbance term.
The Treynor return-to-volatility measure is used to adjust returns for systematic risk. This procedure converts a security's excess return \( (r_{i,t} - r_{f,t} = r_{i,t}' \) to a risk-adjusted return by standardizing the respective security's return by its beta coefficient, i.e., \( r_{i,t}' / \hat{\beta}_{i,t} \).

The systematic risk coefficients are averaged across the firms within each portfolio to estimate the portfolio's systematic risk \( \hat{\beta}_{p,t} \) in period \( t \),

\[
\hat{\beta}_{p,t} = \frac{1}{N_{p,t}} \sum_{i=1}^{N_{p,t}} \hat{\beta}_{i,t}
\]

where \( N_{p,t} \) is the number of stocks in portfolio \( p \) in period \( t \). Each quarterly risk-adjusted excess portfolio return is obtained by averaging cross-sectionally the risk-adjusted excess returns of the individual securities belonging to the relevant portfolio,

\[
r_{p,t}' = \frac{1}{N_{p,t}} \sum_{i=1}^{N_{p,t}} r_{i,t}'
\]

Therefore, the risk-adjusted mean excess returns are calculated for each of the five relative E/P portfolios for a series of 42 consecutive quarters \( (t = 1, \ldots, 42) \). The geometric mean excess return for each E/P quintile over the entire period is then computed,

\[
\bar{r}_{p} = \prod_{t=1}^{n} (1 + r_{p,t}')^{1/n} - 1
\]

where \( n \) denotes the number of quarters in the overall period.

The resultant mean quarterly excess returns are observed to determine if significant return differences exist among the various E/P and MV portfolios. These results are presented and explained in the following sections.
C. Performance of E/P Portfolios

The CAPM postulates that the risk (beta)-adjusted returns of various diversified portfolios should be identical. In a perfect CAPM world an investor cannot earn a portfolio return in excess of that implied by the asset pricing equation. Thus, one can hypothesize that, after risk-adjustment, there is no difference in expected returns among alternative portfolios. In this context, the "excess" return, i.e., the actual risk-adjusted return minus the CAPM expected return, for all five E/P portfolios should equal zero.

The risk-adjusted mean excess returns and average betas for the five E/P portfolios are reported in Table I. Over the entire 10 1/2-year time horizon, the average quarterly excess return of portfolio EP5 is 2.80 percent higher than the average return suggested by its systematic risk level. Moreover, portfolio EP1 shows an average quarterly excess return that is 2.42 less than that implied by its beta risk. In fact, the risk-adjusted excess returns enlarge monotonically as the portfolio mean E/P ratio increases. A one-way analysis of variance test is used to determine the statistical significance of the return differences among E/P quintiles. The calculated F-Statistic and corresponding significance level (Table I) confirm that the risk-adjusted return differences among E/P portfolios are statistically significant beyond the 1% level. Furthermore, the individual portfolio's t-values reveal that portfolio EP5 returned statistically significant (beyond the .01 level) positive excess returns, whereas portfolio EP1 generated significant negative excess returns.

(Insert Table I Here)

Therefore, portfolio returns not only differ across E/P portfolios, but also move directly with the overall E/P magnitude of the respective portfolios. Although these findings directly conflict with the primary CAPM
assertion of equality among risk-adjusted portfolio returns, they verify the earlier conclusions of Basu, Banz and Reinganum that either the CAPM is mis-specified or that capital markets are inefficient (or both).

One should note that before risk adjustment the differences in excess returns among the E/P quintiles would not be as substantial. The average beta for portfolio EP1 equals 1.16 indicating a higher-than-market systematic risk level, whereas portfolio EP5 has a lower-than-market mean beta of 0.92. Overall, the mean portfolio betas reveal that high E/P portfolios are not associated with more systematic risk than are low E/P portfolios. Thus, the application of high betas to the already negative absolute excess returns of portfolio EP1 causes these returns to collapse even further. Also, the use of low betas to risk-adjust the already high absolute excess returns of portfolio EP5 accentuates the positive abnormal returns. Therefore, an interesting dichotomy is detected: high E/P portfolios generate greater-than-average returns at less-than-average systematic risk levels, while exactly the opposite results emerge for low E/P portfolios.

II. Rates of Return For MV Portfolio

Since the seminal studies of Banz [2] and Reinganum [18], the small size effect has been the focus of considerable attention in the financial and academic literature. A size-related anomaly, similar to that found using U.S.A. security returns, is detected with Canadian data (see Morgan, MacBeth and Novak [15]). Keim [11] and Reinganum [20] observe a continuing size effect but illustrate that after the removal of abnormal returns occurring in January, the effect substantially disappears (the "January effect"). Brown, Kleidon and Marsh [8] show that, although the size effect exists, it tends to be unstable over time, i.e., sensitive to the time period studied. Several attempts have been made to provide an explanation for the existence of this
anomaly (see Basu [4], Stoll and Whaley [25], and Roll [21]). However, these explanatory efforts have either been discounted by subsequent research (see Reinganum [19]) or not broadly accepted as sufficient to account for the persistence of the size effect. As a testimony to the popularity of the effect, researchers and practitioners recently have united to devise actual portfolios based upon small firms' stocks (see Jansson [10]).

While Basu [3] and Banz [2] independently observe separate E/P and MV effects, respectively, Reinganum [18] detects the existence of both an E/P and MV effect in his sample of common stocks. Accordingly, the next phase of this analysis centers on replicating Reinganum's discovery, i.e., establishing that an MV effect exists on the sample of securities used to reveal the E/P anomaly.

A. Data and Methodology

To confirm the presence of a MV effect, the same sample of firms as described in Section I.A is employed. The market value for all sample firms is calculated at quarterly intervals from the first quarter of 1970 to the second quarter of 1980. A firm's MV for a quarter is defined as the product of the number of common shares outstanding and the stock's closing share market price at quarter end (closing bid prices are used for over-the-counter securities). In this sense, a firm's MV can fluctuate from quarter-to-quarter as a result of either a change in shares outstanding or a change in the stock's price (or due to simultaneous changes in both factors).

The stocks are ranked according to their quarterly market values and grouped into portfolio quintiles (MV1 = lowest MV firms, ..., MV5 = highest MV firms). Both actual and risk-adjusted excess returns are computed for each MV portfolio, using equal weightings on each component security. Therefore, each portfolio is revised quarterly to account for relative changes in firm values.
B. Performance of MV Portfolios

The risk-adjusted mean excess returns and the average betas for the MV quintiles are presented in Table II. On balance, the mean portfolio beta varies, directly with the portfolio's average market value. In this manner, the portfolio of smallest firms possesses the highest beta risk, whereas the portfolio of largest firms has the lowest beta risk. Due to the beta characteristics of the various MV portfolios, the observance of risk-adjusted portfolio returns reveals a smaller size effect than would the observance of non-adjusted returns. The high beta level of the smallest firms causes the excess returns to collapse after risk-adjusting. On the other hand, the application of the lower-than-average betas for large MV firms tends to expand excess returns when risk adjusting. Although obviously diminishing in magnitude after beta risk-adjustment, the size effect still persists. The average quarterly excess return of portfolio MV1 is 1.30 percent higher than implied by its beta risk. Portfolio MV5 shows an average quarterly excess return that is 1.61 percent less than its beta risk warrants. These portfolios' returns have associated t-values that are statistically significant at the .05 and .01 levels, respectively, indicating that each extreme MV portfolio yields a return inconsistent with that implied by the CAPM. Also, the high F-Statistic (7.22) reveals that mean returns differ significantly among the various MV portfolios. Excess returns decrease monotonically as portfolio MV increases. Thus, the findings support that a significant size effect exists in this sample along with the previously detected E/P effect.

(Insert Table II Here)
III. Relationship Between the E/P and Value Effects

In Section I, a significant E/P effect is detected in a sample of industrial common stocks. Section II presents evidence illustrating that the value anomaly also appears in this same sample of securities. However, no evidence has been offered to determine whether the E/P and MV anomalies are independent or whether the two effects are related to the same factor(s). If the two effects are independent, one might surmise that excess returns could be enhanced by adhering to a high E/P-small MV investment strategy. On the other hand, if the two effects are highly interrelated, then there most likely would not exist an additive return possibility, because one effect would proxy for the other. The relationship between the E/P and MV anomalies is explored in this section to determine if the two effects are independent or related.

Three progressively more rigorous methodologies are applied in order to examine the relative importance of the two anomalies. These methodologies differ in two major dimensions, as dictated by the way in which they answer the following questions: (1) Is each security variable (E/P or MV) classified (ranked) by an absolute scale or relative to some predefined factors? (2) Is the classification of one test variable performed independent of or with respect to the second test variable?

Initially, the cross classification control procedure used by Reinganum [18] is employed. This is the first methodological design and is developed in Section III.A. Classification is performed with an absolute ranking scale and each variable is categorized independent of the other. This means that the two test variables, E/P and MV, are classified into cells according to numeric limits which are predefined and fixed for all time periods. Furthermore, each parameter is classified separately into categories without consideration of the other variable. This is the least rigorous methodology because of time
fluctuations in the variables and because one variable does not strictly control the other. This procedure will be further elucidated later.

A second (intermediate) level methodology is utilized next. In methodology II (Section III.C), classification of the variables is performed on a relative basis into percentiles for each time period. This prevents the partial randomization of the variables due to time variability. In methodology II, each variable is still classified into categories so that one variable is independent of the other.

The final methodology to be applied, methodology III (Section III.D), is the most rigorous test control procedure. Here, one variable is initially classified into quintiles on a relative basis, as in methodology II. Then a secondary classification is performed but only within each of the primary quintile categories. This second classification, which is also performed on a relative basis, is strictly dependent on the first classification. This procedure yields tight control for the first variable while testing the second. To complete this type of experiment, the procedure must be repeated in reverse so that the first variable can be tested while controlling for the second.

The detailed experimental procedures are described in the following sections.

A. E/P and Value Interactions

A two-way cross classification scheme is devised. Each quarterly excess return observation is categorized according to the E/P quintile and the MV quintile to which it jointly belongs. Each quintile's boundary is established by averaging the respective E/P and MV values over the 42 quarterly portfolio formation periods -- compatible with the manner in which Reinganum classifies observations. Table III presents the observations which fall into each of the 25 EP/MV portfolio cells and in so doing reveals a distribution pattern similar to that detected by Reinganum. In particular, one may note two apparent
positive correlations: low E/P ratios and large market values (7.7 percent of all observations) and high E/P's and small MV's (6.1 percent of total observations). Also evident is the scarcity of firms with high E/P ratios and large values (only 1.5 percent of the observations). The seeming relationships between high E/P and small MV firms along with the strong correlation of low E/P and large MV firms might lead one to believe that the two anomalies are not independent, but rather one effect merely proxies for the other. Are high and low E/P ratios, respectively, merely surrogates alternately for large and small MV firms? Indeed, Reinganum addresses this query and concludes that the E/P and MV anomalies are interrelated and, as such, E/P ratios indirectly proxy for the same factors that generate the value anomaly.

(Insert Table III Here)

Table IV provides the risk-adjusted mean excess returns for 25 portfolios based on E/P ratios and market values. An observation is classified into the appropriate cell based jointly upon its respective E/P ratio and MV amount. In this manner, one can observe whether an E/P effect still exists after controlling for the value effect, and vice versa. The results show that, after risk-adjustment, both the E/P and MV anomalies persist. The associated F-Statistics for both anomalies are statistically significant at the .01 probability level. These findings differ from an earlier conclusion in that Reinganum [18] shows the E/P effect to substantially disappear after controlling for market value, leading him to conclude that the MV effect largely subsumes the earnings' yield effect.

(Insert Table IV Here)
One explanation for these contradictory results could be that the respective firm samples possess different E/P and MV characteristics. A more likely explanation, however, revolves around the fact that Reinganum elects to use non-risk-adjusted returns, whereas risk-adjusted data is employed in this study. If the E/P effect is merely a proxy for the market value effect, one would likely expect high E/P portfolios, for example, to have similar risk traits to small MV portfolios since high E/P's would be presumed to proxy for small MV's. Table V, however, indicates otherwise. High E/P ratio portfolios are characterized by low beta risk, but small MV portfolios are typified by high betas. Alternatively, low E/P's are associated with high betas, while large firms typically possess low betas. In fact, beta risk declines monotonically as E/P ratios increase, but increases consistently as firm value falls. The beta distribution for the sample used in this study confirms Reinganum's beta characteristics.

(Insert Table V Here)

These beta characteristics have important implications to E/P and MV returns. The risk-adjustment of Reinganum's excess returns would tend to shrink the observed value effect (due to the application of high betas to small firms' returns and low betas to large firm's returns), but would cause the E/P effect to expand (for the same reason). Since a small, although statistically insignificant, E/P effect already exists (after controlling for size) in Reinganum's non-risk-adjusted data, one could conclude that the risk-adjustment of these returns would accentuate this effect. In this manner, it is possible that, after risk-adjusting excess returns, a significant E/P effect still exists. Certainly the E/P effect would be more prominent than is the case when non-risk-adjusted returns are considered. Alternatively, it becomes apparent that risk adjustment would mitigate the MV effect.
Therefore, the different findings of the two studies may be attributable
to the adherence to different risk compensation techniques. It seems likely
that the two securities' samples possess relatively similar earnings' yield
and market value effects as well as similar risk traits.

B. **Time-Aggregated Versus Time-Standardized Portfolio Returns**

The manner in which the mean quarterly excess returns are computed (Table
IV) introduces a potentially severe bias that could produce a distortion in
the perceived E/P and MV effects. The 25 separate E/P-MV portfolio returns
reported in this Table (for the entire 10 1/2-year observation period) are de-
termined in the following way. First, each sample security's respective E/P
ratio and firm market value is calculated and observed for each of the 42 con-
secutive quarters. Thus, a series of 42 separate E/P ratios and 42 distinct
MV's exist for each security. Second, all E/P and MV observations, represent-
ing the 42 distinct quarters, are aggregated into one overall non-time-
related vector. Third, these aggregated E/P ratios and market values are
placed in respective rank order from lowest to highest, and the E/P's and MV's
are then grouped into respective quintiles so that group EPl includes the 20
percent of lowest E/P observations, group MV1 contains the 20 percent of
smallest firm MV's, and so forth. Next, each observation is placed into one
of the 25 mutually exclusive E/P-MV portfolios depending on the observation's
E/P ratio and its market value of common stock. The cutoff point for port-
folio inclusion is thus jointly based on the E/P quintile and the MV quintile.

As already illustrated in Section III.A, the number of securities within each
E/P-MV portfolio varies considerably with the primary differences attributable
to a clustering of observations in the highest E/P-lowest MV and the lowest
E/P-highest MV portfolios. Finally, the mean excess returns are calculated
for all 25 E/P-MV portfolios.
The above two-way classification methodology is used to generate the mean portfolio returns reported in Table IV and, as such, conforms to the technique employed by Reinganum [18] in computing his mean excess returns for 25 E/P-MV portfolios. The aggregation of all observations into a single time-dimension vector introduces a bias into the manner in which E/P and MV quintiles are formed. In particular, when the data is aggregated, E/P ratios and firm market values are classified "low" or "high" relative to the overall multiperiod grand mean, rather than relative to the quarterly mean for the period from which the observation is extracted.

This bias becomes especially acute when one observes the formation of E/P portfolios. Table VI presents a distribution of annual E/P ratios for the selected sample. The annual E/P ratio means exhibit substantial variability over the 1970-1980 period, ranging from a low of 4.65 percent (1971) to a high of 14.08 percent (1980). Of particular interest is the fact that the lowest E/P quintile mean of 8.40 percent in 1980 is actually higher than the highest E/P quintile mean of 7.75 percent in 1971.

(Insert Table VI Here)

The violent systematic fluctuations in E/P ratios over time contribute to the aforementioned portfolio formation bias. Since all E/P ratio observations over the 42 quarters are stacked into one time-series vector, the notion of what really constitutes a low or high E/P ratio becomes very distorted. For instance, the 1971 sample average E/P ratio is only one-third the 1980 E/P mean. As a result, most 1971 observations are categorized as low E/P's, whereas, on the other hand, the majority of 1980 values are grouped in the highest multiyear E/P quintile. Indeed, most 1971 E/P ratios are low when compared to the 10 1/2-year mean E/P, just as most 1980 E/P's are high in an
overall context. However, the inclusion of a disproportionately large number of 1971 securities in the lowest E/P quintile and the insertion of a large proportion of 1980 stocks in the highest E/P group vividly portrays the problem of aggregating data into a single time-dimension vector. The resultant E/P effect becomes time-biased. Thus, if a proliferation of high E/P ratio observations occurs during characteristically high E/P years (such as 1980), then the existence of an E/P effect becomes at least partially dependent on the performance of stocks in general during high E/P years as compared to low E/P times.

The same phenomenon occurs, although to a lesser extent, when utilizing time-aggregated data to construct MV quintiles. The market value for most securities declines in poor stock market years and rises during prosperous market environments. As a result, a proportionately larger number of "small firms" exist at the trough of a bear market, and vice versa. Again, portfolio observations are not normally distributed on a period-to-period basis. More firms are entered into the smallest MV portfolio during low market years; alternatively, the highest MV portfolio contains a disproportionately large number of observations from high stock market years.

To extract this potentially damaging time distortion bias, a new two-way classification matrix is designed. Individual E/P ratios and firm market values are compared to their respective mean values for the quarter from which the observation is taken. Therefore, each E/P and MV is ranked in ascending order on a single, as opposed to multiple, period basis. Accordingly, time-related distortions are eliminated. To accomplish this task, each individual quarterly E/P and MV observation is divided by its appropriate quarterly mean value -- thus constructing standardized E/P and MV indices. In this manner, each E/P and MV observation is converted to an index number which gauges the
magnitude of the particular variable relative to its associated quarter's mean value. As such, a high absolute E/P ratio, for example, could actually convert to a low E/P index number, if the observation occurs during a year when overall E/P's are very inflated. In the next section, Reinganum's cross classification control technique is again utilized; however, portfolios are constructed using a ranking procedure based on standardized E/P and MV indices instead of absolute values. This procedure should expel potentially damaging time-related biases.

C. A Further Analysis of E/P and Value Anomalies

The use of standardized E/P and MV indices, respectively, permits one to aggregate all observations from the 42 quarters into a single time-dimension vector without producing the time-related distortion that otherwise results from the use of non-standardized values. The combined E/P and MV indices are ranked in ascending order and then divided into their respective portfolio quintiles (EPI1 = lowest E/P index portfolio, ..., EPI5 = highest E/P index; MVI1 = smallest MV index quintile, ..., MVI5 = largest MV index). This portfolio ranking scheme obviously produces quintile groupings that differ from the groups created with absolute (non-time-adjusted) earnings' yields and firm market values. As a result, for instance, the lowest E/P index quintile does not contain a disproportionate number of observations from a characteristically low E/P ratio quarter -- rather, each respective E/P and MV index quintile is comprised of a similar number of values from each of the 42 quarters.

Another 25-cell matrix is constructed. A component value is assigned to an individual cell based upon its combined E/P and MV standardized index values, i.e., Reinganum's cross classification control procedure is again employed. The mean quarterly excess return for each E/P-MV index portfolio is computed and the results are displayed in Table VII.
The time-standardized excess portfolio returns matrix reveals results dissimilar from the aggregated, single-time dimension matrix. A noticeable E/P effect still emerges among the MV-controlled returns data. Mean quarterly excess returns increase almost monotonically as portfolio E/P ratios enlarge. Furthermore, the highest E/P ratio portfolios always outperform their lowest E/P counterparts. This E/P phenomenon systematically occurs across all five MV categories. Thus, after controlling for size, an E/P effect still exists. The associated F-Statistic confirms that a statistically significant overall E/P effect persists throughout the entire set of multiperiod portfolios even after controlling for a possible size-related anomaly. These findings coincide with those previously detected when employing aggregated, time-biased portfolio return data.

On the other hand, the significant size effect that results when aggregated return data is used diminishes substantially when employing time-standardized return data. The results in Table VII portray that, after controlling for the E/P effect, a consistent size effect is not discernible. The F-Statistic that measures the extent of excess return differences across all MV portfolios is not statistically significant. Apparently, after controlling for E/P-related factors, most of the size effect disappears -- a result in direct opposition to Reinganum's findings. If anything, the size effect appears to proxy for the E/P ratio effect, and not vice versa.

Further analysis of the findings in Table VII reveals that even though a significant size effect does not exist across the entire scheme of portfolios after accounting for E/P-related factors, there are nevertheless some size-related anomalies visible within specific underlying E/P-MV component portfolios. The most noticeable size effect emerges within the series of highest
E/P portfolios. As already reported, the highest E/P portfolios, *ceteris paribus*, yield positive and significant abnormal rates of return. By adhering to a high E/P selection criterion, one would have earned positive abnormal returns over the selected time period. On average, the highest E/P quintile produced a 1.77 percent mean quarterly excess return. But, in addition, the division of the highest E/P ratio portfolios into five separate MV subportfolios would have enabled one to attain even greater excess returns. The most dramatic example emerges from the highest E/P - smallest MV portfolio -- subscription to this strategy would have produced a 5.01 percent mean quarterly excess return over the cited time period. This excess return level is almost triple the excess returns attainable by merely adhering to a high E/P criterion. The large associated t-value indicates that the excess returns generated by purchasing high E/P-low MV portfolios are significantly different from the overall sample mean excess return of zero. Alternatively, excess returns actually turn negative (although not statistically significant) when large size (highest MV) firms are acquired within the highest E/P quintile. Thus, within the highest E/P portfolios, a separate and distinct size subeffect appears. Apparently, in extreme instances (highest E/P and smallest MV portfolios) the earnings' yield and market value anomalies are not related to identical contributory factors. Rather, the two anomalies exist somewhat independently of each other and therefore to some extent are additive in effect.

In the following section a more stringent control technique is implemented to verify the empirical results presented in this section. This validation procedure is designed to confirm two primary findings: that the E/P effect, on average, overwhelms the MV effect and that within certain extreme portfolio categories the E/P and MV effects are at least partially independent and additive.
D. A Final Examination of the E/P and MV Interrelationship

In the preceding section, portfolio inclusion was based on an observation's joint E/P and MV indices. Thus, for example, to be categorized in the first portfolio cell (lowest EPI-smallest MVI) an observation would simultaneously have to possess both an E/P index value and a MV index value that rank within the lowest one-fifth of their total respective values. In this section, a more rigorous control procedure is introduced. Initially, all observations for the entire experimental period are grouped into quintiles based solely on E/P index values (as opposed to jointly with MV index values as done in the previous section). This classification procedure ensures that each quintile contains exactly 20 percent of all observations ranked continuously in ascending E/P index order. After each E/P index quintile is constructed, a subordinate MV index ranking is undertaken. Specifically, each E/P index quintile is divided into subquintiles based upon MV index values. Since the initial quintiles are constructed using only E/P index values (and not MV index values), the obvious result is that a complete control for the earnings' yield effect exists. The subdivision of E/P indices into MV index quintiles allows one to investigate the market value effect after the removal of the earnings' yield anomaly. One may also note that each of the resultant portfolio cells in this new 5x5 matrix will contain exactly the same proportion of observations, i.e., each of the 25 cells consists of precisely four percent (1/25) of all observations. This distribution pattern differs considerably from that of Reinganum [18]. By having an equal percentage of observations in each portfolio cell, one can be assured that approximately the same number of low versus high E/P and MV index values are taken from each quarter. Accordingly, time biases are removed.
The empirical results are given in Table VIII. After completely controlling for the earnings' yield effect, the resultant portfolios do not produce excess returns that differ significantly across the various MV index categories. The associated F-Statistic confirms that, after controlling for an E/P effect, the MV anomaly is statistically insignificant. These results conform to those detected when using a joint E/P-MV cross classification portfolio methodology. Even though an overall size effect is not evident, a micro size effect appears within the high E/P index portfolios. The smallest MV index category within the EPI5 group yields a 5.08 percent quarterly excess return -- the highest return for any of the 25 portfolios -- which is considerably higher than the 2.80 percent mean excess return for the overall EPI5 quintile. The calculated t-value of 3.68 is highly significant, indicating that an additive excess return effect apparently still exists within the highest E/P - smallest MV index portfolio.

(Insert Table VIII Here)

The final phase of this study focuses on the determination of whether an earnings' yield anomaly still exists after stringently controlling for the market value effect. To accomplish this task, all observations over the 10 1/2-year period are ranked in ascending order according to MV index magnitude and partitioned into quintiles so that each quintile contains exactly one-fifth of the total values. Each MV index quintile is further divided into E/P index subquintiles. In this way, the E/P effect can be investigated after completely controlling for the size effect. This MV control procedure is more rigorous than that employed in Section III.C where portfolio categories are established based jointly upon E/P and MV indices.
The findings presented in Table IX verify the existence of a significant earnings' yield anomaly, even after accounting for the impact of size-related factors. The importance of the E/P ratio effect is substantiated by the high F-Statistic (9.76) which signals that excess portfolio returns vary materially across the entire E/P portfolio classification scheme. Furthermore, the additive effect of high E/P-low MV portfolios is corroborated. Statistically significant (.01 level) positive excess returns occur not only in the extreme EPI5-MVI1 portfolio, but also in two surrounding portfolios (EPI4-MVI1 and EPI5-MVI2). Also, the two highest E/P index quintiles appear to possess very distinct size effects. For these two categories excess portfolio returns decline monotonically as the MV index expands -- the effect being more prominent for the highest E/P index quintile. On the other hand, no apparent MV effect occurs among the three lowest E/P index quintiles. This evidence provides additional support for the existence of an additive E/P-MV effect within certain portfolio categories. It seems that in some instances the E/P and MV anomalies are not related to the same factor(s), but occur independently.

(Insert Table IX Here)

IV. Concluding Remarks

The analysis of a sample of industrial common stock returns over the 1970-1980 period provided several noteworthy results. Some of these findings reinforce prior research discoveries. In particular, high earnings' yield portfolios were found to yield significant "excess" returns when compared to the market average. Furthermore, low E/P portfolios performed poorly relative to the market. In addition, a meaningful size effect was detected within the same securities sample -- portfolio returns vary inversely with firm market value.
Other empirical findings in this study, however, refute previous research conclusions. The most important discrepancy is attributable to the results showing that, after risk-adjustment and time-standardization of returns, the earnings' yield effect overwhelms the size effect suggesting that to some extent firm market value may proxy for earnings' yield. Nevertheless, within certain portfolio categories (notably high E/P-low MV groups), the two effects appear to be independent and their combined return impact additive. These results are also inconsistent with the primary assertions of the simple CAPM. Either persistent market inefficiencies exist or, more likely, the CAPM is misspecified due to the omission of certain undefined risk factors. Certainly the attempt to determine the underlying cause(s) of these anomalies should provide an ambitious challenge for future researchers.
Footnotes

1Dimson [9] shows that the infrequent trading of a security creates a bias in its systematic risk parameter, beta. When trading is infrequent, positive serial correlation is induced into the calculated returns and the estimated beta is biased downward. Smith [24] finds that risk underestimation is particularly acute when small trading intervals, such as daily, are used, but as the trading interval is lengthened, the beta bias tends to disappear. Thus, for this study, quarterly returns are used to minimize this bias.

2The Sharpe return-to-volatility measure (excess return of $r_t$, divided by its standard deviation, $\delta(r_t)$). However, only the Treynor procedure is reported because the Sharpe method produced substantially similar results.

3Reinganum [18] did not risk-adjust portfolio returns. Since he detected similar beta distributions (high E/P portfolios have low betas and low E/P portfolios have high betas), his reported results do not reveal as significant differences among E/P groups as would have been shown if he used risk-adjusted returns.
REFERENCES


Table I

Mean Quarterly Excess Returns of E/P Portfolios

<table>
<thead>
<tr>
<th>E/P Quintile</th>
<th>E/P Mean</th>
<th>Beta</th>
<th>Mean Excess Percentage Returns&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>EP1</td>
<td>.040</td>
<td>1.16</td>
<td>-2.42 ((-3.90))</td>
</tr>
<tr>
<td>EP2</td>
<td>.070</td>
<td>1.02</td>
<td>-1.42 ((-2.29))</td>
</tr>
<tr>
<td>EP3</td>
<td>.088</td>
<td>0.98</td>
<td>-0.47 ((-0.76))</td>
</tr>
<tr>
<td>EP4</td>
<td>.105</td>
<td>0.95</td>
<td>1.51 (2.44)</td>
</tr>
<tr>
<td>EP5</td>
<td>.141</td>
<td>0.92</td>
<td>2.80 (4.52)</td>
</tr>
</tbody>
</table>

F-Statistic = 12.98 (significance = .01).

<sup>a</sup>Risk-adjusted. T-values are shown in parentheses.
Table II
Mean Quarterly Excess Returns of MV Portfolios

<table>
<thead>
<tr>
<th>MV Quintile</th>
<th>Mean (million $)</th>
<th>Beta</th>
<th>Mean Excess Percentage Returns&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>MV1</td>
<td>25.1</td>
<td>1.14</td>
<td>1.30 (2.10)</td>
</tr>
<tr>
<td>MV2</td>
<td>85.3</td>
<td>1.04</td>
<td>1.04 (1.68)</td>
</tr>
<tr>
<td>MV3</td>
<td>225.8</td>
<td>0.98</td>
<td>0.12 (0.19)</td>
</tr>
<tr>
<td>MV4</td>
<td>562.5</td>
<td>0.99</td>
<td>-0.86 (-1.39)</td>
</tr>
<tr>
<td>MV5</td>
<td>968.4</td>
<td>0.91</td>
<td>-1.61 (-2.60)</td>
</tr>
</tbody>
</table>

F-Statistic = 7.22 (significance = .01).

<sup>a</sup>Risk-adjusted. T-values are shown in parentheses.
Table III

Percentage of Firms in E/P and MV Quintiles

<table>
<thead>
<tr>
<th>E/P Quintile</th>
<th>MV Quintile</th>
<th>MV Quintile</th>
<th>MV Quintile</th>
<th>MV Quintile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MV1</td>
<td>MV2</td>
<td>MV3</td>
<td>MV4</td>
</tr>
<tr>
<td>EP1</td>
<td>2.8</td>
<td>2.8</td>
<td>4.1</td>
<td>4.3</td>
</tr>
<tr>
<td></td>
<td>(3.6)a</td>
<td>(2.6)</td>
<td>(3.1)</td>
<td>(4.1)</td>
</tr>
<tr>
<td>EP2</td>
<td>2.7</td>
<td>3.7</td>
<td>4.1</td>
<td>4.4</td>
</tr>
<tr>
<td></td>
<td>(2.7)</td>
<td>(3.2)</td>
<td>(3.6)</td>
<td>(4.8)</td>
</tr>
<tr>
<td>EP3</td>
<td>2.9</td>
<td>3.7</td>
<td>4.8</td>
<td>4.4</td>
</tr>
<tr>
<td></td>
<td>(3.4)</td>
<td>(4.0)</td>
<td>(4.7)</td>
<td>(4.5)</td>
</tr>
<tr>
<td>EP4</td>
<td>3.4</td>
<td>4.2</td>
<td>4.3</td>
<td>4.6</td>
</tr>
<tr>
<td></td>
<td>(3.9)</td>
<td>(5.2)</td>
<td>(4.6)</td>
<td>(3.6)</td>
</tr>
<tr>
<td>EP5</td>
<td>7.7</td>
<td>5.0</td>
<td>3.4</td>
<td>2.7</td>
</tr>
<tr>
<td></td>
<td>(6.5)</td>
<td>(5.0)</td>
<td>(4.1)</td>
<td>(3.0)</td>
</tr>
</tbody>
</table>

*Figures in parenthesis are percentage of total firms in each cell from Reinganum [18] study (condensed from deciles to quintiles).
Table IV
Mean Quarterly Excess Returns of E/P-MV Portfolios

<table>
<thead>
<tr>
<th>E/P Quintile</th>
<th>MV Quintiles</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MV1</td>
<td>MV2</td>
<td>MV3</td>
<td>MV4</td>
<td>MV5</td>
</tr>
<tr>
<td>EP1</td>
<td>-1.01</td>
<td>-1.64</td>
<td>-1.11</td>
<td>-2.59</td>
<td>-2.01</td>
</tr>
<tr>
<td></td>
<td>(-0.62)</td>
<td>(-0.99)</td>
<td>(-0.82)</td>
<td>(-1.95)</td>
<td>(-1.81)</td>
</tr>
<tr>
<td>EP2</td>
<td>-0.41</td>
<td>-0.01</td>
<td>-1.70</td>
<td>-0.87</td>
<td>-1.97</td>
</tr>
<tr>
<td></td>
<td>(-0.25)</td>
<td>(-0.01)</td>
<td>(-1.25)</td>
<td>(-0.66)</td>
<td>(-1.67)</td>
</tr>
<tr>
<td>EP3</td>
<td>0.23</td>
<td>-0.26</td>
<td>0.02</td>
<td>-0.97</td>
<td>-1.63</td>
</tr>
<tr>
<td></td>
<td>(0.14)</td>
<td>(-0.18)</td>
<td>(0.03)</td>
<td>(-0.73)</td>
<td>(-1.19)</td>
</tr>
<tr>
<td>EP4</td>
<td>1.84</td>
<td>1.69</td>
<td>0.88</td>
<td>-0.01</td>
<td>-0.87</td>
</tr>
<tr>
<td></td>
<td>(1.23)</td>
<td>(1.26)</td>
<td>(0.67)</td>
<td>(-0.01)</td>
<td>(-0.55)</td>
</tr>
<tr>
<td>EP5</td>
<td>5.05</td>
<td>3.18</td>
<td>2.01</td>
<td>1.53</td>
<td>0.61</td>
</tr>
<tr>
<td></td>
<td>(5.08)</td>
<td>(2.59)</td>
<td>(1.35)</td>
<td>(0.92)</td>
<td>(0.27)</td>
</tr>
</tbody>
</table>

F-Statistic (E/P) = 10.32 (significance = .01).
F-Statistic (MC) = 5.73 (significance = .01)

*All values are in parentheses.*
Table V

Estimated Betas of E/P–MV Portfolios

<table>
<thead>
<tr>
<th>E/P Quintile</th>
<th>MV Quintile</th>
<th>MV1</th>
<th>MV2</th>
<th>MV3</th>
<th>MV4</th>
<th>MV5</th>
</tr>
</thead>
<tbody>
<tr>
<td>EP1</td>
<td></td>
<td>1.24</td>
<td>1.31</td>
<td>1.09</td>
<td>1.06</td>
<td>1.09</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.17)</td>
<td>(1.19)</td>
<td>(1.11)</td>
<td>(1.00)</td>
<td>(0.92)</td>
</tr>
<tr>
<td>EP2</td>
<td></td>
<td>1.17</td>
<td>1.04</td>
<td>0.97</td>
<td>0.94</td>
<td>0.99</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.10)</td>
<td>(1.08)</td>
<td>(0.93)</td>
<td>(0.85)</td>
<td>(0.81)</td>
</tr>
<tr>
<td>EP3</td>
<td></td>
<td>1.10</td>
<td>0.98</td>
<td>0.92</td>
<td>0.96</td>
<td>0.93</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.98)</td>
<td>(0.96)</td>
<td>(0.85)</td>
<td>(0.82)</td>
<td>(0.75)</td>
</tr>
<tr>
<td>EP4</td>
<td></td>
<td>1.07</td>
<td>0.95</td>
<td>0.94</td>
<td>0.99</td>
<td>0.92</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.92)</td>
<td>(0.89)</td>
<td>(0.81)</td>
<td>(0.81)</td>
<td>(0.76)</td>
</tr>
<tr>
<td>EP5</td>
<td></td>
<td>1.09</td>
<td>0.94</td>
<td>0.98</td>
<td>1.02</td>
<td>0.81</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.93)</td>
<td>(0.94)</td>
<td>(0.89)</td>
<td>(0.95)</td>
<td>(0.86)</td>
</tr>
</tbody>
</table>

*aFor comparative purposes, the betas estimated by Reinganum [18] are reported in parenthesis.
### Table VI

Annual Distribution of E/P Ratios$^a$

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>3.11</td>
<td>4.90</td>
<td>5.95</td>
<td>7.04</td>
<td>9.43</td>
<td>5.32</td>
</tr>
<tr>
<td>1971</td>
<td>2.87</td>
<td>4.24</td>
<td>5.24</td>
<td>5.95</td>
<td>7.75</td>
<td>4.65</td>
</tr>
<tr>
<td>1972</td>
<td>2.86</td>
<td>4.37</td>
<td>5.46</td>
<td>6.58</td>
<td>8.85</td>
<td>4.88</td>
</tr>
<tr>
<td>1973</td>
<td>3.44</td>
<td>6.21</td>
<td>8.06</td>
<td>10.31</td>
<td>13.51</td>
<td>6.71</td>
</tr>
<tr>
<td>1974</td>
<td>4.78</td>
<td>7.81</td>
<td>10.75</td>
<td>14.29</td>
<td>20.83</td>
<td>9.09</td>
</tr>
<tr>
<td>1975</td>
<td>5.52</td>
<td>9.17</td>
<td>12.35</td>
<td>16.39</td>
<td>26.32</td>
<td>10.64</td>
</tr>
<tr>
<td>1977</td>
<td>6.54</td>
<td>8.93</td>
<td>10.75</td>
<td>12.50</td>
<td>16.95</td>
<td>10.10</td>
</tr>
<tr>
<td>1978</td>
<td>7.94</td>
<td>10.64</td>
<td>12.50</td>
<td>9.86</td>
<td>18.52</td>
<td>11.76</td>
</tr>
<tr>
<td>1979</td>
<td>6.94</td>
<td>10.99</td>
<td>12.82</td>
<td>14.71</td>
<td>18.52</td>
<td>11.49</td>
</tr>
<tr>
<td>1980</td>
<td>8.40</td>
<td>12.82</td>
<td>15.87</td>
<td>18.52</td>
<td>23.26</td>
<td>14.08</td>
</tr>
</tbody>
</table>

$^a$Condensed from quarterly E/P ratios by averaging the four quarters in a calendar year to obtain the annual mean. The 1980 values represent only one-half year.
Table VII
Mean Quarterly Excess Returns of E/P-MV Index Portfolios

<table>
<thead>
<tr>
<th>E/P Index Quintile</th>
<th>MV Index Quintile</th>
<th>MVI1</th>
<th>MVI2</th>
<th>MVI3</th>
<th>MVI4</th>
<th>MVI5</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPI1</td>
<td></td>
<td>-0.22</td>
<td>-3.52</td>
<td>-1.24</td>
<td>-2.22</td>
<td>-1.70</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-0.16)</td>
<td>(-2.06)</td>
<td>(-0.79)</td>
<td>(-1.48)</td>
<td>(-1.57)</td>
</tr>
<tr>
<td>EPI2</td>
<td></td>
<td>-0.04</td>
<td>-0.44</td>
<td>-2.23</td>
<td>-0.80</td>
<td>-1.06</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-0.02)</td>
<td>(-0.24)</td>
<td>(-1.69)</td>
<td>(-0.70)</td>
<td>(-0.93)</td>
</tr>
<tr>
<td>EPI3</td>
<td></td>
<td>-0.84</td>
<td>-1.20</td>
<td>1.66</td>
<td>-0.48</td>
<td>-1.02</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-0.52)</td>
<td>(-0.81)</td>
<td>(1.24)</td>
<td>(-0.40)</td>
<td>(-0.71)</td>
</tr>
<tr>
<td>EPI4</td>
<td></td>
<td>1.75</td>
<td>1.27</td>
<td>2.26</td>
<td>1.77</td>
<td>-0.53</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.42)</td>
<td>(1.02)</td>
<td>(1.69)</td>
<td>(1.36)</td>
<td>(-0.28)</td>
</tr>
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<td>EPI5</td>
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<td>2.55</td>
<td>1.89</td>
<td>0.28</td>
<td>-0.90</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(4.47)</td>
<td>(2.32)</td>
<td>(1.29)</td>
<td>(0.16)</td>
<td>(-0.37)</td>
</tr>
</tbody>
</table>

F-Statistic (E/P Index) = 6.98 (significance = .01).
F-Statistic (MV Index) = 2.13 (significance = ---).

\(^a\) T-values are in parenthesis.
Table VIII

Mean Quarterly Excess Returns by MV Index (E/P Controlled)\(^a\)

<table>
<thead>
<tr>
<th>E/P Index Quintile</th>
<th>MV Index Quintile</th>
<th>MVII</th>
<th>MVI2</th>
<th>MVI3</th>
<th>MVI4</th>
<th>MVI5</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPI1</td>
<td></td>
<td>-2.61</td>
<td>-2.89</td>
<td>-1.39</td>
<td>-2.63</td>
<td>-2.60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-1.89)</td>
<td>(-2.09)</td>
<td>(-1.01)</td>
<td>(-1.91)</td>
<td>(-1.88)</td>
</tr>
<tr>
<td>EPI2</td>
<td></td>
<td>-0.65</td>
<td>-1.36</td>
<td>-2.26</td>
<td>-1.08</td>
<td>-1.73</td>
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<td>(-0.47)</td>
<td>(-0.99)</td>
<td>(-1.64)</td>
<td>(-0.78)</td>
<td>(-1.25)</td>
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<tr>
<td>EPI3</td>
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<td>-0.93</td>
<td>-0.01</td>
<td>0.46</td>
<td>-0.42</td>
<td>-1.45</td>
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<td>(-0.67)</td>
<td>(-0.01)</td>
<td>(0.33)</td>
<td>(-0.30)</td>
<td>(-1.05)</td>
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<tr>
<td>EPI4</td>
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<td>2.52</td>
<td>2.25</td>
<td>1.82</td>
<td>0.89</td>
<td>0.07</td>
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<tr>
<td></td>
<td></td>
<td>(1.83)</td>
<td>(1.63)</td>
<td>(1.32)</td>
<td>(0.64)</td>
<td>(0.05)</td>
</tr>
<tr>
<td>EPI5</td>
<td></td>
<td>5.08</td>
<td>3.81</td>
<td>2.86</td>
<td>-0.04</td>
<td>2.29</td>
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<tr>
<td></td>
<td></td>
<td>(3.68)</td>
<td>(2.76)</td>
<td>(2.07)</td>
<td>(-0.03)</td>
<td>(1.66)</td>
</tr>
</tbody>
</table>

F-Statistic (MV Index) = 1.66 (significance = --).

\(^a\)T-values are in parenthesis.
Table IX
Mean Quarterly Excess Returns by E/P Index (MV Controlled)\textsuperscript{a}

<table>
<thead>
<tr>
<th>E/P Index Quintile</th>
<th>MV Index Quintile</th>
<th>MVI1</th>
<th>MVI2</th>
<th>MVI3</th>
<th>MVI4</th>
<th>MVI5</th>
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<tbody>
<tr>
<td>EPI1</td>
<td>-3.16</td>
<td>-0.21</td>
<td>-2.12</td>
<td>-2.61</td>
<td>-2.64</td>
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<td></td>
<td>(-2.29)</td>
<td>(-0.15)</td>
<td>(-1.54)</td>
<td>(-1.89)</td>
<td>(-1.91)</td>
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<td>EPI2</td>
<td>0.29</td>
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<td>-2.40</td>
<td>-2.73</td>
<td>-2.46</td>
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<tr>
<td></td>
<td>(0.21)</td>
<td>(-0.62)</td>
<td>(-1.74)</td>
<td>(-1.98)</td>
<td>(-1.78)</td>
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<tr>
<td>EPI3</td>
<td>2.13</td>
<td>1.01</td>
<td>1.81</td>
<td>-0.22</td>
<td>-1.64</td>
<td></td>
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<tr>
<td></td>
<td>(1.54)</td>
<td>(0.73)</td>
<td>(1.31)</td>
<td>(-0.16)</td>
<td>(-1.19)</td>
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<tr>
<td>EPI4</td>
<td>2.72</td>
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<td>0.99</td>
<td>-0.02</td>
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<tr>
<td></td>
<td>(1.97)</td>
<td>(1.65)</td>
<td>(0.72)</td>
<td>(-0.01)</td>
<td>(-0.27)</td>
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<tr>
<td>EPI5</td>
<td>4.52</td>
<td>2.98</td>
<td>2.34</td>
<td>1.30</td>
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<tr>
<td></td>
<td>(3.28)</td>
<td>(2.16)</td>
<td>(1.70)</td>
<td>(0.94)</td>
<td>(-0.70)</td>
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</table>

F-Statistic (E/P Index) = 9.76 (significance = .01).

\textsuperscript{a}T-values are in parenthesis.
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