Common Stock Appraisal in Relation to Their Price-Earning Ratios Using Risk-Adjusted Measures: An Emerging Market Perspective

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ABSTRACT

In this paper, an attempt was made to determine empirically the relationship between investment performance of equity securities and their P/E ratios using risk-adjusted measures. While the efficient market hypothesis denies the possibility of earning excess returns, the price-earnings hypothesis highlighted that P/E ratios, due to exaggerated investor expectations, may be indicated of future investment performance. The study used 83 of Jordanian Companies listed on Amman Stock Exchange (ASE), one of the emerging markets, and observed the monthly returns of these firms over the period ₀April 1996- March 2004. This issue has not yet been subjected to direct empirical investigation at the emerging markets such as ASE, which provides the importance of this study. After adopting the Augmented Dickey-Fuller Unit Root for testing the satisfying stationarity assumption, Ordinary Least Squares (OLS) regression results suggest that gaining abnormal return is a function of changes in Portfolio's P/E over the period considered. The study, therefore, supports the hypothesis that the P/E has important implications for portfolio's performance, a result supporting the rejection of the semi-strong level of efficiency for ASE.

KEYWORDS: Price-Earnings Ratio; Portfolio's performance; Capital Market Efficiency; Common Stock Appraisal.

I- INTRODUCTION

The stock market is an institution of considerable interest to the public and of importance to economists. The stock market deals with instruments representing claims of ownership to enterprises of industrial, financial and service character. These claims are viewed by their owners as assets, which are transformable into money, which in turn is offered for their purchase. The world stock markets are the assets and contribute to the continuous and competitive determination of prices. It is of great importance for stock markets to operate efficiently. In a general sense, an Efficient Stock Market in which firms can make production investment decisions and investors can choose among the securities that represent ownership of firms' activities.

In an efficient capital market, prices should reflect all available information and should adjust instantaneously to new information, so investors can rely upon the price as a measure of the assets' intrinsic value. While there is substantial empirical evidence supporting the efficient market hypothesis,[1] many still question its validity. One such group believes that Price-Earnings (P/E) ratios are indicators of the future investment performance of a security. Proponents of this price-ratio hypothesis claim that low P/E securities will tend to outperform high P/E stocks providing arguments concerning the not existence of the capital markets efficiency.[2]

[1] See (Fama, 1970) for an extensive discussion of the efficient market hypothesis and a synthesis of much of the empirical evidence on this issue.

[2] See (Williamson, 1970).

In short, prices of securities are biased, and the P/E ratio is an indicator of this bias.[3] A finding that returns on stocks with low P/E ratios tends to be larger than warranted by the underlying risks would be inconsistent with the efficient market hypothesis.[4]

The purpose of this paper is to determine empirically whether the investment performance of common stocks is related to their P/E ratios using risk-adjusted measures. In section II, literature review is outlined, whereas in Section III data, sample, and estimation procedures are presented. Empirical results are discussed in Section IV, and conclusions and implications are given in Section V.

II- LITERATURE REVIEW

P/E ratio (Price Earning multiplier) could be considered as an indicator of the relation between stock market price and its earnings. It measures the investor's willing to pay for one dollar of earnings. In other words, the number of earnings times the investor prepared to pay

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[3] (Smidt 1968) argues that one potential source of market inefficiency is inappropriate market responses to information. Inappropriate responses to information implicit in P/E ratios are believed to be caused by exaggerated investor expectations regarding growth in earnings and dividends; *i.e.,* exaggerated optimism leads, on average, to high P/E securities and exaggerated pessimism leads, on average, to stocks with low P/E ratios (Nicholson 1960; Miller and Widmann 1966; Nicholson 1968; Williamson 1970). A contrary position is discussed in (Ofer 1975).

[4] In general, results of previous empirical research by (McWilliams 1966; Miller and Widmann 1966; Breen 1968; Breen and Savage 1968; Nicholson 1968) seem to support the price-ratio hypothesis. While this may suggest a violation of the semi-strong form of the efficient market hypothesis, all of these studies have one or more of the following limitations: (i) retroactive selection bias, (ii) no adjustment for risk, marginal information processing and transactions costs, and differential tax effects pertaining to capital gains and dividends, and (iii) earnings information is assumed to be available on or before the reporting date.

for one stock. Others might see this multiplier according to the number of years required to recover an asset or the cost of the investment in the stock. Some investors estimate earnings for the current year and apply an appropriate price – earning ratio to the estimated earnings in order to predict future market price. Predicted market price then compared to the current market price to see if the share looked currently over –or- under priced (Pike, Meerjanseen et al., 1993).

P/E multiplier considered most familiar models for common stock appraisal since such an indicator prepared and published by most international capital markets. Most investors believe that such a ratio is the most valuable for choosing a stock and determining whether the stock market price is over -or- under priced or even fairly priced. P/E enables the investors to compare among companies or industries performance. That is, the higher the P/E, the better performance. It is an indicator of confidence, enthusiasm, and investor's expectation around the companies present and future performance .It is a method for determining the price of newly issued stocks. Some believe that stock P/E priced fairly equals the growth rate for that stock, and consequently by comparing the growth rate with the P/E an investment could be made. That is if the P/E is lower than the growth rate, then the stock is a bargain, since it is considered under priced and abnormal profits could be achieved in the near future (Lynch, 1989).

Still the debate among the specialists of investments and stock evaluation about if the stocks or portfolios of high *P/E* ratios achieve higher returns compared with stocks or portfolios with lower *P/E* ratios. For example, Bodie et al. (2002) argued that having one dollar of present profits would be cheaper when buying a stock with low *P/E* and that means profits are priced reasonably (Bodie et al., 1998). Levy and Sarant (1988) confirmed these arguments that the price which profit is bought – for companies that have high *P/E* - would be high. This was interpreted by others who argued that stocks with low *P/E* might be neglected by the market practitioners now. They will be good bargains in the future and display high cash flows and profits, (McMenamin, 1999). Bodie et al. (2002) argued that

investors prefer stock with higher P/E and think it will be a good bargain if its profits and dividends are expected to grow higher and faster than low *P/E* stock (Bodie et al., 1998). Others agree to use the *P/E* ratio to determine whether the stock is a reasonable investment possibility, and to evaluate the level of the market by using the average *P/E* for stocks in a market index (or the entire market). Further, the ratio might have to be adjusted to better reflect special circumstances like extraordinary liabilities and material excess cash (Bierman and Harold, 2002). Grinblatt and Titman (1998) also consider several complexities relative to the equation of a firm's P/E. Their first concern is the quality of the earning measure. Second, they recommended considering the amount of debt leverage, and offer comprehensive analysis of this issue. Given that debt leverage affects the cost of capital, it should also affect the P/E that one would expect from a given growth situation. Hirt and Block (1999) added that not only the quality of management is important to investors in determining the firm's P/E ratio, but also the quality of earnings. There are many interoperations of a dollar's worth of earnings. Some companies choose to use conservative accounting practices,[5] so their reported earnings can be interpreted as being very solid by investors. Other companies use more liberal accounting interpretation to report maximum earnings to their shareholders, and they, at times, overstate their true performance. On the other hand, firm's earnings vary from year to year, and yet the firm's value may be much less variable. In such cases, a firm can have a high *P/E* during a bad year when earnings are low and a low *P/E* during a good year. Yet in both cases, the firm may not have changed fundamentally. Therefore, a high *P/E* can be the result of low earnings rather than a high expected return of future investments (Emery et al., 2004).

A number of theorists believe that low *P/E* stocks, on average, outperform high *P/E* stocks. Basu (1977) studied this issue by ranking stocks by their P/E ratios and compared the results of the high *P/E* ratio group with those of the low P/E ratio group 12 months following purchase. Since the P/E ratio is known information and presumably reflected in price, a relationship between the price ratio and subsequent returns should exist if the market is efficient. The result of Basu's study indicated that the low P/E ratio stocks outperformed the high P/E ratio stocks. Furthermore, risk was not a factor. After various adjustments for risk, the low P/E stocks were still superior performance. The results reported in this paper are consistent with the view that P/E ratio information was not fully reflected in security prices in as rapid a manner as postulated by the semi –strong form of efficient market hypothesis. Instead, it seems that disequilibria persisted in capital markets during the period studied (Basu, 1977). These results attracted considerable attention because of their implications in investment strategies and market efficiency.

Subsequently, questions about the validity of the P/E ratio were raised by other academic researchers in studies of the size effect. Banz (1981) investigated the size effect as one of the anomalies of financial stock markets and found that stocks of small NYSE firms (on average) earned higher risk – adjusted returns than the stocks of large NYSE firms (Banz, 1981). Peavy and Goodman (1983) examined P/E ratios with adjustments for firm size, industry effect and infrequent trading. They found that the risk adjusted return for stocks in lowest P/E ratio's quintile were superior to those in the highest P/E ratio quintile.

In response to the question raised by Banz, Basu conducted a new study in 1983 to reexamine the relationship between the P/E ratio, the size effect and returns in NYSE stocks for the period 1963 – 1980. He found that the stocks of low P/E firms generally had higher risk adjusted return than firms with high *P/E* ratio, furthermore, this P/E ratio's effect was significant even after adjustments were made for differences in firm size. Controlling for differences in both risk and P/E ratios, Basu found that the size effect virtually disappeared (Basu, 1983).

In view of some research suggesting that the *P/E* effect confined to low-beta- risk securities, a recent study

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[5] It has been suggested that Japanese companies use more conservative accounting practices, thereby creating higher P/E ratios. This point appears to explain only a small part of Japan's high multiple (Ross, Westerfield et al. 1999).

examined the *P/E* with respect to both total risk and systematic risk. Goodman and Peavy (1985) found that regardless of the risk measure used, low *P/E* securities provided significant positive excess returns across all risk levels. According to Dreman (1994), for the 20 years period through 1993, and for a sample of 1200 small stocks, low P/E stocks outperform high P/E stocks over long periods of time. The lowest *P/E* group returned 22.9 percent on an annual basis compared to 11.3 percent for the highest *P/E* group and 17.2 percent for the mean small- capitalization over the more recent 10 years; the smallest quintile outperformed the largest quintile by almost a three to one ratio. Other researchers argued that *P/E* does not worth the effort that it has. Lie and Lie (2002) are among the first to compare the accuracy of various multiples. They examined firms on Compstate as of their 1998 fiscal year, and found that asset multiples provide generally more accurate stock value estimates than do sales and earning multiples.

A large body of empirical research on stock prices in Malkiel (2004) study revealed that the market is not a perfect random walk. There is some amount of short-run positive serial correlation and considerable evidence of longer run negative serial correlation. In addition, market *P/E* multiplier varies with interest rates and with expectations regarding profit margin. Malkiel concluded that certain valuation metrics such as P/E multiplies do have some ability to predict future returns. Lewellen (2004) used the operating income instead of net income in calculating the P/E multiplier during a period from 1946 – 2000 and reexamined the predictability of returns in sub period, he found that Book – to - Market and Earning – price ratio predicted returns during the shorter sample 1963 -2000.

III- DATA AND METHODOLOGY

The following general research design was employed to examine the relationship between P/E ratios and investment performance of equity securities using risk-adjusted measures. For any given period under consideration, five portfolios consisting of securities with similar P/E ratios are formed. The risk-return relationships of these portfolios are compared and their performance is then evaluated in terms of pre-specified measures, namely; Sharpe's, Treynor's, Jensen's, and Appraisal ratio's measures. Finally, as a test of the efficient market hypothesis, the returns of the low P/E portfolio are compared to those of high P/E. Moreover, the expected rates of return were compared with the required rate of return to each portfolio. The database and methodological details are now discussed.

Data Base and Sample Selection Criteria

The primary data for this study is drawn from a data provided by Amman Stock Exchange (ASE). The database represents over 205 firms. 18 were banks and financial companies, 26 insurance companies, 71 services companies, and 90 firms were industrial companies, which actually traded on the ASE between January 1996 and December 2004.

For any given year under consideration, three criteria were used in selecting sample firms:[6] (i) the fiscal year-end of the firm is December 31 (fiscal years being considered are 1996—2004); (ii) the firm actually traded on the ASE as of the beginning of the portfolio holding period and is included in the data provided; (iii) the relevant investment return and financial statement data are not missing; and (iv) the firms were actively traded over the whole period. A total of 83 firms satisfied the above requirements qualifying for inclusion in each of the 8 years.

Historical or actual *P/E* ratio is calculated by using the historical data of price and earning per share, that is:

$$P/E = P_0 / E_0 \qquad\qquad \dots (1)$$

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[6] The fiscal year requirement was enclosed since P/E portfolios are formed by ranking P/E ratios as of the fiscal year-end, and it is not clear that these ratios computed at different points in time are comparable. Further, for reasons indicated in Section IV, all firms having less than 60 months of investment return data preceding the start of the portfolio-holding period in any given year were excluded.

Where P_0 = Close price at the period end (close price), or by taking the average of the highest and the lowest stock price because stock prices usually fluctuate, E_0 = Earning per share of the last 12 months which is sometimes called the historical profit. The above ratio is usually reported at the financial newspaper and price quotations. Formula 1 is used when the earning per share is more than zero, otherwise the ratio would be unlimited (Sinkey, 1998).

The *P/E* ratio can be derived from the Dividend Discount Model (DDM), which is the foundation of common stocks valuations. The estimated price of a stock using the constant – growth version of the model can be written as:

$$P_0 = D_1 / (K_e - g) \qquad \ldots (2)$$

Where D_1 = The dividend expected to be received in the next period, K_e = The required rate of return for this stock which is the discount rate applicable for an investment with specific degree of risk, g = The expected growth rate of dividends. By dividing both sides of formula 2 by the expected earnings per share E_1, we get:

$$P_0 / E_1 = (D_1/E_1) / (K_e - g) \qquad \ldots (3)$$

The above formula 3 indicates those factors that affect the estimated *P/E* ratio like dividend payout ratio, *D/E*; required rate of return, K_e; expected growth rate of dividends, *g*. The relationships should be held, therefore, after controlling other variables such as the higher payout ratio and expected growth rate, the higher the P/E. On the other hand, the higher the required rate of return, the lower the *P/E* (Jones, 2000).

Applying formula 3, if the firm could increase its estimated *P/E* ratio by raising its payout, it would be very tempted to do so. However, such an action would in all likelihood reduce future growth prospects, lowering *g* and thereby defeating the increase in the payout. Similarly, trying to increase *g* by taking on particularly risky investment projects, would cause investors to demand a

higher required rate of return, thereby raising K_e. Again this would work to offset the positive effect of the increase in *g*. Others emphasized that the growth rate is the most effective factor on the profit multiplier (Bodie et al., 2002; Schall and Haley, 1977; Samuels and Brayshaw, 1996). In addition, others argued that *P/E* ratios reflect investor's expectation about the growth potential of a stock and the risk involved. These two factors can offset each other. The greater the risk of a stock, the lower the *P/E* ratio. However, growth prospects may offset the risk and lead to a higher *P/E* ratio. For example, the Internet companies that were so popular in the late 1990s were clearly very risky, but investors valued their potential very highly, and were willing to pay very high prices for these companies (Jones, 2000).

Beginning with 1996, the P/E ratio of every sample security listed on Amman Stock Exchange was computed. The numerator of the ratio was defined as the market value of common stock (market price times number of shares outstanding) as of December 31 and the denominator as reported annual net income after interest and tax available for common stockholders. These ratios were ranked and five portfolios were formed. [7] Although the P/E ratio was computed as of December 31, it is unlikely that investors would have access to the firm's financial statements, and exact earnings figures at that time. Since Jordanian companies have to release their financial reports within three months of the fiscal year-end according to the Companies Act No.22 of 1997, the P/E portfolios were assumed to be purchased on the following April 1. The monthly returns on each of these portfolios were then computed for the next twelve months assuming an equal initial investment in each of their

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[7] Although the construction of five portfolios is arbitrary, that number represents a balance between obtaining as large a spread in P/E's as possible and a reasonable number of securities (about 15) in each portfolio. Further, the reciprocal of the P/E ratio was employed in ranking the securities. Consequently, firms with negative earnings (losses) were included in a separate P/E portfolio.

respective securities and then a buy-and-hold policy.[8]

The above procedure was repeated annually on each April 1 giving 8 years (April 1996-March 2004) of return data for each of the P/E portfolios. Each of these portfolios may be viewed as a mutual fund with a policy of acquiring securities in a given P/E class on April 1, holding them for a year, and then reinvesting the proceeds from disposition in the same class on the following April 1.[9]

If capital markets are dominated by risk-averse investors and portfolio (security) returns incorporate a risk premium, then the appropriate measures of portfolio (security) performance are those that take into consideration both risk and return. Four such evaluative measures have been developed by Sharpe (1964); Treynor Jensen and are employed here along with the *Appraisal Ratio* which measures abnormal return per unit of risk that in principle could be diversified away by holding a market index portfolio (Bodie et al., 2002). Sharpe's measure divides average portfolio excess return over the sample period by the standard deviation of returns over that period. It measures the reward to *total* volatility trade-off. Treynor's measure, however, gives excess return per unit of risk, but it uses *systematic risk* instead of total risk. Jensen's measure, moreover, is the average return on the portfolio over and above that predicted by the CAPM, given the portfolio's beta and the average market return. Therefore, Jensen's measure is the portfolio's *alpha* value. In addition, the appraisal ratio divides the alpha of the portfolio by the nonsystematic risk of the portfolio. It measures *abnormal return per unit of risk* that in principal could be diversified away by holding a market index position. As it can be seen, each of the above

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[8] See (Latane and Young, 1969) and (Basu, 1977) for computational details. The entire analysis was repeated assuming monthly reallocation with substantially identical results (see Appendix1).

[9] A survey of the sector distributions of the five P/E portfolios reveals that the various portfolios consist of securities drawn from the entire spectrum of sectors. The results of a chi-square test, however, reject the hypothesis that the proportion of firms in the four sectors is the same in all P/E portfolios.

measures has some appeal. But each does not necessarily provide consistent assessments of performance, since the risk measures used to adjust returns differ substantially.

While these measures were originally based upon the Sharpe-Lintner version of the capital asset pricing model (Sharpe 1964; Lintner, 1965; Fama, 1968), more recent developments in the area suggest an alternate specification might be more appropriate (Black, 1972; Black et al., 1972; Fama and MacBeth, 1973). Accordingly, performance measure underlying both specifications $(\hat{\delta}, \hat{\beta})$ of the asset pricing equation are estimated using the following model:

$$r_{pt} - r_{fl} = \hat{\delta}_{pf} + \hat{\beta}_{Pf}[r_{mt} - r_{fl}] \qquad \ldots (4)$$

Where r_{pt} = continuously compounded return on P/E portfolio p in month t; computed as the natural logarithm of one plus the realized monthly return (wealth relative). r_{mt} = continuously compounded return on "market portfolio" in month 1; measured by the natural logarithm of the equally weighted index developed by the researchers including all companies considered in the analysis. Such an index was developed for a specific month by adding the closing market prices at the end of that month for the companies considered divided by the number of those companies.[10] r_{ft} = continuously

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[10] It has to be reported that using the ASE general index raised the problem of having very low estimators closed to zero, especially those for betas ranging from +0.042 to −0.028 except for the Arab Bank (representing almost 30% of ASE market capitalization) were beta was 1.25. Using equally weighted index developed by the researchers containing those 83 companies included in the study, however, shifted beta values to be around the accepted level ranging between +2 and −2 except that for the Arab Bank where beta was unrealistic (52.47). Therefore, the researchers exclude the Arab Bank from the sample used for developing the equally weighted index (see Appendix 2). Calculating the market beta by adding the included companies betas divided by the number of those companies gives the value 1.05 which is almost the recognized market beta (market beta equals 1) confirming the correctness of the index used for

compounded "risk-free" return in month t; measured by the natural logarithm of one plus the monthly return on 30-day Jordanian Government treasury bills. $\hat{\delta}_{pf}$ = estimated intercepts (differential return - Jensen's measure). $\hat{\beta}_{Pf}$ = estimated slopes (systematic risk).

IV- EMPIRICAL RESULTS

IV-I- Relative Performance of the P/ E Portfolios

Equation (1) was estimated by Ordinary Least Squares (OLS) using 96 months of monthly return data (April 1996—March 2004). Table (1) shows the scores of the four performance measures and selected summary statistics for the (i) five P/E portfolios *(A - highest P/E, B, C, D* and *E - lowest P/E);* (ii) lowest P/E portfolio includes only firms with negative earnings.

The following observations on the results in Table (1) seem pertinent.[11] First, consider the mean price-earnings ratio for each of the P/E portfolios over the 8-year period ending March 31, 2004. The differences in P/E ratios for the various portfolios are, of course, significant. It could be strongly argued that the four-portfolio performance

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estimating the estimators (α and β). Further, running the correlation test between the ASE index and the equally weighted index developed by the researchers, the correlation were 0.98 which means any of the indices used representing the another in estimating the estimators. It has to be noted, however, that the market price of the Arab Bank was around 300 JD over the period under consideration, where all other market share price for the companies listed on ASE considered in this study ranging between 0.20 to 10 JD, an issue might created such a problem in estimating the companies' betas.

[11] It should be noted that the results in Table 1 are based on continuous compounding and that although monthly return data were employed in estimating equation (1), r_p , r'_p , $\hat{\delta}_p$ and σ(*r'_p*) in that table have been stated on an annual basis by multiplying their mean monthly values by 12. This is always possible under continuous compounding due to the additive property of logarithms, i.e. if *r*_p* and r_p are the continuously compounded mean monthly and annual returns respectively, then it can be easily shown that r_p = 12 *r*_p*.

measures used indicated that moderate P/E portfolios are superior to that of the highest or lowest P/E portfolios.

As indicated in Table (1), portfolio C had a superior performance followed by portfolio D and finally portfolio B, where portfolios A (the highest portfolio P/E) and E (the lowest portfolio P/E) had the worst performance leaving ASE efficiency questionable. According to Sharpe's measure, for example, the lowest and highest P/E portfolios, *E and A,* lost about -40.5% and –21.4% *per annum*, respectively *more* than any other portfolios leaving the best performance for portfolio C, which earned 74% *per annum*, followed by portfolio D earning 27.7%.

Using Treynor's measure, , the lowest and highest P/E portfolios, *E, B and A,* lost about –11.6%, -3.8%, and –1.4% *per annum*, respectively leaving the best performance for portfolio C, which earned 3.5% *per annum*, followed by portfolio D earning 2.5%. The same scenario can be seen using Jensen's measure, where portfolios E and A lost more than any other portfolios, while portfolios C and D performed better than any other portfolios.

First, the Appraisal ratio's measure indicated that the lowest and highest P/E portfolios, *E and A,* lost about –365% and –568% *per annum*, respectively leaving the best performance for portfolio C, which earned 1301% *per annum*, followed by portfolio D earning 125%. Clearly, all portfolio performance measures agreed that portfolios C and D were the best, while the worst were portfolio E followed by portfolio A, which represent the highest and lowest P/E portfolios.

Second, the serial correlation in the regression residuals is fairly small since calculated Durbin-Watson figures presented in Table (1) higher than the upper limit of Recognized Durbin –Watson (i.e.1.695). Third, a fundamental assumption underlying the results in Table (1) is stationary of the regression relationships- differential return (intercept) and systematic risk (slope)- over the entire 8-year period since adopting the OLS method in testing the null hypothesis requires to assure such an assumption.

The stationarity of the variables used in the model employed is a requirement in order to avoid being mistaken

in rejecting the null hypothesis when it is not and vice versa. To determine the validity of this assumption, the 8 year portfolios' stationarity were tested using Augmented Dickey-Fuller (ADF) test. The homogeneity of the estimated regression coefficients was tested statistically, and the results of this test appear in the last panel in Table (1). Since the 0.01 critical value of ADF test was–3.5132, it has to be noted that none of the results indicates a non-stationary problem confirming the argument that risk, differential returns, and related measures of performance for each of the five portfolios were not different over the period under consideration (see Appendix 3).

IV-II- The Security Market Line (SML) and Portfolios Based on P/E Ratio

As it is presented in Table (1) and Figure 1 below, it can be clearly seen that portfolio C performed very well providing yearly expected return more than what was required since its expected return *per annum* was 10.8%, while its required rate of return *per annum* was 8.14% locating such portfolio over the Security Market Line (SML) and being underpriced.[12]

In an efficient market, however, the expected rate of return should equal the required rate of return and the location of the portfolio stands exactly on the SML. The same argument could be presented for portfolio D, but with expected return 9.9% and required rate of return 8.22%. On the other hand, portfolio E had a badly performance followed by portfolios A and B by providing expected return less than what was required since their expected returns *per annum* were 1.8%, 4.9% and 5.1%, while their required rate of returns *per annum* were 7.33%, 8.34%, and 7.35% locating such portfolios under the SML and being overpriced.

V- SUMMARY AND CONCLUSIONS

In this paper, an attempt was made to determine

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[12] For further readings concerning efficient portfolios and Security Market Line (SML), see (G. (Arnold 1998; Blake 2001; Bodie, Kane et al. 2002).

empirically the relationship between investment performance of equity securities and their P/E ratios. While the efficient market hypothesis denies the possibility of earning excess returns, the price-earnings hypothesis highlighted that P/E ratios, due to exaggerated investor expectations, may be indicated of future investment performance.

During the period April 1996-March 2004, the moderate P/E portfolios seem to have, on average, earned higher absolute and risk adjusted rates of return than high and low P/E securities. These results suggest a violation in the joint hypothesis that (i) the asset pricing models employed in this paper have descriptive validity and (ii) security behavior is consistent with the efficient market hypothesis. If (i) above is assumed to be true, conclusions pertaining to the second part of the joint hypothesis may be stated more definitively. We therefore assume that the asset pricing models are valid.

The results reported in this paper are consistent with the view that P/E ratio information was not fully reflected in security prices in as rapid a manner as postulated by the semi-strong form of the efficient market hypothesis. Instead, it seems that disequilibria persisted in capital markets, on average, seem to have been inappropriately priced, and opportunities for earning *abnormal* returns were afforded to investors. From the viewpoint of these investors, market inefficiency seems to have existed. In addition, such a result helps investors in selecting those shares which were under-priced in order to develop more *inefficient* but *profitable portfolios*.

In conclusion, the behavior of security prices over the 8-year period studied is, perhaps, not completely described by the efficient market hypothesis. To the extent moderate P/E portfolios did earn superior returns on a risk-adjusted basis, the propositions of the price-ratio hypothesis on the relationship between investment performance of equity securities and their P/E ratios seems to be valid. Contrary to the growing belief that publicly available information is instantaneously impounded in security prices; there seems to be lags and frictions in the adjustment process. As a result, publicly available P/E ratios seem to possess "information

content" and may warrant an investor's attention at the time of portfolio formation or revision making helping the capital market dealers to obtain abnormal profits.

Such a conclusion could be confirmed in future research by using different methods of calculating P/E such as the Forward P/E_1 Ratio, P/E calculated using Modigliani and Miller Model, Allowable P/E Ratio, P/E when zero growth assumed, P/E when constant growth assumed, P/E calculated using Johnson Model.

Table 1
Performance Measures and Related Summary Statistics (April 1996-March 2004).[13]

Performance Measure / Summary Statistics	P/E Portfolios[14]				
	A	**B**	**C**	**D**	**E**
Mean P/E ratio	42.37	21.26	13.25	7.14	-15.58
Yearly Portfolio Expected Rate of Return[15]	0.049	0.051	0.108	0.099	0.018
Yearly Required Rate of Return[16]	0.0834	0.0735	0.0814	0.0822	0.0733
Portfolio's Alpha ($\hat{\alpha}_P$)	-0.0047 (0.603)	0.0013 (0.91)	0.0014 (0.776)	0.0001 (0.993)	-0.0014 (0.919)
Systematic risk ($\hat{\beta}_P$)	1.331 (0.0001)	0.454 (0.255)	1.15 (0.0001)	1.228 (0.004)	0.437 (0.38)
Unsystematic risk ($Var\ e_t$)	0.007	0.010	0.002	0.011	0.015
Portfolio's Total Risk[17]	0.008	0.010	0.003	0.012	0.016
Jensen's Differential Return ($\hat{\delta}_p$)	-0.037	-0.023	0.024	0.014	-0.057
Treynor's Reward-To- Volatility Measure: $r`_p/\hat{\beta}_P$ [18]	-0.014	-0.038	0.035	0.025	-0.116
Sharpe's Reward-To- Variability Measure: $r`_p/\sigma(r`_p)$ [19]	-0.214	-0.170	0.740	0.277	-0.405
Appraisal Ratio: ($\hat{\alpha}_P/ Var\ e_t$)	-5.68	-2.34	13.01	1.25	-3.65
Coefficient of Correlation: $\rho\ (r`_p, r`_m)$	0.418**	0.126	0.599**	0.309**	0.098
Coefficient of Serial Correlation: * $\rho\ (e_{t+1}, e_t)$	1.67 (0.418)	1.952 (0.126)	2.074 (0.599)	2.069 (0.309)	1.847 (0.098)
Dickey-Fuller (ADF) – ADF Test Statistic	-5.485342	-4.389313	-4.713407	-5.382538	-
1% Critical Value	-3.5132	-3.5132	-3.5132	-3.5132	-

**Correlation is significant at the 0.05 level (2-tailed).

* From DW table, the dL=1.595 and dU=1.695. This means we accept the Ho saying that there is no Autocorrelation among residuals (P = 0)

---

[13] Significance at the 0.05 level (2-tailed) in parenthesis.

[14] A = highest P/E quintile, E= lowest P/E quintile.

[15] $R`_p = \hat{\alpha}_P + \hat{\beta}_P (r_m)$, where $r_m = 0.082$ and It is the continuously compounded market return over the period April 1996 - March 2004.

[16] $RRR_p = r_f + \hat{\beta}_P (r_m - r_f)$, where $r_f = 0.07$, and It is the continuously compounded T-Bills of Jordanian government over the period April 1996 - March 2004.

[17] It has to be highlighted the fact that ASE suffers from the problem of thin trading and low level of trade activeness. Such an issue might explain the low level of risk, although he Middle East area considered as one of the hottest area in the world.

[18] Mean excess return of portfolio p, $r`_p$ divided by its systematic risk, $\hat{\beta}_P$.

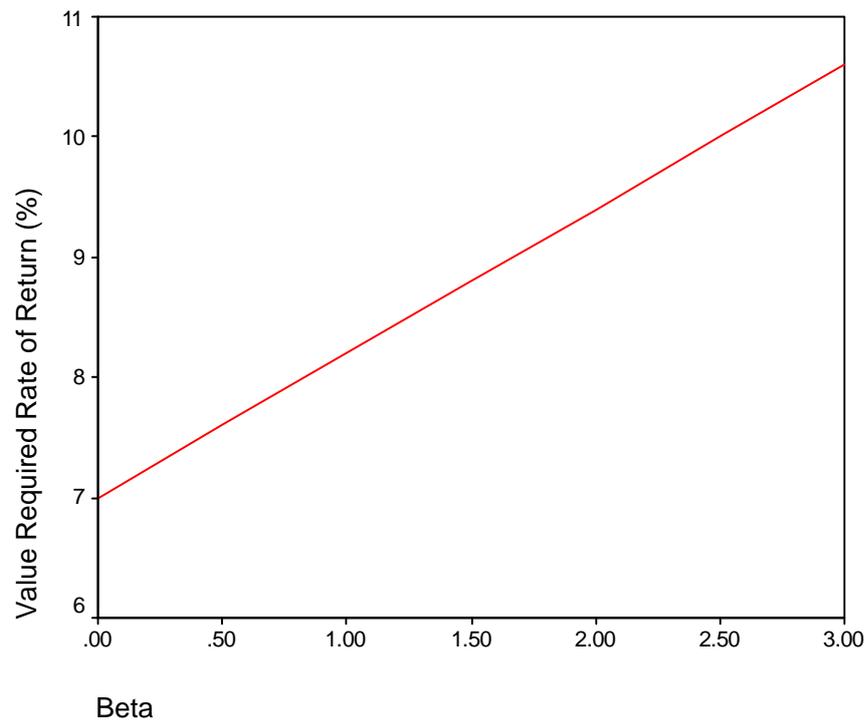[19] Mean excess return of portfolio p, $r`_p$ divided by its standard deviation, , $\delta(r`_p)$.

Figure 1
The Sml and Portfolios' Performance Based On P/E Ratios
(April 1996-March 2004).

Appendix 1
Amman Stock Exchange General Index And Portfolios' Continuously Compounded Monthly Return
(April 1996-March 2004).

Month	Index Return	E	D	C	B	A
29-5-96	-0.0254	0.0015	-0.0342	-0.0269	-0.0104	-0.0005
30-6-96	-0.0377	-0.0842	-0.0545	-0.0146	-0.0218	-0.0470
31-7-96	-0.0325	-0.0780	-0.0071	-0.0250	-0.0151	-0.0353
31-8-96	0.0548	-0.0098	0.0078	0.0191	-0.0034	-0.0112
30-9-96	0.0250	0.0382	0.0002	-0.0067	0.0099	-0.0220
30-10-96	0.0011	-0.0318	-0.0140	-0.0230	-0.0068	-0.0419
30-11-96	0.0322	0.0000	0.0139	-0.0020	-0.0147	0.0033
30-12-96	0.0038	0.0200	-0.0214	0.0440	0.0113	0.0146
29-1-97	-0.0020	0.0017	0.0328	-0.0160	-0.0227	-0.0064

Month	Index Return	E	D	C	B	A
26-2-97	0.0239	-0.0085	0.0069	0.0068	-0.0064	-0.0070
31-3-97	-0.0321	-0.0763	-0.0123	-0.0186	-0.0293	-0.0306
30-4-97	-0.0102	-0.0243	0.0649	-0.0936	0.2131	-0.1295
31-5-97	0.0834	-0.0236	0.0022	0.0617	-0.0224	0.0384
30-6-97	-0.0252	-0.0355	-0.0321	-0.0117	0.0052	-0.0092
30-7-97	0.0517	-0.0620	-0.6020	0.0998	0.1244	0.1566
31-8-97	-0.0068	0.0274	0.0116	-0.0010	-0.0231	-0.0375
30-9-97	0.0632	0.0287	0.0297	0.0348	0.0051	0.0068
29-10-97	-0.0296	-0.0280	0.0307	-0.0202	-0.0037	0.0052
30-11-97	0.0020	-0.0482	-0.0497	-0.1067	-0.0610	-0.1103
30-12-97	-0.0123	0.0130	-0.0087	-0.0004	0.0191	0.0263
27-1-98	-0.0142	-0.2176	0.5869	-0.1269	-0.1523	-0.1747
28-2-98	0.0168	-0.2541	-0.0437	0.0036	-0.0605	-0.0170
31-3-98	-0.0228	-0.0714	-0.0128	-0.0483	-0.0182	0.0007
29-4-98	0.0274	0.6857	0.0188	-0.1696	-0.5266	0.0508
31-5-98	0.0556	-0.0201	-0.1404	-0.0527	-0.0071	-0.0248
30-6-98	-0.0287	-0.0695	-0.0624	-0.0187	-0.0172	0.0087
29-7-98	0.0317	-0.0325	0.0017	-0.0225	-0.0370	-0.0230
31-8-98	-0.0038	-0.0445	-0.0091	-0.0280	-0.0271	-0.0167
30-9-98	-0.0459	-0.0275	-0.0457	-0.0223	-0.0174	0.0007
31-10-98	-0.0551	-0.0392	-0.0302	-0.0047	-0.0091	-0.0403
30-11-98	0.0206	-0.0008	0.0206	-0.0213	-0.0049	0.0148
30-12-98	0.0301	-0.0158	0.0129	0.0777	0.0724	0.1325
31-1-99	0.0496	0.0000	0.0805	-0.0228	-0.0034	0.0087
28-2-99	0.0222	-0.0112	0.0576	-0.0147	-0.0121	-0.0048
31-3-99	-0.0114	0.0200	0.0125	-0.0164	-0.0289	0.0051
29-4-99	-0.0374	0.6931	-0.0643	-0.1770	0.3108	-0.1631
31-5-99	-0.0167	0.0520	-0.0620	-0.0091	-0.0208	-0.0713
30-6-99	-0.0145	-0.0109	-0.0032	0.0337	0.0387	-0.0081
29-7-99	-0.0089	-0.2662	-0.0197	-0.0348	-0.0369	0.0162
31-8-99	-0.0237	-0.0482	0.0032	-0.0366	-0.0547	0.0012
30-9-99	-0.0303	-0.0441	-0.0008	-0.0354	-0.0167	-0.0280
31-10-99	-0.0005	-0.0153	0.0103	-0.0058	0.0024	0.0159
30-11-99	0.0263	0.0110	0.0018	-0.0085	0.0311	0.0024
29-12-99	0.0330	0.1010	0.0298	0.1325	0.0704	0.1362
31-1-2000	-0.0283	-0.0331	0.0070	-0.0476	-0.0139	0.0109
29-2-2000	-0.0206	-0.0491	-0.0074	-0.0446	-0.0110	-0.0095
30-3-2000	-0.0357	-0.0365	-0.0308	-0.0343	-0.0094	0.0042
27-4-2000	-0.0459	0.1221	-0.3846	0.1782	-0.1022	0.0509
31-5-2000	0.0081	-0.0119	-0.0320	-0.0298	-0.0100	-0.0318

Month	Index Return	E	D	C	B	A
29-6-2000	-0.0307	0.0226	0.0052	0.0564	0.0105	0.0844
31-7-2000	-0.0292	-0.0276	-0.0260	-0.0496	-0.0661	-0.1392
31-8-2000	-0.0324	-0.0116	0.0077	-0.0106	0.0410	-0.0150
28-9-2000	-0.0137	0.0180	0.0192	0.0230	0.0141	0.0319
31-10-2000	0.0254	-0.0115	0.0573	-0.0017	0.0070	-0.0065
30-11-2000	-0.0134	-0.0076	0.0060	0.0054	-0.0181	-0.0116
21-12-2000	-0.0086	-0.0138	-0.0114	0.0108	-0.0087	0.0507
31-1-2001	0.0277	-0.0202	0.0655	-0.0020	-0.0036	-0.0028
28-2-2001	0.0083	-0.0158	0.0346	0.0078	-0.1088	0.0045
29-3-2001	0.0044	0.0032	0.0049	0.0116	0.0365	-0.0007
30-4-2001	-0.0170	0.1074	-0.1253	-0.0950	0.5296	-0.6293
31-5-2001	0.0363	-0.0398	0.0029	0.0152	0.0473	-0.1329
28-6-2001	-0.0015	-0.0430	-0.0035	0.0327	-0.0188	0.0363
31-7-2001	0.0250	-0.0021	0.0297	0.0297	0.0009	0.0602
30-8-2001	0.0381	-0.0088	0.0970	0.0390	-0.0117	-0.0482
30-9-2001	0.0321	-0.0259	-0.0248	-0.0109	-0.0125	0.0063
31-10-2001	0.0741	-0.0016	0.0776	0.0207	-0.0183	0.0324
29-11-2001	0.0404	0.0149	0.0436	0.0545	0.0153	-0.0089
30-12-2001	-0.0010	0.0354	0.0259	0.0408	0.0272	0.0089
30-1-2002	0.0192	0.0247	0.1256	0.0517	0.0163	0.0074
28-2-2002	-0.0139	-0.0858	-0.0065	-0.0123	0.0120	-0.0252
31-3-2002	-0.0079	-0.0298	-0.0389	0.0055	0.0281	0.0117
30-4-2002	-0.0418	-0.1112	-0.1408	-0.0379	-0.0383	0.1587
30-5-2002	0.0531	0.0571	0.0369	0.0742	0.0542	0.0416
30-6-2002	0.0671	-0.0167	0.0468	0.0781	0.0206	0.0421
31-7-2002	-0.0144	-0.0317	-0.0036	-0.0096	-0.0742	-0.0016
29-8-2002	-0.0238	0.0660	-0.0363	-0.0221	-0.0518	-0.0162
30-9-2002	-0.0240	-0.0879	-0.0129	-0.0063	-0.0467	-0.0198
31-10-2002	-0.0308	0.0232	-0.0156	0.0028	-0.0151	-0.0214
28-11-2002	0.0149	-0.0150	0.0222	0.0146	0.0438	-0.0011
30-12-2002	-0.0074	-0.0050	0.0023	0.0377	0.0304	0.0192
29-1-2003	0.0155	0.0157	0.0072	0.0153	-0.0055	0.0017
27-02-2003	-0.0501	-0.0576	-0.0346	-0.0228	-0.0229	-0.0433
31-03-2003	0.0389	0.0124	0.0461	0.0378	0.0431	0.0184
30-04-2003	0.0389	-0.0318	-0.0140	-0.0230	-0.0068	-0.0419
29-5-2003	0.0389	-0.0243	0.0649	-0.0936	0.2131	-0.1295
30-6-2003	0.0389	-0.0280	0.0307	-0.0202	-0.0037	0.0052
31-7-2003	0.0389	0.6857	0.0188	-0.1696	-0.5266	0.0508
31-8-2003	0.0389	-0.0392	-0.0302	-0.0047	-0.0091	-0.0403
30-9-2003	0.0389	0.6931	-0.0643	-0.1770	0.3108	-0.1631

| Month	Index Return	E	D	C	B	A
30-10-2003	0.0389	-0.0153	0.0103	-0.0058	0.0024	0.0159
30-11-2003	0.0389	0.1221	-0.3846	0.1782	-0.1022	0.0509
30-12-2003	0.0389	-0.0115	0.0573	-0.0017	0.0070	-0.0065
29-1-2004	0.0389	0.1074	-0.1253	-0.0950	0.5296	-0.6293
29-2-2004	0.0389	-0.0016	0.0776	0.0207	-0.0183	0.0324
31-3-2004	0.0389	-0.1112	-0.1408	-0.0379	-0.0383	0.1587

Appendix 2
Jordanian Companies Considered Betas Using Equally Weighted Index And Ase General Index
(April 1996-March 2004).

| Companies Name	Equally Weighted Index	ASE General index
Arab Aluminum Industry / ARAL	2.2096	0.0042
National Steel Industry	0.1566	0.0013
The Jordan Pipes Manufacturing	1.6027	0.0121
National Capel and Wire Manufacturing	2.4223	-0.0007
Jordan New Cable Company	0.9140	0.0043
Jordan Steel	0.2965	0.0103
Arab Electrical Industries	0.2689	0.0029
RUM Metal Manufacturing	0.4022	-0.0006
The Public Mining	1.7739	0.0060
Jordan Ceramic Industries	4.1259	-0.0279
Jordan Phosphate Mines	1.7393	0.0110
RAFIA Industries	0.8566	-0.0043
Jordan Cement Factories	0.8594	-0.0117
Jordan Industrial Resources Co.	0.8792	-0.0088
Jordan Petroleum Refinery	-4.4591	0.0175
Arab Potash	1.9104	0.0094
International Ceramic Industries	0.5017	0.0034
The Jordan Worsted Mills	1.2537	-0.0103
The Jordan Tanning	3.0986	0.0265
Woolen Industries	0.9778	0.0125
Jordan Rock Wool Industry	1.5401	0.0131
EL-ZAY Ready Wear Manufacturing	0.6643	-0.0057
International Textile Manufacturing	0.4530	0.0016
National Textile and Plastic Industries	0.2420	-0.0022
Jordan Dairy	0.2822	0.0188
General Investment	0.1762	-0.0026
International Tobacco and Cigarettes	0.2396	0.0312
Universal Modern Industries Co. for Edible Oil	0.5655	-0.0189

Companies Name	Equally Weighted Index	ASE General index
Kawther Investment	0.6140	-0.0059
Arab Investment and International Trade	0.2852	-0.0025
Livestock and Poultry	0.5140	0.0051
The Union Tobacco and Cigarettes Industries	-2.7211	0.0266
Pearl Sanitary Paper Converting	0.2727	-0.0039
The Arab Pharmaceutical Manufacturing	1.7082	0.0376
The Industrial, Commercial and Agricultural	0.9302	-0.0126
The Arab Chemical Detergents Industries	0.7860	-0.0132
Dar Al-Dawa Development and Investment	1.6430	0.0413
Arab Center for Pharmaceuticals and Chemicals	0.5011	0.0087
Jordan Chemical Industries	-0.3837	-0.0239
Universal Chemical Industries	0.7621	-0.0179
Jordan Industries and Match / JIMCO	0.0249	-0.0007
Jordan Sulpha Chemicals	0.5912	-0.0010
Union Chemical and Vegetable Oil Industries	0.3724	-0.0006
CAIRO AMMAN BANK	2.3181	-0.0125
BANK OF JORDAN	1.9884	0.0043
THE HOUSING BANK	2.7803	0.0116
INDUSTRIAL DEVELOPMENT BANK	1.2633	0.0015
ARAB JORDAN INVESTMENT BANK	2.0378	-0.0021
JORDAN KUWAIT BANK	2.5639	0.0175
JORDAN ISLAMIC BANK	2.2056	-0.0062
JORDAN INVESTMENT & FINANCE BANK	1.9215	-0.0071
JORDAN INSURANCE	0.1822	-0.0147
MIDDLE EAST INSURANCE	-0.0252	-0.0139
UNITED INSURANCE	0.5349	-0.0081
ARABIAN SEAS INSURANCE	0.7523	0.0008
JERUSALEM INSURANCE	2.6856	-0.0137
GENERAL ARABIA INSURANCE	0.5663	-0.0049
JORDAN FRENCH INSURANCE	-0.0303	0.0063
YARMOUK INSURANCE & REINSURANCE	1.1555	-0.0100
HOLY LAND INSURANCE	0.8728	-0.0051
PHILADELPHIA INSURANCE	2.0484	-0.0182
ARAB LIFE & ACCIDENT INSURANCE	0.6133	0.0046
AL-NISR AL-ARABI INSURANCE	2.2823	-0.0082
DELTA INSURANCE	1.2069	-0.0047
ARAB UNION INTERNATIONAL INSURANCE	1.2852	-0.0087
THE NATIONAL AHLIA INSURANCE	1.5658	-0.0077
JORDANIAN ELECTRIC POWER	0.3069	0.0053
JORDAN HOTEL & TOURISM	2.5270	0.0365

| Companies Name	Equally Weighted Index	ASE General index
IRBID DISTRICT ELECTRICITY	0.2750	0.0194
VEHICLES OWNERS FEDERATION	3.7293	-0.0267
ARAB INTERNATIONAL HOTELS	1.1322	0.0028
JORDAN NATIONAL SHIPPING LINES	1.7699	0.0088
NATIONAL PORTFOLIO SECURITIES	1.0095	0.0011
REAL ESTATE INVESTMENT	0.3087	0.0028
JORDAN INTERNATIONAL TRADING CENTER	0.4406	-0.0009
JORDAN PRESS FOUNDATION / ALRA'I	2.8505	-0.0181
JORDAN PRESS & PUBLISHING /AD-DUSTOUR	2.8135	0.0051
UNITED MIDDLE EAST & COMMODORE HOTELS	0.6328	-0.0068
ARAB INTER. FOR INVESTMENT & EDUCATION	1.7918	0.0037
AL-ZARQA FOR EDUCATION & INVESTMENT	0.6365	0.0021
UNIFIED CO. FOR ORG. LAND TRANS.	0.9430	-0.0076
UNION LAND DEVELOPMENT CORP.	0.4334	0.0022
Average Beta	**1.0516**	**0.0007**

Appendix 3
The Augmented Dickey-fuller Unit Root Test and the Stationarity
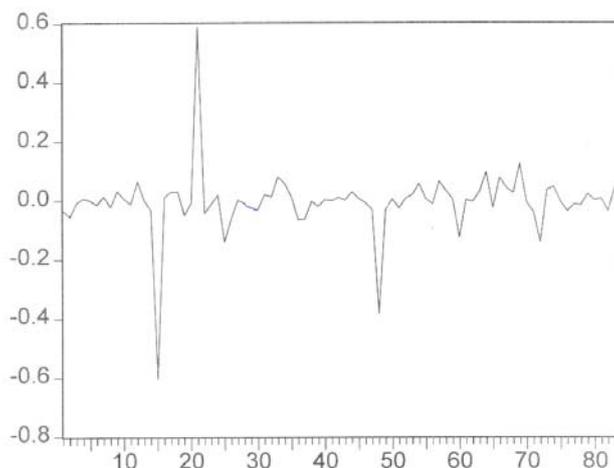**(April 1996-March 2004)**
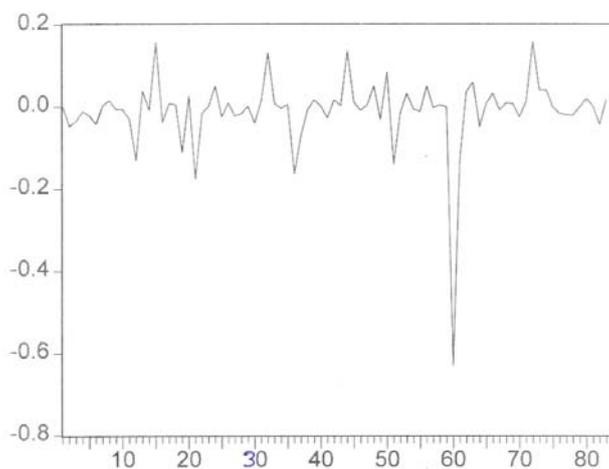
Portfolio A
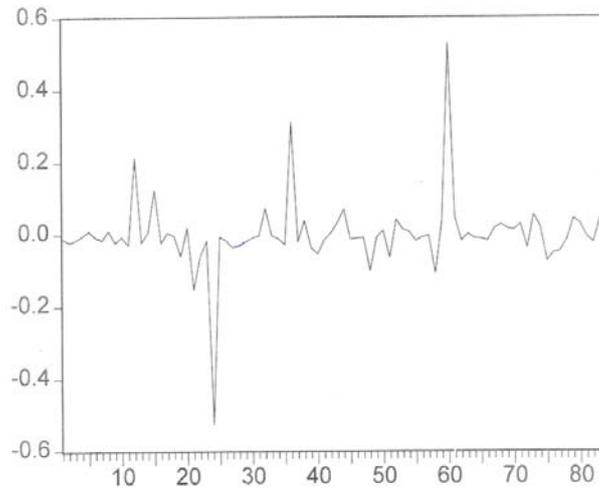
Portfolio B
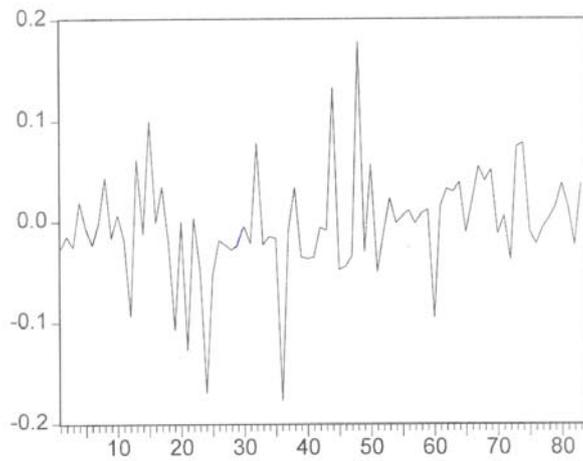
Portfolio C

Portfolio D

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العلاقة بين أداء الاستثمار في الأسهم ونسبة السعر السوقي للسهم الى عائد السهم

محمد الشياب وأسعد العلي

ملخص

تحاول هذه الورقة تحديد العلاقة بين أداء الاستثمار في الأسهم و نسبة السعر السوقي للسهم إلى عائد السهم نظريا و تطبيقيا. على الرغم من كون فرضيات كفاءة أسواق رأس المال ترفض فكرة إمكانية تحقيق أرباح غير عادية، إلا أن فرضية نسبة السعر السوقي للسهم إلى عائد السهم ركزت على إمكانية التنبؤ بأداء الأسهم مستقبلا، و الذي يعود إلى تضخيم المستثمرين لتوقعاتهم. تحاول هذه الدراسة استكشاف بيانات العائد الشهري لـ (83) شركة مساهمة عامة مدرجة في سوق عمان المالي، الذي يعد من الأسواق المالية الناشئة، خلال الفترة من نيسان 1996 ولغاية آذار 2004. بعد أن تم تطبيق اختبار جذر الوحدة للاستقرارية باستخدام اختبار ديكي– فولر (ADF) الذي بينت نتائجه تحقق شرط الاستقرارية، تم استخدام اختبار نموذج الانحدار (OLS) الذي أوضحت نتائجه إمكانية تحقيق أرباح غير عادية اعتمادا على تكوين محافظ استثمارية مصنفة على أساس نسبة السعر السوقي للسهم إلى عائد السهم لاسهم الشركات المكونة لهذه المحافظ. وعليه فان الدراسة تدعم الفرضية التي تقول بأهمية نسبة السعر السوقي للسهم إلى عائد السهم في تحديد أداء المحافظ، وهذه النتيجة لا تدعم فرضية كفاءة سوق عمان المالي على المستوى شبه القوي.

الكلمات الدالـة: نسبة السعر السوقي الى العائد على السهم العادي، اداء المحفظة، كفاءة السوق المالي، تقييم الاسهم العادية.

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