University of Natal (Durban)
Graduate School of Business

AN EMPIRICAL STUDY OF CAPITAL ASSET PRICING MODEL ANOMALIES ON THE JSE

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PAUL LYES

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University of Natal (Durban)
Graduate School of Business

CONTENTS

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Abstract

The introduction of the Capital Asset Pricing Model in 1964, and its subsequent study by hundreds of thousands if not millions of people at universities throughout the world, has had far reaching consequences in terms of the way portfolios were constructed for many insurance and pension funds. It has affected the investment philosophies of large numbers of investors as well as influenced the calculations of firms costs of capital. Countless investment proposals have been accepted or rejected based on what the Capital Asset Pricing model has calculated the minimum return demanded by shareholders to be. This dissertation looks at the empirical evidence supporting the debate about the usefulness of the Capital Asset Pricing model, as well as presenting evidence as to any possible anomalies to this model on the JSE.

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An empirical study of Capital Asset Pricing Model anomalies on the JSE.

Introduction

One financial theory has dominated academic literature and influenced greatly the practical world of finance and business for over three decades since it was first expounded by the Nobel prizewinner William Sharpe. This is the Capital Asset Pricing Model (CAPM). At its heart the CAPM has an old and common observation - the returns on a financial asset increases with risk. The breakthrough in the 60's was to define risk in a very precise way. It was no longer enough to rely on standard deviation after the work of Markowitz and others had shown the benefits of diversification. The argument goes that it is illogical to be less than fully diversified so investors tend to create large portfolios. William Sharpe extended modern portfolio theory to introduce the notions of systematic and specific risk. Essentially the CAPM describes the way prices of individual assets are determined in an efficient market, based on their relative riskiness in comparison with the return on the risk-free assets. According to this model, prices are determined in such a way that risk premiums are proportional to systematic risk as measured by the beta coefficient.

CAPM considers a simplified world where, there are no transaction costs, all investors have identical investment horizons and all investors have identical perceptions regarding the expected returns, volatilities and correlations of available risky investments.

In such a world all investors will hold the market portfolio leveraging and de-leveraging it with positions in the risk free asset. CAPM divides the risk of holding risky assets into systematic and specific risk. Systematic risk is the risk associated with holding the market portfolio, where as specific risk or unsystematic risk is the risk unique to an individual asset.

By diversifying his portfolio an investor can effectively eliminate unsystematic risk and is thus left with only systematic risk. One can thus measure the risk of an individual share by its Beta (β) which is an index of a securities responsiveness to a change of returns in the market portfolio. Thus the CAPM is a risk based pricing model which attempts to explain the cross section of expected stock returns through a single factor(β).

1. Problem statement and objectives of the study

Despite efforts to explain the cross section of expected stock returns via risk based asset pricing models, several empirical anomalies seem to remain at odds with the risk based explanations. Of these anomalies the three most cited by researchers are those of size, book-to-market and momentum. Although some researchers claim these anomalies are related to risk, others reject such claims in favour of explanations related to investor behavior. The aim of this study is to empirically identify anomalies to the capital asset pricing model using historical monthly returns earned on the shares traded on the JSE industrial index as well as macro-economic data over the period 1982-1999.

2. Theoretical Background

Sharpe (1964) introduced the world to the CAPM the derivation of which as shown by Jagannathan (1999) is: Start with the simple problem of choosing a portfolio of assets for an investor. In order to set up the problem we need a few definitions. Let R_0 be the return (that is, one plus the rate of return) on the risk-free asset (asset 0). Thus by investing \$1 the investor will get \$$R_0$ for sure. In addition, assume that the number of risky assets is n. The risky assets have returns that are not known with certainty at the time the investments are made. Let α_i be the fraction of the investors initial wealth that is allocated to asset i. Then R_i is the return on asset i. Let R_m be the return on the entire market portfolio of risky assets. Here R_i is a random variable with an expected value ER_i and variance $Var(R_i)$, where variance is a measure of the volatility of the return. The covariance between the return of asset i and the return of asset j is represented by $cov(R_i,R_j)$. Covariance provides a measure of how the returns on the two assets i and j move together.

Suppose that the investors utility can be represented as a function of the expected return on the investor's portfolio and its variance. In order to simplify notation without losing generality, assume that the investor can choose to allocate wealth to three assets: i= 0, 1, or 2. Then the problem is to choose fractions α_0, α_1, and α_2 that maximise

(1) $V(ER_m, var(R_m))$

subject to

(2) $\alpha_0 + \alpha_1 + \alpha_0 = 1$

(3) $ER_m = \alpha_0 R_0 + \alpha_1 ER_1 + \alpha_2 ER_2$

(4) $var(R_m) = \alpha_1.\alpha_1 var(R_1) + \alpha_2.\alpha_2 var(R_2) + 2\alpha_1\alpha_2 cov(R_1,R_2)$.

The objective function V is increasing in the expected return, $\partial V/\partial ER_m > 0$; decreasing in the variance of the return, $\partial V/\partial var(R_m) < 0$; and concave. These properties imply that there is a trade-off between expected returns. The constraint in equation (2) ensures that the fractions sum to 1. Equations (3) and (4) follow from the definition of the rate of return on the wealth portfolio of the investor R_m.

Substituting $1-\alpha_1 - \alpha_2$ for α_0 in equation (1) and taking the derivative of V with respect to α_1 and α_2 yields the following conditions that must hold at an optimum:

(5) $(ER_1-R_0)V_1 + 2[\alpha_1 var(R_1) + \alpha_2 cov(R_1,R_2)]V_2 = 0$

(6) $(ER_2-R_0)V_1 + 2[\alpha_2 var(R_2) + \alpha_1 cov(R_1,R_2)]V_2 = 0$

Where V_j is the partial derivative of V with respect to its J^{th} argument, for j = 1,2. Now consider multiplying equation (5) by α_1 and equation (6) by α_2 and summing the results:

$$(7) \quad [\alpha_1 (ER_1-R_0) + \alpha_2(ER_2-R_0)]V_1+2\{\alpha_1[\alpha_1 var(R_1) + \alpha_2 cov(R_1,R_2)] + \alpha_2[\alpha_2 var(R_2) + \alpha_1 cov(R_1,R_2)]\} V_2 = 0$$

Using the definitions of ER_m and $var(R_m)$, we can write this more succinctly:

$$(8) \quad (ER_m-R_0)V_1 + 2var(R_m)V_2 = 0$$

The expressions in (5), (6), and (8) can all be written as explicit functions of the ratio V_2/V_1, and then the first two expressions [from (5) and (6)] can be equated to the third [from (8)]. This yields the following two relationships:

$$(9) \; ER_i - R_0 = [cov(R_i,R_m)/var(R_m)](ER_m-R_0)$$

for i = 1,2. In fact, even for the more general case, where n is not necessarily equal to 2, equation (9) holds. Let $cov(R_i,R_m)/varR_m$ be the *beta* of asset i or β_i. Then we have

$$(10) \; ER_i = R_0 + (ER_m - R_0)\beta_I$$

for all i = 1,...n

A portfolio is said to be on the mean variance frontier of the return/variance relationship if no other choice of weights α_0, α_j (for j = 1,2,...n) yields a lower variance for the same expected return. The portfolio is said to be on the efficient part of the frontier if, in addition, no other portfolio has a higher return. The optimally chosen portfolio for the problem in equations (1) - (4) has this property. In fact equation (10) will continue to hold if the return R_m is replaced by the return on any mean variance portfolio other than the risk-free asset.

Note that the return R_m in (10) is the return for one investors wealth portfolio. But equation (10) holds for every mean-variance efficient portfolio, and V need not be the same for all investors. A property of mean variance efficient portfolios is that portfolios of them are also mean variance efficient. If we define the market portfolio to be the weighted sum of individual portfolios with the weights being determined by the fractions of total wealth held by the individual, the market portfolio is also mean variance efficient. Therefore an equation of the form given by (10) also holds for the market portfolio. In fact, equation (10) with R_m equal to the return on the market portfolio is the key relation for the CAPM. This relation implies that all assets i have the same ratios of reward, measured as the expected return in excess of the risk free rate ($ER_i - R_0$), to risk (β_i). This is consistent with the notion that the investors trade off return for risk.

When the CAPM assumptions are satisfied, everyone in the economy will hold risky assets in the same proportion. Hence the Beta's computed with reference to every individuals portfolio will be the same, and we might as well compute Beta's using the market portfolio of all assets in the economy. The CAPM predicts that the ratio of the risk premium to the beta of every asset is the same. That is every investment opportunity provides the same amount of compensation for any given level of risk.

3. Review of Prior Research

Efforts to explain the cross section of expected returns via a multi-factor linear asset pricing model have generally failed due to the existence of several empirical anomalies. The Capital Asset Pricing Model (CAPM) of Sharpe (1964), Lintner 1965, and Black (1972) states that the covariance of a security's return with the return on the market (β) should be sufficient to describe the cross-section of expected returns.

International studies

South African finance research has in the past taken its lead from that conducted in the international arena particularly the US. Many empirical studies have contradicted the CAPM .

One of the first empirical studies of the CAPM is that of Black, Jensen and Scholes (1972). They used all the stocks on the New York Stock Exchange during the period 1931-1965 to form 10 portfolios. They then estimated the beta of these portfolios using historical data. Using the 30 day T-bill as an approximation of the risk free asset, they regressed the average monthly excess returns on beta. They used an average monthly excess return on the market of 1.42 percent. The slope of the resulting regression line was 1.08 percent instead of 1.42 percent as predicted by the CAPM. The estimated intercept was 0.519 percent instead of zero. The t-statistics that Black, Jensen and Scholes report indicate that the slope of the regression line and the intercept are significantly different from their theoretical values.

As Black points out this does not necessarily mean that the data does not support the CAPM, he offers two plausible reasons for this anomaly. One is measurement and model specification error, due to the fact that a proxy was used instead of the actual market portfolio. This error influences the slope of the regression line towards zero and its intercept away from zero. The second possibility is that there are no risk free assets and in the absence of such the CAPM does not predict an intercept of zero. Ultimately Black Jensen and Scholes concluded that data was consistent with Black's (1972) version of the model.

Jagarnath and Mcgrattan (1995) conducted a similar study using the same approach as Black, Jensen and Scholes (1972) extending the sample of data to the period 1926-1991 found that the results were consistent with the predictions of the CAPM.

Fama and Macbeth (1973) examined whether there is a positive relation between average return and beta, and whether the squared value of beta and the volatility of the return on an asset can explain the residual variation in average returns across assets that is not explained by beta alone. Fama and MacBeth found, using data for the period 1926-1968 for stocks traded on the NYSE, that the data supported the CAPM.

Banz (1981) investigated whether size (market capitalization) has any additional explanatory power over market β for describing the cross-section of expected stock returns. Banz challenged the CAPM by showing that size does indeed hold additional explanatory power over market β of the cross section of returns. Banz Found during the period 1936-1975 the average return to stocks of small firms(those with low market capitalisation) was substantially higher than the average return to stocks of large firms after adjusting for the risks using the CAPM. Banz conducted his research using an approach similar to that used by Black, Jensen and Scholes. He constructed two portfolios each with 20 assets. One portfolio contained only stocks of small firms, while the other portfolio consisted of stocks of large firms. The two portfolios were constructed in such a way that they both had the same beta. Banz found that the small firms over the period

1936-1975 earned on average 1.48 percent per month more than large firms. Banz concluded that size was a missing factor in the CAPM.

Fama and French (1992) found that the ratio of the book value of a firms common equity to its market value could account for a substantial portion of the cross-sectional variation in average returns. Interestingly Fama and French used the same procedure as Fama and McBeth (1973) the only difference being the sample periods used in the two studies. Thus over the period 1926-1968 Fama and McBeth found a positive relationship between return and risk, whereas over the period 1963-1990 Fama and French found that there was no relationship between return and risk.

Jaggannathan and McGratten (1995) considered these findings and tested them over various periods. They found that over the period 1926-1990 there was a positive relationship between return and risk on the NYSE. However during the sub-period 1976-1980 no relationship could be found between the two. During this period it was found that small-firms had produced unusually high returns in relation to the S&P 500 index. Next they considered the sub-period 1981-1991 during this period it was found that the size effect disappeared all together with small firms under-performing the S&P 500. They concluded that although we find empirical support for the CAPM over a long horison (1926-1991), there are periods in which we do not find it.

Other Studies by Bhandari (1988), Stattman (1980) and Rosenberg, Reid and Lanstein (1985) found that leverage, the book value to market value of equity (B/M) and earnings-price ratios all have additional explanatory power over β and size.

Baker and Haugen (1996:435-436) examine over fifty candidate factors and conclude "...it is noteworthy that none of the factors related to sensitivities to macro-economic variables seem to be important determinants of expected stock returns". Haugen and Baker identified the twelve most important predictors of the cross-section of returns to be: (i) the past months excess returns; (ii) the market to book ratio; (iii) the past twelve months excess returns; (iv) the cash flow to price ratio; (v) the price to earnings ratio; (vi) sales to price; (vii) past three months excess earnings; (viii) the debt to equity ratio; (ix) the variance of total returns; (x) the variance of residual returns; (xi) the past five years expected returns; (xii) the return on equity.

Fama and French (1992:428) in a widely acclaimed study found that between 1963 and 1990, the anomalies, size, P/E, leverage (D/E) and B/M were found to have strong individual relationships with the average returns realized on portfolios sorted according to these characteristics. It was found that portfolios ranked according to P/E and M/B are not closely related to market betas. When examining the aggregate accounting ratios of β ranked portfolios, it was found that less risky shares were the higher performing value stocks.

The Primary contribution of Fama and French (1992) was however not the identification of the anomalies but rather the finding that market betas were unable to explain the cross sectional variation in equity returns, "...the most basic prediction of the [Sharpe,Lintner,Black] model". Fama and French suggest that betas role need be redefined "...if there is a role for β in average returns, it is likely to be found in a multifactor model that transforms the flat simple relation between average return and β into a positively sloped conditional relation" (1992:449).

Arguments have been put forward to explain these anomalies, for instance Jegadeesh and Titman (1993) offer a behavioral explanation for momentum claiming that positive stock return auto-correlation is driven by "delayed price reactions to firm specific information" (p. 67). However if this were the case and investors consistently under reacted to firm specific information, then rational investors can profit from their irrational counterparts, these arbitrage opportunities would lead to riskless profits being made.

Banz and Breen (1986) and Korthari, Shanken and Sloan (1995) raised the issues of 'survivorship' and 'look-ahead' bias. Look-ahead bias the more important of the two occurs when predictor variables are used which were unknown to market participants at the time they are dated in the data set. For example if a firm makes an announcement of high earnings which leads to an increase in its share price and this earnings figure is used to calculate the firms PE ratio at a time prior to it having been announced, the firm will be ascribed a misleadingly low multiple. Thus the fact that the firm made high earnings over a period does not mean that this information was reflected in the share price at all times during that period.

Chan, Jegadeesh and Lakonishok (1995) studied the effects of survivorship bias. Survivorship bias is caused by the fact that the sample of data used will not include securities which have gone into liquidation or delisted. Findings however suggest that survivorship bias does not have a distorting influence particularly in the case of South African studies where large non-thinly traded securities are used.

In the South African context thin trading is of a major concern. Due to the lack of activity on the JSE many shares are not vigorously traded and as a result their price might not be a fair reflection of their market value, in order to overcome this bias it is important that one select only those non-thinly traded share in ones sample.

4. Review of South African Literature

South African research has to a large degree been driven by studies conducted in the United States. And as such there has been very little in the way of empirical studies in this area of research.

In their test of the CAPM on the JSE, Bradfield, Barr and Affleck-Graves (1988) found no evidence of dividend yield, firm size or liquidity 'anomalies' over the period 1973 to 1984. Page and Palmer (1991) also found no evidence of a size effect on the JSE but did find that a P/E effect existed. Over the period 1978 to 1987 they found that a portfolio of low P/E securities outperformed a portfolio of high P/E securities by 6.5% per annum. Fraser and Page (1999) investigated the interaction of value (low B/M and D/P) and momentum (prior year returns) for industrial JSE shares. It was found that low B/M shares produced higher returns, but that this relation did not hold when D/P was used as a measure of value. Higher momentum shares were found to produce higher returns.

5. Methodology and Data

This study aims to extend existing South African research by investigating the ability of a relatively broad range of firm-specific factors to influence the cross section of JSE industrial returns. The time series returns of portfolios ranked by these characteristics will be examined to obtain some insight into the time variation of the rewards to the factor exposures.

The following categories of candidate factors are selected (i) Measures of value/growth; (ii) Measures of expected future earnings growth; (iii) Measure of investor 'irrationality' (iv) Measures of momentum (A list of factors tested can be seen in Appendix A)

Monthly share return data from February 1982 to February 1999 on JSE industrial shares are employed in the analysis. All raw data is obtained from INET. A tradability filter of omitting those least traded shares that cumulatively account for 5% of median monthly Rand value of total trade on the JSE is applied. To avoid look ahead bias it was insured that all accounting information used in the construction of the portfolio is obtained from a financial year end at least three months prior to the date of portfolio construction.

In the case of shares that delisted during the sample period, a return of (-100%) was earned in the period of delisting and any liquidation dividend was added to the portfolio's returns in the period it was paid, mitigating the influence of survivorship bias.

The portfolio's are formed by ranking all the shares in a particular month by the factor concerned and forming three equally weighted portfolios, with the top one third of shares according to this ranking being portfolio 1 (high portfolio) and the lowest one third being in portfolio 3 (low portfolio). The returns on these portfolios are calculated and the portfolios are re-balanced at the last trading day of the next month, repeating the procedure. Thus for every factor there are two portfolios a high portfolio (portfolio 1) and a low portfolio (portfolio 3). The excess returns on these portfolios is calculated by deducting the monthly risk free rate from the monthly portfolio returns.

The monthly risk free rate is calculated by using the BA rate at the end of the month divided by 12 to get a monthly rate. These excess returns are then regressed using multiple regression methodology against excess returns on the market portfolio.

The excess returns on the market portfolio are derived by deducting the monthly risk free rate (as calculated above) from the monthly returns on the All Share Index (ALSI). The Monthly returns on the ALSI are calculated by dividing the change in the index by the index value at the beginning of the month.

The t statistic is employed to ascertain whether the intercept term (constant) is significantly different from nil. If the CAPM holds true then a regression based on these factors should have an intercept of nil. Thus any factors for which an intercept term exists which is significantly different from nil will qualify as an anomaly. Once anomalies have been identified further research will be conducted using cluster analysis to identify whether portfolios derived based on these factors consistently earn excess returns.

The initial data already stratified in terms of the factors listed in appendix (A) was tabulated using Microsoft Excel in a format that would enable it to be read by the SPSS statistical software package.

Once the data had been tabulated, the regressions were performed using SPSS. The results of the regressions can be seen in (Appendix B)

6. Results

The complete results can be seen in appendix (B). A summary of the results of the empirical research carried out can be seen in Table (A) In total 58 sets of data were tested, of these using a 95% confidence interval 17 were identified as anomalies. A summary of these factors can be seen in Table (B) at a confidence interval of 98% the number of factors identified as anomalies is reduced to 12, these can be seen in Table (C).

If one considers the anomalies at the 95% and 98% confidence interval, four distinct categories emerge. Factors associated with high momentum, factors associated with low value, factors associated with small size and other factors.

Value Factors

Price / Turnover

The first of the value factors tried was price/turnover.

It was found that share with a low price per Rand of turnover managed to achieve a 1.033% return premium over the market as a whole. This further supports the earlier findings of Bradfield, Barr and Affleck-Graves, who found both size and value to be strong factors in explaining the cross-section of returns. The mean monthly return for shares selected based on low price/turnover was 2.287% which equates to an annual return of in the region of 27.44% over the 16 year period. The Beta of this portfolio is 0.58355, which is slightly above the average Beta of shares on the industrial index of 0.53. This is to be expected as value shares generally represent the more risky securities on the market.

Price: NAV

The second of the value factors was Price: Net Asset Value.

Again it was found that shares with low price in relation to their NAV produced a premium over and above that explained by the CAPM. In this case a premium of 1.004 was found at a confidence interval of 98.5%. The average return on such a portfolio was 2.237% per month or 26,84% annually over the 16 year period. The Beta for this portfolio was again marginally higher than the Beta for the industrial index as a whole. Interestingly it was found that the opposite effect was not found when one considered the high value shares. Thus when one looked at those shares with a high price to turnover ratio or high price to NAV it was found that these share returns behaved very much in line with the CAPM.

Cash-flow:Price

The third of the value factors which came up as an anomaly was cash-flow:price. In this case it was found that share with high cash-flow in relation to their price, (thus low price:cash-flow) produced excess returns of 1.4% over and above those predicted by the CAPM. Of all the value factors tested this one proved to be the most conclusive anomaly with a significance level of 99.97%. The mean monthly returns on this portfolio were 2.625 or 31.5% on an annual basis, with a Beta of only 53.536% a portfolio of shares with high cash-flow to price ratio would have produced a very high return at a relatively low risk over the last 16 years.

Earnings Yield

The fourth of the value factors at the 95% confidence interval was the Earnings yield, this is a measure of a companies earnings in relation to its share price. As expected those companies with low price in relation to their earnings (value companies), those with high earnings yield, produced excess returns other than those explained by the CAPM. Excess returns of 1.25% were earned by the portfolio of companies weighted on the basis of high earnings yield. The mean return on such a portfolio was 2.523% or 30.28% on an annual basis, the Beta on such a portfolio was 0.5174 or slightly less than the industrial index average. The significance of the portfolio was again high with a confidence level of 99.81%.

Dividend yield

The last of the value factors to show an anomaly at the 95% confidence level was dividend yield. A measure of a companies dividend payout in relation to its market price. A portfolio of shares with high dividend yields would have gained an investor excess returns of 1.059% over and above those expected under the CAPM. While not as strong an indicator of value as the other factors considered the significance at a level of over 99% was still very high. Mean returns on a portfolio thus weighted would have been 2.322% per month or 27.86% per annum over the last 16 years. The Beta on this portfolio was .48444 one of the lowest Beta's of the portfolios tested.

Overall the evidence collected further substantiates research carried out both locally and internationally, with reguard to value shares. It is possible for one to obtain excess returns by investing in 'value' shares, furthermore the evidence suggests that the best means of assessing 'value' is through the cash-flow:price ratio and earnings yield.

Investing in 'non-value' shares did not however lead to returns less than those expected in terms of the CAPM.

Size Factors

The second factor identified by Bradfield, Barr and Affleck-Graves, as an anomaly to the CAPM in the South African context was size. It was discovered that smaller firms tended to make better returns than their larger counterparts.

Market Capitalisation

Market capitalisation was used as the primary measure of size for the purposes of this research. It was found that excess returns of 0.92791% could be obtained by investing in a portfolio of low market capitalisation shares. This was very much in line with the conclusions drawn by Bradfield, Barr and Affleck-Graves. The Beta of such a portfolio was 0.45483 and the mean monthly returns earned was 2.161 or 25.932% on an annual basis.

Other factors

Other factors, these were factors that did not fit into any of the other three categories. Interestingly three of the four factors relate to accounting measures of solvency and liquidity and could be categorised as representing the perceived financial risk of the business.

Cash-flow/Debt

A high cash-flow/debt was found to be a strong anomaly. Thus shares with good cash-flow or low debt generated excess returns on the CAPM. A portfolio of such shares would produce a mean monthly return of 2.151% at a beta of 0.654, this would equate to an excess monthly return of 0.896% on those predicted by the CAPM at a confidence level of 99.1%.

Assets/debt

Again with assets to debt it was found that shares with high assets to debt ratio's produced excess returns on those predicted under the CAPM. In this case monthly returns of 2.02% could be made at a beta of 0.556, an excess return of 0.947% on that predicted by the CAPM. The confidence level for such excess returns was 99.4%.

Quick Ratio

The final of the three financial risk indicators which proved to be an anomaly was the quick ratio. It was found that a portfolio of shares chosen on the basis of a high quick ratio (liquidity level) would outperform the CAPM by 0.69%, at a confidence level of 96%, offering monthly returns of 1.94% at a beta of 0.488.

Trade-ability

The last of the four **other factors** found to be an anomaly was trade-ability. It was found that share with a low trade-ability (shares which were not traded often) produced excess returns on the CAPM. This was not unexpected as the price of such shares would not be a true reflection of their value due to the fact that they were not being traded. A portfolio of such shares would offer monthly returns of 1.956% at a beta of 0.388.

Momentum

In an effort to corroborate the earlier study by Fraser and Page (1999), which found that shares with higher momentum tended to produce higher returns than those forecast under the CAPM, a number of momentum based factors were tested.

These included factors measuring 1 month, 3 months, 6 months, 12 months and 24 months momentum. The objective of studying these factors was to discover firstly whether momentum was an anomaly, and secondly if it is which measure of momentum produced the greatest excess returns.

A second set of factors comprising shares ranked by positive momentum only was also introduced for each of the time periods. The results of the regression of these factors against the market can be seen in Table (D), although both high momentum and low momentum was tested for as can be seen in Table (A) all factors involving low momentum produced negative results when testing for anomalies and so no further consideration is given to them.

Results of high momentum strategies

1 month price momentum

1 month positive price momentum, was proved to not be an anomaly with only a 9% significance level and a very low constant of only 0.042.This is in line with the results obtained by Fraser and Page which suggested that only long term momentum held any additional explanatory power over the CAPM.

1 Month positive price momentum

As expected like 1 month price momentum, 1 month positive price momentum was also show to be a factor which held no additional explanatory power over the CAPM. Interestingly its level of significance was even lower than that of the one month price momentum at only 7% and its constant was a Negative one at -0.04.

3 Month price momentum

Although the evidence was not sufficient to warrant calling 3 month price momentum and anomaly, it level of significance was far higher than that obtained on the 1 month strategies. The confidence interval moved from less than 10% for the one month strategies to over 80% for 3 Months, the value of its constant also increased to 0.45.

3 Month positive price momentum

Similar to the one month momentum factors the 3 month positive price momentum was outperformed by 3 month price momentum. It had a level of significance of close on 75% and a constant of 1.1. Again there was a noticeable improvement on the results obtained using the 1 month strategies.

6 Month price momentum

When extending the analysis to shares showing high momentum over a six month period the first of the momentum anomalies was found. The level of significance was 98%, and a portfolio of shares purchased using high six month momentum as its determining factor would have produced excess returns on the CAPM of 0.88%. The beta of such a portfolio would have been 0.55 which is a medium risk portfolio and the mean gross return on such a portfolio would have been 2.137% per month over the period 1983-1999.

6 Month positive price momentum

With the 6 month momentum factors the positive momentum, proved to be more of an anomaly than the ordinary price momentum, with a 99% significance level. The excess returns over the CAPM (constant) was 1.09 and the beta of this portfolio was 0.56. The average monthly return on such a portfolio was 2.354% over the 16 year period.

12 month price momentum

The 12 month momentum strategies proved to be the strongest of all the momentum strategies tested. 12 month price momentum had a constant of 1.033 at a confidence level of 99.5%, a definite anomaly. A portfolio of shares based on high 12 month price momentum would net a monthly return of 2.28% and have a beta 0.55.

12 Month positive price momentum

Of all the factors tested, including the momentum factors, 12 month positive price momentum proved to be the strongest anomaly discovered. It had a constant of 1.44 at a 99.9% level of significance, producing monthly mean returns of 2.694 at a beta of only 0.534. Thus by investing in a portfolio of shares based on high 12 month positive price momentum and investor could expect to outperform the CAPM by 1.44% monthly.

24 Month price momentum and 24 month positive price momentum

24 Month price momentum, proved to be an anomaly at the 95% level of significance. The mean for this data set was 1.909% at a beta level 0.5349. The level of significance was 95.9%, providing increased returns on the CAPM of 0.65420%. As an anomaly 24 month momentum was slightly less significant than 6 month price momentum but more significant than 3 month strategies. Interestingly the data obtained from testing **24 month positive price momentum** was identical to that obtained from 24 month price momentum, therefore these results have not been recorded separately.

Summary of momentum strategies

The results of the testing of the various momentum strategies as shown in table (D), based on JSE industrial stocks, are very much in line with the results obtained by leading American research into momentum strategies. Of all the momentum strategies tested 12 month positive price momentum proved to be the strongest anomaly followed by 12 month price momentum, and the 6 month momentum strategies. Thus if one is to use momentum to earn excess returns on the JSE industrial shares 12 month positive price momentum would be the best factor to use to determine such momentum. In terms of the 98% confidence interval used to determine an anomaly both the 12 and 6 month strategies were identified as anomalies. The graph in appendix (C) shows the various strengths of the momentum strategies tested, the 6, 12 and 24 month strategies all showed strongly.

Conclusion

The Capital Asset Pricing Model, first proposed by Sharpe (1964), has been the cornerstone of academic study into asset pricing. The appeal of this model lies in its postulation of a simple measurable relationship between risk and return. Although the key variables can be easily obtained, there has particularly in the South African context been very little in the way of empirical studies into the effectiveness of the Model.

South African Research has to a large extent been led by that carried out in foreign markets, particularly the US market. The majority of research carried out to date has focused on one or two perceived anomalies, which have been tested with the results proving largely inconclusive. The reasons for this can be attributed to the lack of data available on which to conduct such research. The availability of such data in this case has enabled a far more comprehensive study of the Capital Asset Pricing Model and its ability to accurately predict returns on the JSE industrial index.

At the predefined confidence level of 98%, 12 anomalies were identified. Bye further extending the analysis to a 95% level of confidence a further 5 anomalies were identified giving a total of 17 anomalies. These anomalies could be broken down into four categories, value, size momentum and other factors.

The results obtained and discussed earlier fall very much in line with those obtained in leading international empirical research. Essentially what these results mean is that an investor can earn a greater return at the same level of risk by investing in a portfolio of shares weighted by the 17 factors identified.

If one assumes that investors are compensated for additional systematic risk based on the beta of their portfolio, then it is possible for such investors to make a seemingly risk-less profit by investing in a portfolio weighted by the anomalies identified. By doing so they are able to achieve a portfolio with the same Beta as their current portfolio, yet which offers a higher return.

Of the factors tested the strongest anomalies found were those of 1 year positive price momentum and the ratio of cashflow:price.

What does this mean for the CAPM? For some time it has been suggested both by academics and investment managers that the assumptions of the model are too restrictive, as a result of which the model cannot really be tested empirically. Many investment managers find it difficult to believe that risk can be fully captured in a single factor, sensitivity to the market.

Alternative models to the CAPM have been suggested, foremost among these is Arbitrage Pricing Theory (APT) devised by Steven Ross (1977). Ross suggested that returns vary from suggested levels because of unanticipated changes in production, inflation, term structure and other basic economic forces. Then assuming that decision makers take advantage of all arbitrage opportunities to hold portfolios that offer higher returns, Ross built a model of risk and return based on an assets sensitivity to these factors.

Practically however APT has not taken off, due to the fact that unlike the CAPM one cannot easily identify the factors which influence risk. It seems that a multi-factor model is called for however, the identification of what factors to include and how they should relate to one another is the stumbling block which currently prevents such models from being applied.

Thus it appears that although empirical evidence may suggest that the Capital Asset Pricing Model has its shortcomings, as an academic model of the relationship between risk and return it will be with us for sometime yet. The simplicity with which it can be used to predict portfolio returns makes it a useful tool and ready starting point for investment analysis.

TABLE (A)

FACTOR TESTED	R-Square	Std Error	Beta	Constant	T-Stat	Sig-T	Mean
Cashflow:Price (Low)	0.20593	5.36298	0.44898	-0.31914	-0.825	0.4107	0.929
12 Month Price Momentum (Low)	0.27135	5.25683	0.52739	-0.01753	-0.046	0.9632	1.214
6 Month Price Momentum (Low)	0.25188	5.56396	0.53075	-0.09846	-0.245	0.8066	1.135
Price/Turnover (Low)	0.28918	5.56513	0.58355	1.03304	2.572	0.0109	2.287
6 Month Positive Price Momentum (Low)	0.22834	5.06488	0.45294	0.25785	0.705	0.4814	1.504
3 Month Price Momentum (Low)	0.26335	5.51693	0.54229	0.23807	0.598	0.5506	1.482
3 Month Positive Price Momentum (Low)	0.24353	5.62857	0.52502	0.07325	0.180	0.8571	1.326
1 Month Positive Price Momentum (Low)	0.20000	5.55730	0.45681	-0.40516	-1.010	0.3137	0.849
Earnings Yield I-Net Historic (Low)	0.36748	5.03238	0.63060	-0.13942	-0.384	0.7015	1.115
Market Capitalisation (Low)	0.21751	5.24739	0.45483	0.92791	2.450	0.0152	2.161
Dividend Yield (Low)	0.34929	5.16426	0.62202	-0.10142	-0.272	0.7858	1.116
Quick Ratio (Low)	0.28417	5.28361	0.54728	0.28824	0.756	0.4506	1.533
24 Month Price Momentum (Low)	0.24417	5.56085	0.51961	0.15131	0.377	0.7066	1.382
24 Month Positive Price Momentum (Low)	0.24417	5.56085	0.51961	0.15131	0.377	0.7066	1.382
Close-Market Cap Weighted (Low)	0.23333	6.03544	0.54739	0.32094	0.737	0.4621	1.585
Turnover-Market Cap Weighted (Low)	0.36101	5.31702	0.65702	-0.78166	-2.037	0.0430	0.489
1 Month Price Momentum (Low)	0.32353	5.25500	0.59745	0.69203	1.825	0.0696	1.947
Price:NAV (Low)	0.26662	5.51004	0.54617	1.00448	2.526	0.0124	2.237
Tradeability (Low)	0.19789	4.75104	0.38795	0.71710	2.091	0.0378	1.956
Plowback Ratio * ROE =g (Low)	0.28032	5.60482	0.57506	0.37355	0.923	0.3569	1.617
Cash Flow/Debt (Low)	0.19555	5.42084	0.43939	0.03819	0.098	0.9223	1.303
Payout Ratio (Low)	0.33343	5.86024	0.68139	0.39729	0.939	0.3487	1.687
ROE (Low)	0.27809	5.66348	0.57787	0.39397	0.964	0.3363	1.633
Assets/Debt (Low)	0.26406	5.81225	0.57237	0.12792	0.305	0.7607	1.357
12 Month Positive Price Momentum (Low)	0.21870	4.72868	0.41130	-0.05764	-0.169	0.8660	1.172
Price:Cashflow Per Share (Low)	0.00980	6.21605	0.10165	0.04199	0.094	0.9255	1.320

TABLE (A)

FACTOR TESTED	R-Square	Std Error	Beta	Constant	T-Stat	Sig-T	Mean
Cashflow:Price (High)	0.27985	5.22384	0.53536	1.39983	3.713	0.0003	2.652
12 Month Price Momentum (High)	0.31756	4.94960	0.55507	1.03398	2.895	0.0042	2.288
6 Month Price Momentum (High)	0.32624	4.87564	0.55776	0.87466	2.486	0.0138	2.137
Price/Turnover (High)	0.34173	4,59279	0.54402	-0.00818	-0.025	0.9803	1.231
6 Month Positive Price Momentum (High)	0.25928	5.77437	0.56165	1.09212	2.621	0.0095	2.354
3 Month Price Momentum (High)	0.34021	4.52401	0.53406	0.45227	1.385	0.1676	1.690
3 Month Positive Price Momentum (High)	0.18627	6.75011	0.53093	1.09669	2.251	0.2550	2.328
1 Month Positive Price Momentum (High)	0.16066	5.90006	0.42437	-0.03517	-0.830	0.9343	1.204
Earnings Yield I-Net Historic (High)	0.24672	5.49943	0.51741	1.25162	3.154	0.0019	2.523
Market Capitalisation (High)	0.46260	4.07517	0.62158	-0.20907	-0.711	0.4780	1.038
Dividend Yield (High)	0.22739	5.43163	0.48444	1.05958	2.703	0.0075	2.322
Quick Ratio (High)	0.28632	4.68532	0.48788	0.68974	2.040	0.0428	1.943
24 Month Price Momentum (High)	0.35260	4.40627	0.53459	0.65420	2.057	0.0410	1.909
24 Month Positive Price Momentum (High)	0.35260	4.40627	0.53459	0.65420	2.057	0.0410	1.909
Close-Market Cap Weighted (High)	0.78054	3.93762	0.80831	0.11461	0.403	0.6872	1.338
Turnover-Market Cap Weighted (High)	0.57827	3.93853	0.75819	0.10951	0.385	0.7005	1.336
1 Month Price Momentum (High)	0.30372	4.98685	0.54146	0.04072	0.113	0.9100	1.287
Price:NAV (High)	0.35246	4.54303	0.55102	0.39027	1.190	0.2354	1.649
Tradeability (High)	0.49332	4.20067	0.68142	0.12463	0.411	0.6815	1.381
Plowback Ratio * ROE =g (High)	0.31658	4.68029	0.52368	0.53574	1.586	0.1144	1.819
Cash Flow/Debt (High)	0.41481	4.72501	0.65400	0.89599	2.628	0.0093	2.151
Payout Ratio (High)	0.30908	4.58136	0.50374	0.28326	0.857	0.3927	1.533
ROE (High)	0.28807	4.43750	0.46405	0.45673	1.426	0.1555	1.730
Assets/Debt (High)	0.34466	4.64648	0.55516	0.94721	2.819	0.0053	2.202
12 Month Positive Price Momentum (High)	0.21860	6.14152	0.53403	1.44243	3.254	0.0013	2.694
Price:Cashflow Per Share (High)	0.00067	6.52967	-0.02788	1.30249	0.000	0.9998	1.266
PEG Ratio (High)	0.45729	4.51285	0.54740	0.49578	0.628	0.5345	-0.635
PEG Ratio (Low)	0.27939	7.57233	0.61923	2.43649	1.804	0.0810	1.370
2 Years Rolled Past Earnings Growth (High)	0.48773	4.83860	0.62389	0.52265	0.617	0.5413	-0.484

TABLE (A)

FACTOR TESTED	R-Square	Std Error	Beta	Constant	T-Stat	Sig-T	Mean
2 Years Rolled Past Earnings Growth (Low)	0.14694	7.37134	0.40427	1.80396	1.399	0.1715	1.172
Expected 1 Years Earnings Growth (High)	0.32231	6.09572	0.55550	1.82070	1.707	0.0974	0.971
Expected 1 Years Earnings Growth (Low)	0.08717	7.06558	0.28852	0.93259	0.754	0.4561	0.492

TABLE (B)

FACTOR TESTED	R-Square	Std Error	Beta	Constant	T-Stat	Sig-T	Mean
Price/Turnover (Low)	0.28918	5.56513	0.58355	1.03304	2.572	0.0109	2.287
Market Capitalisation (Low)	0.21751	5.24739	0.45483	0.92791	2.450	0.0152	2.161
Price:NAV (Low)	0.26662	5.51004	0.54617	1.00448	2.526	0.0124	2.237
Cashflow:Price (High)	0.27985	5.22384	0.53536	1.39983	3.713	0.0003	2.652
12 Month Price Momentum (High)	0.31756	4.94960	0.55507	1.03398	2.895	0.0042	2.288
6 Month Price Momentum (High)	0.32624	4.87564	0.55776	0.87466	2.486	0.0138	2.137
6 Month Positive Price Momentum (High)	0.25928	5.77437	0.56165	1.09212	2.621	0.0095	2.354
Earnings Yield I-Net Historic (High)	0.24672	5.49943	0.51741	1.25162	3.154	0.0019	2.523
Dividend Yield (High)	0.22739	5.43163	0.48444	1.05958	2.703	0.0075	2.322
Cash Flow/Debt (High)	0.41481	4.72501	0.65400	0.89599	2.628	0.0093	2.151
Assets/Debt (High)	0.34466	4.64648	0.55516	0.94721	2.819	0.0053	2.202
12 Month Positive Price Momentum (High)	0.21860	6.14152	0.53403	1.44243	3.254	0.0013	2.694

TABLE (C)

FACTOR TESTED	R-Square	Std Error	Beta	Constant	T-Stat	Sig-T	Mean
Price/Turnover (Low)	0.28918	5.56513	0.58355	1.03304	2.572	0.0109	2.287
Market Capitalisation (Low)	0.21751	5.24739	0.45483	0.92791	2.450	0.0152	2.161
Price:NAV (Low)	0.26662	5.51004	0.54617	1.00448	2.526	0.0124	2.237
Cashflow:Price (High)	0.27985	5.22384	0.53536	1.39983	3.713	0.0003	2.652
12 Month Price Momentum (High)	0.31756	4.94960	0.55507	1.03398	2.895	0.0042	2.288
6 Month Price Momentum (High)	0.32624	4.87564	0.55776	0.87466	2.486	0.0138	2.137
6 Month Positive Price Momentum (High)	0.25928	5.77437	0.56165	1.09212	2.621	0.0095	2.354
Earnings Yield I-Net Historic (High)	0.24672	5.49943	0.51741	1.25162	3.154	0.0019	2.523
Dividend Yield (High)	0.22739	5.43163	0.48444	1.05958	2.703	0.0075	2.322
Cash Flow/Debt (High)	0.41481	4.72501	0.65400	0.89599	2.628	0.0093	2.151
Assets/Debt (High)	0.34466	4.64648	0.55516	0.94721	2.819	0.0053	2.202
12 Month Positive Price Momentum (High)	0.21860	6.14152	0.53403	1.44243	3.254	0.0013	2.694
Quick Ratio (High)	0.28632	4.68532	0.48788	0.68974	2.040	0.0428	1.943
24 Month Price Momentum (High)	0.35260	4.40627	0.53459	0.65420	2.057	0.0410	1.909
24 Month Positive Price Momentum (High)	0.35260	4.40627	0.53459	0.65420	2.057	0.0410	1.909
Tradeability (Low)	0.19789	4.75104	0.38795	0.71710	2.091	0.0378	1.956
Turnover-Market Cap Weighted (Low)	0.36101	5.31702	0.65702	-0.78166	-2.037	0.0430	0.489

TABLE (D)

FACTOR TESTED	R-Square	Std Error	Beta	Constant	T-Stat	Sig-T	Mean
12 Month Positive Price Momentum (High)	0.21860	6.14152	0.53403	1.44243	3.254	0.0013	2.694
12 Month Price Momentum (High)	0.31756	4.94960	0.55507	1.03398	2.895	0.0042	2.288
6 Month Positive Price Momentum (High)	0.25928	5.77437	0.56165	1.09212	2.621	0.0095	2.354
6 Month Price Momentum (High)	0.32624	4.87564	0.55776	0.87466	2.486	0.0138	2.137
24 Month Price Momentum (High)	0.35260	4.40627	0.53459	0.65420	2.057	0.0410	1.909
24 Month Positive Price Momentum (High)	0.35260	4.40627	0.53459	0.65420	2.057	0.0410	1.909
3 Month Price Momentum (High)	0.34021	4.52401	0.53406	0.45227	1.385	0.1676	1.690
3 Month Positive Price Momentum (High)	0.18627	6.75011	0.53093	1.09669	2.251	0.2550	2.328
1 Month Price Momentum (High)	0.30372	4.98685	0.54146	0.04072	0.113	0.9100	1.287
1 Month Positive Price Momentum (High)	0.16066	5.90006	0.42437	-0.03517	-0.830	0.9343	1.204

APPENDIX A

FACTOR TESTED

1 LOW CF:PRICE (INDUSTRIALS ONLY)
2 LOW 12 MONTH PRICE MOMENTUM (INDUSTRIALS ONLY)
3 LOW 6 MONTH PRICE MOMENTUM (INDUSTRIAL ONLY)
4 LOW PRICE/TURNOVER (INDUSTRIAL ONLY)
5 LOW 6 MONTH PRICE MOMENTUM (POSITIVE INDUSTRIALS ONLY)
6 LOW 3 MONTH PRICE MOMENTUM (INDUSTRIALS ONLY)
7 LOW 3 MONTH PRICE MOMENTUM (POSITIVE INDUSTRIALS ONLY)
8 LOW 1 MONTH PRICE MOMENTUM (POSITIVE INDUSTRIALS ONLY)
9 LOW EARNINGS YIELD (I-NET HISTORIC, INDUSTRIALS ONLY)
10 LOW MARKET CAP (CALCULATED, INDUSTRIALS ONLY)
11 LOW DIVIDEND YIELD (INDUSTRIALS ONLY)
12 LOW QUICK RATIO (INDUSTRIALS ONLY)
13 LOW 24 MONTH PRICE MOMENTUM (INDUSTRIALS ONLY)
14 LOW 24 MONTH PRICE MOMENTUM (POSITIVE INDUSTRIALS ONLY)
15 LOW CLOSE (MARKET CAP WEIGHTED, INDUSTRIALS ONLY)
16 LOW TURNOVER (MARKET CAP WEIGHTED, INDUSTRIALS ONLY)
17 LOW 1 MONTH PRICE MOMENTUM (INDUSTRIALS ONLY)
18 LOW PRICE:NAV (INDUSTRIALS ONLY)
19 LOW TRADEABILITY (INDUSTRIALS ONLY)
20 LOW PLOWBAK RATIO * ROE = g (INDUSTRIALS ONLY):
21 LOW CASH FLOW/DEBT (INDUSTRIALS ONLY):
22 LOW PAYOUT RATIO (INDUSTRIALS ONLY):
23 LOW ROE (INDUSTRIALS ONLY):
24 LOW ASSETS/DEBT (INDUSTRIALS ONLY):
25 LOW 12 MONTH PRICE MOMENTUM (POSITIVE INDUSTRIALS ONLY)
26 LOW PRICE:CASSFLOW PER SHARE
27 HIGH CF:PRICE (INDUSTRIALS ONLY)
28 HIGH 12 MONTH PRICE MOMENTUM (INDUSTRIALS ONLY)
29 HIGH 6 MONTH PRICE MOMENTUM (INDUSTRIAL ONLY)
30 HIGH PRICE/TURNOVER (INDUSTRIAL ONLY)
31 HIGH 6 MONTH PRICE MOMENTUM (POSITIVE INDUSTRIALS ONLY)
32 HIGH 3 MONTH PRICE MOMENTUM (INDUSTRIALS ONLY)
33 HIGH 3 MONTH PRICE MOMENTUM (POSITIVE INDUSTRIALS ONLY)
34 HIGH 1 MONTH PRICE MOMENTUM (POSITIVE INDUSTRIALS ONLY)
35 HIGH EARNINGS YIELD (I-NET HISTORIC, INDUSTRIALS ONLY)
36 HIGH MARKET CAP (CALCULATED, INDUSTRIALS ONLY)
37 HIGH DIVIDEND YIELD (INDUSTRIALS ONLY)
38 HIGH QUICK RATIO (INDUSTRIALS ONLY)
39 HIGH 24 MONTH PRICE MOMENTUM (INDUSTRIALS ONLY)
40 HIGH 24 MONTH PRICE MOMENTUM (POSITIVE INDUSTRIALS ONLY)
41 HIGH CLOSE (MARKET CAP WEIGHTED, INDUSTRIALS ONLY)
42 HIGH TURNOVER (MARKET CAP WEIGHTED, INDUSTRIALS ONLY)
43 HIGH 1 MONTH PRICE MOMENTUM (INDUSTRIALS ONLY)
44 HIGH PRICE:NAV (INDUSTRIALS ONLY)

45 HIGH TRADEABILITY (INDUSTRIALS ONLY)
46 HIGH PLOWBAK RATIO * ROE = g (INDUSTRIALS ONLY):
47 HIGH CASH FLOW/DEBT (INDUSTRIALS ONLY):
48 HIGH PAYOUT RATIO (INDUSTRIALS ONLY):
49 HIGH ROE (INDUSTRIALS ONLY):
50 HIGH ASSETS/DEBT (INDUSTRIALS ONLY):
51 HIGH 12 MONTH PRICE MOMENTUM (POSITIVE INDUSTRIALS ONLY)
52 HIGH PRICE:CASSFLOW PER SHARE
53 HIGH PEG RATIO
54 LOW PEG RATIO
55 HIGH 2 YEARS ROLLED PAST EARNINGS GROWTH
56 LOW 2 YEARS ROLLED PAST EARNINGS GROWTH
57 HIGH EXPECTED 1 YEARS EARNINGS GROWTH
58 LOW EXPECTED 1 YEARS EARNINGS GROWTH

APPENDIX B

Equation Number 1

Dependent Variable: Cash-Flow : Price (Low)

Multiple R	.45379
R Square	.20593
Adjusted R Square	.20175
Standard Error	5.36298

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1417.15964	1417.15964
Residual	190	5464.69567	28.76156

F = 49.27270 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.448983	.063963	.453792	7.019	.0000
(Constant)	-.319136	.387040		-.825	.4107

Equation Number 2

Dependent Variable : 12 Month Price Momentum (Low)

Multiple R	.52092
R Square	.27135
Adjusted R Square	.26752
Standard Error	5.25683

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1955.33809	1955.33809
Residual	190	5250.51761	27.63430

F = 70.75764 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.527390	.062697	.520917	8.412	.0000
(Constant)	-.017531	.379379		-.046	.9632

Equation Number 3

Dependent Variable: 6 Month Price Momentum (Low)

Multiple R	.50187
R Square	.25188
Adjusted R Square	.24794
Standard Error	5.56396

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1980.31228	1980.31228
Residual	190	5881.95570	30.95766

F = 63.96841 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.530747	.066360	.501872	7.998	.0000
(Constant)	-.098462	.401544		-.245	.8066

Equation Number 4

Dependent Variable: Price/Turnover (Low)

Multiple R	.53776
R Square	.28918
Adjusted R Square	.28544
Standard Error	5.56513

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2393.95406	2393.95406
Residual	190	5884.43305	30.97070

F = 77.29738 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.583551	.066374	.537756	8.792	.0000
(Constant)	1.033043	.401629		2.572	.0109

Equation Number 5

Dependent Variable: 6 Month Positive Price Momentum

Multiple R	.47785
R Square	.22834
Adjusted R Square	.22428
Standard Error	5.06488

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1442.27192	1442.27192
Residual	190	4874.06329	25.65296

F = 56.22243 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.452944	.060407	.477849	7.498	.0000
(Constant)	.257851	.365526		.705	.4814

Equation Number 6

Dependent Variable: 3 Month Price Momentum (Low)

Multiple R	.51318
R Square	.26335
Adjusted R Square	.25947
Standard Error	5.51693

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2067.39428	2067.39428
Residual	190	5782.94536	30.43655

F = 67.92471 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.542291	.065799	.513177	8.242	.0000
(Constant)	.238070	.398150		.598	.5506

Equation Number 7

Dependent Variable: 3 Month Positive Price Momentum (Low)

Multiple R	.49349
R Square	.24353
Adjusted R Square	.23955
Standard Error	5.62857

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1937.81512	1937.81512
Residual	190	6019.34197	31.68075

F = 61.16696 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.525021	.067130	.493489	7.821	.0000
(Constant)	.073246	.406207		.180	.8571

Equation Number 8

Dependent Variable: 1 Month Positive Price Momentum (Low)

Multiple R	.44722
R Square	.20000
Adjusted R Square	.19579
Standard Error	5.55730

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1466.98428	1466.98428
Residual	190	5867.88712	30.88362

F = 47.50040 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.456808	.066280	.447215	6.892	.0000
(Constant)	-.405163	.401064		-1.010	.3137

Equation Number 9

Dependent Variable: Earnings Yield I-Net historic (Low)

Multiple R	.60620
R Square	.36748
Adjusted R Square	.36415
Standard Error	5.03238

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2795.52404	2795.52404
Residual	190	4811.72338	25.32486

F = 110.38655 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.630598	.060020	.606203	10.507	.0000
(Constant)	-.139422	.363181		-.384	.7015

Equation Number 10

Dependent Variable: Market Capitalisation (Low)

Multiple R	.46638
R Square	.21751
Adjusted R Square	.21339
Standard Error	5.24739

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1454.27705	1454.27705
Residual	190	5231.65941	27.53505

F = 52.81549 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.454825	.062584	.466383	7.267	.0000
(Constant)	.927906	.378697		2.450	.0152

Equation Number 11

Dependent Variable: Dividend Yield (Low)

Multiple R	.59100
R Square	.34929
Adjusted R Square	.34586
Standard Error	5.16426

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2719.94798	2719.94798
Residual	190	5067.21820	26.66957

F = 101.98695 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.622015	.061593	.591004	10.099	.0000
(Constant)	-.101417	.372698		-.272	.7858

Equation Number 12

Dependent Variable: Quick Ratio (Low)

Multiple R	.53307
R Square	.28417
Adjusted R Square	.28040
Standard Error	5.28361

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2105.61450	2105.61450
Residual	190	5304.13963	27.91652

F = 75.42538 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.547281	.063016	.533074	8.685	.0000
(Constant)	.288235	.381312		.756	.4506

Equation Number 13

Dependent Variable: 24 Month Price Momentum

Multiple R	.49414
R Square	.24417
Adjusted R Square	.24019
Standard Error	5.56085

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1898.05278	1898.05278
Residual	190	5875.38819	30.92310

F = 61.37978 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.519607	.066323	.494137	7.835	.0000
(Constant)	.151309	.401320		.377	.7066

Equation Number 14

Dependent Variable: 24 Month Positive Price Momentum (Low)

Multiple R	.49414
R Square	.24417
Adjusted R Square	.24019
Standard Error	5.56085

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1898.05278	1898.05278
Residual	190	5875.38819	30.92310

F = 61.37978 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.519607	.066323	.494137	7.835	.0000
(Constant)	.151309	.401320		.377	.7066

Equation Number 15

Dependent Variable: Close-Market Cap Weighted (Low)

Multiple R	.48305
R Square	.23333
Adjusted R Square	.22930
Standard Error	6.03544

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2106.41494	2106.41494
Residual	190	6921.04075	36.42653

F = 57.82640 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.547385	.071983	.483047	7.604	.0000
(Constant)	.320944	.435570		.737	.4621

Equation Number 16

Dependent Variable: Turnover-Market Cap Weighted (Low)

Multiple R	.60084
R Square	.36101
Adjusted R Square	.35765
Standard Error	5.31702

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	3034.70835	3034.70835
Residual	190	5371.42337	28.27065

F = 107.34484 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.657021	.063415	.600842	10.361	.0000
(Constant)	-.781664	.383723		-2.037	.0430

Equation Number 17

Dependent Variable: 1 Month Price Momentum (Low)

Multiple R	.56879
R Square	.32353
Adjusted R Square	.31997
Standard Error	5.25500

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2509.34051	2509.34051
Residual	190	5246.85765	27.61504

F = 90.86862 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.597449	.062675	.568794	9.533	.0000
(Constant)	.692027	.379247		1.825	.0696

Equation Number 18

Dependent Variable: Price:NAV (Low)

Multiple R	.51635
R Square	.26662
Adjusted R Square	.26276
Standard Error	5.51004

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2097.09968	2097.09968
Residual	190	5768.50862	30.36057

F = 69.07313 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.546173	.065717	.516349	8.311	.0000
(Constant)	1.004483	.397653		2.526	.0124

Equation Number 19

Dependent Variable: Tradebility (Low)

Multiple R	.44485
R Square	.19789
Adjusted R Square	.19367
Standard Error	4.75104

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1058.07205	1058.07205
Residual	190	4288.74588	22.57235

F = 46.87470 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.387952	.056664	.444846	6.847	.0000
(Constant)	.717104	.342877		2.091	.0378

Equation Number 20

Dependent Variable: Plowback Ratio*ROE =g (Low)

Multiple R	.52945
R Square	.28032
Adjusted R Square	.27653
Standard Error	5.60482

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2324.82978	2324.82978
Residual	190	5968.65757	31.41399

F = 74.00620 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.575064	.066847	.529452	8.603	.0000
(Constant)	.373548	.404493		.923	.3569

Equation Number 21

Dependent Variable: Cash Flow/Debt (Low)

Multiple R	.44221
R Square	.19555
Adjusted R Square	.19132
Standard Error	5.42084

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1357.21318	1357.21318
Residual	190	5583.23675	29.38546

F = 46.18656 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.439385	.064653	.442212	6.796	.0000
(Constant)	.038190	.391215		.098	.9223

Equation Number 22

Dependent Variable: Payout Ratio (Low)

Multiple R	.57744
R Square	.33343
Adjusted R Square	.32993
Standard Error	5.86024

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	3264.00404	3264.00404
Residual	190	6525.05712	34.34241

F = 95.04296 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.681391	.069893	.577437	9.749	.0000
(Constant)	.397288	.422926		.939	.3487

Equation Number 23

Dependent Variable: ROE (Low)

Multiple R	.52734
R Square	.27809
Adjusted R Square	.27429
Standard Error	5.66348

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2347.57093	2347.57093
Residual	190	6094.26001	32.07505

F = 73.18993 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.577870	.067547	.527340	8.555	.0000
(Constant)	.393969	.408727		.964	.3363

Equation Number 24

Dependent Variable: Assets/Debt (Low)

Multiple R	.51387
R Square	.26406
Adjusted R Square	.26019
Standard Error	5.81225

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2303.09904	2303.09904
Residual	190	6418.63235	33.78228

F = 68.17478 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.572370	.069321	.513872	8.257	.0000
(Constant)	.127918	.419463		.305	.7607

Equation Number 25

Dependent Variable: 12 Month Positive Price Momentum (Low)

Multiple R	.46766
R Square	.21870
Adjusted R Square	.21459
Standard Error	4.72868

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1189.23615	1189.23615
Residual	190	4248.48355	22.36044

F = 53.18483 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.411296	.056398	.467655	7.293	.0000
(Constant)	-.057644	.341263		-.169	.8660

Equation Number 26

Dependent Variable: Price : Cashflow Per Share (Low)

Multiple R	.09898
R Square	.00980
Adjusted R Square	.00459
Standard Error	6.21605

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	72.63370	72.63370
Residual	190	7341.47406	38.63934

F = 1.87979 Signif F = .1720

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.101646	.074137	.098978	1.371	.1720
(Constant)	.041987	.448605		.094	.9255

Equation Number 27

Dependent Variable: Cashflow : Price (High)

Multiple R	.52901
R Square	.27985
Adjusted R Square	.27606
Standard Error	5.22384

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2014.85194	2014.85194
Residual	190	5184.81514	27.28850

F = 73.83520 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.535356	.062303	.529012	8.593	.0000
(Constant)	1.399828	.376998		3.713	.0003

Equation Number 28

Dependent Variable: 12 Month Price Momentum (High)

Multiple R	.56352
R Square	.31756
Adjusted R Square	.31397
Standard Error	4.94960

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2165.97620	2165.97620
Residual	190	4654.71500	24.49850

F = 88.41260 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.555070	.059032	.563524	9.403	.0000
(Constant)	1.033979	.357206		2.895	.0042

Equation Number 29

Dependent Variable: 6 Month Price Momentum

Multiple R	.57117
R Square	.32624
Adjusted R Square	.32269
Standard Error	4.87564

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2186.97853	2186.97853
Residual	190	4516.64714	23.77183

F = 91.99876 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.557755	.058150	.571173	9.592	.0000
(Constant)	.874661	.351869		2.486	.0138

Equation Number 30

Dependent Variable: Price/Turnover (High)

Multiple R	.58458
R Square	.34173
Adjusted R Square	.33826
Standard Error	4.59279

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2080.57630	2080.57630
Residual	190	4007.81234	21.09375

F = 98.63473 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.544017	.054777	.584576	9.932	.0000
(Constant)	-.008177	.331456		-.025	.9803

Equation Number 31

Dependent Variable: 6 Month Positive Price Momentum (High)

Multiple R	.50920
R Square	.25928
Adjusted R Square	.25538
Standard Error	5.77437

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2217.59035	2217.59035
Residual	190	6335.23766	33.34336

F = 66.50771 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.561645	.068869	.509197	8.155	.0000
(Constant)	1.092116	.416729		2.621	.0095

Equation Number 32

Dependent Variable: 3 Month Price Momentum (High)

Multiple R	.58327
R Square	.34021
Adjusted R Square	.33674
Standard Error	4.52401

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2005.11583	2005.11583
Residual	190	3888.65812	20.46662

F = 97.97004 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.534061	.053957	.583275	9.898	.0000
(Constant)	.452273	.326492		1.385	.1676

Equation Number 33

Dependent Variable: 3 Month Positive Price Momentum (High)

Multiple R	.43159
R Square	.18627
Adjusted R Square	.18199
Standard Error	6.75011

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1981.69353	1981.69353
Residual	190	8657.15426	45.56397

F = 43.49256 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.530932	.080507	.431590	6.595	.0000
(Constant)	1.096694	.487147		2.251	.0255

Equation Number 34

Dependent Variable: 1 Month Positive Price Momentum (High)

Multiple R	.40083
R Square	.16066
Adjusted R Square	.15624
Standard Error	5.90006

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1266.02900	1266.02900
Residual	190	6614.02951	34.81068

F = 36.36898 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.424368	.070368	.400827	6.031	.0000
(Constant)	-.035171	.425800		-.083	.9343

Equation Number 35

Dependent Variable: Earnings Yield I-Net Historic (High)

Multiple R	.49671
R Square	.24672
Adjusted R Square	.24275
Standard Error	5.49943

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1882.04444	1882.04444
Residual	190	5746.30302	30.24370

F = 62.22931 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.517411	.065590	.496706	7.889	.0000
(Constant)	1.251617	.396887		3.154	.0019

Equation Number 36

Dependent Variable: Market Capitalisation

Multiple R	.68015
R Square	.46260
Adjusted R Square	.45977
Standard Error	4.07517

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2716.14877	2716.14877
Residual	190	3155.33914	16.60705

F = 163.55398 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.621581	.048603	.680147	12.789	.0000
(Constant)	-.209074	.294100		-.711	.4780

Equation Number 37

Dependent Variable: Dividend Yield

Multiple R	.47686
R Square	.22739
Adjusted R Square	.22333
Standard Error	5.43163

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1649.79958	1649.79958
Residual	190	5605.49400	29.50260

F = 55.92048 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.484436	.064782	.476857	7.478	.0000
(Constant)	1.059576	.391994		2.703	.0075

Equation Number 38

Dependent Variable: Quick Ratio

Multiple R	.53509
R Square	.28632
Adjusted R Square	.28256
Standard Error	4.68532

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1673.30810	1673.30810
Residual	190	4170.91575	21.95219

F = 76.22512 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.487875	.055880	.535087	8.731	.0000
(Constant)	.689739	.338134		2.040	.0428

Equation Number 39

Dependent Variable: 24 Month Price Momentum (High)

Multiple R	.59380
R Square	.35260
Adjusted R Square	.34919
Standard Error	4.40627

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2009.11326	2009.11326
Residual	190	3688.88587	19.41519

F = 103.48152 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.534593	.052552	.593801	10.173	.0000
(Constant)	.654201	.317995		2.057	.0410

Equation Number 40

Dependent Variable: 24 Month Positive Price Momentum (High)

Multiple R	.59380
R Square	.35260
Adjusted R Square	.34919
Standard Error	4.40627

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2009.11326	2009.11326
Residual	190	3688.88587	19.41519

F = 103.48152 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.534593	.052552	.593801	10.173	.0000
(Constant)	.654201	.317995		2.057	.0410

Equation Number 41

Dependent Variable: Close-Market Cap Weighted (High)

Multiple R	.78054
R Square	.60925
Adjusted R Square	.60719
Standard Error	3.93762

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	4593.21904	4593.21904
Residual	190	2945.91578	15.50482

F = 296.24459 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.808313	.046963	.780545	17.212	.0000
(Constant)	.114608	.284173		.403	.6872

Equation Number 42

Dependent Variable: Turnover-Market Cap Weighted (High)

Multiple R	.76044
R Square	.57827
Adjusted R Square	.57605
Standard Error	3.93853

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	4041.19713	4041.19713
Residual	190	2947.28819	15.51204

F = 260.51998 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.758186	.046974	.760437	16.141	.0000
(Constant)	.109514	.284239		.385	.7005

Equation Number 43

Dependent Variable: 1 Month Price Momentum (High)

Multiple R	.55111
R Square	.30372
Adjusted R Square	.30005
Standard Error	4.98685

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2061.07750	2061.07750
Residual	190	4725.05066	24.86869

F = 82.87842 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.541462	.059477	.551107	9.104	.0000
(Constant)	.040724	.359895		.113	.9100

Equation Number 44

Dependent Variable: Price : NAV (High)

Multiple R	.59368
R Square	.35246
Adjusted R Square	.34905
Standard Error	4.54303

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2134.47066	2134.47066
Residual	190	3921.43206	20.63912

F = 103.41870 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.551018	.054183	.593684	10.169	.0000
(Constant)	.390273	.327865		1.190	.2354

Equation Number 45

Dependent Variable: Tradeability (High)

Multiple R	.70237
R Square	.49332
Adjusted R Square	.49065
Standard Error	4.20067

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	3264.25310	3264.25310
Residual	190	3352.67028	17.64563

F = 184.98929 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.681417	.050100	.702367	13.601	.0000
(Constant)	.124631	.303157		.411	.6815

Equation Number 46

Dependent Variable: Plowback Ratio*ROE = g (High)

Multiple R	.56265
R Square	.31658
Adjusted R Square	.31298
Standard Error	4.68029

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1927.93942	1927.93942
Residual	190	4161.98036	21.90516

F = 88.01303 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.523682	.055821	.562653	9.382	.0000
(Constant)	.535743	.337771		1.586	.1144

Equation Number 47

Dependent Variable: Cashflow/Debt (High)

Multiple R	.64406
R Square	.41481
Adjusted R Square	.41173
Standard Error	4.72501

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	3006.85480	3006.85480
Residual	190	4241.89395	22.32576

F = 134.68097 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.653999	.056354	.644058	11.605	.0000
(Constant)	.895987	.340999		2.628	.0093

Equation Number 48

Dependent Variable: Payout Ratio (High)

Multiple R	.55595
R Square	.30908
Adjusted R Square	.30544
Standard Error	4.58136

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1783.92942	1783.92942
Residual	190	3987.87728	20.98883

F = 84.99424 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.503744	.054641	.555946	9.219	.0000
(Constant)	.283258	.330631		.857	.3927

Equation Number 49

Dependent Variable: ROE (High)

Multiple R	.53672
R Square	.28807
Adjusted R Square	.28432
Standard Error	4.43750

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1513.84975	1513.84975
Residual	190	3741.36218	19.69138

F = 76.87880 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.464047	.052925	.536718	8.768	.0000
(Constant)	.456726	.320249		1.426	.1555

Equation Number 50

Dependent Variable: Assets/Debt (High)

Multiple R	.58708
R Square	.34466
Adjusted R Square	.34121
Standard Error	4.65648

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2166.65378	2166.65378
Residual	190	4119.73785	21.68283

F = 99.92486 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.555157	.055537	.587076	9.996	.0000
(Constant)	.947208	.336053		2.819	.0053

Equation Number 51

Dependent Variable: 12 Month Positive Price Momentum (High)

Multiple R	.46755
R Square	.21860
Adjusted R Square	.21449
Standard Error	6.14152

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	2004.87874	2004.87874
Residual	190	7166.46634	37.71824

F = 53.15408 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	.534029	.073248	.467549	7.291	.0000
(Constant)	1.442429	.443226		3.254	.0013

Equation Number 52

Dependent Variable: Price : Cashflow Per Share (High)

Multiple R	.02596
R Square	.00067
Adjusted R Square	-.00459
Standard Error	6.52967

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	5.46325	5.46325
Residual	190	8100.94821	42.63657

F = .12814 Signif F = .7208

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
BF	-.027877	.077878	-.025960	-.358	.7208
(Constant)	1.3024904	.471238		.000	.9998

Equation Number 53

Dependent Variable: PEG Ratio (High)

Multiple R	.67623
R Square	.45729
Adjusted R Square	.44033
Standard Error	4.51285

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	549.12835	549.12835
Residual	32	651.70620	20.36582

F = 26.96323 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
H	.547398	.105419	.676231	5.193	.0000
(Constant)	.495779	.789474		.628	.5345

Equation Number 54

Dependent Variable: PEG Ratio (Low)

Multiple R	.52857
R Square	.27939
Adjusted R Square	.25614
Standard Error	7.57233

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	689.17857	689.17857
Residual	31	1777.54625	57.34020

F = 12.01912 Signif F = .0016

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
H	.619230	.178614	.528574	3.467	.0016
(Constant)	2.436489	1.350922		1.804	.0810

Equation Number 55

Dependent Variable: 2 Years Rolled Past Earnings Growth

Multiple R	.69838
R Square	.48773
Adjusted R Square	.47173
Standard Error	4.83860

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	713.31068	713.31068
Residual	32	749.18691	23.41209

F = 30.46762 Signif F = .0000

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
H	.623886	.113028	.698380	5.520	.0000
(Constant)	.522647	.846461		.617	.5413

Equation Number 56

Dependent Variable: 2 Years Rolled Past Earnings Growth (Low)

Multiple R	.38333
R Square	.14694
Adjusted R Square	.12029
Standard Error	7.37134

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	299.51308	299.51308
Residual	32	1738.77330	54.33667

F = 5.51217 Signif F = .0252

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
H	.404272	.172192	.383332	2.348	.0252
(Constant)	1.803956	1.289535		1.399	.1715

Equation Number 57

Dependent Variable: Expected 1 Earnings Growth (High)

Multiple R	.56772
R Square	.32231
Adjusted R Square	.30113
Standard Error	6.09572

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	565.50623	565.50623
Residual	32	1189.05046	37.15783

F = 15.21903 Signif F = .0005

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
H	.555501	.142394	.567721	3.901	.0005
(Constant)	1.820696	1.066380		1.707	.0974

Equation Number 58

Dependent Variable: Expected 1 Years Earnings Growth (Low)

Multiple R	.29525
R Square	.08717
Adjusted R Square	.05865
Standard Error	7.06558

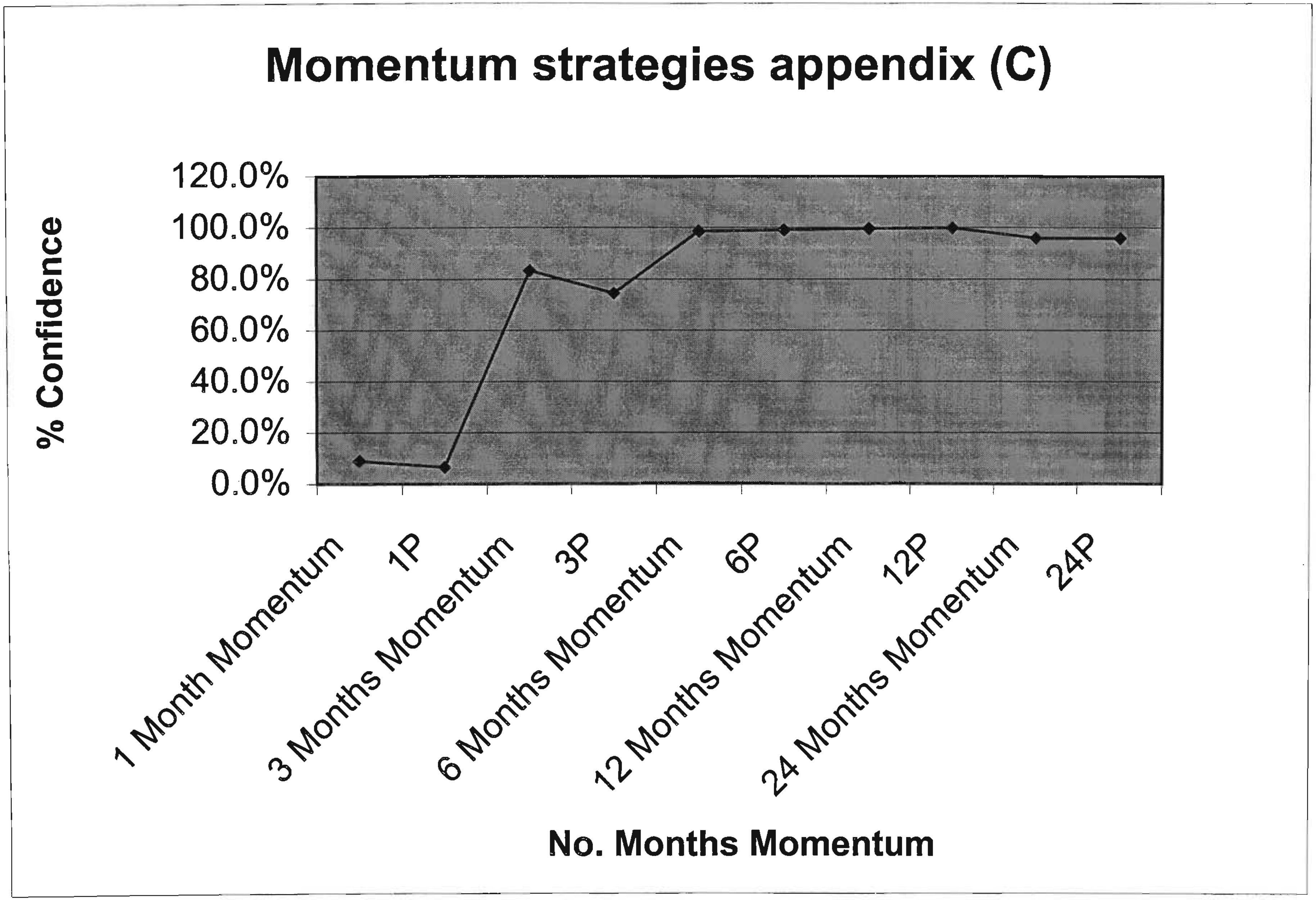
Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	152.55725	152.55725
Residual	32	1597.51856	49.92245

F = 3.05588 Signif F = .0900

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	T	Sig T
H	.288524	.165049	.295249	1.748	.0900
(Constant)	.932594	1.236046		.754	.4561


Momentum strategies appendix (C)
% Confidence
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
1 Month Momentum
1P
3 Months Momentum
3P
6 Months Momentum
6P
12 Months Momentum
12P
24 Months Momentum
24P
No. Months Momentum

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