The Cross-Sectional Variation in Portfolio Returns: Evidence from Bahrain Bourse

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Abstract
The study tests the cross-sectional variation in portfolio returns based on a sample of 30 companies listed on Bahrain Bourse. Bahrain All Share Index is used as a market proxy and yield of Government of Bahrain securities as risk free rate of return. The study covers a period of five years from January 2011 to December 2015. The results of the study indicate that in majority of the years, alpha value is not significantly different from zero and the p-values of independent variables are greater than the level of significance. This indicates that the independent variables either individually or in combination do not explain the variation in portfolio returns. Moreover, the results of F-test indicate that the regression is not a good fit in majority of the years.
Key words: Factors model, Alpha, Portfolio, Excess return, Risk.

Introduction
The variation of portfolio returns may be explained either by a single or many independent variables. Many researchers used the univariate variables to test the extent of these variables' influence on the security/portfolio returns. There are considerable evidence that the cross-sectional pattern of stock returns can be explained by characteristics such as size, leverage, returns, dividend-yield, earnings-to-price ratios and book-to-market ratios. The size anomaly was documented by Banz (1981) and Keim (1983), leverage by Bhandari (1988), the past returns effect by DeBondt and Thaler (1985) and Jegadeesh and Titman (1993), the earnings-to-price ratio by Basu (1983), the book-to-market effect by Stattman (1980) and Rosenberg et al. (1985). Fama and French (1992, 1996) examine all of these variables simultaneously and conclude that, with the exception of the momentum strategy described by Jegadeesh and Titman (1993), the cross-sectional variation in expected returns can be explained by only two of these characteristics, size and book-to-market.
There is considerable disagreement with the reason for the high discount rate assigned to small and high book-to-market firms. The traditional explanation for these observations, exposited by Fama and French (1993, 1996), is that the higher returns are compensation for higher systematic risk. Fama and French (1993) suggest that book-to-market and size are proxies for distress and that distressed firms may be more sensitive to certain business cycle factors, like changes in credit conditions, than firms that are financially less vulnerable. In addition, the duration of high growth firms' earnings should be somewhat longer than the duration of the earnings of low growth firms. Therefore term structure shifts should affect the two groups of firms differently.
In contrast, Lakonishok, Shleifer, and Vishny (1994) suggested that the high returns associated with high book-to-market (or value) stocks are generated by investors who incorrectly extrapolate the past earnings growth rates of firms. They suggest that investors are overly optimistic about firms which have done well in the past and are overly pessimistic about those which have done poorly.
Out of 45 companies listed on Bahrain Bourse, for 15 companies sufficient daily share prices are not available. Therefore, we selected 30 companies listed on Bahrain Bourse as a sample for the study. We use Bahrain All Share Index as a market proxy and yield of Government of Bahrain securities as risk free

rate of return. The study covers a period of five years from January 2011 to December 2015. The daily closing share prices of the sample companies and Bahrain All Share Index data are used.

Review of Literature

The results of the following studies are supporting Factors model. Chan, Hamao and Lakonishok (1991) relate the cross-sectional differences in returns on Japanese security to the underlying behaviour of four variables: earnings yield, size, book-to-market ratio, and cash flow yield. Of the four variables considered, the book-to-market ratio and cash flow yield have a more significant and positive impact of expected returns. Fama and French (1992) have argued that beta alone cannot explain expected return and suggest that a firms' size, book-to-market ratio (BE/ME) absorb the role of leverage and E/P factors in security returns. Fama and French (1993) propose a three-factor model comprising market, size and BE/ME. Davis (1994) found that BE/ME, earnings yield, and cash flow yield have significant explanatory power with respect to the cross-section of realized security returns. Capaul et al. (1993), Lakonishok et al. (1994) and Fama and French (1995) suggest that low book-to-market (or growth) securities are more glamorous than value securities and may thus attract naïve investors who push up prices and lower expected returns of these securities. Chan et al. (1995), Fama and French (1996a, 1996b) argue that beta premium is more and cannot save the CAPM, given the evidence that beta alone cannot explain expected premium. Fama and French (1998), Davis et al. (2000) found that there is a strong positive relation between average return and book-to-market equity. Mohanty (2002) found that size, market leverage, price-to-book value, and earnings-to-price ratio were highly correlated with security returns. Studies by Sehgal (2003), Connon and Sehgal (2003) show that the three-factor model provides a better description of the cross-section of average returns compared to one-factor CAPM. Beltratti and Tria (2002) and Wang (2003) found that a nonparametric version of the Fama and French's (1993) multi-factor model performs well, even when challenged by momentum portfolios. Gokgoz (2008), Al Mwalla and Karasneh (2011) and Hamid et al. (2012) found that Fama and French three factors model has more explanatory power than than the single factor CAPM.

The following studies are contradicting Factors model. Black (1993) refutes that the announcement of death of beta seems to be rather premature. Studies by Kothari and Shanken (1995), Kothari et al. (1995) argue that the relation between book-to-market equity and returns is weaker and less consistent than that in Fama and French (1992). They assert that any rational asset-pricing model must be tested to work under a variety of conditions and not for a limited set of portfolios. MacKinlay (1995) suggests that multi-factor pricing models alone do not entirely resolve CAPM. Barber and Lyon (1997) present evidence that survivor bias does not significantly affect the estimated size or book-to-market premiums in returns. Daniel and Titman (1997) indicate that the return premium on small capitalization and high book-to-market securities does not arise because of the co-movements of these securities with pervasive factors. They concluded that it is the characteristics rather than the covariance structure of returns that appear to explain the cross-sectional variation in security returns. Veysel (2013) found that Fama and French three factor model has power on explaining variations on excess portfolio returns. However, this power is not powerful throughout the study period from 2003 to 2010 on the Istanbul Stock Exchange.

Objectives of the Study

The study is undertaken with the following objectives:
To test cross-sectional variation in portfolio returns in Bahrain Bourse.
To ascertain the relationship between portfolio and market returns.
To ascertain the factors that explains the variation in portfolio returns.

Hypotheses

Based on Fama and French (1992) the following hypotheses are formulated:
H1: The alpha value is not significantly different from zero.
H1: The cross section regression is a good fit in multiple regression.
H1: Size explains the cross-sectional variation in portfolio returns.
H1: Book-to-market equity ratio provides explanation for the cross-sectional variation in portfolio returns.
H1: EPS/Price ratio explains the cross-sectional variation in portfolio returns.
H1: Excess return (Rm-Rf) explains the cross-sectional variation in portfolio returns.

Research Methodology

Step 1: Construction of Portfolio with Equal Weights:
Portfolios have been formed with equal weightage, as suggested by Lakonishok, et al. (1994). In this set, portfolio 1 has been formed by choosing the first five securities having highest beta (securities 1, 2, 3, 4 and 5) and their respective ME, BE/ME, EPS/Price and (Rm-Rf) arranged in different columns. For all these variables equal weights have been used to form portfolio ME, BE/ME, EPS/Price and (Rm-Rf). Portfolio 2, is formed by choosing the next five securities (6, 7, 8, 9, and 10) with their respective ME, BE/ME, EPS/Price and (Rm-Rf) and assigning them equal weights. This process is repeated until all the portfolios are formed. Using this process, 6 portfolios have been formed with equal weight.
Step 2: Steps for regression of Portfolios:
1. Regression using Size (year t-1)
The methodology of Banz (1981) has been used. Reinganum (1981a), Fama and French (1992) and Iqbal (2015) have used this methodology. Using size as independent variable and the difference between the individual portfolio returns and the risk-free rate of returns (Rp-Rf) as the dependent variable, a regression is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_2 R_{ME_{p_{t-1}}} + e_{p_{t-1}} \tag{1}$$

If the factors model holds, we expect α to be closer to zero and size to capture the cross-sectional variation in average security returns.
2. Regression using ln(BE/ME) (year t-1)
The methodology of Chan et al. (1991) has been used. Fama and French (1992), Kothari et al. (1995) and Iqbal (2015) have used this methodology. Using BE/ME as independent variable and R_p-R_f as the dependent variable, a regression is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_3 R_{\left(\frac{BE}{ME}\right)_{p_{t-1}}} + e_{p_{t-1}} \tag{2}$$

If the factors model holds, we expect α to be closer to zero and book-to-market equity to capture the cross-sectional variation in portfolio returns.
3. Regression using EPS/Price (E/P) (year t-1)
The methodology of Fama and French (1992) has been used. Using EPS/Price as independent variable and Rp-Rf as the dependent variable, a regression is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_4 R_{\left(\frac{E}{P}\right)_{p_{t-1}}} + e_{p_{t-1}} \tag{3}$$

If the factors model holds, we expect α to be closer to zero and EPS/Price to capture the cross-sectional variation in portfolio returns.
4. Regression using (Rm-Rf) (year t-1)

The methodology of Kothari et al. (1995) has been used. Using excess market returns over the risk free rate of return (Rm-Rf) as independent variable and R_p-R_f as the dependent variable, a regression is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_5 R_{\left(R_m - R_f\right)_{p_{t-1}}} + e_{p_{t-1}} \quad (4)$$

If the factors model holds, we expect α to be closer to zero and Rm-Rf to capture the cross-sectional variation in portfolio returns.

5. Multiple regression using $B_{p,}$ and Size (year t-1)

The methodology of Banz (1981) has been used. Fama and French (1992), Kothari et al. (1995) and Iqbal (2015) have used this methodology. Using portfolio beta and size as independent variables and R_p-R_f as the dependent variable, multiple regression is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_1 \beta_p + \beta_2 R_{ME\, p_{t-1}} + e_{p_{t-1}} \quad (5)$$

If the factors model holds, we expect α to be closer to zero and two variables, size and beta combine to capture the cross-sectional variation in portfolio returns.

6. Multiple regression using $\beta_{p,}$ and BE/ME (year t-1)

The methodology of Fama and French (1992) has been used. Using portfolio betas and BE/ME as independent variables and R_p-R_f as the dependent variable, a multiple regression is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_1 \beta_p + \beta_3 R_{\left(\frac{BE}{ME}\right)_{p_{t-1}}} + e_{p_{t-1}} \quad (6)$$

If the factors model holds, we expect α to be closer to zero and two variables, BE/ME and beta combine to capture the cross-sectional variation in portfolio returns. 7. Multiple regression using β_p and EPS/Price (year t-1)

The methodology of Fama and French (1992) is used. Using portfolio betas $\frac{E}{P}$ as independent variables and $\left(R_p - R_f\right)$ as the dependent variable, a multiple regressions is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_1 \beta_p + \beta_4 R_{\left(\frac{E}{P}\right)_{p_{t-1}}} + e_{p_{t-1}} \quad (7)$$

If the factors model holds, we expect α to be closer to zero and the two variables, EPS/Price ratio and beta combine to capture the cross-sectional variation in portfolio returns.

8. Multiple regression using $\beta_{p,}$ and Rm-Rf (year t-1)

The methodology of Kothari et al. (1995) is used. Using portfolio beta and excess market returns over the risk free rate of return (Rm-Rf) as independent variables and Rp-Rf as the dependent variable, a multiple regression is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_1 \beta_p + \beta_5 R_{\left(R_m - R_f\right)_{p_{t-1}}} + e_{p_{t-1}} \quad (8)$$

If the factors model holds, we expect α to be closer to zero and two variables, $\left(R_m - R_f\right)$ and beta combine to capture the cross-sectional variation in portfolio returns.

9. Multiple regression using $\beta_{p,}$ size and ln(BE/ME) (year t-1)

The methodology of Fama and French (1992) has been used. Using portfolio beta, size and BE/ME as independent variables and R_p-R_f as the dependent variable, a multiple regression is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_1 \beta_p + \beta_2 R_{ME_{p_{t-1}}} + \beta_4 R_{\left(\frac{BE}{ME}\right)_{p_{t-1}}} + e_{p_{t-1}} \quad (9)$$

If the factors model holds, we expect α to be closer to zero and the three variables, beta, size and $\frac{BE}{ME}$ combine to capture the cross-sectional variation in portfolio returns.

10. Multiple regressions using β_p, size and EPS/Price ratio (year t-1)

The methodology of Fama and French (1992) has been used. Using portfolio betas, size and E/P as independent variables and R_p-R_f as the dependent variable, a multiple regression is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_1 \beta_p + \beta_2 R_{ME_{p_{t-1}}} + \beta_4 R_{\left(\frac{E}{P}\right)_{p_{t-1}}} + e_{p_{t-1}} \quad (10)$$

If the factors model holds, we expect α to be closer to zero and the three variables, beta, size and EPS/Price ratio combine to explain the cross-sectional variation in portfolio returns.

11. Multiple regression using β_p, ln(BE/ME) and EPS/ Price ratio (year t-1)

The methodology of Fama and French (1992) has been used. Using portfolio beta, BE/ME and E/P as independent variables and R_p-R_f as the dependent variable, a multiple regression is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_1 \beta_p + \beta_3 R_{\left(\frac{BE}{ME}\right)_{p_{t-1}}} + \beta_4 R_{\left(\frac{E}{P}\right)_{p_{t-1}}} + e_{p_{t-1}} \quad (11)$$

If the factors model holds, we expect α to be closer to zero and the three variables, beta BE/ME and EPS/Price ratio combine to capture the cross-sectional variation in portfolio returns.

12. Multiple regression using β_p, size and Rm-Rf (year t-1)

The methodology of Kothari et al. (1995) has been used. Using portfolio beta, size and Rm-Rf as independent variables and Rp-Rf as the dependent variable, a multiple regression is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_1 \beta_p + \beta_2 R_{ME_{p_{t-1}}} + \beta_5 R_{\left(R_m - R_f\right)_{p_{t-1}}} + e_{p_{t-1}} \quad (12)$$

If the factors model holds, we expect α to be closer to zero and the three variables beta, size and Rm-Rf combine to explain the cross-sectional variation in portfolio returns.

13. Multiple regression using β_p, BE/ME and R_m-R_f (year t-1)

The methodology of Kothari et at. (1995) has been used. Using portfolio beta, BE/ME and Rm-Rf as independent variables and Rp-Rf as the dependent variable, a multiple regression is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_1 \beta_p + \beta_3 R_{\left(\frac{BE}{ME}\right)_{p_{t-1}}} + \beta_5 R_{\left(R_m - R_f\right)_{p_{t-1}}} + e_{p_{t-1}} \quad (13)$$

If the factors model holds, we expect α to be closer to zero and the three variables beta, book-to-market equity and Rm-Rf combine to capture the cross-sectional variation in portfolio returns.

14. Multiple regression using β_p, EPS/Price ratio and Rm-Rf (year t-1)

Using portfolio beta, EPS/Price ratio and Rm-Rf as independent variables and Rp-Rf as the dependent variable, a multiple regression is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_1 \beta_p + \beta_4 R_{\left(\frac{E}{P}\right)_{p_{t-1}}} + \beta_5 R_{\left(R_m - R_f\right)_{p_{t-1}}} + e_{p_{t-1}} \quad (14)$$

If the factors model holds, we expect α to be closer to zero and the three variables, beta EPS/Price ratio and Rm-Rf, combine to explain the cross-sectional variation in portfolio returns.

15. Multiple regression using β_p, size, BE/ME, E/P (year t-1).

Using portfolio betas, size, book-to-market equity and EPS/Price ratio as independent variables and R_p-R_f as the dependent variable, a multiple regressions is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_1 \beta_p + \beta_2 R_{ME_{p_{t-1}}} + \beta_3 R_{\left(\frac{BE}{ME}\right)_{p_{t-1}}} + \beta_4 R_{\left(\frac{E}{P}\right)_{p_{t-1}}} + e_{p_{t-1}} \quad (15)$$

If the factors model holds, we expect α to be closer to zero and the four variables, portfolio beta, size, book-to-market equity and EPS/Price ratio combine to capture the cross-sectional variation in portfolio returns.

16. Multiple regression using $\beta_{p,}$ size, BE/ME, Rm-Rf (year t-1)

Using portfolio beta, size, BE/ME and Rm-Rf as independent variables and R_p-R_f as the dependent variable, a multiple regression is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_1\beta_p + \beta_2 R_{ME_{p_{t-1}}} + \beta_3 R_{\left(\frac{BE}{ME}\right)_{p_{t-1}}} + \beta_5 R_{\left(R_m - R_f\right)_{p_{t-1}}} + e_{p_{t-1}} \quad (16)$$

If the factors model holds, we expect α to be closer to zero and the four variables, portfolio beta, size, book-to-market equity and Rm-Rf combine to explain the cross-sectional variation in portfolio returns.

17. Multiple regression using $\beta_{p,}$ size, BE/ME, EPS/Price ratio and R_m-R_f (year t-1)

Using portfolio beta, size, BE/ME, EPS/Price ratio and Rm-Rf as independent variables and Rp-Rf as the dependent variable, a multiple regression is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_1\beta_p + \beta_2 R_{ME_{p_{t-1}}} + \beta_3 R_{\left(\frac{BE}{ME}\right)_{p_{t-1}}} + \beta_4 R_{\left(\frac{E}{P}\right)_{p_{t-1}}} + \beta_5 R_{\left(R_m - R_f\right)_{p_{t-1}}} + e_{p_{t-1}} \quad (17)$$

If the factors model holds, we expect α to be closer to zero and the five variables, beta, size, book-to-market equity, EPS/Price and Rm-Rf, combine to capture the cross-sectional variation in portfolio returns.

18. Multiple regression using size and BE/ME (year t-1)

The methodology of Fama and French (1992) has been used. Using portfolio size and BE/ME as independent variables and R_p-R_f as the dependent variable, a multiple regression is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_2 R_{ME_{p_{t-1}}} + \beta_3 R_{\left(\frac{BE}{ME}\right)_{p_{t-1}}} + e_{p_{t-1}} \quad (18)$$

If the factors model holds, we expect α to be closer to zero and the two variables, size and BE/ME ratio combine to capture the cross-sectional variation in portfolio returns. 19. Multiple regression using size and EPS/Price ratio (year t-1)

The methodology of Fama and French (1992) has been used. Using portfolio size and EPS/Price ratio as independent variables and R_p-R_f as the dependent variable, a multiple regression is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_2 R_{ME_{p_{t-1}}} + \beta_4 R_{\left(\frac{E}{P}\right)_{p_{t-1}}} + e_{p_{t-1}} \quad (19)$$

If the factors model holds, we expect α to be closer to zero and the two variables, size and EPS/Price ratio combine to explain the cross-sectional variation in portfolio returns.

20. Multiple regression using BE/ME and EPS/Price ratio (year t-1)

The methodology of Fama and French (1992) has been used. Using portfolio BE/ME and EPS/Price ratio as independent variables and R_p-R_f as the dependent variable, a multiple regression is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_3 R_{\left(\frac{BE}{ME}\right)_{p_{t-1}}} + \beta_4 R_{\left(\frac{E}{P}\right)_{p_{t-1}}} + e_{p_{t-1}} \quad (20)$$

If the factors model holds, we expect α to be closer to zero and the two variables, BE/ME and EPS/Price ratio combine to capture the cross-sectional variation in portfolio returns.

21. Multiple regression using Size, BE/ME and Rm-Rf (year t-1)

Using portfolio size, BE/ME and Rm-Rf as independent variables and R_p-R_f as the dependent variable, a multiple regression is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_2 R_{ME_{Pt-1}} + \beta_3 R_{\left(\frac{BE}{ME}\right)_{Pt-1}} + \beta_5 R_{\left(R_m - R_f\right)_{Pt-1}} + e_{p_{t-1}} \quad (21)$$

If the factors model holds, we expect α to be closer to zero and the three variables, size, book-to-market equity and Rm-Rf combine to explain the cross-sectional variation in portfolio returns.

22. Multiple regression using Size, BE/ME, EPS/Price ratio and R_m-R_f (year t-1)

Using size, BE/ME, EPS/Price ratio and Rm-Rf as independent variables and R_p-R_f) as the dependent variable, a multiple regression is run for the following:

$$\left(R_p - R_f\right) = \alpha + \beta_2 R_{ME_{Pt-1}} + \beta_3 R_{\left(\frac{BE}{ME}\right)_{Pt-1}} + \beta_4 R_{\left(\frac{E}{P}\right)_{Pt-1}} + \beta_5 R_{\left(R_m - R_f\right)_{Pt-1}} + e_{p_{t-1}} \quad (22)$$

If the factors model holds, we expect α to be closer to zero and the four variables, size, book-to-market equity, EPS/Price ratio and Rm-Rf, combine to capture the cross-sectional variation in portfolio returns.

Analysis and Discussion of Results of the Study

The results of the study for each of the combinations are presented and discussed in this section.

Table 1: The test for Intercept (alpha) and slope co-efficient of portfolio beta and size as independent variables and R_p-R_f as dependent variable

P-value α	P-value In(ME)	P-value β_p	Sig F	Status of P values
8.70	8.70	8.70	8.70	P<0.05
91.30	91.30	91.30	91.30	P>0.05

Notes: The Table shows the percentage of the total number of years in which the p-values are less than or greater than the chosen level of significance (0.05 in the study). P-values of the intercept (α) and the independent variables indicate whether the values are less than or greater than the chosen level of significance. The first row in each of the column shows the variable/test name, the second row in each of the columns indicates that the percentage of the total number of p-values of the co-efficient of the respective variables that are less than 0.05 and the third row indicates that their p-values are greater than 0.05 (as indicated in the last column).

Excess portfolio returns (R_p-R_f) is taken as the dependent variable and the combination of two independent variables (beta and size, beta and BE/ME, beta and EPS/Price, beta and R_m-R_f; size and BE/size, EPS/Price, BE and ME/ME and EPS/Price). Similar combination is done for three, four and five independent variables to test the variation in the security/portfolio returns. The researcher used regression taking one of the combined variables as independent variable and R_p-R_f as the dependent variable. For testing the intercept and slope co-efficient of the independent variables the researcher used t-test and F-test for testing the goodness of fit of the regression. The above notes are applicable to all the Tables.

Table 1 exhibits that in majority (91.30%) of the years, α value is not significantly different from zero and therefore the hypothesis is accepted. The p-values of ln(ME) and β_p slope co-efficient are greater than the level of significance in majority (91.30%) of the years. Thus, the slope co-efficient of the two independent variables are not significantly different from zero. Further, the F-test also indicates that the regression is not a good fit in majority (91.30%) of the years. Therefore, we may conclude that both size and beta do not explain the variation of portfolio returns.

Table 2: The test for alpha and slope co-efficient of beta and EPS/Price ratio

P-value α	P-value EPS/Price	P-value Beta	Sig F	Status of P values
32.76923077	9.692307692	9.692307692	9.692307692	P<0.05
67.23076923	90.30769231	90.30769231	90.30769231	P>0.05

The results presented in Table 2 indicate that in majority (67.23%) of the years, α value is not significantly different from zero and therefore the hypothesis is accepted. The p-values of EPS/Price and βp slope co-efficient are greater than the 0.05 in majority of the years. This indicates that two independent variables do not explain the variation in portfolio returns. Further, the F-test also indicates that the regression is not a good fit in majority (90.31%) of the years. Therefore, we may conclude that both EPS/Price ratio and beta either individually or in combination do not explain the variation in portfolio returns.

Table 3: The test for alpha and slope co-efficient of beta and Rm-Rf

P-value α	P-value Rm-Rf	P-value β_p	Sig F	Status of P values
24.49580724	12.5	15.38461538	8.58129658	P<0.05
75.50419276	87.5	84.61538462	91.41870342	P>0.05

Table 3 indicate that in majority (75.50%) of the years, α value is equal to zero and therefore the hypothesis is accepted. The p-values of (Rm-Rf) and βp slope co-efficient are greater than the level of significance in majority of the years. This indicates that two independent variables do not explain the variation in portfolio returns. Further, the F-test also indicates that the regression is not a good fit in majority (91.42%) of the years. Therefore, we conclude that both (Rm-Rf) and beta leave the portfolio returns unexplained.

Table 4: The test for alpha and slope co-efficient of beta, size and EPS/Price ratio

P-value α	P-value E/P	P-value In(ME)	P-value β_p	Sig F	Status of P values
13.49	6.38	6.38	6.38	6.38	P<0.05
86.51	93.62	93.62	93.62	93.62	P>0.05

The results of the study presented in Table 4 indicate that in majority (86.51%) of the years, α value is not significantly different from zero and therefore the hypothesis is accepted. The p-values of EPS/Price, ln(ME) and βp slope co-efficient are greater than the level of significance in majority of the years. The slope co-efficient of the three independent variables are equal to zero. Further, the F-test also indicates that the regression is not a good fit in majority (93.62%) of the years. Therefore, we conclude that variables, EPS/Price ratio, size and beta together as well as individually do not explain the variation in portfolio returns.

Table 5: The test for alpha and slope co-efficient of beta, size and Rm-Rf

P-value α	P-value (Rm-Rf)	P-value In(ME)	P-value β_p	Sig F	Status of P values
9.69	14.50	9.69	9.69	15.38	P<0.05
90.31	85.50	90.31	90.31	84.62	P>0.05

The results of the study presented in Table 5 indicate that in majority (90.31%) of the years α value is not significantly different from zero and therefore the hypothesis is accepted. The p-values of (Rm-Rf), ln(ME) and βp slope co-efficient are more than 0.05 in majority of the years. The slope co-efficient of the three independent variables are not significantly different from zero. Further, the F-test also indicates that the regression is not a good fit in majority (84.62%) of the years. Therefore, we conclude that (Rm-Rf), size and beta neither individually nor in combination capture the variation in portfolio returns.

Table 6: The test for alpha and slope co-efficient of beta, EPS/Price ratio and Rm-Rf

P-value α	P-value (Rm-Rf)	P-value E/P	P-value β_p	Sig F	Status of P values
13.48	12.50	9.49	15.38	9.49	P<0.05
86.52	87.50	90.51	84.62	90.51	P>0.05

In Table 6, the results indicate that in majority (86.52%) of the years α value is not significantly different from zero and therefore the hypothesis is accepted. The p-values of (Rm-Rf), EPS/Price and βp slope co-efficient are greater than the level of significance in majority of the years. This indicates that, three independent variables do not explain the variation in portfolio returns. Further, the F-test also indicates that the regression is not a good fit in majority (90.51%) of the years. Therefore, we conclude that (Rm-Rf), EPS/Price ratio and beta do not explain variation in portfolio returns.

Table 7: The test for alpha and slope co-efficient of size and EPS/Price ratio

P-value α	P-value E/P	P-value In(ME)	Sig F	Status of P values
8.492308	17.58462	8.492308	17.58462	P<0.05
91.50769	82.41538	91.50769	82.41538	P>0.05

The results presented in Table 7 indicate that in majority (91.51%) of the years α value is not significantly different from zero and therefore the hypothesis is accepted. The test for EPS/Price ratio and ln(ME) slope co-efficient shows that in majority of the years, slope co-efficient are equal to zero. This indicates that the independent variables do not significantly explain the variation in portfolio returns. Further, the F-test also indicates that the regression is not a good fit in majority (82.42%) of the years. Therefore, we conclude that two variables, EPS/Price ratio and size do not explain the variation in portfolio returns.

Conclusion

The analysis of the results of the study indicates that the α value is not significantly different from zero for majority of the years. The variation of portfolio returns is not depending on single factor. The combinations of more than two variables with Rm-Rf can explain the variation in portfolio returns. However, the combinations of more than two variables with EPS/Price ratio do not significantly explain the variation in portfolio returns. The inclusion of Rm-Rf in the regression gives explanatory power to other independent variables. The overall analysis of the results shows that the role of other independent variables is captured by Rm-Rf. This implies that in multiple regression, excess market returns factor Rm-Rf emerges as the strongest independent variable in explaining the variation in portfolio returns and EPS/Price ratio is the weakest variable.

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Author’s profile

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Having obtained his Ph.D. from Mangalore University, India, Dr. Iqbal Thonse Hawaldar continues to commit himself to teaching and research. He has more than two decades of teaching experience from various institutes of repute in India as well as Kingdom University, Bahrain and a publication of 20 research papers in USA, UK, Australia and India to his credit. His presentation of research papers in many international and national conferences and seminars has acclaimed international reception and debate. He has published a book titled “Efficiency of Stock Market” in USA, UK and Germany, which continues to be a significant resource in its domain. As an appreciation to his academic excellence and research contribution, he is not only recognized as an active member of the editorial boards of many renowned refereed international journals but also a reviewer for many international refereed journals and conferences.