Two-Pass Regression Based Estimation of Ownership Risk Premium Using Fama & Macbeth (1973) Approach: Evidence from Emerging Market of Pakistan

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Abstract

This study examines the role of institutional ownership in explaining stock returns. The Fama & Macbeth (1973) rolling Beta (β) and two pass regression methodology is used in estimating ownership risk premium for a period from June 2002 to June 2012 by using a data set of 187 companies listed at Karachi Stock Exchange (KSE). Standard portfolio based approach is used to mitigate Errors-in-Variable (EIV) problem. Findings of this study give an insight to develop a new theoretical framework and are an attempt to give fresh perspective into the puzzling empirical linkages documented in existing literature between equity market returns and firm specific characteristics such as size, value and ownership structure. The relationship reveals that institutional ownership concentration increases information availability and results are in line with monitoring hypothesis that argues that institutional investors create value by effective monitoring that ultimately translates into equity market returns. The study reports that a significant ownership premium exists for stocks traded at KSE.

Key Words: Fama& Macbeth (1973) approach, Errors-in variables, rolling betas, institutional ownership premium.
JEL Classification: **G1, G11, G12, G14**

Introduction

Fama & Macbeth (1973) approach has been widely used in asset pricing and finance literature in estimating factor exposures (betas). This approach involves two pass regressions: the first regression is time series regressions where returns are regressed on factors of each portfolio or asset, which give an estimate of factor loadings, known as betas. In second pass, asset or portfolio returns are regressed cross-sectionally on betas obtained in first pass regression. This study uses portfolios instead of individual stocks to reduce errors-in-variables bias. According to Black, Jensen & Scholes (1972) and Fama & Macbeth (1973), second pass regression inherently contains errors-in-variables (EIV) problem as explanatory variables are estimates of first pass regression which can be mitigated by using diversified portfolio returns instead of using individual stocks. Portfolio based approach reduces Error-in-variable bias in portfolios and betas estimated in such way are least affected by idiosyncratic risk (problem is fully eliminated when ($N \rightarrow \infty$).

Asset pricing paradigm has been changed significantly during past two decades. Risk factors other than market movement have been identified explaining cross-sectional differences in returns. Asset pricing anomalies such as size, book-to-market and momentum have opened a challenge to asset pricing theory since their birth. Risk premia associated with these factors provide critical input in explaining the cross-section of expected return. On the other hand, magnitude, robustness, and pervasiveness of these factor premia have become central point in discussions on market efficiency. Robustness of these asset pricing anomalies has been tested in many markets for different time settings and asset classes (Lakonishok, et al 1991;

Hawawin & Keim 1995; Fama & French 1992; Griffin et al. 2003; Maskowitz & Pedersen 2012). Vast body of literature is also available on asset pricing models which assess returns based on these risk factors (Fama & French 1992; Carhart1997; Moskowitz et al. 2004; Hasan & Javed 2011). These factor based models opened empirical debate on underlying explanation of return associated with these risk premia, which are further sub-categorized into rational risk-based and behavioral explanation of asset pricing anomalies.

Empirical research has identified number of factors other than merely market premium, which are helpful in explaining why asset return vary cross-sectionally. Most renowned amongst these factor based models is Fama & French (1992) three factor model. This model focuses on three factors to explain cross-sectional return difference: market, size and Book-to-Market ratio (Fama & French, 1993; Fama & MacBeth, 1973; Roll, 1977; Sharpe, 1964). The efficacy of this model has been reviewed by Fama & French (1996) and several other researchers. These studies generally support the argument that this model is more suitable to explain average returns as compared to standard CAPM. In financial market research, Fama & French (1992) Three Factor Model has become a contemporary framework for pricing of the risky assets. Literature also indicates most of the asset pricing risk factors are country specific (Fama & French (1998) and Griffin (2002).

There are few studies that take into account corporate governance considerations in asset pricing. Like other emerging markets Pakistan's equity market also suffers from poor corporate governance practices and low institutional holdings where institutional investors trade speculatively for short holding periods.

Such an exceptional investment setting provides motivation to explore asset pricing dynamics in such environment. Thus this study is aimed to explore how institutional holdings affect monitoring and information generation process in capital markets and to reexamine the way this ownership structure affects stock market returns. In particular, it is also worth knowing whether there is a significant size effect and how its presence differs from a developed market such as U.S. and Japan. One of the core purposes of this study is also to investigate the role of size and book-to market factor in explaining stock returns in equity market of Pakistan. Answer to these questions may provide further insight about existence and pricing of these factors in emerging equity market of Pakistan.

This study is intended to identify new proxies of systematic risk or idiosyncratic risk. Proposed framework provides a through theoretical and empirical base for scrutinizing the relationship between institutional ownership and equity market returns. This study also sheds light on the monitoring and informational benefits of institutional ownership. It also aims to provide a fresh insight on already examined relationship amongst firm size, value and equity market returns for stock market of Pakistan (Hasan & Javed, 2011).

Finally, this study tries to knit the existing literature on cross sectional return difference and aims to document series of empirical patterns which are not supported by standard CAPM and existing Asset Pricing Models. This study also takes into account the already acknowledged anomalies like size and book-to-market to understand existing asset pricing strands of Pakistan's equity market. This study contributes to the existing body of literature as it underlines a new

factor that is priced in stock return i.e. institutional ownership concentration.

Hypotheses Development

Conventional CAPM developed by Sharpe, Linter & Black (1964) regards beta or market risk as the only factor that explains stock returns. Previous literature also documents a significant return premium for small size and high book-to-market companies (Banz 1981, Rosenberg 1985) which is not captured by CAPM stand alone. Dimson et al. (1979) identified that presence of size effect is due to impact of thin trading on beta estimation.

Fama & French (1992) develop a three factor model with two additional factors other than market beta i.e. size and B/M and their findings show that this model captures cross-sectional return variation for US market in better way as compared to CAPM. Fama & French argue that the existence of size and value premium is reward for the risk borne by investors. Fama & French (1995) associate high B/M factor with firm distress level. They regard low B/M stocks as growth stocks with sustained profitability and small stocks low profitable as compared to large stock. Investors are compensated for holding such riskier stocks with high distress level and low profitability. Fama & French (1998) provide evidence of size, value and momentum premium for international markets. They test the model for three regions (America, Europe, and Japan) and found plausible explanation of average return of portfolios when sorted on the basis of size and B/M. Academic debate on Fama & French three factor model is focused on two central points. First argument implies that stocks with high B/M imply a higher required rate of return or discount rate. The second approach view presence of

B/M anomaly as a proxy for mispricing as a result of systematic errors made by investors with arbitrage constraints.

Daniel & Titman (1997) explore that whether stocks that exhibit similar characteristics such as firm size and B/M but different factor loadings have returns differences as predicted by Fama & French model. Findings of their study reveal that returns are not related to the loadings on Fama & French risk factors. They conclude that the presence of B/M factor is due to similar characteristics of these stocks and not because of common risk factor.

Davis et al. (2000) extended the prior work of Daniel & Titman (1997) and examine a significant relationship between factor loadings and expected returns. They argue that poor results of Daniel & Titman's (1997) test were due to short time horizon used by them. Later on Daniel & Titman (2001) retested the model on Japanese stock market and rejected the three factor model but accepted the explanatory power of characteristics model.

Fama & French (1995) and Chen et al. (1998) argue that one explanation for higher expected returns for value stocks is higher risk premium required by investors due to their persistent low earnings, high distress level, low dividend pay offs and high financial leverage. Literature also documents presence of value premium due to data snooping and selection bias.

Ali, Hwang & Trombley (2003) find a positive and linear relationship between B/M, idiosyncratic volatility and stock returns. Shleifer & Vishny (1994) argue that investors over value growth stocks because investors over estimate this growth potential and prefer stocks with higher current returns as compared to ones offering higher future prices. On contrary, alternate explanation is used for

value stocks that may not appear attractive for investors. As a results growth stocks are overvalued and value stocks are undervalued. Behavioral models explain presence of value premium as mispricing mechanism (Daniel, Barberis & Vishny 1997).

Consistent with the mispricing hypothesis Phalippou (2007) proposes an alternative explanation of value premium. He argues that value premium is driven by stocks held by individual investors rather than institutional investors. He reports a decreasing relationship between value premium and institutional ownership concentration.

Shleifer & Vishny (1994) and Shefrin & Statman (1995) argue that that behavioral explanation lies underneath value premium phenomenon, if investors choose glamour stocks as good performing stocks not on the basis of their risk characteristics, they may increase required rate of return for small firms. Shafana, Rimziya & Jariya (2013) investigate the size and book-to-market factors in explaining stock returns for Sri Lankan Stock market. Empirical findings of their study highlight two new findings; size effect is insignificant for Sri Lankan equity market and book-to-market factor has a negative relationship with stock returns.

There are many behavioral explanations documented in the literature in explaining size effect and B/M effect. The most widespread behavioral explanation is market participants' over reaction to the good and bad firm performance. Good performance is rewarded by market and prices are driven far away from their fundamentals. Bad performance results in deviation of prices below their intrinsic value (Lakonishok, 1994). Behavioral finance refers this biased behavior as result of conservatism and recency bias where people over weight readily available information at the expense of

past information. Result of this pessimism towards bad performance is evident around earnings announcements when prices react unduly to earnings surprises (LaPorta, 1997).

Over the past few decades, role of institutional investors in capital markets has grabbed attention of both academicians and practitioners. Institutional holdings have increased enormously over the last few years in Pakistan. So, it is important to study the role of institutional investors as equity-holders who may affect stock market prices and volatility. Vast body of literature is available which examined the effectiveness of institutional investors in developed countries like UK and USA. There is also growing body of knowledge available exploring role of institutional investors in emerging markets. In Pakistan, focus of institutional investment related studies was more on its impact on corporate governance mechanism and shareholders activism. Not much literature is available on impact of these institutional holdings on stock market performance of a firm. This specific study is aimed to investigate relationship between institutional ownership concentration and stock returns from Pakistan's perspective.

Since developing economies have relatively weaker investor protection, concentrated ownership structure and poor governance practices so, this empirical evidence lends further support to test the hypothesis in emerging market of Pakistan. We test here whether market discounts ownership structure information. Institutional investors have more expertise and resources to gather and analyze data and sometimes they have information advantage regarding selective disclosure over individual investors. Literature regards institutional investors as more sophisticated and informed traders

than individual investors. Many recent empirical investigations support this claim. Scharfstein & Stein (1990) argue that investment managers should avoid return outcomes revealing them as uniformed traders. Literature provides strong evidence of clientele effect in ownership structures exhibiting the special concern of institutional investor. Gompers & Merick (2001) find that institutional holdings are more in liquid and larger stocks. Falkenstein (1996) shows that mutual fund investment is more inclined towards large and liquid firms, about which, lot of information is available. Grinblatt et al., (1997) document this consideration as herd behavior in investment decisions.

Sias et al. (2006) find that institutional trading significantly affects pricing dynamics of equity market due information content of their trade. Previous literature reveals that institutional investors outperform the market and retail traders as well (Daniel et al, 1997, Nofsinger & Sias 1999, Wermers, 2000). This study is also aimed to investigate the role of institutional players in explaining asset pricing in financial markets.

This study proposes another paradigm that explains stock returns by constructing ownership structure factor. Thus this study purposes to examine the relationship between firm's ownership structure and equity returns by adding the INSH factor to the Fama & French three factor model, where, INSH is the difference between average returns of the portfolios with high institutional holdings and the average of the returns of the portfolios firms with low institutional ownership.

Institutional shareholding can be measured as percentage of shares held by institutional investors such institutions, foreign

investors and investment companies. Institutional ownership concentration (INSH) introduces the degree of the concentration of shares which belongs to institutional owners in a firm. Information transparency and efficient monitoring hypotheses state that firms with higher institutional investors are considered as more efficiently managed by mangers and more information is available to investors of such firms. So, institutional investment can be treated as a risk proxy and it is expected that in firms with high institutional investment are deemed as less risky and hence low compensation is required by investors. On the basis of literature review, it is hypothesized that Fama & French Three factor Model better explains equity market returns in Pakistan when Ownership premium is added as a fourth factor to explain cross-sectional variations.

H1: Institutional ownership concentration is a priced risk factor to explain equity market returns.

Experimental Design & Procedures

Data & Sample

This study employs the data of 187 companies listed on the Karachi Stock Exchange (KSE) for the period from June 2002 to June 2012. Reason to choose this study period is unavailability of corporate governance related data prior to 2002. Share price is defined as closing price on the last trading day of month t. This study uses Treasury bill rates for risk free returns and value-weighted index of Karachi stock exchange i.e. KSE-100 index, as proxy for market portfolio. Data regarding ownership structure for ten years have been collected from financial reports of the sample companies. Following inclusion and exclusion criteria are used to select sample companies.

The companies are continuously listed at KSE for the period of analysis

All companies are non-financial in nature.

The companies share the same accounting year.

Companies should be listed at the stock exchange for at least 24 months before portfolio formation. This condition ensures proper beta estimation. Only firms with positive book to market are included in sample. Negative market value is an attribute of highly financially distressed companies.

List of Variables

Table 1. *List of Variables*

Variable	Abbreviation	Description
Portfolio Return	R_p	expected return of portfolio at time t
Dependent Variables		
Market Return	R_m	Market Return at time t
Size	SMB	Difference between return of small size minus return of large size firm at time t
Book-to-market ratio	HML	Difference between return of High BE/ME to Low BE/ firm at time t
Institutional ownership concentration	INSH	Difference between return of firms having high institutional ownership minus return of firms having low institutional ownership at time t.

Empirical Design

The empirical work is asset pricing domain employs firm specific characteristics to explain cross-sectional return differences and sensitivity to returns. This approach requires portfolio formation on the basis of characteristics. Fama & French (1992, 1993, 1996, 1998, and 2014) use this approach to propose their renowned three and five factor model. The present study also uses the same approach (Fame & French, 2014).

This Study uses Fama & MacBeth (1973) methodology to test proposed multi-factor model. Fama& Macbeth (1973) developed the two pass cross sectional regression methodology to test the linear relationship between expected stock returns and factor betas (Wang 2005). To overcome the cross correlation problem in regression residuals, Fama & MacBeth (1973) propose that in second pass regression, running regressions on month on month basis instead of taking average returns on their betas for entire sample period will allow betas to roll over time (rolling betas obtained in first pass). Betas obtained in such a way are used to explain next period stock returns. This study employs Fama & MacBeth Procedure as follows:

Portfolio Formation

The two step estimation uses portfolios instead of individual stocks. Using portfolios eliminates the unsystematic risk and minimizes the Errors in Variable (EIV) problem. This EIV problem arises due to use of beta estimates rather than using true betas. Fama & MacBeth (1973) and Chen et al. (1986) suggest that to reduce EIV and to mitigate the noise in individual stock returns, stocks should be grouped in portfolios. When stocks are grouped into portfolios, the errors in stock returns are likely to cancel each other and aggregate affect becomes negligible.

Portfolio formation method involves three core steps:

1. Sorting of the securities on basis of specific characteristics
2. Portfolio formation on the basis of common attributes.
3. Explain factor from above portfolios

To construct size based portfolios, market capitalization of each stock is calculated at the end of June for year t-1 and then stocks are arranged in descending order. On the basis of observed median,

sample is divided into two size sorted portfolios. Portfolio comprising stocks below the median are categorized as "Small" and the portfolio comprising stocks above median is named as "Big".

These size sorted portfolios are further divided into two equally weighted sub portfolios on the basis of book-to-market ratio. Small portfolio constitutes two sub portfolios names S/H and S/L (Small high and small low). Similarly, "Big" portfolio further forms two portfolios namely B/H and B/L (Big high, big median and big low). By splitting these portfolios further on the basis of institutional ownership results in formation of following portfolios S/H/HO, S/H/LO, S/L/HO, S/L/LO, B/H/HO, B/H/LO, B/L/HO, and B/L/LO. Given that size, value and institutional ownership portfolios are formed one year lagged period to analyze information is priced in returns of next year. Where, Institutional Ownership concentration is measured as:

$$INSH = \frac{\text{Shares owned by Institutions, Investment Companies \& Foreign Investors}}{\text{Total Number of Shares Outstanding}} * 100$$

Companies are further ranked on the basis of institutional holding and portfolios are formed as high institutional ownership and low institutional ownership portfolios.

Factor Construction

To compute the factor specific premium, three factors are constructed as zero-investment portfolios from twelve sub portfolios. The approach employed for construction of size, value and ownership premium factor is same as used by Fama& French (1992).

SMB=1/4*(S/H/HO-B/H/HO)+(S/H/LO-B/H/LO)+(S/L/HO-B/L/HO)+(S/L/LO-B/L/LO)

HML=1/4*(S/H/HO-S/L/HO)+(S/H/LO-S/L/LO)+(B/H/HO-B/L/HO)+(B/H/LO-B/L/LO)

INSH=1/4*(S/H/HO-S/H/LO)+(S/L/HO-S/L/LO)+(B/H/HO-B/H/LO)+(B/L/HO-B/L/LO)

Where,

SMB (Small minus Big) =Size premium

HML (High book-to-market minus Low book-to-market) =Value premium

INSH (High institutional ownership minus low institutional ownership) =Ownership premium

Following multi factor model is suggested for empirical testing.

$$R_{pt} - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 INSH + \varepsilon_t \ldots (1)$$

Where:

R_{pt} = the return of portfolio "P" at time "t"

R_{ft}= risk free rate

MKT = $(R_{mt} - R_{ft})$

SMB=difference between return of small size portfolio minus return of big size portfolio

HML= return of high BE/ME ratio portfolio minus return of low BE/ME ratio portfolio

INSH= return of high institutional ownership portfolio minus return of low institutional ownership portfolio

βi=Factor betas or factor loadings

$\varepsilon_{t=}$ the residual/error term

Portfolio Returns

Following the methodology of Chen et al. (1986), portfolio returns are computed as equally weightedaverage monthly returns of stock in each portfolio.

$$R_p = \sum_{i=1}^{N} W_i R_i \ldots\ldots\ldots\ldots (2)$$

Where, W_i represents the weight of each stock in portfolio and R_p is average return of portfolio.

Fama-MacBeth (1973) Procedure

Majority of the empirical tests on CAPM follow the methodology pioneered by Fama & MacBeth (1973), and hereinafter, referred to as the "traditional approach." Under this method, the data

set is divided into two: the estimation and the testing periods. In the estimation period, the beta is estimated by running a regression of realized returns of an asset against market returns. Then proxy for the true beta of the asset and is regressed against the excess return of the asset. Generally, this regression takes the following form:

Pass 1:First Pass Estimation of Factor Beta Coefficients

$$R_{pt} - R_{fit} = \alpha + \beta_i \sum X_i + \varepsilon_{it} \text{ ..... (3)}$$

Above stated equation yields the estimates of betas of portfolio returns to firm specific characteristics. This equation merely relates portfolio returns to estimated exposures (betas) and do not have future return predictive ability (Cochrane, 2001).

Pass 2: Estimation of Factor Risk Premia

Suppose, length of Fama & Macbeth rolling window is Ƭ and F_t is the transpose of the sub-matrix comprising columns t- Ƭ+1 to t of the factor observations. In essence,

$$Ft = [ft + 1, \ldots \ldots . ft \quad \text{..... (4)}$$

Let R_t and Ω_t be the corresponding columns of R and Ω. Estimates of first pass regression are as follows:

$$\hat{\beta} = \left(F_t{}' F\right)^{-1} F_t{}' R_t \text{ ..... (5)}$$

Any return vector r_s is dependent variable in cross-sectional regression for a disjoint period t+1. The regression can be written as:

$$E\left(R_p - R_f\right) = \gamma_o + \gamma_1 \beta_i + \varepsilon_{it} \text{ ..... (6)}$$

Where betas, excess returns, and residual variances (unique risks), are obtained from the first-pass regressions. Fame & MacBeth standard procedure of two pass regression focuses on estimating the magnitude of risk premium associated with each risk factor. Once betas are estimated through first pass estimation, these coefficients are further used to explain the cross section of realized stock returns

in each month of sample period (i.e. betas are estimated for first 36 month (2002-2005) and testing period starts from 2006). Betas obtained for estimation period become independent variables to explain portfolio returns. Sandaker (2010) argues that these cross sectional regressions provide a way to test how company specific characteristics affect equity returns for a specified time period.

Empirical Results

Descriptive Statistics

Table 2 describes the summery statistics of monthly returns of 21 stylized portfolios are formed on the basis of size, value and Institutional ownership concentration of 187 listed companies at Karachi stock exchange.

Table 2. *Descriptive Statistics*

Portfolio	Mean	Standard Deviation	Minimum	Maximum
P	0.0037	0.0062	-0.1660	0.1611
S	0.0033	0.0072	-0.1850	0.3481
B	0.0048	0.0084	-0.3838	0.4252
S/H	0.0078	0.0092	-0.2181	0.5674
S/M	0.0026	0.0072	-0.2151	0.3525
S/L	-0.0009	0.0070	-0.2712	0.1750
S/H/HO	0.0067	0.0087	-0.2244	0.2337
S/H/LO	0.0082	0.0118	-0.2528	0.9010
S/L/HO	0.0001	0.0091	-0.3955	0.2760
S/L/LO	0.0017	0.0077	-0.2313	0.2344
B/H	0.0008	0.0076	-0.2203	0.2324
B/L	0.0037	0.0095	-0.6931	0.3676
B/H/HO	0.0001	0.0091	-0.3233	0.3257
B/H/LO	0.0016	0.0076	-0.1662	0.1558
B/L/HO	0.0048	0.0108	-0.6933	0.6769
B/L/LO	0.0026	0.0096	-0.6928	0.1735

Results of table 2 indicate portfolio of companies with large capitalization (B) yield more return as compare to companies with small capitalization (S) which contradicts traditional size anomaly which assets that companies with small capitalization are perceived as more riskier by investors due to their high exposure to macro economic shocks and hence more return is required by investors investing in such companies. As we move towards more stylized portfolios of small capitalization and high and low book to market (S/H, S/L), value affect becomes evident and average returns of high book to market portfolios are greater than low book to market companies and even portfolio with small size and low book to market companies yields negative average return. When these portfolios are further sorted on the basis of their institutional ownership holding, more stylized sub portfolios are formed with high and low institutional ownership. Results reported in table 2, reveal companies with low institutional holding are perceived as more risky by investors and ownership premium is priced in returns of equity market. It is also observed that returns of the portfolios with small capitalization, high book to market and high institutional ownership (S/H/HO) yield low returns as compare to portfolios with small capitalization, high book to market and low institutional holding (S/H/LO). On the other hand, portfolios formed on the basis of small capitalization and low book to market ratio and ownership structures, portfolios with high book to market stocks (S/L/HO) outperform low book to market portfolios (S/L/LO). Standard deviation of all small size sorted portfolios support high risk high return hypothesis.

Results indicate that size effect is more dominant in portfolios of firm with small capitalization.

On the contrary, descriptive statistics of large capitalization firms, it is evident from those Portfolios of large capitalization and high book to market firms (B/H) outperform portfolios with large capitalization and low book to market portfolios (B/L). So, Value effect is more rampant in portfolios with large capitalization. When these large capitalization firms are further sorted on the basis of institutional holding, it is observed that portfolios of companies with low institutional ownership and large capitalization (B/H/LO and B/L/LO) earn more returns as compare to firms with high institutional holding (B/H/HO and B/L/HO). The reason might be low trading frequency of institutional investors as they hold investments for longer period of time. As literature indicates institutional trading cost is positively associated with high trading frequency and negatively associated with stock liquidity (Chordia & Tong, 2013).

First Pass Regression Results

Table 3 show the regression results for CAPM, 3 FF Model & Proposed four factor model for each portfolio for the sample period June 2002 to June 2012. Where, R_m-RFR is the return difference between value weighted KSE index and one month treasury bill rate, SMB (Small minus Big) is the size factor, HML (high book to market minus low book to market) is the value factor and INSH (High institutional ownership minus low institutional ownership) is the ownership factor.. Significance of all factors has been checked at 5% level.

Table 3. *First Pass Regression Results*

Portf.			Intercept	MKT	SMB	HML	INSH	Adj. R^2
	CAPM	*t-values*	-1.39	6.22			0.26	
		B	-0.01	0.45				
	3FF	*t-values*	-2.24	10.49	8.51	-0.50	0.64	
S		B	-0.01	0.59	0.54	-0.05		
	4Factor Model	*t-values*	-2.50	11.06	9.43	-0.03	3.35	0.67
		B	-0.01	0.60	0.65	0.00	0.42	
	CAPM	*t-values*	-1.55	9.38			0.44	
		B	-0.01	0.69				
B	3FF	*t-values*	-1.95	9.69	-8.28	0.19	0.72	
		B	-0.01	0.56	-0.53	0.02		
	4Factor Model	*t-values*	-2.22	10.34	-5.89	0.75	3.71	0.75
		B	-0.01	0.56	-0.41	0.07	0.46	
	CAPM	*t-values*	-0.64	5.82			0.23	
		B	-0.01	0.55				
	3FF	*t-values*	-1.30	9.45	6.67	4.62	0.71	
S/H		B	-0.01	0.61	0.49	0.49		
	4Factor Model	*t-values*	-1.47	9.83	7.43	5.15	2.88	0.72
		B	-0.01	0.62	0.60	0.54	0.42	
	CAPM	*t-values*	-1.93	5.39			0.20	
		B	-0.01	0.40				
	3FF	*t-values*	-2.55	9.06	7.45	-5.08	0.47	
S/L		B	-0.01	0.61	0.56	-0.56		
	4Factor Model	*t-values*	-2.74	9.37	7.97	-4.77	2.62	0.50
		B	-0.01	0.61	0.67	-0.52	0.39	
	CAPM	*t-values*	-3.00	13.32			0.62	
		B	-0.01	0.73				
	3FF	*t-values*	-3.05	11.16	-3.44	2.02	0.66	
B/H		B	-0.01	0.65	-0.23	0.19		

	4Factor Model	*t-values*	-3.30	11.66	-1.66	2.52	3.04	0.68
		B	-0.01	0.66	-0.12	0.24	0.39	
	CAPM	*t-values*	-1.30	6.92				0.31
		B	-0.01	0.64				
	3FF	*t-values*	-2.04	10.11	-7.88	-5.34		0.79
B/L		B	-0.01	0.58	-0.51	-0.50		
	4Factor Model	*t-values*	-2.29	10.69	-5.60	-5.04	3.43	0.81
		B	-0.01	0.58	-0.39	-0.46	0.43	
	CAPM	*t-values*	-0.96	7.14				0.32
		B	-0.01	0.60				
	3FF	*t-values*	-1.11	7.08	1.88	1.89		0.41
S/H/ HO		B	-0.01	0.62	0.18	0.27		
	4Factor Model	*t-values*	-1.47	8.02	4.33	2.85	5.16	0.53
		B	-0.01	0.63	0.43	0.37	0.93	
	CAPM	*t-values*	-0.36	3.65				0.10
		B	0.00	0.48				
	3FF	*t-values*	-0.92	5.63	4.69	9.01		0.74
S/H/ LO		B	-0.01	0.44	0.41	1.16		
	4Factor Model	*t-values*	-0.91	5.60	4.06	8.86	-0.07	0.74
		B	-0.01	0.44	0.41	1.16	-0.01	
	CAPM	*t-values*	-1.17	3.05				0.10
		B	-0.01	0.31				
	3FF	*t-values*	-1.99	8.26	10.94	-5.99		0.56
S/L/ HO		B	-0.01	0.65	0.96	-0.77		
	4Factor Model	*t-values*	-2.27	8.83	11.96	-5.73	3.73	0.61
		B	-0.01	0.65	1.13	-0.70	0.63	
	CAPM	*t-values*	-1.51	5.77				0.23
		B	-0.01	0.46				
	3FF	*t-values*	-0.01	0.56	0.20	-0.41		0.27
S/L/		B	0.12	0.00	0.04	0.01		

LO	4Factor Model	*t-values*	-1.63	6.51	2.30	-2.68	1.06	0.28	
		B	-0.01	0.56	0.26	-0.38	0.21		
	CAPM	*t-values*	-2.44	10.75				0.52	
		B	-0.02	0.81					
	3FF	*t-values*	-2.67	9.60	-5.16	0.71		0.64	
B/H/HO		B	-0.01	0.69	-0.42	0.08			
	4Factor Model	*t-values*	-3.16	10.69	-2.64	1.49	4.85	0.70	
		B	-0.02	0.70	-0.22	0.16	0.73		
	CAPM	*t-values*	-2.36	10.56				0.51	
		B	-0.01	0.66					
	3FF	*t-values*	-2.46	9.19	-0.47	2.76		0.54	
B/H/LO		B	-0.01	0.62	-0.04	0.30			
	4Factor Model	*t-values*	-2.47	9.15	-0.22	2.78	0.39	0.54	
		B	-0.01	0.62	-0.02	0.31	0.06		
	CAPM	*t-values*	-0.87	5.05					0.19
		B	-0.01	0.58					
	3FF	*t-values*	-1.14	5.30	-9.51	-1.77			0.71
B/L/HO		B	-0.01	0.40	-0.81	-0.22			
	4Factor Model	*t-values*	-1.62	6.35	-6.71	-1.11		6.35	0.79
		B	-0.01	0.41	-0.56	-0.12		0.95	
	CAPM	*t-values*	-1.58	7.91					0.37
		B	-0.01	0.71					
	3FF	*t-values*	-2.27	11.66	-2.78	-7.36			0.73
B/L/ LO		B	-0.01	0.76	-0.20	-0.78			
	4Factor Model	*t-values*	-2.24	11.61	-2.70	-7.34		-0.57	0.73
		B	-0.01	0.75	-0.23	-0.79		-0.09	

Empirical results evidence a positive and significant relationship for MKT in explaining portfolio returns of Small Capitalization firms' portfolio S, positive and significant relationship for MKT has been found, with t-stat of 6.2215 and the value of Adj.

R^2 is 0.26 for 1 factor model. When SMB is added and has been regressed along MKT, SMB is found to have a positive significant impact on portfolio returns with t-stat of 10.6422, and the Adj. R^2 of two factor model has increased to 0.64, which evidence the existence of SMB in explaining portfolio returns. Next HML is added and regressed along with MKT and SMB. Results indicate an insignificant relationship with portfolio returns with t-stat of -0.5030, the value of Adj. R^2 for three factor model has not changed. Lastly INSH has been added to the equation and the results indicate a positive significant impact with t-stat value of 3.3523 and the Adj. R^2 of four factor model has increased to 0.67.

For dependent variable B (Portfolio comprising large capitalization firms), positive and significant relationship for MKT has been found, with t-stat of 9.3824 and the value of Adj. R^2 is 0.44 for 1 factor model. When SMB is added and has been regressed along MKT, SMB is found to have a negative significant impact on portfolio returns with t-stat of -10.609, and the Adj. R^2 of two factor model has increased to 0.73, which again shows the existence of SMB in explaining portfolio returns. Then HML is added and regressed along with MKT and SMB. Results indicate an insignificant relationship with portfolio returns with t-stat of 0.1920, the value of Adj. R^2 for three factor model has decreased to 0.72. Lastly INSH has been added to the equation and the results indicate a positive significant impact with t-stat value of 3.7096 and the value of Adj. R^2 for four factor model has increased to 0.75.

With dependent variable S/H (Portfolio comprising small capitalization and high book-to-market firms), MKT is found to have positive and significant relationship with t-stat of 5.8186 and the

value of Adj. R^2 is 0.23 for 1 factor model. When SMB is added and has been regressed along MKT, SMB is found to have a positive significant impact on portfolio returns with t-stat of 11.3799, and the Adj. R^2 of two factor model has increased to 0.65, which shows market prices SMB. Then HML is added and regressed along with MKT and SMB. Results indicate a positive significant relationship with portfolio returns with t-stat of 4.6158, the value of Adj. R^2 for three factor model has increased to 0.71. Lastly INSH has been added to the equation and the results indicate a positive significant impact with t-stat value of 2.8788 and the value of Adj. R^2 for four factor model has increased to 0.72.

With dependent variable S/L (Portfolio of small capitalization and low book-to-market firms), MKT is found to have positive and significant relationship with t-stat of 5.3942 and the value of Adj. R^2 is 0.20 for 1 factor model. When SMB is added and has been regressed along MKT, SMB is found to have a positive significant impact on portfolio returns with t-stat of 4.9220, and the Adj. R^2 of two factor model has increased to 0.35. Then HML is added and regressed along with MKT and SMB. Results indicate a negative significant relationship with portfolio returns with t-stat of -5.0771, the value of Adj. R^2 for three factor model is 0.47. Lastly INSH has been added to the equation and the results indicate a positive significant impact with t-stat value of 2.6217and the value of Adj. R^2 for four factor model has increased to 0.50.

When S/H/HO (Portfolio comprising small capitalization, high book-to-market and high institutional ownership firms) is taken as dependent variable, MKT is found to have positive and significant relationship with t-stat of 7.1434 and the value of Adj. R^2 is 0.32 for

1 factor model. When SMB is added and has been regressed along MKT, SMB is found to have a positive significant impact on portfolio returns with t-stat of 3.9346, and the Adj. R^2 of two factor model has increased to 0.40. Then HML is added and regressed along with MKT and SMB. Results indicate a positive insignificant relationship with portfolio returns with t-stat of 1.8899, the value of Adj. R^2 for three factor model is 0.41. Lastly INSH has been added to the equation and the results indicate a positive significant impact with t-stat value of 5.1648 and the value of Adj. R^2 for four factor model has increased to 0.53.

Then S/H/LO (Portfolio comprising small capitalization, high book-to-market and low institutional ownership firms) is taken as dependent variable and MKT as an independent, the regression results show MKT has a positive and significant relationship with t-stat of 3.6549 and the value of Adj. R^2 is 0.10 for 1 factor model. When SMB is added and has been regressed along MKT, SMB is found to have a positive significant impact on portfolio returns with t-stat of 10.1545, and the Adj. R^2 of two factor model has increased to 0.54. Then HML is added and regressed along with MKT and SMB. Results indicate a positive significant relationship with portfolio returns with t-stat of 9.0118, the value of Adj. R^2 for three factor model is 0.74. Lastly when INSH has been added to the equation and the results indicate a negative insignificant impact with t-stat value of -0.0652 and the value of Adj. R^2 for four factors model is 0.74.

Next S/L/HO (Portfolio comprising small capitalization, low book-to-market and high institutional ownership firms) has been used as dependent variable and first of all MKT is taken as an independent variable, results indicate that MKT has been found to have positive

and significant relationship with t- stat value of 3.0472 and the value of Adj. R^2 is 0.072 for 1 factor model. When SMB is added and has been regressed along MKT, SMB is found to have a positive significant impact on portfolio returns with t-stat of 8.0003, and the Adj. R^2 of two factor model has increased to 0.42. Then HML is added and regressed along with MKT and SMB. Results indicate a negative significant relationship with portfolio returns with t-stat of -5.9896, the value of Adj. R^2 for three factor model is 0.56. Lastly when INSH has been added to the equation and the results indicate a positive significant impact with t-stat value of 3.7981 and the Adj. R^2 of four factor model is 0.61.

S/L/LO (Portfolio comprising small capitalization, low book-to-market and low institutional ownership firms) has been used as dependent variable next and first of all MKT is taken as an independent variable, regression results indicate that MKT has been found to have positive and significant relationship with t- stat value of 5.7663 and the value of Adj. R^2 is 0.23 for 1 factor model. When SMB is added and has been regressed along MKT, SMB is found to have a positive insignificant impact on portfolio returns with t-stat of 0.2755, and the Adj. R^2 of two factor model has decreased to 0.22. Then HML is added and regressed along with MKT and SMB. Results indicate a negative significant relationship with portfolio returns with t-stat of -2.8670, the value of Adj. R^2 for three factor model is 0.27. Lastly when INSH has been added to the equation and the results indicate a positive insignificant impact with t-stat value of 1.0577 and the Adj. R^2 of four factor model is 0.28.

Next B/H (Portfolio comprising large capitalization and high book-to-market firms) has been used as dependent variable and first

of all MKT is taken as an independent variable, results indicate that MKT has been found to have positive and significant relationship with t- stat value of 13.3160 and the value of Adj. R^2 is 0.62 for 1 factor model. When SMB is added and has been regressed along MKT, SMB is found to have a positive significant impact on portfolio returns with t-stat of -2.7532, and the Adj. R^2 of two factor model has increased to 0.65. Then HML is added and regressed along with MKT and SMB. Results indicate a positive significant relationship with portfolio returns with t-stat of 2.0199, the value of Adj. R^2 for three factor model is 0.66. Lastly when INSH has been added to the equation and the results indicate a positive significant impact with t-stat value of 3.0435 and the Adj. R^2 of four factor model is 0.68.

B/L (Portfolio comprising large capitalization and low book-to-market firms) has been used as dependent variable next and first of all MKT is taken as an independent variable, regression results indicate that MKT has been found to have positive and significant relationship with t- stat value of 6.9202 and the value of Adj. R^2 is 0.31 for 1 factor model. When SMB is added and has been regressed along MKT, SMB is found to have a negative significant impact on portfolio returns with t-stat of -12.9925, and the Adj. R^2 of two factor model has decreased to 0.73. Then HML is added and regressed along with MKT and SMB. Results indicate a negative significant relationship with portfolio returns with t-stat of -5.3367, the value of Adj. R^2 for three factor model is 0.79. Lastly when INSH has been added to the equation and the results indicate a positive significant impact with t-stat value of 3.4331 and the Adj. R^2 of four factor model is 0.81.

For returns of portfolio B/H/HO (Portfolio comprising large capitalization, high book-to-market and high institutional ownership firms), positive and significant relationship for MKT has been found, with t-stat of 10.7535 and the value of Adj. R^2 is 0.52 for 1 factor model. When SMB is added and has been regressed along MKT, SMB is found to have a negative significant impact on portfolio returns with t-stat of -6.1101, and the Adj. R^2 of two factor model has increased to 0.64, which evidence the existence of SMB in explaining portfolio returns. Next HML is added and regressed along with MKT and SMB. Results indicate a positive insignificant relationship with portfolio returns with t-stat of 0.7121, the value of Adj. R^2 for three factors model has not changed. Lastly INSH has been added to the equation and the results indicate a positive significant impact with t-stat value of 4.8544 and the Adj. R^2 of four factor model has increased to 0.70.

B/H/LO (Portfolio comprising large capitalization, high book-to-market and low institutional ownership firms) has been used as dependent variable next and first of all MKT is taken as an independent variable, regression results indicate that MKT has been found to have positive and significant relationship with t- stat value of 10.5563 and the value of Adj. R^2 is 0.51 for 1 factor model. When SMB is added and has been regressed along MKT, SMB is found to have a positive insignificant impact on portfolio returns with t-stat of 1.6193, and the Adj. R^2 of two factor model has changed to 0.52. Then HML is added and regressed along with MKT and SMB. Results indicate a positive significant relationship with portfolio returns with t-stat of 2.7641, the value of Adj. R^2 for three factor model is 0.54. Lastly when INSH has been added to the equation and

the results indicate a positive insignificant impact with t-stat value of 0.3881 and the Adj. R^2 of four factor model is 0.54.

With dependent variable B/L/HO (Portfolio comprising large capitalization, low book-to-market and high institutional ownership firms), MKT is found to have positive and significant relationship with t-stat of 5.0498 and the value of Adj. R^2 is 0.19 for 1 factor model. When SMB is added and has been regressed along MKT, SMB is found to have a negative significant impact on portfolio returns with t-stat of -13.6237, and the Adj. R^2 of two factor model has increased to 0.70, which shows market prices SMB. Then HML is added and regressed along with MKT and SMB. Results indicate a negative insignificant relationship with portfolio returns with t-stat of -1.7666, the value of Adj. R^2 for three factor model has increased to 0.71. Lastly INSH has been added to the equation and the results indicate a positive significant impact with t-stat value of 6.3488 and the Adj. R^2 of four factor model has increased to 0.79.

With dependent variable B/L/LO (Portfolio comprising large capitalization, low book-to-market and low institutional ownership firms), MKT is found to have positive and significant relationship with t-stat of 7.9071 and the value of Adj. R^2 is 0.37 for 1 factor model. When SMB is added and has been regressed along MKT, SMB is found to have a negative significant impact on portfolio returns with t-stat of -7.8641, and the Adj. R^2 of two factor model has increased to 0.60, which shows market prices SMB. Then HML is added and regressed along with MKT and SMB. Results indicate a negative significant relationship with portfolio returns with t-stat of -7.3625, the value of Adj. R^2 for three factor model has increased to 0.73. Lastly INSH has been added to the equation and the results

indicate a positive insignificant impact with t-stat value of 0.5681 and the Adj. R^2 of four factor model is 0.73.

Discussion

Empirical results show a positive and significant relationship for Market factor (MKT) in explaining portfolio returns for all sorted portfolios on the basis of market capitalization, book-to-market ratio and institutional ownership. It is concluded that there is no considerable difference between beta coefficients of MKT factor for these sub-sorted portfolios; thus, CAPM fails to explain size effect, Value effect & Ownership premium effect. When Fama & French (1992), Size and value factors are added as independent variable, predictive ability of the model increased.

The excess returns of size sorted portfolios are more for small firms as compare to large capitalization firms. It affirms presence of size premium and a negative and significant relationship between firm size and stock returns. These results are is in line with the finding of previous studies conducted on Pakistan's stock market (Hassan & Javed 2011). Book to market factor shows a positive and significant relationship with returns of portfolios of small and large capitalization firms. Coefficients are positive for high book to market portfolios and negative for low book to market portfolios, confirming the presence of value effect in Pakistan's equity market. Results show a positive and significant relationship between excess return of portfolios and book-to-market factor. These results are again in line with the vast majority of literature including Fama & French (1993), Carhart (1997), Wermers (2006), Hasan & Javed (2011), who found value effect positive significant for in explaining stock market returns. Result show strong ownership premium when ownership

premium factor is added to standard Fama& French three factor model (1992). As per findings of this study there is a positive and significant relationship between ownership premium and return of all sub-sorted portfolios. Above result indicate usefulness of ownership premium factor in explaining stock returns in Pakistan's stock market. It is concluded that Ownership exists in Pakistani equity market and is discounted by investors. Results are in line with the findings of previous studies (Sias & Titman (2006), Starks (2003), Gompers & Metrik (2001), Zheng (2004), who argue that institutional trading is positively correlated with subsequent returns. It can be concluded that institutional investors are better informed and information is incorporated in security prices when they trade.

Second Pass Regression Results

To test the predictive power of model for future returns, sample period is further sub-divided into estimation period and testing period. Betas are estimated for an initial testing period of 36 months (July 2002-June 2005) and then rolling betas are obtained for next over-lapping periods till June 2012. These betas have been used as a proxy for true betas or exposures and are regressed with all sub-sorted portfolios to test model's power to predict future returns. Table below describes the duration of estimation and testing periods to test the model.

Table 4. *Estimation and Testing period*

Description	Time periods
Initial beta estimation period	July 2002-June 2005
Testing period	July 2005- June 2012

Table 5 shows two pass regression results of four factors model for all size, book to market and ownership sorted portfolios.

Table 5. *Second Pass Regression Results*
(Significance of all factors checked at 5% level)

Portfolios		Intercept	MKT	SMB	HML	INSH	Adj. R^2
S	*t-values*	-2.37	1.70	1.57	0.69	-0.91	0.04
	β	-0.13	0.13	0.06	0.04	-0.04	
B	*t-values*	0.19	0.79	2.49	-1.10	-1.00	0.04
	β	0.01	0.07	0.09	-0.08	-0.04	
S/H	*t-values*	-0.85	0.48	2.28	-0.20	-2.14	0.07
	β	-0.09	0.06	0.13	-0.01	-0.11	
S/L	*t-values*	0.00	1.41	-0.68	2.12	0.29	0.03
	β	0.00	0.09	-0.03	0.11	0.01	
B/H	*t-values*	-2.45	0.99	2.14	1.82	0.51	0.05
	β	-0.13	0.08	0.12	0.10	0.04	
B/L	*t-values*	-1.70	1.38	3.35	-1.48	0.91	0.12
	β	-0.11	0.17	0.18	-0.11	0.06	
S/H/HO	*t-values*	-0.89	1.06	0.63	0.65	-1.05	0.00
	β	-0.10	0.16	0.05	0.04	-0.06	
S/H/LO	*t-values*	-1.28	0.05	0.54	1.51	0.48	-0.01
	β	-0.17	0.01	0.02	0.12	0.02	
S/L/HO	*t-values*	1.04	-0.55	0.71	3.06	0.07	0.11
	β	0.05	-0.03	0.02	0.13	0.00	
S/L/LO	*t-values*	0.11	-0.18	-0.19	0.16	0.22	-0.05
	β	0.01	-0.02	-0.01	0.01	0.01	
B/H/HO	β	-0.34	-0.31	0.84	0.11	0.63	-0.02
	t-values	-0.03	-0.05	0.04	0.01	0.07	
B/H/LO	β	-2.84	2.30	2.87	1.76	0.62	0.07
	t-values	-0.12	0.13	0.23	0.09	0.03	
B/L/HO	β	-1.19	0.74	3.78	-2.03	2.94	0.16
	β	-0.08	0.10	0.20	-0.13	0.14	
B/L/LO	*t-values*	-1.31	1.02	1.43	-0.29	-0.16	0.01
	β	-0.10	0.11	0.08	-0.02	-0.01	

Fama & Macbeth (1973) procedure has been used, where the factor betas are estimated by time series linear regression of portfolio return on a set of common factors. Then, factor risk prices are estimated by cross sectional regression of mean returns on betas. Purpose is to evaluate the significance of firm specific factor in the second stage ordinary least square (OLS). Results reveal four factor model fails to explain relationship between MKT premium, size premium, value premium, ownership premium and future stock returns during testing period. R^2 show weal explanatory power of the model. Hence, no significant relationship exists between portfolio betas and systematic risk premiums for factor model. As, all the coefficients for four factors are statistically insignificant except few coefficients which show significant size premiums. Hence, size effect to a little extent is useful in forecasting future returns.

Conclusion

Our study has several implications for both investors and researchers and opens new avenues to study asset pricing dynamics of Pakistan's Stock Market. This study supports the well documented findings that institutional investors are well informed and they outperform retail investors. Findings of this study provide a new perspective to existing body of literature from both empirical and theoretical standpoint.

We find that relationship between expected average return and the prescribed risk factors is monotonically increasing as we go into more stylized portfolios. This pattern persists independently within the sub portfolios formed on the basis of size, book to market and institutional ownership concentration. Most importantly, spread between the average returns of high institutional ownership and low

institutional ownership portfolios is not accounted for by Fama & French (1992) three factor model. Since all portfolios are formed on the basis of past information hence, we conclude that institutional ownership concentration is well-built predictor of future returns.

This paper interlinks the three different strands of existing literature on asset pricing. Primarily, this study adds to the vast body of knowledge on the relationship between institutional ownership and stock return and pin points another asset pricing anomaly that prevails in equity market of Pakistan.

We also show that cross sectional return differences cannot be explained with risk factors prescribed by traditional asset pricing models. Here, element of the interest remained firm specific characteristics of the firm with special focus on ownership structure that is deep rooted in explaining cross sectional return differences.

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