Role of Size, Value and Financial Distress Factors in Banking Stock Returns:

An Empirical Analysis of Banking Sector of Pakistan

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CERTIFICATE

This is to certify that this thesis entitled: **"Role of Size, Value and Financial Distress Factors in Banking Stock Returns: An Empirical Analysis of Banking Sector of Pakistan"** submitted by Mr. Fahim Ullah Khan is accepted in its present form by the Department of Business Studies, Pakistan Institute of Development Economics (PIDE), Islamabad as satisfying the requirements for partial fulfillment of the degree of **Master of Science in Management Sciences**.

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Dedication

I am dedicating this research work to all my family members and especially beloved brother ***Mr. Imran Ullah Khan*** *who help me in every possible way for my successful future. Without your help, patience and confidence in me, I was not able to complete this whole journey. I love you*

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Abstract

The study attempts to explore the relationship among size premium, value premium, financial distress premium and banking stock return. To achieve the empirical results Fama and French (1992, 1993) methodology is used by employing data of all commercial banks listed at PSX from 2008 to 2018. Our finding suggests that size, value and financial distress premium are priced by Pakistani financial market. As stated variables exist in Pakistan financial market so, investors should consider these factors while devising decisions concerning investment and financing. This study also examine factor based model and characteristic based model in Pakistan financial market.

Key word: Financial distress Premium, Size Premium, Value premium, Characteristics Model, Factor model, Banking Sector.

Table of Contents

List of Tables

List of abbreviations

P	Portfolio of all stocks
S	Portfolio having small size (market capitalization)
B	Portfolio having big size (market capitalization)
S/L	Portfolio having small size and low book to market ratio
S/H	Portfolio having small size and high book to market ratio
B/L	Portfolio having big size and low book to market ratio
B/H	Portfolio having big size and high book to market ratio
HR	Portfolio having high financial distress
LR	Portfolio having low financial distress
SMB	Small minus big
HML	High minus low
HRMLR	High risk minus low risk
BE/ME	Book to market value of equity ratio
E/P	Earning price ratio
PI	Performance Index

Chapter No 1

Introduction

Financial institutions play a significant role in the development of financial markets in any country. The development of this sector is always a debatable topic in the financial literature. Historical experience is evident that whenever the financial system collapse it will create panic in the overall economic condition of the country. From the last couple of decades, the financial distress of financial institutions is a major concern of policymakers which affects the performance of other sectors as well as the returns of the financial institutions.

The high book to market (BE/ME)[1] ratio has low power to predict the firm future earnings and it is hypothesized that it captures the financial distress risk which is priced by the equity returns (Fama & French, 1995). Further studies measure the financial distress risk to predict the excess return in comparison to the BE/ME ratio (Griffin & Lemmon, 2002 and Campbell Szilagyi & Hilscher, 2005). The results confirm the anomalous behavior of financial distress risk.

Financial distress risk is referred to a business condition where a firm is unable to pay its debt or credit obligation till maturity. This situation may be temporary and in some cases, companies do not meet these obligations in the long run. It is considered to be a crucial phase for the businesses and lead towards bankruptcy. The main parties who will suffer from financial distress risk are financial institutions and capital providers (i.e. shareholders and bondholders).

[1] Boot to market ratio reflects the difference between book value of common equity reported by financial statements under GAAP and what market assesses to be the economic value of common equity. High book to market ratio stocks referred to undervalued while low ratio referred to overvalued stocks.

Financial distress risk is a systematic risk as this is within the system of companies and cannot be avoided (Chen & Zhang, 1988).

Financial distress risk is frequently invoked to justify the existence of "anomalous" cross-sectional properties of equity returns such as the size effect and the value premium. A risk-based explanation suggests that due to the riskiness of stocks those who are in high financial distress will earn a high return in the future. In case of behavioral explanation, the misevaluation of stocks doesn't earn a high return from distressed firms but stock prices move towards their mean return in future and arbitrage can be captured (Dichev, 1998; Campbell, Hilscher & Szilagyi, 2011). Eisdorfer, Goyal, and Zhdanov (2018) find out that financial distress risk is stronger in markets that have easy access to low financing, comparatively harder takeover legislation, transparency of information and relatively lower barriers to arbitrage.

The study also focuses to check the impact of size and value premium on banking stock returns. The fundamental commitments are confirmation on behalf of size-sorted portfolios. Furthermore the study stands to look at how well each stock catch normal return for portfolios formed on the basis of size and boot to market ratio. Banks having small market capitalization get high returns as compared to large banks (Gandhi and Lusting 2015). It is because small banks have high risk as compared to large banks. When there are the chances of financial crises then the gap of expected earning on the stock between small cap banks and large cap bank also increases. It is due to the risk management like government guarantees and put options, which basically allow stockholders of large banks that can only be exercised after large failures in a wide stocks index. These factors basically reduce the negative risk of large cap banks stock returns but the factor exists in small cap banks. Value premium is defined as book to market (BE/ME) ratio of the firm.

The BE/ME ratio derives undervalued or overvalued stocks by comparing or taking the ratio of book value of equity to its market value. The BE/ME ratio effect is more likely the most governed and widely used impacts in financial markets. When the BE/ME ratio is higher its mean the targeted firm is cheap and performing not better than those having low book to market ratio.

Financial institutions are mostly excluded from asset pricing analysis because of their high leverage that is normal for these firms probably does not have the same meaning as for non-financial firms, where high leverage more likely indicates financial distress (Fama & French,1992). The exclusion of the financial firms can be questioned both on theoretical and empirical grounds. The theoretical structure originally developed by Modigliani and Miller (1963) demonstrates that leverage can change the risk (beta) profile of a firm but it does not invalidate the central principles of the capital asset pricing model (CAPM). In this sense, it would be more desirable if the pricing model is generally applied rather than restricted to non-financial firms. On empirical grounds, Barber and Lyon (1997) have revealed that size and value proxies could be significant predictors of cross-sectional returns of financial firms and that there are no significant differences between financial and non-financial firms in their exposure to this factors.

In this study financial distress risk factor is incorporated as an additional factor in Fama and French three factor model to check cross sectional variation in return for banking stocks in Pakistan. This study also contribute to check the impact of size and value premium on banking stock return in Pakistan. Also performance of both factor based model and characteristics based model are examined.

1.1 Problem statement

Small size banks often show lower financial flexibility and are highly sensitive to business risk (operational and financial risk) conditions as compared to large size banks which results in an increase of risk for small. Also, banking stocks having a high BE/ME ratio are suspected to be stocks with distressed characteristics and it would be rational to demand a premium for investment in such stocks. Financially distressed stocks earn lower average returns than financially un-distressed stocks known as the "financial distress puzzle, which proves to be a challenge to rational asset pricing. Still today many risk factors are identified by the researchers and many other yet to be discovered but out of them all only few are significantly responsible in explaining the risk and return relationship[2]. This study will address from an investor point of view that how different risk factors i.e. size, value and financial distress effect banking stocks returns in Pakistan.

1.2 Research Questions

The study tries to answers the following questions.

1. Does size premium explain banking returns in Pakistan?
2. What is the effect of value premium on banking returns in Pakistan?
3. Whether financial distress premium can be the additional factor in asset pricing framework for banking stocks?
4. Whether a portfolio formed based on beta base model assume lower risk or portfolio formed on the characteristic model assumes lower risk?

[2] Maiti, M. (2019). *A Critical Review On Evolution Of Risk Factors And Factor Models*. *Journal of Economic Surveys*.

1.3 Objectives of the study

Following are the main objectives of the study

1. To examine three factor model for banking stocks in Pakistan.
2. To explore the effect of a financial distress premium as an additional variable in the Fama and French model.
3. To examine the performance of characteristics based model and factor-based model for banking returns in Pakistan.

1.4 Significance of the study

Small size banks are inherently riskier than large sizes due to differences in their operating, financial and liquidity risk characteristics. It has been empirically shown that small bank stocks are less liquid and more neglected by institutional investors and security analysts (Amihud & Mendelson , 1986; Edmister & James, 1983; Arbel, Carvell & Strebel , 1983). Small banks are expected to be operationally riskier compared to large banks. Small size banks have low operating profitability (as revealed by their low operating profit ratio) and higher financial leverage (Debt-equity ratio). Moreover small sizes banks are highly distressed as shown by their high BE/ME ratio.

The financial distress risk is the source of systematic risk. Systematic risk factor such as size, BE/ME ratio and financial distress risk contribute to price financial asset and estimate their expected return. Mselmi, Hamza, Lahiani and Shahbaz (2019) argue that financial distress factor is significantly priced only in the absence of the size and book to market ratio. Financial distress risk is a priced systematic risk and SMB and HML include important information related to financial distress risk and hence are proxies for the financial distress risk (Vassalou & Xing, 2004).

The stability of banking sector is very essential for achieving sustainable economic growth and development of any economy. However, banking industry due to its central part in the economy accounts for achieving socio economic development of the country (Brown, 2003; Safiullah, 2010). Apparently due to the dominance and central role of banking industry in the financial system the risk of collapse to the financial system is ever more dependent on the working process of banking industry, especially where the dominance of banking industry in the overall economy has reached up to 70-80 percent (Swamy, 2014). Looking into the scenario of businesses today the enhancing uncertainty scenario takes away the surety of existence from firms. Perhaps to be sure of the longevity of the firm becomes the prime issue of concern by all the business houses. The viability of banks holds prime importance as it relates to financial investments, funding, capacity building and expansion by investing back profits.

The findings of the study has contribute significantly to different perspectives. This study will facilitate fund managers, investors and corporate managers to manage their portfolios and asset valuation. This study will be meaningful for pricing decisions and the determination of the fair value of securities. This study will also facilitate investor's inefficient resource allocation and decisions regarding investments and financing. This study will provide insight to investors about risk model performance while making investment decisions in the context of the Pakistan financial market. This study will contribute to the size, value and financial distress risk factors literature for emerging markets.

1.5 Research Gap

As per the knowledge of author(s) there is no study done as off today in the context of Pakistan that critically evaluates evolution of risk factors and factor models for banking sector.

This is the first study that will investigates the size premium, value premium and financial distress premium in the banking sector of Pakistan. In this study, financial distress factor is added as an additional factor to check its impact on banking stock returns. This study also contributes to examine both factor-based model and characteristics based model in the financial sector of Pakistan in terms of risk. This research provides a gateway to future researchers in the new domain.

1.6 Organization of the study

The rest of the study is organized as follows.

Introduction of the study is included in Chapter No 1. The literature review base on empirical findings are described in Chapter No 2. The data description and methodology used in the study are comprised in chapter No 3. Results analysis and discussions are summarized in Chapter No 4. Conclusion, recommendation, and directions for future research are included in chapter No 5

Chapter No 2

Literature review

3.1 Theoretical background

3.1.1 Modern portfolio theory (MPT)

Modern portfolio theory is presented by Markowitz (1952) and identified systematic risk with the idea of diversification "do not put all your eggs in one basket". The risk associated with any asset/security is minimized by following diversification and only risk left is systematic that is common among all securities. A set of portfolios that offer higher returns for a given level of risk or assumed the lower risk for a given level of return is known as efficient portfolios. The message given by the theory is the selection of such a portfolio to minimize risk and earn higher return. The theory further suggests that standard deviation should be reduced to zero if possible and covariance to have as much as possible negative interactive effect among the securities within the portfolio. So that portfolio risk as a whole can be negligible.

3.1.2 Capital Asset pricing model (CAPM)

The capital asset pricing model expresses stock market systematic risk and expected return relationship. For pricing, risky securities CAPM is widely used throughout finance. Sharpe (1964) and Lintner (1965) present this model and argue that portfolio return can be affected by a single factor market premium. As systematic risk (market risk) is common for the whole market, therefore, investors can diversify it but cannot avoid the risk related to their investment. The capital asset pricing model is miss specified according to the evidence presented in Banz (1981) study. Roll (1977) raised important objections on CAPM. Roll asserts that the CAPM is not testable, even

in the theory, unless the exact composition of the true market portfolio is known with certainty and this portfolio is used in all empirical tests. According to Roll, if the proxy to the market portfolio was mean-variance efficient, CAPM would always hold and vice versa. Moreover, Roll sees an effort to test CAPM as useless, since the market portfolio is not identifiable, and can not be proxy by a single factor like a stock market index.Roll became a strong supporter of Ross's APT as an alternative explanation to the risk-return relationship.

3.1.3 Arbitrage Pricing Theory (APT)

Stephen Ross in 1976, states that stock returns depend upon several factors and are not affected only by a single factor. Chen, Roll, and Ross (1986) found a positive relationship between the macroeconomic variables and the expected stock returns. They explored a set of economic state variables as systematic influences on stock market returns and has examined their influence on asset pricing. The APT does not deal with the issue of portfolio efficiency but it assumes that equity's return depends on a number of factors.

3.1.4 Fama and French three-factor model

The contributions of Fama and French (1992, 1993, 1996) proposed a significant alternate model based on the APT framework for asset pricing known as Fama and French three-factor model. According to Fama and French three-factor model market premium, size premium and value premium define stocks return. Fama and French (1992) first time found that stock market Size and BE/ME ratio has significant high explanatory power in explaining stock returns variations. The study has reported that these factors determine equity returns. Fama and French models have been tested worldwide in several markets but very little work has been done in Pakistan. Firms having small market capitalizations will better perform than firms having large market capitalizations is the historical tendency of size premium for the stocks (Banz, 1981). The

performance and stock returns of firms having small market capitalization will high than large capitalized firms because of the compensation of an additional risk factor. Fama and French three-factor model includes this additional factor. The size premium is the historical tendency for the stock that firms having a small market capitalization (small companies or firms) go to better performance than larger firms (Basu, 1983). The economic growth of any firm is eventually the driving force behind its stock's performance. Small firms have much longer runways for growth than that of larger firms. Significantly stocks positioned by aggregate size of the balance sheet of the biggest commercial bank, have low risk-adjusted stock returns than that of small and medium-sized bank stocks, even though larger banks are altogether significantly more levered (Gandhi & Lusting, 2015).

3.1.5 Double Prime Z-score model

There are number of models available to predict firm's future financial distress. Such as Altman Zscore, CLSA stress test, CAMEL etc. Altman model is a linear model assigned with different weights. Chiaramonte, Croci, and Poli (2015) investigate the accuracy of Altman Z score on a sample of European banks of 12 countries for the period of 2001 to 2011. The key results indicate that the Z score perform as well as the CAMEL variables but it has the advantage to be more parsimonious than CAMELS models because it demands less accounting and questionable data. Such a result is extremely valuable for those stakeholders who rely solely on public available information and look for simple and trustable measures of bank soundness. Mossman, Bell , Swartz, and Turtle (1988) compared the top available bankruptcies models and rated Altman model as the best predictor for bankruptcy due to its ratios built nature. Altman Z-score model could predict the failure of a bank better than the CAMEL model with a high bankruptcy probability level because Z"-Score uses various accounting ratios and market-derived price data

to predict future financial distress Kusdiana (2014) .Altman's Z" is one of the best known, statistically derived predictive models used to forecast a non-manufacturing firm's future financial distress. The Z"-Score uses various accounting ratios and market-derived price data to predict future financial distress. In order to measure and predict the likelihood of financial distress for non-manufacturing firms, Altman Z" Model is developed (Altman & Hotchkiss, 2006). This model was designed for non-manufacturing firms. The formula for Z" is given by

$$Z'' = 6.56\,X1 + 3.26\,X2 + 6.72\,X3 + 1.05\,X4$$

Where, X1= (current assets – current liabilities) / total assets, X2= retained earnings / total assets, X3= earnings before interest and taxes / total assets, X4= book value of equity / total liabilities.

In the Z" formula, which is employed in this study, scores of 2.6 and greater indicate that the firm is in a safe zone. Scores ranging from 1.1 to 2.6 represent the grey zone. The distress zone includes scores below 1.1.

3.1.6 CAMEL Model

CAMEL is basically a ratio-based model to evaluate the performance of banks under various criteria. It is a supervisory rating system originally developed in the US to classify a bank's overall position. CAMEL model of rating was first developed in the 1970s by the three federal banking supervisors of the U.S (the Federal Reserve, the FDIC and the OCC) as part of the regulators" "Uniform Financial Institutions Rating System", to provide a convenient summary of bank condition at the time of its onsite examination. It is applied to every banks and credit union in the U.S. and also implemented outside the U.S. by various banking supervisory regulators. The

uniform financial institution rating system commonly termed to the acronym CAMEL. The banks were judged on five different components under the acronym C-A-M-E-L:

C – Capital Adequacy

A – Asset Quality

M – Management Soundness

E – Earnings Capacity and

L – Liquidity

3.2 Emperical background

This part of the dissertation contains insight of the existing literature and collects empirical evidence about stock returns variations, capital asset pricing model (CAPM), size premium (SMB), value premium (HML) and identify the major factors that bring variations in glamour and value stock prices in the context of Pakistan. There is in-depth literature available about stock returns fluctuations, CAPM, value factor and size factor in past research studies. The CAPM of Sharpe (1964), Lintner (1965) and Black (1972) is the first and most widely used model of asset pricing because of its simplicity.

Since the publication of sharp's paper on CAPM, it has gain popularity in finance literature. CAPM is the first model which describes and quantifies capital market risk. Mossin (1996) research is more helpful and provides useful information to the investors. He is of view that by using equilibrium model one can identify the market line. Through slope of this line risk factor can be measured accordingly. In such pricing mechanism the investors can identify the riskiness of any asset in portfolio. While Pastor and Stambaugh (2000) describe that many investors update their prior beliefs based on some other asset pricing models. CAPM gain popularity among investors for optimal portfolios risk. Black Sholes and Jensen (1972) test many alternative hypotheses in New York stock exchange from 1926 to 1966. They use some assumptions of

traditional capital asset-pricing model. Black, Jensen and Sholes (1972) examine the relationship between stock returns and volatility in US market by employing cross-section regressions on monthly data for the period 1931 to 1965. Results indicated that there is significant and positive relationship between returns and beta. So, it has been reported that Sharpe's CAPM is applicable in US market.

Many patterns emerge from empirical studies which are not explained by the CAPM; such as: expected returns and earnings to price ratio have a positive relationship (Basu1977), small capitalizations have higher expected returns than big ones Banz(1981). He investigates the relationship between market value of common stocks and return. The undertaken study contains all common stocks of US firms listed at NYSE for the period 1926 to 1975. Findings indicate that large size firms have lower risk adjusted return than smaller size firms. The size effect has been persisted for last four decades and, it has been observed that CAPM is misspecified during that period. It is also examined that the size effect is nonlinear in nature. It has been observed a little difference exists between the averages returns of large firms and average sized firms.

After the introduction of APT by Stephen Ross in 1976 that there are several factors that are able to explain the cross sectional variation in stock return and not only a single factor. APT is an extension of CAPM i.e step towards multifactor model. From here debate start that what are the factors that affect returns?

Lam (2002) investigates the impact of firm β, size, leverage, BE/ME and E/P ratio on cross-sectional stock returns by using the FF (1992) approach. The study has employed the data of 100 firms that are listed on the Hong Kong stock exchange and do not delist during the entire analysis period from July 1980 to June 1997. The findings of the study have suggested that size, BE/ME and E/P could better explain cross-sectional fluctuations in stock returns, but the beta is

not able to explain the variation in the return. The leverage and market premium are also able to capture the cross-sectional variation in average monthly returns, but their effects seem to be dominated by size, BE/ME and E/P ratios. Morelli (2007) contradicts the findings of Lam (2002) and reports an insignificant relationship. Morelli (2007) argues that irrespective of whether beta is the only explanatory variable or whether it is combined with the size and BE/ME, beta is not found to be statistically significant, thus plays no role in explaining realized returns.

Halliwell, Sawicki, and Heaney (1999) examine the validity of Fama and French (1993) three factors on the Australian equity market. The study concludes that the effect of size and value are existed in the small-sized firm and high BE/ME stock but not on large-size firms. The study also reports that the effect is existed in low sized but not in high sized firms as well as in high BE/ME stock but not in low BE/ME stocks. The study also described that the Fama and French three-factor model has more explanatory power than traditional CAPM. Moreover, the study of Halliwell et al. (1999) does not provide any evidence for the trends from low to high BE/ME ratio stocks and for a decline in size stock variation. But Connor and Sehgal (2001) conduct a study on Indian stock and provide evidence that Fama and French three-factor model has more explanatory power than CAPM which is based on a single factor. Their study also concluded that size, BE/ME ratio and the market premium has a significant result in the Indian stock market. Drew and Veeraraghavan (2003) affirm the findings of Halliwell and Sawicki (1999) and find a significant relationship and evidence on the validity effect of size and value premiums on stocks return.

Djajadikerta and Nartea (2005) investigate the size and BE/ME ratio as determinants of return in Newzealand share market and the ability of the FF three-factor model to explain the variations in stock returns. The study has employed a data period from 1994 to 2002 by using the Fama and Macbeth (1973) model. The results of the study suggested a statistically significant size

effect but a weak BE/ME ratio effect. Furthermore, the study also finds some improvement in explanatory power provided by the three-factor model relative to the conventional CAPM. The findings of this study identified that if the size effect is significant then the BE/ME ratio showing a weaker effect. Djajadikerta and Nartea (2005) results are not consistent with the work of Vos and Pepper (1997), Paul and Venkat (1997) who already work on the Newzealand stock market. Vos and Pepper (1997) determine that size and BE/ME both are significant. Paul and Venkat (1997) by using the data throughout 1971-1993 confirmed that BE/ME effect significant but the size effect is weaker.

Faff (2004) examines the three-factor model for the Australian market. The study has employed a data sample of both daily and monthly data from May 1996 to April 1999 and January 1991 to April 1999 respectively. The findings of the study indicated that in the aspects of the market and BE/ME risk premium found a significant positive relationship. Furthermore, in this sample, the risk premium of a size found significantly negative. The findings of this study fully favor the BE/ME factor but against the results of Halliwell et al. (1999) as they do not observe the robust BE/ME result. Brailsford and Gaunt (2012) find for the first time that both size and BE/ME factor consistently exhibit significant positive influences over Australian equity returns and thus contradict the results of Faff (2004) that size factor is significant but negative.

Stock-return volatility checks out by Estrada and Serra (2005) via using several factors. 30 economies were selected in this respect. Data of 1600 institutions is used to check the prepositions. Results indicate downsize risk is directly affect the stock-returns. It has significant contribution in its instability. Size along-with B/M also cause instability in returns but its contribution is not significant. Likewise, Rahman and Baten (2006) studies risk as well as return association for equity-securities. He selects 5 factors like (stock market return, beta, book to market ratio, size).

Through implicated Fama French-model he finds that these 5 variables are strongly correlated each-other for Bangladesh markets.

Currently, Frazzini and Pedersen (2014) document the inter-linkage of volatility with leverage constraint. Furthermore, they not only investigate the risk-return relationship cross-sectional but also find when funding constraints become intense. Graph show that beta approaches to 1 by increasing constraint on funds. However, correlation between risk-return becomes flatter at this stage. In addition, their model argue that" less leverage-constrained investors (e.g., private equity) hold low-beta stocks, while more leverage-constrained investors (e.g., mutual funds) prefer high beta stocks".

Gaunt (2004) examines the impact of size and value premium on equity return of the Australian stock market. The study draws on accounting data that covers the period from 1991 to 2000 by using Fama and Macbeth (1973) methodology to empirically test the return of above variables. The results of the study suggested a significant positive relationship between size and are/ME ratio with stock returns. Findings of the study completely consistent with the Fama and French (1993) study which suggested that a company with a low BE/ME ratio and a small size bear high risk but the outcome of the size very small as compare to the effect of BE/ME ratio. In contrast to Halliwell et al. (1999), this study examined to explain the three-factor model and it's useful over CAPM whereas BE/ME ratio also plays a significant role in asset pricing. Gharghori, Lee and Veeraraghavan (2009) find the significant positive size, BE/ME and E/P factors and thus assert the study of (Gaunt,2004). O'Brien, Brailsford, and Gaunt (2010) endeavor to separate the role of size and momentum in Australian stock returns and Concerning the size effect their results are similar to that of Gaunt (2004).

Chui and Wei (1998) examine the relationship between market beta, BE/ME, size and expected stock returns in five Pacific-Basin emerging markets (Hong Kong, Korea, Malaysia, Taiwan, Thailand). The data sample covering the period of 1977 to 1993 using Fama and Macbeth (1973) model to test the return of above variables. The findings of the study have suggested that there is a weak relationship between market beta and market return. Furthermore, they investigate that BE/ME can describe the cross-sectional fluctuations of expected stock return in maximum markets while size effect is significant in all expect Taiwan. The study also determines that the January effect is also there and BE/ME premium is suggestively in January. The size premium in January is significantly positive in Hong Kong and significantly negative in Korea. Aksu and Onder (2000) and Morelli (2012) in contrast find both sizes and BE/ME effects to be priced by the market and thereby regarded as significant determinants of security returns.

Cooper, Jackson and Patterson (2003) examine the predictability of cross-section of bank returns by using prominent variables of the financial sector. Data sample constituted of 213 banking firms for the period between 1986 and 1999. Study use specific bank variables of E/P, loans to total assets, loan loss provisions to total loans, non-interest income to net income, unused loan commitments to total loans, interest rate swaps to total assets, standby letter of credit to total loans and book value of equity to total assets. They included Fama and French-style BE/ME and size variables to analyze the impact of value and size factors. They determined that bank-specific variables have superior predictability power than traditional asset pricing models for a cross-section of financial returns.

Barber and Lyon (1997) study the pricing of a market, size and value factors in US financial stocks using data sample from July 1973 to December 1994. They find no significant difference by comparing the mean returns of financial and non-financial firms sorted on BE/ME and size

factors. Their findings demonstrate that despite having substantially high financial leverage for financial firms, the market factor along with size and value premium is priced in banking returns and hence such returns could be explained under the traditional asset pricing framework.

Lewellen (1999) explores the impact of expected return, book to market ratio and risk by using the monthly financial data of NASDAQ, AMEX and NYSE capital markets and observation period of 1964 to 1994. By employing the methodology of Daniel and Titman (1997) and Fama and French (1993) he finds out that BTM ratio is significantly associated with risk this finding also in line with finding of (fama and French 1993). It also explores the impact of size book to market equity on stock return on five different developing capital markets returns. He also uses Fama & Macbeth (1973) estimation technique for the period of 1977 to 1993. He finds significant but weaker relationship between stock market return and beta of market. In addition, he also indicates that book to market equity have positive and significant impact on stock return and also size have positive impact on all developing markets rather than Taiwan. Moreover, he also provides the evidence of January effect on book to market premium. So, big firms of Korea and Hong Kong and small firms of Taiwan have greater return for the month of January.

Shanken, Sloans, and Kothari (1995) verify that BTM or beta explains the variations in stock returns or not. It is used for pre-classified and post-beta in the study and the data is utilized for the period 1940-1957. The data sample is based on S & P and COMPUSTAT manufacturing level data. The finding reveals that there is a more significant and weaker relationship between BTM and stock performance and less consistent with the study of Fama and French (1992). In addition to one of the other studies which is concluded by Shanken and Kothari (1997), they examined the relationship between expected return on shares and dividends yield BTM. The said study is focused on US equity market for the period 1926 -1991. They find that during the 1926

to1991 periods there is a regular relationship between stock market performance and BTM. The study also reveals that a high association among stock performance and dividend yield for the observed period 1941 to1991.

Walkshausl and Lobe (2011) study an alternative three factor model performance in the US stock market. Methodology of Macbath and Fama (1973) is used to test empirically returns of investment premium, profitability premium for the period of 1982-2009 for US equity stock return. In this Fama and French three-factor model is more appealing for averages return and an alternative three-factor model which do not provide the clarity in the international market. Moreover, the result shows that large number of portfolio and their performances cannot be explained with alternative three factor model. Return on investment and return on equity factors are explained by Min, Kang and Lee (2011) on macroeconomic condition. In the period from 1972-2010 the study is conducted for stock returns on AMEX,NASDAQ & NYSE. Regression is used as an estimation tool for data analysis by Fama and Macbeth (1973). Results show a positive indication towards economic growth of return on investment. However, investment return show significant high effect on condition of business in the condition to the good circumstances as compared to the bad condition of' the business in bad circumstances. Furthermore,the study reveals a non-positive return on equity related to economic development. Moreover, higher investment stocks are less complex as compared to thelow investment stock with high complication.

Wang (2013) explores that proxy is used in investment factor and equity return for economic risk of non-financial firms. A methodology is used by Mina and Macbeth (1973) to test the returns of variable for the period 1972-2009. The outcomes explain in the presence of other financial and economic variables by Fama and French (1993) that for the future GDP investment premium is a strong forecaster. Furthermore, there is losing some of the pricing power on return

of equity premium in the presence of GDP. It is explored there are two alternative proxy variables. Firstly, is profitability premium and other is investment premium used for future planning and asset return.

Boubaker , Hamza, and Garcia (2018) investigate the relation between the financialdistress and equity return of twelve portfolios, which are made on a different basis(size, book-to-market, and leverage) by using three factor asset pricing model by taking data of the 18 year period. The results capture additional risk missed by the market portfolio, the leveraged risk premium is positively related to high age firms. The results also suggested that the equity portfolio investment requires systematically both size and value premiums and that SMB and HML.

Hassan and Javed (2011) investigate the asset pricing techniques in the Pakistani equity market for monthly stock prices by using nine years of data from June 1998 to June 2007. Working on the FF three-factor model approach they discovered the combined effect of size and value premium in their study. They demonstrate that Value premium is positively significant for all portfolios except those stocks having low BE/ME ratios whereas size premium has a positive significant relationship to small portfolio returns but it has insignificant relation for portfolios of big stocks. The study further executes strong evidence that BE/ME effect is increasing constantly when going from lowest to highest portfolios based on BE/ME.

Stivers (2018) examines whether a direct mechanism can be found that demonstrates that the size and value factors of Fama and French (1993) are indeed ICAPM factors. He takes the sample period from 1930 to 2015. Results indicate that small stock portfolios and high BE/ME stock portfolios have predictive power for future market returns, thereby making them potential ICAPM risk factors. Rafique, Iqbal, Zakaria, and Mujtaba (2019) confirm the findings of Stivers

(2018) and find a significant relationship by indicating a positive intertemporal risk-return relationship in Pakistan stock market.

Banz (1981) investigates the empirical relationship between the return and the total market value of NYSE common stocks. Results show that, in the period 1936-1975, small firms common stock had, on average, higher risk-adjusted returns than the common stock of large firms. Basu (1983) asserts the findings of Banz (1981) and argues that size anomaly refers that firms having low market capitalization will better perform than those having large market capitalization.

Zaremba (2017) examines the performance of the CAPM, Fama-French three-factor and Carhart four-factor models on the Polish market. The data used ranging from 2001 to 2014. The study concluded that the value, size and momentum factors perform poorly in explaining cross-sectional variation in stock returns on the Polish market.

Shoaib and Siddiqui (2017) conduct a study to identify the adjustment pattern of stock returns (India, Pakistan and China) towards, size, value, momentum and market gearing premium. They take the data sample period from 2001-2013. They identify that Small-cap stocks have higher average returns than large-cap stocks. China was observed as the most stable of the three markets analyzed in this study. In the Chinese market, all the risk factors play their role to determine risk premiums. However, in India and Pakistan, the risk premium is mostly determined by market risk factors.

Fama and French (1995) investigate the impact of size and value premium on equity return of AMEX, NYSE and NASDAQ stock. The study employed a data sample from 1963 to 1992 by using Fama and Macbeth (1973) methodology to empirically test the return of above variables. The findings of the study indicated that there are the size and BE/ME factors in earnings like those

in returns. They also find that firms with low earnings had a high BE/ME and a positive slope for HML, while firms with high earnings had a low BE/ME and a negative HML slope.

Chan, Hamao and Lakonishok (1991) examine changes in cross-sectional return with the help of size, BE/ME ratio, earning yield and cash flow yield. The study has employed data listed on the Tokyo Stock Exchange (TSE) from 1971 to 1988 and used both manufacturing and non-manufacturing monthly data by using Fama and Macbeth (1973) methodology. The findings of the study have suggested that cross-sectional returns are significantly associated with BE/ME, size, cash flow yield, and earnings yield. However, cash flow yield and BE/ME ratio provide more significant positive results with the stock return.

Daniel and Titman (1997) conducted a study to investigate the rationale behind different returns on portfolios that have similar characteristics with varying factor loadings. They use data for the period 1973–1993 and find that expected returns are not a function of loadings on the Fama and French risk factors after controlling for the size and BE/ME. They also suggest that it is the covariance between high BE/ME stocks that leads to similar properties rather than a common risk factor.

Mirza and Shahid (2008) conduct a study to evaluate the ability of the Fama and French Three-Factor model to explain a cross-section of stock returns in the Karachi Stock Exchange (KSE). They use Fama and French three Factor approach by using five years daily data of 81 non-financial listed firms (January 2003 to 31 December 2007) and find a significant impact of size and value anomaly in KSE. According to this study, the size premium is found significant for small stock but has no effect for big stocks Whereas value premium is found significant for all stocks.

Fama and French (2012) conduct a study on 23 countries of four regions examined (North America, Europe, Japan, and the Asia Pacific) to check the effect of CAPM whether it explains the effect of size, BE/ME and momentum on return in this region. The study employed 22 years of monthly data from November 1989 to March 2011. The finding of the study has suggested that the effect of size and BE/ME is significant in all regions but insignificant in Japan.

Novak and Petr (2010) analyze the ability of CAPM beta, the market value of equity, BE/ME and stock price momentum to explain the cross-sectional variation in Swedish stock returns. The study has employed the data from 1979 to 2005 by using the standard Fama-MacBeth (1973) methodology. The study determines that none of these factors is significant for explaining stock returns on the Swedish Stock Exchange. Therefore, the popular three-factor model may not be an equally useful tool for determining the expected return and the previously documented relationship is contingent on the data sample used and on the period.

Drew and Veeraraghavan (2003) compare the explanatory power of a CAPM with the FF three-factor model for southeast Asian (Hong Kong, Korea, Malaysia and the Philippines) markets and report the presence of size and value premiums in these markets. They suggest that the CAPM beta alone is not sufficient to describe the cross-section of expected returns and provides evidence that the Fama and French three-factor model can better explain the variations in return for these markets. They also argue that premiums are compensation for the risk that is not captured by CAPM.

Hameed, Qarni, and Shafi (2018) investigate the applicability of Fama and French's three-factor model for four Asian(Karachi, Bombay, Dhaka, Colombo) stock markets. By analyzing monthly stock returns of 60 firms from each of the four stock markets for the period of 2003 to

2011. Their study reports the presence of size and value premiums in these markets and suggests that the FF three-factor model is valid for these markets and can explain the return variations.

Lischewski and Voronkova (2012) check the existing evidence that shows that value premium, size premium and liquidity factors affect emerging market and their study findings support the existing evidence of Fama and French. They find the evidence that market factor, size and BE/ME value factors all have explanatory power for the polish stock returns and concluded that liquidity risk is less relevant for the Polish stock market.

Maiti (2019) conducts a study to critically evaluate the evolution of risk factors and factor models. The main message from the study is that evolution of risk factors and factor models are continuous and endless development. Still today over 300 risk factors are identified by the researchers but out of them all only few are significantly responsible in explaining the stock markets risk return relationship. Due to continuous evolution and changing of nature of the risk factor it seems quite impossible to have a stable efficient factor models that can explain stock market risk return relationship globally in long run

Rozzani and Rahman (2013) conduct a study to explore the area of bank performance using CAMELS rating, where its main objective was to examine the performance of both Islamic and conventional banks that are operating in Malaysia. The study employed the data from 2008 until 2011 were gathered from these banks' annual reports. From analysis, it could be seen from an overall view that the levels of performance for both conventional and Islamic banks in Malaysia were highly similar. By displaying the potential interaction between both Islamic and conventional banks in Malaysian banking system, this study is hoped to provide useful information for stakeholders to make better investment decisions and to help both conventional and Islamic banks

to mark and re-evaluate their performance based on the performance measurement used in the study.

Sangmi and Nazir (2010) conduct a study to evaluate the financial performance of the two major banks operating in northern India. This evaluation has been done by using CAMEL Parameters, the latest model of financial analysis. Through this model, it is highlighted that the position of the banks under study is sound and satisfactory so far as their capital adequacy, asset quality, Management capability and liquidity is concerned. Kumar, Harsha, Anand, and Dhruva (2012) analyze the performance of 12 public and private sector banks over a period of eleven years (2000-2011) in the Indian banking sector. For this purpose, CAMEL approach has been used and it is established that private sector banks are at the top of the list, with their performances in terms of soundness being the best. Public sector banks like Union Bank and SBI have taken a backseat and display low economic soundness in comparison.

All these trends of literature saying one thing that market premium is not enough for explaining the market risk return relationship. There are certain other factors that capture the extra market risk and those factors should be part of the equation for estimating required rate of return.In the past a number of studies investigate the dynamic relationship between risk factors and stock returns particularly in the advanced economies. Most of the studies in the developed and emerging economies (Halliwell et al, 1999) , (Fama & French, 1995), (Griffin & Lemmon, 2002), (O'Brien et al, 2010), (Mirza & Shahid, 2008) suggest positive and significant results. In the current study financial distress factor is added as an additional factor in Fama & French multifactor model to check it's impact on banking stock returns in the context of pakistan. As the return of finacially high distress firms and low distress firms are not same therefore on the basis of financial distress

risk we can form arbitrage portfolio which return are higher than risk adjusted rate of return. The current study will also contribute to the literature of size premium,value premium and fincial distress premium for financial sector. This study also through light on the performance of characteristic as well as factor based model for banking stock returns in the context of pakistan.

Hypothesis:

H_1: Size premium and Value premium influence banking stock return.

H_2: Financial distress premium has positive and significant affect on banking stock return.

H_3: There is an evidence of Fama and French three-factor model for banking stocks in Pakistan.

Chapter No 3

Data description and research methodology

3.1 Methodology

The main focus of this study is to determine the impact of size, value and financial distress factors in the banking stock returns. In past various studies have been conducted to determine the effect of various factors on cross sectional variation of banking return. In Arbitrage pricing theory (APT) introduced by Stephen Ross in 1976 it is mentioned that there are n number of factors that affect the risk and return relationship. Fama and French add size and value premium in single factor model named as three factor model. Carhart (1997) introduces momentum as the fourth factor in three factor model. In this study Fama and French methodology is used to explore the effect of size, value and financial distress on banking stock returns.

3.2 Data description

The study examines the impact of size premium, value premium and financial distress premium on banking returns in Pakistan. The study use data of the financial sector of Pakistan Stock exchange (PSX) for the period of 2008-2019. The population of the study is all listed commercial banks at PSX. The sample size of this study comprise of 20 commercial banks from the financial sector and six month T-bill is used as a risk-free rate. Financial sector is considered because the capital structure of both sectors are different. Also closing period for financial sector is December while non-financial sector accounting period closes at June.

List of commercial banks included in this study (See appendix I)

3.3 Measurement of variables

3.3.1 Size

Size factor has been introduced by Banz in 1981. Market capitalization is used as the proxy of size. The size is measured by keeping in mind the method used by Fama and French (1992, 1993, 1996). It is measured by using the following formula:

Size = No of shares outstanding × MPS (1)

3.3.2 Book to market ratio

Value premium has been introduced by Rosenberg in 1985. For value premium book to market ratio is used as proxy to calculate it. By using the following formula:

Book to market (BE/ME) ratio= $\frac{\boldsymbol{Book\ value\ of\ equity}}{\boldsymbol{Market\ value\ of\ equity}}$ (2)

3.3.3 Financial distress

Financial distress measures the probability that a firm may default in the future, hence measures the firm's future performance. Two proxies are used in this study for measuring financial performance of the banks. One is Altman's Z Score while other is CAMEL model

$$\text{Z score} = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4 \quad (3)$$

Where, X1= (current assets – current liabilities) / total assets, X2= retained earnings / total assets, X3= earnings before interest and taxes / total assets, X4= book value of equity / total liabilities.

In the Z" formula, scores of 2.6 and greater indicate that the firm is in a safe zone. Scores ranging from 1.1 to 2.6 represent the grey zone. The distress zone includes scores below 1.1.

Through CAMEL model performance index of each bank for each year is calculated. The banks were judged on five different components under the acronym C-A-M-E-L:

C – Capital Adequacy

A – Asset Quality

M – Management Soundness

E – Earnings Capacity and

L – Liquidity

3.4 Portfolio construction

3.4.1 Size sorted portfolio

For size-sorted portfolios market capitalization value for of 20 banks is calculated and then data is arranged in descending order. Now the median is calculated and the sample is divided into two portfolios. 10 banks have market capitalization less than the median is called "SMALL" while remaining 10 banks have market capitalization above the median is called "BIG".

3.4.2 Value sorted portfolio

In value sorted portfolios 10 small and 10 big banks are further sorted on the basis of BE/ME ratio value. When "SMALL" is sorted on the basis of BE/ME ratio, it forms two portfolios labeled S/H (portfolio having small size and high BE/ME ratio) and S/L (portfolio having small size and low BE/ME ratio). When BIG is sorted on the basis of BE/ME ratio it also forms two portfolios named B/H (portfolio consist of stock having big size and high book to market ratio) and B/L (portfolio consist of stock having big size and low book to market ratio).

3.4.3 Financial distress sorted portfolio

Size sorted portfolios are constructed twice based on two different methods. First, Z score of each bank is calculated through the Altman Z" score model. After calculating Z score all the banks are arranged in descending order on the basis of Z score value and two portfolios are formed named H/R and L/R. 10 banks having high financial distress risk are named as H/R while remaining 10 have low financial distress risk named as L/R .

Second, performance index (PI) value of each bank is calculated through CAMEL model. After calculating PI values all banks are arranged in descending order on the basis of PI value and two portfolios are formed named H/R and L/R. 10 banks having low PI are named as H/R while remaining 10 having high PI are named as L/R.

3.5 Model specification

3.5.1 Panel data analysis

Panel data (also known as a longitudinal data set) is defined as a data set which has both cross-sectional and time-series dimension. If the data set has the same number of time observations for every variable and every individual it is known as a balanced panel. If the data set has different numbers of time observations for some of the individuals it is known as an unbalanced panel.

To analyze the panel data correctly, it is important to know the method of panel data. These methods are classified into three categories as Common constant model, fixed-effect method and random effect method.

3.5.1.1 Common constant model

It is also known as the polled Ordinary Least Square method. OLS **is** a type of linear least-squares method for estimating the unknown parameters in a linear regression model. It chooses the parameters of a linear function of a set of independent variables by the principle of least squares, minimizing the sum of the squares of the differences between the observed dependent variable in the given dataset and those predicted by the linear function. The OLS method is a form of regression analysis used to determine the line of best fit for a set of data, providing a visual demonstration of the relationship between the data points. Each point of data represents the relationship between a known independent variable and an unknown dependent variable. The form of panel data regression equation is similar to ordinary least square, i.e

$$Y_{it} = \alpha + \beta X_{it} + \mu_{it} \quad (4)$$

3.5.1.2 Fixed effect model

In the fixed-effect model, the individuals within the measurement set have a unique attribute that does not vary across time. These attributes of the individual independent variable may or may not be correlated with the dependent variables. The fixed-effects method is also called the least-squares dummy variables (LSDV) method because, to allow for different constants for each group, it includes a dummy variable for each group. To check the validity of whether the fixed-effect method or OLS method should include in the model is better, the standard F -test can be used. The fixed effect model is as follow:

$$Y_{it} = \alpha_i + \beta_1 X_{1it} + \beta_2 X_{2it} + \ldots + \beta_k X_{kit} + \mu_{it} \quad (5)$$

3.5.1.3 Random effect model

Another method of estimating a model is a random-effects model. The individuals in the random-effect model have unique, time constant attributes that are not correlated with the individual regressors. In the Random Effect method, the difference between intercepts is accommodated by the error terms of each individual. The advantage of using the random effect method is to eliminate heteroscedasticity. This random effects model is also known as the Error Component Model (ECM) or Generalized Least Square (GLS) technique. The random effect model is as follow

$$Y_{it} = \alpha_i + \beta_1 X_{1it} + \beta_2 X_{2it} + \cdots + \beta_k X_{kit} + (V_i + \mu_{it}) \quad (6)$$

3.5.1.4 Selection method of Panel data estimation

To select the most appropriate method, several tests can be used

1) Chow test is a test used to determine whether the common effect (CE) or fixed effect (FE) method is most appropriate. Based on the results if p> 0.05 Select CE and if p <0.05 Select FE.
2) Hausman test is a statistical test used to select whether the fixed-effect method or random-effect method is most appropriate. Based on the results if p> 0.05 select RE otherwise select FE.
3) Lagrange multiplier test (LM) is a test to determine whether the Random Effect method or Common Effect (PLS) method is most appropriate. On the basis of the results if p > 0.05 Select CE otherwise Select RE,

3.6 Variable description:

We have the following portfolios the two main portfolios on the basis of size B and S. On the basis of value B/H, B/L, S/H and S/L. On the basis of financial distress risk portfolio constructed are H/R and L/R. The monthly returns of all the portfolios is calculated and then on the basis of these returns market, size, value and financial distress premium is calculated.

In this study performance of both models i.e factor and characteristic is investigated.

3.6.1 Factor model

Factor model predicts that cross sectional variation in expected stock returns is due to factor loadings.

Market premium:

The market risk premium is the difference between the expected return on a market portfolio and the risk-free rate.

Market return = ln(current price/previous price) (7)

Market premium(MKT)=($\boldsymbol{R_m - R_f}$) (8)

Where

$$R_m = l_n(I_t/I_{t-1}) \quad (9)$$

Rm represents the market return for the month "t" and I_t and I_{t-1} are closing values of PSX for month t and t-1 respectively. The risk-free rate is represented by R_f, is for the proxy of the risk-free rate.

Size premium:

Size premium (SMB) is captured through market capitalization. The SMB is the return spread between stock having small market capitalization and stock having large market capitalization.

$$SMB = 1/2 * [(S/H - B/H) + (S/L - B/L)] \quad (10)$$

Where, SMB = small minus big, S/H= average return on all portfolios of small size and high BE/ME value, B/H= average return on all portfolios of big size and high BE/ME value, S/L= average return on all portfolios of small size and low BE/ME value, B/L = average return on all portfolios of big size and low BE/ME value

Value premium:

Value premium is captured through book to market (BE/ME) ratio of the stocks. Value premium is the return spread between stocks with high BE/ME ratios (value stocks) and stocks with low BE/ME ratios (growth stocks). The value premium is calculated by

$$HML = 1/2 * [(S/H - S/L) + (B/H - B/L)] \quad (11)$$

Where, HML = high minus low, S/H = average return on all portfolios of small size and high BE/ME value, S/L = average return on all portfolios of small size and low BE/ME value, B/H = average return on all portfolios of big size and high BE/ME value, B/L = average return on all portfolios of big size and low BE/ME value.

Financial distress Premium:

The financial distress premium is the return spread between stocks of high financial distress firms and low financial distress firms. Financial distress premium is captured through two methods

i.e Z score value of Altman model as well as Performance index value of CAMEL model. The financial distress premium is one of the important variables of our study. It is estimated by

$$\text{HRMLR} = \text{HR} - \text{LR} \quad (12)$$

Where, HR = high risk and LR = low risk

3.6.2 Characteristic model

The characteristics model explains excess return by stock characteristics. Daniel and Titman (1997) contend that the Fama-French three-factor model's ability to explain cross-sectional variation in expected returns is a result of characteristics that firms have in common rather than any risk-based explanation. They contend it is the similar characteristics of firms (size or book-to-market) that explain cross-sectional variation in expected returns. Size, BE/ME ratio and distress risk under characteristic model can be calculated as

Book to Market ratio:

$$\ln(\text{BE/ME}) = \ln(\frac{total\ shareholders\ equity}{market\ value\ of\ equity}) \quad (13)$$

Size:

$$\ln(\text{size}) = \ln(\text{number of shares outstanding} * \text{MPS}). \quad (14)$$

Distress risk:

Through Altman's Z score

$$\ln(Zscore) = \ln(6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4) \quad (15)$$

Through CAMEL model

$$\ln(performance\ index) \quad (16)$$

3.5 Econometric models

$$R_i - R_f = \alpha + \beta_1 MKT_t + \varepsilon_t \quad (17)$$

$$R_i - R_f = \alpha + \beta_1 MKT_t + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_t \quad (18)$$

$$R_i - R_f = \alpha + \beta_1 MKT_t + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 HRMLR_t + \varepsilon_t \quad (19)$$

$$R_{it} = \alpha + \beta_1 R_{mt} + \beta_2 Size_{it}/\beta_2 PI_{it} + \beta_3 BE/ME_{it} + \beta_4 Zscore_{it} + \varepsilon_{it} \quad (20)$$

Where, $\boldsymbol{R_{it}}$= return of portfolio "i" for period "t" and $\boldsymbol{R_f}$=risk free rate, MKT = market premium ($\boldsymbol{R_m}$–$\boldsymbol{R_f}$), SMB (small minus big) = size premium, HML (high minus low) =value premium, HRMLR (high risk minus low risk) = distress risk premium.

Chapter No 4

Results and Discussion

4.1 Descriptive Statistics

The study examines behavior of data to check its accuracy before applying regression test. Descriptive statistic shows the general behavior of data including all the variables. The mean value shows the average of data and standard deviation shows deviation from mean. The descriptive statistics table along with mean and standard deviation also include skewness, kurtosis, maximum and minimum values.

Table 4.1 Descriptive statistics for size, value and distress risk sorted portfolios

V's	Mean	Median	Std. Dev	Kurtosis	Skewness	Mini	Max
P	0.003	-0.003	0.066	1.093	0.099	-0.208	0.193
S	-0.000	-0.002	0.083	3.713	0.861	-0.234	0.381
B	0.006	0.005	0.063	0.574	-0.058	-0.183	0.167
S/H	0.000	-0.002	0.100	4.429	0.960	-0.249	0.472
S/L	-0.001	-0.003	0.078	2.403	0.032	-0.256	0.289
B/H	0.009	0.011	0.065	0.914	-0.129	-0.200	0.184
B/L	0.003	0.000	0.071	0.900	0.178	-0.199	0.220
HR	0.003	0.006	0.063	0.636	-0.201	-0.206	0.146
LR	-0.001	0.000	0.077	2.445	0.618	-0.210	0.309

Note: P portfolio consists of all stocks(arranged in descending order with); S portfolio consists of first 50% stocks of P portfolio having small size; B portfolio consists of remaining 50% stocks of P portfolio having big size; S/H portfolio consists of stocks having small size and high BE/ME ratio; S/L portfolio consists of stocks having small size and low BE/ME ratio; B/H portfolio consists of stocks having big size and high BE/ME ratio; B/L portfolio consists of stocks having big size and low BE/ME ratio.HR portfolio consist of stocks(first 50% of p) having high z score value and LR portfolio consist of stocks(remaining 50% of p) having low z score value.

The descriptive statistics in Table 4.1 exhibit that mean ranges from -0.000(S) to 0.009(B/H). The mean for P is 0.002 and for B is 0.006. Similarly mean for S/H, S/L and B/L are

0.000, -0.001 and 0.003 respectively. Likewise mean for HR and LR are 0.003 and -0.001. The minimum and maximum values also showing the normal distribution of data. Standard deviation which is the measure of deviation or dispersion from mean ranges from 0.063 (B/HR) to 0.100 (S/H). In case of kurtosis, when value is equal to 3 then data is normally distributed and such pattern is known as mesokurtic. If value of kurtosis is greater than 3 then such data pattern is said to be leptokurtic which mean that the data is peaked and fat tail. When the value of kurtosis is <3 such pattern is known as platykurtic and that are associated with simultaneously "less peaked" and have "thinner tail". All the values in the table (except two) are less than 3 showing platykurtic behavior indicating that data is flat and have thinner tail. Skewness shows the data distribution. When value is equal to zero shows normal distribution indicating that data is symmetrical and bell shaped graph. Positive skewness indicate that data is positively skewed (right tail is longer than left side). Negative skewness means data is negatively skewed (left tail is longer than right side). Skewness indicates that most of the values are positively skewed i.e right tail is longer than left tail.

Table 4.2 Descriptive statistics for multifactor model

	MKT	SMB	HML	HRMLR
Mean	0.007	-0.007	0.004	0.004
Median	0.012	-0.013	0.004	0.004
Std. Dev	0.054	0.067	0.044	0.050
Kurtosis	0.236	8.515	2.774	4.384
Skewness	-0.100	1.134	-0.515	-0.408
Mini	-0.122	-0.265	-0.185	-0.232
Max	0.171	0.375	0.125	0.189

Note: MKT: market return, SMB: small minus big, HML: high minus low, HRMLR: high risk minus low risk

Table 4.2 evaluate the statistical behavior of different portfolios based on market premium, size premium, value premium and distress risk premium. The size based portfolio incurred an average loss of -0.7%. The average risk of the portfolio is 6.7%. The maximum return earned in a month is 37.5% and maximum loss incurred in a month is 26.5%.Further statistics show that the kurtosis of the portfolio is 8.515 which is more than 3 so return are peaked. Also the data is positively skewed as skewness is 1.134. Value based portfolio earn an average return of 0.4%. Variability in the return is measured with the standard deviation which is calculated as 4.4%. The maximum loss incurred in a month is 18.5% while maximum return earned in a month is 12.5%. Skewness of the data is -0.515. Which tells that data is negatively skewed. Kurtosis is approximately 2.8 shows that the data is peaked and asymmetrically distributed. Distress risk based portfolio earned an average return of 0.4% in the month. Average risk of the portfolio is 5.0% estimated through standard deviation. The maximum return earned in a month is 18.9% while it incurred a maximum loss of 23.2%. The kurtosis is 4.384 therefore it is peaked and asymmetrically distributed and skewness is -0.408 indicating that data is negatively skewed or skewed left. Looking to the descriptive statistics among portfolios in above table, a few observations are worth to mention. The market premium based portfolio has the highest mean returns 0.7%. The value and distress based portfolio has a average return of 0.4% and the size based portfolio has a negative average return of 0.07%.As higher returns are associated with higher risk, which is measured by the standard deviation. The size based portfolio assumes a high standard deviation of 6.7% compared to other portfolios.

Table 4.3 Descriptive statistic for characteristic model

	Stock return	Market return	Size(million)	BE/ME	Z Score	PI
Mean	0.092	0.215	52,889	1.302	1.169	0.092
Median	0.041	0.269	19,605	1.138	1.154	0.041
Std. Dev	0.392	0.252	72,813	0.757	0.441	0.392
Skewness	1.465	-0.027	0	4.905	5.162	1.465
Kurtosis	5.558	-1.497	0	1.890	52.355	5.558
Mini	-0.723	-0.154	1,637	0.373	0.067	-0.723
Max	2.341	0.586	400,817	4.912	5.741	2.341

Table 4.3 exhibit the statistical behavior of data for characteristic model for the period of 2008 to 2018. Table show mean, median, standard deviation, skewness, kurtosis, minimum and maximum value of the monthly return of all stocks. The average size is 52,889 million with a standard deviation of 72,813. Skewness show data distribution. When value is equal to zero shows normal distribution indicating that data is symmetrical and bell shaped graph. Positive skewness indicate that data is positively skewed (right tail is longer than left side). Negative skewness means data is negatively skewed (left tail is longer than right side). Skewness indicates that most of the values are positively skewed. In case of kurtosis data have leptokurtic patterns for stock return and distress risk (peaked and fat tail) while platykurtic patterns for market return and book to market ratio (less peaked" and have "thinner tail"). For size skewness value is equal to zero show normal distribution indicating that data is symmetrical and bell shaped graph.

Table 4.4 Correlation analysis for characteristic based model

	Size	BE/ME	Z score	Ri	Rm	PI
Size	1.000					
BE/ME	-0.450	1.000				
Z score	0.195	0.005	1.000			
Ri	-0.094	0.327	0.131	1.000		
Rm	-0.201	0.179	0.237	0.509	1.000	
PI	-0.094	0.327	0.131	1.000	0.509	1.000

NOTE: Size; market capitalization, BE/ME; book to market ratio; Z score: distress risk; Ri: return on asset; Rm; market return.PI;performance index

Table 4.4 Exhibit correlation among different characteristics of stock. Market return has negative correlation with size while positive correlation exist among asset return, distress risk and book to market ratio. Return on asset has negative correlation with size while positive with Z score and BE/ME. Book to market ration and size has negative correlation.

Table 4.5 Correlation analysis for risk factors

	RMF	***SMB***	***HML***	***HRMLR***
RMF	1			
SMB	0.060	1		
HML	-0.065	0.366	1	
HRMLR	-0.037	-0.681	-0.255	1

NOTE: RMF; market premium, SMB; size premium, HML; value premium, HRMLR; distress risk premium

Table 4.5 exhibit correlation among different risk factors. Distress risk premium has negative correlation with size premium, value premium and market premium. Value premium has negative correlation with market premium while positive correlation with size premium. Also size premium has positive correlation with market premium.

Table 4.6 Analysis results of single and three factor model

	P	P	S	S	B	B
α	-0.003	-0.002	-0.007	-0.002	0.000	-0.002
	(0.004)	(0.003)	(0.006)	(0.003)	(0.004)	(0.003))
β_1	0.940***	0.930***	0.977***	0.930***	0.903***	0.930***
	(0.067)	(0.060)	(0.102)	(0.060)	(0.065)	(0.060)
β_2		0.233***		0.733***		-0.267***
		(0.052)		(0.052)		(0.052)
β_3		0.139		0.139*		0.139*
		(0.080)		(0.080)		(0.080)
Adj R^2	0.602	0.678	0.407	0.797	0.593	0.656
F stat	199	93	91	173	192	84
F sign	0.00	0.00	0.00	0.00	0.00	0.00

*Note: P portfolio consists of all stocks (arranged in descending order with respect to size); S portfolio consists of first 50% stocks of P portfolio having small size; B portfolio consists of remaining 50% stocks of P portfolio having big size; β1-coefficient of Mkt; β2-coefficientof SMB; β3-coefficient of HML;; R2=Adjusted R square; F stat= F statistics; F sig=F significance. Value enclosed in parenthesis report standard error. P<0.01*** p<0.05** p<0.1**

Table 4.6 exhibits the results of single factor CAPM and three factor model based on market premium, size premium and value premium. Result shows that market premium is significantly positive and explains 60.2% of the total variation in returns of portfolio of all the stocks at 99% confidence level so capital asset pricing model is a valid model for portfolios of all the stocks. Overall when size premium is added, its effect on the portfolio of all stocks is significant. Similarly, the impact of value premium is insignificant.

In small stock portfolios, market premium is significantly positive at 99% confidence level and explains 40.7% of total variations in return of small stock portfolios. Size premium has significantly positive impact on the return of small stock portfolios and explains 79.7% of total variation whereas value premium has insignificant impact on the returns of small stock portfolios.

In big stock portfolios, market premium is significantly positive at 99% confidence level and explains 59.3% of total variations in return of portfolios. When size premium is added it has the

significantly negative impact on the return and explains 65.5% of total variation in return of big stock portfolios. When value premium is added it has insignificant impact on portfolio of big stocks.

Table 4.7 show the results of single factor CAPM and three factor model based on MKT (market premium), SMB (size premium) and HML (value premium). Results indicate that market premium is positive and significant for all portfolios. Size premium is positive and significant for all portfolios except for portfolio having high risk (H/R) for which it is positive and insignificant. Value premium is positive and significant for portfolio having high book to market ratio while negative and significant for portfolios having low book to market ratios. Also value premium is positive and insignificant for both portfolios having high and low distress risk.

Table 4.7 Analysis results of single and three factor model

	S/H	**S/H**	**S/L**	**S/L**	**H/R**	**H/R**	**L/R**	**L/R**
α	-0.007	-0.004	-0.007	0.000	-0.002	-0.002	-0.006	-0.002
	(0.007)	(0.003)	(0.005)	(0.004)	(0.004)	(0.004)	(0.006)	(0.004)
β_1	1.065***	1.050***	0.889***	0.810***	0.784***	0.782***	0.819***	0.779***
	(0.133)	(0.062)	(0.099)	(0.072)	(0.074)	(0.075)	(0.102)	(0.081)
β_2		0.781***		0.685***		0.058		0.567***
		(0.053)		(0.062)		(0.065)		(0.070)
β_3		0.819***		-0.541***		0.038		0.045
		(0.082)		(0.096)		(0.100)		(0.108)
Adj R^2	0.324	0.857	0.377	0.678	0.458	0.455	0.328	0.577
F stat	64	263	80	93	112	38	65	61
F sign	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

*S/H portfolio consists of stocks having small size and high BE/ME ratio; S/L portfolio consists of stocks having small size and low BE/ME ratio; B/H portfolio consists of stocks having big size and high BE/ME ratio; B/L portfolio consists of stocks having big size and low BE/ME ratio.HR portfolio consist of stocks(first 50% of p) having small size and high z score value and LR portfolio consist of stocks(remaining 50% of p) having big size and low z score value. ; β1-coefficient of Mkt; β2-coefficientof SMB; β3-coefficient of HML; R2=Adjusted R square; F stat= F statistics; F sig=F significance. Value enclosed in parenthesis report standard error. P<0.01*** p<0.05** p<0.1*.*

Table 4.8 Analysis results of single and three factor model

	B/H	B/H	B/L	B/L
α	0.004	0.000	-0.003	-0.004
	(0.004)	(0.004)	(0.004)	(0.003)
β_1	0.763***	0.810***	1.043***	1.050***
	(0.080)	(0.072)	(0.068)	(0.062)
β_2		-0.315***		-0.219***
		(0.062)		(0.053)
β_3		0.459***		-0.181**
		(0.096)		(0.082)
Adj R^2	0.406	0.528	0.640	0.710
F stat	91	50	234	108
F sing	0.00	0.00	0.00	0.00

*B/H portfolio consists of stocks having big size and high BE/ME ratio; B/L portfolio consists of stocks having big size and low BE/ME ratio; β1-coefficient of Mkt; β2-coefficientof SMB; β3-coefficient of HML; β4-coefficient of HRMLR; R2=Adjusted R square; F stat= F statistics; F sig=F significance. Value enclosed in parenthesis report standard error. P<0.01*** p<0.05** p<0.1*.*

Table 4.8 results reveal that market premium is positive and significant for all type of portfolios. It is also found that SMB is significant and negative for both portfolios whether B/H or B/L. HML is positive and significant for portfolios having big size and high book to market ratio while negative and significant for portfolios having big size and low book to market ratio. Distress risk premium is significant and negative for portfolios having big size and high book to market ratio as well as for portfolios having big size and low book to market ratio. It indicates that high BE/ME stocks outperform low BTM ratio stocks. Also results of size and value premium are consistent with the previous study of Hassan and Javed (2011). Thus it can be concluded that these factors exist in Pakistan equity market and investors should consider these factors as an evaluation tool while making investment decision.

Table 4.9 show the results of four factor model based on CAMEL analysis. Across all the portfolios market premium along with size premium show positive and significant relationship supported with R^2 ranging from 52% to 80%. Signs of coefficients for HML factor was negative for low BE/ME stocks (S/L) and was positive for high BE/ME stocks (S/H) indicating existence of value premium. Similarly, signs of coefficients for financial distress factor are negative for stocks having low risk (L/R) and positive for stocks having high risk (H/R) indicating existence of value premium. The explanatory power of four factor model based on financial distress factor is higher than single factor model CAPM and three factor Fama and French (1992) model. However, CAPM results shows that MKT is significant and positively related to all portfolios returns while the intercept is found insignificant.

Table 4.9 Four factor model results based on CAMEL analysis

	P	**S**	**B**	**S/H**	**S/L**	**B/H**	**B/L**	**LR**	**HR**
α	-0.002 (0.003)	-0.002 (0.003)	0.002 (0.003)	-0.004 (0.003)	0.000 (0.004)	0.000 (0.004)	-0.004 (0.003)	-0.002 (0.003)	-0.002 (0.003)
β_1	0.938 (0.060)***	0.938 (0.060)***	0.938 (0.060)***	1.054 (0.062)***	0.821 (0.071)***	00.821 (0.071)***	1.054 (0.062)***	0.938 (0.060)***	0.938 (0.060)***
β_2	0.190 (0.059)***	0.690 (0.059)***	-0.310 (0.059)***	0.758 (0.060)***	0.623 (0.070)***	-0.377 (0.070)***	-0.242 (0.060)***	0.190 (0.059)***	0.190 (0.059)***
β_3	0.127 (0.080)	0.127 (0.081)	0.127 (0.080)	0.812 (0.083)***	-0.558 (0.095)***	0.442 (0.095)***	-0.188 (0.083) **	0.127 (0.080)	0.127 (0.080)
β_4	0.120 (0.076)	0.120 (0.076)	0.0120 (0.076)	0.065 (0.078)	0.176 (0.090)*	0.176 (0.090)*	0.065 (0.078)	-0.380 (0.076)***	0.620 (0.076)***
Adj R^2	0.676	0.800	0.665	0.86	0.685	0.525	0.709	0.751	0.685
F stat	71	132	62	200.37	69.39	37.24	99.70	72	72.35
F sign	00	00	00	0.00	0.00	0.00	0.00	0.00	0.00

*β1-coefficient of Mkt; β2-coefficientof SMB; β3-coefficient of HML; β4-coefficient of HRMLR; R2=Adjusted R square; F stat= F statistics; F sig=F significance. Value enclosed in parenthesis report standard error. P<0.01*** p<0.05** p<0.1*.*

Table 4.10 Four factor model results based on Altman's Z score analysis

	P	S	B	S/H	S/L	B/H	B/L	LR	HR
α	-0.002	-0.002	-0.002	-0.004	0.000	0.000	-0.004	-0.002	-0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)
β_1	0.931***	0.931***	0.931***	1.050***	0.811***	0.811***	1.050***	0.781***	0.781***
	(0.058)	(0.058)	(0.058)	(0.062)	(0.067)	(0.067)	(0.062)	(0.072)	(0.072)
β_2	0.091	0.591***	-0.409***	0.730***	0.453 ***	-0.547***	-0.270***	0.245***	0.245***
	(0.066)	(0.066)	(0.066)	(0.070)	(0.076)	(0.076)	(0.070)	(0.082)	(0.082)
β_3	0.137	0.137*	0.137*	0.818***	-0.544***	0.456***	-0.182**	0.041	0.041
	(0.077)	(0.077)	(0.077)	(0.082)	(0.089)	(0.089)	(0.082)	(0.096)	(0.096)
β_4	-0.278***	-0.278***	-0.278***	-0.099	-0.457***	-0.457***	-0.099	-0.633***	0.367***
	(0.085)	(0.085)	(0.085)	(0.090)	(0.097)	(0.097)	(0.090)	(0.105)	(0.105)
Adj R^2	0.701	0.812	0.681	0.858	0.723	0.594	0.710	0.669	0.499
F stat	78	142	71	198	87	48.93	81	67	34
F sign	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

*β1-coefficient of Mkt; β2-coefficientof SMB; β3-coefficient of HML; β4-coefficient of HRMLR; R2=Adjusted R square; F stat= F statistics; F sig=F significance. Value enclosed in parenthesis report standard error. P<0.01*** p<0.05** p<0.1*.*

Table 4.10 show the results of four factor model based on Altman's Z score analysis. Across all the portfolios market premium along with size premium show positive and significant relationship supported with R^2 ranging from 50% to 86%. Signs of coefficients for HML factor was negative for low BE/ME stocks (S/L) and was positive for high BE/ME stocks (S/H) indicating existence of value premium. Similarly, signs of coefficients for financial distress factor are negative for stocks having low risk (L/R) and positive for stocks having high risk (H/R) indicating existence of value premium. The explanatory power of four factor model based on financial distress factor is higher than single factor model CAPM and three factor Fama and French (1992) model. However, CAPM results shows that MKT is significant and positively related to all portfolios returns while the intercept is found insignificant.

Table 4.11 exhibit the results of characteristics model based on Altman's Z score for all stocks for the period of 2008 to 2018. Market return, size and book to market ratio of a stock has a significant and positive impact on stock returns. The explanatory power of model is 36%. Financial distress is unable to predict the stock return. Dummy is used for 2008 crises which is found negative and insignificant.

Table 4.11 Regression analysis for characteristics model based on Altman's Z score

	Coefficient	**Standard error**	**P value**
$\boldsymbol{\alpha}$	-1.325	0.288	0.000
$\boldsymbol{\beta_1}$	0.906	0.097	0.000
$\boldsymbol{\beta_2}$	0.050	0.011	0.000
$\boldsymbol{\beta_3}$	0.258	0.049	0.000
$\boldsymbol{\beta_4}$	-0.085	0.065	0.192
$\boldsymbol{\beta_5}$	-0.058	0.038	0.128
F-statistic	25.963		
Prob(F-statistic)	0.000		
Adj R^2	0.363		

Note:β1-coefficient of market return; β2-coefficientof size of stock; β3-coefficient of book to market ratio; β4-coefficient of distress risk; R2=Adjusted R square; F stat= F statistics; ; β5 is used for dummy.

Table 4.12 Regression analysis for characteristics model based on CAMEL

	Coefficient	Standard error	P value
α	0.647	0.023	0.000
β_1	0.052	0.019	0.007
β_2	0.001	0.001	0.327
β_3	-0.023	0.008	0.005
β_4	0.442	0.006	0.000

Note:β1-coefficient of market return; β2-coefficientof size of stock; β3-coefficient of book to market ratio; β4-coefficient of distress risk(PI)

Table 4.12 exhibit the results of characteristics model based on CAMEL analysis for the period of 2008 to 2018. Market return, book to market ratio of a stock and performance index value calculated through CAMEL model has a significant and positive relationship with stock returns. When PI value is added in the model instead of Z score then Size become unable to explain variation in stock return.

Chapter No 5

Conclusion and Recommendations

In this study financial distress is combined with other asset pricing model. This study has examine the asset pricing mechanism in Pakistan financial sector from 2008 to 2018 by using monthly banking stock returns. Across all portfolios, the existence of market premium as well as size, value and financial distress premium is well supported with R square value ranging from 32% to 86%. To illustrate the combine effect of size, value and financial distress premium, Fama and French multifactor factor model has been tested.

Size premium is found significantly positively related to small size sorted portfolio returns but it is negatively significant for big size sorted portfolio returns. Value premium is found positive and significant for value stocks except growth stocks. So, it can be argued that size and book to market effect is present in Pakistan financial sector. Value stocks outperform growth stocks. When financial distress premium is added the explanatory power of model is better than CAPM. The financial distress premium is influencing insignificantly on small stocks with high book to market ratio. In case of small stocks with low book to market ratio it is influencing significantly negative. For the big stocks, it is influencing significantly negative on stocks with high book to market ratio and insignificantly negative on stocks having low book to market ratio. Financial distress premium is positive and significant for stocks possessing high financial distress risk (H/R) whereas negative and significant for stocks possessing low financial distress risk (L/R). It indicate that financial distress factor is also priced in financial sector of Pakistan. The findings of the study further clarifies that FF three factor and multifactor model significantly describes the portfolio returns of banking stock in Pakistan financial market.

The estimated coefficients are also encouraging for the existence of the all aforementioned factors. The MKT dominates other three factors across all the portfolios. The SMB is the second dominant across all markets. Coefficients signs were mostly positive for small portfolio and negative for large portfolio promising the presence of MKT and consistent with the FF proposition. Similarly, signs of coefficients for HML factor across all the portfolios was negative for B/L and S/L even though positive for B/H and S/H confirming the existence of HML. By comparing the beta's values of factor based model and characteristic based model we found that characteristic based model assume lower risk.

Recommendation:

Our results are applicable for decision makers and fund managers. Investors and corporate managers can use this model as an investment tool for managing their portfolios and determination of fair value of securities. From policy maker's perspective, a rationally explained size effect implies that the Pakistan financial market is becoming informationally more efficient over time. So, top management should account for Size, Value and Financial distress factors in their decisions regarding investment, financing and valuation of securities.

Directions for future research:

To explore the relationship between different risk factors and banking stock returns, in future study should be done with large sample size. Also other factors can be added i.e liquidity premium etc as an additional risk factor in multifactor model to check its impact on banking stock returns in the context of Pakistan financial market. Finally, the present study gives an appropriate direction to the future studies to be taken in terms of risk factors and factor models.

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Appendix (I)

List of commercial banks

1) Allied bank
2) National Bank Of Pakistan
3) Askari bank limited
4) Bank alhabib limited
5) Bank alfalah limited
6) Bank of khyber limited
7) Bank punjab limited
8) BankIslami pakistan limited
9) Faysal bank limited
10) Habib bank limited
11) Habib metropolitan bank limited
12) JS Bank ltd
13) MCB Bank limited
14) Meezan bank limited
15) Silk bank limited
16) Soneri bank limited
17) Standard chartered bank
18) Summit bank limited
19) United limited
20) Samba bank