The Firm-Specific Determinants of Systematic Risk-Evidence from Pakistan Stock Exchange

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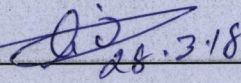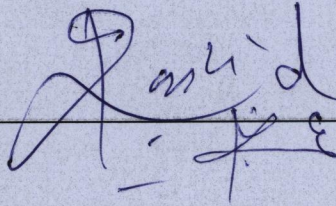# The Firm-Specific Determinants of Systematic Risk-Evidence from Pakistan Stock Exchange

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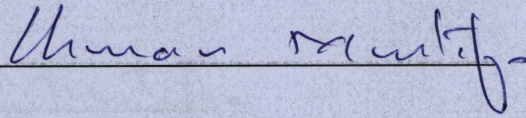**For the Pakistan Institute of Development Economics, Islamabad**

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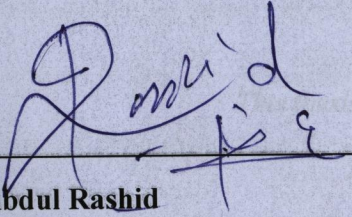**PIDE, Islamabad.**

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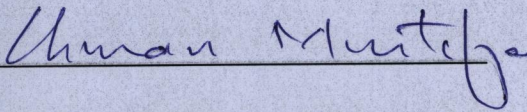
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Dedication

This thesis is proudly dedicated to

Almighty Allah

And

All my beloved family, my parents, my teachers and my friends

Thanks for your endless love, sacrifices, prayers,

Support, guidance and advices.

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ABSTRACT

This thesis examines the relationship between the systematic risk and the firm-specific variables of non-financial companies listed on Pakistan Stock Exchange. The thesis uses the beta of market model as proxy for the systematic risk of the firm and investigates its relationships with seven financial variables of the non-financial firms. The findings of 135 non-financial firms listed on Pakistan Stock Exchange obtained from fixed effects model over the period of 5 years from 2011 to 2015 indicate that the positive relationship of financial leverage and profitability with the systematic risk of firms, whereas, the size, liquidity and activity has negative impact on the systematic risk of the firm. The study disapproved the relation of two variables which are growth and operating leverage with the systematic risk. Moreover, the study has successfully implied the relationship between firm-specific variables and systematic risk which can be helpful in practical contribution in Pakistan to investors, managers and business owners in many ways.

JEL Classification Codes: G01, C23, G120

Keywords: Systematic Risk, Panel Data Models, CAPM, Financial Variables, Pakistan Stock Exchange

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CHAPTER I

INTRODUCTION

1.1 Introduction of risk

Risk is signified by the variance of future return that shows the uncertainty from the payoffs of investments. The risk will determine the criteria of rate of return on an investment and that same rate cannot be applied until the projects carry the same risk (Ball and Brown, 1969). Mostly, companies of wide-range do not put all the eggs in one basket and considers mutual reliance between the risk and return of different securities. The annual reports assist the capital market in forming the covariances of the returns from assets, thus it will surely provide the valuable information about the risk particularly the predictive ability of the financial variables in explaining the systematic risk of the firm. The investigation of systematic risk (measured by beta) of non-financial companies will be helpful to the stakeholders to improve the return for their project. The estimation of beta would enable the decision makers of non-financial firms in making the strategies and guidelines to enrich the firms value and diminish risk. This will lead to increase in the wealth of stakeholders particularly for the shareholders.

The solitary efforts of firm cannot alter the systematic risk caused by the market. However, the measurement of the market risk with the help of financial variables based on accounting risk explains the extent that how much a firm is affected by systematic risk. The past literature considered different variables that have the predictive ability in explaining the market risk comprehended by the different countries.

The total risk of stock is the combination of two: first is the unsystematic risk that could be any firm specific event that results in unsystematic risk that can be diversified by the universe of different stock while the other is the market risk which is non-diversifiable. Gu and Kim (2002) revealed the importance of information and estimation of systematic risk to understand the nature of risk (variance) in the stock. The study revealed the Casino industry analysis that includes the 92% of unsystematic risk that account for variance. It showed the importance of a firm's asset efficiency of generating more output would be critical for the systematic risk in enhancing the firm's value.

When the risk is associated with the investments, then there will be probability of earning less than the expected. For this purpose, an investor need the rate that helps to take part in the trading activity which is the rate of return that associated with the risk. The greater the risk, there will be higher rate of return which logically means that investors need premium for the more volatile expected return to finance its projects. The Capital Asset Pricing Model (CAPM) has been proposed by Sharp (1964) to measure the risk and return relationship which is based on the tremendous work of the Markowitz (1959). The systematic risk considered to be of great concern for the estimation of expected return on asset.

As the first asset pricing theory, CAPM contributes in the valuation of the of risky assets and the method to measure the systematic risk of the stock. This concept assumes the efficient market hypothesis which was developed by Fama in 1970 can be found in the literature of finance. This hypothesize that the *market* reflects the fair and unbiased prices for a short span of time and the relevant information floating in market would be readily adjusted in the prices.

Beaver *et al.,* (1970) presented the first empirical study that measures the association between the accounting risk and the market risk. The study found that the differential riskiness of securities can also be reflected through the accounting based risk and strategy to rank portfolio through accounting measures of risk makes no difference than ranked by the market measures of risk. While the market betas also vary with macroeconomic indicators which means the beta is also a macro factor (Andersen *et al.,* 2005) in determining the macro-economic effects on the expected returns of business.

An investor wants to invest in the financial securities, the most important factor is the systematic risk. The systematic risk is the market risk which can be measured by beta. The financial decision making depends on this risk because it is associated with the firm decision and the equity market. Therefore, the results showed that the non-financial firms have beta which increases with stock market ups and downs which may affect the business of the firm because of the negative relationship between beta and sales to total assets (Eldomiaty *et al.,* 2009).

Even though the systematic risk cannot be eliminated, it can only be monitored and optimized by understanding the factors influencing it. The consideration of systematic risk in the decisions regarding financial and investments is crucial in relation to the stock market. These decisions are great deal of importance for the two groups of people. For the executives or directors of the

companies who always in search of an access to capital resources which are low-cost, low-risk and long-term. It is a critical problem for the firms, because any funding comprises in some charges which had better to be paid by the firm through the returns on its assets/investments, and the failure in payment of such funds will outcome in serious problems. For the financiers or can be the stockholders who are in quest of more profits and lesser risks, this issue is a matter of great concern to them. They require financial decisions to be made in a manner to grasp an increase in the firm's profitability and value as well (Saidi and Edrispour, 2012).

This study chooses the firm-specific determinants which are indicated by the financial variables as independent variables and investigates how they affect the systematic risk of the firm. However, financial variables are easy available for the external stakeholders like investors. These financial ratios are publicly published in the financial reports of each company. And also, the standardized measurements used help in making the comparisons across companies and varying time period.

The study of relationship between the systematic risk and the financial variables has been discussed much in the literature of finance. The past studies like Beaver et al. (1970), Genodes *et al.,* (1973), Gu and Kim (2002), Mandelker and Rhee (1984), Borde (1198), Alaghi (2013), Lee and Jang (2007), Rowe and Kim (2007), Eldomiaty *et al.*, (2009), Arslan (2013), Logue and Merville (1972), Hamada (1972) and Hong and Sarkar (2002) includes different financial variable indicators. These include firm size, profitability, liquidity, growth, financial leverage, operating leverage, activity ratio, etc. These studies have mixed conclusion and not exact because of the different sample of companies and time period but they offer a strong theoretical basis for this study.

1.2 Literature gap:

In the recent years, there has been an increased focus on the relationship between the systematic risk and financial factors in the mature countries. But in context of Pakistan, there are not many studies like (Iqbal and Shah, 2012) which used the data of 93 non-financial firms covering the time period from 2005 to 2009. The study investigated the predictive ability of eight accounting and financial variables which includes liquidity, firm size, market value of equity, dividend-payout, financial leverage, operating efficiency, profitability and growth on the systematic risk of the firm. Therefore, in evolving markets like Pakistan, few case studies have been identified that are based

on the realistic data. The result of the past researches on the systematic risk is contradictory or even inconclusive for some variables. Consequently, more research is needed to focus on the sample size of the firms, the inclusion of most relevant variables and period which is more recent that brings recent findings to the existing literature.

The current study aims at fulfilling this literature gap with much possible recent time period with the help of sufficient sample from Pakistan Stock Exchange. This study helps to investigate the more firm-specific determinants of systematic risk of the firm.

1.3 Research problem

Wealth can be generated or depleted based on the ultimate result of decisions about financial policies. These will significantly affect the systematic risk which leads to influence the stock prices. Consequently, it is necessary to understand the concepts that directs investors to make better decisions for investments. Pakistan Stock Exchange is an emerging stock market that includes the high probability of risk. The quality of information published in the annual reports of companies listed at Pakistan Stock Exchange has been a contentious issue as discussed widely in the literature of finance and accounting given in the literature section. Past researches on CAPM has depicted the importance of measuring risk that help to estimate the return of the stock and role of systematic risk in affecting most of the investments.

In case of Pakistan Stock Exchange, there exists rare studies that determines the factors contributing the systematic risk of the firm. The current study is designed only to estimate the level of systematic risk that can be explained by varieties of the firm-specific factors like financial characteristics or variables of the companies listed on Pakistan Stock Exchange and the relationship between the variables and the systematic risk of the firm.

1.4 Research questions

In this study, there are questions that need to be analyzed and answered empirically regarding the Pakistan Stock Exchange:

i. How the CAPM framework helps in measuring the systematic risk of firm?
ii. What are the firm-specific factors that are contributing into the systematic risk of the firm?

1.5 Research objectives

The objectives of the study that provides an outline for the accomplishment of this study and the focus on the target are necessary which are as follows:

i. To estimate the systematic risk for each firm in CAPM framework.
ii. To examine the firm-specific determinants of systematic risk.

1.6 Significance of the study

The current study will contribute in the past literature on systematic risk in Pakistan Stock Exchange by providing the findings of more recent time period to the existing literature. The study will check the consistency of the results found from the previous researches up to date. This would be beneficial for making the foundation for the future researchers in theory and practice in the filed of corporate financial management.

For the investors, this study will have important practical implication in making financing decision regarding the assessment about the prospect of risk and return relation of the stock. This study will demonstrate the role and nature of each factors towards the systematic risk that will help the firms to increase the expected return by making useful investment strategies.

The empirical evidence of this study is not significantly important for the investors but also for the managers, executives, government and regulatory agencies. As updating the past research with recent findings that can help the stakeholders in different situations like the estimation of

systematic risk is possible with the help of firm-specific determinants when there will be non-availability of the market data in case of private held companies.

The study may also contribute to the accounting regulatory agencies that can formulate the new rules with the consideration of systematic risk in mind. As the accounting information helps in estimation of the risk faced by the firms. Therefore, the publication of financial ratios that help the investors to understand the risk of the firm and the future prospects of different firms listed on the stock exchange.

1.7 Plan of the study

The study is structured into 5 chapters. The first chapter of the study includes the introduction of the main topic, literature gap, research problem, research questions and objectives and the significance of the study. The second chapter sheds light onto the literature review of the past studies along with hypothesis generated, theoretical backgrounds and the frameworks. Afterward, the third chapter describes the data description and employed methodology framework of study. The fourth chapter provides empirical evidence for the study and detailed discussions. The final fifth chapter concludes the overall study along with its practical implications and the limitations associated with it.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

This chapter assessed the literature to obtain information about the firm-specific determinants and their impact on the systematic risk of the firms based on various models. This chapter is structured in a manner that at first the theoretical background of the concerned theories is presented which followed by the empirical review and the table summing up the conclusions of different studies.

2.2 Theoretical background

Theoretical background provides an insight of theories that are relevant to the study. A theory is necessary to define the concepts and formulate to explain the process and the facts. Therefore, certain theories have supported this study that have been discussed as follows:

2.2.1 Portfolio theory

The portfolio theory is considered modern portfolio theory which was presented by Markowitz. The theory explains the mathematical models that can construct an ideal portfolio that provides maximum return based on the risk appetite of investors by keeping in view the risk and return relationship. The formed portfolio has risk that is significantly lesser than the individual security. Hence, when any investment is made then the challenge is not only the selection of stocks only but also the optimum point where the merging stocks to invest provide maximum return and minimum level of risk. The theory emphasizes on the diminution of risk relating to portfolio by the help of diversification.

This modern portfolio theory becomes the base of the study of systematic risk which was denoted to as covariance risk. Markowitz (1952) stated that the advantage of the diversification is possible when there is negative value of correlation among the securities in portfolio and in this way, the positive will be value of correlation then diminishing would be the benefit of diversification. Hence, the systematic risk is identified and acknowledged as the risk that is relayed to any security and the portfolio but did not be able to provide the measures to estimate the systematic risk and the factors determining this risk.

2.2.2 Asset pricing theory

The theory related to asset pricing is all about estimating the value or price of the financial asset in this world of uncertainty. This depicts the element of risk associated with each investment opportunity that would give the return on security. An investor always tries to capture opportunities that give more return and less risk associated to it. The tremendous work of Markowitz (1959) considered to be the foundations of many asset pricing models. The two-classical model of asset pricing models are explained as:

Capital asset pricing model is the remarkable work done by Sharpe (1964) for which he got Nobel Prize in 1990 and later this work was extended by many researchers. It is the most used model for calculating the cost of equity of firms, to examine the performance of portfolios and an introduction to the important concepts of portfolio theory. It lays foundation on the work by Markowitz's (1959) mean variance criteria. The logic behind the CAPM is to determine the risk and return relationship in mean efficient portfolio (Fama & French, 2004). The model has failed empirically to prove that the return of security is linear function of systematic risk (beta) contained by the security. Its applicability to Karachi Stock Market discussed later in the empirical review. (Akbar & Ali, 2010). However, often CAPM used in measuring the performance of mutual funds. The criticism of CAPM started based on different reasons and Roll (1997) declares that it is impossible to create truly diversified portfolio as the composition of true portfolio includes every opportunity of investment in each market that may be uncertain but has some marketable value, therefore, it creates hurdle in testing the CAPM.

Arbitrage pricing theory is generated to eliminate the problem of identifying the true market portfolio which CAPM unable to done entirely. The APT proposed that return of security is the linear function of many other factors because it assumed that there are a lot of betas or sources of risks that cannot be eliminated from diversification. Ross (1976) introduced this model which considered to be the alternative of mean-variance model given by Sharp (1964). The APT was tested in many markets to check the validity of this theory. A critical issue while testing the APT was reported by many studies that the factors increases with the increase in securities.

The modeling of time varying variances and co-variances by the help of new econometrics times series techniques called *ARCH* (autoregressive conditional heteroskedasticity), introduces by Engle (1982), considered to important to extract strong evidence on the risk return relationship as compared to the unconditional modeling (Bollerslev, Engle and Nelson, 1994). The dynamic asset pricing relationships often gear into different issues which needs to be solved timely, but the unconditional covariance matrix depends on the past states, hence, these econometric techniques crucial for many finance issues.

2.3 Empirical literature

The linkage between the stock market and financial decision cannot be understand without incorporating the risk factor. The importance of risk can be assessed while valuing the security for investment. The firm's decisions which are related to the stock market and the investors expectations and if firms have ambiguity in its decision making then, it certainly affects the investors in valuing the stocks contrary to their expectations. The future prospect of firms cannot be assessed truly or be decision usefulness. The need of estimating risk is highlighted in making the financial decisions especially of systematic risk which affects most of the investments. Prior literature is interested to estimate the systematic risk which is most important for decision usefulness. Therefore, systematic risk is the matter of concern and challenge for investors to calculate expected return through its estimations while unsystematic risk is considered to be diversifiable which goes unrewarded at equilibrium specified by Capital Asset Pricing Model (Theobald, 1980).

In the past, there exist the diversification of investment but the only thing that lacked was the adequacy of investment theory that can differentiate between the efficient and inefficient portfolio by considering the risk and return relationship. That literature gap was fulfilled by Markowitz in 1952 through his exceptional work on portfolio selection theory. The theory put forward the set of mean-variance combinations that provide investors a choice of desired risk-return combination. In the literature of finance, the mean-variance criterion turns into extensively used and applied to establish a relationship between expected risk and expected return of asset. Sharpe (1964) established a theory of market equilibrium under the condition of risk and shows the Capital Market Line that depict the rates of return (for efficient portfolios) subject to the standard deviation (for market portfolio) and risk-free rate of return. The study concluded that assessment of risk is

related to the change in rate of return with subject to level of economic activity because the changes or responsiveness of return rates due to economic fluctuations cannot be eliminated by diversification and that leads to systematic risk which even exists in the efficient portfolio while other component of total risk is diversifiable which is called unsystematic risk.

Akbar and Ali (2010) attempted to test the validity of CAPM in Pakistan Equity Market. For it, the authors used the Sharpe and Linter's linear equation that shows the relationship between the return and beta of a security. The validity of CAPM is being investigated by applying cross-sectional regression of return on beta of that security. Moreover, they used observations of 34 listed companies on stock exchange and used certain reports of State Bank of Pakistan for the determination of 6-months risk free rate of treasury bills as proxy. The paper concludes that the intercept term remained to be significant in employed models but the addition of other factors like co-skewness that was statistically insignificant with positively valued. The other factor was co-kurtosis risk that was insignificant in model with negatively priced in Pakistan Equity Market.

Qamar, Rehman and Shah (2013) conducted a research that helped to prove the CAPM applicability in Pakistan Stock Markets. This study aimed at understanding the importance of CAPM in evaluating the relationship between risk and return of security in Pakistan Stock Exchange by Sharp (1965) and Linter (1965) approach. This study entails 10 companies trading on KSE-100 index through systematic sampling and risk-free rate is picked from the National Saving Certificates. The data used in this research was of 5 years from 2006 to 2010 and regression analysis was employed. The result matches the already done studies on Karachi Stock Exchange which means that the actual return and the expected return is different with little bit-variation for few periods. The half of sample showed the validity of CAPM in few results out of 51. One table shows that the expected return was greater than actual while other was entirely different showed undervalued expected return of 8 companies. Hence, the study concludes the CAPM as non-applicable on securities trading on Karachi Stock Exchange.

Rashid and Hamid (2015) attempted to analyse the mean variance and downside risk of Capital Asset Pricing Model (CAPM). The authors investigate the downside beta to check that how it is better able to explain the return on stock. The paper also aimed to investigate the response of investors when return co-vary with declining market that that of rising market. The data collected of 13 years from January 2000 to December 2012 which was of closing prices of stocks of 63

companies listed in KSE-100 index. The two-pass regression analysis is done to estimate the downside beta and non-normal distribution is eliminated through the GMM. The study investigates the downside beta as appropriate to find the risk associated with investment that that of conventional beta. The results of study showed the CAPM does not hold true for the Karachi Stock Exchange because the by adding beta as explanatory variable, the risk premium remains negative and a bit significant for few times which means that it is different from zero in overall period examined. While the DR-CAPM shows the return-risk relation positive but insignificant which means downside risk better explains the observation of investors related to its investment decisions.

Shah and Asalya (2013) tested the Capital Asset Pricing Model on the Karachi Stock Exchange. This paper highlights the importance of the expected return on the investment with the help of wise decision making and can be measured through the CAPM. The model used helps to determine the return on the investment along with the risk averse mind of the investor. They selected 10 companies that were trading on the KSE-30 index and cannot use the concept of efficient market due to political situation in country and due to insider trading effects. The data collected includes weekly return of companies between February 2009 and January 2013. The authors used the cross-sectional regression of Fama & Macbeth (2013). The result answers the hypothesis that the non-linear relationship between the risk and return which means the higher risk will gear into low return and vice versa. The applicability of CAPM becomes difficult due to non-zero intercept and revealed the high-risk premium for the last periods and last but no least that the stock exchange like Pakistan Stock Exchange, there is also inclusion of other risk (i.e, political) rather than just systematic risk that are linked with the expected return.

Shamim, Abid and Shaikh (2014) investigated the validity of Capital Asset Pricing Model (CAPM) by using the data of companies trading at Karachi Stock Exchange. The paper discussed the situation of Karachi Stock Exchange which is instable and one cannot easily quantify the risk associated with the stock. For which, the authors took the data of 1 company from each 22 sectors for the period of 5 years from 2008 to 2012. The regression analysis was employed to analyze the data. The empirical findings from stationary test and ADF unit root test revealed that the excess return and required rate of return are stationery and the only 3 out of 22 sectors having normal beta

of value between 1 and 0.5. Therefore, the specific time could not postulate the overall behaviour of investor and it showed the non-validity of CAPM in estimating the expected return and risk of security in Karachi Stock Exchange.

The systematic risk, measured by beta, changes along with the variance of economic event changes. The beta also changes up to the extent of these economic changes. Hence, it showed the sharp difference between estimation of past and prediction of future value of beta. Rosenberg and Guy (1995) also put forward the criteria for valuing the beta (estimation or prediction) ascends from the requirements of usage. One of the most frequent use of beta is the performance appraisal of historical investment. The assumptions of capital markets theory fairly specify that beta can be used to examine the historical investment and can serve as decision usefulness for the investors. The prediction of future beta is the main component in the decisions related to investment strategy. Therefore, this beta would help the investors to predict the future movements of market and making the portfolio that linearized the relationship between risk and expected return.

Hong and Sarkar (2007) conducted a comprehensive study on determining the systematic risk of equity and its determinants. An attempt has been made to fill the gap of the lack of theory to support the research study by developing the theoretical model. The study aimed at creating and testing the Contingent Claim Model using variables of both fundamental and firm-specific variables. They used the model by testing US firms of S&P 500 index and computed the beta by through time series data of last 5 years. The empirical results of this study provide evidence that beta is the increasing function of leverage, market price of risk, correlation, volatility and growth. However, it is decreasing function of earnings level, tax rate and growth rate that shows the support towards the model predictions. The practical implication of estimating beta is helpful in event study in which impact of firm decisions are estimated in the market and other includes cumulative abnormal return (CAR) measurement, effective capital budgeting choices, better estimation of fair value as per recommendation of FASB.

Eldomiaty *et al.,* (2009) has documented a rare study in the DFM General Index that investigated the importance of financial information in explaining the systematic risk. The study examined the relationship between the financial information as indicated by financial ratios and systematic risk of three type of industry which were bank sector, insurance sector and nonfinancial sector. The sample of this study entails the dataset of 20 firms of DFM General index for 3 years and Ordinary

Least Square (OLS) model used for examining the proposed relationships. The findings of study support the previous literature that market fluctuations negatively affect the systematic risk and usually causing it to rise and study also showed negative ratio of Sales to Total Assets revealing the hampered sales then that of rising beta in the non-financial sector making the growth rate and book value of asset quite to be the statistically significant determinant of systematic risk. Therefore, it was recommended that financial information must include the ratio-based analysis for investors to help them in analyzing the true value of investment and to monitor the systematic risk.

Mnzava (2009) considered the corporation tax as one of the factor influencing the systematic risk. For this purpose, the study incorporates 197 firms of UK and taken changes in corporation taxes of 1984 as event to study along with the fundamental determinants of systematic risk as control variables. The time series and cross-sectional regression used for analysis and both results in decrease in systematic risk as changes in corporation tax of 1984 ascertaining the effect tax rate to be determinant of systematic risk whereas return on assets, leverage, growth, financial risk and risk of real asset to be positively related to systematic risk.

Keeping in view the empirical literature, this study focused on narrowing down the importance of the risk and also its determinants. The hypotheses are generated that build the relationship between firm-specific factors and the systematic risk based on past literature. This study will capture the recent time period that fulfills the literature gap and the addresses the contradictory and inconclusive results of past studies.

2.4 Firm-Specific Determinants of Systematic Risk:

To understand the factors that are contributing the systematic risk in the total risk of firm captured a lot of attention in the previous literature of accounting and finance. Many studies used different accounting and macroeconomic factors that relates to the systematic risk of the firm. Hence, these studies increased understanding of predicting the systematic risk and useful insights to avoid any measurement errors. Moreover, different studies used different variables in determining the systematic risk of firm, in this way, current study used firm size, growth, financial leverage, operating leverage, liquidity, profitability and variability of earnings as firm-specific factors responsible for systematic risk in firms;

2.4.1 Firm size

Olibe *et al.,* (2008) argued that the size of firm is negative in relation to systematic risk and empirically proved to be significant. The findings of study showed that larger firms have low systematic risk because of economies of scale. Moreover, many researches found reported to be the same results of negative relationship between size and systematic risk (Iqbal and Shah, 2012; Breen and Lerner, 1973).

Sullivan (1978) documented that the large size firms known as powerful firms as are attracted to low cost of capital and the fluctuations in social, economic and political events that produces systematic risk cannot influence the large size firms because of their power to reduce that change that causes the systematic risk. Titman and Wessels (1988) also concluded that the small size firms are more fascinated to the risk factors because of more short-term financing which gear it into more sensitive to the any economic change as compared to large firm.

One study of gaming research concluded the positive relationship between casino's beta and size as opposing to prior literature. Rowe and Kim (2010) attempted to analyze the casino's before and after recession periods using financial ratios as predictors. The market capitalization used as proxy for measuring the size. Prior to literature, the hypothesis generated was that the low systematic risk exists in large casinos. The study took sample of 19 gaming companies traded publicly from 2005 to 2008 and multiple regression analysis run between dependent variable as beta and independent variables of financial ratios. The findings of study showed another side of generated hypothesis in case of firm size that happened to be linear with beta and discussed this inconsistency

because of the expansion of gaming companies rapidly in the given period of 2005-2008 which ultimately arose the competition and substitution posing more chances of being default.

H1: The systematic risk is in inverse relation with the firm size.

2.4.2 Growth

The firm's market value consists of two things; one is the assets on which firm already invested called as assets-in-place and other is the growth opportunities. Generally, a growth in firm considered to be the increased in earnings, assets or may sales over the time but it also encompasses the investment return of which excesses the cost of capital. Hence, the main ingredient of growth is the attainment of profitable investment opportunities (Chung and Charoenwong, 1991). This study aimed at determining the relationship between growth opportunities and systematic risk of firm. The hypothesis generated was as the higher the market value of stock obtained through growth opportunities, the higher the risk associated with stock. The sample of 482 firms from 1979 to 1988 with monthly stock return and accounting ratios were used to calculate the market beta and beta of equity calculated by applying regression. The earning price ratio is used as proxy for firm's growth opportunities. The empirical results strongly support the hypothesis generated and suggested to shareholders that the risk associated with future investment opportunities are also considered to be the strong determinant of systematic risk.

Hong and Sarkar (2007) concluded that equity beta, the increasing function of growth opportunities and showed significant importance of equity beta in capital budgeting particularly for firms with high growth rate. There, beta needs to be adjusted properly for thorough investment decisions.

Gu and Kim (2002) revealed that in 1995 and 1996, the casino industry experienced the slow growth rate in revenue instead of expanding the capacity of gaming which increases the assets but decreases its turn over ratio because of assets were not used of full capacity i.e., inefficiency which increases the systematic risk, therefore, with the increasing growth opportunities, there would be increase in systematic risk in the case of casino industry as stock may be sensitive as compared to others. Therefore, it could pose threat to the value of the firm. This study would serve as a lesson to the shareholders that unseeingly expansion as opposing to market condition may target the value of the firm.

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On contrary to the above arguments, Turnbull (1977) derived the equation that demonstrates the factors that determine the market value and affects the systematic risk. The growth model used to derive an expression of the growth rate for systematic risk that results in non-increasing of systematic risk if the growth increases. Further, the duration of the project is also non-increasing function of systematic risk. These findings shunned the views of many studies that using the firm's capitalization as cut-off rate for accepting and rejecting projects of investments may lead to non-optimizing decisions.

H2: The systematic risk is in inverse relation with the growth.

2.4.3 Liquidity

In the literature related to systematic risk, liquidity to be used numerous time as determinant. Liquidity is the trade off the corporate assets or can be defined as the readily available resource to pay off the liabilities and measured using the current ratio. The studies conducted shows both the negative and the positive relationship between liquidity and systematic risk. Jensen M. C. (1986) revealed the positive relationship between the liquidity and systematic risk. The considerable free cash flow means the higher liquidity which may help to increase dividends that used to mitigate the increasing agency cost of free cash flow but the fluctuations in the capital market may lead to lower the dividend in the future and cost increases. Therefore, the higher the liquidity, the higher the systematic risk.

However, the negative relationship between liquidity and systematic to be also reported in many studies. Iqbal and Shah (2012), Gu and Kim (1998) and Logue and Merville (1972) documented that if the liquidity increases, there would be a decrease in the systematic risk. It concluded the inverse or non-linear relationship between the liquidity and systematic risk. It considered that the higher the liquidity, the firm would be less insensitive to the changes in the economy.

H3: The systematic risk is in inverse relation with the liquidity.

2.4.4 Financial leverage

Beaver *et al.,* (1970) investigated that there exists a positive linear relationship between the systematic risk and leverage (financial variable). This relationship has higher degree of association. Logue and Merville (1972) also argued the same that the economic changes can make

the earnings of common stock much sensitive, therefore, the beta came in a positive and direct relation with leverage which means the higher the leverage, the higher will be the beta. Moreover, Hamada, (1972) qualified the leverage ratio be the cause of difference between the observed systematic risk and systematic risk. This approach was considered to undertake the validity of MM theory. Another study conducted by Melicher (1974) to understand the influence of financial factors on the beta fluctuations and concluded that the non-linear relationship between the beta and leverage (measured by long term debts plus par value of preferred stock) and statically significant with first positive and second negative term which means that if the ratio of leverage increases then, the beta (measure of systematic risk) happened at an increasing rate. Gu and Kim (2002) attempted to understand the systematic risk of Casino firms having sensitive stock and concluded that the financial leverage showed negative relationship with beta which seemed to be very illogical and the study revealed that there would be no conclusion to be made by financial leverage on beta based on this study.

H4: The systematic risk is in direct relation with the financial leverage.

2.4.5 Profitability

The probability of failure of any firm is low due to the higher profitability of firm and increased expected return (Logue and Merville, 1972). Borde, Chambliss and Madura (1994) attempted to understand the risk associated with insurance firms. The study argued that the stock return is positively related to systematic risk. It means to be profitable, the company would take more risk and a strict investment strategy required for the desired result of higher efficiency and lower cost. Based on the prior literature, Iqbal and Shah (2012) and Kheder and Alaghi (2013) also documented that there is a positive relationship between the profitability and the systematic risk of the firm listed on a stock exchange.

While previous study (Gu and Kim, 1998) also accounted for determining the negative relationship between the profitability and beta. As followed in this study, the return on asset ratio concluded that the casino firms efficiently used their assets to obtain revenue and gear into negative correlation with the systematic risk measured by beta. The findings for profitability is consistent with Lee and Jang (2007) that also considered the negative relation between profitability and systematic risk significant in total risk of firm and manifest to be different in traits associated with

the profitability and risk as compared to other industries that take more credit risks exposures for more profitability.

H5: The systematic risk is in direct relation with the profitability.

2.4.6 Operating leverage

In the literature of finance, there exists a huge volume of papers examining the impact commonly of finance manager's decision on the value of firm. The overall transitions in the investing strategies, financing its operations and guidelines of how much to pay shareholders necessary to run the firm smoothly. Hence, operating leverage is the crucial factor in understanding the production factor for which managerial decision is important. The operating leverage is basically the proportion of the combination of fixed and the variable cost. It is argued that there exists the negative relationship between average variable cost and systematic risk of different production process units supported by empirical results that revealed that the explanatory power of variable cost component is significant and showing the variability of overall and systematic risk measures. The findings documented the positive association between systematic risk and operating leverage measured by the decrease in the variable cost. The practical implication useful for both the firm and the investors level. (Lev, 1974)

Mandelker and Rhee (1984) attempted to empirically prove the impact of both degrees of operating and financial leverage on the systematic risk measured by beta of common stock. The first analysis by running time series regression includes sample of 255 manufacturing firms covered the period from 1957 to 1976 and market model used to estimate the beta of common stock. The empirical result concluded the positive association between the impact of DOF and DOL and the systematic risk of common stock showed the approximately similar explanatory power of both DOL and DOF before and after using the instrumental variable by each having data set of 51 portfolios.

H6: The systematic risk in in direct relation with the operating leverage.

2.4.7 Activity ratio:

Chun and Ramasamy (1989) attempted to understand the relationship between the systematic risk of the common stock and the financial variables. This study focused on the developing markets such Kuala Lumpur Stock Exchange to understand the deviation as compared to the developed market. For this, data of 67 companies listed on stock exchange were used and systematic risk computed by using monthly historical return from stock market exchange of year from 1977 to 1980 and 1981 to 1984 by sub-divided 4-year period. The results revealed activity ratio and profitability to significant impact on systematic risk with acceptable level of significance.

Eldomiaty *et al.*, (2009) conducted comprehensive study based on three categories; banking, insurance and non-financial firms to understand the importance of financial reporting in managing or controlling the systematic risk. The study examined the 20 firms included in the DFM General Index which covered the year 2005 to 2007. The OLS regression results in acceptance of hypothesis that revealed negative relationship between the asset's efficiency and systematic risk. Another study by Gu and Kim (2002) also concluded the same negative relationship as operating efficiency leads to more profit which results in reduction of systematic risk of the restaurant firm. This relationship further proved by the Iqbal and Shah (2009) which also found the same negative relationship between Sales to Total assets and systematic risk of stock listed on Karachi Stock Exchange from 2005 to 2009.

H7: The systematic risk is in inverse relation with the activity ratio.

Table: 2.1

Literature Review

Authors	Data Information	Methodology	Conclusions
Alaghi (2013)	Sample consists of 457 companies listed on Tehran Stock Exchange through 2001 to 2011.	Panel Regression Analysis	The result of study show that except Firm Size, all other financial variables like Liquidity, Leverage, Operating Efficiency and Profitability are related statistically significant with the systematic risk.
Arslan (2013)	Quarterly data of 6 tourism firms were obtained from the Istanbul Stock Exchange (ISE) which covers 1997 to 2011.	Panel Regression Analysis	The findings of study are helpful for hotel business in Turkey liquidity, operating efficiency, growth, firm size and leverage of hotels are related to systematic risk. Whereas, only growth and operating efficiency are statistically significant to systematic risk of Tourism industry in Turkey.
Iqbal and Shah (2012)	93 non-financial firms listed on Karachi Stock Exchange were included in the sample covering the period from 2005 to 2009.	Panel Methodology Regression Analysis	The study concluded that firm size, liquidity, operating efficiency, dividend pay-out and market value of equity inversely related to systematic risk while profitability is in direct and significant impact. Whereas, leverage and growth remain insignificant.
Eldomiaty, Dhahery and Shukri (2009)	The dataset drawn from Reuters is of 20 firms listed on DFM General Index for 3 years from the year 2005 to 2007	OLS Regression Analysis	The study conducted for 3 sectors while in non-financial sectors, the results supports hypothesis that liquidity, asset efficiency and profitability negatively while debt ratios positively impact on beta. The market fluctuations increased beta which hampered the sales.
Olibe et al (2008)	Initial sample of 594 firms in Compustat data from 2000 to 2004.	OLS and MAD Regression Analysis	Empirical evidence suggest that international diversification leads to increased systematic risk as costs dominates benefits
Rowe and Kim (2007)	Data of 19 gaming companies trading Stock exchange from 2005 to 2008.	Multiple Linear Regression Analysis	In the study, only the market capitalization shows the positive and significant relationship with beta before and during the recession whereas the financial ratios like asset turnover significant

			and liabilities as percentage of assets were only significant before and during the recession respectively.
Lee and Jang (2007)	The financial data pf 16 airline companies drawn Mergent online data base from 1997 to 2002.	Multiple Regression Analysis	The study concentrated on the relationship between financial variables and beta. The study revealed profitability, debt leverage, growth, firm size and safety are significant while liquidity and operating efficiency are not significant related to beta.
Gu and Kim (1998)	Data of 35 Casino of USA used in this study for the year 1992 to 1994.	Multiple Regression Analysis	The findings revealed that the overall risk contained 92% by unsystematic risk and suggested to make the gaming capacity productive rather than just expanding which may reduce the systematic risk.
Borde (1998)	Data of 52 restaurant companies obtained traded on NYSE, AMEX and NASDAQ from the year 1992 to 1995.	OLS Regression Analysis	The study shows the negative impact of dividend-payout, Leverage and ROA on systematic risk. Whereas, Liquidity and Growth in earnings shows positive relationship.
Chung and Charoenwong (1991)	Sample of this study composed of 482 firms listed on CRSP and Compustat from 1979 to 1988.	Cross-sectional Regression Analysis	The empirical evidence strongly supports the hypothesis that growth opportunities (of various measures) has positive relationship with the equity beta of firm autonomous of firm size.
Chun and Ramasamy (1989)	Data of 67 firms listed in Kuala Lumpur Stock Exchange for sub divided four years from 1977 to 1980 and 1981 to 1984.	Factor Analysis for multicollinearity and Regression Analysis.	The results revealed activity ratio and profitability to significant impact on systematic risk with acceptable level of significance unlike the liquidity and leverage ratio.
Mandelker and Rhee (1984)	This study consists of 255 Manufacturing firms that covers the period from 1955 to 1976.	Multiple Regression Analysis	The study demonstrated the relationship of degree of financial leverage and operating leverage with systematic risk. Therefore, both DOL and DOF showed positive association and around similar explanatory power towards systematic risk.

Lev (1974)	Data set of this study contains three homogeneous industries drawn from Standard and Poor's Compustat and CRSP tape from 1958 to 1967.	Regression Analysis	The findings documented the positive association between systematic risk and operating leverage measured by the decrease in the variable cost. The practical implication useful for both the firm and the investors level.
Genodes (1973)	The data of 99 firms based of certain criteria drawn from the CRSP Tape covers the year from 1946 to 1968.	Market Model and Cross-Sectional Correlation Coefficients	The results revealed low association between estimates and the results difference with the literature was due to the different scaling methods for income.
Beaver, Ketter and Scholes (1970)	Analysis of 305 firms whose data drawn from Compustat from 1947 to 1965.	Co-efficients of Correlation	The findings of study revealed that there is high degree of association between the measures accounting and market risks. Further research needed to confirm the interpretation.

2.5 Theoretical Model

The figure 2.5.1 shows theoretical model that exhibits the dependent variable which is systematic risk on the right side of framework and the explanatory variables which are on the left side which are firm size, growth, profitability, financial leverage, liquidity, operating leverage and the activity ratio. This structure helps to easily understand the process.

The theoretical framework of this model can be easily understood by the following diagram:

Independent Variable   Dependent Variable

| Firm Size |
| Growth |
| Profitability |
| Financial Leverage |
| Liquidity |
| Operating Leverage |
| Activity Ratio |
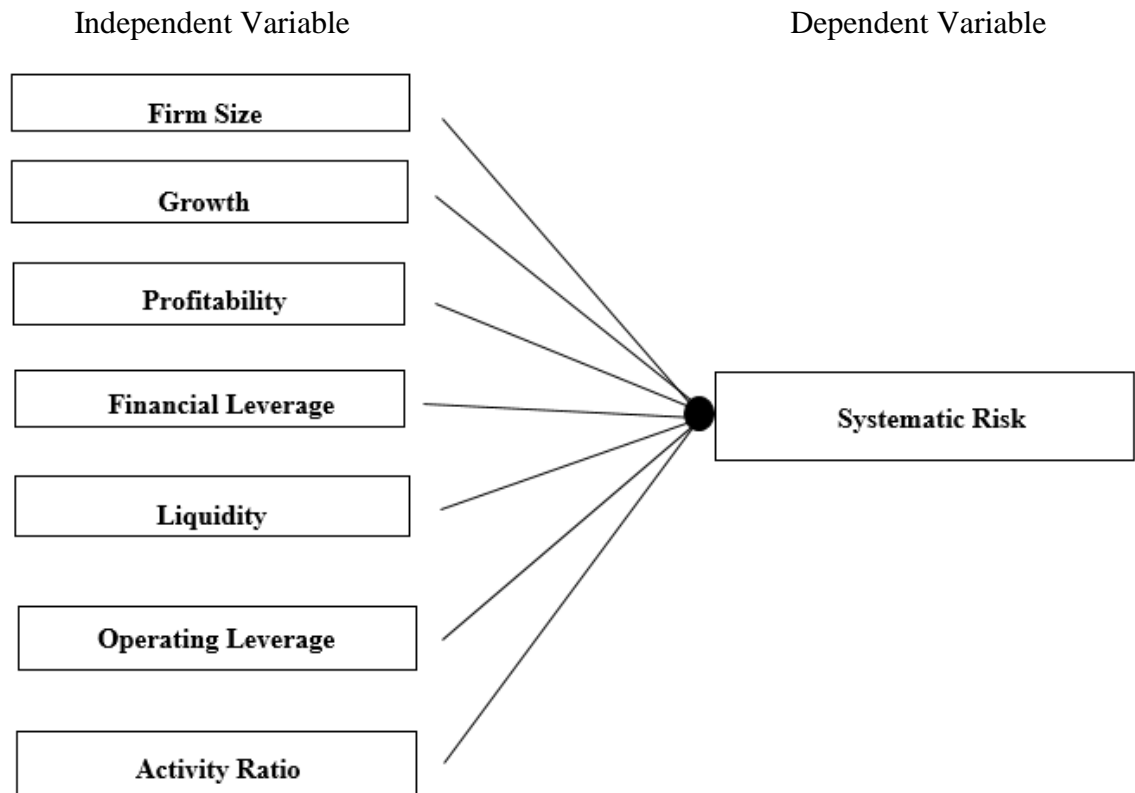
Systematic Risk

Note: Figure 2.5.1 explains the relationship between the dependent and independent variables.

CHAPTER III

DATA AND METHODOLOGY

The study aimed at examining the firm-specific factors that are explaining the systematic risk of the firms listed on Pakistan Stock Exchange (PSX). Those factors are considered in financial reports of the companies issued at the end of the year. This chapter includes the information about the current study regarding the data, variable measurement, empirical framework, models and the estimation techniques used to analyze the data for the checking of hypothesis generated.

3.1 Data Description

Data description consists of the discussion that how the data is to be collected, time period that study covered, sources and how sampling is done along with its restrictions These are given as follows:

3.1.1 Data sources

This study conducted to explore that factors, impact of which causing the systematic risk of firms in Pakistan. The study uses the annual ratios of financial statements and daily prices of 135 non-financial companies listed at Pakistan Stock Exchange (PSX) from 2011 to 2015 for 5 years. The data collected from the reliable sources for estimation like the daily stock prices are obtained from the websites of Pakistan Stock Exchange and the financial data of non-financial firms obtained from the financial statement analysis of companies listed at Pakistan Stock Exchange issued by the State Bank of Pakistan each year.

3.1.2 Sample selection

The study depends on data that is already available in market, hence, a secondary data. The sample selected is of non-financial sector ignoring financial firms because of the different accounting period as it is closed on June as compared to financial companies ends on December and capital structure as both uses different debt-equity ratio. The sample selected is based on the data availability and avoidance of statistics errors because the selection of large number of companies lead to irregular, infrequent data or inactive stocks otherwise.

3.2 Variables Measurement

Different measurements have been used for the calculations of independent variables. These measurements are adopted based on the literature review.

3.2.1 Systematic risk (Dependent variable)

A linear regression model, in finance, used for the calculation of systematic risk measured by beta called as Market Model. This market model equation first introduced by the Sharpe (1963), so this study needs to calculate the beta separately for each firm yearly. Therefore, estimated beta for each firm has been obtained by the given below regression equation;

$$R_{it} = \alpha_i + \beta_i \, (R_{mt}) + \varepsilon_{it} \tag{1}$$

where;

$R_{it} =$ at the time t, Ri is the return of stock

$R_{mt} =$ at the time t, Rm is the return of market

$\beta =$ measure of systematic risk (variations in stock market)

$\varepsilon =$ consideration of error term (non-market fluctuations)

Beta is estimated by means of regression analysis and explains the propensity of a stock's returns to respond the swings in the market. A beta of 1 directs that the stock's price will change with the market. A value of beta which is less than 1 directs that the stock will be less volatile than that of market. Beta which is greater than value 1 indicates that the stock's price will be much volatile than the market.

3.2.2 Firm-Specific Factors (Independent Variables)

Table 3.2 shows the different measurements for independent variables. Seven variables are selected in this study as potential determinants of systematic risk of firm. They are Firm size (FS)measured by the natural logarithm of total assets. Growth (GR) is the annual percentage change in EBIT. Financial Leverage

(FL) measured by the total debt to total assets ratio. Profitability (PRFT) measured by Return on asset. Quick ratio is used to determine liquidity (LIQD) while operating leverage (OL) is measured by the ratio of change in EBIT to change in sales. Finally, the activity ratio (AR) is measured by asset turn over which is dividing total revenue by the total assets. Each variables value is quantified for 5 years for the regression purposes.

Table 3.2: Measurements of Independent Variables

Variable	Measurement
Firm Size (FS)	Ln (Total Assets)
Growth (GR)	Percentage Change in EBIT (Earning before Interest and Tax)
Profitability (PRFT)	Return on Assets = Net Income/Total Assets
Financial Leverage (FL)	Ratio of Total Debt to Assets
Liquidity (LIQD)	Quick Ratio = Current Assets minus Inventory divided by Current Liabilities
Operating Leverage (OL)	Ratio of change in EBIT to change in Sales.
Activity Ratio (AR)	Asset Turnover = Total revenue / Total assets

Note: This table reports the measurement used in calculating the values of independent variables and are adopted on the basis of previous literature.

3.3 Methodology

Methodology is the strategy or the technique that describes the manner in which study is to be conducted to achieve the purpose of the study. The panel methodology is being used in this study to investigate the firm-specific variables that helps to understand the systematic risk of the firm. This study composed of 135 number of cross-sections and the time series of 5 years. Hence, the study is dealing with both cross-sectional and time series spontaneously that lead to panel dataset. This panel data is strongly balanced with 675 number of observations which is large data of 135 number of non-financial firms listed on Pakistan Stock Exchange for a period of 5 years from 2011 to 2015.

Initially, the multi-collinearity test is being used to ensure the absence of multi-collinearity between the independent variables. Therefore, the correlation matrix used to confirm the absence of this problem of multi-collinearity in the dataset which do not increase from the level of 0.80. After this, the panel regression analysis is being applied for the identification of statistical significant relationship between the systematic risk and the firm-specific variables.

3.3.1 Regression specification

A panel data methodology is used over cross-sectional and time series data and the motivation to use is the large number of observations (product of number of individuals and number of time periods) obtained through it which leads to increase in the number of freedom. Consequently, the econometric model defined gave the improved results of estimates. The next reason why to use panel data methodology is the control for heterogeneity which would otherwise lead to obtain biased result. This is captured by the error term which further splits into different component (firm-specific, time-specific and random disturbances). Therefore, the researcher understands the methodology completely (Pindado and Requejo, 2015).

The panel regression model includes combination of time series and cross-sectional data to estimate the regression analysis by follows construction:

Mathematically,

$$\beta_{it} = \alpha_0 + \alpha_1 FS_{it} + \alpha_2 GR_{it} + \alpha_3 LIQD_{it} + \alpha_4 FL_{it} + \alpha_5 PRFT_{it} + \alpha_6 OL_{it} \qquad (2)$$
$$+ \alpha_7 AR_{it} + \varepsilon_{it}$$

where;

β (Beta) =	Systematic Risk
Firm Size =	Size of firm
FL =	Financial Leverage
OL =	Operating Leverage
LIQD =	Liquidity
PRFT=	Profitability
GR =	Firm Growth
AR =	Activity Ratio

3.4 Estimation Methods: Fixed Effects Model Vs. Random Effects Model

In the panel data, generally, fixed and random effects model are used to estimate the econometric model and the selection between the both model is decided with the help of Hausman' Specification test.

3.4.1 Fixed effects model

The fixed effects model is also called as Least Square Dummy Variable (LSDV) because a dummy variable is created to show the inconsistency of data. The model assumed the existence of heterogeneity explained by different intercept according to cross section and time but the slope remains constant. It treats the unobserved heterogeneity to be correlated with the explanatory variable. Fixed effects models are intended and prepared to distinguish the particulars and specifics of changes within a person or entity. As the time-invariant feature is fixed and static for each person, it can never amount to such change.

3.4.2 Random effects model

It also assumes that the effects related to individual specific characteristics which is unobserved heterogeneity consider to be independent of explanatory variables. The individual specific characteristics is included as error term. As opposed to fixed effects model, the rationality and philosophy behind random effects model is that deviation across entities is thought to be random and disparate with the predictors involved in the model. In the model of random effects, time invariant variables can be convoluted and scrutinized, while, such variables are riveted by the intercept in fixed effects model. The main difference is if not inspected individual effect signifies elements that relate to regressors in the model.

3.4.3 Hausman Test

Hausman test analysis the estimator's reliability and consistency associated to substitutive estimator that is recognised to be consistent. Hausman's test is frequently applied in the writings to select between the fixed effects and random effects. Since, its publication in 1978, Hausman's paper remains prominent in econometrics and apply economics. Taking into account its simplicity and expediency, it ahs become most important presenter in scheming different actions and behaviours. The null hypothesis of Hausman's test states that Random effect model is appropriate however alternative hypothesis states Fixed effects model is appropriate. It basically examines that whether the error terms are interrelated with regressors in model whereas the null hypothesis is that they are not interrelated.

Decision law:

The study conducted Hausman 'test for each regression separately for determining the most significant model. Hausman's test suggests whether the random effects model is appropriate or the fixed effects is suitable.

a)   If values of probability are less than 0.05 say 5% which is significant, then it will mean that the use of fixed effect model is preferred.

b)   While, if the probability is greater than 0.05 say 5% which is insignificant, then random effect will be more suitable.

CHAPTER IV

RESULTS AND DISCUSSION

This chapter provides the empirical evidence for what reasons this study is conducted. The section is structured along with tables to provide the superfluous details of results obtained which includes descriptive statistics, correlation analysis and the results of common effect model.

4.1. Descriptive Statistics

Table 4.1 presents mean, standard deviation, minimum and maximum values of all the variables including both the dependent and independent variables in the sample. This summarizes the nature and its behaviour by presenting its deviation from mean and its scattered data. The accuracy of data must be ensured prior to apply any statistical test for any distortions. Descriptive statistics of the sample data is found at table 4.1.

Table 4.1: Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
beta_firm	3.2892	6.1408	-26.4704	55.8284
FS	15.5182	1.5077	11.2658	20.1323
GR	-.0209	2.4730	-43.1803	16.5976
LIQD	1.7402	1.4905	0.1300	11.8100
FL	0.5186	1.4443	0.0076	0.93957
PRFT	8.5638	10.9787	-49.1000	57.9600
OL	-18.6942	300.1731	-7094.9970	146.1749
AR	1.7642	5.1986	0.0000	70.5018

Table 4.1 reveals the behaviour of data towards the systematic risk statistically for the period of 2011 to 2015. The beta is the measurement of systematic risk and the selected firms show the 3.29 mean value of beta, whereas the maximum and minimum value is 55.82 and -26.47 respectively.

The firm size has been calculated of 135 non-financial firms for 5 years and the table summarize the mean value of firm size is 15.52 in Pakistan within the sample with the maximum value to be 20.13 and minimum to be 11.27.

The growth has been measured for each sample firm for consecutive 5 years which shows the mean value of -0.02 and minimum & maximum value of -43.18 and 16.59 respectively along with the standard deviation value of 2.47.

The liquidity ratio has been taken as independent variable to measure its ability to explain the variation in dependent variable. The liquidity ratio predicts the company's ability that how quick it can pay off its current liabilities. The descriptive statistical table summarizes the average value of liquidity is 1.74 of while the minimum and maximum value is 0.13 and 11.81, respectively.

The financial leverage that predicts the company's decisions of how the company's assets are going to be financed. The above descriptive statistics of 135 firms shows the mean value of financial leverage is 0.51 which means the capital structure of the sampled 135 non-financial firms listed at stock exchange contain 51% debt and 49% equity. Whereas, the minimum and maximum portion to be 0.7% and 93% respectively along with standard deviation value of 0.21 in Pakistan.

Return on Assets (ROA) has been used as the indicator of profitability of firms in Pakistan from 2011 to 2015. The above table shows the minimum and the maximum value of which to be -0.72 and 5.96 respectively while the average of overall sample selected firm's profitability has 0.13 value. The considered standard deviation has 0.37 value captured. In Pakistan, the average operating leverage is -13.4 of non-financial firms which having the minimum and maximum value of -7094 and 2745.16 respectively with standard deviation of 303.57 value. Finally, the mean value of activity ratio is 1.68 with 0 and 70.51 as minimum and maximum value respectively and standard deviation value of 4.91.

4.2 Test of Multicollinearity

The multicollinearity test is the prerequisite before performing any statistical regressions for obtaining the refined results. In this study, correlation matrix has been used for this purpose.

4.2.1 Correlation analysis

This study considered correlation matrix for checking the possibility of in the independent variable multicollinearity. Although this tool is the weak form of test but most widely used in many studies like Lee and Jang (2007) and Iqbal and Shah (2012). It helps to examine the relationship among independent variables or dependent variables and determine the extent and direction of relationship. In this way, it exhibits the multicollinearity problems among variables. The cut-off point ranges between +1 and -1 which means +1 correlation value shows the positive correlation between the independent variables while the -1 shows the negative correlation between them. So, the multicollinearity problem exists in that variable when the correlation value has 0.8 or above this value. Moreover, if zero-correlation value exists, it means no correlation among variables. The result of current study shows that there is no multicollinearity problem among the independent variables as all variables has values within the prescribed limits.

Table 4.2.1: Correlation Matrix

	beta_firm	FS	GR	LIQD	FL	PRFT	OL	AR
beta_firm	1.0000							
FS	0.0539	1.0000						
GR	-0.0099	-0.0261	1.0000					
LIQD	-0.0146	-0.0453	0.0042	1.0000				
FL	0.0504	-0.0492	-0.0135	-0.2315	1.0000			
PRFT	-0.0325	0.0263	0.0119	-0.0044	-0.1150	1.0000		
OL	0.0334	0.0194	0.1617	0.0044	-0.0278	0.0082	1.0000	
AR	-0.0551	-0.0477	0.0109	-0.0299	0.0212	0.0697	0.0063	1.0000

Table 3 shows the relationship among the explanatory variables of the study. The correlation values of explanatory variables exhibit no multicollinearity problems in the current study because of the values lower than the 0.8.

Table 4.2.1 shows the extent of association between the variables with the help of Correlation matrix tools. The result of the table for current study shows that all the correlation values of variables are in the prescribed range and do not observed any high correlation value that concluded no multicollinearity problem. Table 4.2.1 exhibits that firm size has a positive correlation with profit and operating leverage whereas all other independent variable shows negative correlation with firm size and are significant at 5%. It means that larger firm size can result in decrease of growth, liquidity, financial leverage and activity ratio while increase in the profitability and operating leverage of firm. In case of growth, there is only negative correlation with financial leverage but has positive association with the other independent variables that includes liquidity, profitability, operating leverage and activity ratio. While, the liquidity has only a positive correlation with the operating leverage and negative correlation with the financial leverage, profitability and the activity ratio. Financial leverage shows only positive correlation with the activity ratio while a negative correlation with the profitability and operating leverage. Firm profitability has positive relation with both operating leverage and activity ratio. Operating leverage has positive correlation with the activity ratio with 5% level of significance. The above given correlation matrix concluded that the high positive correlation obtained between growth and operating leverage with the magnitude of 0.1617 while the high negative correlation obtained between liquidity and financial leverage with the magnitude of -0.2315. Therefore, the result indicates that the dataset of selected variables has not any issue multicollinearity problem and can be fit for any statistical purpose.

4.3 Choosing Between Fixed Effects Model and Random Effects Model

As per discussed in the methodology chapter for the selection of estimation methods, here the Hausman specification test used as the selection criteria to select best possible approaches from the fixed effects method and random effects model.

4.3.1 Hausman's specification test

Hausman specification test used to facilitate the appropriate choice of approach used for two competing approaches namely fixed effect and random effect model. This test concludes whether there is any difference between the fixed effects (FE) and random effects (RE) estimators or not? Therefore, to answer this, two hypotheses for test are generated as:

H_o = The appropriate model to use is Random Effects.

H1 = The appropriate model to use is Fixed Effects.

As discussed earlier, Hausman test is applied to find the best suitable model. Table 4.3.1 revealed the results obtained from test that the Chi- square value of cross-section is 15.75 along with the p-value of 0.0275. Hence, Hausman test recommends the fixed effects approach to get the reliable and effectual estimates.

Table 4.3.1: Hausman Test Results

Test Summary	Chi-Square Stat.	d.f	p-value
Values	15.75	7	0.0275

4.4 Fixed Effects Model (FE)

Table 4.4 reveals the results obtained for the fixed effects model between the systematic factors and the factors explaining it. This regression model entails the systematic risk measured by beta as the dependent variable. The assumption taken in the fixed effects model is that the intercept changes over the cross-section but there are constant coefficients of slope. To identify the model best suitable for estimation, we have applied the Hausman test between the fixed and the random effects. The chi-square along with p-value used as criteria for selection and results showed fixed effect model to be the best approach for estimation. This model equation regressed following variables such as firm size, growth, liquidity, financial leverage, profitability, operating and activity ratio as the explanatory variables for the period of 5 years from 2011 to 2015.

Table 4.4: Results of Fixed Effects Model

Variables	Coef.	Robust Std. Err.	t- Statistics	p-value
FS	-3.6348***	1.3163	-2.7600	0.0070
GR	0.0049	0.0084	0.5800	0.5630
LIQD	-0.0230**	0.0099	-2.3400	0.0210
FL	6.152**	2.7209	2.2600	0.0250
PRFT	5.5978**	2.6973	2.0800	0.0400
OL	0.0005	0.0007	0.7000	0.4860
AR	-0.9854**	0.4330	-2.2800	0.0240
Constant	57.5428**	20.2679	2.8400	0.0050
N	665			
F- Stats & Probability	7.090 0.000			

Note: *This table presents the results of strongly balanced data using the fixed-effects approach. The symbol (**) and (***) denotes the variables significant at 5% and 1% respectively acceptable level of significance.*

To determine which explanatory variables are statistically significant and how changes in these variables relate to changes in the dependent variable in a correctly specified regression model. The F-stats and its probability has been taken for that reason which recommends that the model is appropriate (Shaikh, Iqbal and Shah, 2012).

The estimation results are presented in Table 4.4 with their robust standard error, t-statistics and p-values. Other information such as number of observations, number of firms, F-statistics and its p-value are also given in the table. The results presented in table provide significant evidence on the impact of firm-specific variable on systematic risk. One can also note from table some variables such as financial leverage and profitability are positively related with systematic risk while the other variable namely firm size, liquidity and activity ratio are negatively related with systematic risk.

Specifically, the estimated value of coefficients of firm size is -3.364 with p-value 0.007 which indicates the impact of size of firm on systematic risk is negative and statistically significant at any acceptable level of significant. It signifies that if firm size increases by one unit then systematic risk measured by beta will decrease by 3.364. This result indicate that firm size is negatively related with systematic risk of firm. This implies higher the size of firm the lower would be the systematic risk of the firm. Therefore, the first hypothesis of current study H1: *"The systematic risk is in inverse relation with the firm size"* is accepted by the results obtained. This finding is consistent with argument that larger firms are considered less risky. This finding is consistent with other studies such as Lee and Jang (2007), Olibe (2008) and Iqbal et al., (2015). They also find a significant and negative relationship between firm size and systematic risk.

Liquidity is another factor that determines the systematic risk. The results obtained support the hypothesis H3 which shows that "*The systematic risk is in inverse relation with the liquidity*" and the H3 is accepted. The estimated value of coefficients of liquidity is -0.023 with p-value 0.021 which indicates the impact of liquidity of firm on systematic risk is negative and statistically significant at any acceptable level of significant. The results are consistent with the prior studies of Lee and Jang (2006), Gu and Kim (1998) and Iqbal and Shah (2012). Their studies found significant and negative relationship between the liquidity and systematic risk. Therefore, it indicates that if firm's liquidity increases by one unit then systematic risk measured by beta will

decrease by 0.023. This implies higher the liquidity of firm the lower would be the systematic risk of the firm.

The activity ratio has been considered an important explanatory variable in this current study as depicted by the fixed effect model that it has negative and significant impact on the systematic risk of firms in Pakistan. The hypothesis H7: "*The systematic risk is in inverse relation with the activity ratio*" is accepted and the current study is consistent with the Gu and Kim (2002), Chun and Ramasamy (1989) and Iqbal and Shah (2012) who found the same negative and sufficient impact on the systematic risk of stock. The results obtained shows that the value of coefficients of activity ratio is -0.985 with p-value 0.024 which specifies the impact of activity ratio of firm on systematic risk is negative and statistically significant at any acceptable level of significant. This infers that higher the operating efficiency of firm the lower would be the systematic risk of the firm. It means that if firm's operating efficiency increases by one unit then systematic risk measured by beta will decrease by 0.985. This result indicate that activity ratio of the firm is negatively related with systematic risk of firm.

Most importantly, the financial leverage is also determining factor that has positive and significant effect on the systematic risk. The results of fixed effects model accept the hypothesis H4: "*The systematic risk is in direct relation with the financial leverage*" and remain consistent with Beaver et al., (1970), Mandelker and Rhee (1984) and Logue and Merville (1972) who also argued the same positive impact of financial leverage on the systematic risk of the firms: the higher the ratio of total liabilities to the total assets then there will be higher beta. The estimated value of coefficients of financial leverage is 6.152 with p-value 0.025 which indicates the impact of financial leverage of firm on systematic risk is positive and statistically significant at any acceptable level of significant. It implies that if firm's financial leverage increases by one unit then systematic risk measured by beta will increase by 6.152. Hence, this result concluded that financial leverage of the firm is positively related with systematic risk of firm.

According to the analysis result, profitability is also another factor that pose positive and significant impact on the systematic risk of firms in Pakistan. This result obtained from the above table accepts the hypothesis H5: "*The systematic risk is in direct relation with the profitability*" in the current study. The estimated value of coefficients of profitability is 5.598 with p-value 0.040 which indicates the impact of profitability of firm on systematic risk is positive and statistically

significant at any acceptable level of significant. It signifies that if firm's profitability increases by one unit then systematic risk measured by beta will increase by 5.598. The findings are in support of prior studies by Alaghi (2013), Gu and Kim (2002) and Iqbal and Shah (2012) who also found the positive and significant relationship between the financial leverage and systematic risk. Hence, we can understand the importance of that variable in Pakistan's context and incorporate the significance of liquidity on the determination of systematic risk.

The second hypothesis of current study H2: "*The systematic risk is in inverse relation with the growth*" is rejected because the findings exhibits that there is no any significant impact of growth on the systematic risk of stock. The findings of this variable contrast with the study of Borde (1998) and Gu and Kim (2002) which shows that the positive co-efficient of growth would result in increased systematic risk as sensitivity of stock poses threat to the value of firm because of illogical expansion in oppose to the market conditions, so, beta increases with increase in growth co-efficient. The hypothesis is rejected because the possible reason of insignificance is measuring the growth as the study supposed to measure the growth of earnings deprived of any expansion. Hence, there is no way to control the expansion values and pick only the regular earnings growth, which might partly lead to insignificance of growth in the regression.

The findings of study depicted that operating leverage has insignificant effect on the systematic risk of the firm. The proposed sixth hypothesis H6: "*The systematic risk in in direct relation with the operating leverage*" is rejected based on the results that obtained from fixed effect model. The results of that variable are contrary to the earlier studies of Lev (1974), Mandelker and Rhee (1984), Eldomiaty (2009) and Wooi (2010), who found positive co-efficient of operating leverage in relation to the systematic risk. The reason behind insignificance of operating leverage is due to having no better understanding about the inner workings of the firms as the sales volume increased without considering its capacity or additional capital investment that would ultimately increases the fixed cost resulting in altered operating leverage and huge impact on the prices, cost of goods and raw materials. Hence, its very complicated to obtain precise measure of DOL.

Table 4.5: Summary of Fixed Effects Model Analysis

Hypotheses	Results
1. The systematic risk is in inverse relation with the firm size	Accept H1
2. The systematic risk is in inverse relation with the growth	Reject H2
3. The systematic risk is in inverse relation with the liquidity	Accept H3
4. The systematic risk is in direct relation with the financial leverage	Accept H4
5. The systematic risk is in direct relation with the profitability	Accept H5
6. The systematic risk in in direct relation with the operating leverage	Reject H6
7. The systematic risk is in inverse relation with the activity ratio	Accept H7

CHAPTER V

CONCLUSION AND POLICY IMPLICATION

5.1 CONCLUSION

This research investigates the firm-specific factors of systematic risk for companies listed on the Pakistan Stock Exchange. The systematic risk measured by beta using the daily stock price of firms regress on the market stock index. The panel data methodology employed on the data of 135 non-financial firms of Pakistan Stock Exchange from 2011 to 2015. The selected suitable fixed effect model shows the estimation results which are quite consistent. The result shows that only the profitability and financial leverage are positive and significant related to systematic risk, while firm size, liquidity and activity ratio are negative and significant associated with systematic risk.

The study is based on the Asset Pricing Theory i.e., CAPM explain the risk-return relationship that contemplate the risk in investment-decision process for which this study composed of firm-specific variables are considered that contribute to the systematic risk. From the findings of the study, it is depicted that there has been revealed the negative and significant relationship between firm size and systematic risks. It means that the larger the size of the firm, there will be the marginal increase in the systematic risk. The results are consistent with the earlier studies. Likewise, this study has liquidity and activity ratio that pose same significant and negative effect on the systematic risk as evidenced by previous studies. Whereas, the findings exhibit profitability and financial leverage has significant and positive relationship with systematic risks of the firm, the results are consistent with many earlier studies. So, the crux of the study is that the firm specific variables (financial characteristics) are suitable to determine the systematic risk of the firm and there exists the significant relationship between the systematic risk and the financial variables like firm size, liquidity, profitability, financial leverage and activity ratio. While the operating leverage and growth because of insignificance disapproved by the study.

Compared with the previous studies, the current study differs in objectives and findings. Firstly, it has successfully examined the systematic risk with significant variables that were not significant in the past studies. Secondly, this study captures the recent time period and helpful in detecting the new findings.

These results supported the argument that financial characteristics are helpful in predicting the systematic risk of the firm to such extent. There exists a significant relationship between the financial variables and the systematic risk of firms listed on the Pakistan Stock Exchange. The expectations of investor considered to be the main part of planning models (long -term). The findings of this study benefit the investors by identifying the changes in the policies which includes the financial, production and marketing which can impact the systematic risk and the share prices of the stocks. This could be possible when investors demand the annual reports that consists of the information about the financial, production and marketing strategies. The identified factors of systematic risk will help in estimating the systematic risk and establishing the range in which it can be restricted and policies to optimize it.

Likewise, the managers of firms and financial consultants are always concerned about the risk-return relation under certain conditions, hence, they always anticipate systemic risk is of great importance in investment decision making process. Hence, they can incorporate these findings while making short run-financial, production and marketing strategies to identify and adjust the optimum level of beta in implementing these strategies. Hence, the importance of using firm-specific factors in obtaining the systematic risk is helpful for stakeholders which is the real motive and interest behind conducting this study.

5.2 Policy implication

i. It is recommended that in Pakistan Stock Exchange, investors and business owners are facing challenges in choosing the best strategies for their survival in the market. As findings of this study suggest that size and profitability has significant impact on systematic risk of firms in Pakistan stock market. Therefore, the firms can assess the market risk by undertaking control on firm size and profitability in choosing the best suitable decisions for their survival in market.

ii. From the management perspective, the information regarding the negative impact of liquidity on the systematic risk in Pakistan stock market concluded from this study can be helpful for the manager to closely monitor this index and make financing decisions that uplift the decisions of risk. Therefore, the sufficient liquidity would help to meet operational needs of company by decreasing systematic risk.

5.3 Limitations

The limitations of this study are the size of the sample cannot be generalized on whole population due to the small sample because of non-availability of data. The study considered the firms irrespective of industries which cannot give the precise insights. The study does not explain the overall effect of systematic risk; therefore, the macro-economic determinants can also be added for further explanation of the systematic risk.

References

Akbar, M., & Ali, S. (2010). A Test of the Validity of the CAPM in Pakistani Equity Market. *Business & Economic Review*, *2(1),* 23-28.

Alaghi, K. (2012). Operating Leverage and Systematic Risk. *African Journal of Business Management*, *6*(3), 1095-1099.

Andersen, T. G., Bollerslev, T., Diebold, F. X., & Wu, J. (2005). A Framework for Exploring the Macroeconomic Determinants of Systematic Risk. *American Economic Review, 95(2)*, 398-404.

Asalya, D., & Shah, A. (2013). Testing the Capital Asset Pricing Model on the Karachi Stock Exchange. *International Journal of Business, 12(4),* 1-44.

Ball, R., & Brown, P. (1969). Portfolio theory and accounting. *Journal of Accounting Research*,300-323.

Beaver, W., Kettler, P., & Scholes, M. (1970). The Association Between Market Determined and Accounting Determined Risk Measures. *The Accounting Review*, *45*(4), 654-682.

Bollerslev, T., Engle, R. F., & Nelson, D. B. (1994). ARCH Models. *Handbook of Econometrics*, (*4)*, 2959-3038.

Borde, S. F., Chambliss, K., & Madura, J. (1994). Explaining Variation in Risk Across Insurance Companies. *Journal of Financial Services Research*, *8*(3), 177-191.

Breen, W. J., & Lerner, E. M. (1973). Corporate Financial Strategies and Market Measures of Risk and Return. *The Journal of Finance*, *28*(2), 339-351.

Chee-Wooi, H., & Chyn-Hwa, L. (2010). The Determinants of Systematic Risk Exposures of Airline Industry in East Asia. *Proceedings of Regional Conference on Tourism Research*, (1), 212-222.

Chun, L. S., & Ramasamy, M. (1989). Accounting Variables as Determinants of Systematic Risk in Malaysian Common Stocks. *Asia Pacific Journal of Management*, *6*(2), 339-350.

Chung, K. H., & Charoenwong, C. (1991). Investment Options, Assets in Place, and the Risk of Stocks. *Financial Management*, *20(3)*, 21-33.

Eldomiaty, T. I. (2009). The Fundamental Determinants of Systematic Risk and Financial Transparency in the DFM General Index. *Middle Eastern Finance and Economics*, (5), 49-61.

Engle, R. F. (1982). Autoregressive Conditional Heteroscedasticity with Estimates of the Variance of United Kingdom Inflation. *Econometrica. Journal of the Econometric Society*, *50(4)*, 987-1007.

Fama, E. F., & French, K. R. (2004). The Capital Asset Pricing Model: Theory and Evidence. *Journal of Economic Perspectives*, *18*(3), 25-46.

Fama, E. F., & MacBeth, J. D. (1973). Risk, return, and equilibrium: Empirical Tests. *Journal of Political Economy*, *81*(3), 607-636.

Gahlon, J. M. (1981). Operating Leverage as a Determinant of Systematic Risk. *Journal of Business Research*, *9*(3), 297-308.

Gonedes, N. J. (1973). Evidence on the Information Content of Accounting Numbers: Accounting-Based and Market-Based Estimates of Systematic Risk. *Journal of Financial and Quantitative Analysis*, *8*(3), 407-443.

Gu, Z., & Kim, H. (1998). Casino Firms' Risk Features and Their Beta Determinants. *Progress in Tourism and Hospitality Research*, *4*(4), 357-365.

Gu, Z., & Kim, H. (2002). Determinants of Restaurant Systematic Risk: A re-examination. *The Journal of Hospitality Financial Management*, *10*(1), 1-13.

Hamada, R. S. (1972). The Effect of the Firm's Capital Structure on the Systematic Risk of Common Stocks. *The Journal of Finance*, *27*(2), 435-452.

Hong, G., & Sarkar, S. (2007). Equity Systematic Risk (Beta) and its Determinants. *Contemporary Accounting Research*, *24*(2), 423-466.

Huo, Y. H., & Kwansa, F. (1994). Effect of Operating and Financial Leverage on Firm's Risk. *Journal of the International Academy of Hospitality Research Logo*, (8), 2-17.

Iqbal, J., & Haider, A. (2005). Arbitrage Pricing Theory: Evidence from an Emerging Stock Market. *Lahore Journal of Economics*, 10(1), 123-140.

Iqbal, M. J., & Shah, S. Z. A. (2012). Determinants of Systematic Risk. *The Journal of Commerce*, *4*(1), 47-56.

Jensen, M. C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review*, *76*(2), 323-329.

Kheder, A. (2013). Determinants od Systematic Risk of the Listed Companies in Tehran Stock Exchange. *Journal of Basic and Applied Scientific Research*, *3*(1), 596-600.

Lee, J. S., & Jang, S. S. (2007). The Systematic-Risk Determinants of the US Airline Industry. *Tourism Management*, *28*(2), 434-442.

Lev, B. (1974). On the Association Between Operating Leverage and Risk. *Journal of Financial and Quantitative Analysis*, *9*(4), 627-641.

Lintner, J. (1965). Security Prices, Risk, and Maximal Gains from Diversification. *The Journal of Finance*, *20*(4), 587-615.

Logue, D. E., & Merville, L. J. (1972). Financial Policy and Market Expectations. *Financial Management*, 1(2), 37-44.

Mandelker, G. N., & Rhee, S. G. (1984). The Impact of the Degrees of Operating and Financial Leverage on Systematic Risk of Common Stock. *Journal of Financial and Quantitative Analysis*, *19*(1), 45-57.

Markowitz, H. (1952). Portfolio Selection. *The Journal of Finance*, *7*(1), 77-91.

Markowitz, H. M. (1999). The Early History of Portfolio Theory: 1600–1960. *Financial Analysts Journal*, *55*(4), 5-16.

Melicher, R. W. (1974). Financial Factors which Influence Beta Variations within an Homogeneous Industry Environment. *Journal of Financial and Quantitative Analysis*, *9*(2), 231-241.

Mnzava, I. D. (2009). The Significance of Corporation Tax as a Determinant of Systematic Risk: Evidence using United Kingdom (UK) data. *KCA Journal of Business Management*, *2*(1), 44-61.

Olibe, K. O., Michello, F. A., & Thorne, J. (2008). Systematic Risk and International Diversification: An Empirical Perspective. *International Review of Financial Analysis*, *17*(4), 681-698.

Pindado, J., & Requejo, I. (2015). Panel Data: A Methodology for Model Specification and Testing. *Wiley Encyclopedia of Management*. 4, 1-8.

Rashid, Abdul & Faiza Hamid (2015). "Downside Risk Analysis of Returns on the Karachi Stock Exchange." *Managerial Finance*, 41(9), 940-957.

Reeb, D. M., Kwok, C. C., & Baek, H. Y. (1998). Systematic Risk of the Multinational Corporation. *Journal of International Business Studies*, *29*(2), 263-279.

Rizwan Qamar, M., Rehman, S., & Shah, S. A. (2013). Applicability of Capital Assets Pricing Model (CAPM) on Pakistan Stock Markets. *International Journal of Management and Business Research*, *4*(1), 1-9.

Roll, R. (1977). A Critique of the Asset Pricing Theory's Tests Part I: On Past and Potential Testability of the Theory. *Journal of Financial Economics*, *4*(2), 129-176.

Rosenberg, B., & Guy, J. (1995). Prediction of Beta from Investment Fundamentals. *Financial Analysts Journal*, *51*(1), 101-112.

Ross, S. A. (1976). The Arbitrage Theory of Capital Asset Pricing. *Journal of Economic Theory*. *13(3),* 341-360.

Rowe, T., & Kim, J. S. (2010). Analyzing the Relationship Between Systematic Risk and Financial Variables in the Casino Industry. *UNLV Gaming Research & Review Journal*, *14*(2), 47-58.

Seyyed Nasser Saidi & Seyyed Hadi Edrispour (2012). An Examination on the Effects of Different Financing Methods on the Stock Yield and Price in the Companies Registered in Tehran Stock Exchange. *Journal of Basic and Applied Scientific Research, 2(3*), 3114-3119.

Shaikh, A. M., Iqbal, M. J., & Shah, S. Z. A. (2012). Institutional Ownership and Discretionary Accruals: Empirical Evidences from Pakistani Listed Non-Financial Companies. *Information Management and Business Review*, *4*(3), 217.

Shamim, M. A., Abid, Y., & Shaikh, E. A. (2014). Validity of Capital Asset Pricing Model in Pakistan's Capital Market (Karachi Stock Exchange). *Journal of Emerging Issues in Economics, Finance and Banking (JEIEFB), An Online International Research Journal*, *3*(4), 1141-1149.

Sharpe, W. F. (1963). A Simplified Model for Portfolio Analysis. *Management Science*, *9*(2), 277-293.

Sharpe, W. F. (1964). Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk. *The Journal of Finance*, *19*(3), 425-442.

Sullivan, T. G. (1978). The Cost of Capital and the Market Power of Firms. *The Review of Economics and Statistics*, 60(2), 209-217.

Theobald, M. (1980). An Analysis of the Market Model and Beta Factors using UK Equity Share Data. *Journal of Business Finance & Accounting*, *7*(1), 49-64.

Titman, S., & Wessels, R. (1988). The Determinants of Capital Structure Choice. *The Journal of Finance*, *43*(1), 1-19.

Turnbull, S. M. (1977). Market Value and Systematic Risk. *The Journal of Finance*, *32*(4), 1125-1142.

Appendix

Appendix A: Table of Independent Variable Measurements	
Variables	**Measurement**
1. Firm Size	i. Natural log of total asset for firm (Olibe,2008) ii. Market Capitalization(shares*price) (Row & Kim 2007) iii. Natural log of 1972 sales for firm (Survillan 1978)
2. Growth	i. Ten-year average earning-price ratio (Chung 1991) ii. Ten-year average ratio of market to book value of equity (Chung 1991) iii. Average fractional changes in earnings (Hong and Sarkar, 2007) (Gu and Kim, 1998)
3. Liquidity	i. Current Ratio (Gu & Kim 1998) ii. Quick ratio which is current assets minus inventory divided by current liabilities (Gu and Kim, 2002) iii. Current Ratio (Logue & Merville 1972)
4. Financial Leverage	i. Leverage Ratio (total senior securities/total assets) by Beaver 1970 ii. Short Term Liabilities / Total Assets (Logue & Merville 1972) iii. Long term debt plus par value of preferred stock / Total Assets (Logue & Merville 1972) iv. Long term debt plus preferred stock to Common Equity (Melicher 1974)
5. Profitability	i. ROE = average percentage change in return on owner's equity (Borde 1994) ii. ROA = net income / total assets (Alaghi 2013) iii. Profit Margin = Net Income / Total Revenue (Kim & Gu 1998) iv. ROA = Net income / total assets (Lee and Jang 2007)

6. Operating Leverage	i. $DOL = Q(P-V)/ Q(P-V)-F$
	  or EBIT = Q (P - V) - FC
	    Q = Quantity produced or sold
	    V = Variable cost per unit
	    P = Sales price
	    FC = Fixed operating costs
	      OR

	$DOL = \Delta EBIT / \Delta SR$
	SR = sales revenue*(Alaghi, 2011)*
	  i. DOL (Gahlon, 1981)
	  ii. DOL = revenue before fixed costs / EBIT or
	      DOL = S - VC / S - VC - FC
	        where S represents sales, VC variable costs and FC fixed
	        cost. (Kwansa,1994)
	  iii. DOL is measured for each trucking company as the estimate
	        obtained from a regression of the natural logs of earnings on
	        sales over the firm's years of observations (HOUMOS,2012)
	  iv. DOL (Mandelker, 1984)

7. Activity
     Ratio
	i. Asset Turnover Ratio = Total revenue divided by total assets
	     (Gu and Kim,2002)
	ii. The ratio of turnover to the total assets (Chun and Ramasamy
	     1989)