# Comparative Risk Return Analysis of Islamic and Conventional Non-Financial Firms

## Case of Karachi Stock Exchange


**A THESIS SUBMITTED FOR THE PARTIAL FULFILLMENT OF MS/M.PHIL ECONOMICS AND FINANCE**

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Accession No TH-16674

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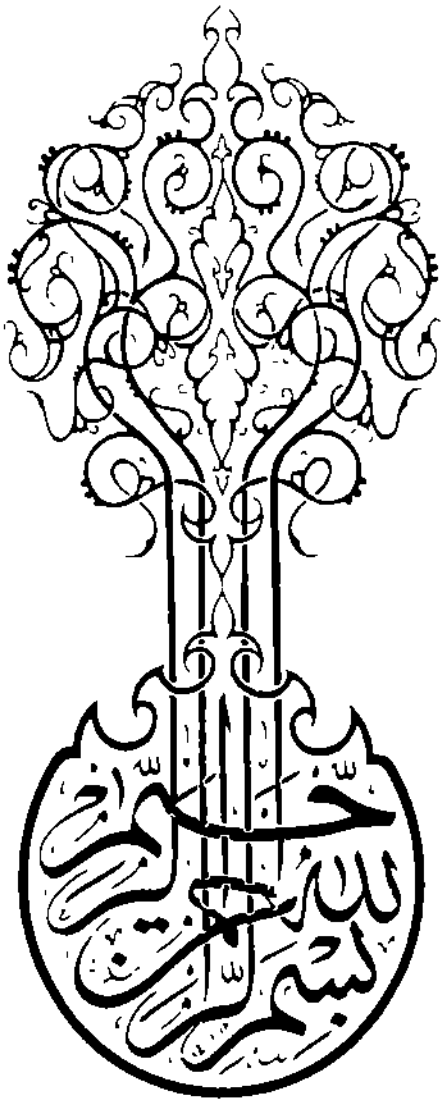
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**APPROVAL SHEET**

# Comparative Risk Return Analysis of Islamic and Conventional Non-Financial Firms

## (Case of Karachi Stock Exchange)

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## *"**DEDICATIONS**"*

*"This thesis is dedicated to my parents especially to my beloved father Abdul Hayee, husband Bilal Mazhar and all of my family members for their love, endless support and encouragement".*

# ACKNOWLEDGMENT

With the Almighty Allah s blessings and spectacular munificence I was able to attain knowledge and lay down the edifice of my research work in a tangible form I overlapped the fences of knowledge and wisdom with comfort and accomplished in the course of my studies and research and it`s only by Almighty Allah s will

I irst of all, I would like to pay my thanks and gratitude to my honoured mentor and supervisors Dr Atiq-ur-Rehman who always helps me regarding all hypotheses which originates in my mind, he also supports through his solicitous comments and guidance at every stage His devotion towards work and his enormous academies as well as practical knowledge helped me to be accomplished in my goals more efficiently I would also like to appreciate the guidance from Sir Khaleeq-Uz-Zaman throughout my research work I couldn't be able to make my research work logical and fruitful without their sagacious technical guidance

I would also like to pay my thanks to my beloved parents and husband from the core of my heart for encouraging me to accomplish my commitments towards studies Whenever I was depressed or discouraged, the prayers and love of my parents heightened my spirit I want to express my heartfelt thanks to my friends for their guidance, support and motivations in every stage when I needed and eventually I was able to complete this research work

**Anika Kanwal**

# Comparative Risk Return Analysis of Islamic and Conventional Non-Financial Firms Case of Karachi Stock Exchange

## Abstract

Return and risk are two important characteristics of every investment Investors attempt to reduce the level of variability of returns through diversification of investment This study examines the risk and the return characteristics of the Islamic market indices versus their conventional counterpart indices This study aims to examine, whether there is a significant risk and returns difference in selected public companies listed in Karachi Stock Exchange (KSE) representing KSE 100 index and KMI30 index of during the period of 2009-2014 This paper addresses the question whether the Islamic indexes are more or less affected by sudden changes in volatility regimes than the "conventional" counterparts in the normal period The firms performance and investment decision usually dependent on the risk and return of the shares of respective firm Two methods are usually adopted for comparative risk-return analysis i e GARCH-M model and CAPM We employed both of these models to evaluate and compare the performance of firms By using ARCH and GJR GARCH M Models we calculated conditional mean and conditional variance then calculated return to risk ratio of each respective firm By using CAPM model we calculated CAPM Beta and Expected return of each selected firm We have compared Return to risk ratio and Expected Return of Islamic versus Conventional non-financial firms The empirical results shows that Islamic non-financial firms' performance is much better than conventional one

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# LIST OF ACRONYMS

| | |
|---|---|
| KSI | Karachi Stock Exchange |
| APT | Arbitrage Pricing Theory |
| ARCH | Autoregressive Conditional Heteroskedasticity |
| ARCH-LM | Autoregressive Conditional Heteroskedasticity Lagrange Multiplier |
| ARCH-M | Autoregressive Conditional Heteroskedasticity- in-mean |
| CAPM | Capital Asset Pricing Model |
| CFI | Conventional Financial Institutions |
| COV | Covariance |
| CV | Coefficient of Variance |
| EGARCH | Exponential GARCH |
| GARCH | Generalized Autoregressive Conditional Heteroskedasticity |
| GARCH-M | Generalized Autoregressive Conditional Heteroskedasticity- in Mean |
| ICAPM | Intetemporal Capital Asset Pricing Model |
| IFI | Islamic Financial Institutions |
| IFSB | Islamic Financial Services Board |
| ER | Expected Return |
| RRR | Return to Risk Ratio |

# Chapter 1:

## Introduction

Islam has prescribed a particular set of guiding principles for any business including the financial and non-financial businesses These rules of business differentiate Islamic firms from the conventional firms Some financial transactions and businesses are strictly prohibited by Islam, whereas, some of business transactions are discouraged and not appreciated by the Shariah There is specific prohibitions guidance, for example interest, gambling, virtual trading etc that should be restricted The prohibition of gambling can have implication both for risk and for return While undertaking business in Islamic framework Therefore "comparative analysis "come to be essential due to the differences in business implements and practices of both type of the selected conventional and Islamic non-financial firms Certain Islamic firms operate under the supervision of shariah board implementation of the Islamic injunction, as well as regulations to help differentiating between permissible and prohibited businesses While the conventional firms are free to operate in an environment based on interest and time value of money, the Islamic firms have to refrain from such opportunities Conventional firms can do any business they want including gambling and speculation etc It becomes important to investigate, how adopting the Islamic regulation would affect the performance of firms Walkshausl and Lobe, (2012) study exposes that Islamic indices capitalise their assets mainly in growth and the positive momentum stocks Mostly investors remain flowing their assets from actively managed mutual funds to passive index-based investments This issue has been investigated in past in context of financial institutions Scholars agree

that the Islamic financial institutions should be more stable because of adopting the guidance provided by Shariah Those whose analysed the risk and return if Islamic and conventional institution, they usually differentiate between stable period and crisis period In case of crisis period scholars agree that Islamic indices have better performance Ho et al (2014) findings reveal that in the crisis time period Islamic indices well performed compare to their conventional counterparts However their results are questionable for the non-crisis or the normal periods In case of stable period, Scholars found mixed evidence of relative performance of Islamic and conventional institutions This study will explore the comparative risk return performance in the stable period And contribute in the existing literature that whether Islamic firms' performance is better than conventional counterparts in non-crisis or normal period 2010 to 2015 The firms in this study are randomly selected from KSE 100 index and KMI 30 index, representing for 'conventional and Islamic non-financial firms" and aims at to analyse risk and return of these non-financial firms during the non-crisis period

No research could be found exploring this area in Pakistan The "comparative risk return analysis" will be helpful for investors about investment decision in which steam of investment less or more risky stocks Theoretical literature depicts that the Islamic firms exhibit lower volatility because of high ratio of real transactions, assets backing and profit and loss sharing system However, the empirical evidence is lacking regarding performance of the Islamic non-financial firms during the normal period that have been listed in Meezan KMI 30 index become main emphasis of this research This research contributes as how to the risk and profit of Meezan index firms are dissimilar to KSE100 index firms It is comparative risk return analysis of Islamic

firms listed in Meezan bank under KMI 30 index and Conventional firm listed in KSE 100 index in normal period i e 2009 to 2014

## 1.1Statement of the Problem:

At this point the comparative risk and return analysis of two types firms has done Firms' selection is randomly total firms are 20, out of which 10 firms are listed in KSE100 index and 10 firms are listed KMI 30 index

## 1.2 Objectives of the Study:

The followings are the objectives of this study

- To compare risk and return behaviour of "Islamic and conventional non-financial firms" registered in Karachi Stock Exchange
- To analyse the effect of market conditions on risk and returns of "Islamic and conventional non-financial firms"

## 1.3 Significance of Study:

This research would be helpful for investors who are interested in investing in Islamic stocks The results of the research would help as to which firm is exposed lesser risk or higher return, which stream is most feasible etc the comparison of risk and returns of "Islamic and conventional non-financial firms' will bring healthy competition among all firms Above all, and besides economic conditions, the people of Islamic state would feel more comfortable interacting with Shariah complaints businesses

## 1.4 Outline of the study:

There is a brief description about our study in this section Chapter#2 includes the comparison of Islamic business against conventional business Moreover it covers the study about theoretical framework of Islamic financial business Chapter# 3 covers discussions about general idea of empirical story of the existing literature associated to our study, for Islamic and conventional countries also Chapter# 4 comprehends methodology and data description which provide a comprehensive overview of estimation methodologies and procedure which is adopted to determine the risk return association of selected non-financial firms Chapter# 5 contains conclusion and comprehensive discussion as well as the comparison with existing literature Chapter# 6 compresses the discussion about the conclusion and policy implications of the study

# Chapter 2:

## Overview of the Islamic Finance

The conceptual context is the key point of discussion in this section which is related to the "risk and return analysis of Islamic versus conventional non-financial firms" First section explains philosophy of Islamic finance, unlike second section elaborates the features of Islamic businesses The third sections discuss screening criteria to help to identifying which firm is Islamic or not Last section gives conclusion of this chapter

## 2.1 Philosophy of Islamic finance:

Islam is not simply a religion but also it extends over the entire life and it can guide us about every aspect of life Islamic finance is the part of the Islamic economic system and is sub-servient to the Islamic law According to the principle of Shariah Islamic businesses are based on the values prescribed by the normative concerns i e, justice, balance, equity, value judgement, etc However, primarily, the businesses are required to observe certain prohibition as enjoined by Islamic law derived from Quran[1] and Sunnah[2]

The core prohibition relates to riba that prevents coercion, wealth concentration and equity A number of ahadiths also have prescribed this prohibition in different context i e , trading commodities', prohibition of ribavi transaction Trade is allowed in Islam conditionally to have removed excessive and biased exchange of business dealings

[1] *Allah has permitted trade and has forbidden riba" (Qu an 2 2~5)*

[2] *Ibn Abbas reported As for that of which the Holy Prophet prohibited sale it is food-crops till them come in possession Ibn Abbas said I don t consider anything but just like it (Bukhari and Muslim)*

Islamic firms' activities are according to Islamic law, Shariah complaints and interest free transactions While most of activities of conventional firms are interest based Any business in which there is interest based transaction is un-Islamic Against the prohibition of riba, Islam finance promotes the entrepreneurship culture and requires the trading parties to share return and risk [3] Profit and loss sharing provides the alternate to the riba based transaction that creates confidence among the financed as the risks are shared by the financier, leaving a true economic impact through cooperation and generosity The entrepreneurial activities inspire conjoint collaboration, munificence and an essence of partnership The financier can stay up to date with real economic activities An Islamic financier can be an actual part of contribution to the wellbeing and prosperity of the society through commerce, manufacturing and construction etc

*O you who believe! Do not devour your property among yourselves unjustly except that it be by trade amongst you, by mutual consent (Qur'an 4 29)*

The Islamic finance focuses on mutual benefits and justice Social benefits dominate the individual benefits So Islamic institutions must fallow Islamic principles Therefore any business which is indulged in injustice transaction would necessarily be un-Islamic

Islam injections also required avoiding gharar In Arabic "Gharar" used to describe uncertainty The business dealings which are done according to the concept of "Gharar" are indistinct or vague The two parties involved in Business deal based on "Gharar" are not certain of the consequences of the business done "Gharar" occurs

[3] *These are the higher purposes of Shariah which besides the five required purposes prescribe the social norms to be undertaken by the people business and societies*

when two parties make an agreement and any of the parties having incomplete information or when both parties don't seem to have control over the business agreement what they have signed The institutions or business which involved these type of contract would be considered as un-Islamic For example gambling, Lottery and any product based on uncertainty are prohibited That is why any speculation in stock exchange, future markets, etc , are prohibited The firms also required to undertake halal business Therefore any firm indulged in haram activities like production of liquor, alcohol, pork, prostitution, pornography and keeping funds in and raising loans from conventional banks are not eligible to be categorized as Islamic business The firms also required to observed moral and social values as enjoined by maqasid al Shariah The Quran demands to all its followers to attention and funding the deprived and penniless Islamic non-financial firms are expected to provide special services to those in need In Islam it's not prohibited to provide a loan or to donate for the people who are in need even to enhance this concept of Islamic charitable donations, there are many institutions who are helping people with providing interest free-loans or Quard Al Hasanah concerns the all-embracing concept of fairness In Islamic society the Islamic firms are social responsible to pitiable and needy, and requisite to contribute in collecting funds and zakat for destitute and pitiable

Another important characteristic is avoiding those activities which are harmful to society Islam doesn't allow those products and industries which are considered harmful to the society and endanger social atmosphere, i e tobacco etc Muslims need to take a close look at the business they are about to become involved in the idea that all parties concerned should both share in the risk and profit of any enterprise To be entitled to a return, a provider of finance must either accept business risk or provide

some service such as supplying an asset This principle is derived from a saying of the Prophet Mohammed (May Peace be upon Him) "Profit comes with liability" What this means is that one becomes entitled to profit only when one bears the liability, or risk of loss By linking profit with the possibility of loss, Islamic law distinguishes lawful profit from all other forms of gain As conclusion according to Islamic rules and guidelines Muslims can go ahead in the world to participate in the business activities like profit-loss sharing There are some obligations doing business in the market like asset backed trading and interest free loans but keeping those restrictions in mind which make our business anti-Islam

## 2.2 Shariah Guidance:

Allah (SWT) is owner of everything in the world, a human is his trusty in the world Allah (SWT) has chosen man to follow his command Our maximum aspects of life is covered by these commands But in some matters Muslims have to take decisions with their instinctive powers keeping in view these commands human instinctive powers would not over rule the fundamental principles of Allah (SWT) The obedience of Muslims is not only required in worship but also in their economic activities[4]

In the following table there are distinct features of Islamic finance which differentiate it with conventional finance The risk return effect of both type of finance is also different So here is comparative analysis of these features has been done

[4] *Usmani (1998) "An Introduction to Islamic Finance" p 10*

**Table 2.1 Comparative Features of Islamic and Conventional Finance**[5]

| Conventional Finance | Islamic Finance |
|---|---|
| 1 Speculative law is based on human wisdom | 1 Islamic law is based on Divine guidance |
| 2 Money Lending | 2 Assets Financing |
| 3 Interest based businesses | 3 Profit sharing on investment or profit realized on trading activities |
| 4 Utilizes money to generate income | 4 Build assets to increase income |
| 5 Debts for business at any time | 5 Papers trading only if it's asset backed |
| 6 Acquired by conventional businesses only | 6 Acquired by both Islamic and conventional businesses |
| 7 No screening criteria for trading stocks | 7 Screening criteria is used to identify Islamic stocks |
| 8 Does not prohibit speculative activities | 8 Speculative activities are forbidden |

## 2.2.1 How these features effect Return and risk?

There are significant difference between features if Islamic finance and conventional finance

[5] Islamic Finance 'Basics & Performance (2010)

Islamic finance prohibits riba and promotes risk reward sharing Here we will discuss some special features of Islamic finance

### 2.2.1.2 Real Asset-based Transactions:

A real asset-based financing is one of the most important features of Islamic firms The conventional firm businesses mainly deal with only money and monetary papers Islam prohibits trading in terms monetary papers, it is only medium of exchange Conventional institutions business is paper trading and have more risk and generate bubble economy Money has not an intrinsic value, profit is created when something having intrinsic value Conventional firms finance their business through trading in liquid asset and dealing in money Islamic firms finance their businesses through illiquid asset The profit which is gained by an exchange of equivalent currencies known as Interest is not allowed in Islam So, Islamic transactions are based on assets backed like land, inventories etc

It is obvious from the above debate that every financing in an Islamic system creates real assets This is true even in the case of murabahah and leasing, despite the fact that they are not believed to be ideal modes of financing and are often criticized for their being close to the interest-based financing in their net results It is known, on the other hand, that interest-based financing does not essentially create real assets, therefore, the supply of money through the loans advanced by the financial institutions does not normally match with the real goods and services produced in the society, because the loans create artificial money through which the amount of money supply is increased, and sometimes multiplied without creating real assets in the same quantity This gap between the supply of money and production of real assets creates or fuels inflation Since financing in an Islamic system is backed by assets and profit is not so

speculating, huge loss cannot occur a financier has a real asset to compensate loss due to this risk will be lower it is always matched with corresponding goods and services

### 2.2.1.2 Capital and Entrepreneur:

The capitalist theory states that the factor of productions like capital and entrepreneur these two are separate elements of production The capital remunerated by interest and the entrepreneur is eligible to profit While profit would be earned after paying to other factors of productions like land labour On the other hand in Islam business there no different concepts of capital and entrepreneur Everyone who funds the capital (in the form of money) to any commercial enterprise take responsibility to bear the risk of loss, for that reason he is legitimate to a proportional share in the real profit Investor who is offering loan is not permitted to take profit as it leads to Interest which is forbidden Investor can be a person who is an owner of the business So he is liable for profit &loss An essential part of entrepreneur is the concern about business risk which demonstrates the capital Therefore, entrepreneur is deriving indefinite revenue on capital instead of fixed Riba Higher return would be gained by higher profit on capital and vice versa [6]An essential principle of Islamic finance is "Profit loss sharing" Holy Prophet Muhammad (PBUH) said "profit comes with liability" this saying has representation of the concept of "Profit loss sharing" This concept describes that a man can earn permissible profit by bearing loss and other consequences Ideal ways and means of Islamic finance introduce relationship of entrepreneur, partner, investor and agent instead of the creditor The profit as well as loss or commission is always being shared between investor, partner and agent The perception of profit & loss sharing in Islamic businesses is directly linked with

[6] Usmani (1998) An Introduction to Islamic Finance p 14-15

profitability having physical investment not trading by paper The revenue is based on indefinite future income of Islamic non-financial institutions The expectations of investment depositors could be altered due to uncertainty in future income On the other hand, Conventional finance guarantees capital and Riba It does not accommodate its positive utilization and all kinds of risks of investments are born by the borrower Conventional bank is also concerned with profitability due potential default

### 2.2.1.3 Nobody can trading of Debts:

In conventional businesses the debt trading is common, it is the spinal of their system But, In the Islamic business there remain closed all the doors of trading the debt based instruments i e derivatives etc There are equity based financing in Islamic businesses Which are established on the risk and reward distribution activities? Each activity of Islamic non-financial is backed by some physical asset Trading of debt based securities is strictly banned in Islamic non-financial firms businesses The securities which can be issued and traded by Islamic firms must backed by any physical asset

### 2.2.1.5 Prohibition of Speculation:

When someone buys the things at reduced rates and sell those things in the future when those things get more costly, it's called "Speculation" Speculative buyers always buy things when those things are expected to get higher in cost in future with an intention of selling them on higher rates when the price of these things get higher In the same way if there is a chance to get the things cheap in the future then the speculators will sell the things to avoid selling the things at cheap rates in the

future Islam condemn these kind of businesses, especially concealment of those essential things which are used in daily routine with an intention of raising their prices artificially and it has been strongly condemned by our beloved Prophet of Islam The Hadith stated below prescribed the above mentioned Islamic norms

*Umar said ' one who brings grain in our city will be blessed with (abundance of) wealth and one who hoards will be cursed If anyone* (Business) *withholds grain (or other articles of use) while men of God (i e the people) need it the ruler can forcibly sell his grain (or other articles of use)"*

From above ahadiths we came to know that Allah (SWT) strictly prohibited speculation and hoarding Anyone who involved that type of business has been cursed by Allah (SWT) A Muslim investor must avoid to indulge in these type of businesses A Muslim is trusty of Allah (SWT) so he is answerable for his business activities

## 2.3 Screening Criteria of Islamic firms:

In the Islamic financial business screening Criteria displays an important role in promoting religion code and social welfare of the society It discourages moral susceptibilities and immoral businesses like laying a bet, drinking a vine, and nightclubs etc and all those businesses that demonstrate lack of respect to human kind There are different screening criteria that Islamic capital markets practice to evade from illegal businesses and it arrange for the allowable (halal) income to the concerned investors

## 2.4 Islamic indices and their Screening Criteria:

Shariah experts have presented screening criteria to identify the permissible businesses to invest in as reflected from the Islamic injunctions contained in Quranic verse[7] and Sunnah[8]

Currently, there are three well-known criteria operational in the global markets like DOW Jones screening index, Malaysian Islamic index and Meezan Islamic index

# 2.5 Meezan Islamic Fund Criteria:

KSE-Meezan Index (KMI) is used for evaluating the performance of Shariah compliant equity based investments The "Free-Float Market Capitalization" is used in calculation of KMI index The free-float methodology is an index construction methodology For the calculation of index it takes into the account only the market capitalization of free-float shares of a company

The Shariah screening criteria for equities and other securities is given below

## 2.5.1 Business of the investee company:

[7] *The al-Qur'an surah al-Mukminun verse 51 states that Muslims are commanded to participate in good things and work for righteousness (Mohd Ma'sum Billah, 2006) '*

[8] *Jabir ibn Abdullah reported that "the Prophet (SAW) forbade the sale of wine, swine and idols"*

The basic business of the Investee Company should be halal There is banned to invest in forbidden items like vine selling etc

### 2.5.2 Debt to total assets

The total interest-bearing debt of the Investee Company should not exceed 45% of the total assets If any company exceed its limit then it will be excluded from this category

### 2.5.3 Net Illiquid to total assets:

Illiquid asset should minor The total illiquid assets of the Investee Company as a percentage of the total assets should be at least 10%

### 2.5.4 Net Liquid assets versus share price:

The net liquid assets (current assets minus current liabilities) per share should be less than the market price of the share

### 2.5.5 Characteristics of Meezan Islamic companies:

For any stock to remain Shariah compliant, it requisite to meet all six criteria given below

1 The core business of the company must be Hilal and in accordance with doctrines of Shariah
2 Debt trading is forbidden The Debt to Asset ratio should be less than 40% Zero coupon bonds and preference shares are also element of debt

3 The ratio of non-compliant investments to total assets should be less than 33% Investment in any non-compliant security is included for the calculation of this ratio

4 The ratio of non-compliant income to total revenue should be less than 5% Total revenue includes Gross revenue plus any other income earned by the company This amount is cleansed out as charity as a pro rata ratio of dividends issued by the company

5 The ratio of illiquid assets to total assets should be at least 20% Illiquid asset, here, is defined as any asset that Shariah allows to be traded at value other than the par Illiquid Assets are tangible assets that are not liquid It focuses on that the company should invest in the tangible assets

6 The market price per share should be greater than the net liquid assets per share

If the main business of the investee companies is Halal, like automobiles, textiles, manufacturing concerns etc but they deposit their surplus amounts in an interest bearing account or borrow money on interest, the shareholders must express their disapproval against such dealings, preferably by raising their voice against such activities in the annual general meeting of the company and or by sending a letter to the management in this regard[9] There are thirty companies which come under Meezan Islamic companies and fulfil above six characteristics are given below

[9]https //en wikipedia org/wiki/KMI_30_Index#cite_note-3

## 2.6 CAPM Theory:

To determine proper required rate of return of an asset the well-known capital asset pricing (CAPM) empirical model has been presented by William Sharpe, in the book "Portfolio Theory and Capital Markets " Every investor bears two types of risk in their business First risk is undiversifiable, unpredictable and unavoidable It cannot be alleviated through diversification, can be alleviated only through hedging It is determination of prices of an assets or risk We have not found any theory which telling the way in which worth of risk effect by basic investor preferences and the characteristics of the physical asset No doubt a large no of economist have developed the large no of models But none had yet tried to spread it underneath the condition of risk to build a "market equilibrium theory" of the asset prices First of all we determine optimal policy for investment In assessing the desirability of particular investment, the investor needs only expected value and variance of an asset Investors always prefer more return to less return Risk averse investor will choose those asset which give him less value of variance or standard deviation

## 2.7 Conclusion:

At the last, we concluded our whole chapter First of it has discussed the viewpoints of Islamic finance effects of risk return on fundamental principles of Islamic finance Due to differential features like ' risk return sharing" and 'asset backed financing' etc of Islamic finance has minimize the risk of Islamic non-financial firms compare to conventional finance This risk and reward nature of Islamic versus conventional finance is to be investigated empirically in next chapters

# Chapter 3:

## Empirical Literature:

The review of empirical literature has the contradicting results about the performance of both Islamic versus conventional finance There are three major groups of opinion in literature about Islamic and conventional finance Empirical framework consists of three parts, Parts are dividing by the opinions of different scholars First parts explains the opinions of that group who says there are no significant difference between performance of Islamic finance versus conventional finance. Second parts describes the opinion of those groups who favour the Conventional finance and Last section represents the opinions of that group who believes that Islamic financial products behave much more better than conventional one and it gives peace of mind to Muslim investors

## 3.1The performance of Islamic finance and conventional finance is almost parallel:

There are many opinions about the "comparative analysis of Islamic and conventional finance" in this section we talk over that group of opinion who says there is no significant difference between performances of Islamic finance and conventional finance An Indian comparative study about Nifty shariah index and nifty index is Dharani and Natarajan (2011), study about the performance of Islamic and conventional indices and their empirical result bring into being that there is not

noteworthy difference among the Nifty Shariah index and Nifty Index in term of average daily returns

Malaysia has so many studies about Islamic finance, a study which is about the indifference performance of "Islamic and conventional finance' is Albaity and Mudor (2012) study, and by comparing return performance the empirical results show that there is not major difference between the both types of indices during different crisis periods According to them by comparing in term of performance there is definitely not advantage of investing in Islamic indices over the conventional indices However, by investing in Islamic stocks Muslim investors might have the peace of mind that they are looking for Hassan and Girard (2011) study results also confirmed that Islamic and non-Islamic indexes have not weighty difference Overall, both the Islamic and conventional indexes have related reward to risk and diversification proceeds Wilson (1997) study results indicated that both conventional and ethical funds are behaving in same manner

There are large no of Islamic banks In GCC countries The investors of GCC countries have shown most interest in investing for Shariah-compliant products Abbes (2012) study is about the risk adjusted performances of Islamic and conventional stock market indices in different markets like developed, emerging and GCC markets The Sharpe ratio test and the CAPM model results show that in the normal period as well as in the crisis period there is not major difference between performance of the all considered types of indices in risk adjusted return basis in emerging GCC and developed markets except Italy and Australia Another GCC market study by Miniaoui et al 2015study results show that both Islamic and

conventional explosive nature is effected by similar way in the period of crisis Suhana et al (2012) review the performance research of Islamic and conventional unit trust funds Both unit trusts have same performance

Another Australian study Fu and Reddy (2014) study results describes that the Islamic and conventional stocks have statistically substantial difference in their performances in terms of risk, besides in term of returns the performance of the Islamic stocks tends to be parallel to the conventional stocks By comparing the returns of "Islamic and conventional stock and got no noteworthy difference between their performances These studies concluded that there is not major difference between the performances of "Islamic finance and conventional finance" are almost parallel In some studies there is risk is more in conventional finance than Islamic finance but return is also more so overall performance may remain same

## 3.2 Performance of conventional finance is better than Islamic finance:

In these sections the theories discusses that conventional finance performance is better than Islamic finance Second group of opinions debated that conventional stocks behave better than the Islamic stocks (McGowan and Junaina. 2010) A Malaysian study by Mansor and Bhatti (2011) that confirmed the Kuala Lumpur Shariah Index (KLSI) slightly underperformed Kuala Lumpur Composite Index (KLCI) In short run KLCI index has the greater the risk-adjusted returns and beta averages comparative to KLSI which has lesser risk-adjusted returns and beta Another Malaysian study by Hooi and Parsva (2012) found that the average daily return for all considerable indices

is positive during non-crisis period On the other hand during the crisisperiod the FTSE Shariah index has higher standard deviation indicating higher risk than its conventional counterpart Yong and Jusoh (2012) the Malaysian study identify the fund characteristics and performance Their study results demonstration that higher risk offers higher return Islamic young funds' conventional old one in the market Hunjra and Bashir (2014) study determines that Conventional banks performance is much more gainful, prearranged and operationally proficient while less liquid and more risky as compared to Islamic banks Bashir and Nawang (2011) studyabout the performance of Malaysian Islamic and conventional unit trusts The results demonstrate that Islamic funds' average returns are lower than conventional funds In "risk-return relationship" these funds 'standard deviation are very low Saad et al (2010) study is about Malaysian unit trust The results show that Islamic unit trust companies performance and efficiency better and stable than conventional companies A UAE study Miniaoui and Gohou (2013), describes that the conventional banking system is performing better than the Islamic one

According to Charles et al (2011) the Islamic indexes exposes higher volatilities and variances in different time periods On the other hand conventional indexes exposes slightly lower variances Cihak and Hesse (2010) study reveals that conventional banks are financial stable than Islamic banks Islamic banks have not noteworthy market share which has not major effect on financial power of others strong banks Moin and Chen (2008) is about Pakistani Islamic and conventional study result found that Islamic banks are less cost-effective, less risky), and less efficient linking to of the conventional banks Norman et al (2013) study is about the performance of shariah

based and conventional funds Conventional fundscarry outbetter position and having higher standard deviation than "Shariah based funds"

All above mentioned literature reveals that conventional finance is performing well than Islamic finance It may be due to conventional indices strong market capitalization In Pakistan the reasons are of better performance of conventional banks is because of the facts that large number of conventional banks have been working from couples of years in Pakistan These banks have longer history and experience in doing banking business And it grasp leading position in the financial sector having its large share in the overall financial sector, as compared to Islamic banks

## 3.3 Performance of Islamic finance is better than conventional finance:

In this section the theories discusses that the Islamic finance performance is less risky and safe than conventional finance Abdul et al (2014) study shows that the Islamic stock market produced more return compared to conventional in all sample periods crisis as well as normal periods In Malaysia they also find that there is significant short-run bidirectional causality between two markets Boumediene and Caby results state that Islamic banks moderately safe to the crisis and Islamic banks position of risks are not same as conventional banks Because of Islamic banks links are different They deals with the real economy, they ensure earlier or far ahead tolerate the consequences of the crisis Yong and Jusoh (2012) the Malaysian study identify the fund characteristics and performance The results demonstrate that the higher risk is to be responsible for the higher return Islamic young funds' performance is better than

conventional old one in the market Razzaq et al (2012) by using Sharpe ratio the results describes that overall Islamic mutual performance are positive and better

Rizvi and Arshad (2014) study results reveals Islamic indices provide though not complete, but partial insulation, thus a safer haven This signifies well for a hugely untapped Islamic alternate investment opportunity for consideration In Pakistan there are many studies that show Islamic finance is safer than conventional finance In Pakistan Amjed et al (2013) study results reveal that mostly Islamic banks are demonstrated to be less risky, more liquid and more proficient comparatively to conventional banks Another Pakistani study by Sehrish et al (2012), their study shows that there is no significant difference between Islamic and conventional finance in profitability The study empirical results show that Islamic banks are less risky and overall of performance of Islamic finance is much better than conventional one

Wahab et al (2015) Malaysian study displays that both the Islamic financial system and conventional financial system are significance different in term of performances According to them Muslims have more opportunities' to invest in Islamic financial market that is attained with Shariah Islamic financial market which provides comprehensive Shariah settlement products has advanced the whole universal economy Beck et al (2013) study result shows Islamic bank has higher capitalization and high asset quality and less likely to disintermediate during crisis compare to conventional banks Usman and Khan (2012) Pakistani study about Islamic and Conventional bank performance The study outcomes are that Islamic banks have extraordinary growing rate and profitability in excess of the conventional banks Moreover the Islamic banks have high liquidity power over conventional banks

Alzoubi (2015) study indications also same as previous study that Islamic bank's growth rate is high compare to the conventional banks

## 3.4 Theoretical Comparison of Risk and Return:

According to Khan and Ahmed (2001) the Islamic financial and non-financial institutions bear first type of credit risk, market risk and operational risk etc two types of risks Another type of the risks that the Islamic financial and non-financial institutions suffers to their asset and liability structures Islam (2013) also used daily stock returns data of Malaysia and apply GARCH M model, found positive relationship between the risk and return for all expected markets The Indonesian market is found to be more volatile than the other selected markets also support portfolio theory that increased risk leads to increase in return Harrison and Zhang (1999) observed "stock return and volatility" in different time period And account the risk-return relation is positive at long time period, but insignificant at short time period Brandt and Kang (2004) finding that the correlation among the conditional mean as well as stock volatility is negative And the correlation between the unconditional mean and stock volatility is positive Merton (1980) estimations is about the relationship of 'market risk premium and volatility" He accessed a positive relationship between risk premium and volatility And negative relationship between the excess holdings and unexpected changing in volatility According to his study realized stock returns have larger variance than expected return variance Aslanidis et al (2013) assumes dynamic factor models and resulting strong negative relationship between "conditional stock return and conditional volatility" In Jordan Al Rjoub (2011) used the GARCH-M model in the crisis period to checked the influence of

dummy variables on the "stock returns volatility" The results of their study proven that there is negative relationship between "stock returns volatility" According to them fluctuation because of the result coming news and general public prospects about the Jordanian stock market

## 3.5 Gap in Literature:

However, we have not found any research on risk-return analysis and discussions of the performances among the "Islamic and conventional non-financial firms" The "comparative risk return analysis" of firms will be supportive for restricted and foreign investors about the selection of their investment stream wherever to invest in less risky stocks or more risky stock This analysis would also be obliging to attract investors and helping to improvement of non-financial industry of Pakistan

Finally, here the above section describes the opinions of scholars into three groups Empirical literature documented numerous studies on comparative performance of Islamic and conventional banks, mutual funds stocks and companies However, different studies documented different results with better or weak performance of Islamic and conventional financial institutions Our study present comparative risk returns analysis of Islamic and conventional firms' performance And explore the result that which type of firm is better This empirical section put down the groundwork for our empirical analysis in Chapter 5

# Chapter 4:

# Methodology

## 4.1 Introduction:

The performance and investment decision of the firms are usually dependent on the risk and return of the shares of respective firm Two methods are usually adopted for this purpose i e GARCH-M model and CAPM We employ both of these models to evaluate and compare the performance of firms

The arrangement of this Chapter section 4 1 has been discussed above, section 4 2 reports analytical contextual of the selected GARCH model, 4 3 discusses the return to ratio, 4 4 describes the CAPM model and 4 5 data and sampling

## 4.2 Volatility Analysis and Risk-Return Relationship:

The GARCH model is mainly beneficial as it makes current conditional variance reliant on the model There are two important variables that play role in decision making in the financial market, these variables are risk and return To calculate the risk and return, we apply GARCH-M (GJR) model The volatility of returns which is measured by the variance, has an autoregressive structure i e volatility depends on its past values the GARCH model takes into account this autoregressive structure The GARCH model is written as follows

### 4.2.1 GARCH effects and Stationary Tests:

Like every model the GARCH-type models are also some assumptions which should be fulfilled prior to applying the model Far-reaching, the raw stock prices data are

non-stationary and log of the returns of the stock prices are stationary at least in the short run Therefore, raw stock price series are converted into log stock prices

$$R_t = \log P_t - \log P_{t-1} \quad \text{---------- (1)}$$

GARCH models consider that series should be stationary For this purpose, we take log returns of stock prices The null hypothesis implies that series is non stationary For this purpose, we use KPSS test to justify with the assumption of stationary If KPSS rejects null hypothesis that the absolute value of KPSS[10] statistics is greater than the McKinnon[11] critical value, then the series is considered to be stationary at that point we can continue to analyze the series

Secondly, for the GARCH model it is required to check the residuals either there is existence of ARCH effect or not There should be ARCH effect in the residuals, if it is not found then the GARCH model is unusable However, all those firms are selected which assures ARCH effect For this, Lagrange Multiplier (LM) test is put up under the assumption that there is no ARCH effect in the residuals term P-value is the basis to accept or reject null hypothesis at the convention of 5% level of significance If P-values are significant then we reject null hypothesis, which states that series behavior is volatility clustering If LM test for ARCH effect is significant then we proceed to estimate conditional risk and conditional return through appropriate GARCH models

[10] *We use KPSS test to analyze the assumption of stationarity as it contains less restrictions than ADF*

[11] *The critical value of KPSS test at 5% level of significance is 0 463*

### 4.2.2 Mean Equation:

The GARCH M Model is used for the analysis of the stock prices series by estimating two parallel equations First is for the mean as given below,

$$r_t = \theta_0 + \theta_1 r_{t-1} + \quad + \theta_k r_{t-k} + \phi_1 \varepsilon_{t-1} + \phi_2 \varepsilon_{t-2} + \quad \phi_p \varepsilon_{t-p} + \mu_t \text{ ——— (2)}$$

Where $r_{t-1}$, $t = 1,2,3$ . represents the Lags of the return series and $\varepsilon_{t-1}$. represent stochastic error terms

### 4.2.3 Variance Equation:

$$\sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \alpha_2 \varepsilon_{t-2}^2 + \quad + \beta_1 \sigma_{t-1}^2 + \beta_2 \sigma_{t-2}^2 + \quad + \nu_t \text{ ---------- (3)}$$

Conditional mean and conditional variance would be calculated from the GARCH model mentioned in Equation (2) and Equation (3) It is important to note that $\alpha + \beta < 1$ if the stationarity condition is to be satisfied as there is no theoretical justification for models whose summation of the lagged residual term and the lagged conditional variance is more than one When the coefficient $\beta$ is positive and significant, then the conditional variance also leads to high mean returns with high risk If negative coefficient of the β, at that time mean and variance will also low We are interested to study comparative risk return analysis on stock prices data of the firms And then need to enter some selected variables in the variance equation of the selected model that will affect the volatility of the stocks In equation (3) the variables α and β ought to directly affect the return, for that reason these variable should be included in the variance equation

For fulfilling our objective of analysing comparative risk return relationship on the level of stock prices and volatility of the selected series Therefore, risk variable $\sigma_t^2$ is included in mean equation Therefore, equation (2) will take following form,

$$r_t = \theta_0 + \theta_1 r_{t-1} + \quad + \theta_k r_{t-k} + \phi_1 \varepsilon_{t-1} + \phi_2 \varepsilon_{t-2} + \quad \phi_p \varepsilon_{t-p} + \psi_t \sigma_t^2 + \mu_t \text{ —— (4)}$$

Some generalization of GARCH model are also commonly used in literature which account for the presence of asymmetric effects (GJR-GARCH model) and for risk premium If we take into account the risk premium terms, the model will become,

$$\sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \alpha_2 \varepsilon_{t-2}^2 + \ldots + \beta_1 \sigma_{t-1}^2 + \beta_2 \sigma_{t-2}^2 \ldots + \nu_t \text{ ------ (5)}$$

Wherever the coefficient of $\sigma_{t-1}^2$ represents the risk premium Firstly we intend to use most general procedure of the model and then reduce it by the significance level of the selected variable coefficients



## 4.3 Return to Risk Ratio:

By using above equations we computed the conditional risk and the conditional return of each selected firm Then the return/risk ratio of each selected firm is calculated as a result of dividing average returns by standard deviation of the all-inclusive period The below formula is used for RRR for the analysis

$$RRR_i = r_{ti}/\sigma_{ti} \text{ ------ (6)}$$

Where i denote i'th firm If RRR is unity (RRR=1), this means that the particular firm has equal returns and risk If RRR is less than one (RRR<1), this indicate that the firm's risk is greater than returns If RRR is greater than one (RRR>1), this recommend that the performance of the firm is better than others selected firms because of that firm's returns are higher than that one risk A firm with negative returns indicates negative RRR A frim with lower negative RRR contain lower risk as

compared to firm with higher negative RRR The return to risk ratio for each firm in the sample will be calculated as follows $rrr_{it} = r_{it} / \sigma_{it}$

Where $r_{it}$ is conditional mean, $\sigma_{it}$ is Conditional variance And $rrr_{it}$ is risk return ratio The risk to return ratio for Islamic and conventional stocks will be compared using descriptive statistical methods

## 4.4 CAPM Model:

CAPM theory has been discussed in Chapter 2

$$E(Ri) = Rf + \beta(Rm - Rf) \text{ ------ (7)}$$

Where $E(Ri)$ is the expected return on security $i$, $Rm$ is the return of the market portfolio, $Rf$ is the risk free return and $\beta i$ is market beta a measure of the systematic risk of asset for security $i$ It can be calculated by this formula

$$\beta = \frac{Covar(Rm,Ri)}{Var(Rm)} \text{ ------ (8)}$$

In order to acquire the estimates of the expected return, we first need to create return series by GARCH mean variance equation We take daily T-bills rate for risk free returns and also calculate daily market index return, then by using market returns and individual security returns we calculate individual beta Then step by step we calculate expected returns of all selected Islamic and conventional companies Which company has higher expected return it will have lower beta and higher profitability

## 4.5 Data and Sampling:

This research is exclusively based on daily data consisting of the daily stock prices of non-financial public companies listed on Karachi Stock Exchange (KSE), these companies are selected randomly Where Islamic non-financial companies are selected from KMI30 index and conventional non-financial companies are selected from KSE100 index from the year 2009 to 2015, which is collected from official website of KSE KMI 30 enlists the companies whose business is Shariah complaints Therefore the "firms" termed as "Islamic" are chosen from KMI 30 The conventional firms are

# Chapter 5:

## Empirical Results

## 5.1 Introduction:

In this section the empirical analysis has done first section analyses the descriptive statistics, second address GARCH specification Models and third report Comparison Islamic versus Conventional non-financial firms by two approaches, first by comparing overall return to risk ratio of the selected firms and the Expected returns, and afterwards sector wise comparative analysis has been done for the selected firms and fourth section draws conclusions of this findings We have selected five sectors for this analysis and in which 10 firms are Islamic under (Index KMI 30) and remaining ten are conventional firms under (Index KSE 100)

## 5.2 Descriptive statistics and stationarity test:

Here descriptive statistics are discussed in table 5 1(A) in which Mean, Median of the simple returns are calculated Below the results are discussed in detail and also the results of KPSS stationary test Firstly we discussed mean of the returns, secondly the debates on average risk, and thirdly discussion of the risk return relationship and lastly demonstrations of the stationary test has been explained

### 5.2.1 Average Returns:

Table 5 1 shows the summary statistics of average or mean, median, minimum and maximum of the returns of selected "Islamic and the conventional non-financial firms" In column 1 there are means of all the selected non-financial firms All

"selected firms" shows positive mean returns except the conventional power generation sector i e SEPCO Company Mostly selected firms have positive returns it shows that their earnings are positive The "Oil & Gas sector" conventional firms like APL, SNGP, SSGC, and OGDC Islamic companies like MARI, PSO, POL, and PPL "Refinery sector" companies like PRL, ATRL, "Cement sector" companies like MLCF, DCL, DGKC and LUCK, "Telecommunication sector" companies like PTC, TELE and "Power generation sector" companies like KAPCO, HUBC and JPGL, all these firms have positive mean returns and only SEPCO (-0 0002) has negative mean returns

| TABLE 5.1 | DESCRIPTIVE STATISTICS AND STATIONARITY TEST | | | | | | |
|---|---|---|---|---|---|---|---|
| Company | Mean | Median | Maximum | Minimum | Std.Dev. | KPSS | Observation |
| APL | 0 004 | - 0 00041 | 5 25 | -0 28 | 0 14 | 0 09 | 1463 |
| ATRL | 0 00082 | - 0 00047 | 0 10 | -0 06 | 0 02 | 0 13 | 1464 |
| DCL | 0 00065 | - 0 00347 | 0 47 | -0 23 | 0 05 | 0 10 | 1464 |
| DGKC | 0 00116 | 0 | 0 11 | -0 07 | 0 02 | 0 11 | 1464 |
| HUBC | 0 00113 | 0 00095 | 0 08 | -0 09 | 0 02 | 0 19 | 1464 |
| JPGL | 0 00048 | - 0 00456 | 0 47 | -0 22 | 0 05 | 0 05 | 1463 |
| KAPCO | 0 00053 | 0 00022 | 0 06 | -0 10 | 0 01 | 0 10 | 1462 |
| LUCK | 0 00193 | 0 001 | 0 11 | -0 08 | 0 02 | 0 11 | 1464 |
| MARI | 0 00111 | - 0 00052 | 0 06 | -0 66 | 0 03 | 0 15 | 1464 |
| MLCF | 0 00161 | 0 | 0 25 | -0 15 | 0 04 | 0 46* | 1464 |
| OGDC | 0 001 | 0 | 0 07 | -0 06 | 0 02 | 0 53** | 1464 |
| POL | 0 00093 | 0 00052 | 0 06 | -0 07 | 0 02 | 0 69*** | 1464 |
| PPL | 0 00035 | 0 00022 | 0 09 | -0 24 | 0 02 | 0 30 | 1464 |
| PRL | 0 00038 | - 0 00148 | 0 13 | -0 08 | 0 03 | 0 10 | 1464 |
| PSO | 0 00065 | - 0 00025 | 0 10 | -0 18 | 0 02 | 0 14 | 1464 |
| PTC | 0 00025 | - 0 00053 | 0 11 | -0 14 | 0 02 | 0 07 | 1464 |
| SEPCO | -0 0002 | - 0 00414 | 0 49 | -0 21 | 0 05 | 0 08 | 1464 |
| SNGP | 0 0002 | - 0 00099 | 0 06 | -0 21 | 0 02 | 0 11 | 1464 |
| SSGC | 0 00083 | -0 0005 | 0 12 | -0 23 | 0 02 | 0 047* | 1463 |
| TELE | 0 00034 | - 0 00377 | 0 33 | -0 21 | 0 05 | 0 061* | 1463 |

**On values shows significance at 5 %

***on values shows significance at 1%

* On values shows significance at 10

**KPSS[12] test; H *: series is I (0), asymptotic critical values of KPSS (1%, 5% and 10%) = (0.739, 0 463 and 0.347).**

[12] *KPSS Test The unit root test introduced by Kwiatkowski - Phillips -Schmit -Shin (1992) has the null hypothesis about stationarity of a series around either mean or a linear trend*

In the second column there are the median returns of selected firms Some companies have positive median return and other selected firms have negative median return "Oil & Gas sector" conventional firms like APL, SNGP, and the Islamic firms like MARI, PSO, "power generation sector" conventional companies like JPGL, SEPCO all these have negative median returns Islamic" Oil & Gas sector" companies' like POL, PPL and the same sector's conventional company i e SSGC and the Islamic "power generation sector" companies like HUBC, KAPCO all these have positive median average returns Oil & Gas conventional company OGDC has zero median So results showed that the performance of Islamic oil & Gas Company and Power Generation Company are better than conventional oil & Gas and power generation companies

### 5.2.2 Average Risk:

All selected companies have positive standard deviation or risk Through sector wise comparative analysis we came to know that oil & Gas conventional company which is APL (0 142809) has highest risk Other all selected non-financial firms have moderate risk which is less or equal to 5% Refinery sector firms ATRL, PRL, Cement sector firms MLCF, LUCK, DCL, DGKC, Telecommunication sector firms PTC, TELE, Power Generation firms KAPCO, JPGL, SEPCO, HUBC, and Oil & Gas sector firms MARI, OGDC, POL, PPL, SNGP, SSGC these all have moderate risk (standard deviation) which is less than or equal to 5%

### 5.2.3 Risk-Return Relationship:

In Table 5 1 the descriptive statistics shows the theoretical relationship i e the higher return incorporates higher risk As we observed means returns of all selected firms By

comparing means return we came to know that APL Oil & Gas conventional company has highest return (0 004) to their counterparts as well as highest standard deviation (0 142) It supports the portfolio theory that larger the return larger will be the expected risk Standard deviation shows the volatility estimates which ranges from 2% to 14 % Conventional JPGL Company has highest standard deviation (0 053) among all firms Volatility estimations of standard deviation conveys that volatility in Islamic non-financial companies is low and comparatively similar than the other non-financial conventional firms, it is found that higher risk and return is for the APL Oil & Gas company which shows that it is most volatile company among all other non-financial selected firms

By sector wise comparative analysis witnessed that Oil & Gas sector is the best among all others sectors The APL Oil & Gas conventional company has 0 4% average mean, -0 04% average median and 1 4% average standard deviation It reveals that APL returns are more than the PPL returns and also lower the risk than the PPL

### 5.2.4 Stationarity Results:

To check the presence of the stationarity in the financial data the KPSS test is advantageous The null hypothesis of this test is to assuming that the data is stationary Rejection of null hypothesis indications is that the selected data series is non-stationary We put on KPSS test on stock returns of data to check the stationary of selected time series data and for the model deterministic The results of KPSS have been shown in last column of table 5 1 KPSS test shows that data is stationary at 1%, 5% and 10% as usual level of significance Mostly selected companies KPSS test statistics are significant at 10% level of significance, out of selected three companies

KPSS test statistics are significant at 5% level of significance and only one select company is significant at 1% level of significance KPSS test values of APL, PPL, SEPCO, SNGP, ATRL, SSGC, PRL, DCL, PSO, MARI, JPGL and KAPCO are significant at 10% level of significance KPSS test values of MLCF, OGDC POL are significant at 5% level of significance Mostly firm are significant at 10% level of significance Only one Islamic company POL KPSS test value is significant at 1% level of significance

## 5.3 Analysis of CAPM beta:

As reported in chapter 4 that return to risk ratio is equal the ratio of conditional return of conditional risk And expected return calculation process is also reported in chapter 4 Firstly, we have calculated expected CAPM beta The CAPM beta results are in Appendix in Table Beta is used to measure the stock's volatility It a relative measure of sensitivity of systematic risk It shows the sensitivity of stock price return of individual security with the stock return of market Risk is calculated by CAPM formula which has been discussed in chapter 4

The price fluctuates with overall market The beta is used to compare individually stock volatility with market volatility Mostly favourable value of beta should be less than one If value of beta is equal to one it indicates that individual stock price has a tendency to move with the market And value of beta is greater than one indicates that individual stock price tends to be more volatile than the market, a value of beta less than one indicates that individual stock price tends to less volatile than market After checking the means returns of non-financial companies, here we want to check the risk of all selected companies In Table 3 there is averages of mean, median and

standard deviation In Table 3 LUCK Islamic non-financial company has zero beta, it shows that LUCK stock prices do not moves with market The value of cash prices remains same have no inflation In first column there are some conventional companies that have positive averages of beta that are APL ,DGKC ,DCL,ENGRO,JPGL,NRL,SNGP, SSGC etc and some other Islamic companies like KAPCO, MARI, PEAL, POL, SHEL and PTC If a betas of firms are positive suggesting that the firms have limited diversification Bello et al (2011) These values of beta represent that all above non-financial companies' stock prices are less volatile than the market After reviewing the CAPM beta of all selected sector companies we calculated the expected returns by using this beta ratio According to Norman et al (2013) In Malaysia the beta of Shariah based fund are less sensitive to compare to conventional funds These results favour our research

## 5.4 Model specification:

After checking the occurrence of ARCH effect[13] in each selected return series, in the direction of estimating mean and variance now we ascertain the ARMA and GARCH model The univariate GARCH model is estimated by employing mean equation The ARCH terms values ($\theta_1$ and $\theta_2$) and the GARCH term value ($\beta_1$) diagnose the volatility persistence This is important to defining the relationship among returns and volatility Generally in the GARCH model the summation of $\alpha$ and $\beta$ ($\alpha+\beta<1$) is less than one which shows that returns generating process is bring out the high level of persistence in conditional variance Therefore, as the value becomes closer to one, a shock will

[13] *ARCH Effect The presence of white noise disturbances and is detected through Lagrange Multiplier test It is done with the help of E-views software*

persist for many periods in future A high value of β recommends that any shock to conditional variance It will take long time to be wiped out, so that the volatility is found to be constant

In the models described below show that models does not need extra generation because we have sure that there are no more ARCH effect in the final model Therefore the final models give the unbiased estimates of the returns and the risk as well In appendix table (5 2) A, B, and C shows that the estimates of the GARCH model for Islamic and conventional firms listed in KSE In econometric modelling, a model produce biased results if it is underspecified To check the specification, we have applied ARCH-LM test is used to checked the residuals of the model The empirical results of the LM test are given in the bottom line of the table (2) These results show that the P-value of ARCH LM test is large than 5% for all the selected firms included in the our sample It implies that there are no more ARCH effect in the residual terms so it indicates that the model is not under specified We also see from table (2) that most of the repressor in mean and variance equation is significant Therefore model gives good summary of the underlying structure present in the market

## 5.5 Analysis of Return to risk ratio and expected return:

Here we will compare the performance of non-financial companies by two ways Firstly we are comparing return to risk ratio of all selected Islamic versus conventional companies, from which whose company has highest return to risk it has higher profitability, it has more returns compare to its risk Secondly there are comparisons of expected returns of all selected sectors companies

## 5.6 Conventional Versus Islamic Non-financial Companies Performance:

Expected returns have been calculated by using CAPM beta CAPM beta is measure of sensitivity of an asset Asset pricing theory suggests that expected return should be related to the sensitivity to the factors There are a comparison of averages of expected return and return to risk ratio of ten selected "Islamic non-financial firms" and ten 'conventional non-financial firms" Overall averages of all selected companies are used for comparison in the following table

| TABLE 5.4A | EXPECTED RETURNS OF ISLAMIC AND CONVENTIONAL COMPANIES | | | | | | |
|---|---|---|---|---|---|---|---|
| Type | Mean | Median | Q1 | Q3 | Std. Dev. | Skewness | Kurtosis |
| ISLAMIC | 0 001093 | 0 00032 | -0 4961 | 0 00028 | 0 018819 | 18 39157 | 493 9595 |
| CONVENTIONAL | 0 00074 | 0 00032 | -0 3755 | 0 00119 | 0 012989 | 5 507422 | 156 5085 |
| RETURN TO RISK RATIO OF ISLAMIC VS CONVENTIONAL COMPANIES | | | | | | | |
| ISLAMIC | 0 033065 | 0 00032 | 0 00033 | 0 98932 | 0 954982 | -1 272395 | 22 90149 |
| CONVENTIONAL | 0 013934 | -0 03362 | 0 054849 | 0 838373 | 1 003807 | 0 738282 | 27 6336 |

In Table (5 4 A) the comparison of the Means of return to risk ratio of Islamic companies (0 033065) is higher than conventional companies (0 013934) and the median (0 00032), Q3 (0 98932) of Islamic companies are higher than the median (-0 03362), Q3 (0 838373) of the conventional companies but Q1 (0 00033) 0f Islamic firms is lower than Q1 (0 054849) of the conventional firms Now comparison of return to risk ratio of the Islamic versus conventional firms also favour the Islamic firms The empirical results show that the means of the expected return of the Islamic firms (0 001093) are higher than the conventional firms (0 00074) and standard

deviation is also higher in the Islamic firms (0 018819) rather than the conventional firms (0 012989) It supports the Risk-return theory in which if we want high return we have to bear more risk. Islamic firms have lower Q1 (-0 4961) and Q3 (0 00028) than conventional firms Q1 (-0 3755) and Q3 (0 00119)

## 5.7 Sector wise comparison of Islamic Versus Conventional companies:

We selected five sectors namely Power Generation, Telecommunication, Cement, Refinery and oil & Gas, and takings ten Islamic and ten conventional non-financial firms for the risk return comparisons

In Table (5 4 B) there are sector wise comparative analysis of the expected return and the return to risk ratio It showed that upper side of the table there are estimates of the return to risk ratio and expected return of Islamic non-financial companies and lower side of table there are estimates of the return to risk ratio and expected return of the conventional non-financial firms All selected Islamic and conventional firms have positive mean and median averages of the expected returns The Telecommunication sector has best result to all Telecommunication conventional companies have highest expected mean return to all other selected sectors Secondly Islamic refinery sector companies have higher expected returns mean Thirdly Islamic Oil & gas Islamic companies have high expected returns to others By comparing the return to risk ratio of selected sector firms we came to know that all selected Islamic firms averages are positive but less than one Except The power generation and telecommunication conventional firms have negative return to risk ratio Mostly the median of the return to risk ratio of the conventional firms are negative So these companies are not earning positive returns

| TABLE 5.4 (B) SECTOR WISE COMPARISON OF ISLAMIC VERSUS CONVENTIONAL COMPANIES | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **SECTORS** | **POWER GENERATION** | | **TELECOMMUNICATION** | | **CEMENT** | | **REFINERY** | | **OIL & GAS** | |
| **ISAMIC** | **Mean** | **Median** | **Mean** | **Median** | **Mean** | **Median** | **Mean** | **Median** | **Mean** | **Median** |
| **EXPECTED RETURNS** | 0 000506 | 0 000318 | 0 001666 | 0 000429 | 0 00014 | 0 000279 | 0 00147 | 0 00035 | 0 00159 | 0 00032 |
| **RETURN TO RISK RATIO** | 0 055823 | 0 036908 | 0 003353 | -0 024014 | 0 02631 | 0 000324 | 0 03015 | -0 0265 | 0 03323 | 0 00383 |
| **CONVENTIONAL** | **Mean** | **Median** | **Mean** | **Median** | **Mean** | **Median** | **Mean** | **Median** | **Mean** | **Median** |
| **EXPECTED RETURNS[14]** | 0 000602 | 0 000284 | 0 00177 | 0 000273 | 0 00094 | 0 000365 | 0 00051 | 0 00034 | 0 00051 | 0 00032 |
| **RETURN TO RISK RATIO[15]** | -0 00832 | -0 098094 | -0 016469 | -0 075362 | 0 02567 | -0 02652 | 0 00334 | -0 0696 | 0 0289 | -0 0206 |

[14] $ER = rf + \beta(rm - rf)$ *Rf is risk free rate we take T bills rate for Rf and Rm is market index rate and* $\beta$ *is CAPM beta or risk*

[15] *Return to risk ratio=* $\mu/\sigma$

### 5.7.1 Comparison of Expected Return:

By comparing all the expected returns of the conventional telecommunication sector has highest expected return (0 00177) at all Then Islamic Telecommunication Company's average return (0 001666) came second Thirdly the Refinery sector Islamic companies average return (0 00147), fourthly the cement sector conventional companies average return (0 00094), fifthly the power generation conventional companies' return (0 000506) and lastly the Oil & Gas Islamic companies average mean return (0 00159) The average median return of all selected companies is also positive The telecommunication sector Islamic companies have highest median average return (0 000429) then second highest median average return (0 000365) of the cement sector conventional firms Thirdly the power generation Islamic companies' median return (0 000318), Fourthly Islamic Oil & Gas companies have average median return (0 00032) etc By comparing the expected returns averages of all selected companies we came to know that mostly Islamic companies have highest the mean and the median return averages

### 5.7.2 Comparison of Return to Risk Ratio:

Now by comparing to return to risk ratio of all selected sectors companies' averages Some sectors companies' average of return to risk ratio are negative and some have positive The averages of return to risk ratio of Islamic power Generation sector companies are highest (0 055823) The telecommunication sector Islamic companies have mean average return to risk ratio (0 003353) ,mean average return to risk ratio (0 02631) of the cement sector Islamic companies and the conventional cement companies average mean return to risk ratio(0 02567),refinery sector Islamic

companies' mean return to risk ratio (0 03015) and refinery sector conventional companies return to risk ratio (0 00334) and Islamic Oil & Gas companies have average mean return to risk ratio (0 03323) conventional oil &gas companies risk to return ratio (0 0289) have positive return to risk ratio These companies have risk more than returns In table 04 mostly conventional companies have negative mean return to risk ratio Like the power generation conventional companies mean return to risk ratio ((-0 00832), Telecommunication conventional companies mean return to risk ratio (-0 016469) have negative return to risk ratio By comparing also median averages return to risk of all selected sector companies we came to know that mostly Islamic companies have positive mean and median averages return to risk ratio All sectors Islamic companies mean average of return to risk ratio are positive, also mostly Islamic companies have median average return to risk to ratio except telecommunication(-0 024014) and refinery(-0 0265) sectors All selected sector conventional companies median averages of return to risk ratio are negative So collectively performance is Islamic companies is better than conventional companies

## 5.8 Comparisons of Islamic Firms with Conventional Firms:

For the explicit picture of the result now we are doing comparative analysis of each selected Islamic firm to other counterpart firm

In Table 5 5 A there are the expected return comparisons of selected sector Islamic and conventional firms There are the mean median Quartiles 1 and 3, skewness kurtosis etc in table 05 A descriptive statistics results shows that all selected Islamic companies have positive mean returns except MLCF The Median, Quartile 3,

standard deviation and kurtosis of all selected Islamic and conventional companies are positive In Table 5 5 A mean expected return of all selected conventional companies is positive Firstly, by comparing the expected returns of power generation sector, the Islamic companies HUBC and KAPCO have better mean returns than conventional power generation sector companies like JPGL and SEPCO The average of median of Islamic firms HUBC and KAPCO and median of conventional firm JPGL and SEPCO are same At the end of the table the t-stat value is less than2 It means that the difference of Islamic and conventional companies expected returns would be insignificant

| TABLE 5.5 A | SEPARATELY EXPECTED RETURNS COMPARISON OF ISLAMIC VS CONVENTIONAL FIRMS | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SECTORS | COMPANY | Mean | Median | Q1 | Q3 | Std Dev. | Skewness | Kurtosis |
| POWER GENERATION | HUBC | 6 65 | 0 03 | 55 20 | 1398 53 | 0 48 | 109 92 | 1828 06 |
| | KAPCO | 0 03 | 0 03 | 59 27 | 1221 96 | 0 18 | 118 37 | 1589 82 |
| TELECOMMUNICATION | PTC | 0 17 | 0 04 | -0 09 | 0 22 | 0 94 | 513 67 | 4155 55 |
| OIL & GAS | MARI | 0 55 | 0 03 | -0 12 | 0 21 | 5 03 | 931 63 | 9285 95 |
| | POL | 0 03 | 0 03 | -0 05 | 0 12 | 0 41 | -319 43 | 6784 88 |
| | PSO | 0 02 | 0 03 | -0 11 | 0 15 | 0 53 | 34 24 | 1094 47 |
| | PPL | 0 03 | 0 03 | -0 07 | 0 14 | 0 37 | -16 69 | 1477 78 |
| REFINERY | ATRL | 0 15 | 0 03 | -0 11 | 0 20 | 1 48 | 890 88 | 10032 74 |
| CEMENT | LUCK | 0 04 | 0 03 | -0 13 | 0 17 | 0 57 | 160 63 | 1921 35 |
| | MLCF | -0 02 | 0 03 | -0 22 | 0 22 | 0 89 | -212 71 | 2899 07 |
| SECTOR | CONVENTIONAL NON-FINACIAL FIRMS | | | | | | | |
| | COMPANY | Mean | Median | Q1 | Q3 | Std. Dev. | Skewness | Kurtosis |
| POWER GENERATION | JPGL | 0 00 | 0 03 | -30 54 | 938 65 | 1 39 | -62 48 | 1272 36 |
| | SEPCO | 0 12 | 0 03 | 48 59 | 1246 97 | 1 26 | 95 91 | 1630 65 |
| TELECOMMUNICATION | TELE | 0 18 | 0 03 | -60 44 | 47 00 | 2 27 | 849 11 | 11498 78 |
| OIL & GAS | APL | 0 08 | 0 03 | -0 12 | 0 21 | 2 25 | 144 97 | 4738 35 |
| | OGDC | 0 03 | 0 03 | -0 07 | 0 12 | 0 32 | 41 05 | 1296 40 |
| | SNGP | 0 04 | 0 04 | -0 10 | 0 17 | 0 49 | 44 57 | 1251 35 |
| | SSGC | 0 05 | 0 03 | -0 11 | 0 16 | -6 39 | 0 54 | 3165 37 |
| REFINERY | PRL | 0 05 | 0 03 | -0 12 | 0 20 | 0 56 | 116 63 | 3230 09 |
| CEMENT | DCL | 0 05 | 0 05 | -0 26 | 0 38 | 1 13 | -76 44 | 1506 21 |
| | DGKC | 0 14 | 0 03 | -0 11 | 0 20 | 0 94 | 538 65 | 4908 84 |
| T-STAT=0.576 | | | | | | | | |

Secondly, In the Telecommunication sector the mean of the expected return of the conventional companies are higher than Islamic companies the mean of expected return The median expected return of the Islamic firm PTC are more than the conventional firm TELE The Oil & Gas sector Islamic firms like MARI, POL, PSO, and PPL have better mean of expected than the conventional firms like APL, OGDC, SNGP and SSGC The Refinery sector Islamic firm average of the expected return ATRL which is more than conventional firm mean average of expected return PRL The cement sector Islamic firms mean of expected return LUCK, MLCF are less than the conventional firms DCL and DGKC mean of expected return Over all the expected return of all companies are seems to be same Mostly expected returns averages supports the Islamic companies' performance For the clearest picture we calculated the return to risk ratio of all selected companies in the following Table 5 5 B In the risk return analysis there are relationship of securities stock return's conditional mean and conditional variance It also represented the optimal portfolio theory about risk and return choice

In Table 5 5 (A) and 5 5 (B) are values are multiplied by 100

| TABLE 5.5 B | SEPRATELY COMPARISON OF RETURN TO RISK RATIO OF ISLAMIC VS CONVENTIONAL FIRMS | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Company | Mean | Median | Q1 | Q3 | Std. Dev. | Skewness | Kurtosis |
| TELECOMMUNICATION | PTC | 0 00 | -2 40 | 31 75 | 424 99 | 100 81 | -37 31 | 749 17 |
| OIL & GAS | MARI | 3 98 | -2 08 | -46 67 | 52 42 | 101 56 | -384 11 | 6276 54 |
| | POL | 5 02 | 3 76 | -50 44 | 60 29 | 100 55 | -40 15 | 658 96 |
| | PPL | 1 79 | 1 20 | -41 52 | 45 56 | 100 22 | -403 97 | 5339 80 |
| | PSO | 2 51 | -1 35 | -47 27 | 50 90 | 100 38 | -153 23 | 2195 66 |
| REFINERY | ATRL | 3 01 | -2 65 | -55 25 | 56 81 | 101 24 | 23 50 | 358 67 |
| CEMENT | LUCK | 0 03 | 0 03 | 0 03 | 0 03 | 0 00 | -12 86 | 153 95 |
| | MLCF | 5 23 | 0 00 | -56 88 | 59 61 | 100 34 | 79 52 | 680 24 |
| POWER GENERATION | HUBC | 7 05 | 6 51 | 14 36 | 639 99 | 100 29 | -71 57 | 877 18 |
| | KAPCO | 4 11 | 1 62 | -2 91 | 968 18 | 100 64 | -106 47 | 1326 40 |
| SECTOR | CONVENTIONAL NON-FINACIAL FIRMS | | | | | | | |
| | Company | Mean | Median | Q1 | Q3 | Std. Dev | Skewness | Kurtosis |
| TELECOMMUNICATION | TELE | -1 65 | -7 54 | -60 44 | 47 00 | 100 16 | 64 58 | 753 84 |
| OIL & GAS | APL | 1 75 | -1 11 | -28 19 | 25 68 | 98 46 | 386 35 | 20993 93 |
| | OGDC | 5 95 | 0 00 | -48 81 | 57 15 | 100 63 | 21 73 | 448 23 |
| | SNGP | 0 26 | -4 54 | -54 96 | 48 40 | 97 41 | -82 96 | 1448 90 |
| | SSGC | 3 60 | -2 60 | -54 47 | 52 04 | 100 31 | -37 05 | 1143 09 |
| REFINERY | PRL | 0 33 | -6 96 | -61 11 | 59 18 | 103 34 | 29 05 | 337 17 |
| CEMENT | DCL | 0 58 | -7 84 | -54 96 | 42 88 | 100 24 | 135 07 | 1510 87 |
| | DGKC | 4 55 | 0 00 | -54 53 | 60 85 | 100 45 | 2 79 | 331 04 |
| POWER GENERATION | JPGL | -0 12 | -9 89 | 127 67 | 1191 18 | 101 44 | 153 90 | 1536 94 |
| | SEPCO | -1 54 | -9 78 | 86 30 | 611 07 | 100 97 | 71 62 | 790 89 |

In the Table 5 5 B the descriptive statistics shows that the return to risk ratio of the Islamic firms has higher mean of return to risk ratio than conventional firms average of mean of return to risk ratio and also median of return to risk ratio of Islamic firms is higher than median average of conventional firms Overall the performance of Islamic non-financial companies is better than the performance of conventional non-financial companies the mostly Islamic companies have return to risk ratio is greater than one which shows Islamic companies have more return compare to their risk The conventional power generation companies like JPGL and SEPCO have negative mean of return to risk ratio It shows their returns are negative having more risk compare to risk Only risk lover investors could invest in these type of companies

## 5.9 Comparison to previous studies:

Finally by comparing return to risk ratio and expected returns, the empirical results shows that Overall the performance of Islamic non-financial companies is better than the performance of conventional non-financial companies Our research results are contrasting to Miniaoui and Gohou (2013) UAE study that refer to the conventional finance performance is better than islamic finance Also by Al Khazali et al (2014) study is contrasting to our study according to them the conventional indexes stochastically dominates Islamic index in all markets except in the European market by using daily data over the period 1996 to 2012 And supports the Usman and Khan (2012) Pakistani study shows that Islamic financial banks have better perfoamance compare to conventional banks Another Pakistani study by Mumtaz et al (2014) indicate that the Islamic funds have less risk than compare to conventional funds Herwany and Febrian (2013) study also measure volatility of both conventional and Islamic stocks using Value-at-Risk (VaR) The results of their study provide more

precise approach in Islamic stocks analysis compare to conventional one According to Al-Zoubi and Maghyereh (2007 the Islamic index has lower risks as compared to conventional index and it is due to the profit and loss sharing (PLS) contract practiced by Shariah-compliant stocks that help to decrease investment risk and have an attraction for investors There are also some sudies which shows that the both types of stocks have not so much differrenc on term of performance Dharani and Natarajan (2011),Albaity and Mudor (2012) and Hassan and Girard (2011) These studies concluded that there is no significant difference between the performance of Islamic finance and conventional finance In some studies there is risk is more in conventional finance than the Islamic finance but return is also more so overall performance remain same

# Chapter 6:

## 6.1 Summary of the Study:

This study examined the risk-return relationship between Islamic and Conventional non-financial firms listed at Karachi Stock Exchange (KSE) We used daily data of 10 Islamic companies listed in Meezan Bank KMI 30 index and 10 conventional non-financial companies listed in KSE 100 index period from 2009-2014 The GARCH-M model is estimated for mean and variance for all selected companies CAPM model is used to estimate expected return and beta And beta is used for risk estimation

### 6.1.1 Islamic and Conventional non-financial firms:

Initially we examined the simple return average of all selected companies The comparison could not reveal a difference between Islamic and conventional firms We cannot draw a clear image in between both types of companies, so we applied GJR GARCH-M model to estimate mean and variance of all selected companies Then we calculated return to risk ratio of all selected non-financial companies Return to risk ratio of Islamic and conventional companies is mostly positive except the TELE Company which is fit in to conventional telecommunication sector, JPJL and SEPCO companies which are comes from the conventional power generation sector Most of Islamic companies return to risk ratio are greater than one except PTC which is Islamic telecommunication companies, LUCK which is Islamic cement Sector Company And the return is more than risk in these Islamic companies In conventional companies, the return to risk ratio of TELE, APL, OGDC, SSGC and

DGKC are greater than one it means that the return of these companies is higher than risk Return to risk ratio of conventional companies like PRL, SNGP, DCL, JPGL and SEPCO is less than one and risk is higher than return and as profitability is less and not favourable for most investors

Secondly we calculated expected return of all selected companies

### 6.1.2 Telecommunication Sector Companies:

The descriptive statistics of telecommunication sector reveal that mean median Q1, Q3 skewness and kurtosis of expected return is found higher as compared to other sectors In this sector conventional company expected return results are higher than Islamic companies

### 6.1.3 Oil & Gas sector companies:

The descriptive statistics specify that Oil & Gas sector companies has positive returns By comparing expected returns results the Islamic Oil & Gas companies gives good picture than conventional companies The return to risk ratio comparisons of this sector companies also shows that Islamic companies have higher return to risk ratio So the performance of Islamic Oil & Gas is better than conventional oil & Gas companies

### 6.1.4 Cement sector Companies:

Conventional cement sector companies expected return results are higher than Islamic sector companies results The performance of conventional cement companies is better than Islamic cement companies in term of expected return comparison But the

return to ratio comparison provides reverse picture The returns to risk of Islamic companies are higher than conventional companies

### 6.1.5 Refinery sector:

The study reveals that Islamic firms have higher expected return compare to the conventional companies And return to risk ratio of the Islamic refinery sector companies is also better than the conventional refinery companies

### 6.1.6 Conclusion:

After the search we initiated we come to the point where we can ultimately declare that the earnings from the Islamic firms are far better than the earning from the conventional firms The concept of risk sharing in the Islamic firms has boosted up their performance The investor has more chances to get an extra profit by investing in the Islamic firms The investor is secured while investing in Islamic firms because of the implementations of the Shariah Law in which the investor can get profit which can be increased by the time when the profitability will be increased of the Islamic firm An Islamic investor will prefer the Islamic firms to invest because of the Halal profit as well as peace of mind As a Muslim every one wishes to invest and gain against the investment according to the Shariah law so the Islamic firms are the best option for the Islamic investor

## 6.2 Policy Implications for the Investors:

The final points of this research have important consequences and policy recommendations for investment decision Investor can recognize the important of both types of companies

In general, all financial and non-financial sectors have increasing trend of volatility The investors and policy makers should be aware about volatility and return of their investment Risk averse investor would be invest in less volatile asset by using this information It may result in capital outflow which could basis for financial instability and might shake the origins of whole economy

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## Appendix:

## List of non-financial companies listed under KSE100 index and KMI 30 index

| Company | Type | Sector |
|---|---|---|
| D G Khan Cement Company Limited (DGKC) | Conventional | Cement |
| Dewan Cement Limited (DCL) | Conventional | Cement |
| Lucky Cement Limited (LUCK) | Islamic | Cement |
| Maple Leaf Cement Factory Limited (MLCF) | Islamic | Cement |
| Mari Petroleum Company Limited (MARI) | Islamic | Oil & Gas |
| Pakistan Oilfields Limited (POL) | Islamic | Oil & Gas |
| Pakistan Petroleum Limited (PPL) | Islamic | Oil & Gas |
| Attock Petroleum Limited (APL) | Conventional | Oil & Gas |
| Pakistan State Oil Company Limited (PSO) | Islamic | Oil & Gas |
| Sui Northern Gas Pipelines Limited (SNGP) | Conventional | Oil & Gas |
| Sui Southern Gas Company Limited (SSGC) | Conventional | Oil & Gas |
| Oil and Gas Development Company Limited (OGDC) | Conventional | Oil & Gas |
| Southern Electric Power Company Limited (SEPCO) | Conventional | Power Generation |
| Japan Power Generation Limited (JPGL) | Conventional | Power Generation |
| Kot Addu Power Company Limited (KAPCO) | Islamic | Power Generation |
| Hub Power Company Limited (HUBC) | Islamic | Power Generation |
| Pakistan Telecommunication Company (PTC) | Islamic | Tech & Communication |
| Telecard Limited (TELE) | Conventional | Tech & Communication |
| Attock Refinery Limited (ATRL) | Islamic | Refinery |
| Pakistan Refinery Limited (PRL) | Conventional | Refinery |

| Table 5.3 | CAPM β(risk) OF NON-FINANCIAL COMPANIES | | | | | | |
|---|---|---|---|---|---|---|---|
| Companies | Mean | Median | Maximum | Minimum | Std. Dev | Skewness | Kurtosis |
| AHCL Con | -0 04 | 0 01 | 1 63 | -2 03 | 0 62 | -0 56 | 3 91 |
| APL Con | 0 17 | -0 02 | 5 67 | -1 29 | 0 94 | 3 75 | 18 90 |
| ATRL Isl | -0 09 | 0 01 | 1 95 | -3 34 | 0 62 | -1 95 | 10 91 |
| DAWL Isl | -0 19 | -0 15 | 2 01 | -2 19 | 0 70 | -0 28 | 3 47 |
| DGKC Con | 0 08 | 0 06 | 2 10 | -1 55 | 0 46 | 0 57 | 5 53 |
| DCL Con | 0 22 | 0 21 | 3 38 | -2 62 | 0 96 | 0 10 | 3 59 |
| DSFL Con | -0 23 | -0 29 | 5 56 | -3 80 | 1 31 | 0 82 | 5 95 |
| ENGRO Con | 0 04 | -0 02 | 2 53 | -2 79 | 0 69 | 0 52 | 5 63 |
| FFC Isl | -0 01 | 0 01 | 0 73 | -1 07 | 0 25 | -0 46 | 4 52 |
| JPGL Con | 0 09 | 0 08 | 4 24 | -5 64 | 1 44 | -0 35 | 5 00 |
| KAPCO Isl | 0 05 | 0 06 | 0 64 | -0 43 | 0 15 | -0 01 | 3 89 |
| KEL Isl | -0 05 | -0 10 | 2 69 | -1 95 | 0 73 | 0 65 | 4 65 |
| LUCK Isl | 0 00 | -0 03 | 1 89 | -1 29 | 0 53 | 0 44 | 3 69 |
| MARI Isl | 0 14 | 0 10 | 3 54 | -2 44 | 0 81 | 0 50 | 5 48 |
| MLCF Isl | -0 32 | -0 16 | 2 64 | -5 21 | 1 02 | -1 30 | 6 65 |
| NML Con | -0 17 | -0 12 | 1 37 | -1 74 | 0 53 | -0 12 | 2 78 |
| NRL Con | 0 02 | -0 02 | 1 55 | -1 33 | 0 50 | 0 40 | 4 05 |
| PEAL Isl | 0 26 | 0 08 | 4 34 | -2 83 | 1 06 | 1 25 | 4 88 |
| OGDC Con | -0 09 | | 0 79 | -0 78 | 0 29 | 0 23 | 2 70 |
| POL Isl | 0 01 | -0 01 | 1 63 | -0 99 | 0 38 | 0 80 | 4 87 |
| PPL Isl | -0 02 | -0 09 | 2 68 | -0 97 | 0 58 | 1 87 | 8 81 |
| PRL Isl | -0 07 | -0 09 | 2 43 | -2 24 | 0 69 | 0 11 | 3 97 |
| TELE Con | -0 35 | -0 23 | 3 00 | -6 58 | 1 30 | -1 82 | 8 72 |
| SSGC Con | 0 03 | -0 03 | 1 70 | -1 65 | 0 53 | 0 08 | 3 47 |
| SNGP Con | 0 05 | 0 15 | 2 53 | -2 62 | 0 72 | -0 43 | 5 06 |
| SHEL Isl | 0 02 | 0 02 | 2 94 | -3 53 | 0 75 | -0 40 | 7 10 |
| SEPCO Con | -0 01 | -0 07 | 3 98 | -5 88 | 1 37 | -0 45 | 4 74 |
| PSO Isl | -0 15 | -0 06 | 2 15 | -2 90 | 0 74 | -0 87 | 5 25 |
| PTC Isl | 0 01 | -0 01 | 2 50 | -2 34 | 0 64 | -0 25 | 4 44 |

| TABLE 5.2(A) | | GARCH MODEL SPECIFICATION | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean equation | COMPANY | KAPCO(ISL) | | PPL (ISL) | | HUBC(ISL) | | MLCF(ISL) | | DGKC(CON) | | OGDC(CON) | | SEPCO (CON) | | APL (CON) | |
| | Variable | Coeff | Prob | Coeff | Prob | Coeff | Prob | Coeff | Prob | Coeff | Prob | Coeff | Prob | Coeff | Prob | Coeff | Prob |
| | C | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 64 | 0 00 | 0 40 | 0 00 | 0 23 | 0 00 | 0 00 | -0 02 | 0 45 |
| | AR(1) | 0 14 | 0 73 | -0 26 | 0 79 | -0 07 | 0 87 | 0 26 | 0 29 | -0 19 | 0 55 | 0 16 | 0 67 | 0 49 | 0 00 | 0 43 | 0 01 |
| | MA(1) | -0 12 | 0 76 | 0 28 | 0 77 | 0 13 | 0 79 | -0 26 | 0 29 | 0 26 | 0 39 | -0 08 | 0 82 | -0 60 | 0 00 | 0 46 | 0 00 |
| Variance Equation | C | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 03 | 0 00 | 0 00 | 0 00 | 0 00 | 0 01 | 0 00 |
| | RESID(-1)^2 | 0 15 | 0 00 | 0 03 | 0 10 | 0 18 | 0 00 | 0 10 | 0 00 | 0 00 | 0 92 | 0 15 | 0 00 | 0 15 | 0 00 | 0 42 | 0 14 |
| | RESID(-1)^2*(RESID(-1)<0) | -0 12 | 0 00 | 0 25 | 0 00 | -0 08 | 0 00 | 0 08 | 0 01 | 0 07 | 0 05 | 0 02 | 0 00 | 0 11 | 0 00 | 0 59 | 0 43 |
| | RESID(-2)^2 | -0 01 | 0 27 | 0 18 | 0 04 | -0 10 | 0 00 | 0 01 | 0 72 | 0 05 | 0 14 | -0 15 | 0 00 | -0 10 | 0 00 | 0 13 | 0 63 |
| | GARCH(-1) | 0 46 | 0 00 | 0 25 | 0 00 | 1 31 | 0 00 | 0 34 | 0 09 | 0 49 | 0 33 | 1 57 | 0 00 | 0 44 | 0 00 | 0 38 | 0 00 |
| | GARCH(-2) | 0 40 | 0 00 | 0 00 | 0 00 | -0 36 | 0 00 | 0 49 | 0 01 | 0 38 | 0 41 | -0 58 | 0 00 | 0 39 | 0 00 | -0 06 | 0 00 |
| | RT | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 43 | 0 00 | 0 09 | 0 00 | 0 00 | 0 00 | 0 00 |
| | ARCH LM Test F Stat | 0 01 | 0 91 | 0 07 | 0 79 | 0 27 | 0 61 | 0 07 | 0 79 | 0 11 | 0 74 | 0 00 | 0 95 | 0 00 | 0 95 | 0 01 | 0 94 |

| TABLE 5 2 (B) | | GARCH SPECIFICATION MODEL | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ATRL (ISL) | | PTC (ISL) | | LUCK(Isl) | | PSO(Isl) | | PRL (CON) | | TELE (CON) | | DCL(Con) | | SSGC(Con) | |
| | Variable | Coeff | Prob | Coeff | Prob | Coeff | Prob. | Coeff | Prob | Coeff | Prob | Coeff | Prob | Coeff | Prob. | Coeff | Prob. |
| Mean Equation | C | 0 00 | 0 65 | 0 00 | 0 34 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 09 | 0 00 | 0 01 | 0 00 | 0 05 | 0 00 | 0 93 |
| | AR(1) | -0 29 | 0 08 | -0 10 | 0 76 | -0 01 | 0 98 | -0 36 | 0 24 | 0 22 | 0 07 | 0 65 | 0 00 | 0 22 | 0 35 | 0 71 | 0 00 |
| | MA(1) | 0 41 | 0 01 | 0 18 | 0 56 | 0 06 | 0 91 | 0 42 | 0 15 | -0 01 | 0 95 | -0 71 | 0 00 | -0 32 | 0 17 | -0 74 | 0 00 |
| Variance Equation | C | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 01 | 0 00 | 0 00 | 0 00 | 0 03 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 |
| | RESID(-1)^2 | 0 17 | 0 17 | 0 14 | 0 00 | 0 13 | 0 00 | 0 16 | 0 00 | 0 17 | 0 00 | 0 21 | 0 00 | 0 07 | 0 00 | 0 04 | 0 00 |
| | RESID(-1)^2*(RESID(-1)<0) | 0 07 | 0 07 | -0 06 | 0 00 | -0 01 | 0 11 | 0 03 | 0 65 | 0 08 | 0 02 | 0 07 | 0 11 | 0 18 | 0 00 | -0 04 | 0 00 |
| | RESID(-2)^2 | -0 12 | 0 12 | -0 08 | 0 00 | -0 12 | 0 00 | 0 21 | 0 00 | -0 13 | 0 01 | 0 02 | 0 39 | -0 04 | 0 04 | 0 04 | 0 00 |
| | GARCH(-1) | 0 96 | 0 96 | 1 50 | 0 00 | 1 61 | 0 00 | 0 46 | 0 00 | 0 98 | 0 00 | 0 08 | 0 31 | 1 35 | 0 00 | -0 02 | 0 03 |
| | GARCH(-2) | -0 07 | 0 07 | -0 56 | 0 00 | -0 62 | 0 00 | -0 13 | 0 00 | -0 09 | 0 72 | 0 54 | 0 00 | -0 48 | 0 00 | 0 94 | 0 00 |
| | RT | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 18 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 |
| | ARCH LM Test ( F Stat) | 0 02 | 0 88 | 0 35 | 0 56 | 0 01 | 0 92 | 0 12 | 0 73 | 0 00 | 0 99 | 0 00 | 0 98 | 0 06 | 0 81 | 0 23 | 0 63 |

| TABLE 5.2 (C) | GARCH MODEL SPECIFICATION | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | SNGP | | MARI | | JPGL | | HUBC | |
| Mean Equation | Variable | Coefficient | Prob. | Coefficient | Prob. | Coefficient | Prob. | Coefficient | Prob. |
| | C | 0 00 | 0 15 | 0 00 | 0 06 | 0 00 | 0 00 | 0 00 | 0 00 |
| | AR(1) | 0 13 | 0 60 | 0 16 | 0 37 | 0 46 | 0 00 | -0 07 | 0 87 |
| | MA(1) | -0 05 | 0 85 | 0 10 | 0 58 | -0 60 | 0 00 | 0 13 | 0 79 |
| Variance Equation | C | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 |
| | RESID(-1)^2 | 0 26 | 0 00 | 0 16 | 0 25 | 0 02 | 0 19 | 0 18 | 0 00 |
| | RESID(-1)^2*(RESID(-1)<0) | -0 05 | 0 00 | 0 14 | 0 49 | 0 20 | 0 00 | -0 08 | 0 00 |
| | RESID(-2)^2 | -0 20 | 0 00 | 0 03 | 0 56 | -0 01 | 0 55 | -0 10 | 0 00 |
| | GARCH(-1) | 1 13 | 0 00 | 0 37 | 0 00 | 1 32 | 0 00 | 1 31 | 0 00 |
| | GARCH(-2) | -0 18 | 0 02 | -0 08 | 0 00 | -0 44 | 0 00 | -0 36 | 0 00 |
| | RT | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 |
| | ARCH LM | F test 0 226 | 0 63 | 0 01 | 0 94 | 0 04 | 0 84 | 0 27 | 0 61 |