Impact of the Foreign Exchange Exposure Elasticity on Idiosyncratic Risk, Foreign Ownership and Financial Distress of Firms: A Comparative Analysis of Developed and Emerging Economies

(A Doctoral Dissertation PhD-Finance)

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By

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All praises to ALLAH (subhan-o-ta'ala) for His countless blessings on me and my family, all along our life.

Dedications

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RESEARCH PUBLICATIONS

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Conferences

Resource Person on Accounting concepts and procedures at workshop on Branch Managers training, conducted by **SME Bank Ltd,** Islamabad.

Presented my research paper, "The relative Efficiency of Commercial Banks in Pakistan, with respect to size and ownership structure during and after the Global Financial crisis" at **1st International Research Conference on Economics, Business and Social Sciences 12-13 April 2016.**

Presented my research paper, "Significance of Internal Cash flows on Investments of a Firm and Use of Cash-Flow sensitivity as Financial constraints: A panel Data analysis" at **5th International Applied Business Research Conference(IABRC),** organized by Faculty of Management sciences, International Islamic University, Islamabad, May 17 & 18, 2016.

Participated in two days conference, "**6th International Applied Business Research Conference (IABRC),** organized by Faculty of Management sciences, International Islamic University, Islamabad, 2017.

Participated as a Session Co-coordinator in two days conference, "International Research Conference on Economics, Business and Social Sciences (IRCEB&SS), and December 12-13, 2018.

This study uses Fama–French three factor model and EGARCH for calculating idiosyncratic risk. The effect of the foreign exchange exposure elasticity on idiosyncratic risk of both the Pakistani and US firms is highly positively significant at contemporaneous as well as at lag level. We find a negative impact of the foreign exchange exposure elasticity on the foreign ownership in the Pakistani firms. In case of the US firms, the relation is insignificant. The study has a number of implications regarding financial stability of the firms, their idiosyncratic risks and of foreign equity. This study is unique on the relation between foreign exchange exposure and financial distress in Pakistan and adds in the literature on USA in this dimension. It also gives a good insight on valuation of firms taking foreign exchange exposure and idiosyncratic risk into consideration. The study makes number of valuable recommendations for carrying out future research on this domain.

Key Words: Emerging economy, developed economy, foreign exchange exposure elasticity, financial distress, ownership, idiosyncratic risk, crisis, rolling regression, OLS, fixed effect, random effect, and logit model.

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ABBREVIATIONS

Abbreviation	Description
AFC	Asian Financial Crisis
APT	Arbitrage Pricing Theory
BWS	Bretton Woods System
CAPM	Capital Asset Pricing Model
CCM	Common Constant Method
EMH	Efficient Market Hypothesis
FDI	Foreign direct Investment
FEM	Fixed Effect Method
FPI	Foreign Portfolio Investment
FEEE	Foreign exchange exposure elasticity
FF3F M	Fama-French three Factor Model
FO	Foreign Ownership
FE	Foreign Exchange
REM	Random Effect Method
Rf	Risk free rate
FX	Foreign exchange
GARCH	Generalized Autoregressive conditional Heteroskedasticity
GBP	Great Britain Pound
GDP	Gross Domestic Product
GFC	Global Financial Crisis
HML	High minus Low
IFE	International Fischer Effect
IR	Idiosyncratic risk
KSE	Karachi Stock Exchange
MC	Market Capitalization
NYSE	New York Stock exchange
OLS	Ordinary Least Square

OMOs	Open Market operations
PKR	Pakistani Rupee
PPP	Purchasing Power Parity
Rm	Market Return
S&P	Standard and Poor
SMB	Small minus Big
USA	United State of America
USD	US Dollar

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CHAPTER - 1

INTRODUCTION

1.1 Background of the Study

Exchange rates and stock prices volatility occupy an ever growing existence on financial
markets. Macroeconomic variables such as interest rate, inflation, money supply and exchange rates have a significant effect on stock prices' fluctuations. Foreign exchange fluctuation is the major source of macroeconomic uncertainty affecting firms in an open economy and the firms at global level (Dhagat & Raju, 2016). It is essential for managers of firms to know how much they are exposed to these fluctuations. Firms from countries following floating exchange rate regime face more exposure to such fluctuations.

The foreign exchange transactions occur constantly at macro and micro level. Inter-country and inter-institutional transactions made in trillions of dollars per day confront many challenges and problems in their settlement. The foreign exchange transactions are executed at their bilateral exchange rates with counter currencies. The countries have mostly followed fixed exchange rate regime and floating exchange rate mechanism overtime. In floating exchange rate regime, demand for a foreign currency is consequentially dependent upon a demand for the assets, goods and services rendered in that currency. However, the domestic currency prices of foreign goods do not react fully to the exchange rate changes (Goldberg and Knetter, 1997).

Short–run response of exchange rate changes is found different from that of long-run changes. The exchange rate changes are likely to affect the price of imports in terms of domestic currency and that of the exports in foreign currency. The foreign exchange risk arises from exchange rate changes whereas the foreign exchange exposure depicts the sensitivity of the value of foreign currency items such as assets,

liabilities and foreign cash flows in domestic currency to the exchange rate changes (Musa, 3rd edi.p.356).

At micro level, foreign transactions are made both by financial and non-financial companies. Exchange rate changes create macroeconomic uncertainty which in turn affect financial position of firms in an economy. Fluctuations in exchange rates affect firm's operating cash flows and ultimately firm's value through transaction, translation, and economic exchange rate exposure. Macroeconomic shocks are likely to cause inter-dependence between exchange rate changes and stock returns. We may therefore expect that value of a firm is affected by the changes in exchange rates. Significance of exchange rate changes on a firm's value is evident from the fact that firms keep a close eye on movement of exchange rates, assessment of the risk due to such changes and consequently take measures for its management (Choi & Prasad 1995). The existing empirical evidence on the effect of the foreign exchange exposure on firms' value is, however minimal.

1.2 Motivation of the Study

It is well-recognized in the relevant literature that the exchange rates cause foreign exchange exposure to firms which affects their financial performance and ultimately their value. It is also a fact that managers, creditors, investors and even regulators of foreign exchange face challenges on account of the magnitude and effect of the foreign exchange exposure on the firms' value. Until and unless, the exposure is predicted, decision to manage or keep it un-hedged is very difficult, if not possible.

A firm faces distress on many counts and tends to default their financial obligations which hurt not only their sustainability but it also affects the financial system of a

country. It is therefore desirable that the exchange rate changes be looked into as a factor contributing towards distress of firms. Managers of the firms mostly take systematic risk into consideration on the basis of the Portfolio theory but in actual, firms face their internal risks which may be exacerbated due to changes in exchange rates. Moreover, in this globalized world, firms do not depend on local equity and besides debt financing; they try to invite foreign equity in their capital structure due to financing and managerial issues such as diversification hypothesis and agency problem. We have not seen any research work on these issues especially in Pakistan and a very few studies somewhat relevant to these domains are found in all available stock of literature at global level.

The study is being carried out to investigate the potential effect of foreign exchange exposure elasticity on the stability of non-financial firms, their idiosyncratic risk, and foreign investment in their equity.

1.3 The Foreign Exchange Exposure

Exchange rates begin to fluctuate excessively since the decade of 1970s with the adoption of the floating exchange rates system. Since then researchers and managers have concentrated on its measurement and pricing. It has however remained a very contentious issue in international financial management. The exchange rate fluctuations affect earnings and cash flows of firms involved in international business activities. Researchers argue that such changes should visibly affect the market prices/value of firms and contend that companies face the foreign exchange risk (Abor, 2005).

Exchange rate elasticity may cause cash flow risk for those firms which have foreign assets and liabilities as well as firms with any form of overseas operations. It is observed that even the firms not having foreign revenues & costs and no foreign operations may also be affected by unexpected changes in exchange rates. This effect is largely on account of foreign competition and macroeconomic conditions (Parsley and Popper, 2002). The exposure becomes more severe for businesses dealing in a number of currencies. Businesses also face the foreign exchange exposure if they depend on imported products. Firms therefore, try to manage the foreign exchange risk as exchange rate fluctuations might affect their profitability considerably.

1.4 Theoretical Framework:

There is no general theory about exchange rate determination (Eitman et al, 2002). However, there are theories about currency parity conditions which somehow explain exchange rates and their determinants. Among all theories of determination of the exchange rate, Purchasing Power Parity (PPP) and monetary models have evoked a vast amount of literature and empirical results. PPP asserts that the exchange rate between two currencies over any period of time is determined by the change in the two countries price levels. This theory singles out changes in price levels as the overriding determinant in the determination of exchange rate that is why it is called "the inflation theory of exchange rates". Cassel (1918) however, pointed out that exchange rates in the short-run may diverge from PPP and identified three disturbances to cause these deviations: actual and expected inflation, barriers to trade and, shifts in international movements of capital. Other reasons why deviations from PPP occur may include restrictions on trade and capital movements or transfer pricing in a country which are likely to distort the relationship between home and foreign

prices, speculative activities and official intervention which may cause PPP disparity and, the productivity bias when there is a relatively faster growing productivity growth in the tradable sector than in the non-tradable sector will result in systematic divergence of internal prices (Balassa, 1964).

Interest rate parity (IRP) is another, rather the most important theory in international finance to explain how exchange rate values are determined and why they fluctuate as such. Most of the international currency exchanges occur for investment purposes, and therefore understanding the prime motivations for international investment is a vital issue.

A third theory in international finance is International Fischer Effect which suggests that the nominal interest rate contains two components: expected inflation rate and real rate of interest. The Purchasing Power Parity (PPP) theory compares the inflation rate differential of the countries to look for future exchange rate movements whereas the International Fisher Effect (IFE) considers the existing interest rate differentials to forecast the future movement of exchange rates (Madura, 2002, p.145). According to PPP, if domestic rate of inflation is higher than foreign rate of inflation, goods in domestic market will be more expensive than foreign goods. This will increase the demand of foreign goods and consequently an increase in the demand for foreign currency. Ultimately, the exchange rate will move up which means depreciation in domestic currency. However, most of the empirical findings state that PPP may hold only for a very long period of time and there are persistent short-term deviations from PPP implying that changes in prices are not completely responded by nominal exchange rate changes.

The parity theories explain just the behavior of currencies under certain conditions and do not depict reality (Brealy & Myres, 2005). These are based on efficient market hypothesis (Taylor, 1995), according to which investors are neutral to risk which is adjusted to risk premium. However, this premium has no consensus in literature and no conclusive empirical answers (Garcia & Oblivaries, 2000). The foreign exchange market efficiency is also a controversial issue (Taylor, 1995) and strong evidence is found against efficiency hypothesis. Moreover, the connection between the reflections of interest and purchasing power parity are not clear even in the long run and thus the currency markets cannot be termed as efficient.

According to the interest rate discovery condition, if markets are efficient and risk neutral, the returns in one country should be equal to that in other country, when measured in same currency. Any difference thereby may be due to changes in exchange rates which also affect the competitive positions of the firms and thus pose the foreign exchange exposure to them (Musa, 2002, p.104 & 120).

This study uses asset pricing theory to work out the foreign exchange exposure elasticity of the firms, which is main variable of interest in this study. Moreover, capital markets are not always efficient and thus the standard asset pricing models fail to capture all the risks. Hence idiosyncratic risks are considered to account for the anomalies found in asset pricing models. The exchange rate exposure affects the firms' cash flows on the one side and their cost of capital on the other side which result into adverse effect on their profitability and value. These firms face financial constraints and cannot hedge their foreign exchange exposure according to optimal hedging hypothesis. These firms are also unable to capitalize the available investment

opportunities according to the Underinvestment hypothesis. Moreover, they are unable to attract foreign investment in their capital structure.

Our study finds out the foreign exchange exposure of the Pak and US non-financial firms and then explores how it affects financial distresses of the firms, company-specific (idiosyncratic) risks as well as foreign investment in equity of the firms. We use the ICAPM type model to work out the exposure to exchange rate changes taking return on exchange rates as an additional variable in the CAPM.

The portfolio theory states that investors do not receive compensation for stocks' idiosyncratic risk, due to its diversification. A prime assumption of the portfolio theory is that all investors are rational and the markets are efficient but investors have not always been found rational and markets may not be efficient at all the times (Scholes, Jensen, and Black 1972). The imperfect capital markets theory also explains about existence of idiosyncratic risk along with the systematic risk in pricing financial assets such as stocks and bonds.

When one developing market is affected by some event over there, other markets are likely to suffer from such consequences. When a country has a slight link with other countries, the effects transmitted to this country from the other countries is termed as financial contagion.

Lastly, international financial integration has resulted into an enhanced level of cross border trade and investment. It has directly affected international competitiveness, financial flows and prices. Penetration into new markets is likely to increase a firm's profitability; it may also increase the variability in its net income because of a host of additional risks of internationalization especially the foreign exchange risk. Due to

enhanced level of international business activities over time, companies have experienced greater exposure on account of fluctuations in the foreign exchange rates.

This study is made to explore the following relationships:

1. The foreign exchange exposure elasticity and financial distress of the firms,
2. The foreign exchange exposure elasticity and firms' idiosyncratic risk,
3. The foreign exchange exposure elasticity and firms' foreign ownership, and
4. The foreign exchange exposure, financial distress of firms, and the global financial crisis (2007-09)

1.5 The Foreign Exchange Exposure Elasticity and Financial Distress

At micro level, the exposure due to changes in the foreign exchange rates refers to the risk that future changes in exchange rate of a country affects a firm. It is the sensitivity wherein changes in the domestic value of assets, liabilities as well as operating income of firms are observed to happen due to unexpected changes in exchange rates (Adler and Dumas, 1984). Such frequent changes in the foreign exchange rates can affect firm's operations, revenue and ultimately their valuation.

Companies involved in international activities are particularly expected to bear the risk of adverse movements in exchange rates. Individuals and firms engaged in cross border transactions face an additional exposure to the foreign exchange risk. In view of globalization of the financial markets and increasing role of corporate international diversification, researchers have focused on the likely effects of the foreign exchange exposure on firms' financial distress, likelihood of bankruptcy, as well as on foreign investment in the firms.

According to Wruck (1990) and Asquith, et al, (1994), financial distress is the financial position of a company where its cash flows cannot cover its financial obligations. Practically a firm is called financially distressed if its earnings before interest, taxes, depreciation and amortization (EBITDA) are less than its financial expenses for two consecutive years or its EBITDA is less than 80% of a firm's annual interest expense. According to Andrade and Kaplan (1998), a firm is said to be financially distressed if its earnings before interest, tax, and depreciation in the first year are less than its financial expenses. Some authors contend that when a firm makes attempt to get its debt restructured or tend to default on its financial commitments, it falls in the category of financially distressed firms.

We assume that the distressed firms may not comfortably hedge themselves from adverse effects of changes in the exchange rates due to financial constraints and lack of operational flexibility. The financially distressed firms will not be able to access external markets as they will face high cost of capital and such firms will consequently have to forego good investment opportunities (Campello, Graham, and Harvey, 2010). A firm's value depends on its future cash flows and discount rate. The value of future cash flows changes due to expected exchange rate fluctuations. The distressed firms may not be able to manage this risk and consequently may face increased cash flow volatility which will have higher impact on their stock prices than discount rates used for valuation.

Due to high potential effects of the foreign exchange exposure on firm's operations, a large number of researches have examined the scale and sources of this exposure. Though researchers in this area argue that exchange rate fluctuations affect the cash flows and operations of firms extensively, the empirical results of most of such

studies depict a rather weak impact of exchange rate changes on the stock prices (Griffin and Stulz, 2001). Many reasons have been cited for the weak empirical findings including passing out the effects of changes in exchange rates to customers, financial hedging, and operational hedging.

This study attempts to look for the foreign exchange exposure elasticity of non-manufacturing firms from a developed and an emerging economy and then how this elasticity impinges on the financial downturn of these firms, how that affects its internal risks and what has been its impact on the investment outlook ok of these firms from foreign investors. It appraises the exchange rate exposure effect of the firms during the global financial crisis in both of the countries.

The dissertation describes the effect of firms' fundamental variables such as size, debt, sales, and liquidity position in the short-term and in the long-term on their financial health, ownership structure and risk profile. This study looks that when the exchange rates elasticity of a firm increases, what are the chances that its financial distress will be affected. An increase in a firm's exchange rate exposure elasticity increases chances of financial distress, after controlling firms' attributes such as size, total sales, foreign sales, leverage, cash ratio and the retained earnings. Large firms may be more exposed to the foreign exchange risk as they normally have different domestic and overseas business activities. At the same time, large firms are capable of managing their costs well and are more flexible in managing their risks than small firms (Chow et al. 1997).

We also investigate the effect the financial crisis 2007-09 on the above relationship between the foreign exchange exposure and distress of firms both from Pakistan and

USA. The crisis though was sub-prime mortgage crisis and mainly affected financial firms but it may likely to adversely affect the non-financial sectors being financed by the financial institutions especially banks. It is further assumed that US manufacturing firms might experience higher impact than the firms in Pakistan and that may be in later year years as per contagion theory and spillover effect.

Owing to frequent changes in Pak rupee exchange rates and ultimately off and on depreciation, the firms in Pakistan may experience negative impact on their earnings and liquidity position. The uncertainty in exchange rates of Pak currency is bound to affect its internal risks which causes investors/owners' desire to get compensated for that. We assume that such uncertainty in exchange rate coupled with imperfect markets of a country like Pakistan, the idiosyncratic risk being an internal risk of a firm is likely to increase with the increase in a firm's exchange rate exposure. We thus test their concurrent behavior which challenges the standard asset pricing theories for valuation of firms wherein idiosyncratic risk is not taken into account.

Due to uncertainty in the exchange rates, the exposure of the firms increases which require higher return by foreign investors. In case the return realized by the foreign investors in terms of their home currency in lowered by the depreciation in the currency of host country, the foreign equity may not be obtained adequately.

1.6 The Foreign Exchange Exposure and Idiosyncratic Risk

Idiosyncratic risk is micro-economic or firm specific risk and it is independent of the movement of market factors. The foreign exchange risk is a macroeconomic risk which is affected by a host of factors at the economy level as well as internationally.

The capital asset pricing model (CAPM) is built on Markowitz portfolio theory which states that in equilibrium, every investor holds market portfolio. Hence, systematic risk is priced only and idiosyncratic risk is not taken in pricing financial assets. But a lot of recent studies argue that firm-specific factors should be priced which the CAPM has not been able to take into account. Merton (1987), Malkiel and Xu (2002) argue that weakly diversified portfolios entail an extra risk premium for those holding stocks especially having high idiosyncratic volatility. They observed a relationship between idiosyncratic risks and expected stock returns. Campbell *et al.* (2001) also find an increasing role of idiosyncratic risk in pricing of the stocks in the market.

Capital markets in Pakistan are imperfect where-in under-diversified portfolios are maintained by investors. Such portfolios require premium in pricing on account of idiosyncratic risk as it is part of risk born by investors. Unlike developed markets, institutional investors such as mutual funds largely dominate the Pakistan stock market. These institutional investors don't follow market fundamentals which increase total risk of investment; hence idiosyncratic risk is priced in the portfolio.

A sizeable literature has documented the idiosyncratic risk as a new dimension of the Markowitz's theory. These studies consider idiosyncratic volatility as an important factor in asset pricing in emerging markets due to market frictions and non-availability of accurate and equal information. Investment managers in these markets

fail to observe standard investment practices. International investors also adapt their investment strategies according to the very different structure and nature of these markets (Bruner et al, 2003).

Market frictions hamper arbitrage, and achievement of a wholly diversified portfolio as per assumptions of Markowitz theory is not certain in Pakistan. The private information cannot be accessed freely which lowers profitability in an emerging market as compared to a developed market. Recent evidence shows that stock prices do not depict adequate information in an emerging market because of deficient informed trading. This leads to an increase in risk of assets (Fu, 2009). Farooq & Zarouali, 2016 and Waseem et al, 2017 also witnessed holding of less-diversified portfolio even in developed countries. Empirical studies such as Malkiel and Xu (2002) state that idiosyncratic risk has positive relation to the expected stock returns of the firms.

Financial markets in the emerging markets like Pakistan fail to operate smoothly due to underdeveloped institutional infrastructure and weak governance. There is corruption, poor legal system, political instability and inadequate transparency. Transaction costs, tax regimes, transparency, liquidity and accounting practices are not very conducive for the investors. Regulations and enforcement of contracts are not up to the mark which failed to provide a favorable investment environment.

In emerging countries, stock prices are maneuvered by active market players which results into an increase in volatility of the financial markets (Khawaja & Mian, 2005). The Efficient Market Hypothesis (EMH) fails to hold completely for such type of markets and market players take undue advantage from speculation on account of

market inefficiency (Bashir et al, 2014). It is argued that the systematic risk does not fully explain the relationship with the stock returns and consequently residual volatility is explained by the idiosyncratic risk. Empirical studies such as Eiling (2013) and latest finance literature has challenged the existing asset pricing models (CAPM, APT) and argued for inclusion of other relevant factors. Therefore, it would be very relevant new dimension to look into the effect of the exchange rate exposure on the residual volatility of the asset pricing model, i.e., idiosyncratic risk.

In highly competitive industries, changes in currency values may affect different firms even in the same industry to different degree due to their specific operating structure. Moreover, the exchange rate changes will also influence operations and financial position of domestic and international firms dealing in the identical product or services.

No study has examined the relation between the foreign exchange exposure and idiosyncratic risk of firms in Pakistan. This study has looked the likely relation of the factors that influence idiosyncratic volatility while taking the foreign exchange risk as one of them. It is therefore an innovative step to undertake research on two different risks faced by a firm at the same time and that by the firms from a developed country (USA) and an emerging country (Pakistan).

This study has looked into the way the foreign exchange exposure affects idiosyncratic risk of a firm. This study uses Fama-French three factor model to workout idiosyncratic risk of the sample firms of Pakistan and USA on monthly basis. Alternatively EGARCH is also used to calculate the idiosyncratic risk.

1.7 The Foreign Exchange Exposure and Foreign Ownership

The increased international financial integration results in massive capital inflows to emerging countries in recent years. A large proportion of these flows are in the form of foreign direct investment (FDI), which is taken as a measure of financial openness. FDI has been considered to be among the fastest growing economic activities around the globe (Lucke & Eichler 2016).

Foreign ownership is getting complete/majority ownership or control of a business carried out in a country by non-residents. Foreign companies having ownership stake in companies of other countries or establishing fully owned subsidiaries outside their home countries falls in the ambit of foreign ownership. Foreign ownership can be segregated into foreign direct investment and foreign portfolio investment. In foreign portfolio investment, investors make their international investment portfolio by investing in different securities to diversify their overall risk of investment and getting higher returns. In foreign direct investment, companies or individuals of one country make investment in business interests in other countries by establishing business operations or acquire business assets in a foreign company.

Foreign ownership had been debated a lot but analytical work is very scarce on it. Literature on foreign investment ownership has especially got increasing attention as it is free of cost source of capital and augments local investment activities. In the wake of increasing globalization and high currency instability, exchange rate changes influence operations and profitability of international businesses. The intensity of the exchange rate changes has increased as most of the world currencies have become floating and financial markets have become more integrated (Insah & Chiaraah, 2013). Foe developing countries, portfolio flows can play a crucial role in reducing

the saving-investment gap and consequently lessen current account deficit. The foreign capital in form of FPI and /or FPI provides a thrust for growth of the recipient country and becomes a source for development of its financial market.

This study investigates the impact of the foreign exchange exposure on the foreign ownership of the companies. There is a lot of literature on FDI and FPI on country level and very little research is seen on the ownership stake of the foreign investor in the different companies of the countries. The foreign direct investment (FDI) and foreign portfolio investment (FPI) have been largely discussed in the context of overall economy and not at firm level. The foreign direct investment (FDI) covers the acquisition and/or exertion of significant control over a foreign firm. The direct investment is referring to an investment that is made to acquire a lasting interest in an enterprise operating in an economy other than that of the investor (IMF Balance of Payment Manual).

Current study is made on the foreign ownership of firms and foreign currency risk, which has not been acknowledged by the preceding literature. We find a negative significant impact of the foreign exchange exposure on the foreign ownership in the Pak firms at contemporaneous as well as lagged level.

Lee and Jang (2010) affirmed that probability of a firm being international has negative correlation with magnitude of the coefficient of exchange rate exposure. They argued that when a firm enters into foreign markets or invest directly in foreign countries, no new risk is added to it but it shifts firm's position in terms of exposure to losses caused by foreign currency movements.

1.8 The Foreign Exchange Exposure and Global Financial Crisis

Financial crisis is an economic situation in which an economy of a country faces some unanticipated downturn or recession, price fluctuations, current account deficits and uncertainty on foreign sector. A number of studies are witnessed on the unfavorable consequences of so-called global financial crisis (GFC 2007-09) on different economies. According to IMF paper by Claessens & Kose (2010), global per capita output decreased to 1.8 percent in 2009 as against about 2.2 percent annually before it. Markets around the world experienced drastic implications in the asset and credit markets, enormous decline of wealth, and a lot of bankruptcies. Its relentless effects were witnessed in developed and developing countries. It rendered around 30 million people unemployed worldwide. It is termed as black swan in the literature.

The global financial crisis initially erupted in USA in mid 2007 and spread to other countries subsequently. This crisis has been found more contagious and relentless than previous crises. Different countries faced its negative effects to different extent in the field of finance and trade. Capital flows to developing countries were reduced significantly from the onset of the crisis in the developed countries. The crisis badly affected FDI and FPI as well as export from the developing countries. Its effects are assumed to continue even after that period (spillover effect theory). First sudden decline was witnessed in London stock market during January 2008 (Usman 2010). A number of countries managed the crisis well and recovered from its effects in the year 2009 (Adamu 2010). The global financial crisis (2007-09) beside USA, Europe and other developed countries also affected the emerging countries.

A sizeable literature is found regarding impact of the foreign exchange exposure elasticity on the performance and value of a firm. It is, however observed that no reasonable study has been carried out on the crisis issue in the developing countries. According to spillover effect hypothesis (SEH) and contagion concept of the crises theory, it is presumed that firms in developing countries might have been adversely affected during the crisis period differently.

We explore the effect of financial crisis on the relationship between the foreign exchange exposure and financial distress of the Pak and US firms during the year 2007, 2008, and 2009.

1.9 Research Gap

Despite some recent researches on the foreign exchange exposure, no conclusive evidence is found in the most of these studies as how and how much effect it has on a firm's value. It is argued by most of the researchers that the foreign exchange exposure does matter in carrying out the activities of international businesses but little empirical evidence is witnessed, hence it is termed as a puzzle (Bartram et al, 2010). We find following gaps on the issue:

1. The existing literature on the foreign exchange exposure lacks the comparative studies on the non-financial sectors of the developed and emerging countries. The available studies are mostly of single country and are not directly comparable (Raihan, 2013). As per my knowledge, no study has been found on the issue of the foreign exchange exposure and its impact on financial distress of non-financial firms in Pakistan. A joint analysis will benefit to find a link between the distress risk and the foreign exchange exposure. There is need for exploring the use of the foreign

exchange exposure measure as a predictor variable of corporate distress and bankruptcy.

2. The consequences of the financial crisis 2007-09 are visible in financial markets of the world even after that period. The foreign exchange exposure of the firms has been studied in the context of previous financial crises, but this phenomenon has not been explored adequately in the perspective of 2007-09 financial crises. It is argued that series of the foreign exchange rate shocks may push a firm into distress (Kim and Krapl, 2014) but no study has investigated this event with respect to exchange rate exposure and financial distress.
3. The issue of idiosyncratic risk in pricing the financial assets, especially stocks has largely been researched and debated (Ang et al. 2006, Guo and Savickas, 2010). These studies document that systematic risk does not cover all the risks faced by the firms and the stock returns are not fully explained by it. Investors may not hold fully diversified portfolios (Goetsmann & Kumar, 2004) and the idiosyncratic risks are not fully diversified away. The idiosyncratic risk of the firms and its effect on their stock returns witnessed in various studies may be affected by the foreign exchange risk. We do not find any study on relationship between the foreign exchange exposure elasticity of the firms and their idiosyncratic risk.
4. A number of studies are found on the effect of the foreign exchange rate movements on the foreign direct investment and foreign portfolio investment in a host country but no study is found on the effect of the foreign exchange exposure of the firms on foreign stake-holding in the firms.
5. Most of the existing studies on the impact of the foreign exchange risk on firm value are based on secondary financial and market data (Ameer, 2010; Haris and Ahmad 2012). No study exists as such which has got direct information from corporate financial managers on these complex issues. This study fills this gap.

6. Most of the literature on the idiosyncratic volatility anomaly has focused on credible explanations for it based on investor preferences, investor irrationality or market characteristics. The role of asset-pricing models and firm characteristics in the estimation of idiosyncratic risk measures has been largely neglected (Malagon et al, 2015). Our study has used asset pricing theory (CAPM, ICAPM, Fama-French three factors model) to investigate relation between the foreign exchange exposure of the firms and their idiosyncratic risk.
7. A recent study undertaken by Abed and Boukadida in 2016 finds that response of exchange rate to stock prices of two emerging countries (Mexico and Brazil) was negatively significant during a short time period while the response of macroeconomic factors including the exchange rate was constant and stable in developed countries (Denmark & Japan). Hence relationship between exchange rates and stock prices may be different for countries at different level of development. This study is important in this perspective as well.

8. Most studies of foreign exchange exposure have been made on developed countries (Glaum, Brunner & Himmel, 2000). The studies on the emerging markets at firm level are very few and that also in East Asian countries (Linda & Dominguez, 2006), the reason being lack of aggregate data at business cycle frequency for the developing countries in respect of both quality and quantity.

9. Finding of a study by Dhagat & Raju (2016) indicates that the foreign exchange exposure is highly firm specific and may differ from industries and firm's internal strategy. They suggested that there is further scope of improvement in the study by taking into consideration more specific characteristics of the firm especially size of the firm ought to be taken as one of the determinants.

1.10 Statement of Research Problem

The foreign exchange exposure elasticity has a potential effect on distress of firms, their specific risks and foreign ownership in their equity. This effect may exacerbate during period of crisis as compared to tranquil time and may differ in economies at different level of development i.e. the developed and emerging countries. The issue has not been addressed in the available academic research especially in the context of emerging economies. A comparative study on the issue of the foreign exchange exposure and above dimensions of firms from developed and emerging countries is warranted in the wake of increasing corporate international diversification and globalization.

1.11 Objectives of the Study

Present study is made to document the impact of the foreign exchange exposure elasticity on the financial distress, idiosyncratic risk, and foreign ownership of the publically listed firms in Pakistan and USA.

Specific objectives of the study are underlined here.

To find out the foreign exchange exposure of the non-financial firms and its impact on financial distress faced by the listed firms of USA and Pakistan.

To explore the interaction of exchange rate exposure elasticity and idiosyncratic risk of the sample firms.

To find out the impact of the foreign exchange exposure elasticity on foreign ownership in the sample firms

To look into the effect of global financial crisis (2007-09) on the relationship between the foreign exchange exposure elasticity and financial distress of non-financial firms.

1.12 Research Questions

1. Whether the foreign exchange rate exposure elasticity affects the financial distress of non- financial listed firms in USA and Pakistan?
2. How exchange rate exposure elasticity of the firms interact with their idiosyncratic risk?
3. Does the exchange rate exposure elasticity affect foreign ownership in the firms?
4. Does financial crisis 2007-09 affect the relationship between the foreign exchange exposure and financial distress of firms?

1.13 Significance of the Study

This study is of great significance in understanding the parameters of financial stability of the firms and the foreign exchange risk in the wake of floating exchange rate movements. It gives a deep insight to the managers of international firms to take care of currency risk which, if not addressed adequately can jeopardize their business operations and compromise their set targets.

Findings of this study are a source of knowledge for the management of domestic companies as well who think that their operations are not affected by the movements in exchange rates as they have no international transactions. This study warns them of the consequences, a purely domestic firm may face due to tough competition from the imported products. They need adequate vigilance about the latent effects of the foreign exchange risk and its possible effect on their financial position especially in the short period of time. Financial institutions and regulators of both the financial institutions and public companies may benefit from this study to oversee exchange rate movements and their impact on cost of capital, trade, investment and other financial transactions of the firms.

1.13.1. General Significance

When decisions about international business operations are made, managers need to consider how the foreign exchange risk is identified failing which can cause irreversible losses to their firms. This study clarifies the complex issue of the foreign exchange exposure and financial stability of the non-financial firms in developed and developing countries. This study facilitates the business managers and owners to familiarize about the relationship between the foreign exchange risk and firm's financial stability.

This study has multi-dimensional policy implications for international trade and investment activities of the non-financial firms around the world. It is of relevance to a number of corporate stakeholders such as portfolio managers, managers with excessive wealth and human capital allocated in their respective firms, risk management teams, corporate stakeholders, regulators, policy makers, and the debt holders.

1.13.2. Specific Significance

1.13.2.1. Practical Significance

This study gives signals to the business managers and owners to considering the foreign exchange exposure when evaluating financial position of businesses and making investment decisions to ensure sustainability of their businesses keeping in view its significant determinants (as per findings of this study)

The bankers can benefit from the findings of this study to make lending decisions to corporate sectors for investment and trade financing, keeping in view the impact of exposure of the borrowing firms on account of exchange rate changes.

This study provides an insight to the investors about the behavioral responses of the corporate managers in their financial decisions regarding managing the exchange risk as

well as pricing of the potential securities on the basis of company-specific risks as well as it is also priced and is affected by exchange rate exposure.

This study provides important guidelines and precautions for management of firms to devise efficient risk management strategies and for policymakers to consider the foreign exchange risk and idiosyncratic risk in making industrial, investment and export policies as both risks matter and reinforce each other. The government may devise appropriate reforms in the foreign exchange regulations so as foreign exchange exposure of the firms and its onward effects may be minimized.

The foreign investors may get acquainted with the firms' foreign exchange exposure to make their international portfolio and investing in oversees firms,

1.13.3. Academic Significance

1.13.3.1 Theoretical Significance

This study invites attention of academics toward consideration of exchange rates exposure as an important factor in asset pricing of the firms and as a predictor of their financial stability. It will help in valuation of firms in terms of their idiosyncratic risks and the foreign exchange risk faced by firms.

The results inferred from this study will help to facilitate towards the logical understanding of the need to use hedging tools for minimization of the foreign exchange risk of non-financial firms.

The available studies give a blurred picture on the effect of exchange rate exposure to the firm value. This study gives clarity to scholars and researchers about possible effect of the foreign exchange exposure of firms from developing and developed countries. This provides a clue about the different level of the exposure management techniques and alternatives available to the management of firms in Pakistan and USA

1.13.3.2. Contextual Significance:

Most of the studies on the subject have been made on the different sectors of the developed economies. A very few studies regarding impact of exchange rate elasticity on the foreign exchange exposure of firms are found in the context of developing economies. This study will not only contribute to the existing body of literature but will also make fruitful addition on this globally important issue in the context of both developed and emerging countries.

It provides most recent evidence on the impact of the foreign exchange rate movements at both the cross section level and country level.

1.14 Potential contribution

This study is unique regarding relation between the foreign exchange exposure and financial distress of the firms in Pakistan and adds in scant empirical literature on the issue in developed countries such as USA.

It is the first study which looks into relationship between the foreign exchange risk and idiosyncratic risk at the same time. The shareholders holding stake in foreign firms and those contemplating to make international investment portfolio will gain a lot from the findings of this study.

1.14.1 General and Practical Contributions:

This study adds to a very scarce literature on the relationship between the foreign exchange exposure elasticity of firm and their financial distress, which is a new dimension of research even in developed economies (Wei & Stark, 2013).

This is first study which explores the interaction of idiosyncratic risk and exchange rate exposure of the firms. No prior study is witnessed on both of the risks.

Theory on exchange rate movements states that a depreciation results into a boost in exports and a decline in imports which should exert a positive impact on the trade balance of a country. Practically we did not see such state of affairs especially in the context of Pakistan. This puzzle is explained by a highly placed Chief finance Officer (CFO) of a well-established listed company in an interview with this researcher. He admitted that their exports increased due to depreciation in Pak Rupee but at the same time their import bill on account of their raw material (raw cotton) and machinery also increased. Hence the benefit of depreciation on exports evaporated on account of increase in the cost of inputs. Hence, firms face foreign exchange exposure on account of frequent exchange rate changes

1.14.2 Specific Contribution:

From the findings of the study, we find that the foreign exchange exposure have significant effect on the distress of the firms from Pakistan as well as significant exposure effect is seen in case of US manufacturing firms. This resolves the exposure puzzle.

This study has added a separate domain on effect of the global financial crisis (GFC 2007-2009) as a moderator in the relationship between the foreign exchange exposure and financial distress of non-financial firms from Pakistan and USA. No study exists on this count especially in Pakistan.

1. 14.3. Theoretical Contribution

This is first study which finds a relation between the foreign exchange rate exposure and idiosyncratic risk of firms.

This study adds in the ongoing debate on validity of the capital asset pricing model and the arbitrage pricing model as it added exchange rate as well as interest rate to the market model on the line of ICAPM by Merton (1973). The study confirms that the exchange rate risk is a contributing factor towards value of non-financial firms in both emerging and developed economies.

This study adds on a firm's exposure to exchange rate changes and its difference in different industries as well as different economies.

This study supports stance of some researchers (Fu, 2009, Eiling, 2013) on superiority of EGARCH against linear models such as Fama-French three factors model while giving empirical evidence against the study by Nath and Brooks (2015).

1.14.4. Contextual Contribution

Our comparative analysis of developed and emerging economies (USA and Pakistan) on the issue adds to the existing knowledge on the convergence or divergence of the foreign exchange exposure of firms of the developed and emerging markets.

The extant studies are mostly single country studies and in most of the cases are not directly comparable. This study will provide recent evidence on the impact of the foreign exchange rate movements at micro level of different countries.

1.15 Organization of Study:

This thesis has been divided into eight chapters. Chapter two contains historical background of the exchange rate regimes of USA and Pakistan. Chapter three contains findings of past studies on each of the relevant domains of this study along with hypothesis separately. Population, sample, variables measurement, statistical models and econometric methods are given in chapter 4. Results and analysis on the foreign exchange exposure and financial distress are given in chapter 5. The results about impact of the global financial crisis on the relation between exchange rate exposure and financial distress are also included in this chapter. Results and their analysis on exchange rate exposure and idiosyncratic risk are placed in chapter six

and results with analysis on the exposure and foreign ownership are given in chapter seven. Views of the CFOS of some companies are given at the end of chapter seven in collective form .Conclusions, implications and recommendations are drawn in the eighth chapter

1.16 Delimitations of the study

We give below some important delimitations of this study:

We have measured the foreign exchange exposure elasticity by using 36-months rolling window for regression. A broader window may be tried to get better results. We have used PKR/USD exchange rate. Trade-weighted exchange rate (TWEXR) or major-trading partners' exchange rate (MTPEXR) may be used. There are a number of models to measure financial distress of the sample firms but this study used Altman's The Z-score. Other distress models may be opted.

The sample period of this study is from 2005-2015. Data of exchange rates may be increased to twenty or thirty years to get better results. This study took all non-financial firms listed at Karachi Stock Exchange (Pakistan) and all non-financial firms included in S&P-500 Index of US listed firms but due to non-availability of data of some major variables of the firms for a number of months of the sample period, sample was reduced.

CHAPTER - 2

HISTORICAL BACKGROUND OF FOREIGN EXCHANGE MARKETS: PAK AND USA

The foreign exchange market involves transforming purchasing power from currency of one country to another, foreign currency deposits in banks, credit in foreign currency, foreign trade financing, foreign currency's trading and derivatives financial instruments such as options, futures and swaps (Eun & Resnick, 2001, p.5)

Presently, the exchange rates of most of the countries fluctuate in an unpredictable way. They are said to behave in a random fashion (Random Walk Theory). Such behavior of the exchange rate has been witnessed in the major currencies such as US dollar, Japanese yen, and UK pound sterling from the early 1970s, when fixed exchange rate system collapsed in 1971 and flexible exchange rates were adopted. This caused exchange rate volatility in most of the world currencies which resulted into many financial crises. The most recent crises are Asian financial crisis (AFC), 1997 and global financial crisis (GFC) 2007-09. The ensuing exchange rate uncertainty had influence on the major economic functions such as consumption, production, and investment.

2.1 Historical Perspective: The foreign exchange Market

The foreign exchange markets prevailed since different currencies were issued and exchanged with each other for effecting trade, investment and other international transactions. Different exchange rate regimes have been adopted by countries of the

world since then to carry out such exchanges over time. End of the World War II (1939-1943) changed the financial landscape of the world and so that of the foreign exchange market and exchange rate system. Fixed exchange rate system was adopted in 1944 which more or less had been followed by most of the countries of this globe till early 1970s.

In 1973, the fixed exchange rate system was abandoned altogether at conclusion of Smithsonian agreement-II which allowed exchange rates of major currencies to be free floating. However, the central governments used to intrude in the foreign exchange markets to change the direction of exchange rates and currencies by adjusting interest rates and at times open market operations (OMOs) to influence the value of their currency to saving the economy and its business sectors from unfavorable effects of its fluctuations.

At present, the foreign exchange market has got increasing role and its volume of transactions has surpassed all financial markets. Its turnover per day has exceeded from an average of $5.3 trillion a day as per report of the Bank for international settlements (BIS) as on January 23, 2014 which was about $1.9 trillion a day in the year 2004 (Anthony& Cornett, 3rd ed. 2007 p.231). Majority of the foreign exchange transactions are made in US dollar, Euro, UK pound sterling, Japanese Yen, and Swiss franc. It is the most liquid market as traders have an advantage of a ready and instantaneous entry into and exit out of the market. London (UK) has been and still is the largest center of the foreign exchange trading. The second largest the foreign exchange market is New York, and Tokyo (Japan) is ranked as number three.

It is an almost round the clock market starting from Tokyo (Japan) in the east, London (UK) in the west, and then New York (USA) through the day. Changes in the exchange rates continue persistently and the foreign exchange exposure persists even when the business operations of the firms in a country are closed. The exchange rates movements and especially their unexpected changes pose the foreign exchange risk to a business on account of their foreign assets, liabilities as well as other transactions. Their returns on investment and cost of borrowing are also affected by changes in the exchange rates.

Businesses have not been concerned very much in the era of fixed exchange rates and did not feel to manage the foreign exchange risk under the Bretton Woods System (1944-71). In 1973 and onward, when most of countries of the world shifted to floating exchange rates, firms faced an additional risk due to exchange rate fluctuations. Since then many currency crises such as Mexican debt crisis, 1994, Asian currency crisis, 1997 and recently global financial crisis (GFC 2007-09) caused substantial losses to businesses from the foreign exchange rate fluctuations. All this happenings attracted attention of the firms' management towards the foreign exchange risk and consequently various ways and strategies were found to hedging this risk.

The foreign exchange exposure is often divided into three categories:

1) **Transaction exposure**: This type of exposure arises due to currency fluctuations when a firm has contractual future foreign cash flows. This risk emerges due to effect of exchange rate changes on firm's receivables, payables or dividend from foreign countries. It is mostly termed as short-term and medium-term in nature.

2) **Translation Exposure**: This is also termed as accounting exposure as no cash is involved in it. In this type of exposure, exchange rate changes affect values a firm's foreign assets and liabilities at the time of consolidation of its financial statements. This exposure is faced by holding company on account of financial reports of its foreign subsidiaries.

3) **Economic Exposure**: This exposure is faced by the companies by unexpected fluctuations in the relevant currencies. This affects a firm's value of a firm's future cash flows and its market value. The exchange rate movements can greatly affect revenues, both local and foreign sales, and operating expenses including imports and ultimately affect the competitive position of a firm.

The transaction exposure and translational exposure are specific to multinationals where as economic exposure is not necessarily associated with the international status of a firm (Eiteman et al., 2006). A firm's transaction exposure can be fully covered by using a forward contract if the time of cash flow and the hedging strategy is same and no randomness persists in prices of foreign assets (Adler & Dumas, 1984). In such a situation, there is no need for pricing the transaction risk.

As stated above, the translation risk is only seen on a firm's balance sheet. It has no effect on a firm's cash flows (Dalquist & Robertson, 2001). As stocks are priced on account of a firm's future cash flows, it can be contended that the translation exposure should not affect it. But there is cause of concern for the multinationals due to this exposure which experience its effect due to loss of value in its assets and increase in values of its liabilities on the balance sheet. Firms commonly use local currencies borrowing for financing the operations of their subsidiaries.

Economic risk is multi-dimensional and more complex. It affects firm's future forecasting and planning due to uncertainty in estimation of magnitude of cash flows due to unknown variation in the exchange rates. Management of the company feels it quite difficult to measure and hedge it. Firms try to diversify its product lines to minimize the economic risk to its firm's cash flows. It may also do this by diversifying its supply chains as well as final output markets (Papaioannou, 2006). Firms try to make large share of production in the same currency where sales operations are large or they may re-allocate production facilities in the country where their final output markets are located.

The economic exposure arises from uncertainty of sales price, expected sales volume, costs of inputs/raw materials and its potential competition due to unexpected exchange rate movements. These effects are not of direct nature but each of them might have some indirect effect. The longer the nature of activity, higher will be the uncertainty and, lesser will be the extent of risk coverage (Chow et al., 1997).

2.2 Exchange Rate Regimes: Pakistan

Pakistan is an emerging economy but its financial markets are not stable due to political and economic factors. Moreover, its economic policies are not consistent over the time unlike developed countries. Growth in stock market and foreign portfolio investment has been substantial but has witnessed many ups and downs over the time period. Pakistan has followed a pragmatic approach in liberalizing its financial system including financial markets.

Pakistan is a small and an open economy which appeared on the globe on August, 14, 1947. Its total GDP stood as low as US$3.71billion in 1960 but increased to

US$283.66 billion in 2016, which is counted for as low as 0.46 percent of total world economy. Pakistan's GDP averaged US$67.19 billion during the period 1960-2016.Pakistan's imports have experienced a large increase to the tune of US$ 48.506 billion in 2016-17 which were US$41.255 billion in 2015-16 and US$41.357 in 2014-15. But its exports have declined over time to US$21.938 in 2016-17 from US$ 21.972 billion in 2015-16 and US$24.090 billion in 2014-15. Thus its trade deficit has largely increased from US$17.267 in 2014-15 to US$ 26.568 in the year 16-17which is ever high increase of 54 percent just in two years' time.

Rupee is Pakistan's national currency. US dollar is largely used in its foreign transactions. The exchange rate of Pak Rupee has been fixed and linked with other currencies (GBP &USD) till 1980 and its was not very cause of concern for the businesses but due to quick and ill-conceived trade liberalization and trade policies, significance of floating exchange rates of Pak rupee has attained paramount importance in formulating and effecting its monetary as well as other financial policies.

Exchange rate is a major macroeconomic variable which associates national markets of a country with all markets of other countries. It also exerts profound effects on both internal and external sectors of that economy (Akhter 2007). Pakistan's monetary policy has gone through a number of phases in the past years. The rupee remained attached with UK pound sterling till 1971and then exchange rate of rupee remained fixed against US dollar from 1973 to 1981. Exchange rate of Pak Rupee against US dollar was 9.81 at the time of delinking from US dollar in 1981.The Rupee was brought to a managed floating system in 1982. In 2000, market- based exchange rate system was adopted after which the exchange rate depreciated continuously and was

58.03 in 2000. It was maintained at around Rs.60 during 2001-2007. The PKR exchange rate against US dollar depreciated speedily during period 2008-2013. It increased to 108.60 per US dollar in 2013, brought somewhat back to 101.8 in 2015 but again increased to 104.30 in 2016.

2.3 Exchange Rate Regimes: USA

Up to 1914, gold standard was followed by most of the countries of the world... After World-War II, US dollar became the only currency to be convertible into gold at the parity of one ounce gold for 35 US dollar. Currencies of other countries based their values on the U.S. dollar. The US dollar faced loss in its value against other major currencies due to higher inflation in its economy and it failed to keep pace with the fixed parities with gold and other currencies. Consequently its parity with gold was changed to 38 US dollar per ounce of gold and further reduced to $70 per ounce gold. In 1971, US government left the gold standard and convertibility of dollar into gold.

Despite continuous decline in global position of US and its currency forthwith, the US dollar is still at the top of all currencies in terms of volume of international transactions. It is the largest currencies in the world's financial markets. Exchange rates of most of the currencies are articulated in terms of U.S. dollar. Almost 50 percent of international currency transactions in the world are made in US dollar along with Euro. It is also estimated that US dollar, Euro, UK pound, Australian dollar, Canadian dollar and Japanese yen account for about 80 percent of all global currency exchanges.

It is ironic but fact of life that mostly of invoicing of the international transactions (exports, imports, and services) made by developing countries are executed in US

dollar with few exceptions. Next comes the Euro, UK pound, and Japanese Yen. However, invoicing of such transactions by developed countries is made in their own currencies. In this context, this researcher has witnessed that UK, Japan, Euro-zone countries and even Australia, Canada and Switzerland use their national currencies for invoicing their exports to USA and rest of the world.

It is evident from the above lines that the most important foreign exchange rate for firms in Pakistan is PKR/USD where as trade-weighted index of exchange rate seems appropriate for US firms. We therefore opt for the use of bilateral exchange rate between Pak rupee and US dollar (PKR/USD) for Pak Firms and a trade- weighted exchange rate of US dollar for firms inUSA as these firms have to execute their international transactions in more than just one or two currencies unlike Pakistan.

One caution needs to be looked into i.e., US firms make international transactions with rest of the world using bilateral exchange rates between US dollar and the respective counterparty's currencies. It is therefore important to note that trade-weighted US dollar index is suitable for an overall economic study and may be less precise at the practical level(Al-Rashidi and Lahiri, 2012)

CHAPTER - 3

LITERATURE REVIEW

In this chapter, we review the available literature on the foreign exchange rate exposure of firms, their financial distress, idiosyncratic risks and foreign ownership. We have also gone through the research work made till date relating to the financial crises and their effect on the firms' financial position and ultimately their value. This study is mainly based on asset pricing theory, contagion theory, international diversification hypothesis, and hedging theory.

Exchange rate exposure is referred to as an extent to which exchange rate changes affect stock returns and ultimately firm value (Bacha et al, 2013). Standard theory of economics states that firm's value does relate to exchange rates. A wide-ranging research is witnessed on the foreign exchange exposure (Shapiro, 1975, Adler and Dumas 1984, Bartram et al, 2010), but the results of these studies are not conclusive (Chow et al., 1997). The remote literature shows that stock returns of firms may be affected by exchange rate risk either through its effect on firms' future cash flows or by increasing cost of firms' capital when valuing firms using cash flows discounting model (Bartram, et al, 2010). In 2012, Lim stated that efforts were made to detecting sensitivity of stock returns vis-a-vis exchange rate movements but no commendable result could be inferred out. It is further noted that economists have not been able to agree upon a definite model for predicting future exchange rates. Researchers such as Jorion (1990); Dominguez and Tesar (2006) argued in their findings that there is somewhat relation between exchange rate variations and firms' stock prices but the same is very weak.

3.1. Empirical Studies on Exchange Rate Exposure and Firm Performance

According to Kiymaz (2003), firms listed at Istanbul Stock exchange, Turkey were found highly exposed to the foreign exchange risk during 1991 to 1998. The extent of the exposure was different for firms from different industries. A contemporary study by Halil (2003) further confirmed that Turkish firms faced high exposure on account of the foreign exchange risk and exchange rate fluctuations affected firms' values significantly. It was also noted in that study that firms having higher level of exports and imports faced higher the foreign exchange exposure.

Dominguez and Tesar (2006) carried out a study on the exchange rate exposure of a very broad sample of firms from different industries from eight industrialized and developing countries for 20-year period from 1980 to 1999. They used two-factor market model taking change in exchange rate as a second explanatory factor with the usual market variable to see any statistical relationship between the foreign exchange returns and excess stock returns at the firm as well as industry-level. They documented that in five sample countries, 20% firms from the sample were found exposed to movements in exchange rates and the exposure at the industry level is generally much higher, with over 40% of industries exposed in Germany, Japan, Netherlands and UK. Their analysis stated that exchange rate changes do matter for a sizeable fraction of firms. It was however argued that direction of exposure effect of the firms varies with specific exchange rate as well as over time. They also commented that the effect of the foreign exchange exposure were comparatively more in small firms and specifically in firms having foreign asset and liabilities in their total portfolio. They further state that firms vigorously make adjustments in their

operations to minimize the risk due to exchange rate changes and a host of factors interact towards overall exposure faced by them.

Tudor and Duta (2012) argued that equity market prices and the exchange rates are two time series which affects each other and found such causality in the Korean economy. They also found that exchange rate changes did have effect on the next month's stock returns in the stock market of Russia and Brazil. Their study however found an effect of stock market behavior on the exchange rates only in UK. In case of Pakistan, Sidra and Attiya (2013) tried to find out the determinants of firm performance. Their study showed that the economic factors such as inflation & Per capita income, ownership structure, and risk management had impact on the firm performance. They found that risk management along with corporate governance, ownership structure and capital structure did indicate effect on the stock returns.

Bacha et al. (2013) made a study about the effect of exchange rate exposure on the value of Malaysian firms for 16 years period and found 71 percent of the sample firms were faced with statistically significant exchange rate exposure. Moreover, they supported the findings of Dominguez and Tesar (2006) that the exposure to firms varies over time variant as well as firms in different sectors did not experience the same exposure

Jiang, et al (2013) took exchange rate risk as a factor in selection of an international portfolio in the perspective of behavioral portfolio theory (BPT) and argued that a portfolio of international investments faced the exchange rate risk in the portfolio risk. The existence of exchange rate risk was due to variations in the returns on the

domestic currency. Franke, et al, 2006 also contended that exchange rate risk is a background risk in making an international investment decision in foreign markets.

Abed and Boukadida (2016) examine the interaction between interest rate, monetary aggregate (M1), exchange rate, inflation, foreign direct investment and stock market return in two emerging countries: Mexico and Brazil and two developed countries: Denmark and Japan. The study determined the response of the stock returns to a shock in each of the macroeconomic variables, using Panel VAR approach and found that the exchange rate responses were negatively significant to stock prices during a short period where as the response of major macroeconomic factors on stock prices was constant and stable.

Dhagat & Raju (2016) measured the foreign exchange exposure and its determinants for selected non-financial Indian firms. They used a panel data methodology with fixed effects model to measure the firm's exposure for a sample of 85 non-financial Indian firms. The findings of the study showed that 55% variation in the stock returns was explained by the variation in the exchange rates. Moreover, market capitalization, a proxy for the size of the firm, was found significant determinant for the exchange rate exposure.

Akhter et al. (2016) tried to confirm the implementation of capital asset pricing model (CAPM) on companies listed at Pakistan Stock Exchange before, during and after financial crisis. It concluded that fair prices of stock cannot be determined with the help of CAPM in Pakistan.

Koibuchi, Sato & Shimizu (2016) estimated the firms' exposure to the exchange rate risk by regression of stock prices on the exchange rate and the market portfolio. They also investigated possible influences of various risk management measures on the

firms' foreign exchange exposure. Risk management variables include financial and operational hedging, the invoice currency, and the price revision (pass-through) strategy of 227 listed firms in 2009, collected from a questionnaire survey of Japanese firms listed with Tokyo Stock Exchange. This study concluded that firms with greater dependency on sales in foreign markets were more exposed to exchange rate. Furthermore, the higher the US dollar invoicing share, the more the foreign exchange exposure is, while yen invoicing reduces foreign exchange exposure. They also conclude that Japanese firms use a combination of risk management tools to mitigate the degree of exchange rate risk.

A study by Alain & Krapl (2018) finds that asymmetry is pervasive in several alternative

measures of foreign exchange cash flow exposure. After decomposing foreign exchange equity exposures into discount rate and cash flow components, the study documents significant asymmetries in foreign exchange discount rate exposures. The latter finding implies that market-related factors in addition to cash flow–based arguments may be explored to estimate foreign exchange equity exposure.

3.2 The Exchange Rate Exposure Elasticity and Financial Distress

In Capital Asset Pricing Model (CAPM), only market risk is taken to count for all the macro economic factors. When one considers the foreign exchange rate risk separately in pricing a company's assets, it will require higher rate of return especially when exchange rate fluctuations are high. The increased fluctuations will thus cause higher discount rate affecting thereby a firm's value. Exchange rate movements also affect firm's contractual cash flows as well as future cash flows which will result into

reduced firm's valuation using discounted-cash flows method. The frequent changes in the foreign exchange rates can affect firm's operations, revenue and ultimately their valuation. Due to effect of exchange rates on revenue, costs and ultimately profitability of firms, it is logical to presume that the exposure of a firm due to exchange rate changes may substantiate financial distress of a firm and may trigger it towards bankruptcy.

Smith and Stulz (1985) argue that when firms face financial constraints, they have to incur bankruptcy costs. Exchange rate changes exacerbate firms' financial difficulties and they find it optimal to hedge the foreign exchange risk. This reduces the variability of firms' cash flow, its tax liability, as well as chances of incurring bankruptcy costs and raising net value. Williamson (2001) looked into the effect exchange rate changes on the value of multinational firms, in presence of intra-industry competition and a significant exposure to firms was witnessed in response to exchange rate shocks. This study also documented existence of time-variation regarding exchange rate exposure and foreign sales as one of the main determinants of this exposure. Effectiveness of operational hedging the firms' risks through international production was also found significant.

Anand (2001) found higher exchange rate exposure of firms in which there was more competition as compared to firms operating in oligopolistic setting. Moreover, firms that deal in consumer items face greater exposure than that faced by firms dealing in institutional sector. One findings of this paper is that historical movements in dollar currency are not having valuable information for forecasting portfolio returns of an industry but only contemporary relation is found between movements in a foreign currency and stock prices but Makar & Huffman (2001) revealed that a lagged

exchange rate movements add to explain about abnormal returns of firms which normally use derivatives rarely irrespective of their size or scale of foreign interest. At lagged level, the magnitude of the foreign exchange exposure of all the sample firms was not identical and it is larger for firms using less financial derivatives.

Salifu et al. (2007) used two-factor Jorion model to find out exchange rate exposure of twenty Ghanaian listed companies. They came up with the results that more than half of the sample firms showed significant exchange rate exposure to US dollar and about one-third of the firms were found significantly exposed to UK pound sterling. They found that the firms from manufacturing sector showed a significant positive exchange rate exposure while firms falling in retail sector witnessed a negative significant exposure to the US dollar exchange rate. The sample firms were found exposed mostly to US dollar, UK pound sterling and Euro. No exchange rate exposure was found in the financial sector regarding any international currency.

El-Masry and Salam (2007) looked into relationship between unexpected exchange rate changes and stock returns of different size as well as their level of foreign operations. They took variations in bilateral as well as in equally weighted and trade-weighted exchange rate indices. They find that a significant proportion of UK firms were exposed to contemporaneous exchange rate changes. The effect of exchange rate movements was more pronounced on stock returns of UK firms than the stock returns of US firms. This effect was higher for large firms than small firms Moreover, the firms with higher foreign revenue faced greater exposure. This study however, stated that domestic firms were also exposed to changes in exchange rates.

Bartram and Bodnar (2007) argued that whatever exposure is witnessed in the different studies is not the total exposure a firm usually comes across with but such magnitude of exposure is net hedging activities. They argued that non-financial firms have a number of alternatives to manage their exchange rate exposure. They opt for financial derivatives to reduce effect of short-term volatility in the exchange rates and use operational hedging to minimize the long-term exchange rate exposure on the firm's value. They argued that non-existence or statistically insignificant level of the exposure does not mean that firms did not face exposure to the exchange rate fluctuations. According to them, a rational reaction of management of firms to the exchange rate movements may reduce their exposure to such a level which cannot be detected by the empirical studies. Such a perplexing scenario has been termed as exchange-rate puzzle by them.

In a separate study, Bartram in 2007 took an alternative approach taking corporate cash flows as a dependent variable instead of stock returns of firms to gauge firms' performance and estimating the extent to which a non-financial firm is exposed to exchange rate risk. His study documented similar findings as that based on a firm's stock returns with a negligible difference. He found that accuracy of the foreign exchange exposure significance of non-financial firms gets better when time horizon of both the earnings and stock prices (returns) is increased. In 2008, Bartram stated that management of firms facing exchange rate risk use various available instruments and strategies which enable them in reducing their exposure to exchange rate movements to a level that is not empirically identifiable. Moreover, the impact of exchange rate exposure on the non-financial firms' stock price emanates from a host of firm's attributes and its activities, for instance foreign sales, firm size, financial

derivatives, use of foreign debt, liquidity and of course attributes of its industry such as market share and concentration of industry.

Chu and Cook, (2008) made a study on measuring effect of exchange rate movements of national currencies of emerging markets on the stock market valuations of their firms. They used same type of instruments for all the fifteen sample countries and compared the exchange rate exposure of their firms. They found that if a currency depreciated by one percent, it will cause a decline in stock price of a firm by 0.4 %. Moreover, the countries which have a high level of foreign debt, depreciation in their currency would likely to result into an increase in its firms' value. Generally, the foreign exchange exposure was found negative and in Brazil, Chile, South Korea, Mexico, Taiwan and Thailand, a significant percentage of firms depicted a significant negative exposure.

Fornes and Cardoza, (2009) studied the effect of the exchange rate variations in Latin American countries during 1998-2004 on the worth of Spanish investors in that area. They adopted Cross-functional approach and used mixed methodology to reviewing the strategies which were pursued by companies to shield their values from different currency fluctuations. They recommended that foreign companies facing exchange rate exposure in emerging countries might achieve flexibility if they adopt a cross-functional approach in the appraisal and accomplishment of hedging strategies and by giving some autonomy in making the decisions about deployment of hedging initiatives.

According to Talat and Alam (2011), leveraged firms normally use derivatives for reducing abrupt changes in their net income. Firms with high growth also more

inclined towards derivative use which is consistent with underinvestment hypothesis. Corporations facing liquidity constraints were found to use derivative instruments to minimize the foreign exchange risk and ultimately smoothing their net income. They found that non-financial firms from Pakistan use hedging techniques to decrease costs of financial distress, to lessen effect of financial constraints and managing the foreign exchange exposure.

Behr et al (2013) documented that major determinants of financial constraints are cash flow troubles, lack of access to credit, and consequently greater costs of credit which result into inability of firms taking otherwise desirable investments. They argue that lender and its behavior is very important for the financially constrained firms.

Marshall et al. (2013) examined overall hedging strategies in UK firms as well as hedging by the foreign exchange derivatives only. They focused on small firms normally facing financially constraints. They argued that financial distress costs, underinvestment problems and taxes were major reasons of pursuing hedging activities. They selected a sample of such firms which were assumed to experiencing exposure to the foreign exchange risk and they focus on the use of the foreign exchange derivatives as well as those using internal hedging instruments. This study documented that larger firms have more hedging activities as smaller firms did not have enough knowledge about their exchange rate exposure. Industry effect was also witnessed in the hedging decisions but there is lack of consistency on the determinants to hedge. They found support for financial distress hypothesis in case of the foreign exchange derivative users.

Lin et al (2014) used the wrapper method to search for good quality subsets which are likely candidates from each subset class. They took Taiwanese listed companies and argued that this method of predicting financial distress and bankruptcy of the firms is more appropriate than other prediction methods. Kim & Kraple (2014), however, argued that financial distress results in limited hedging capability, which in turn increases the foreign exchange exposures. They argued that the foreign exchange exposure has a significant impact on financial distress risk. They stated that relationship between the foreign exchange exposure and distress risk may be bidirectional or simultaneously determined.

Hericourt and Poncet (2015) investigated the effect of Real Exchange Rate (RER) volatility on existing financial constraints. The empirical data consisted of more than 100,000 Chinese exporters over the 2000–6. They find that firms' decision to begin exporting and the exported value decrease for destinations with higher exchange rate volatility and that this effect is magnified for financially vulnerable firms. These results provide that the existence of well-developed financial markets allows firms to hedge exchange rate risk and support a key role of financial constraints in determining the macro impact of Real Exchange Rate volatility on real outcomes.

H_10: The foreign exchange exposure elasticity of a firm does not affect its financial distress.

H_11. The foreign exchange exposure elasticity of a firm affects it's financially distress.

3.3 The Foreign Exchange Exposure, Idiosyncratic Risk and Stock Returns

Textbooks usually state that the idiosyncratic risk of a firm or firm – specific risk is not a factor in valuation of firm's assets in the paradigm of capital asset pricing model assuming that an investor can construct and maintain a well-diversified portfolio. The capital asset pricing model which makes this premise fails to give any prediction regarding idiosyncratic risk on the stock returns when investors are unable to making diversified portfolios because of transactions costs or information costs. The Modern Portfolio theory also states that there should be no compensation for a firm's idiosyncratic risk because investors do not put their money in single assets but they maintain a set of investments which diversify their idiosyncratic risk.

In contrast to above theories, a number of empirical studies have documented existence of the idiosyncratic risk in finding a relation between risk factors and expected stock returns. It is argued that when the systematic risk fails to count for all risks in the framework of CAPM, the error term in the model shows the portion of risk not so captured. This results in the presence of idiosyncratic risk which contributes towards pricing of the assets.

Merton (1987) documented that idiosyncratic risk is positively related to stock returns especially in markets which lack full disclosure of information. In this situation, under-diversified portfolios are formed and investors are expected to gain from stocks which have higher idiosyncratic volatility. Idiosyncratic risk may therefore be accountable in raising higher returns on the stocks. Since all stocks are affected not only by systematic risk but they may also face idiosyncratic risk, it is necessary for

individual as well as institutional investors to understand the relation of idiosyncratic risk with the stock returns.

Merton (1987) extended CAPM considering idiosyncratic risk along with systematic risk or market risk and presented an investor recognition hypothesis (IRH). According to this investors hold only those securities about which they have information on account of their risk and returns characteristics. Their portfolios are not fully diversified, rather they are holding under-diversified portfolios [under-diversified Portfolio Hypothesis (UIH)] in the static mean- variance framework assumed by Merton. Consequently, they expect additional reward for securities' idiosyncratic risk.

Long staff (1989) finds a weak negative relation between idiosyncratic risk and stock returns. His study took a valuation model based on incomplete information which shows an ambiguous association of idiosyncratic volatility with stock returns. They argued that investors examined total shocks due to different risk factors along with cash flows of the firms but they lack possession of complete information regarding idiosyncratic shocks and consequently expansion in rates of cash flows is to be measured.

Fu, F. (2009) documented that idiosyncratic volatilities of firms vary over time. His study estimated the expected idiosyncratic volatilities by means of EGARCH model and depicted a positive relation with expected returns, supporting the under-diversification hypothesis. He further concluded that stocks of firms having more idiosyncratic risk are likely to earn more returns. This study showed that small firms having high idiosyncratic volatilities gave high returns in the same month but these

returns show declining trend in the next month which means downside abnormal returns.

Chua et al (2010) documented a strong indication of positive relation between unexpected idiosyncratic volatility (*UIV*) and contemporaneous returns. They argued that this result was not influenced by firms' fundamental attributes such as size, liquidity and book-to-market as well as earlier period returns and a particular sample period. They further concluded that both expected idiosyncratic volatility and unexpected idiosyncratic volatility were significantly associated to the stock returns.

Garcia et al (2011) appraised the conflicting stances of various studies on existence and measurement of idiosyncratic volatility over time, and its relation with aggregate and cross sectional stock returns. They appraised the studies by Malkiel and Xu, 2006, Bali et al, 2005, Ang et al , 2009 etc. and discussed the factors about dynamics of idiosyncratic variance estimating cross-sectional dispersion in the firms' stock returns where cross-sectional variance of returns moved towards average idiosyncratic variance. They estimated the cross-sectional variance by using CAPM and Fama-French three factor model using daily frequency. Their study finds positive significant pricing of risk exposure on account of idiosyncratic variance risk. They further argued that a theoretical justification about presence of idiosyncratic risk may be given in asset pricing literature when a major proportion of portfolios held by investors differ from the market. This difference may be due to a number of firm-specific factors such as borrowing constraints, human capital and private businesses.

According to a study by Berrada & Hugonnier (2013), the relation between idiosyncratic volatility and stock returns is negative. They witnessed different

behavior of high and low idiosyncratic volatility stocks on the arrival of good news as against bad news. They also used Fama- French 3-factor for measuring idiosyncratic volatility and documented a visible relation between idiosyncratic volatility and stock on account of incomplete information. Their results about presence of the idiosyncratic volatility effect were stronger when separate estimations were carried out for good and bad news.

Nath and Brooks (2015) tested the link of the idiosyncratic risk with stock returns of Australian firms by using two alternative prediction models: the GARCH model and the Fama –French Three factor model to look into the puzzle of idiosyncratic risk-stock return. They used daily data in both measuring methods and found no superiority of GARCH model as claimed by Fu (2009). They further argued that "the idiosyncratic volatility-return" results are significantly affected by prediction models and this relationship is not static but changes at different levels of data.

According to arbitrage pricing theory of Ross (1976), an economy is represented by few numbers of factors which are considered as some source of risk and investors are inclined to pay additional price as a compensation of such risks. In this structure of reasoning, investors are willing to pay premium for exchange rate risk provided exchange rate movements are considered as one of such risks. APT states that exchanges rate changes cause transaction and economic exposures on expected and future cash flows of a firm. Hence value of a firm will be affected by it (Knetter, 1994). Movements in exchange rates impinge on prices of goods imported in finished form as well as costs of goods in raw or semi-finished form imported as inputs by domestic companies. This price effect emanating from exchange rate changes will bound to affect revenues of the domestic firms competing with the above type of

firms. Taylor (1995) acknowledged that efficiency of the foreign exchange market is controversial matter. His findings stated that risk aversion and rejection of rational expectations theory would reject the efficient market hypothesis.

Studies such as Dumas and Solnik (1995) demonstrated that a significant risk premium was witnessed in overall market but no such occurrence seen in the industry sample. Francis, et al, (2008), however argued that the same could not be the outcome of hedging the foreign exchange risk by a firm but this may be due to model misspecification. Bartram, et al, (2010) examined the divergence in linking of predictions advanced by theories with the extent of exchange rate exposure observed in a large sample of international corporations. According to their findings, firms may reduce their exchange rate exposure up to 15% through increasing prices of their product and operational hedging whereas foreign debt along with use of financial derivatives may reduce the exposure by around 40%. They used Global competition Model (GCM) and concluded that firms have to retain the net exchange rate exposure which might become the cause of risk premium.

Kodongo and Ojah (2012) analyzed pricing of the foreign exchange rate risk taking firms from South Africa and Nigeria stock markets. They showed that exchange rate risk was found priced in the stock market of South Africa's when two factor structure was employed but in three-factor structure setting, no such effect was witnessed. The pricing effect was not witnessed in case Nigerian firms in any of the above mentioned models. The reason of such diverse results as stated by them was presence of integration of stock market of South Africa with the international equity markets, but no such integration was found in case of Nigeria.

Eiling (2013) took human capital as non-tradable asset in the asset pricing model. He compared various asset pricing models including the Fama-French three factor model (1993), the four-factor Model and the five-factor model and employed both the exponential GARCH and simple regression model (OLS) to explore the relationship among cross-sectional stock returns and human capital idiosyncratic labor income risk as well as idiosyncratic risk. This study found positive premium for idiosyncratic risk by using EGARCH. This study further checked any possible effect of human capital with idiosyncratic risk and came up with the view that an industry-specific human capital is found priced in the stock returns and when the human capital was excluded, the effect of idiosyncratic risk on the cross sectional stock returns was increased.

Raihan (2013) studied differences of the foreign exchange rate exposure for different industrial sectors of USA taking monthly data of exchange rates for an extended period of 40 years (1973-2012 employing Fama –French three factor model adding exchange rate risk to other macro- economic factors. They witnessed that about 40 percent of the sample industries faced significant the foreign exchange rate exposure meaning thereby that investors would demand a premium on account of exchange rate risk in their stock return. However, when two-stage regression designed by Fama-Macbeth was used for firms' stock returns, no significant evidence about presence of risk premium due to exchange rate risk was found The reason for such result is stated that there are ample availability of assets and derivative instruments in the US market through which the firms can hedge their foreign currency risk and investors in that market are not supposed to demand risk premium for exchange rates changes.

Bashir, et al (2014) documented that the efficient market hypothesis (EMH) does not hold completely in case of the foreign exchange market of Pakistan where market players manipulate the market and still benefit from speculation.

Malagon et al (2015) argued that investment and profitability are linked to idiosyncratic risk and are able to account for the anomaly in a cross-section of stock returns. Moreover, they find that this effect is independent and complementary to the effects related to investor preference for skewness.

Babenko et al (2016) demonstrated that cash flow shocks which are not priced possess information on future priced risk. A positive idiosyncratic shock decreases the sensitivity of firm value to priced risk factors and simultaneously increases firm size and idiosyncratic risk. Their study further documented that any economic variable correlated with the history of idiosyncratic shocks may assist in explaining expected stock returns.

Cao & Han (2016) tested a new cross-sectional relation between expected stock return and idiosyncratic risk implied by the theory of costly arbitrage. If arbitrageurs find it more difficult to correct the mispricing of stocks with high idiosyncratic risk, there should be a positive (negative) relation between expected return and idiosyncratic risk for undervalued (overvalued) stocks. They tried several anomalies to measure stock mispricing and proxy stock idiosyncratic risk using an exponential GARCH model for stock returns and confirm that average stock returns monotonically increase (decrease) with idiosyncratic risk for undervalued (overvalued) stocks. Their study supports the significance of idiosyncratic risk as an arbitrage cost.

Malagon et al (2018) documented that stocks with higher levels of idiosyncratic risk provide relatively lower returns than stocks with lower levels of it. It suggests that following recessions, the conditional pricing of liquidity creates a correction in prices of the high idiosyncratic volatility stocks that persists up to nine months and the negative relation between idiosyncratic risk and expected returns is not observed following recessions.

From above studies, it is crystal clear that both the foreign exchange exposure and idiosyncratic risk exposure affect the firms' stock returns. The idiosyncratic risk is a firm specific risk emanating from firms' different operational activities. Thus the idiosyncratic risk is a micro level risk where as the foreign exchange exposure of a firm arises from effect of exchange rate movements as described by Arbitrage pricing theory (APT).

We have perused the studies which have documented a relationship between idiosyncratic risks and expected stock return. Studies showing a relationship between exchange rate risk and stock returns have been looked into in the review. As both the risks have some impact on the stock returns, we wish to investigate how these risks interact with each other. This study intends to look whether and how these two risks interact with each other if both are considered in pricing the different securities and ultimately a firm's value. This aspect has not been explored so for and to my knowledge, no such study exits on this issue in any cross sectional studies of any developed and/or developing economies.

$H0_2$: There exists no relationship between the foreign exchange exposure elasticity of firms and the cross-sectional idiosyncratic risk.

$H0_2$: A relationship exists between the foreign exchange exposure elasticity of firms and the cross-sectional idiosyncratic risk.

3.4. The Foreign Exchange Exposure Elasticity and Foreign Ownership

Globalization has changed the pattern of international transactions including production, trade and investment. It has changed the overall connections of economic variables, including changes in the exchange rates and its impact on the economy. Though penetration into new markets is likely to increase a firm's profitability, it also increases the variability in its net income because of a host of additional risks of internationalization especially the foreign exchange risk. Due to enhanced level of international business activities over time, companies have experienced greater exposure on account of fluctuations in the foreign exchange rates.

When a trade transaction is made between two counterparties in developed countries, it is invoiced in terms of exporter's currency but it is ironic that trade transactions (export & imports) between a developed and a developing countries are mostly invoiced in the currency of the developed country (Grassman, 1973). The exchange rate variations have become permanent since the adoption of floating exchange rates system and parties participating in international transactions get exposed to exchange rate risk.

Jorion (1990) argued that the relation between stock returns and a currency value increased with an increase in extent of foreign operations of multinationals taken from USA. Other findings stated that there was no significant difference of exposure for domestic firms having no foreign operations. He supported the pricing of exchange

rate exposure in the context of multifactor asset pricing model. Williamson (2001) documented that automobile industry with greater foreign sales and tough foreign competition confronted higher level exchange rate exposures. His study supports theoretical prophecy that when structure of an industry changes, its exposure also changes especially during the period of large and extensive real exchange rates movements.

Bodnar and Wong (2003) stress for taking the foreign exchange rate into the pricing model of assets for controlling macroeconomic influences. This study supports the stance of exchange-rate theory and states that macroeconomic factors used to become instrumental in changing nominal exchange rates. The study also tried three factor models of Fama-French to test whether firm size describes disparity in the implication of the foreign exchange exposure. They also tested foreign sales variable and hedging techniques in their analyses of investigating the chances that firms may experience increased level the foreign exchange exposure.

Fraser and Pantzalis (2004) worked out about the same question, whether the foreign exchange rate changes influence the stock returns of US multinationals. As per Jorion (1990), this study has employed two factor assets pricing model and employed least squares regression (OLS). They find that only three firms out 310 US firms which were exposed to all measures of the foreign exchange measures. This study witnessed that the %age of firm's foreign subsidiaries depicted a positive relation to the exposure when it was estimated by using a firm-specific index but show negative relation to exposure while using a common index.

Fang et al, (2005) found that exports of almost all the sample countries were significantly affected by both depreciation and appreciation in the exchange rates. The effects however were asymmetric in 5 out of 8 countries. Bartram and Karolyi (2006) confirmed that there is a systematic relation of non-financial firms' exposure to the exchange rate to its major characteristics including sales, extent of foreign sales along with currency strength and industry's competition. Lee and Jang (2010) however documented that US domestic firms from lodging industry experienced a higher foreign currency exposure than US international firms. They argued that a business entry in foreign markets or directly making investment in a foreign country does not mean that a firm has taken a new risk but such foreign activities expose the firm's position to losses caused by foreign currency movements.

Aggarwal and Harper (2010) found that there was no significant difference in the foreign exchange exposure of domestic firms and those having international operations. They documented that strength of the foreign exchange exposure is found more when time period of its measurement is increased. Ameer (2010) found that firm's size, percentage of foreign sales, its liquidity and growth as well as managerial ownership affect the hedging strategies of firms in Malaysia. Study by Afza and Alam (2011) finds that firms with higher percentage of foreign sales face higher exchange rate exposure, and consequently use greater currency derivatives. Findings about exposure to larger firms facing with financial constraints with less managers' ownership are identical.

Lee, et al, (2010) found that foreign currency risk of domestic firms might be greater than multinational corporations as the latter are able to diversify this risk. Moreover, operational hedging as well as franchising lessens the foreign exchange risk.

According to their results, exchange rate exposure of firms with higher foreign sales of firms is likely to be higher. Huffman, et al, (2010) used the Fama-French model to find out relationship between exchange rate exposure and firm's attributes. They find that there is significant relation of a firm's the foreign exchange exposure with size, ratio of foreign sales and hedging. They argued that non-hedging firms are likely to have higher exchange rate risk than firms using risk hedging activities.

Sivathaasan (2013) investigated the impact of foreign and domestic ownerships on capital structure of quoted manufacturing firms during the year 2009-2011 in Sri Lanka. It used correlation and regression models for this relationship. He used stratified random sampling technique to construct sample of the study taking manufacturing sector. It used descriptive and inferential statistics (Multiple regression models). This study showed strong positive association between foreign ownership and leverage and insignificant negative relation between leverage and domestic ownership. This study concluded that ownership structure influenced capital structure decisions, the degree and direction of which is not established.

Insah and Chiaraah (2013) found that government expenditure has positive whereas domestic and external debt have negative relation with real exchange rate volatility. Several other factors have been said to be sources of exchange rate volatility such as inflation, volume of output, interest rates, and openness of an economy, the exchange rate regime and central bank independence in the related literature. Takatoshi et al, (2013) found that the foreign exchange exposure of firms having greater share of their activities in foreign markets is likely to be higher. Moreover, when invoicing is in foreign currency, the exposure increases with the exchange rate movements but it is reduced through different hedging instruments as well as operational hedging.

Invoicing in domestic currency decreases the exposure. Sukor (2014) argues that the extent and intensity of exchange rate exposure differs in different world markets and it also depends on extent of economic openness. Small economies with open emerging markets face more magnitude of the foreign exchange exposure than developed markets which are relatively less open.

Xuan (2018) argues that FDI capital flows from developed countries to emerging countries depend on size and inflationary risk of the source country, the bilateral trade link between the source and the host country, the stock market volatility of the source country and the distance between the source and the host country.

$H0_3$: The foreign ownership/operations of firms are not affected by the exchange rate exposure elasticity.

$H1_3$: The foreign ownership/operations of firms are affected by the exchange rate exposure elasticity.

3.5. The Foreign Exchange Exposure, Financial Distress, and Financial Crises

In today's world, an equity market is taken as a barometer of an economy as it represents the corporate sector of a country. An equity market augments growth of national economy which has been documented in quite a large number of empirical studies such as Levine and Zervos (1996) and Enisan and Olufisayo (2009). Stock exchanges are main components of an equity market and a majority of studies have looked at different aspects of these markets. Any negative event occurring within a country or across the borders causes more volatility in these markets which increases financial risk for the investors. It means volatility in the stock prices affect the decisions of investors in making their portfolio.

The global financial crisis erupted in USA in mid-2007 and spread to countries subsequently. This crisis has been found more contagious and relentless than previous crises. Capital flows from developing countries were reduced significantly from the onset of the crisis in the developed countries. The crisis badly affected Foreign Direct Investment and Foreign Portfolio Investment as well as exports of developing countries (Iqbal, 2010). The global financial crisis was termed as the largest one after great recession of 1930s (Llanto and Badiola, 2010). Usman (2010) also found that stock markets of the world were badly affected by the global financial crisis to which declining effects were witnessed from the very first quarter of the year 2008.

Different researchers explored effects of previous financial crises on stock markets which include studies looking into contagion impact of the Asian financial crisis 1997. Alper and Yilmaz (2004) looked into effect of financial crisis 1994 in Turkey, on the stock returns of firms listed at Istanbul and some other stock market as well as that of Asian financial crisis (1997) and Latin America crisis: 1998 - 2001. This documented that the contagion effect existed in stock markets. Lim, et al., (2008) looked at the efficiency of eight Asian stock markets in response to Asian financial crisis (1997) and found that the efficiency of the Asian stock markets declined remarkably during the crisis of which stock market of Hong Kong deteriorated badly.

Olowe (2009) made a study on the reaction of stock returns of firms from Nigerian stock market and its volatility in response to the global financial crisis using EGARCH. The results did not show significant effect of this crisis on the stock returns and their volatility. Adamu (2010) also made study on the Nigerian stock market but used standard deviation and variance of the data for analysis. This documented that volatility of the returns increased in Nigerian stock market during the

crisis period. Ravi and Maloain (2010) established that stock markets of sample Gulf economies suffered with negative effect during global financial crisis and performance of the markets were found better after crisis period.

Chava and Purnanadam (2010) investigated relationship between the foreign exchange exposures and financial distress during Global Financial Crisis (2007-2009). Their results depict a weak relationship in response to the global financial crisis as compared to the relationship in Asian Financial Crisis (1997-98). According to them, higher the foreign exchange exposures are likely to experience financial distress or bankruptcy due to their susceptibility to adverse the foreign exchange shocks.

Song and Lee in 2012 checked the possible impact the Asian Financial Crisis on liquidity management strategies of Asian firms taking cash holdings during pre- and post- crisis period. They came up with the result that the sensitivity of firms' liquidity to cash flow risk was increased in post-crisis period. It was further recommended that financially constrained firms are found more sensitive to cash flow risk but difference in the changes in cash holding of financially constrained and unconstrained firms was not sizeable.

Essers (2013) argued that from the intensification of the financial crisis in summer 2008 and onward, the US$ appreciated significantly against a number of countries, reason being the flight-to-safety pattern of capital flows in US fixed- income securities. Stock prices especially in developing countries declined drastically, which reflected decline in corporate valuation of firms having major focus on exports. The reason of decline in stock market returns was documented as financial linkages i.e.

participation of US investors in equity markets of other countries and foreign direct investment also shrunken (World Bank, 2011).

Chkili and Nguyen (2014) investigated exchange rate volatility during financial crisis 1997 and global financial crisis 2007, and found that the reaction of exchange rates of US dollar viz-a-viz currencies of China, Russia, India, and South Africa was different in both of the crises. Reaction of Chinese Yuan did not show any significant sensitivity to the fluctuations in US dollar. They documented that changes in exchange rates did not show much effect on stock market returns in these countries. They however found that stock market returns had effect on exchange rates in these countries with the exception of South Africa.

Mughall (2015) explains the significant long run associations among the GDP, Inflation, Balance of Trade and Current Account Balance. The study witnessed the jointly significance of the variables included in the study.

H04: The impact of the foreign exchange exposure elasticity on the financial distress of a firm does not increase in financial crisis period as compared to the tranquil period.

H04: The impact of the foreign exchange exposure elasticity on the financial distress of a firm increases in financial crisis period as compared to the tranquil period.

3.6 Conceptual Framework

Overall impact of the foreign exchange exposure elasticity on financial distress, idiosyncratic risk and firm's foreign ownership.

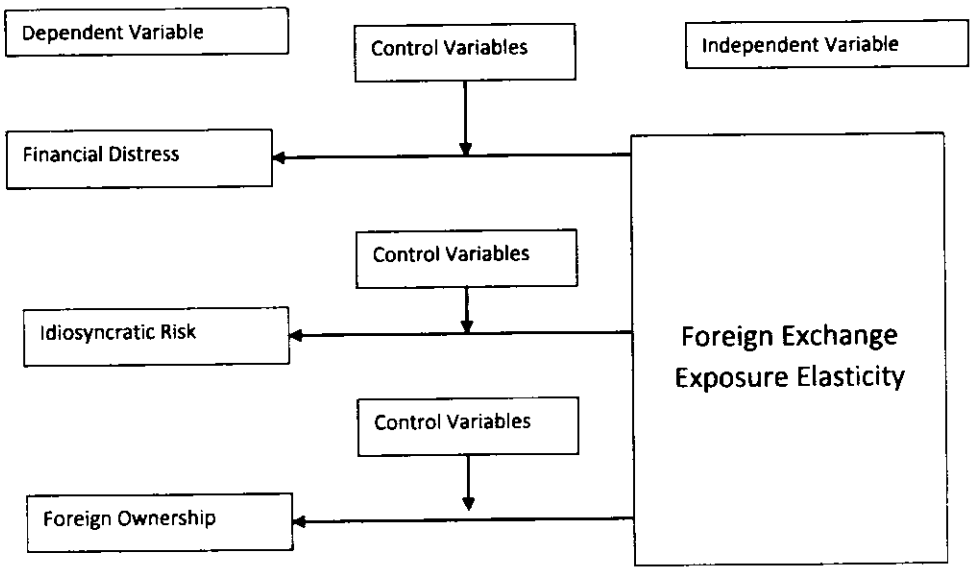


Figure 1(a).Impact of FEE on financial distress, idiosyncratic risk & foreign ownership

The effect of global financial crisis on the relationship between the foreign exchange exposure elasticity and financial distress, idiosyncratic risk, and foreign ownership.

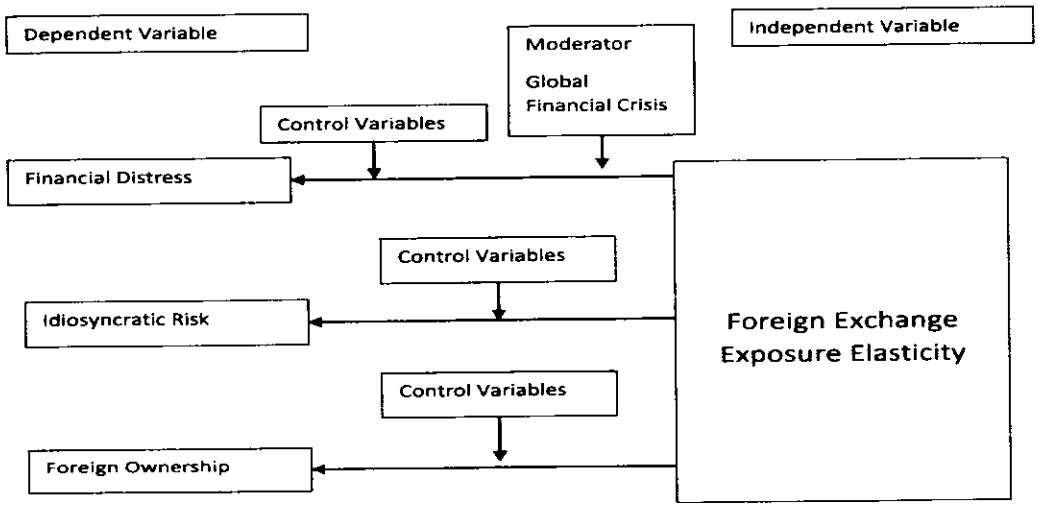


Figure 1(b). Impact of FEE on financial distress with Global Financial Crisis (2007-09)

Any negative event occurring within a country or across the borders causes more volatility in the financial markets which increases financial risk for the investors and ultimately for firms. When financial markets are confronted with some black swan like the GFC 2007-09, it affects other markets as well. Due to this crisis, credit availability was reduced in USA and consequently cost of funds was increased which reduced profitability and cash flows of firms. Credit flows to developing countries were affected adversely and exchange rate fluctuations were higher as compared to pre-crisis period. Such frequent changes in exchange rates are likely to affect cash flows of firms and trigger the firms toward financial distress and bankruptcy if this risk is not managed well in time. We have, therefore, selected financial crisis period 2007, 2008, and 2009 as dummy variables for looking into the crisis effect on the relation between the foreign exchange exposure elasticity and financial distress.

CHAPTER - 4

RESEARCH METHODOLOGY

This section pertains to different models and methodology on the following research domains:

1. The foreign exchange exposure and its effect on financial distress of the firms
2. The foreign exchange exposure and firms' idiosyncratic risk
3. The foreign exchange exposure elasticity and firms' foreign ownership
4. Effect of global financial crisis on the relationship between FE exposure and financial distress of firms

4.1 Population

Population of the study is all firms listed with Pakistan Stock Exchange (PSX) as on December, 2015 and all listed firms in USA (New York Stock Exchange, NYSE &/or NASDAQ). KSE listed firms comprise of 35 sectors and 579 companies in total, out of which six (6) sectors are of financial services. The New York Stock Exchange (NYSE) of USA is the leading stock exchange in the world. The exchange trades stocks for 2,800 companies, including world's top rated blue chip companies and new high-growth companies where as about 3300 companies are listed with NASDAQ, which is 2nd largest stock exchange in USA. Exchange rate effects on domestic companies having no export/import are not significantly different from those with international operations (Aggarwal and Hooper, 2010).

The study has taken USA as representative of a developed countries and Pakistan as representative of emerging countries. The reason for taking Pakistan on the one side and USA on the other side is that USA is the largest economy of the world which is multi-layered and a developed economy. Moreover, its currency, US dollar is mostly accepted as currency of international trade and investment settlements all over the world. Pakistan has also close and long standing multilateral economic relations with USA. A sizeable number of US firms (50) are working in Pakistan, and level of trade and investments between USA and Pakistan is increasing. Hence it is important to look into likely exposure of US dollar faced by firms working in Pakistan as well as those in USA and its impact on their operations.

4.2. Sample

4.2.1 Sampling Method

There are two major categories of sampling methods: i). Probability Sampling and ii).Non-Probability sampling. We followed purposive sampling technique falling under non-probability sampling classification as we took all non-financial firms listed with PSX and very close equivalent number of non- financial firms included in S & P 500 Index, representing all US non-financial firms. However, we used convenience sampling method, another non-probability sampling technique for interviews of CFOs of such firms from Pakistan.

4.2.2 Sample Size

We take all non-financial firms (450) listed at Karachi stock exchange comprising mainly of manufacturing, utilities and other sectors. This Study excluded financial sectors such as mutual funds, commercial banks, investment banks, saving banks,

non-bank finance institutions (NBFIs), leasing companies, insurance companies, asset management companies and investment banks.

We select all non-financial companies from S&P 500 Index companies which totaled to 414 companies as on December 31, 2015 excluding thereby 86 financial companies from the S&P 500 index companies as well. These companies comes from New York stock exchange (2800 companies) &/or from NASDAQ (3300 companies). This index is mostly used by the investors as the benchmark of overall market. It captures about 80% of the market capitalization of all listed companies. This was done to have somewhat equal number of firms in each sample as it was not feasible to consider all US non-financial listed firms.

This study excludes financial firms as their specific asset and liability structure typically produces high financial leverage, which hinders the compatibility of their book to market ratios with those of non-financial firms (Abdullah, Shah & Khan, 2012). Their risk management objectives and practices of financial companies are also different from those of non-financial firms. The non-financial companies fall in risk-averse profile whereas the financial companies are usually risk seekers in that they issue their derivative securities and deal in foreign currencies. The non-financial companies need to hedge their foreign exchange exposure to smooth their business operations and ensuring better future financing and investing decisions.

The act of exclusion of financial firms is consistent with various studies such as Fama & French (2002); Frank & Goyal (2003); Korajczyk & Levy (2003) and Sinha & Agnihotri (2015), as their financing and risk taking strategy differ from non-financial firms.

4.2.2(i) Sample: Pakistan

Though our sample consists of all non-financial firms but some of the firms have to be excluded from the chosen sample during the process of collection of the data due to non-availability of data of different variables for different years of the sample period,. Other reasons for omitting a number of companies are stated as under:

Our sample period is from 2003 to 2015 but a number of companies especially in the field of power generation, technology, and services were listed at the stock exchanges during the sample period. We could not find their data for the previous years.

Few companies have got listed for preference shares but data was rarely available and have to be excluded.

Some companies were delisted for some year(s) and their data could not be found for that period.

Companies with negative book value of equity were excluded as the study is on the relationship between the foreign exchange exposure and financial distress (Chua et al 2010) and such firms are technically insolvent.

Final sample for Pakistan consists of 187 non- financial firms listed at KSE (Pakistan). The sample comprehensively covers almost all the non-financial sectors. These firms are from the following sectors:

Table 1: Sector-wise number of KSE listed companies included in the sample

Sector	Total listed companies	Sample companies	Sector	Total listed companies	Sample companies
Auto & Allied	21	12	Cable & Electronics	9	4
Cement	22	11	Chemical	28	13
Engineering	18	6	Fertilizer	7	4
Food & personal care	21	10	Glass & Ceramics	11	5
Jute	3	1	Leather & tanneries	5	3
Oil & Gas	11	6	Pharmaceutical	9	6
Paper & paper Products	9	6	Power Generation	20	5
Refinery	4	1	Sugar & Allied	36	16
Synthetic & Rayon	11	5	Technology & communication	10	3
Textile composite	56	23	Textile Spinning	87	35
Weaving	14	3	Vanaspati	5	1
Woolen	2	1	Miscellaneous	23	7

4.2.2(ii) Sample : USA

Initially this study takes 414 non-financial companies out of S&P 500 index companies but some companies are excluded later on due to undernoted reasons:

Data of some companies were not found in later years as these were delisted from the New York Stock Exchange stock and data of such companies were missing for some years.

Data of various balance sheet variables required for the research were missing in some years.

Our final sample of USA consists of 222 non-financial firms taken from S&P 500 Index companies. These companies are further divided into 184 manufacturing companies and 38 non-manufacturing companies. Sector-wise detail of the sample firms is given here under:

Table 2: Sector-wise number of NYSE listed companies included in the sample

Sector/Industry	NOs	Sector/Industry	NOs	Sector/Industry	NOs
Aerospace and Defense	6	Automobiles & Allied accessories	4	Chemical	9
Consumer Discretionary	22	Consumer Staples	21	Electricity& Energy	20
General Services	14	Hardware Equipment	2	Health care	18
Information	10	Industrial equipment	36	Leisure	5

Technology					
Materials	5	Media	3	Mining	2
Oil & Gas	12	Real Estate	1	Paper	1
General Retailer	9	Telecommunication Services	3	Tobacco	1
Utilities	15	Unclassified/Misc.	3		

4.3 Sample Period

Data for thirteen-year time period have been taken starting from January 01, 2003 to December, 31, 2015 for both of the sample countries, Pakistan and USA. This period is quite reasonable for the current research work. We have taken monthly and annual stock prices of the sample firms, exchange rates, stock market index and interest rates. Annual data of various balance sheet and profit and loss statement' variables for different domains of the research have been taken for the sample period. We have taken financial crisis period as 2007, 2008 and 2009 for both of the countries.

4.4 Data and its Sources

Stock prices data of the sample firms of Pakistan along with KSE-100 index values have been taken from data portal of Karachi Stock Exchange (KSE), business recorder, and other online available sources containing such data. The data of balance sheet and income statement variables have mainly been taken from balance sheet data analysis compiled by the State Bank of Pakistan and annual reports of the companies

listed in Pakistan. Macroeconomic variables such as Gross domestic product (GDP) have been taken from economic survey of Pakistan and SBP reports. For USA, this study has taken non-financial firms from S&P 500 index companies. Their market and balance sheet variables data have been obtained from DataStream, annual reports, web sites of the indexes and other on-line sources. The Exchange rate data of PKR/USD has been used, obtained from website of SBP where as market weighted average exchange rate of US Dollar has been obtained from on-line financial data sources of Federal Reserve of America. Interest rates have also been obtained from website of the central banks.

4.5 Instrument for Qualitative Analysis

An unstructured questionnaire (annexure-1) has been used to interview CFOs of firms on the different dimensions of the research. For this purpose, we contacted CFOs of non- financial listed companies well versed with such highly technical risks and willing to talk upon these issues.

4.6 Variables

Table 3: Description of Variables

Variable	Variable Name	Measurement	Reference
R_{it}	Stock return	$Ln(P_t/P_{t-1})$	Market Model (Sharpe 1964)
Rm_t	Stock market index Return	$Ln(P_t/P_{t-1})$	Jorion(1990,1991) and many others
Fx	Foreign exchange rate return	$Ln(P_t/P_{t-1})$	APT (Ross 1976) & ICAPM (Merton)
r_t	Interest rate	Monthly real Interest rate	Wei and Stark 2013

MC	Market Capitalization	Ln(MC)	Price per share x No of outstanding shares
SIZE	Total assets	Natural log of total assets	Altman(1968)
WCAP	Working capital	(current assets-current liabilities)/TA	Altman(1968)
SIZE	Size of Firm	Natural log of total assets or market capitalization	Altman(1968)
RE	the retained earnings	the retained earnings /Total Assets	Altman(1968)
EBIT	Earnings before interest and Taxes	EBIT/TA	Altman(1968)
MVE	Market value of equity	Price per share* No of outstanding shares	Altman(1968)
BV	Book value of equity	Total assets-total Liabilities	Altman(1968)
SALE	Total Sales	Total sales/TA	Altman(1968)
DEBT	Total Liabilities	Total Liabilities/TA	Altman(1968)
CASH	Cash	(Cash+Marketable securities) / Current Liabilities	Kim &Kraple (2014)
FS	Foreign Sales	Foreign Sales/TA	Kim &Kraple (2014)
ZS	Z-Score for manufacturing Public US Firms	Calculated by five factors: WCAP,RE,EBIT, MVE/BVL& SALE	Altman(1968)
Z"	Z-Score for non-manufacturing	Calculated by four factors:	Altman(1993)

	Public US Firms	WCAP,RE,EBIT & BVE/BVL	
Z"	The Z-score for emerging Countries (Pakistan)	Calculated by four factors: WCAP,RE,EBIT & BVE/BVL Plus 3.25	Altman(1993)
FX	The foreign exchange Exposure Elasticity	Calculated by Rolling Regression of multifactor market model	Wei & Stark(2013) Kim & Kraple(2014)
Rf	Risk free Rate	Treasury bill Rate	Fama-French (1973)
SMB	Small minus Big	Returns of small cap firms –returns of large cap firms	Fama-French (1973)
HML	High minus Low	Returns of high book to market value- returns of low book to market value	Fama-French (1973)
IR	Idiosyncratic Risk	Standard deviation of residuals of error term using Fama-French three factor Model and EGARCH model	Fu(2007), Nath & Brooks(2015)
SIZE	Market size of a firm	Natural log of firm's market capitalization	Mishra *(2013)*
BM	Book to market value of equity	Positive book value of equity / market value of equity	Mishra *(2013)*
CF/P	Cash flow to price ratio	Cash flow per share /	Mishra *(2013)*

		Price per share(=Cash flow/MC)	
Lev	Leverage	Total debt/Total assets	Mishra *(2013)*
ROE	Return on equity	Net income available to stockholders/Total equity	Mishra *(2013)*
GDP growth	Gross Domestic Product growth	[GDP(current year)-GDP(previous year)]/GDP (previous year)	Various studies use it for growth rate of domestic economy.
Rm	Market return	Return on KSE-100 index	

4.7 Methodology

This study uses mixed methodology which undertakes quantitative analysis and supports its results using qualitative analysis (Jones and Khanna, 2006). In quantitative analysis, we use secondary data of the sample companies from both of the countries whereas for qualitative findings, interviews are conducted with CFOs of the companies in Pakistan by using an unstructured questionnaire.

4.7.1: Mixed Methodology

Mixed methodology models are classified into two categories based on whether the qualitative and quantitative data are collected concurrently or sequentially.

This study uses explanatory design of sequential mixed methods which is explained as under:

The objective of the explanatory mixed methods designs is to use qualitative methods to explain quantitative findings already got. Here quantitative data are collected and analyzed prior to the collection and analysis of qualitative data.

- This method further falls under convergent design- "Quant-Qual" which basically is a quantitative study but uses qualitative data to supplement or validate the quantitative findings.

Mixed methods research refers to all procedures of collecting and analyzing both quantitative and qualitative data in the context of a single study(Creswell and Plano Clark 2007).

This quantitative study involves a panel data analysis to finding the relation between independent and dependent variables whereas the qualitative analysis is done through an un-structured interview questionnaire constructed for personal interview with CFOs of some listed firms from the sample. Qualitative responses are sought for the following variables:

Financial distress

Exchange rate Risk/ Exposure

Firm-Specific risks/ Idiosyncratic risk

Foreign ownership

Hedging strategies for the foreign exchange risk.

The major reason for using the mixed methodology is the foreign exchange exposure puzzle i.e. theoretically foreign exchange risk is taken as one of the major macroeconomic factors which affect cash flows, required rate of return, and ultimately firms' value (Bartram, et al, 2010) but its empirical significance is very rare (Lim, 2012).

The results of quantitative (regression) analysis are worked out initially from secondary data and then interviews are conducted to support or otherwise the findings of the quantitative analysis to make final comments on the relationships being looked.

4.8 Theoretical Rationale of the Exposure Model

Existing literature gives two most likely explanations for the relation between exchange rates and stock prices. A study by Dornbusch and Fisher (1980) uses flow-oriented model stating that depreciation in domestic currency increases exports and expected cash flows of domestic firms. Consequently stock prices will move up. The second is Portfolio balance approach or stock-oriented approach which advocates a directional impact from prices of stocks to exchange rates (Branson, 1983, Frankel, 1983). A number of recent studies have been motivated towards this relationship and positive relationship is found between the foreign exchange rate movements and stock returns (Diamandis & Drakos, 2011 and Lin, 2012).

Our results given in table 1-6 depict that exchange rate movements significantly affect the stock returns of both the sample countries, which means exchange rate is one of the contributing factors in pricing the stocks. All the three models show that the foreign exchange exposure elasticity to the US firm's returns is higher than those of Pak firms. The effect of market return to the firms return in case of US firms is also much higher than that of firms from Pakistan while that of interest, it shows, more or less similar effect in both countries.

4.9 Measurement of the Foreign Exchange Exposure Elasticity

We employ a simple market model to estimate the exchange rate risk sensitivity coefficient of individual firms. We take exchange rate factor as explanatory variable

and stock returns as dependent variable as recommended by Adler and Dumas (1984) as well as by Jorion (1990, 1991), and a number of later studies such as that by Bodnar and Gentry (1993). Recent studies using such type of model for estimation of the foreign exchange exposure elasticity include Bartram (2008), Wei and Starks (2013). The study also takes interest rate to control for the financial charges effect of the financially constrained firms which may trigger them toward financial distress and bankruptcy.

The foreign exchange exposure elasticity (FEEE) may lead to the financial distress of the firms, affecting their cash flows adversely and ultimately their values. This can happen in the short run as well as in the long run. The short –term exposure is usually called transaction exposure and the long run is termed as economic exposure. Though they may be different academically (Chow et al 1997) but it is very difficult to distinguish them empirically.

The study is interested in short-term to medium-term the foreign exchange exposure effects on the financial position/distress of firms. It is expected that such exposures are relevant measures to be investigated to forecast their effects on financial distress and bankruptcy of the firms. As per our literature survey on the subject, it is hard to work out the short-term the foreign exchange cash flow exposure of the firms due to adjustment noise in the financial data (Bartram, 2007,2008; Kraple and O' Brien 2013). The study is close to Wei and Starks 2013 and Kim and Kraple 2014, who have examined the relation between foreign exposure and financial distress.

We first examine the possible impact of the foreign exchange exposure elasticity on the financial distress. The basic idea behind this intuition is that the foreign exchange

related adverse events may cause financial distress and may force the firm into bankruptcy. Such adverse occurrences are found in literature (Sercu 2009) where in the companies with open position in the foreign exchange transactions have to declare bankruptcy just due to unfavorable movement in the exchange rates. It is also found in different studies (Bernstein 19998) that during the decade of 1970-80, there were many corporate failures due to high increase in the foreign exchange rate and interest rate volatility. Such exposure was the flexible exchange rates which could not be hedged appropriately.

We use three foreign exchange exposure Models given as under:

Model I **(Adler & Dumas, 1984)**

$R_{it} = \alpha_i + \beta_i Rfx_t + \epsilon_{i\,t}$ ---------- eq.4.1

Here R_{it} is stock return of a firm i for the time t and Rfx_t is the return in terms of foreign

exchange rate or %age change in the foreign exchange rate. This model measures total foreign exchange exposure (Adler and Dumas, 1984) where β_i is the foreign exchange exposure elasticity or sensitivity of firm value to changes in the foreign exchange rates. This above model was initially used by Adler and Dumas in 1984 and has been used in a number of subsequent researches such as Glaum et al (2000) and by Bergbrant and Hunter (2012).

Model II **(Jorion 1991)**

$R_{it} = \alpha_i + \gamma_{it} R_{mt} + \beta_{i\,t} Rfx_t + \epsilon_{it}$ ---------- eq .4.2

Where R_{mt} the value-weighted market index return; β_{it} is sensitivity of the exchange rate to the value of the firm i.e., elasticity of the foreign exchange rate exposure.

By adding the return on market portfolio/market index, we can avoid omitted variable problems and control for value relevant market-wide factors to reduce noise and improve the efficiency in the estimation of exchange rate exposure. This model was introduced by Jorion (1990, 1991) and has been used in almost all of the studies made thereafter. We also follow the market model of Jorion (1990, 1991) which has been used by many researchers for calculating the foreign exchange exposure of firms.

Model III **(Wei & Stark, 2013)**

$$R_{it} = \alpha_i + \gamma_i Rm_t + \beta_i Rfx_t + \delta_i r_t + \epsilon_{it} \quad \text{eq.4.3}$$

Where r_t is real interest rate

In this model, real interest rate is added to the market model as proxy of financial cost/charges as this study is exploring relation of the foreign exchange exposure elasticity with financial distress. The financial distress is faced by a firm when it is unable to pay its dues on their due date (Wruck, 1990 and Asquith, et al, 1994). Such firms face difficulties in getting external financing and even if they succeed in getting loans, they will be charged higher rate of interest. Ultimately these financially constrained firms will not be able to hedge their foreign exchange risk altogether. We also adopt this model in which interest rate and the stock market return are taken as control variables (Choi and Parsad 1995; Wei and Stark, 2013).

The coefficient β (beta) in the equation 4.3 is elasticity of a firm to exchange rate changes. The beta may thus be called as the foreign exchange exposure elasticity. It is

pertinent to note that the study uses the foreign exchange exposure and the foreign exchange exposure elasticity interchangeably. We have used rolling regression model on the monthly values of the betas taking first 36 values for first annual beta and then rolling over accordingly for its values for the next years.

4.10 Measurement of Financial Distress

In order to test our hypothesis to investigate the effect of the foreign exchange exposure on the financial distress of the company, we need to calculate the potential financial distress of the sample firms. There are various models to calculate the financial distress. Beaver (1966) and Altman (1968) are the pioneers who used univariate and multivariate discriminate analysis (MDA) respectively. Subsequently Merton gave bond pricing model in 1974. Ohlson developed O-score in 1980 using Logit model, Zmijewski presented a probit model in 1984 and Campbell model in 2008. In addition some country specific bankruptcy models have also been developed (Bredart 2014, Abbas &Rashid 2011).

We have opted for the Z-score model (1968) developed initially by Edward I. Altman (1968) for anticipating the likelihood of bankruptcy of US manufacturing firms and Altman's average Z-score(Z" 1993) model for the US non-financial , non – manufacturing firms. We have used The Z-score for emerging countries (Z"-1993) for Pak firms. These models are most recognized and have been widely used for predicting the financial distress of a company (Bemmann, 2005).

It is argued that the Z-score (original) is not adequate for the developing and emerging countries. The author continued to improve it and then gave Z'-score for private companies in 1983. He further developed Z"-score for non-manufacturing firms and

emerging countries in 1993. We segregated the non-financial firms into manufacturing and non –manufacturing firms for application of relevant The Z-score as mentioned above.

4.11 Z-score Model.

The Altman Z-score model is the financial model to predict the likelihood of bankruptcy of companies and was created by Edward I. Altman, a professor at New York University, USA.

$$Z = 1.2(WCAP/TA) + 1.4(RE/TA) + 3.3(EBIT/TA) + 0.6(MVE/BVTL) + 1.0(TS/TA) \ldots Eq.4.4$$

Where WCAP/TA = Working Capital/ total assets

It measures the net liquid assets of a firm relative to its current liabilities (Altman 1968). The more working capital there is compared to the total assets, the better the liquidity situation. This measure is generally more valuable as compared to other liquidity measures i.e. the quick ratio and the current ratio (Altman, 1968).

RE/TA = the retained earnings/ total assets

The retained earnings are net earnings realized over the life of a business not paid out as dividends. The companies with high RE/TA preferably depend more on retention of their profits than external financing. If the retained earnings are zero or low, a company would have to manage money from external sources to keep running its operations smoothly.

EBIT/TA = Earnings before interest and tax (EBIT)/ total assets

It measures productivity of the firms' assets and productivity of a company's assets. This ratio is very much appropriate for financial distress of firms (Altman, 1968).

MVE/BVTL=Market value of equity / Book value of total liabilities.

It shows how much a firm's assets can decline in value before its liabilities exceed the assets and the firm becomes insolvent.

TS/TA=Sales/ total assets

It shows efficiency of the management and business quality over the years under study as sales generates money for the business. Higher the sales, the better will be this ratio, and company will achieve more financial stability.

4.11.1 Z'-score for non-manufacturing companies

There have been arguments against the original Z-score developed by Edward I. Altman (1968) stating thereby that the Z-score was basically developed for manufacturing companies and it is not valid for the non-manufacturing businesses such as utilities and general services sectors. We have therefore used the revised Z-score for non-manufacturing businesses (Altman 1993) given as under:

$Z' = 6.56(X_1) + 3.26(X_2) + 6.72(X_3) + 1.05(X_4)$ ---------- Equ.4.5

X_1= Working capital/total assets

X_2= the retained earnings/total assets

X_3= Earnings before interest and taxes /total assets and

X_4= Book value/total liabilities.

4.11.2: The Z-score (Z") for Emerging Countries

$Z"= 3.25 + 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$ ---------- Eq 4.6

The revised Z-score models provide more accurate and timely information about financial distress of non-manufacturing companies and likelihood of their bankruptcy for longer time before the actual failure of companies.

Z-score models are preferred over ratio analysis as they are parsimonious and at the same time provide an accurate measure to assess the financial position of a firm instead of a large number of ratios.

Many researchers have compared the validity and efficacy of different bankruptcy models including Altman Z-score but most of them found it a reasonably good test to tell the bankruptcy one year to 4 year before. Karamzadeh (2013) finds that Original Altman (1968) bankruptcy prediction model predicted bankruptcy issue of Iranian listed companies with the accuracy of 74.4%, 64.4% and 50%, for 1, 2 and 3 years before respectively while original Olson (1980) bankruptcy prediction model was able to predict bankruptcy of the same sample with an accuracy of 53.3%, 46.6% and 33.3%, respectively for 1, 2 and 3 years before. Hence, the prediction of Altman's model about bankruptcy of companies was much better than the Ohlson's model. Similarly, Pongsatat et al. (2004) made a study on the predictive capability of Ohlson's and Altman's model for bankruptcy of small and large firms in Thailand. Their study also shows that the Altman's model exhibits a higher predictive accuracy than Olson's model for bankrupt firms.

Some researchers have opted for market models such as Merton Model of bankruptcy prediction but relevant data was not available in emerging countries' markets especially Pakistan as such. We therefore opted for Altman's Z-score models.

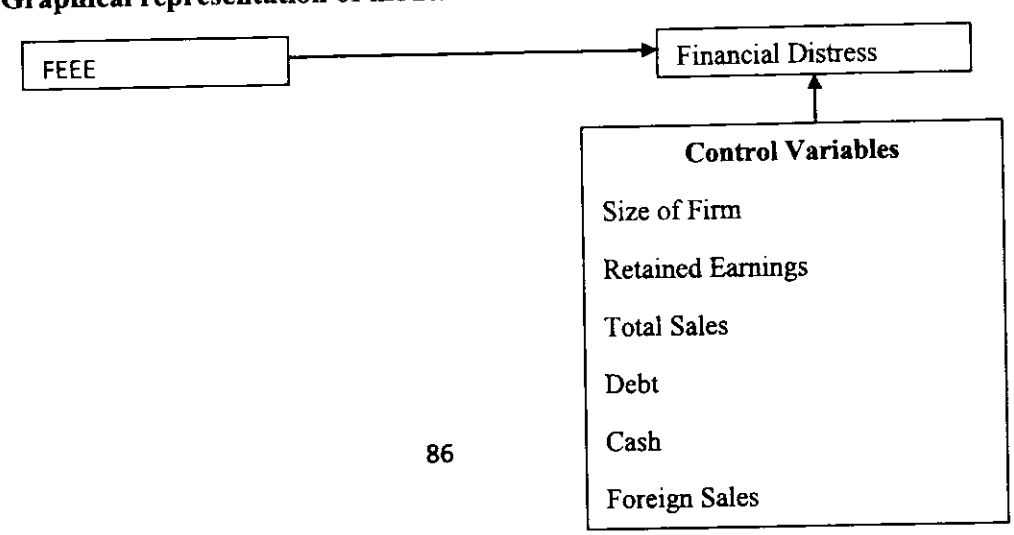
4.12 The Foreign Exchange Exposure and Financial Distress of Firms:

Asset pricing theories particularly arbitrage pricing theory (APT), hedging theory and underinvestment hypothesis support the existence of the foreign exchange exposure. However, weak empirical evidence is witnessed in respect of the foreign exchange exposure and value of a firm. There is lack of consensus on the issue as how to handle foreign currency risk within asset pricing theory (Dumas and Solnik, 1995 and Stulz, 1981). All this increases the probability that standard asset pricing models may not capture the complexities of the foreign exchange exposure in security valuation. To investigate the relation between the foreign exchange exposure elasticity and financial distress empirically, we give following model for the sample firms, with its graphical presentation.(Wei and Stark, 2013 & Kim & Kraple(2014).

$$DIST=\alpha_i+6_i(|FEE|)I+\gamma_1(SIZE)+\gamma_2(RE)+\gamma_3(SALE)+\gamma_5(DEBT)+\gamma_6(CASH)+\gamma_7(FS)+\epsilon_{it} \quad \text{.....} \quad \text{Eq.4.7}$$

Where i=1to 3

4.12.1: Graphical representation of model



In equation 4.7, FEE stands for either one of the three the foreign exchange exposure measures (Beta) which is coefficient of the foreign exchange rate changes in any of the three models obtained by rolling–window regression. It is pertinent to note here that exchange rate fluctuations cause uncertainty in the economy which ultimately affects different sectors including industries. The study takes exchange rate elasticity of firms as independent variable which results from exchange rate movements as it is different for different industries (Wei & Stark, 2013).

SIZE is the natural log of a firm's total assets; RE is the retained earnings, SALE is total sales, and the debt shows total liabilities: all of these variables are scaled by the total assets; CASH is the ratio of cash and short term investment to current liabilities; FSALE is foreign sales scaled by total sales.

We identify variables that are likely to affect financial distress/bankruptcy by drawing on the distress/bankruptcy literature. We mainly rely on Altman (1968), Ohlson (1980), and Zmijewski (1984), but we also include additional firm characteristics that have been identified as potential contributors of financial distress risk in the financial literature.

Firm's size (SIZEA) is the natural log of total assets. An alternative measure of firm's size measurement is the log of equity market capitalization, or log of total assets. Firm's size is commonly included in the study as a proxy for corporate risk (Ohlson, 1980; and Shumway, 2001). Fitzpatrick and Ogden (2011) termed firm's size as the strongest predictor of corporate failure. Based on extent literature we expect a negative relation between firm size and distress risk.

CASH ratio is defined as cash plus marketable securities divided by current liabilities. It shows the liquidity position of the company in the sense whether company is financially constrained or not. This variable gets much importance when we are looking for a relationship between financial distress of a firm and its foreign exchange exposure. More liquid firms are likely to be less risky. One reason is that liquid assets have less volatile return than rather less liquid assets. Altman (1968) and Zmijewski (1984) use measure of liquidity as predictor variable for corporate failure. We use cash ratio as a direct measure of liquidity. Our result remains unchanged if we used the current ratio or quick ratio. A negative relation is expected between liquidity and chances of financial distress.

The variable RE stands for the retained earnings of a firm which is calculated as the retained earnings divided by total assets. They show the cumulated effects of profitability of a company over time. It is found in literature that more profitable firms might be less distressed, particularly if they have been profitable in their recent past. We expect a negative relation between the level of the retained earnings and financial distress. This ratio is very informative on the issue of financial well-being of a firm.

We follow Altman (1968) and Shumway (2001) and use the retained earnings scaled by total assets (RE) as a cumulative measure of past profitability. This ratio also proxies for the firms age where younger firms have most likely lower levels of the retained earnings. Studies show that younger firms are more likely to be risky and experience financial distress.

Ability to generate sales is termed as productivity of the firms. The variable SALE is calculated by dividing total sales by total assets. It measures the total asset turnover of

a company. This ratio is likely to measure managerial capability of dealing with competitive situation. It shows how efficiently a firm is utilizing its assets to generate its revenue. We expect that assets turnover ratio is negative related with financial distress probabilities.

A variable to represent international involvement is essentially required to be included in the model when study involves the foreign exchange exposure of the firms. We use foreign sales as a measure of firms' level of international involvement. It tells how much of a firm's revenues are from outside the home country which is exposed to the foreign exchange exposure or currency exposure. Some studies find that foreign sales are negatively correlated with corporate risk whereas others document the opposite. We cannot say clearly what may be relation between the relative level of foreign sales and financial distress probabilities. Intuitively, one may say, more the foreign component of sales, more is expected to be the foreign exchange exposure.

Debt is a major cause of financial distress. Presence of debt in firms' capital structure increases the volatility of earnings available to equity holders. The use of debt as a source of financing is called leverage. It is argued that leverage increases systematic risk which means an increase in leverage should positivity correlated with distress probabilities. Following Ohlson (1980), firm's leverage is measured as the ratio of total liabilities to total assets.

4.13 Data Analysis Techniques

Ours is a panel data analysis for which three alternative regression models are usually used :

1. Common constant (pooled OLS) Model

2. Fixed effects model

3. Random Effects model

4.13.1 Panel Data Analysis

Panel data is longitudinal or cross sectional time-series data which is normally used to observe the behavior of entities across time. These entities could be states, companies, individuals, countries, etc. Such data allows controlling for variables one cannot observe or measure like cultural factors or difference in business practices across companies; or variables that changes over time but not across entities. This means it accounts for individual heterogeneity. The study took the balanced data which is preferred to the unbalanced one because it is rather complex to analyze such data.

4.13.2: Common Constant (Pooled OLS) Model.

It is a simple regression modeling technique which is often used for analysis of panel data. It considers with constant coefficients, i.e. constant intercept as well as coefficient. It is applied on such data where cross sections are not heterogeneous (homogeneity prevails), for instance the data is of all developed countries with no much difference in their GDP or income level.

4.13.3: Fixed Effects Model

Fixed-effects (FE) model is used whenever one is interested in analyzing only the impact of variables that vary over time. It explores the relationship between predictor and outcome variables within an entity. Each entity has its own individual characteristics that may or may not influence the predictor variables, for instance the business practices of a company may influence its stock price. When using fixed

effect method (FEM), we assume that something within the individual may impact or bias the predictor or outcome variables and we need to control for this. FEM removes the effect of those time-invariant characteristics and one can assess the net effect of the predictors on the outcome variable. Another important assumption of the FE model is that those time-invariant characteristics are unique to the individual and should not be correlated with other individual characteristics. In the case where error terms are correlated, FE is not suitable since inferences may not be correct and one needs to model that relationship using random-effects. This differentiation between fixed effects and random effects methods provide the main rationale for the Durbin-Wu-Hausman test (Greene, William, 2012).

The equation for the fixed effects model becomes: $Y_{it} = \beta_i X_{it} + \alpha + u_{it}$

where

α_i (i=1....n) is the unknown intercept for each entity (n shows entity-specific intercepts).

Y_{it} is the dependent variable where i = entity and t = time.

X_{it} represents one independent variable.

β_1 is the coefficient for independent variable

u_{it} is the error term

The main rationale in this model is that if the unobserved variable does not change over time, then any changes in the dependent variable must be due to other influences (Stock and Watson, 2003, p.289-290). A fixed-effect model does not work well with

data for which within-cluster variation is minimal or for slow changing variables over time.

The fixed effects model is a model for pooling data. It permits cross-section heterogeneity by allowing the intercept to vary across individuals and allows for differences in the intercept parameter for each individual.

4.13.4 Random Effects Model

Random effect Generalized Least Square regression approach assumes that observations are independent across groups but may not be independent within groups (Khanna & Palepu, 2000). The rationale behind random effects model is that the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables included in the model.

If differences across entities have some influence on dependent variable then random effects is appropriate. An advantage of random effects is that time invariant variables can be included in it.

The random effects model is: $Y_{it} = \beta i X_{it} + \alpha + v_i + u_{it}$

Random effects assume that the entity's error term is not correlated with the predictors which allows for time-invariant variables to play a role as explanatory variables. In random-effects, one needs to specify those individual characteristics that may or may not influence the predictor variables. The random effects model treats the heterogeneity across individuals as a random component.

4.13.5: F-Test: Common Constant Method and Fixed Effects Method

F-test is used to decide among Common constant effect (pooled OLS) method and fixed effects method. In F-test, the null hypothesis is

H_0: All the constants are the same (homogeneity)

4.13.6: Hausman Test: Random Effect Model and Fixed Effect Model.

To decide between fixed or random effects, we run a Hausman test where the null hypothesis is that the preferred model is random effects or fixed effects (see Green, 2008, Ch. 9). It basically tests whether the unique errors are correlated with the regressors. Null hypothesis is that they are not. Run a fixed effects model and save the estimates, then run a random model and save the estimates, then perform the test.

Use fixed-effects (FE) method whenever you are only interested in analyzing the impact of variables that vary over time. Fixed effect method explores the relationship between predictor and outcome variables within an entity (country, person, company, etc.). Each entity has its own individual characteristics that may or may not influence the predictor variables.

When using FE, we assume that something within the individual may impact or bias the predictor or outcome variables and we need to control for this. This is the rationale behind the assumption of the correlation between entity's error term and predictor variables. FE removes the effect of those time-invariant characteristics so we can assess the net effect of the predictors on the outcome variable. Another important assumption of the FE model is that those time-invariant characteristics are unique to the individual and should not be correlated with other individual characteristics. Each

entity is different therefore the entity's error term and the constant (which captures individual characteristics) should not be correlated with the others. If the error terms are correlated, then FE is no suitable since inferences may not be correct and you need to model that relationship, using random-effects. This is the main rationale for the Hausman test.

4.14: The Foreign Exchange Exposure, Financial Distress and Global Financial Crisis

As our sample period includes the period of global financial crisis (GFC 2007-09), we have tested the effect of the financial crisis on the relationship of the foreign exchange exposure and the financial distress by taking each year as an interactive dummy separately. Following model is used to find out the effect of the financial crisis on the relationship between the foreign exchange exposure and the financial distress of the firms:

$$Dist=\alpha_i+\delta_i(FEE3)+\gamma_1(SIZE)+\gamma_2(RE)+\gamma_3(SALE)+\gamma_4(DEBT)+\gamma_5(CASH)+\gamma_6(FS)$$

$$+\gamma_7(year)_t*FEE3) + \epsilon_{it} \quad \text{---------- Eq. 4.8}$$

Where t represents year 2007, 2008, or 2009

The above model is developed as per model of Kim & Kraple (2014). It is pertinent to note the fact that the crisis period in some of the recent studies has been taken from the early months of the year 2008 (Usman 2010, Adamu 2010) for emerging countries. Moreover the shocks of the crisis have been witnessed in the financial markets of these countries in late half of the year 2008 and in the year 2009. The logic of this test is based on the contagion theory and spillover effect hypothesis.

4.15: The Foreign Exchange Exposure and Idiosyncratic Risk

According to modern portfolio theory, investors should not receive compensation for stocks' idiosyncratic risk, since this can be diversified away by making different portfolio of securities. However various empirical studies (Campbell et al ,2001, Malkiel and Xu, 2002, Bali et al, 2005, Ang et al, 2006, Brandt et al, 2009, and Chua et al, 2010)) have documented presence of a cross-sectional relation between idiosyncratic risk and expected returns. This provides justification that value of the equity may not solely depend on the systematic risk, one has to consider other risks while pricing the securities of firm.

Alternative asset pricing models have been employed to measure the idiosyncratic risk, for instance Fama and French three factor model(1993,1996) ; Car hart four factor model(1997) and five factor model(2009,2017). We use Fama -French three factor (FF3F) model to work out idiosyncratic risk of Pak and US firms, given as below, also employed by Fu(2009), Nath & Brooks(2015) and others.

$R_{it} - Rf_t = \alpha_i + \beta_i(Rm_t - Rf_t) + s_i\, SMB_t + hi\, HML_t + \varepsilon_{it}$, $\varepsilon_{it} \sim N(0, \sigma 2)$ ..... eq. 4.9

Where: R_{it}-Rf_t is average excess stock returns,

$Rm_t - Rf_t$ is average excess return on market portfolio,

$\alpha_{i\,is}$ alpha (constant) of Fama- French three factor model

SMB_t is an excess average return of small minus big firms

HMLt is return is an excess returns of high minus low book to market value stocks.

si and hi are the regression coefficients related to the variables SMB_t and HMLt, respectively, which measure how much increase/decrease the dependent variables as consequence of the increase of the predictor variables.

ε_{it} is error term

In the four factor model, Momentum is added to the Fama-French three factor model whereas liquidity (Kumari j, et al, 2017) or BMG (bad minus good) factor (Shah, Z.A, 2009) is added to it according to the issue under research. However, the Fama-French three factor model is a widely used model as it is more relevant for working out idiosyncratic risk. Alternatively, we use exponential GARCH to calculate idiosyncratic risk of the firms' excess stock returns. Recent studies using EGARCH model include Fu (2009), Brockman, et al (2009), Nath & Brooks (2015), and Kumari, Mahakud, and Hiremath (2017).

Additional variables SMB and HML are used to control for the effect of size and value on the stock returns. The SMB is used for controlling the possible effect of size i.e. Small vs. large and HML for value effect on the stock returns i.e. the value stocks and growth stocks, $\varepsilon_{i,t}$ is taken as the residual volatility of the relation.

4.15.1: Calculation of SMB:

First of all, the data are arranged in descending order on the basis of market capitalization of the sample firms. They were then distributed in two portfolios each with equal number of cross sections.

After that we split each portfolio into three equal sub-groups with the following names:

SV: Small Value; SN: Small Neutral; SG: Small Growth

BV: Big Value; BN: Big Neutral; BG: Big Growth)

After construction of these value-weighted portfolios, SMB is calculated on the basis of the following equation: SMB= [(SV-BV) + (SN-BN) + (SG-BG)]/3

Where SMB stands for small minus big

4.15.2: Calculation of HML:

We constructed six portfolios of the stock returns data in the same way we did in SMB calculations but here the basis of segregation and making the portfolios is book to market value (= book value of equity divided by market value of equity) of the sample firms.

Portfolios are made on monthly basis in January each year by taking book value of common equity as at December (previous year) and market capitalization (market value) as on January 31, (current year). This value is then used for the next 12 months of that particular year. The same process is done to get monthly HML statistics for the

sample period. After construction of six portfolios as detailed above, HML is worked out by the following formula:

HML = ((SG - SV) + (BG - BV))/2.

All non-financial companies having negative book to market ratio are excluded from the Pak and US sample firms (Chu, Goh, and Zhang, 2010). Chen and Petkova (2012) argue that Non-zero market capitalization and positive book to market values are taken to reduce the impact of infrequent trading on idiosyncratic risk estimates.

4.16: Measurement of Idiosyncratic Risk

We use two alternative methods for measuring idiosyncratic risk.

4.16.1: Fama-French Three factor (FF3F) Model

We do regression of the Fama-French three factor model using monthly data (Fu, 2009) and get residuals for each cross section included in our sample each month by least square estimation. We calculate standard deviation of these monthly residuals and thus get annual value of idiosyncratic risk (IR) for each cross section.

This study measures the idiosyncratic risk of an individual stock as follows.

a). In every month, monthly excess returns of individual stocks are regressed on the Fama-French (1993,1996) three factors given below:

The excess return on a market portfolio (R_m- R_f),

The difference between the return on a portfolio of small stocks and the return on a portfolio of large stocks (SMB), and

The difference between the return on a portfolio of high book- to-market value stocks and the return on a portfolio of low book-to-market stocks (HML).

4.16.2: Exponential GARCH

We also calculated idiosyncratic risk by applying exponential GARCH model which directly gives the idiosyncratic volatility of the series of excess stock returns of the sample firms(Spiegel and Wang, 2005; Fu,2009).The ARCH model was first developed by Robert Engle in 1982, and then generalized as GARCH by Tim Bollerslev in 1986. These models are extensively used in financial time series analysis, where the variance of the dependent variable is taken to be a function of past values of the dependent and independent variables. The GARCH-M model was used by Tudor (2008) in Romanian and US markets and performed better with the confirmation that there was a correlation between volatility and expected returns on both markets.

Nelson (1991) proposed an EGARCH model to catch the asymmetric property of volatility, the return volatility increases after a stock price drop. This phenomenon is also called ''leverage effects'' because the drop of stock price mechanically increases the leverage ratio and thus the risk of the firm.

We selected EGARCH model as it describes the time-series idiosyncratic volatility of individual stock returns well. Pagan and Schwert fit a number of different models to monthly U.S. stock returns and find that Nelson's (1991) EGARCH model is the best in overall performance.

Engle and Mustafa (1992) argued that simple GARCH and EGARCH models performed the best among their selected time-series models. Robert Engle and Victor, Ng (1993) also concluded that Nelson's EGARCH specification did a good job in capturing the asymmetry of conditional volatilities.

We examine the impact of the foreign exchange rate exposure on the idiosyncratic risk (IR) by using Model 2 of Jorion (1991) and Model 3 as given in equation 3.2 and equation 3.3 respectively. Following regression model is used to see the desired impact which is in line with Nath & Brooks (2015).

$IR = \alpha_i + \delta_i FEE_t + \theta_1 SIZEC + \theta_2 BM + \theta_3 CF/P + \theta_4 L\ EV + \theta_5 CASH + \theta_6 ROE + \theta_7 CAPIN + \varepsilon_{it}$ ----------Eq. 4.10

Where IR stands for the idiosyncratic risk and FEE is the foreign exchange exposure elasticity used as dependent and independent variables respectively.

The control variables used here are explained here under:

SIZEC = market capitalization of the firms

It is widely documented in most of the multifactor models that size has the impact on the stock returns and an important variable to include in this multiple regression.

BM = book to market ratio

Book to market is often taken as a proxy for growth opportunities (Tobin Q) and shows the value effect of the stock returns.

CF/P = cash flow per share to price per share

This measure tells very important for the shareholders of a firm as it tells the likelihood of dividend payment as well as its future financial position.

LEV = Leverage (total liabilities/total Assets), Leverage is level of liabilities

CASH = (cash +marketable securities)/current liabilities

ROE (Return on equity) = Net income/ stockholder equity

ROA and ROE are used to judge the return on investment of the company which then affects the stock prices and hence the stock returns.

CAPIN (capital intensity) =Total assets/Total sales: It measures a firm's efficiency in deployment of its assets.

Size, book-to-market, liquidity, cash flow to price and returns on assets, are found significant determinants of idiosyncratic volatility whereas return on equity, leverage and capital intensity (Kumari, J., Mahakud, J., Hiremath, G.S.2017). Mishra (2013) also used similar variables as determinants of idiosyncratic risk. The literature on asset pricing confirms that CAPM is unable to depict the influence of the above firm specific factors on account of which anomalies have been found.

4.17 The Foreign Exchange Exposure and Foreign Ownership

Our major objective in this domain is how changes in exchange rate of the host country affect foreign investment in the equity of the local firms. To investigate the relation between exchange rate exposures of companies and foreign ownership, we

include a number of company-specific financial attributes which show their financial position and operating performance. Firm level attributes usually taken in researches to investigating the impact on foreign ownership in the firms include: Size; Book to market; Return on equity; Leverage; Cash and growth of economy.

We use the following model for the sample firms from Pakistan and USA for the empirical analysis on the issue. This model is derived in line with Mishra (2013).

$$FO= \alpha_i +\delta_i FEE3+ \theta_1 SIZEMC+ \theta_2 BM+ \theta_3 Cash+\theta_4 LEV+ \theta_5 ROE+ \theta_6 Rm+ \theta_7 GDP+ \varepsilon_{it} \quad \text{eq.4.11}$$

Where δ_i is the coefficient of the foreign exchange exposure elasticity and θ_1 to θ_7 are coefficients of the control variables affecting foreign ownership.

FO is foreign ownership used as dependent variable, FEE is the foreign exchange exposure elasticity an independent variable obtained from model 2 and Model 3 given in equation 3.2 & 3.3 respectively. These models are more suitable as they also contain macroeconomic variables along with exchange rate return. Firm specific variables are given below:

SIZEC: Logarithm of market capitalization.

It shows the market value of the firms which is widely documented firm characteristic and foreign investors consider it very much for investment in its equity (Kang and Stulz, 1997). In the literature it is found that foreign investors usually hold more shares of large firms than do local investors. Lin and Shiu (2003) state that foreign investors favor large firms. Eun et al. (2008), however find that investors can reap

significant additional gains from international diversification if they consider foreign small-cap stocks.

BM: book to market equity ratio. Fama and French (1995) recommend this ratio as a proxy for profitability and growth because low book to market firms have persistently high earnings while high book to market firms have consistently poor earnings. Gompers and Metrick (2001) find that institutional investors favor high book to market stocks.

CASH: Ratio of cash and short term investments to current liabilities

The ratio measures the liquidity of a business firm i.e. its ability to satisfy short term obligations as they fall due.

Leverage: Ratio of total debt to total assets. Firms with higher leverage might attract less foreign investment

ROE: Return on Equity =Net Income/Total Equity

It indicates the rate of return achieved by the firm's managers on the capital invested by shareholders. According to Del Guercio (1996), all institutions have a tendency to invest in companies with proven profitability, consistent with the "prudent man" rules that professional money managers mostly follow. Stock market return(Rm) and growth in gross domestic Product (GDP) are used as proxy for the growth of a national economy.

Kang and Stulz (1997) took Size, Book to market ratio, current ratio. Market Return (Rm), systematic risk (Beta coefficient of Rm) , IR as error term, Leverage ratio, and

ROE as relevant firm determinants of foreign ownership, which more or less were adopted by Dahlquis & Robertson *(2001) and* Mishra *(2013).*

We have already measured the foreign exchange exposure elasticity of the sample firms. We take the foreign ownership status of the sample firms as under:

Variable	Measurement
Dummy for foreign ownership	1 for presence of foreign ownership and 0 for no foreign ownership

As the dependent variable is binary in nature, therefore this study uses Logit regression model. This model is used to find the probability of event. In this model, value of dependent variable ranges from 0 to 1 and is given by following equation:

Odds=P/ (1-P) =probability of event occurrence/probability of not event occurrence

Logit (p) = Ln (P/ (1-P)) = b0+b1X1+b2x2+b3X3+.....+bnXn ---------- eq. 4.12

In the above equation, p is the probability of presence of the characteristic of interest.

In the above model, the parameters are chosen to maximize the chances observing the sample values rather than minimizing the sum of squared errors. This model is used for classification and is more suitable for a large sample size. Its maximum likelihood estimates are less powerful at low sample sizes than ordinary least square.

CHAPTER - 5

RESULTS AND ANALYSIS

5.1: The Foreign Exchange Exposure Elasticity and Financial Distress

This section consists of quantitative results of my research study covering:

- The foreign exchange exposure and its effect on financial distress of the firms
- Effect of global financial crisis on the relationship between the foreign exchange exposure and financial distress of firms

Initially quantitative analysis is made to see the impact of the foreign exchange exposure on the financial distress of the sample firms listed at KSE (Pakistan) and at NYSE (USA). We work out descriptive statistics as well as Pearson correlation matrix to see the overall configuration of the data as well as their correlations. We then execute multivariate regression analysis taking Z-score as dependent variable and the foreign exchange exposure as independent variable along with firm–specific relevant control variables. We investigate this relationship at contemporary level as well as lag effect of the foreign exchange exposure.

After concluding results of quantitative analysis, we give qualitative findings of interviews with CFOs of firms from Pakistan obtained in personal interviews with them using unstructured questionnaire and personal interviews.

5.2 Graphical representation of stock data: KSE-100 Index, S &P-500 Index, exchange rates (Pak & US), market returns, and Exchange rate returns

To calculate FEEE of the firms both from Pakistan and USA, this study uses monthly stock prices and monthly stock market data of KSE-100 Index and S&P-500 index. Figures 2 to 7 show the graphs of the market indices data, market return, and exchange rates of both Pakistan and USA.

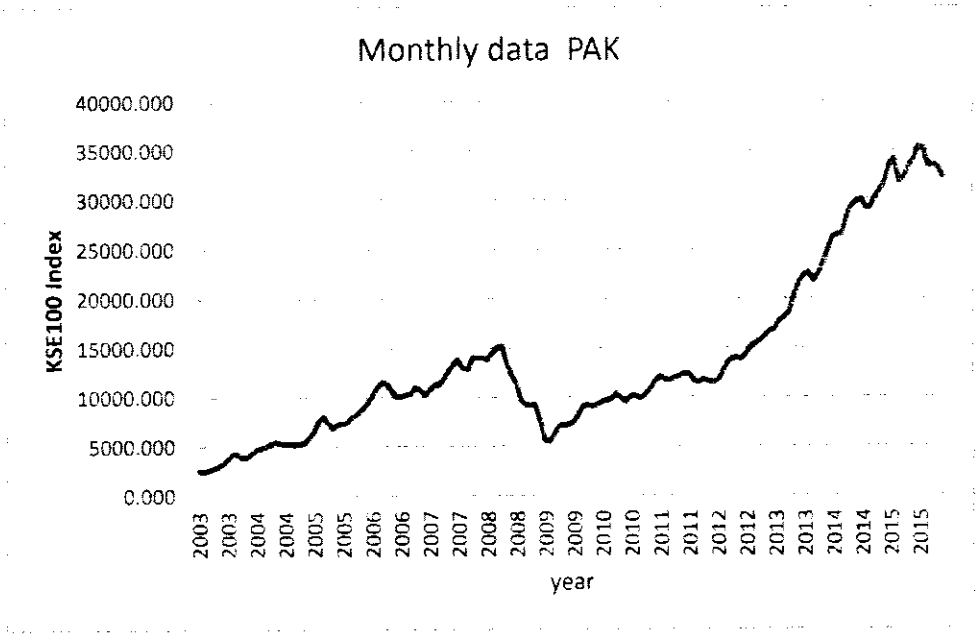


Figure-2: Graph of Monthly KSE-100 Index (2003-2015): Pakistan

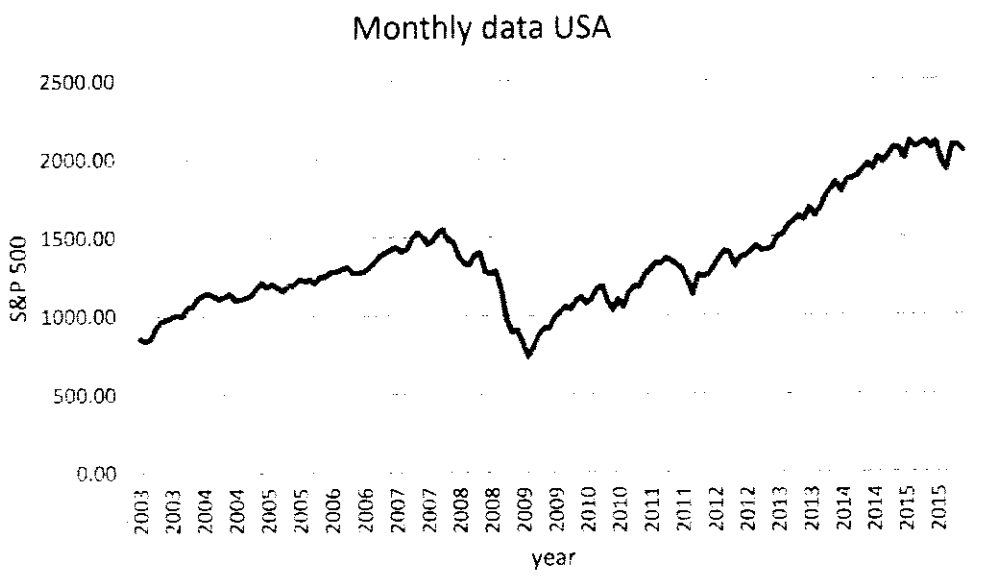


Figure-3: Graph of Monthly S&P-500 Index (2003-2015): USA

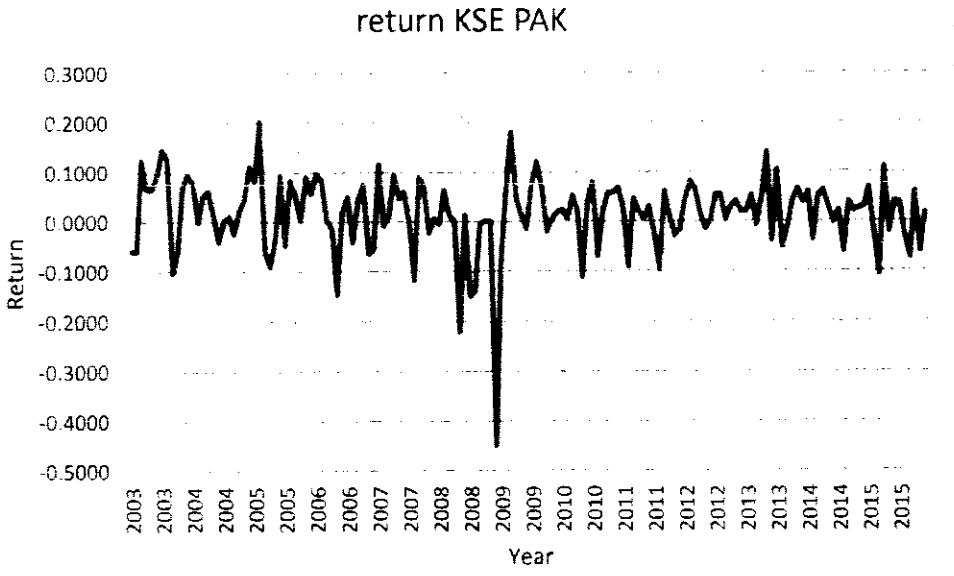


Figure-4: Graph of Monthly Market Return (KSE-100 Index) 2003-2015: Pakistan

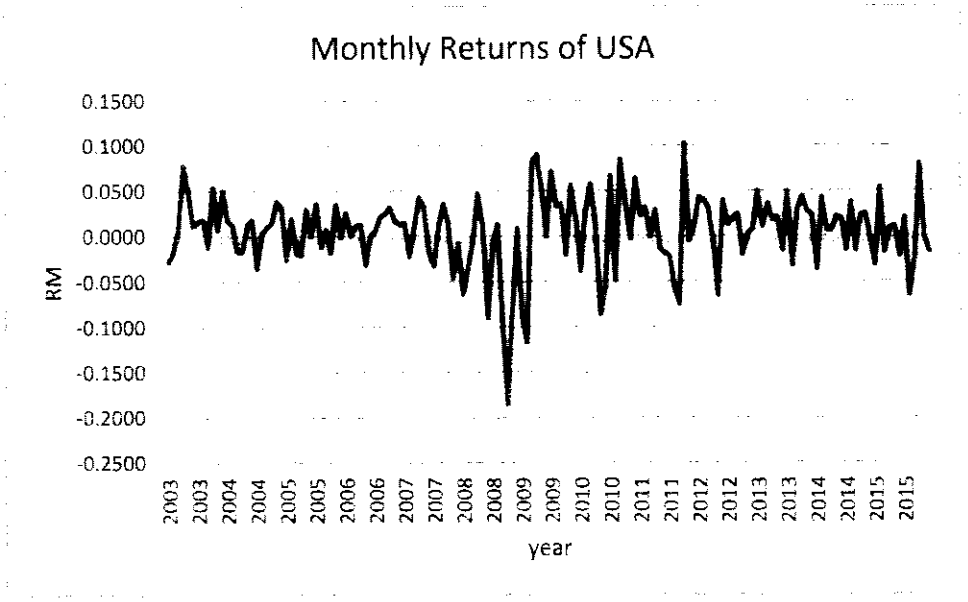


Figure-5: Graph of Monthly Market Return(S&P-500 Index) 2003-2015: USA

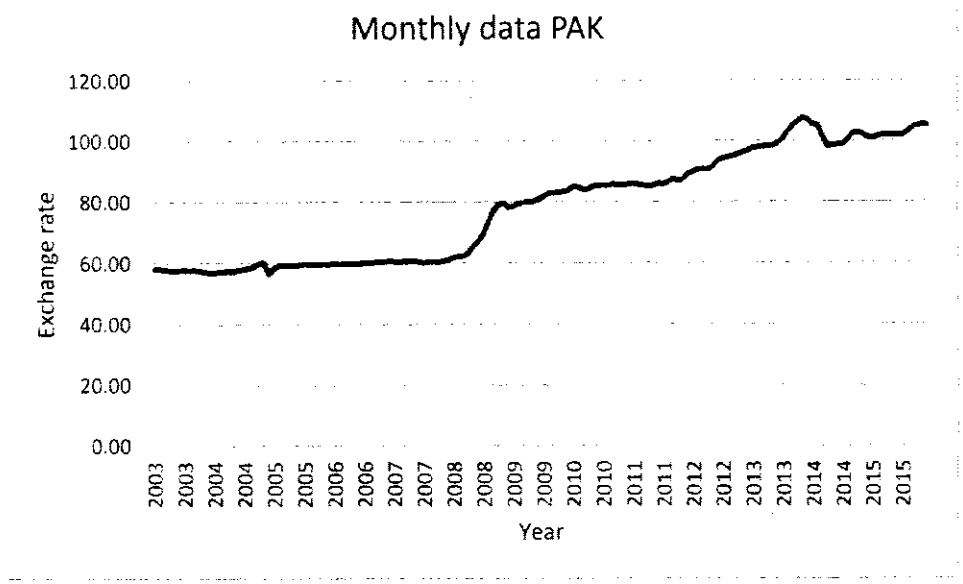


Figure-6: Graph of Monthly Exchange Rate (PKR/USD): Pakistan

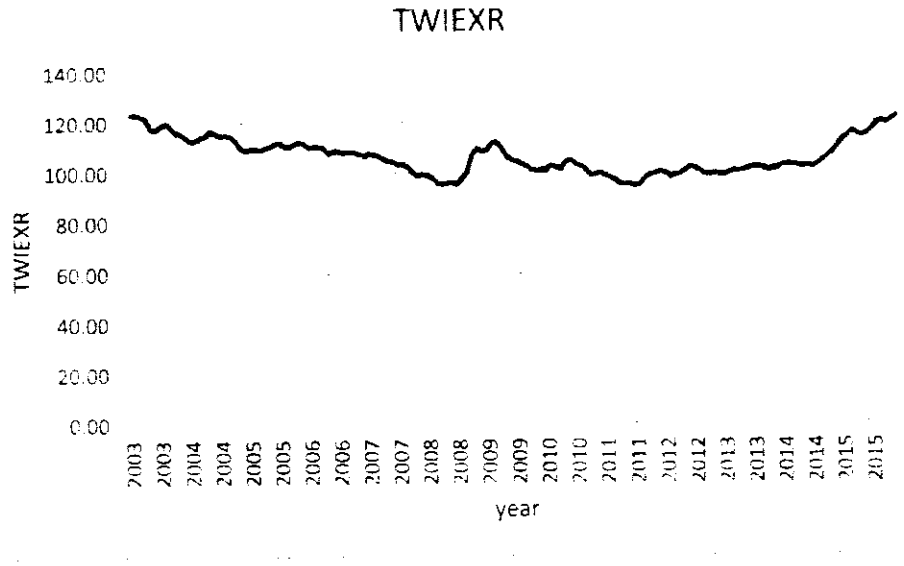


Figure-7: Graph of Monthly Trade-weighted Exchange Rate: USA

The above figures depict that the KSE -100 Index declined significantly in the second half of the year 2008 and continued this trend till last months of the year 2009. The Stock market index of USA (S&P-500 Index) started to decline in the late half of the year 2007 and further declined in 2008 and steep decline can be seen in the first half of year 2009. The exchange rate of PKR/USD increased remarkably from the year 2007-08 which means Pakistan Rupee depreciated highly over the next time period against US dollar. However, trade-weighted exchange rate of US dollar did not varied too much over the sample period.

5.3: Significance of Betas (FEE) with Stock Returns:

We give below significance and descriptive statistics of betas (FEE) of the sample firms from Pakistan and USA in tables 4 to 6 and tables 7 to 9 respectively:

Table 4: Significance and Descriptive Statistics of FEE of Pak firms: Model 1

Year	1%	5%	10%	Mean	Standard Deviation	Minimum	Maximum
2005	6	12	18	-0.33	1.07	-5.07	4.25
2006	9	16	24	-0.34	1.07	-5.16	4.36
2007	9	21	29	0.51	1.58	-2.98	7.11
2008	10	26	43	-1.02	1.69	-8.93	8.42
2009	5	17	32	-0.95	1.70	-8.22	7.49
2010	4	17	24	-0.83	1.65	-9.03	7.25
2011	2	7	18	-0.18	3.34	-10.68	13.70
2012	2	8	16	-0.56	2.96	-9.72	9.10
2013	3	12	30	-1.44	2.51	-10.52	5.60
2014	4	8	14	-0.52	1.47	-5.37	3.82
2015	5	8	10	-0.50	1.42	-5.18	4.44
Total	59	152	258				
%age of Significance	2.9	7.4	12.5				

Table 4 shows total exposure (Adler and Dumas, 1984) of the sample firms listed at Karachi Stock Exchange. Significance of betas of exchange rate fluctuations ranges from 2% to 10%, 7% to 26 % and 10% to 43% at 1%, 5%, and 10% level of significance respectively. Average significance of beta is 3%, 7%, and 13% at 1%, 5%, and 10% level of significance respectively

Table 5: Significance and Descriptive Statistics of FEE of Pak firms: Model 2

	Rfx			Rm			Rfx				Rm			
Year	1%	5%	10%	1%	5%	10%	Mean	S.D	Min	Max	Mean	S.D	Min	Max
2005	6	12	19	60	98	113	-0.18	1.06	-5.04	4.10	0.66	0.49	-0.68	2.20
2006	9	17	25	41	72	90	-0.25	1.07	-5.08	4.26	0.54	0.44	-0.59	2.52
2007	11	22	30	47	71	96	0.29	1.61	-3.14	7.09	0.49	0.43	-0.84	1.78
2008	7	13	23	46	67	82	-0.41	1.61	-10.57	6.01	0.34	0.43	-1.37	1.94
2009	2	9	20	41	62	82	-0.34	1.59	-9.01	4.97	0.35	0.48	-1.46	2.02
2010	3	9	15	42	63	78	-0.25	1.56	-8.68	4.70	0.36	0.48	-1.57	2.08
2011	2	14	28	39	68	83	0.38	3.47	-8.96	14.06	0.52	0.75	-1.57	2.61
2012	0	9	15	37	69	85	1.19	3.01	-9.38	11.95	0.79	0.81	-1.45	2.73
2013	1	9	19	35	54	69	-0.73	2.50	-11.53	5.50	0.58	0.79	-2.36	2.77
2014	3	7	11	33	56	79	-0.01	1.41	-5.51	4.23	0.76	0.83	-1.56	2.98
2015	4	8	12	55	87	99	-0.01	1.35	-4.94	4.27	0.74	0.63	-1.15	2.74
Total	48	129	217	476	767	956								
%age of Significance	2.3	6.3	10.6	23.1	37.3	46.5								

The statistics in the table 5 show net the foreign exchange exposure elasticity of the firms listed at Karachi stock Exchange while controlling for the market return (Jorion, 1990). Significance of betas of exchange rate fluctuations ranges from 2% to 11%, 7% to 22 % and 11% to 30% at 1%, 5%, and 10% level of significance respectively. Average significance of betas of exchange rate changes is 2%, 6%, and 11% at 1%, 5%, and 10% level of significance respectively.

Table 6: Significance and Descriptive Statistics of FEE of Pak firms: Model 3

	Rfx			Rm			Real interest			Rfx				Rm				real interest			
Year	1%	5%	10%	1%	5%	10%	1%	5%	10%	Mean	S.D	Min	Max	Mean	S.D	Min	Max	Mean	S.D	Min	Max
2005	6	12	19	55	88	111	0	6	9	-0.16	1.06	-5.05	4.31	0.64	0.49	-0.87	2.23	0.36	0.80	-2.11	3.38
2006	8	17	27	40	71	89	2	5	10	-0.26	1.07	-5.11	4.42	0.53	0.44	-0.52	2.51	-0.15	0.60	-2.56	2.38
2007	12	25	35	51	76	98	3	14	25	0.51	1.66	-2.89	7.34	0.50	0.43	-0.84	1.77	0.64	0.97	-2.98	4.31
2008	5	12	19	40	63	75	2	7	14	-0.33	1.96	-11.87	14.03	0.33	0.44	-2.19	1.92	0.06	0.70	-1.69	6.07
2009	2	9	16	39	55	71	2	13	21	0.00	1.86	-10.34	9.77	0.31	0.51	-2.10	2.04	0.32	0.66	-1.24	4.50
2010	2	11	17	38	54	71	1	8	16	-0.06	1.79	-10.19	8.93	0.33	0.51	-2.25	2.16	0.24	0.78	-1.88	5.27
2011	2	15	31	43	69	85	6	23	34	0.34	3.47	-9.05	14.01	0.56	0.77	-1.57	3.10	0.53	1.24	-2.14	6.76
2012	1	5	15	39	66	83	1	11	18	0.93	3.25	-9.37	10.96	0.78	0.81	-1.51	2.67	0.56	1.65	-3.81	6.09
2013	1	9	20	33	52	65	0	12	19	-0.73	2.50	-11.55	5.47	0.56	0.79	-2.42	2.71	0.58	1.95	-5.28	7.59
2014	4	8	12	33	58	78	4	10	13	0.01	1.45	-5.46	4.68	0.76	0.83	-1.53	3.00	0.09	1.69	-5.71	7.33
2015	4	9	13	55	84	100	2	4	10	0.00	1.36	-4.89	4.09	0.74	0.64	-1.03	2.83	0.07	1.27	-4.05	4.36
Total	47	132	224	466	736	926	23	113	189												
%age of Significance	2.3	6.4	10.9	22.7	35.8	45.0	1.1	5.5	9.2												

The statistics in the table 6 show the net the foreign exchange exposure elasticity of the firms listed at Karachi stock Exchange, with the interest rate and the market return as control variables. Significance of betas of exchange rate fluctuations ranges from 1% to 12%, 5% to 25%, and 12% to 35% at 1%, 5%, and 10% level of significance respectively. Average significance of betas of exchange rate fluctuations ranges is 2%, 6%, and 11% at 1%, 5%, and 10% level of significance respectively.

Table 7: Significance and Descriptive Statistics of FEE of US Firms: Model 1

Year	1%	5%	10%	Mean	Standard Deviation	Min	Max
2005	8	38	56	-1.26	1.31	-9.30	2.77
2006	2	12	22	-0.54	1.08	-3.75	2.14
2007	1	11	17	0.03	1.29	-4.55	4.70
2008	92	141	155	-2.18	1.44	-7.58	0.26
2009	118	163	175	-2.55	1.52	-7.67	0.22
2010	132	178	194	-2.69	1.51	-7.19	0.00
2011	64	128	157	-2.27	1.46	-7.35	1.10
2012	37	89	118	-1.83	1.28	-7.32	0.91
2013	20	41	58	-1.38	1.48	-6.77	1.89
2014	15	31	49	-0.84	1.53	-6.17	3.55
2015	27	44	61	-1.08	1.76	-9.88	3.09
Total	516	876	1062				
%age of Significance	21.1	35.9	43.5				

Table 7 shows total exposure of the sample firms listed at New York Stock Exchange. Average significance of betas of exchange rate changes is approximately 21%, 36%, and 44% at 1%, 5%, and 10% level of significance respectively. Average beta ranges

from-1.44 to 0.51 with minimum - 10.68 to maximum of 13.70 and standard deviation 1.07 to 3.34%.

Table 8: Significance and Descriptive Statistics of FEE of US firms: Model 2

	Rfx			**Rm**			**Rfx**				**Rm**			
Year	1%	5%	10%	1%	5%	10%	Mean	SD	Min	Max	Mean	SD	Min	Max
2005	6	22	37	89	120	137	-0.51	1.69	-9.77	3.47	0.90	0.93	-4.23	3.36
2006	1	8	21	63	110	125	-0.24	1.12	-4.20	2.78	1.01	0.76	-3.32	4.19
2007	3	11	24	72	132	161	-0.14	1.27	-4.44	4.39	0.97	0.62	-0.57	3.87
2008	4	23	41	143	183	199	-0.36	1.15	-5.22	1.89	1.04	0.49	0.01	2.23
2009	7	23	36	153	184	195	-0.30	1.16	-4.78	2.73	1.03	0.54	-0.01	2.80
2010	6	20	28	166	194	203	-0.22	1.07	-4.82	2.58	1.04	0.55	0.00	2.83
2011	4	17	30	170	191	201	0.03	1.19	-5.11	4.19	1.07	0.62	0.00	2.95
2012	1	10	19	165	191	198	-0.02	0.93	-4.77	2.69	1.06	0.57	-0.06	2.95
2013	2	13	32	140	167	180	-0.21	1.24	-4.40	4.72	0.98	0.61	-0.71	2.92
2014	12	25	40	95	136	162	-0.15	1.49	-5.03	3.40	0.84	0.55	-1.95	3.48
2015	10	35	55	110	151	164	0.08	1.80	-8.52	5.15	0.88	0.47	-1.32	2.49
Total	56	207	363	1366	1759	1925								
%age of Significance	2.3	8.5	14.9	55.9	72.0	78.8								

The statistics in the table 8 show net the foreign exchange exposure elasticity of the firms listed at New York stock Exchange while controlling for the market return (Jorion, 1990). Average significance of betas of exchange rate changes is 2%, 9%, and 15% at 1%, 5%, and 10% level of significance respectively. Average beta ranges from -0.51 to 0.08 with minimum -- 9.77 to maximum of 5.15 and standard deviation of 0.93 to 1.80%.

Table 9: Significance and Descriptive Statistics of FEE of US firms: Model 3

	Rfx			Rm			Real interest			Rfx				Rm				Real interest			
Year	1%	5%	10%	1%	5%	10%	1%	5%	10 %	Mean	S.D	Min	Max	Mean	S.D	Mini	Max	Mean	S.D	Min	Max
2005	6	20	35	86	118	137	0	1	4	-0.48	1.69	-9.68	3.17	0.9	0.93	-4.25	3.37	-0.15	0.95	-2.57	3.44
2006	1	8	20	63	111	127	0	3	15	-0.25	1.12	-4.16	2.69	1.04	0.78	-3.42	4.2	-0.28	0.59	-2.18	1.37
2007	4	18	33	76	130	163	4	15	30	-0.29	1.43	-4.33	3.90	1.01	0.67	-0.71	4.07	-0.37	1.42	-5.33	2.96
2008	6	27	42	132	172	188	6	16	31	-0.40	1.18	-4.97	2.00	1.06	0.54	0.02	2.37	-0.18	1.12	-3.4	3.85
2009	6	22	32	152	184	196	0	1	4	-0.30	1.16	-4.24	2.55	1.03	0.54	-0.01	2.86	0.02	0.57	-1.82	1.88
2010	6	18	28	152	189	201	3	8	15	-0.20	1.12	-4.95	2.72	1.05	0.57	0	2.82	0.14	1.24	-4.2	5.47
2011	4	16	32	169	191	200	0	6	13	0.05	1.21	-4.98	4.12	1.07	0.62	0	2.96	1.93	11.5	-39.3	34.43
2012	1	9	20	165	191	198	0	1	11	-0.01	0.93	-4.72	2.88	1.05	0.57	-0.06	2.94	2.35	9.39	-20.62	37.41
2013	2	13	31	135	165	177	1	5	8	-0.21	1.24	-4.4	4.72	0.99	0.6	-0.59	2.89	-0.88	12.3	-43.75	43.06
2014	7	20	35	94	138	166	6	21	34	-0.07	1.49	-5.18	4.75	0.82	0.57	-2.31	3.54	-7.3	46.9	-201.8	106.2
2015	8	35	52	104	142	164	8	23	45	0.21	1.72	-7.97	5.45	0.84	0.46	-1.53	2.4	-12.6	25.6	-102.4	33.05
Total	51	206	360	1328	1731	1917	28	100	210	-0.18	1.30	-5.42	3.54	0.99	0.62	-1.17	3.13	-1.58	10.16	-38.86	24.84
%age of Significance	2.3	8.4	14.7	54.4	70.9	78.5	1.1	4.1	8.6												

The statistics in the table 9 show the net the foreign exchange exposure elasticity of the firms listed at New York stock Exchange, while controlling for other macroeconomic factors i.e. the market return and the interest rate (Wei & Stark, 2013). The average significance of the betas coefficients of the exchange rate changes is 2%, 8%, and 15% at 1%, 5%, and 10% level of significance respectively. Average beta ranges from -0.48 to 0.21 with minimum 9.68 to maximum of 5.45 and standard deviation of 0.93 to 1.72%.

5.4 The Financial Distress of Firms and its measurement:

Altman Z-score for emerging countries Z" (1993) is used for calculating financial distress sample firms of Pakistan for the sample period. The Z-score for US manufacturing firms and non-manufacturing firms are calculated separately using the original Altman The Z-score (1968) and Z" (1993) respectively. These Z-scores are given below.

Altman Z-score (1968) for manufacturing firms:

$$Z= 1.2 *(WCAP/TA) + 1.4* (RE/TA) + 3.3 *(EBIT/TA) + 0.6 *(MVE/TL) +1.0*(TS/TA) \quad \text{---------- eq.5.4}$$

Altman Z-score (1993) for non-manufacturing firms:

$$Z" = 6.56 (WCAP/TA) +3.26 (RE/TA) +6.72 (EBIT/TA) +1.05(BVE/TL) \quad \text{----- eq.5.5}$$

Altman Z-score (1993) for Emerging Countries:

$$Z" =3.25+6.56 (WCAP/TA) +3.26 (RE/TA) +6.72 (EBIT/TA) +1.05(BVE/TL) \quad \text{----- eq.5.6}$$

We have used equation 4.3.3 to calculate Z-score for the sample companies from Pakistan.

5.5: The Foreign Exchange Exposure and Financial Distress of the Sample Firms.

We use the following multivariate regression model to finding the relation between the foreign exchange exposure and financial distress of the sample firms.

$$Zscore=\alpha i+\beta i(absFEEj)+\gamma_1(SIZEA)+\gamma_2(RE)+\gamma_3(SALE)+\gamma_4(DEBT)+\gamma_6(CASH)-\gamma_7(FSALE)+\varepsilon_{it}$$ ---------- ---------- eq. 5.7

Here abs (FEEi) is absolute value of the foreign exchange exposure elasticity of the firms as we are looking for the nature of relationship between these variables and financial distress, and not the impact of the positive and negative exposure. Abs (FEE) is either one of our three exposure measures as got from equations 5.1, 5.2, and 5.3, and are termed as FEE1, FEE2, and FEE3 in all the subsequent analyses.

5.5.1 Normality Test: Z-score

To check normality of Z-score data, we use jarque-bera test and its graph is given below:

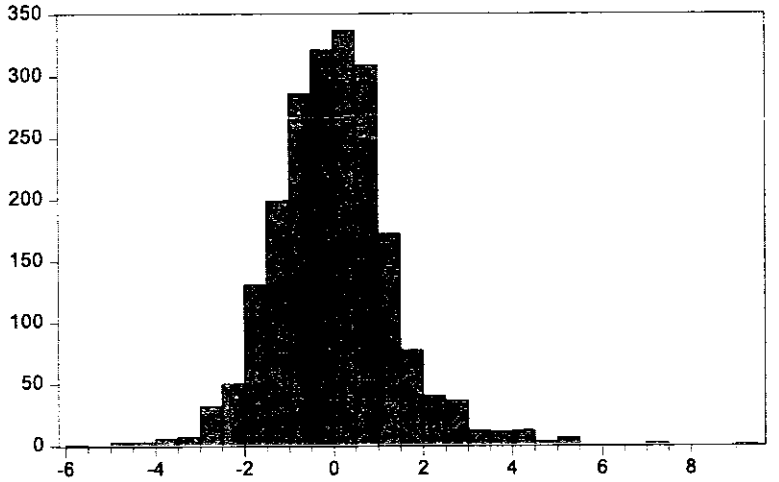


Figure -8: The graph of Z-score of Pak sample companies.

The normality test shows that Z-score data is not truly normally distributed (bell-shape) but somewhat narrow. The above graph tells that it is moderately skewed as skewness is 0.59. Kurtosis is 5.93 which is greater than 3 which means it is somewhat leptokurtic. However, this may only affect the results if sample size is small (Sainani).

5.5.2: Descriptive Statistics and Pearson Correlation Matrix: Pakistan

Descriptive Statistics describe the basic features or nature of data of the study. They provide an overall summary about the sample and the selected variables and hence form the basis of almost every quantitative analysis of data. Descriptive statistics only make statements about the set of data from which they were calculated and nothing more than that. Descriptive stats only make statements about the sample. Here we found distribution of the data, its spread and its location i.e., mean & median tell about central tendency, minimum, maximum & standard deviation speak about spread of data.

5.5.3 Descriptive Analysis and Correlation

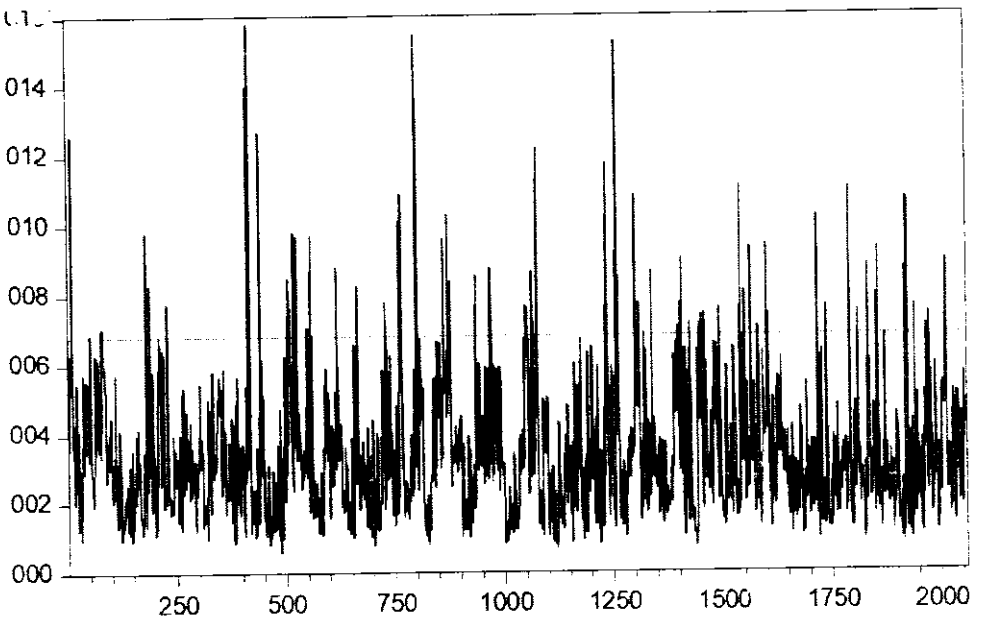
We also perform Heteroskedasticity test before applying multiple regression tests:

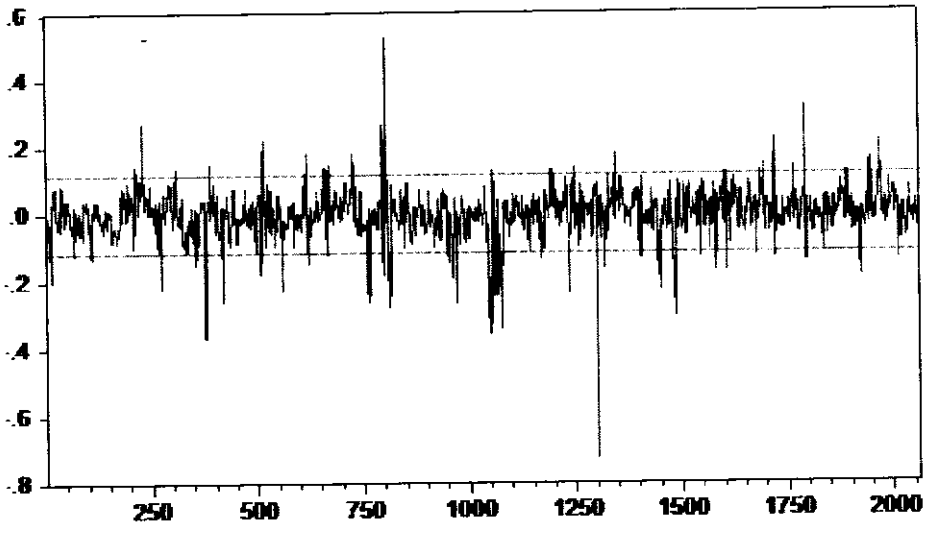
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	37.8719	Prob. F(6,2050)	0.0000
Obs*R-squared	205.256	Prob. Chi-Square(6)	0.0000
Scaled explained S	502.702	Prob. Chi-Square(6)	0.0000
Scaled explained S	502.702	Prob. Chi-Square(6)	0.0000

The above results of Breusch-Pagan-Godfrey test show that Heteroskedasticity is present in the model which means that standard error of the residuals term is not constant. We therefore use White's Heteroskedasticity-consistent standard error test in our regression tests to control for the Heteroskedasticity.

We also check outliers by using Hat Matrix and DFFITS. The resultant graphs are given below:

Figure-9: Hat Matrix-Pak Firms





Hat Matrix and DFFITS graphs given above depicts that some outliers are found in the data. We therefore use the above data after winsorization at 5% level to reduce the effect of outliers. The revised descriptive statistics of the data are given below:

Table 10: Descriptive Statistics of DV, IV and CVs: Pak Firms

	Z-score	FEE1	FEE2	FEE3	SIZEA	RE	SALE	DEBT	CASH	FSALE
N	2057	2057	2057	2057	2057	2057	2057	2057	2057	2057
Mean	6.00	1.29	1.19	1.22	14.97	0.03	1.20	0.54	0.30	0.16
Median	5.26	0.98	0.87	0.89	14.87	0.03	1.10	0.57	0.07	0.01
Standard Deviation	3.02	1.03	0.99	1.01	1.41	0.06	0.68	0.20	0.48	0.25
Minimum	1.80	0.16	0.15	0.14	12.65	-0.10	0.20	0.15	0.00	0.00
Maximum	13.38	3.33	3.25	3.28	17.69	0.15	2.72	0.84	1.75	0.82

Table 10 depicts that there is no sizeable difference between mean and median values. This shows that data has a strong central tendency of the variables except cash and foreign sales. The spread is also very low except Z-score. The spread of all the three measures of the foreign exchange exposure is very close to each other.

5.6 Correlation Matrix:

Correlation matrix tells us the strength of relationship between two continuous variables, having numerical value. This measure is very useful to judge the possible connection between the variables. This does not show cause and effect as change in one variable may bring change in other variables. This matrix shows extent of possible correlations between all the variables under consideration. This correlation between any two variables can be positive or negative. If correlation is found between any two variables and if there is a systematic change in one variable, the other variable will also experience a systematic change over a certain time period.

Pearson coefficient measures correlation and it ranges from +1 to -1. Closer the coefficient to any of two extreme numbers, the stronger will be the correlation. A value close to zero shows no or weak correlation.

Correlation Matrix: Pakistan

Table 11: Correlation Coefficients of Variables (at level): Pak Firms

	Z-score	FEE1	FEE2	FEE3	SIZEA	RE	SALE	DEBT	CASH	FSALE
The Z-score	1									
FEE1	-.078**	1								
FEE2	-.068**		1							
FEE3	-.083**			1						
SIZEA	.001	-.042	-.033	-0.042	1					
RE	.478**	-.021	-.011	-.043	.119**	1				
SALE	.114**	.012	.003	.015	-.125**	.291**	1			
DEBT	-.836**	.049*	.041	.041	.041	-.299**	.040	1		
CASH	.597**	-.057**	-075*	-.084**	.099**	.237**	-.060**	-496**	1	
FSALE	-.138**	.051*	.084*	.082**	.028	.012	-.021	.115**	-.171**	1

*Shows that the relation is significant at 5% level.

**Shows that the relation is significant at 1% level.

Table 11 depicts a negative significant correlation between the Z-score and the foreign exchange exposure elasticity for all the three measures but strength of each of the exposures is very weak. The Z-score has positive correlation with size of the companies as well as the retained earnings, sales and cash while it is negatively correlated with debt and foreign sales. Correlation of Z-score with Debt and cash is very high

It is also observed that not a single correlation between any pair of variables of independent variables is greater than 0.5. This shows that there are no chances of multicollinearity in the data.

5.7 Multivariate Regression Analysis-Pakistan

Regression is a statistical measure to determine the strength of the relationship between dependent variable and independent variable(s). Ours is a panel data and following methods are used to perform the regression analysis:

5.8 Multiple Regression Analysis: KSE Firms, Pakistan

Table-12: Foreign Exchange Exposure and Financial Distress at Level: Pakistan (Fixed Effect)

Variables	Model-I	Model-II	Model-III
FEE1	- 0.0911 (0.0198)***		
FEE2		- 0.1045 (0.0213)***	
FEE3			- 0.1121 (0.0204)***
CASH	0.0282 (0.0081)***	0.0285 (0.0080)***	0.0282 (0.0079)***
DEBT	-3.4836 (0.1260)***	-3.4777 (0.1262)***	-3.4798 (0.1257)***
FSALE	0.0073 (0.0056)	0.0072 (0.0057)	0.0073 (0.0057)
RE	9.8961 (0.5427)***	9.9674 (0.5408)***	9.8869 (0.5409)***
SALE	1.1154 (0.0388)***	1.1117 (0.0387)***	1.1089 (0.0386)***
SIZEA	0.0103 (0.0161)	0.0048 (0.1060)	0.0037 (0.0160)
Adjusted R^2	0.661	0.6614	0.6624
F Value	570.691***	571.877***	574.309***

Table 13 Diagnostic tests

	Test	Alternatives	H0:	F value	Chi square	Decision
Model 1	F-Test	OLS , Fixed	F Test for individual effects	8.826***		Fixed effect is suitable
	Chi Square	Fixed Random	errors are not correlated with the Regressors		35.168***	Fixed effect is suitable
Model 2	F-Test	OLS , Fixed	F Test for individual effects	8.8533***		Fixed effect is Suitable
	Chi Square	Fixed , Random	Unique errors are not correlated With the regressors		32.767***	Fixed effect is suitable
Model 3	F-Test	OLS , Fixed	F Test for individual effects	8.838***		Fixed effect is suitable
	Chi Square	Fixed , Random	Unique errors are not correlated With the Regressors		34.700***	Fixed effect is suitable

***shows that difference in the cross section data is significant and null hypothesis is rejected.

We executed multiple regressions using all of the three methods of panel data analysis. F-test and Hausman tests recommend that fixed effect model is suitable for Pak firms. Results are given in table-12. Results of Common Constant (OLS pooled) and Random Effects models are given in the appendix-2(a-d) for the Pak Firms.

Table 12 shows that the foreign exchange exposure has negatively significant effect on the Z-score.and this effect is similar in all the models. It is however, observed that the coefficient is higher in the model-3 (i.e., 0.1121). It is therefore found that an increase in the foreign exchange exposure of the sample firms of Pakistan increases their financial distress.

The firm-specific attributes size &foreign sales are not significant in any of the models. However the cash, the retained earnings and the sale are positively significantly related whereas the debt is negatively related to the Z-score.

We therefore conclude that the foreign exchange exposure elasticity significantly positively affects the financial distress of the firms at contemporaneous level. It is also found that increase in the retained earnings, the sale and the cash will lessen the chances of financial distress but an increase in debt will increase the chances of financial distress. Adjusted R^2 is 66% in each of the model which means explanatory power of the models is very good.

5.9 Lag Effect of the Foreign Exchange Exposure elasticity on Financial Distress: Correlation Matrix

Table 14: Correlation Matrix of Variables at Lag (-1) of FEE

	Z –score	FEE1-1	FEE2-1	FEE3-1	SIZEA	RE	SALE	DEBT	CASH	FSALE
Z- score	1									
FEE1-1	-.076**	1								
FEE2-1	-.060**		1							
FEE3-1	-.073**			1						
SIZEA	-.001	-.057*	-.010	-.021	1					
RE	*.478***	*-.052**	*-.030*	*-.053**	*.119***	*1*				
SALE	.114**	-.016	-.025	-.040	-.125**	.291**	1			
DEBT	-.836**	.023	.005	.007	.040	-.299**	.041	1		
CASH	.597**	-.037	-.043*	-.060**	.098**	.235**	-.060**	-.497**	1	
FSALE	-.138**	.046*	.071**	.068**	.028	.013	-.021	.115**	-.170**	1

Correlation coefficients of all the three measures of the foreign exchange exposure elasticity with the Z-score are negative which means there is positive correlation

between the foreign exchange exposure elasticity and the financial distress of the firms. However, the strength of the correlation is very weak. The correlation coefficients of all the predictors are very small; it means that there is no multicollinearity amongst them.

5.9.1: Regression Analysis of the foreign exchange exposure elasticity and Financial Distress of Pak firms (at lag value of FEE)

Table-15: Foreign Exchange Exposure and Financial Distress at Lag Level: Pakistan (Fixed Effect)

Variables	Model-I	Model-II	Model-III
FEE1(-1)	-0.1151 (0.0305)***		
FEE2(-1)		-0.1137 (0.0318)***	
FEE3(-1)			-0.1182 (0.0313)***
CASH	1.3872 (0.0927)***	1.3850 (0.0927)***	1.3798. (0.0928)***
DEBT	-10.1998 (0.2493)***	-10.2057 (0.2495)***	-10.2134 (0.2494)***
FSALE	-0.2628 (0.1292)*	-0.2522 (0.1294)*	-0.2525 (0.1295)*
RE	9.7596 (0.7561)***	9.8370 (0.7585)***	9.7995 (0.7561)***
SALE	0.4264 (0.0533)***	0.4214 (0.0534)***	0.4191 (0.0534)***
SIZEA	-0.0087 (0.0235)	-0.0149 (0.0234)	-0.0156 (0.0234)
Adjusted R^2	0.8009	0.8008	0.8009
F Value	1177.099***	1176.194***	1177.418***

Table 16: Diagnostic Tests

	Test	Alternatives	H0:	F value	Chi square	Decision
Model 1	F-Test	OLS , Fixed	F Test for individual effects	8.823***		Fixed effect is suitable
	Chi Square	Fixed , Random	Unique errors are not correlated with the Regressors		37.184***	Fixed effect is suitable
Model 2	F-Test	OLS , Fixed	F Test for individual effects	8.854***		Fixed effect is suitable
	Chi Square	Fixed , Random	Unique errors are not correlated with the Regressors		32.864***	Fixed effect is suitable
Model 3	F-Test	OLS , Fixed	F Test for individual effects	8.826*		Fixed effect is suitable
	Chi Square	Fixed , Random	Unique errors are not correlated with the Regressors		34.536*	Fixed effect is suitable

Table-15 shows that the foreign exchange exposure elasticity is also negatively significant with the Z-score at lag level. This means that the foreign exchange exposure elasticity does affect the financial distress of the firms positively in the following year.

The size does not depict significant impact on the distress but foreign sale shows a negative significant effect. A very high impact of debt on the financial distress is found as evidenced by its coefficient (10.2). The retained earnings, the sale and cash have significant positive coefficients 9.76, 0.43 and 1.39 respectively. The impact of the retained earnings is very high which means if the retained earnings increase by 1%; the Z-score will increase by 9.76 percent. So an increase in both of the retained earnings, sale and cash will reduce financial distress of a firm. However, a debt increase will result into more distress as its coefficient is 10.2, showing a very high impact on the firm distress.

The coefficient of the foreign exchange exposure is rather higher in the lag effect. This means that the foreign exchange exposure of a firm causes more effect on its financial distress in the following year. The results about the significance of the firm's financial variables remain same in all the models except foreign sale which becomes weakly significant when lag value of the exposure is taken.

From our findings given in table 12 and 15, it is concluded that contemporary changes in the foreign exchange exposure affect the financial distress of the firms positively. The effect is also significant when lagged effect is looked into it. It is further observed that there is no remarkable difference in the results of different exposure models. The coefficients in each of the case are very small. The study finds that the retained earnings, the cash position, the sale and the debt significantly affect the financial distress but the size does not affect it in any of the model.

The above results are consistent with Bortov and Bodnor(1994), Harper and Aggarwal (2005) and Aggarwal and Harper, (2010) so far as lagged relationship is concerned but not consistent with them in case of contemporaneous relationship between exchange rate changes and the firm returns. These findings are also in line with the findings of Kim & Kraple (2014) in so far as general relation of these variables is concerned.

The results are justified on the basis of the internationalization theory, corporate risk management theory, and the hedging theory where it is argued that foreign exchange risk does affect the value of the firm and financially constraint firms are unable to hedge their exposure adequately due to cash flow problem which is affected by the exchange rate movements. However, the effect is minimal.

5.10 The Foreign Exchange Exposure and Financial Distress of US Manufacturing Firms

This section uses equation 4.4 and 4.5 to find out the Z-score of US manufacturing firms and non-manufacturing firms as a proxy for financial distress and worked out three measures of the foreign exchange exposure elasticity in the same way we did for Pak firms using equation 4.1, 4.2 and 4.3 of the exposure models.

This study uses the identical multivariate regression model given below to finding the relation between the foreign exchange exposure and financial distress of the sample firms from S&P index companies listed at New York Stock Exchange, USA. Separate analyses of US manufacturing and non-manufacturing firms are carried out as under:

$$\text{Z-score}=\alpha i+ \beta i\ (\text{abs FEEj})+\gamma 1(\text{SIZEA})+ \gamma 2(\text{RE})+\gamma 3(\text{SALE})+ \gamma 4(\text{DEBT})+ \gamma 6(\text{CASH}) +\gamma 7(\text{FSALE})+ \varepsilon_{it} \quad \text{---------- 5.8}$$

Here abs (FEEi) is the absolute value of the foreign exchange exposure elasticity of the firms as we are looking for the overall relationship between the variables of interest and not the impact of the positive and negative exposure. Abs (FEEi) is either one of our three exposure measures worked out from equation 4.1, 4.2, and 4.3 which are termed as FEE1, FEE2, and FEE3 in all the subsequent analyses.

5.10.1: Descriptive Statistics and Pearson Correlation Matrix: US Manufacturing

Before performing multiple regression analysis, we executed normality test (Jarque-Bera), Heteroskedasticity test (Breusch-Pagan-Godfrey) and outliers tests (Hat Matrix & DFFITS graphs). Results of these tests are placed below:

5.9.2 Normality Test: Z-score of US Manufacturing Firms

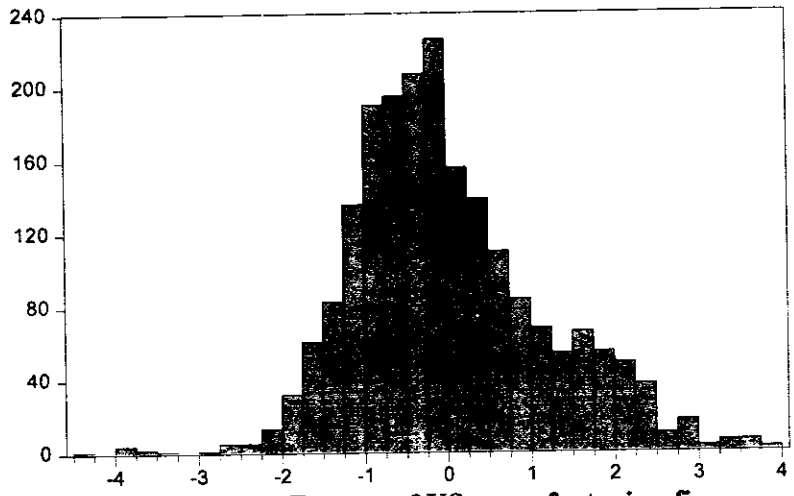


Figure-10: Graph of Z-score of US manufacturing firms

The above graph and statistics depict that variables are almost normally distributed except few extreme values due to which Jarque-Bera test value is affected. However, such situation may be considered in case of a small sample scenario. For large sample like US manufacturing companies' data, absence of normality does not create any effect on the analysis.

5.10.2 Heteroskedasticity Test:

We have checked Heteroskedasticity of the regression model using Breusch-Pagan-Godfrey test and find that there is existence of the Heteroskedasticity. This study applies Heteroskedasticity-consistent standard error test to accommodate it.

Heteroskedasticity test: Multiple Regression Model of US Manufacturing firms			
F-statistic	21.033	Prob. F(6,2017)	0.000
Obs*R-squared	119.181	Prob. Chi-Square(6)	0.000
Scaled explained SS	144.213	Prob. Chi-Square(6)	0.000

We have checked existence of outliers by using hat matrix and DFFITS. Both graphs depict that some outliers are present in the data. Descriptive statistics of US data also shows presence of outliers, especially in the Z- score and the CASH. It is however noted that variations in US data is less than that of Pakistan.

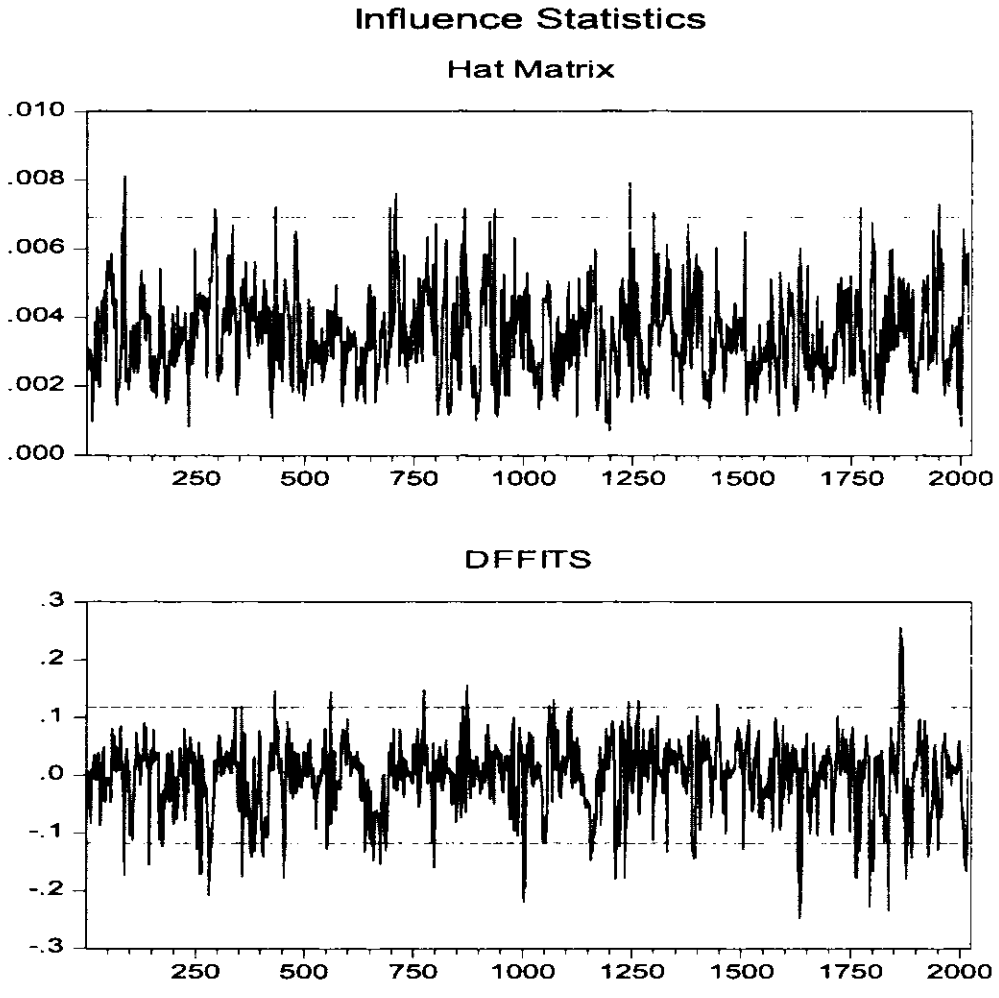


Figure-11: Hat matrix & DFFITS graphs of US Manufacturing Firms

Due to presence of some outliers, the data is winsorized at 5% (5, 95). Moreover, We use Heteroskedasticity-consistent standard errors of White for regression analysis which account for the problem of Heteroskedasticity.

Table 17: Descriptive statistics: US Manufacturing Firms

	Z Mfg	FEE1	FEE2	FEE3	SIZA	RE	SALE	DEBT	CASH	FSALE
N	2024	2024	2024	2024	2024	2024	2024	2024	2024	2024
Mean	3.93	1.61	0.80	0.83	16.43	0.37	0.85	0.45	0.43	0.32
Median	3.66	1.37	0.73	0.73	16.44	0.35	0.79	0.44	0.34	0.33
Standard Deviation	1.71	1.21	0.55	0.56	0.91	0.2	0.43	0.12	0.33	0.24
Minimum	1.56	0	0	0	15.04	0.09	0.31	0.26	0.05	0
Maximum	6.98	3.71	1.82	1.87	17.79	0.73	1.65	0.65	1.07	0.68

It is evident from table-17 that there is no sizeable difference between mean and median values. This shows that data has a strong central tendency for almost all of the variables. The spread of the FEE1 is greater than both of the other measures, which are almost same. There is very small spread witnessed in the firm's fundamental variables ranging from 0.12 to 0.91. The spread of The Z-score is relatively high.

Table 18: Correlation Coefficients: US Manufacturing Firms

	Z Mfg	FEE1	FEE2	FEE3	SIZA	RE	SALE	DEBT	CASH	FSALE
ZMfg	1									
FEE1	-.176**	1								
FEE2	-.084**	.382**	1							
FEE3	-.071**	.347**	.936**	1						
SIZA	-.228**	.019	-.036	-.046*	1					
RE	.591**	-.081**	-.094**	-.107**	-.007	1				
SALE	.404**	-.099**	-.050*	-.053*	-.229**	.272**	1			
DEBT	-.307**	-.030	-.022	-.033	-.017	-.092**	.200**	1		
CASH	.169**	.119**	.075**	.078**	-.258**	-.005	-.180**	-.363**	1	
FSALE	.210**	.171**	.062**	.057*	.133**	.333**	-.064**	-.039	-.023	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 18 depicts a negative significant correlation between the Z-score of US manufacturing firms and the foreign exchange exposure elasticity for all the three measures but strength of model-1 measure is stronger than the exposure measures of model 2 and model3. The Z-score has negative correlation with the size of the companies and their debt but the positive correlation with the firm's other variables including the retained earnings, total sales, cash and the foreign sales. The retained earnings, sales and the debt have high correlation with the Z-score. It is also observed that the correlation between any pair of independent variables is very small with a maximum of 0.36 between cash and debt. This shows that there are no chances of multicollinearity in the data.

5.10.3: Regression Analysis of the foreign exchange exposure and Financial Distress (at level) US manufacturing Firms

As Breusch-Pagan-Godfrey diagnostic test depicts that heteroscedasticity does exist in the model, we use White's Heteroskedasticity-consistent errors & covariance test of the regression which manages the true results controlling Heteroskedasticity. However fixed effect model is found suitable for US manufacturing firms. Its results are given in table-19. Results of OLS and random effect models are given in Appendix-2 (e-h) for the US manufacturing firms.

Table-19: Foreign Exchange Exposure and Financial Distress at Level: US Manufacturing Firms (Fixed Effect)

Variables	Model-I	Model-II	Model-III
FEE1	-0.2116 (0.0210)***		
FEE2		-0.1599 (0.0467)***	
FEE3			-0.1092 (0.0457)**
CASH	0.5516 (0.0899)***	0.4683 (0.0910)***	0.4621 (0.0912)***
DEBT	-4.1298 (0.2272)***	-4.1696 (0.2324)***	-4.1759 (0.2329)***
FSALE	0.8830 (0.1191)***	0.6928 (0.1164)***	0.6813 (0.1166)***
RE	3.4997 (0.1510)***	3.6263 (0.1513)***	3.6381 (0.1518)***
SALE	1.3228 (0.0719)***	1.3348 (0.0739)***	1.3351 (0.0741)***
SIZEA	-0.2654 (0.0320)***	-0.2738 (0.0326)***	-0.2736 (0.0327)***
Adjusted R^2	0.5755	0.5571	0.5558
F Value	390.3746***	362.1937***	360.287***

Table 20: Diagnostic Tables

	Test	Alternatives	Ho:	F Value	Chi-Square	Decision
Model 1	F-Test	OLS, Fixed	F -Test for individual effects	19.759***		Fixed effect is suitable
	Chi Square	Fixed , Random	Unique errors are not correlated With the Regressors		68.51***	Fixed effect is suitable
Model 2	F-Test	OLS, Fixed	F Test for individual effects	20.031		Fixed effect is suitable
	Chi Square	Fixed , Random	Unique errors are not correlated With the Regressors		75.598***	Fixed effect is suitable
Model 3	F-Test	OLS, Fixed	F Test for individual effects	20.113***		Fixed effect is Suitable
	Chi Square	Fixed , Random	Unique errors are not correlated With the Regressors		76.644***	Fixed effect is suitable

In this model, we executed regression using all of the three methods of panel data analysis. We used F-test and Hausman tests which tell that fixed effect method is

suitable. Adjusted R^2 is reasonable (58%) which means explanatory power of the model is satisfactory.

Table 19 shows that the foreign exchange exposure has a significant negative effect on the Z-score. All the company's fundamental variables are statistically significant where the retained earnings, sales and the debt are strong predictors of financial distress. It is important to note that the size and the debt have negative effect on the Z-score, which means as size and debt increase, there will be a decrease in the Z-score and those firms will fall into financial distress and ultimately move towards bankruptcy. The results of the model-2 and model-3 are almost identical with the results found in model 1. The effect of the foreign exchange exposure is significant on the financial distress but at 5% significance level. The explanatory power of market mode is 56% which is almost same in all the models.

These are contemporaneous results which show that the foreign exchange exposure has significant effect on the Z-score at 1% and 5% level of significance. Adjusted R-square of US models for manufacturing firms are much lower than that of model used for firms from Pakistan.

5.10.4 Correlation Matrix of Lag Effect of FEE on Financial Distress: US Manufacturing Firms

Table 21: Correlation coefficients: US manufacturing firms with FEE (lag)

	Z mfg	FEE1 (-1)	FEE2 (-1)	FEE3 (-1)	SIZA	RE	SALE	DEBT	CASH	FSALE
ZMfg	1									
FEE1(-1)	-.123**	1								
FEE2(-1)	-.083**		1							
FEE3(-1)	-.071**			1						
SIZA	-.229**	.015	-.036	-.046*	1					
RE	.591**	-.059**	-.093**	-.107**	-.008	1				
SALE	.404**	-.106**	-.050*	-.053*	-.229**	.272**	1			
DEBT	-.306**	-.040	-.022	-.033	-.017	-.091**	.201**	1		
CASH	.170**	.121**	.075**	.078**	-.258**	-.005	-.180**	-.363**	1	
FSALE	.209**	.153**	.062**	.058**	.133**	.332**	-.064**	-.038	-.023	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

In the correlation matrix of variables with lag values of the foreign exchange exposure, it is found that all the measures of the FE exposures are negatively correlated and thus the foreign exchange exposure and financial distress are positively correlated. This table also shows that the retained earnings, sales and the debt have higher significant correlation with the distress measure. There is very small correlation between every pair of variables.

5.10.5 Regression of The foreign exchange Exposure (Lag values) and Financial Distress: US manufacturing firms

Table-22: Foreign Exchange Exposure and Financial Distress at Lag Level: USA Manufacturing Firms (Fixed Effect)

Variables	Model-I	Model-II	Model-III
FEE1(-1)	-0.1437 (0.0210)***		
FEE2(-1)		-0.1593 (0.0467)***	
FEE3(-1)			-0.1088 (0.0457)**
CASH	0.5174 (0.0912)***	0.4693 (0.0911)***	0.4632 (0.0913)***
DEBT	-4.1453 (0.2303)***	-4.1654 (0.2325)***	-4.1715 (0.2330)***
FSALE	0.7860 (0.1192)***	0.6915 (0.1164)***	0.6800 (0.1167)***
RE	3.5862 (0.1506)***	3.6235 (0.1514)***	3.6352 (0.1519)***
SALE	1.3181 (0.0729)***	1.3346 (0.0739)***	1.3349 (0.0741)***
SIZEA	-0.2682 (0.0326)***	-0.2739 (0.0326)***	-0.2736 (0.0327)***
Adjusted R^2	0.5638	0.5556	0.5552
F Value	372.0071***	361.1881***	359.2973***

Table -23: Diagnostic Tables

	Test	Alternatives	Ho:	F Value	Chi-square	Decision
Model 1	F-Test	OLS, Fixed	F -Test for individual effects	19.491***		Fixed effect is suitable
	Chi Square	Fixed , Random	Unique errors are not correlated With the Regressors		74.501***	Fixed effect is suitable
Model 2	F-Test	OLS, Fixed	F Test for individual effects	20.015***		Fixed effect is suitable
	Chi Square	Fixed , Random	Unique errors are not correlated With the Regressors		75.863***	Fixed effect is suitable
Model 3	F-Test	OLS, Fixed	F Test for individual effects	20.097*		Fixed effect is suitable
	Chi Square	Fixed , Random	Unique errors are not correlated With the Regressors		76.896*	Fixed effect is suitable

The results in table-22 depict that the foreign exchange exposure of the firms has significant effect on the financial distress measure for its lagged values as well whereas all the firms' fundamentals have significant effect on the financial distress (Z-score) of the firms. The size and debt have negative effect on the Z-score which means if the size and debt of a firm increase, the Z-score will decrease and chances of financial distress will increase. The retained earnings, sales, foreign sales and the cash have positive coefficients and they will affect the financial distress inversely.

It is noted that the effect of the foreign exchange exposure on the financial distress is comparatively weak in the model-3.i.e., negatively significant at 5%. The results of firms' fundamental variables are also the same. The adjusted R-square of the models is almost identical with each other (56%).

From the above findings, we conclude that there is a significant positive relation between the foreign exchange exposures and the financial distress of US manufacturing firms both at contemporaneous and lag level but the coefficient are rather small.

The results are in line with Bodnor and Wong (2003), Martin and Mauer (2003), and Kim and Kraple (2014) at contemporary as well as lag level but it is partially consistent with studies such as Aggarwal and Harper (2010) who argue that there is insignificant relation at contemporaneous level. Bodnor and Wong (2003) also found insignificant relation at contemporaneous level stating the choice of the market index may cause insignificance of the impact of the foreign exchange exposure on the firm's value. Another reason for the insignificant may be industry differences in the foreign exchange exposure (Martin and Mauer, 2003 & Bodnar and Gentry, 1993). Our

findings are also somewhat in line with findings of Smith and Stulz, (1985), Froot et al, (1993) which document a weak empirical evidence of the foreign exchange exposure on firm's value.

5.11.1: Analysis of The foreign exchange Exposure of US Non-Manufacturing Firms

This study is unique to segregate manufacturing and non-manufacturing firms for this type of research. This study uses Altman Z-score model developed for non-manufacturing businesses and then equation 4.7 is used for the regression analysis.

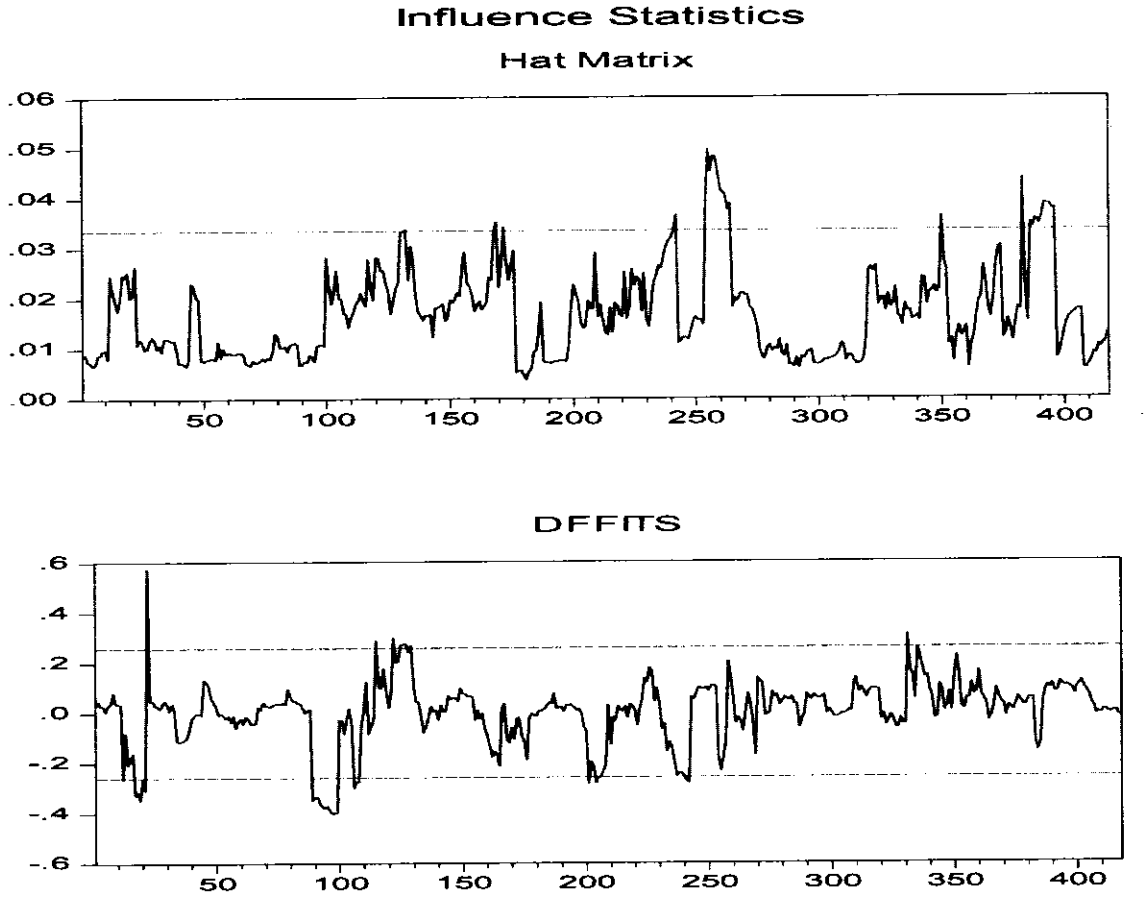


Figure-12: Hat Matrix & DFFITS of US non-manufacturing firms'Z-score Model

The above statistics of US data of non-manufacturing firms contain some extreme values especially in data of the sales, cash and the Z-score. The data is winsorized to the extent of 5% (5, 95) and the revised data diagnostics are given below:

Table-24: Descriptive Statistics US non-manufacturing Firms

	Z NMfg	FEE1	FEE2	FEE3	SIZA	RE	SALE	DEBT	CASH	FSALE
N	418	418	418	418	418	418	418	418	418	418
Mean	3.70	1.33	0.77	0.79	16.75	0.19	0.73	0.44	0.39	0.14
Median	2.69	1.01	0.70	0.73	16.70	0.16	0.54	0.43	0.26	0.08
Standard Deviation	2.43	1.01	0.48	0.51	1.01	0.18	0.48	0.11	0.37	0.16
Minimum	1.13	0.00	0.00	0.01	15.13	-0.05	0.28	0.29	0.03	0.00
Maximum	8.49	3.24	1.51	1.63	18.37	0.51	1.74	0.62	1.12	0.44

Mean and median show somewhat different value but the spread is not wide and the minimum Z-score is 1.13 and maximum is 8.49. The minimum value of Z-score clearly shows that the sample does not include distressed/bankrupt firms. The bankrupt non –manufacturing firms have Z-score of less than 1.10. However, some firms facing danger of bankruptcy seems surely included in the sample because range of Z-score for firms in the grey area is 1.1 to 2.6. This depicts true state of data as we excluded firms with negative book value of the equity. The range of FEE1 data is greater than those of FEE2 and FEE3. So FEE1 is more dispersed than other measures. Average debt ratio of these firms varies from 29% to 62%.

Correlation Matrix

Table 25: Correlation coefficients of Variables: US Non-manufacturing Firms

	ZNMfg	FEE1	FEE2	FEE3	SIZEA	RE	SALE	DEBT	CASH	FSALE
ZNMfg	1									
FEE1	0.075	1								
FEE2	-0.031		1							
FEE3	-0.029			1						
SIZEA	-.215**	-.132**	-0.07	-0.09	1					
RE	.595**	-.107*	-0.02	-0.02	-0.056	1				
SALE	.307**	.127**	.201**	.226**	-.327**	.404**	1			
DEBT	-.621**	0.02	0.036	0.058	-.206**	-.349**	.139**	1		
CASH	.456**	-.204**	-0.05	-0.01	-.446**	.211**	.232**	-.155**	1	
FSALE	.446**	-.226**	-0.03	-0.02	-.199**	.210**	0.084	-.190**	.416**	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 25 shows that the foreign exchange exposure has negative but very small correlation with the Z-score of non-manufacturing US firms when model 2 and model 3 are used. The correlation between all of the firms' financial variables and the Z-score is significant at 1%. The retained earnings, total sales, cash, and foreign sales have positive correlation whereas the size and debt have negative correlation .The correlation of the firm variables except the debt and sales with all the exposure measures are negative. Sales have a significant positive correlation but the debt has insignificant correlation with FEE2 and FEE3. The correlation between any pair of independent variables is very small with a maximum of 0.446 between the cash and the size.

5.11.2: Regression Analysis of The foreign exchange Exposure and financial Distress: US Non-Manufacturing Firms

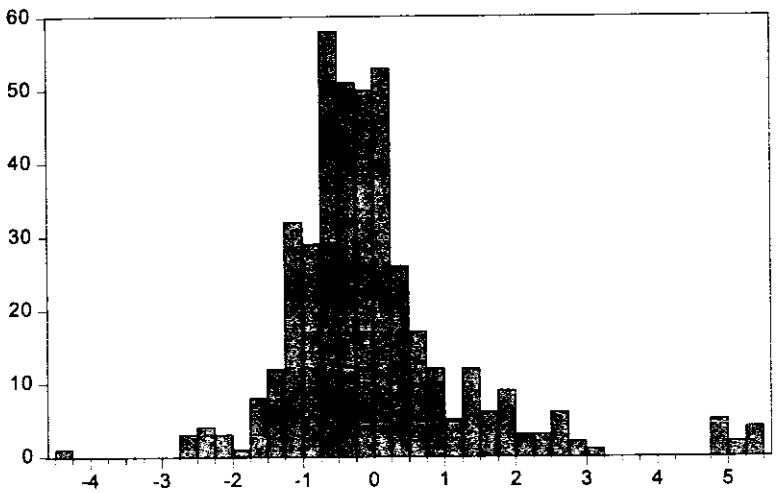


Figure-13: Z-score distribution: Non-manufacturing Firms

The above graph and the associated statistics show that the distribution of data is not normally distributed but it may affect only a small sample.

We applied F-test and Haussmann test on the Common Constant (OLS pooled), Fixed Effects and common Effect Methods, which find that Random Effect Method, is suitable for regression analysis of non-manufacturing firms in all forms. We use the equation 4.7 for the multivariate analysis.

We also checked Heteroskedasticity of the model used for the foreign exchange exposure of US non-manufacturing firms and find that the Heteroskedasticity exists in the model. This study then uses the Heteroskedasticity-consistent standard errors test.

Heteroskedasticity test: Multiple Regression Model of US Manufacturing firms			
F-statistic	3.117	Prob. F(6,2017)	0.005
Obs*R-squared	18.193	Prob. Chi-Square(6)	0.006
Scaled explained SS	62.157	Prob. Chi-Square(6)	0.000

Diagnostics tests however show that random effect model is better for US non-manufacturing firms and its results are given in table-26. Results of OLS and fixed effect model are given in appendix-2(i-l).

Table-26: Foreign Exchange Exposure and Financial Distress at Level: USA Non- Manufacturing Firms (Random Effect)

Variables	Model-I	Model-II	Model-III
FEE1	0.0753 (0.0637)		
FEE2		-0.2153 (0.1227)*	
FEE3			-0.2246 (0.1239)*
CASH	0.8219 (0.1941)***	0.8210 (0.1870)***	0.8299 (0.1874)***
DEBT	-11.8645 (0.6285)***	-11.9353 (0.6230)***	-11.9145 (0.6242)***
FSALE	2.8153 (0.4294)***	2.9011 (0.4453)***	2.9021 (0.4454)***
RE	3.6008 (0.3883)***	3.4707 (0.3920)***	3.4631 (0.3918)***
SALE	0.9309 (0.1484)***	0.9653 (0.1479)***	0.9748 (0.1487)***
SIZEA	-0.3712 (0.0624)***	-0.3829 (0.0616)***	-0.3833 (0.0617)***
Adjusted R^2	0.7171	0.7179	0.7182
F Value	148.4395***	149.0242***	149.3059***

Table -27 Diagnostic Tests

	Test	Alternatives	H_0:	F Value	Chi-square	Decision
Model 1	F-Test	OLS, Fixed	F -Test for individual effects	54.869***		Fixed effect is Suitable
	Chi Square	Fixed , Random	Unique errors are not correlated With the Regressors		6.491	Random effect is suitable
Model 2	F-Test	OLS, Fixed	F Test for individual effects	55.086*		Fixed effect is suitable
	Chi Square	Fixed , Random	Unique errors are not correlated With the Regressors		10.583	Random effect is Suitable
Model 3	F-Test	OLS, Fixed	F Test for individual effects	90.061***		Fixed effect is suitable
	Chi Square	Fixed , Random	Unique errors are not correlated With the Regressors		13.281*	Random effect is suitable

Results of US non-manufacturing firms are different from the results of US manufacturing firms as given in table-26. The foreign exchange exposure does not show any significant impact on the Z- score in the model-1 which shows total exposure of a firm. All the firm's variables depict significant effect on the Z-score as witnessed in US manufacturing firms. In non-manufacturing businesses, the size and debt have negative coefficients with the Z-score, which means the effect of the size and debt on the financial distress is positive. This implies, more the size of a firm, more will be the distress risk. Similarly the higher the debt of a firm, higher will be the chances of financial distress. Adjusted R-square of this model is 71.22% which shows that model is quite good.

Table 26 shows that the regression coefficients of the foreign exchange exposure in model-2 and model-3 are negatively significant at 10% significance level. This means that there is a weak effect of the FE Exposure on the distress of non-manufacturing firms of USA. As expected, the firms' fundamental attributes exhibit a significant

effect on the financial distress. The size and the debt have a positive relation with the financial distress. The explanatory power of this model is 71.30 %.All the firms' predictors show high significant affect on distress of the firms. The adjusted R-square of this model is 71.34%

Lag Effect: Us non-manufacturing firms

Table 28: Correlation coefficients of variables of US non-manufacturing firms' data with lag

	ZNmfg	FEE1	FEE2	FEE3	SIZA	RE	SALE	DEBT	CASH	FSALE
ZNmfg	1									
FEE1	0.048	1								
FEE2	0.003		1							
FEE3	0.019			1						
SIZA	-.215**	-0.1	-0.09	-.116*	1					
RE	.594**	-.119*	-0.02	-0	-0.057	1				
SALE	.306**	-.141**	.162**	.195**	-.327**	.404**	1			
DEBT	-.621**	-0.03	0.005	0.012	-.206**	-.350**	.138**	1		
CASH	.455**	.160**	-0.01	0.035	-.446**	.211**	.230**	-.156**	1	
FSALE	.446**	.191**	0.031	0.049	-.199**	.209**	0.083	-.191**	.415**	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations of different pairs of the variables, with lagged value of the foreign exchange exposure(s) are not different from those reported in table-44 above. The coefficients of the foreign exchange exposure are not significant.

Table-29: Foreign Exchange Exposure and Financial Distress at Lag: USA Non-Manufacturing Firms (Random Effect).

	Model-I	Model-II	Model-III
FEE1(-1)	0.0416 (0.0662)		
FEE2(-1)		-0.2039 (0.1188)*	
FEE3(-1)			-0.2037 (0.1215)*
CASH	0.8371 (0.1920)***	0.8233 (0.1908)***	0.8329 (0.1899)***
DEBT	-11.8606 (0.6300)***	-11.9532 (0.6299)***	-11.9511 (0.6336)***
FSALE	2.8552 (0.4333)***	2.9279 (0.4438)***	2.9307 (0.4432)***
RE	3.5804 (0.3878)***	3.4796 (0.3891)***	3.4716 (0.3914)***
SALE	0.9174 (0.1497)***	0.9491 (0.1477)***	0.9575 (0.1489)***
SIZEA	-0.3758 (0.0623)***	-0.3863 (0.0620)***	-0.3868 (0.0623)***
Adjusted R^2	0.7116	0.7128	0.7130
F Value	147.6092***	148.5182***	148.6540***

Table 30: Diagnostic Tests

	Test	Alternatives	H_0:	F Value	Chi-square	Decision
Model 1	F-Test	OLS, Fixed	F -Test for individual effects	54.657***		Fixed effect is suitable
	Chi Square	Fixed , Random	Unique errors are not correlated With the Regressors		1.166 P 0.992	Random effect is suitable
Model 2	F-Test	OLS, Fixed	F Test for individual effects	54.391***		Fixed effect is suitable
	Chi Square	Fixed , Random	Unique errors are not correlated With the Regressors		7.845	Random effect is suitable
Model 3	F-Test	OLS, Fixed	F Test for individual effects	54.332		Fixed effect is suitable
	Chi Square	Fixed , Random	Unique errors are not correlated With the Regressors		9.0663	Random effect is suitable

There is no lag effect of the foreign exchange exposure on the Z-score in model-1, which means no significant effect of total foreign exchange exposure on the financial distress of the firms. This is similar result as we witnessed in model-1 at contemporary level. All the firms' variables included in the model affect the financial distress significantly. The coefficient of the debt and the size are negatively significant which means an increase in debt will increase the chances of financial distress. Similarly, larger the size of a firm, higher will be the foreign exchange exposure. Other firms' variables will affect the chances of financial distress inversely.

The model-2 and model-3 show that the foreign exchange exposure of the non-manufacturing firms is negatively significant with their Z-score at 10% level. The coefficient is however smaller than that in the same model at contemporary level. The fundamental variables of a firm do affect its financial distress significantly. The debt and the size affect the financial distress of firms positively while other variables' effect is inversely proportional. It is concluded that the foreign exchange exposure of the non-manufacturing firms in minimal.

The findings of this study are consistence with that of Wei and Stark (2013) and Kim & Kraple (2014).The insignificant relation as witnessed in model 1, may be due to the choice of the exchange rate for USA (Aggarwal and Harper , 2010; Koutmos and Martin ,2003 ; and Martin and Mauer2003); the choice of the market index (Bodnor and Wong , 2003 ; industry differences in the foreign exchange exposure (Martin and Mauer , 2003 & Bodnar and Gentry, 1993) and hedging policy of the firms using financial derivatives as well as operational hedging (Smith and Stulz, 1985, Froot et al, 1993).

The international theory along with corporate risk management theory and hedging theory explains such behavior of effect of the foreign exchange exposure of the manufacturing and non-manufacturing firms. At the firm - specific level, there is evidence of some firms facing significant exposure while others facing insignificant exposure; this is consistent with the theories of the determinants of exposure (Mall, Z., et al, 2011)

5.12: Financial Crisis, Foreign Exchange Exposure and Financial Distress

5.12.1:Non-financial firms: Pakistan

In this section, we look for the impact of the foreign exchange exposure elasticity on the financial distress of the non-financial firms in Pakistan, during the period of Global Financial Crisis (GFC 2007-09). As stated in chapter 4, we use the following equation for this analysis:

$$DIST=\alpha_i+\delta_{i(FEE3)}+\gamma_1(SIZE)+\gamma_2(RE)+\gamma_3(SALE)+\gamma_4(DEBT)+\gamma_5(CASH)+\gamma_6(FS)$$

$$+\gamma_7 (Year*FEE3) + \epsilon_i \quad \text{---------- Eq. 4.9}$$

Where t represents the year 2007, 2008 , or 2009.

The last term in the above equation is added as an interactive dummy to check the effect of financial crisis on the relation between the foreign exchange exposure and the financial distress. The regression results are given below.

Table-31: Foreign Exchange Exposure, Financial Distress and global Financial Crisis, at Level

Variables	Model-3 Pakistan	Model-3 US Manufacturing	Model-3 US non-manufacturing
FEE 3	-0.0910 (0.0310)***	-0.0740 (0.0490)	-0.2480 (0.1360)*
CASH	1.3770 (0.0740)***	0.4590 (0.0870)***	0.8470 (0.2180)***
DEBT	-10.2260 (0.1820)***	-4.1320 (0.2260)***	-11.894 (0.697)***
FSALE	-0.2530 (0.1220)**	0.7110 (0.1120)***	2.896 (0.447)***
RE	9.9150 (0.5550)***	3.6370 (0.1400)***	3.472 (0.442)***
SALE	0.4280 (0.0480)***	1.3460 (0.0670)***	0.972 (0.166)***
SIZEA	-0.0140 (0.0220)	-0.2760 (0.0300)***	-0.377 (0.077)***
FEE*2007	0.028 (0.071)	0.2000 (0.0820)**	0.273 (0.211)
FEE*2008	0.103 (0.080)	-0.3790 (0.0860)***	-0.172 (0.267)
FEE*2009	0.150 (0.072)**	-0.2020 (0.0890)**	-0.229 (0.290)
Adjusted R^2	0.800	0.560	0.713
F Value	821.731***	259.368***	104.836***

It is evident from the above results that the effect of the foreign exchange exposure on the financial distress of Pak firms is significant only in the year 2009. It is not significant in either of the year 2007 and year 2008. This shows the spill-over effect of the US sub-prime mortgage financial crisis which became the global financial crisis. The crisis effect on Pak firms is explained by contagion theory.

Table 31 shows the impact of the foreign exchange exposure as an interactive-year dummy is found significant on the financial distress of US manufacturing firms during the crisis years 2007, 2008, and 2009. However the impact of the financial crisis on the relation between the foreign exchange exposure and the financial distress of the US non-manufacturing firms is not found significant in any of the crisis period.

This result may be due to the very different nature of non-financial firms and their business operations. It may also be because of less exposure due to lack of international operations. Another problem may be small size of the sample (198 firms 'years). This financial crisis was just like "Tulip Mania (1637)" in Netherland and termed as sub-prime mortgage crisis as far as US manufacturing firms are concerned and the effect may be appraised using Knut Wicksell's (1898) analysis.

From statistical results, it is concluded that financial crisis has significant impact on the relationship between the foreign exchange exposure elasticity and financial distress of US manufacturing firms in all the three years of the GFC 2007-09 where as it was not significant in US non-manufacturing firms whereas that effect was significant for Pak firms only in the year 2009.

Our findings are consistent with a number of studies made on global financial crisis. According to Usman (2010), adverse impact of the crisis on the economies of developed countries was felt in the last months of 2007, a sharp decline in the world markets; however, was witnessed in January, 2008. Earlier months of the year 2009 witnessed recovery of world economies from this devastating crisis. Pakistan stock markets were affected by it in the second half of the year 2008 as well as in the year 2009.

Figure given below shows a comparison of stock market returns of the both countries (Pakistan & USA) which depicts a vivid picture of the crisis effect on stock markets of the both countries. These results may also be visualized in the figure-3 and figure-4.

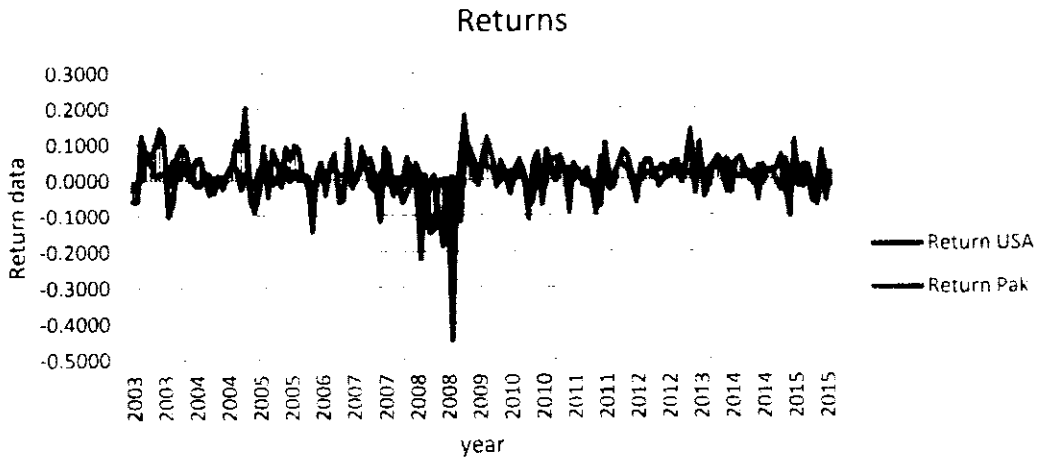


Figure-14: A Joint graph of Stock Market returns of Pakistan (KSE -100) and USA(S&P-500)

It is evident from the above graph that US stock markets experienced a first decline in 2007 which became steeper in 2008 and continued in the year 2009. Equity market returns of Pakistan experienced a decline during second half of 2008 and early 2009.

Overall Results:

Average significance of exchange rate elasticity of Pak firms in model 1(total exposure) is 3%, 7%, and 13%, in model 2 (net market exposure) is 2%, 6%, and 11%, and in model 3(net financial exposure) is 2%, 6%, and 11% at 1%, 5%, and 10% level of significance respectively. The average significance of exchange rate elasticity of US firms in model 1(total exposure) is 21%, 36%, and 44%, in model 2(net market exposure) is 2%, 9%, and 15%, and in model 3 (net financial exposure) is 2%, 8%, and 15% at 1%, 5%, and 10% level of significance respectively.

The overall results depict that a very small percentage of the firms are exposed to the foreign exchange exposure. Moreover, the foreign exchange exposure has significant effect on financial distress of the sample firms from Pakistan both contemporaneously

as well as at lag level in all the three models. This effect is stronger at lag level than contemporaneous effect as coefficients of lag level are higher for all the models. The retained earnings, sales, and cash are positively significantly related to the financial distress where as the debt and the size show a negatively significant effect on it.

These findings are in line with the findings of Kim & Kraple (2014) who find positive effect of the foreign exchange exposure on the financial distress and the chances of bankruptcy. The results are also consistent with Wei & Stark (2013) as far as general relation of these variables is concerned as they did not mention about contemporary or lagged effect. The above results are also consistent with Bortov and Bodnor (1994), Harper and Aggarwal (2005) and Aggarwal and Harper, (2010), who find a strong relationship at lagged changes but did not find contemporaneous relationship between exchange rate changes and firm returns.

The foreign exchange exposure of US manufacturing firms also show a significant effect on financial distress in the Model-1(total exposure) and model-2 (net market exposure) at 1% significance level contemporaneously as well as at lagged values. The FE exposure from model 3 shows a significant effect on the financial distress at 5% level of significance at contemporaneous level and at lag level.

The results are in line with Williamson (2001), Halil (2003), Bodnor and Wong (2003), Martin and Mauer (2003), and Kim and Kraple (2014) as for as the FE exposure at contemporary level is concerned. These results are partially consistent with Aggarwal and Harper (2010) who documented only lag effect of the exposure and not at contemporary level. They argue that firms may have different level of exposure to different currencies which may not correlate with the currency index.

Study of Koutmos and Martin (2003) and Martin and Mauer (2003) also recommended the use of individual currency. Bodnor and Wong (2003) argued that choice of the market index may cause insignificance of the impact of the foreign exchange exposure on the firm's value. Another reason for the insignificant is industry differences in the foreign exchange exposure (Martin and Mauer, 2003; Bodnar and Gentry, 1993). An important aspect of weak empirical evidence is hedging policy of the firms with financial derivatives as well as operational hedging (Smith and Stulz, 1985; Froot et al, 1993).

In case of US non-manufacturing firms, the impact of the foreign exchange exposure on the financial distress is weekly significant. However all the firm's variables depict significant effect on the financial distress? Size has positive relation with the financial distress. This shows that large firms tend to have more distress risk. Debt has negative coefficient which describes a positive effect on the financial distress.

The results are similar at lag level of the foreign exchange exposure. Both show that there is no significant effect of the foreign exchange exposure on the distress of non-manufacturing companies. However, the effect is rather weak i.e., at 10% level of significance. The fundamental variables do affect their financial distress.

The findings of this study are partially consistent with that of Wei and Stark (2013) and Kim & Krapl (2014). The reason for the weak empirical significance may be the industry differences in the foreign exchange exposure (Martin and Mauer, 2003; Bodner and Gentry, 1993) and hedging policy of the firms using financial derivatives as well as operational hedging (Smith and Stulz, 1985; Froot et al, 1993).

The effect of the global financial crisis on the relationship of the foreign exchange exposure and the financial distress of the Pak firms is significant only in the year 2009 for Pak firms. It is not significant either in the year 2007 or year 2008. This shows the spill-over effect of the US sub-prime mortgage financial crisis was felt in Pakistan with delay.

The financial crisis does show a significant impact on the relationship of the foreign exchange exposure and the financial distress of US manufacturing firms in all the three years taken as the crisis period. The impact is however highly significant in the year 2008.The impact of the foreign exchange exposure on the financial distress of the US non-manufacturing firms becomes significant only at 10% when year dummy is taken. However, the relationship between the foreign exchange exposure and financial distress of the firms is not affected in any of the crisis period years 2007, 2008, and 2009.

Our results confirm the rationale of contagion theory under which spillover effect is witnessed in case of Pakistan. Our results also support the market integration theory i.e. a different level of integration between different markets will give a different level of effect of one market on the other markets.

CHAPTER - 6

Results and Analysis: Foreign Exchange Exposure Elasticity and Idiosyncratic Risk

6.1 The Foreign Exchange Exposure and Idiosyncratic Risk

In this section, idiosyncratic risk of the sample firms listed at KSE (Pakistan) and NYSE (USA) is measured using alternative valuation models namely Fama-French three factor (FF3F) model and Nelson's EGARCH model. In the next step, we have taken model-2 and model-3 of the foreign exchange exposure elasticity for the analysis and perform multivariate regression analysis taking idiosyncratic risk as dependent variable and the foreign exchange exposure elasticity of firms as an independent variable along with firm's attributes as control variables.

6.2. Measurement of Idiosyncratic Risk

This section uses Fama-French three factor model (1993,1996) to find out idiosyncratic risk which has widely been used in many researches (Ang et al (2006, Kolari, Moorman and Sorescu, 2007, Fu, 2009, Brockman et al,2009, Nath & Brooks , 2015, and Kumari, Mahakud &Hiremath , 2017).

6.2.1. Fama- French Three Factor (FF3F) Model

Following Fu (2009), we take monthly frequency data of excess cross-sectional stock returns (R_{it}- Rf_t), excess market return (Rm-Rf), SMB (portfolio returns of small cap minus big cap), and HML (Portfolio returns of high book to market value minus low

book to market value), each worked out separately and excess stock returns of each firm are regressed by using the Fama-French three factors for each month.. The idiosyncratic volatility of each stock is then calculated by taking standard deviation of the regression residuals.

6.2.2. EGARCH Model

EGARCH model is used for the calculation of idiosyncratic risk by taking volatility of the series of excess stock returns of firms. This model was developed by Nelson (1991) for calculation of conditional volatility of stock returns which has further been confirmed by Engle and Mustafa (1992), and Engle and Ng (1993) that it did a good job in capturing the asymmetry of conditional volatilities.

6.3. Data Analysis of the Foreign Exchange Exposure and Idiosyncratic Risk: Pakistan

6.3.1. Descriptive Statistics and Correlation

Table 32: Descriptive Statistics of Idiosyncratic Risk (IR) and its Regressors: Pakistan

	IREGARCH	IR FF3F	FEE2	FEE3	SIZEC	BM	CF/P	LEV	CASH	ROE	CAPIN
N	2057	2057	2057	2057	2057	2057	2057	2057	2057	2057	2057
Mean	0.19	0.13	1.19	1.31	13.83	1.79	0.18	0.54	0.24	0.09	1.16
Median	0.18	0.09	0.87	0.89	13.67	1.27	0.09	0.57	0.07	0.09	0.91
Standard Deviation	0.07	0.25	0.99	1.25	1.74	1.49	0.20	0.18	0.34	0.13	0.71
Minimum	0.09	0.01	0.15	0.06	11.27	0.32	0.01	0.23	0.01	-0.14	0.45
Maximum	1.20	7.27	3.25	4.63	16.66	4.92	0.61	0.78	1.02	0.29	2.70

Table 32 gives overall picture of data of the variables of interest of Pak firms. Descriptive statistics help us in knowing what kind of data we are dealing with. Here

values of mean (0.19) and median (0.18) of IR by EGARCH are very close which means a central tendency is found in the data. The mean (0.13) and median (0.09) of IR by FF3F are rather farther from each other.

Minimum and maximum values of IR by EGARCH model are 0.09 and 1.20 with a standard deviation of 0.07 whereas minimum and maximum of IR by FF3F model are 0.01 and 7.27 with a standard deviation of 0.25.

6.3.2 Normality test

We use Jarque-Bera test for checking normality of IR data calculated by EGARCH and Fama-French three Factors Model. The results are given below:

a). **Data by EGARCH**

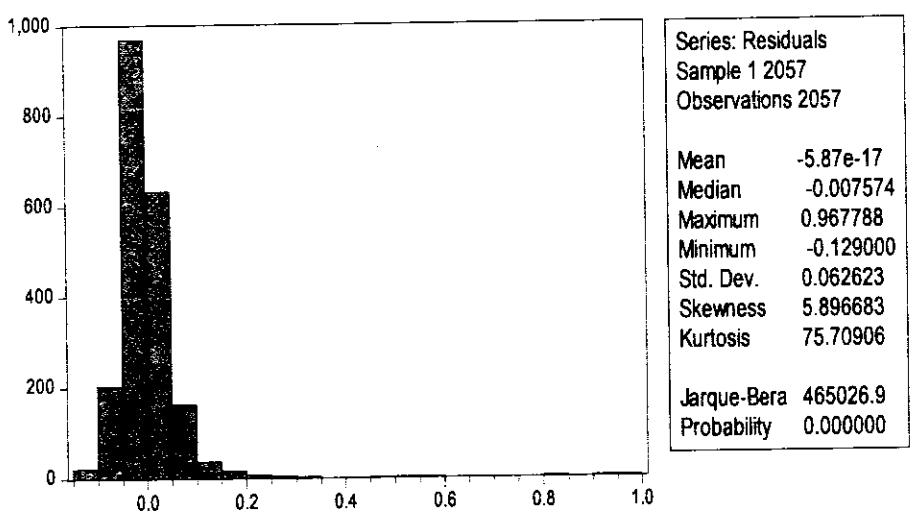


Figure-15: Graph of IR by EGARCH Model

b). **Data by FF3F Model**

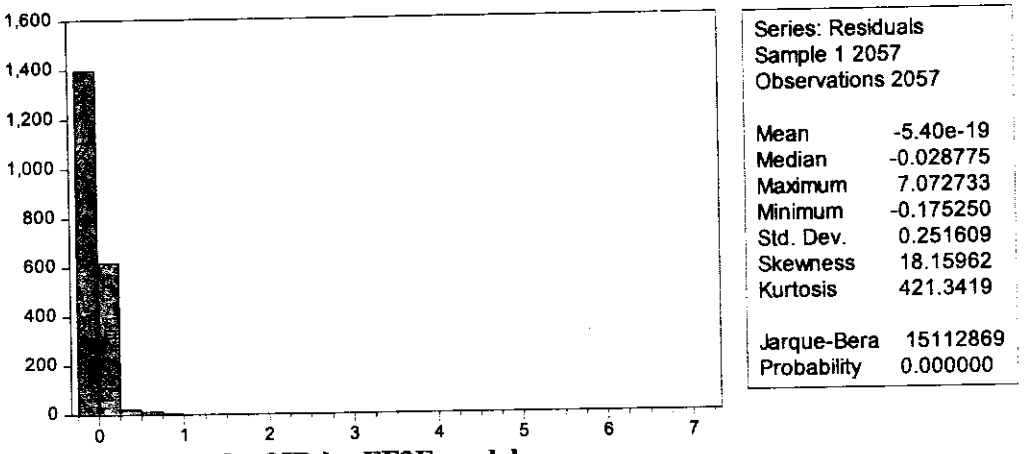


Figure-16: Graph of IR by FF3F model

We may therefore argue that data of IR by EGARCH depicts better normality as compared to that obtained by FF3F model.

We also check outliers by using Hat Matrix and DFFITS tests. Graphs are placed below.

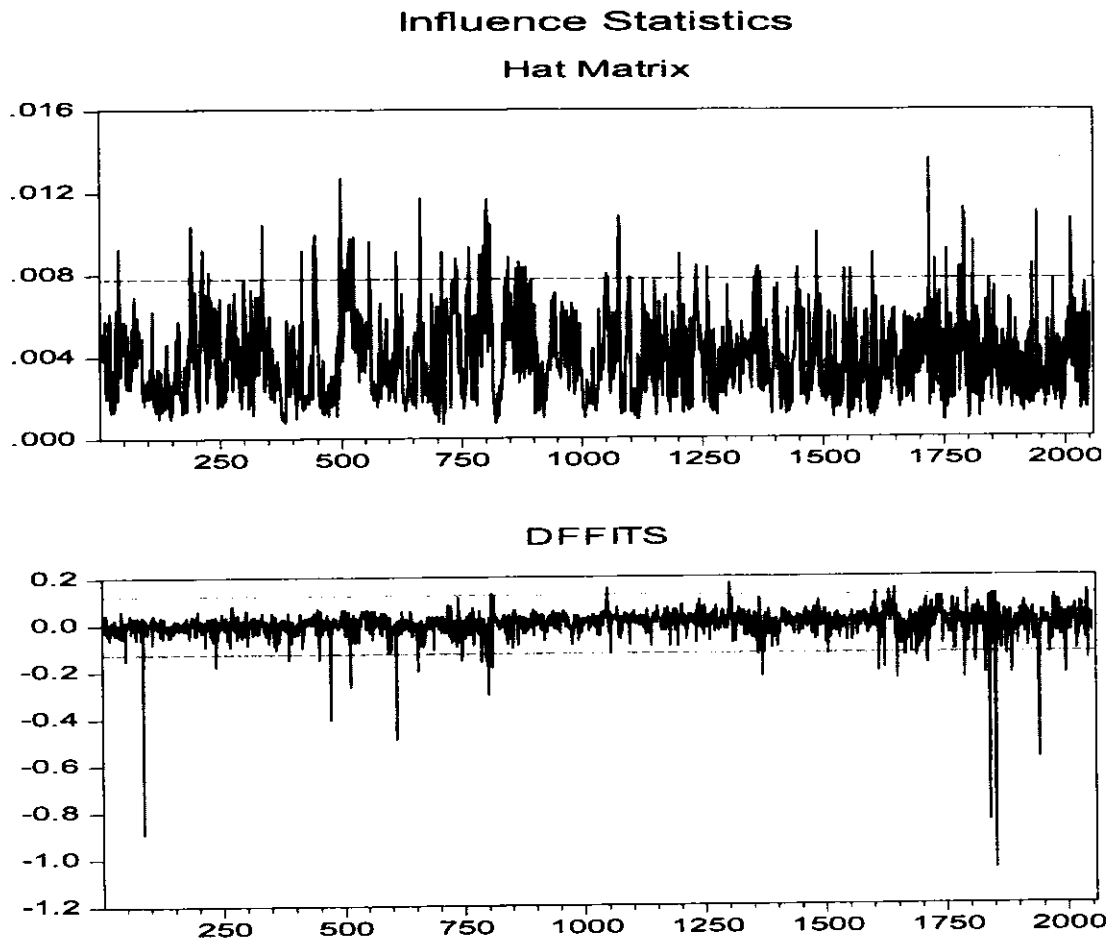


Figure-17: Hat Matrix & DFFITS graphs

The Hat Matrix and DFFITS graphs show existence of some outliers, we therefore winsorize the data at 5% level (5, 95)

Correlation Matrix

Correlation coefficient between pair of variables describes strength of their relation with each other and not the cause and effect.

Table 33: Correlation between idiosyncratic risks, Foreign exchange exposure and control variables

	IR EGARCH	IR FF3F	FEE2	FEE3	SIZEC	BM	CF/P	LEV	CASH	ROE	CAPIN
IR EGARCH	1										
IR FF3F	.742**	1									
FEE2	.213**	.141**	1								
FEE3	.241**	.158**	.925**	1							
SIZEC	-.241**	-.134**	-.121**	-.155**	1						
BM	.200**	.S103**	.159**	.190**	-.541**	1					
CF/P	0.028	0.03	0.018	0.027	-.106**	.229**	1				
LEV	.111**	.064**	0.039	.043*	-.215**	.056*	0.018	1			
CASH	-.102**	-.049*	-.087**	-.099**	.297**	-.218**	.545**	-.477**	1		
ROE	-.181**	-.097**	-.051*	-.076**	.442**	-.402**	-0.04	-.210**	.257**	1	
CAPIN	.095**	0.011	0.015	0.025	0	.204**	.092**	-.108**	.095**	-.333**	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The above table depicts a positive correlation between the foreign exchange exposure and idiosyncratic risk calculated both with FF3F model and EGARCH. The exposure measure of model 3 has more correlation with idiosyncratic risk as compared to that of model 2. Moreover, the statistics of idiosyncratic risk by EGARCH are better than those with FF3F model. Size, Cash and ROE have negative correlation with the idiosyncratic risk while book to market value, cash flow to market price, leverage, and capital intensity have positive correlation with it.

Correlations between the explanatory variables show that they are not highly correlated with each other which mean no multicollinearity is found between them. ROA was, however excluded from the equation due to its high correlation with ROE.

6.3.3. Idiosyncratic Risk and the Foreign Exchange Exposure (At level): Pakistan

Heteroskedasticity Test:

We use Heteroskedasticity of the models using Breusch-Pagan-Godfrey test.

GARCH Model

Heteroskedasticity Test: Multiple Regression Model of Pak firms			
F-statistic	22.426	Prob. F(6,2017)	0.018
Obs*R-squared	16.911	Prob. Chi-Square(6)	0.018
Scaled explained SS	626.837	Prob. Chi-Square(6)	0.000

FF3F Model

Heteroskedasticity test: Multiple Regression Model of Pak firms			
F-statistic	1.849	Prob. F(6,2017)	0.074
Obs*R-squared	12.912	Prob. Chi-Square(6)	0.074
Scaled explained SS	2692.701	Prob. Chi-Square(6)	0.000

The above tables show that model is heteroskedastic. We therefore use Heteroskedasticity-consistent standard errors regression test of White .

Table 34: Estimates of Coefficients, IR (FF3F) and IR (EGARCH) as dependent variable (at Level): Pak Firms

	Model II		Model III	
Variable	**IR (FF3F)**	**IR (EGARCH)**	**IR (FF3F)**	**IR (EGARCH)**
FEE2	0.0319 (0.0090)***	0.0118 (0.0019)***		
FEE3			0.0283 (0.0083)***	0.0106 (0.0016)***
BM	0.0044 (0.0040)	0.0028 (0.0013)*	0.0038 (0.0039)	0.0026 (0.0013)*
CAPIN	-0.0030 (0.0058)	0.0068 (0.0020)***	-0.0032 (0.0058)	0.0067 (0.0020)***
CASH	0.0205 (0.0267)	0.0084 (0.0060)	0.0223 (0.0262)	0.0091 (0.0060)
CF/P	-0.0047 (0.0619)	-0.0131 (0.0108)	-0.0068 (0.0612)	-0.0139 (0.0108)
LEV	0.0583 (0.0290)*	0.0305 (0.0091)***	0.0597 (0.0290)*	0.0310 (0.0090)***
ROE	-0.0871 (0.0444)*	-0.0218 (0.0137)	-0.0860 (0.0444)*	-0.0215 (0.0136)
SIZEC	-0.0124 (0.0027)***	-0.0062 (0.0009)***	-0.0118 (0.0028)***	-0.0060 (0.0009)***
Adjusted R^2	0.033	0.106	0.037	0.114
F-Test:	9.839***	31.478***	10.76***	33.915***

Table 34 shows that the foreign exchange exposure affects the idiosyncratic risk of the Pak firms in its both measures but the effect is not very high. Regression coefficients of the foreign exchange exposure with idiosyncratic risk are 0.032 and 0.012 in the FF3F model and EGARCH model respectively. As far as the effect of other regressors is concerned, the size, leverage and ROE significantly affect idiosyncratic risk in FF3F model but in GARCH results, all other variables except cash flow to price, cash, and ROE have a significant effect on the firm-specific risk. In both measures of idiosyncratic risk, size of the firms affects their idiosyncratic risk negatively meaning thereby that the idiosyncratic risk will be lower for larger firms but an increase in book to market value, leverage, and capital intensity increase the idiosyncratic risk. Adjusted R-squares of EGARCH model (0.106 & 0.114) are higher

than that of FF3F model (0.033 & 0.037) in both models of the foreign exchange exposure. Hence explanatory power of GARCH model is much better.

6.3.4: Relation between IR and FEE (Lag Effect) Correlation Matrix

Table 35: Correlation Matrix: IR, FEE (lag), and other Variables: Pak Firms

	IR EGARCH	IR FF3F	FEE2 (-1)	FEE3 (-1)	SIZEC	BM	CF/P	LEV	CASH	ROE	CAPIN
IR EGARCH	1										
IR FF3F	.742**	1									
FEE2(-1)	.130**	.058**	1								
FEE3(-1)	.160**	.067**	.925**	1							
SIZEC	-.241**	-.134**	-.058**	-.091**	1						
BM	.199**	.103**	.071**	.092**	-.541**	1					
CF/P	0.029	0.03	-0.019	-0.016	-.108**	.230**	1				
LEV	.111**	.064**	0.000	0.005	-.216**	.056*	0.018	1			
CASH	-.101**	-.049*	-.054*	-.071**	.296**	-.217**	.543**	-.478**	1		
ROE	-.180**	-.097**	-.077**	-.099**	.441**	-.402**	-0.039	-.211**	.256**	1	
CAPIN	.095**	0.011	0.025	0.033	-0.001	.204**	.092**	-.108**	.096**	-.333**	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The correlation statistics with lags the foreign exchange exposure data depict no different picture than the contemporaneous level analysis. It also shows a positive correlation between the foreign exchange exposure measures and idiosyncratic measures.

Regression Analysis: FEE (lag) and Idiosyncratic Risk

Model 2: FEE2 with IR (FF3F) and IR (EGARCH)

Table 36: Regression Analysis: FEE(lag) and Idiosyncratic Risk

	Model II		Model III	
Variable	**IR (FF3F)**	**IR (EGARCH)**	**IR (FF3F)**	**IR (EGARCH)**
FEE2 (-1)	0.0124 (0.0063)*	0.0073 (0.0018)***		
FEE3 (-1)			0.0108 (0.0060)*	0.0070 (0.0017)***
BM	0.0068 (0.0044)	0.0036 (0.0013)**	0.0068 (0.0044)	0.0036 (0.0013)**
CAPIN	-0.0026 (0.0057)	0.0069 (0.0020)***	-0.0028 (0.0058)	0.0068 (0.0020)***
CASH	0.0154 (0.0274)	0.0068 (0.0061)	0.0163 (0.0275)	0.0075 (0.0061)
CF/P	-0.0004 (0.0629)	-0.0114 (0.0110)	-0.0010 (0.0629)	-0.0118 (0.0110)
LEV	0.0602 (0.0291)*	0.0318 (0.0092)***	0.0612 (0.0291)*	0.0325 (0.0091)***
ROE	-0.0714 (0.0429)*	-0.0148 (0.0137)	-0.0714 (0.0424)*	-0.0139 (0.0136)
SIZEC	-0.0132 (0.0027)***	-0.0064 (0.0009)***	-0.0130 (0.0028)***	-0.0063 (0.0009)***
Adjusted R^2	0.020	0.086	0.020	0.092
F-Test:	6.353***	25.273***	6.464***	26.901***

Results of lagged foreign exchange exposure with idiosyncratic risk are somewhat same but show less level of significance (5%) in FF3F model. The effect of the foreign exchange exposure on idiosyncratic risk is more significant under GARCH model but it strength is rather weak. ROE in GARCH here is found insignificant but it significant at 10% in FF3F model. Adjusted R-square of the GARCH model is also higher than that of FF3F model in lag effect.

From the above analysis, it is found that the foreign exchange exposure of the firms has positive effect on their idiosyncratic risk and this effect is more pronounced at concurrent level as compared to lagged values of the foreign exchange exposure. The study also finds that EGARCH model explains this relationship better than the Fama-French three factor model as its explanatory power is much higher in EGARCH estimates. It is also found that there is inverse relationship between size of firms and their idiosyncratic risk, which means the idiosyncratic risk, is found lower for large firms as compared to small firms. This is logically understandable as large firms can cope well with their risks which constitute the idiosyncratic risk. Leverage affects the idiosyncratic risk positively i.e. increasing leverage may increase the idiosyncratic risk. The book- to- market ratio and the capital intensity also affects the idiosyncratic risk positively.

6.4. Data Analysis of the Foreign Exchange Exposure and Idiosyncratic Risk: USA

6.4.1. Descriptive Statistics and Correlation

Table 37: Descriptive statistics of Idiosyncratic risk of US firms

	IR EGARCH	IR FF3F	FE E2	FE E3	SIZ EC	B M	CA SH	CF/ P	LE V	RO E	CAP INT
IR											
N	2442	2442	2442	2442	2442	2442	2442	2442	2442	2442	2442
Mean	0.08	0.03	0.8	0.82	16.52	0.63	0.42	0.07	0.44	0.12	1.64
Median	0.08	0.02	0.73	0.73	16.43	0.52	0.33	0.06	0.44	0.11	1.34
Standard Deviation	0.03	0.02	0.53	0.55	0.92	0.38	0.34	0.06	0.12	0.08	0.9
Minimum	0.02	0	0	0	15.2	0.2	0.04	0.01	0.27	0.02	0.6
Maximum	0.29	0.4	1.82	1.87	18.1	1.35	1.09	0.19	0.65	0.26	3.37

Table 72 gives overall picture of data of the US firms' variables as these statistics help us in knowing what kind of data we are dealing with. Values of mean and median (0.08) of IR by EGARCH are equal but there is small difference in the values by FF3F model. This means that the data has central orientation.

Minimum and maximum value of IR by EGARCH model are 0.02 and 0.29 with a standard deviation of 0.03 and these values by FF3F model are 0.00 and 0,04 with a standard deviation of 0.02. We may therefore argue that data of IR by EGARCH depict normality as compared to that obtained by FF3F model.

Outliers in IR data

a). FF3F Model

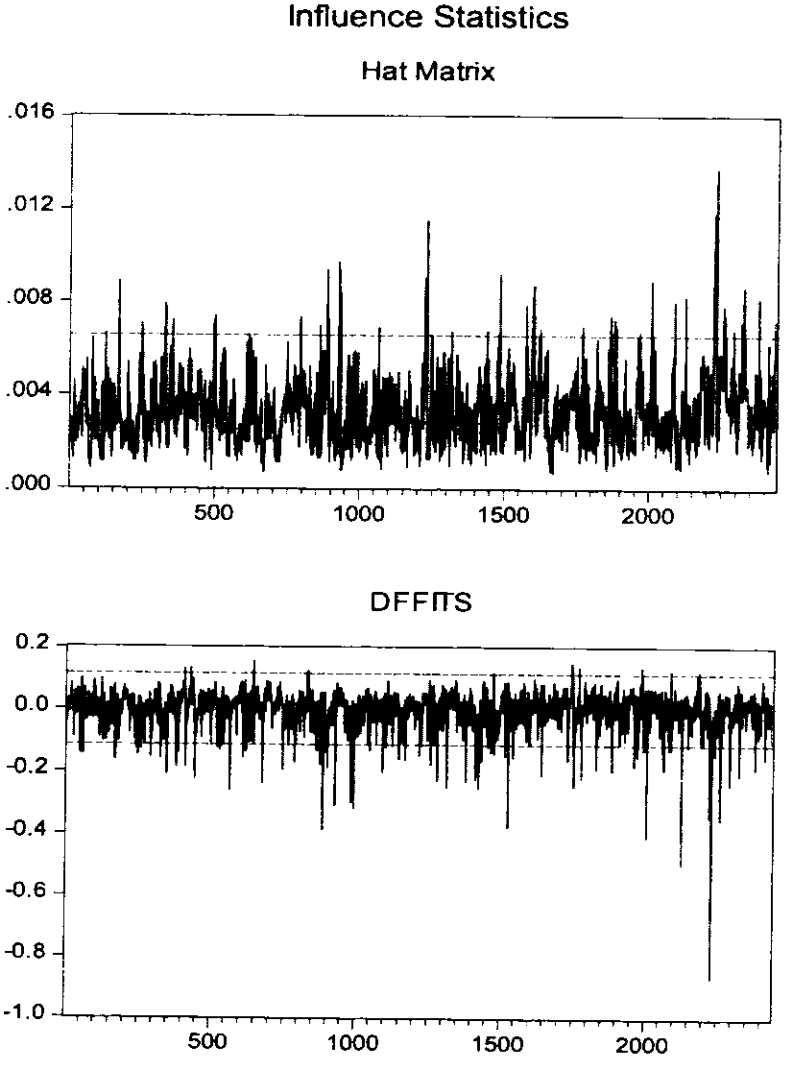


Figure-18: Hat Matrix and DFFITS Graphs , FF3F model USA

b). GARCH Model

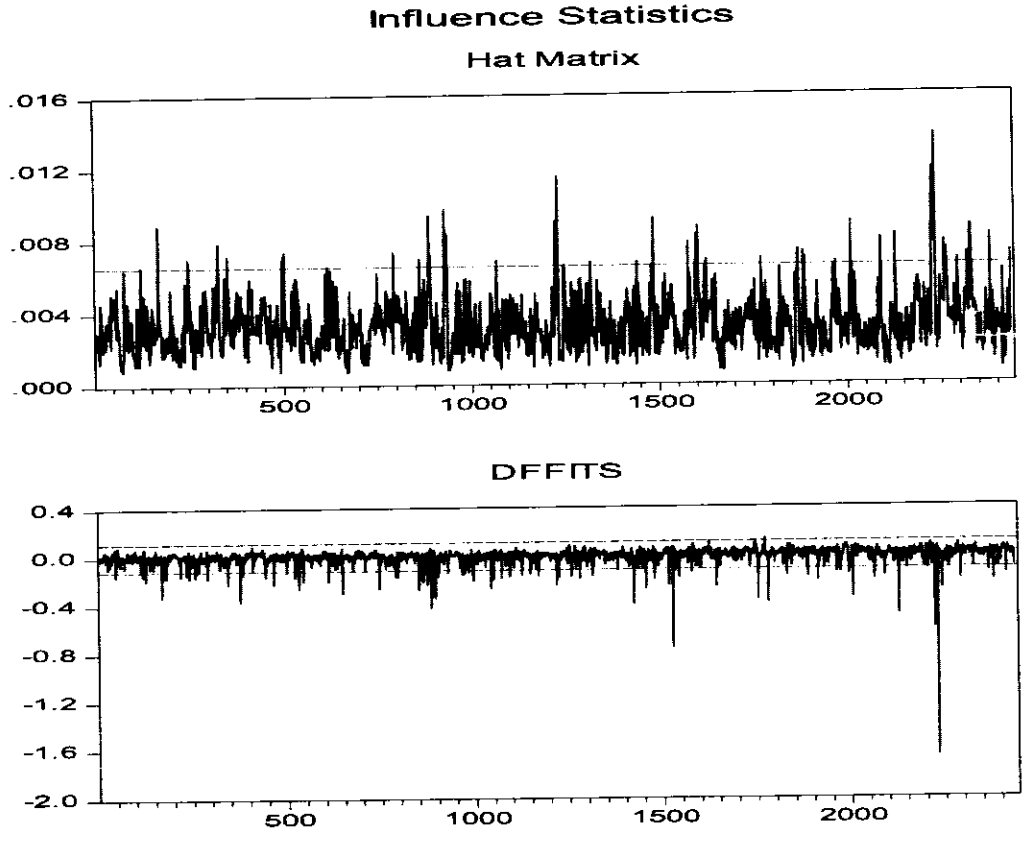


Figure-19: Hat Matrix and DFFITS Graphs , EGARCH model USA

The above graphs depict that some outliers exist in both of the models. We therefore winsorize the data by 5% (5,95) before regression.

Correlation Matrix

Table 38: Correlation coefficients of IR: US Firms

	IR EGARCH	IR FF3F	FEE2	FEE3	SIZEC	BM	CASH	CF.P	LEV	ROE	CAPINT
IR EGARCH	1										
IR FF3F	.690**	1									
FEE2	.217**	.206**	1								
FEE3	.216**	.202**	.935**	1							
SIZEC	-.318**	-.257**	-.085**	-.085**	1						
BM	.183**	.201**	.070**	.051*	-.246**	1					
CASH	.136**	.067**	.057**	.065**	-.161**	-.103**	1				
CF.P	.277**	.205**	.084**	.079**	-.315**	.304**	.576**	1			
LEV	-0.036	-0.014	-0.012	-0.018	-.124**	-.182**	-.325**	.053**	1		
ROE	-.100**	-.053**	-.044*	-.040*	.066**	-.555**	.065**	-.105**	.202**	1	
CAPINT	0.011	0.014	.041*	.041*	.067**	.425**	.074**	-.043*	-.242**	-.433**	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The correlation coefficients between the foreign exchange exposure and idiosyncratic risk are positive in both FF3F model and EGARCH model. Correlation coefficients between each pair of control variables are as small as there are no chances of multicollinearity. As in Pak firms, the correlation statistics of US firms worked out by EGARCH model are better than FF3F model. Moreover, both models of the foreign exchange exposure show very close position of the correlation. Size, leverage, and return on equity have a negative correlation with the idiosyncratic risk while others have positive correlation.

6.4.2. Idiosyncratic Risk and The foreign exchange Exposure (At level): USA

Normality test: Jarque-Bera

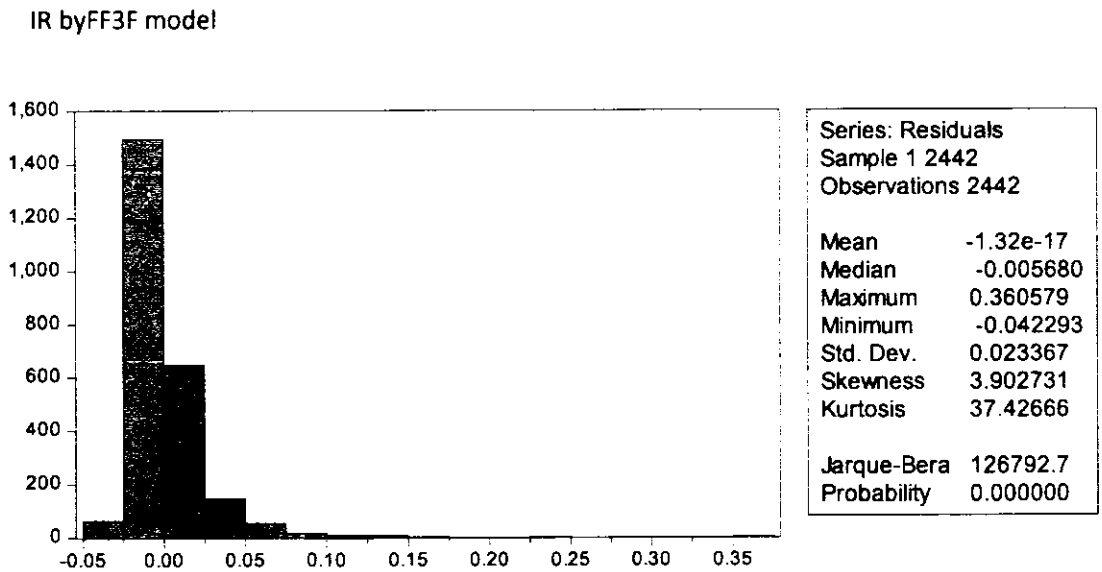


Figure-20: Normality test IR, FF3F model USA

The above graph shows that the distribution is not normal but the issue of such non-normality poses problem especially for a very small sample size. Moreover, we opt for EGARCH model to work out idiosyncratic risk.

Heteroskedasticity Test: to check that variance of the error term of the model is constant, we apply Breusch-Pagan-Godfrey test. The result is given below:

Heteroskedasticity Test: Multiple Regression Model of US firms			
F-statistic	6.626	Prob. F(6,2017)	0.000
Obs*R-squared	45.667	Prob. Chi-Square(6)	0.000
Scaled explained SS	826.316	Prob. Chi-Square(6)	0.000

The above table shows that the IR model (FF3F) is heteroskedastic. To control the variance of the standard errors of its residuals, we opt for the White's Heteroskedasticity-consistent standard errors & covariance test.

Table 39: Data Analysis of the Foreign Exchange Exposure and Idiosyncratic Risk: USA

	Model II		Model III	
Variable	**IR (FF3F)**	**IR (EGARCH)**	**IR (FF3F)**	**IR (EGARCH)**
FEE2	0.0081 (0.0010)***	0.0086 (0.0010)***		
FEE3			0.0078 (0.0010)***	0.0084 (0.0009)***
BM	0.0078 (0.0027)**	-0.0003 (0.0024)	0.0081 (0.0027)**	0.0000 (0.0025)
CAPIN	-0.0002 (0.0008)	0.0001 (0.0007)	-0.0003 (0.0008)	0.0001 (0.0007)
CASH	-0.0046 (0.0024)*	-0.0061 (0.0024)*	-0.0046 (0.0024)*	-0.0061 (0.0024)*
CF/P	0.0593 (0.0156)***	0.1026 (0.0153)***	0.0592 (0.0156)***	0.1025 (0.0153)***
LEV	-0.0114 (0.0049)*	-0.0209 (0.0051)***	-0.0110 (0.0049)*	-0.0205 (0.0051)***
ROE	0.0189 (0.0118)	-0.0089 (0.0097)	0.0192 (0.0119)	-0.0085 (0.0097)
SIZEC	-0.0051 (0.000)***	-0.0071 (0.0006)***	-0.0050 (0.0005)***	-0.0071 (0.0006)***
Adjusted R^2	0.0307	0.1782	0.1304	0.1785
F-Test:	45.7096***	65.9318***	45.5855***	66.0991***

The effect of the foreign exchange exposure on the idiosyncratic risk is positively significant at 1% level of significance in the both models. However, the coefficients in each of the exposure models and alternative measures of idiosyncratic risks are almost similar. The adjusted R-square of the model in EGARCH (0.178) is higher than that in FF3F model (0.037) which means EGARCH model explains the relationship better. The foreign exchange exposure elasticity affects the idiosyncratic risk positively. It is however, noted that the effect is very small.

The effect of the size, cash, cash flow-to-price, and leverage on the idiosyncratic risk is significant but that of the book-to-market ratio, return on equity, and capital intensity is insignificant. The Size and leverage negatively affect the idiosyncratic risk. The CAPIN and the ROE do not show significant effect

There is no remarkable difference between the results of the foreign exchange exposure and the idiosyncratic risk by EGARCH relationship under Model-2 and model-3 of the FE exposure.

6.4.3: Relation between IR and FEE (Lag Effect): USA Correlations

Normality test: IR by EGARCH

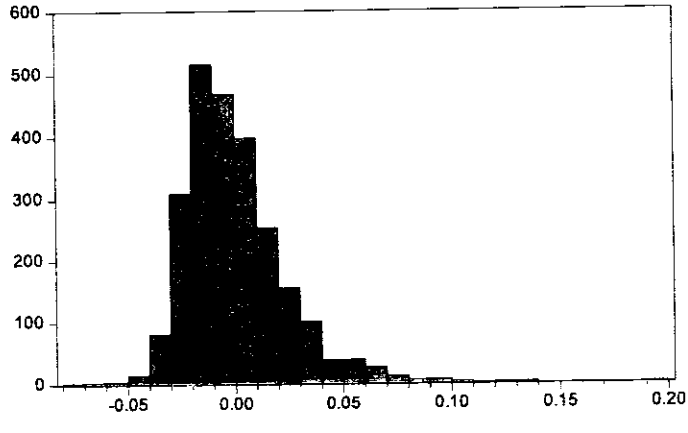


Figure-21: Normality test IR, EGARCH model USA

The above graph and statistics given alongside show a better picture of normality than that of FF3F model but still not fully normally distributed. It is a little bit negatively skewed as Mean and median are close to zero. Such distribution will not adversely affect the results of the regression.

Heteroskedasticity Test: IR by EGARCH using Breusch-Pagan-Godfrey test

Heteroskedasticity Test: Multiple Regression Model of US firms			
F-statistic	8.642	Prob. F(6,2017)	0.000
Obs*R-squared	59.221	Prob. Chi-Square(6)	0.000
Scaled explained SS	198.885	Prob. Chi-Square(6)	0.000

Heteroskedasticity is found in the IR by EGARCH model and the White's Heteroskedasticity-consistent standard errors & covariance test is used to cater for it.

Table 40: Correlation Coefficients of variables

	IR EGARCH	IR FF3F	FEE2(-1)	FEE3(-1)	SIZEC	BM	CASH	CF.P	LEV	ROE	CAPINT
IR EGARCH	1										
IR FF3F	.690**	1									
FEE2(-1)	.252**	.149**	1								
FEE3(-1)	.269**	.184**	.935**	1							
SIZEC	-.318**	-.257**	-.080**	-.090**	1						
BM	.183**	.201**	.054**	.055**	-.246**	1					
CASH	.136**	.067**	.054**	.062**	-.161**	-.103**	1				
CF.P	.277**	.205**	.064**	.072**	-.315**	.304**	.576**	1			
LEV	- 0.04	-0.01	-0.02	-0.03	-.124**	-.182**	-.325**	.053**	1		
ROE	-.100**	-.053**	-0.03	-0.03	.065**	-.554**	.065**	-.104**	.203**	1	
CAPINT	0.011	0.014	0.018	0.017	.067**	.425**	.073**	-.043*	-.242**	-.433**	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Correlation between the foreign exchange exposure and the idiosyncratic exposure is positive in both the FF3F and EGARCH models but it is much higher in EGARCH model. The Size, ROE and leverage are negatively correlated with the idiosyncratic risk whereas the book-to market, cash, and capital intensity are positively related.

Table 41: Data Analysis of the Foreign Exchange Exposure and Idiosyncratic Risk: USA (Lag Effect): USA Correlations

	Model II		Model III	
Variable	**IR (FF3F)**	**IR (EGARCH)**	**IR (FF3F)**	**IR (EGARCH)**
FEE2 (-1)	0.0084 (0.0009)***	0.0105 (0.0010)***		
FEE3 (-1)			0.0069 (0.0010)***	0.0108 (0.0009)***
BM	0.0000 (0.0025)	-0.0005 (0.0024)	0.0078 (0.0027)**	-0.0004 (0.0024)
CAPIN	0.0001 (0.0007)	0.0002 (0.0007)	-0.0001 (0.0008)	0.0002 (0.0007)
CASH	-0.0061 (0.0024)*	-0.0064 (0.0024)**	-0.0046 (0.0024)*	-0.0062 (0.0024)**
CF/P	0.1025 (0.0153)***	0.1047 (0.0149)***	0.0609 (0.0156)***	0.1034 (0.0149)***
LEV	-0.0205 (0.0051)***	-0.0204 (0.0050)***	-0.0105 (0.0049)*	-0.0195 (0.0050)***
ROE	-0.0085 (0.0097	-0.0093 (0.0097)	0.0186 (0.0121)	-0.0092 (0.0097)
SIZEC	-0.0071 (0.0006)***	-0.0070 (0.0006)***	-0.0050 (0.0006)***	-0.0069 (0.0006)***
Adjusted R^2	0.1148	0.1945	0.1238	0.1999
F-Test:	39.4470***	73.3504***	42.9667***	75.9711***

The lag effect of the foreign exchange exposure of firms on their idiosyncratic risk under FF3F model-2 is similar as we witnessed at the contemporaneous level but it has lower coefficient and smaller adjusted R-squared value. The BM, the CAPIN and the ROE are insignificant whereas the CASH, leverage, the size are negatively significant. Cash flow to price shows a positive significant effect on the idiosyncratic risk

The above results depict a positive significant effect of the foreign exchange exposure on the idiosyncratic risk of US firms but this effect is very weak. The adjusted R-square of EGARCH model is fairly higher than that of FF3F model which tells that EGARCH model explains the relation well. The Size, cash, and leverage have significant but negative impact on the idiosyncratic risk. The effect of the book-to-market ratio, return on equity and capital intensity is not significant on the idiosyncratic risk. These results show that if the size of a firm increases, the idiosyncratic risk will reduce and a similar effect is witnessed in case of the leverage and cash.

From the results given in tables 39 & 41, this study concludes that the foreign exchange exposure of US firms positively affects their idiosyncratic risk both at contemporaneous level as well as at lagged value of the foreign exchange exposure elasticity. EGARCH model explains the relationship better than Fama-French three Factors model. In case of US firms, the lagged effect is rather stronger as compared to the contemporaneous especially in EGARCH. In both of the measures of the foreign exchange exposure, the size of firms has inverse relationship with the idiosyncratic risk. The Cash position has also an inverse relationship but the cash flow-to- market price ratio has positive relation. Moreover, the leverage in case of US firm has inverse relationship with the firms' idiosyncratic risk.

6.4.4 Summary of Results

We find that in both US and Pakistan, the foreign exchange exposure of the firms has positive effect on their idiosyncratic risk. However, this effect is more pronounced at contemporary level as compared to lagged values of the foreign exchange exposure in Pak firms but in case of US firm, the lagged effect is found greater than that on concurrent level. The study also finds that EGARCH model explains this relationship better than the Fama-French three factor model as its explanatory power is much higher in EGARCH estimates. It is also found that there is an inverse relationship between size of firms and their idiosyncratic risk, which means the idiosyncratic risk, is found lower for large firms as compared to small firms. The leverage affects the idiosyncratic risk positively i.e. increasing the leverage may increase the idiosyncratic risk. The book- to- market ratio and capital intensity also affects the idiosyncratic risk positively.

The results are consistent with Engle and Mustafa (1992), Engle and Ng (1993), who concluded that Nelson's EGARCH model, is good for capturing the asymmetry of conditional volatilities. Our study is also consistent with the study of Eiling (2013) which used both Fama-French three factor model and EGARCH model, and documented a positive premium for idiosyncratic risk by using EGARCH. Fu (2009) also documented superior performance of GARCH model against other models including linear models'

The findings of this study are not consistent with the study by Nath & Brooks (2015) in context of superiority of EGARCH against linear equation (Fama-French three

Factors model) and quadratic estimation model as well as on the direction of relationship between the idiosyncratic risk and returns.

The findings are in line with anomalies of the asset pricing theory which state that due to asymmetry of information, the investors are unable to hold fully diversified portfolio. This causes the idiosyncratic risk to be priced. Moreover, it is also relevant to internationalization theory under which firms pursue foreign business under imperfect t capital market theory.

CHAPTER - 7

THE FOREIGN EXCHANGE EXPOSURE AND FOREIGN OWNERSHIP

In this chapter, we look for the relationship between the foreign exchange exposure and the foreign ownership of the sample firms from both Pakistan and USA. We have used two alternative models of the foreign exchange exposure and then logistic model is used to find the relationship between the foreign exchange exposure and the foreign ownership. Our dependent variable is the foreign ownership which is binary variable and firms having the foreign shareholding in their equity assume a value of one and those not having any foreign equity stake are assigning zero.

7.1: Analysis Model: The foreign exchange Exposure Elasticity and Foreign Ownership

Exchange rate volatility is expected to have negative effect on international portfolio flows as it creates high uncertainty in the returns of foreign investors when converted into their home currency (Person and Sevens son, 1989; Gargand and Dua, 2014)

7.2: Logit Model

As dependent variable is binary in nature, this study uses Logit regression model. This model is used to find the probability of an event and value of the dependent variable ranges from 0 to 1.

7.3: Descriptive Statistics and Correlations- Pakistan

Table 42: Descriptive Statistics FO Regressors- Pakistan (FO as dependant Variable)

	FEE2	FEE3	SIZEA	BM	CASH	LEV	ROE	RM	GDPg
N	2057	2057	2057	2057	2057	2057	2057	2057	2057
Mean	1.192	1.217	14.960	1.795	0.243	0.539	0.089	0.222	0.044
Median	0.870	0.890	13.670	1.270	0.070	0.560	0.090	0.250	0.040
Standard Deviation	0.995	1.014	1.594	1.486	0.335	0.183	0.129	0.189	0.013
Minimum	0.146	0.139	8.775	0.322	0.006	0.229	-0.137	-0.058	0.027
Maximum	3.255	3.285	19.735	4.920	1.020	0.783	0.292	0.430	0.066

The mean and median value is 1.19 and 0.87 with a standard deviation of 0.995 for model 2 and 1.217and 0.89 with a standard deviation of 1.014 for the model 3 respectively which shows that the data are almost normally distributed. Minimum value is 0.146 while maximum of 3.255 which do not show wide dispersion. Except for the size and the book-to-market value, the dispersion in the data of firms' variables is very small.

Correlation Matrix

Table 43: Correlation Coefficients of variables

	FEE2	FEE3	BM	CASH	LEV	ROE	RM	GDPg	SIZEA
beta2	1.00								
beta4	.934**	1.00							
BM	.159**	.190**	1.00						
CASH	-.087**	-.099**	-.218**	1.00					
LEV	0.04	0.04	.054*	-.473**	1.00				
ROE	-.051*	-.077**	-.402**	.257**	-.209**	1.00			
RM	0.02	0.03	-.121**	0.00	-0.01	0.01	1.00		
GDPg	-.279**	-.277**	-.214**	.067**	0.04	.095**	.334**	1.00	
SIZEA	-0.03	-0.04	-.077**	.095**	.056*	.209**	-0.03	-.134**	1.00

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The book-to-market ratio, the leverage, and the market return are positively correlated with the foreign exchange exposure but the cash, the return on equity, the GDP growth, and the size of the firms have negative correlation. Moreover, the correlation coefficients of the foreign exchange exposure and other Regressors are fairly low which show no chance of multicollinearity between explanatory variables.

7.4: Analysis of Lagged FEE and Foreign ownership

Correlation Matrix

Table 44: Correlation Coefficients of variables: Model 2

	FEE2	FEE3	BM	CASH	LEV	ROE	RM	GDPg	SIZEA
FEE2	1.000								
FEE3	.925**	1.000							
BM	.071**	.092**	1.000						
CASH	-.054*	-.071**	-.217**	1.000					
LEV	0.003	0.008	.054*	-.474**	1.000				
ROE	-.077**	-.099**	-.402**	.256**	-.209**	1.000			
RM	.153**	.153**	-.121**	0.003	-0.008	0.012	1.000		
GDPg	-.204**	-.209**	-.214**	.066**	0.040	.094**	.334**	1.000	
SIZEA	-0.012	-0.037	-.077**	.094**	.056*	.209**	-0.027	-.134**	1.000

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

In lagged environment, the correlation coefficients between any pair of the explanatory variables are very small. Moreover, these are smaller than witnessed in the correlation matrix at contemporaneous level. The book-to-market ratio, the leverage and the market return have positive correlation with the foreign exchange

exposure whereas the size, cash, return on equity, and the gross domestic product (GDP) growth rate have negative correlation.

Table 45: Logit Regression of foreign Ownership - Pakistan

	FEE2	FEE3	Lag FEE2	Lag FEE3
Variable	**Model II**	**Model III**	**Model II**	**Model III**
FEE2	-0.116** (0.055)			
FEE2 (-1)			-0.186** (0.055)	
FEE3		-0.092* (0.054)		
FEE3 (-1)				-0.122** (0.044)
SIZEA	0.308*** (0.034)	0.309*** (0.034)	0.31*** (0.033)	0.308*** (0.033
BM	-0.294*** (0.043)	-0.294*** (0.043)	-0.301*** (0.043)	-0.300*** (0.043)
CASH	0.618*** (0.167)	0.618*** (0.167)	0.612*** (0.168)	0.609*** (0.168)
LEV	-0.887** (0.318)	-0.895** (0.318)	-0.926** (0.318)	-0.922** (0.318)
ROE	0.827* (0.45)	0.806* (0.449)	0.736 (0.45)	0.730 (0.449)
RM	-0.093 (0.285)	-0.104 (0.285)	0.067 (0.291)	0.019 (0.291)
GDPg	-5.603 (4.525)	-4.982 (4.510)	-7.008 (4.504)	-6.255 (4.496)
Constant	-4.143*** (0.588)	-4.198*** (0.588)	-4.021*** (0.585)	-4.082*** (0.585)
R Square	0.181	0.181	0.186	0.184
Chi-square	291.816***	290.226***	297.912***	293.954***

The coefficient of the foreign exchange exposure (FEE2) is negatively significant which means if the foreign exchange exposure increases, the foreign ownership will decrease. The firms' variable book-to market ratio and leverage affects the foreign ownership negatively while the size, cash ratio and the return on equity show a positive effect on it. The effect of the stock market return and the GDP growth on the

foreign ownership is insignificant. These findings show that greater the firm's size, the return on equity, and its cash flow position, more will be the foreign stake-holding.

In model 3, the effect of the foreign exchange exposure is negatively significant on the foreign ownership in the firms but it is somewhat weaker than that we find in model 2. The effects of the firm's variables are almost the same as in model 2. It means change in model does not show any marked difference on the relationship. The significance of the impact is however greater in model 2. Thus the model -2 is better.Size and Cash have positively significant effect on the foreign ownership but the BM ratio and the leverage impact negatively. The return on equity shows an insignificant effect on the foreign ownership.

The lagged value of the foreign exchange exposure of model 3 on the foreign ownership in firms show the same result as that of model 2 but the strength of the coefficient is weaker in model 3. This means interest factor has a very slight impact on the measurement of the foreign exchange exposure. The same was also confirmed in the interviews with CFO.

7.5 Descriptive Statistics and Correlations: USA

Table 46: Descriptive Statistics of FO Regressors: US firms

	FEE2	FEE3	SIZEA	BM	CASH	LEV	ROE	RM	GDPg
N	2442	2442	2442	2442	2442	2442	2442	2442	2442
Mean	0.799	0.823	16.513	0.625	0.421	0.121	0.120	0.007	0.030
Median	0.730	0.730	15.670	0.510	0.330	0.440	0.110	0.01	0.030
Standard Deviation	0.535	0.551	1.151	0.376	0.340	0.121	0.078	0.011	0.009
Minimum	0.000	0.000	12.958	0.199	0.043	0.266	0.017	-0.009	0.018
Maximum	1.821	1.870	16.513	1.343	1.093	0.651	0.261	0.023	0.043

Mean and median of the foreign exchange exposure measures in both models are very close to each other. The minimum values of the both exposure measures are zero as we use absolute value. The maximum value of FEE2 is 1.82 with standard deviation of 0.53 and maximum value of FEE3 is 1.87 with standard deviation of 0.55. Similarly the dispersion of other variables is also not high which means the data are almost normally distributed.

Correlation Matrix:

Table 47: Correlation Coefficients of variables

	beta2	beta4	BM	CASH	LEV	ROE	RM	GDPg	SIZEA
beta2	1.000								
beta4	.935**	1.000							
BM	.063**	.046*	1.000						
CASH	.057**	.065**	-.110**	1.000					
LEV	-0.012	-0.018	-.173**	-.326**	1.000				
ROE	-.044*	-.040*	-.573**	.065**	.202**	1.000			
RM	-.091**	-.120**	.054**	.050*	-.065**	-.046*	1.000		
GDPg	-0.034	0.003	-.100**	-0.031	-.041*	.063**	-.046*	1.000	
SIZEA	-.053**	-.063**	.311**	-.292**	-0.035	-.253**	-0.003	-.087**	1.000

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The book-to- market ratio and the cash ratio have positive correlation with both measures of FE exposure while the size, the leverage, the return on equity, the market return and the GDP growth rate have negative correlation with the FE exposure. The correlation coefficients between each pair of variables are very small which show no multicollinearity.

7.6: Logit Regression Analysis of Foreign Ownership: USA

Table 48: Descriptive Statistics and Correlations: USA

Variable	Model II	Model III
FEE2	0.043 (0.093)	
FEE3		0.120 (0.090)
SIZEA	-0.087* (0.048)	-0.084* (0.048)
BM	-0.223 (0.164)	-0.230 (0.164)
CASH	-0.637*** (0.171)	-0.646*** (0.171)
LEV	0.627 (0.45)	0.624 (0.450)
ROE	-2.369*** (0.791)	-2.348*** (0.791)
RM	0.885 (4.476)	1.415 (4.486)
GDPg	-0.686 (5.292)	-0.768 (5.290)
Constant	0.526 (0.904)	0.419 (0.904)
R Square	0.019	0.020
Chi-square	30.630***	32.186***

Effect of the foreign exchange exposure on foreign ownership in US firms is not significant which means the foreign ownership is not affected by it. This may be due to use of the trade-weighted exchange rate index for which changes are very small. Another reason of insignificance of this relationship may be the hedging of the

exposure. The book-to-market ratio, the cash and the ROE are negatively significant where as other variables are not significant.

The effect of FE Exposure measure of model 3 on the foreign ownership is also non-significant. Book-to- market ratio, CASH and ROE are negatively significant which means their effect on the foreign ownership is inversely proportional. Thus results of both models are identical.

7.7 Analysis of FEE with Lag and Foreign ownership

Correlation Matrix:

Table 49: Correlation Coefficients of Variables (lag effect)

	FEE2	FEE3	BM	CASH	LEV	ROE	RM	GDPg	SIZEA
beta2	1								
beta4	.935**	1							
BM	.047*	.050*	1						
CASH	.054**	.062**	-.110**	1					
LEV	-0.02	-0.033	-.173**	-.326**	1				
ROE	-0.028	-0.029	-.573**	.065**	.203**	1			
RM	-.066**	-.060**	.054**	.050*	-.065**	-.046*	1		
GDPg	0.032	0.001	-.100**	-0.031	-.041*	.063**	-.045*	1	
SIZEA	-.062**	-.070**	.312**	-.292**	-0.035	-.254**	-0.003	-.087**	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The correlation between lag values of the foreign exchange exposure and the other regressors are the same as that at the contemporaneous level. These statistics show that there is no multicollinearity between all the regressors.

Table 50: lag Effect

Variable	Model II	Model III
FEE2 (-1)	-0.015 (0.093)	
FEE3 (-1)		0.063 (0.09)
SIZEA	-0.09* (0.048)	-0.087* (0.048)
BM	-0.214 (0.164)	-0.222 (0.164)
CASH	-0.627*** (0.171)	-0.633*** (0.171)
LEV	0.66 (0.451)	0.661 (0.451)
ROE	-2.424*** (0.792)	-2.415*** (0.792)
RM	0.758 (4.47)	0.99 (4.47)
GDPg	-0.876 (5.294)	-0.9 (5.291)
Constant	0.61 (0.904)	0.501 (0.905)
R Square	0.019	0.020
Chi-square	30.816***	31.275***

The effect of FE exposure on the foreign exchange exposure is not significant. The size of firm has a weak negative effect on the foreign ownership. The return on equity and the cash also show negative effect on the foreign ownership in the equity of the firms.The results of model 3 are almost the same as that of model-2. No significant effect of FE exposure is witnessed on the foreign ownership in this case as well. However, Cash and return on equity (ROE) depict negative effect on the foreign ownership of US firms.

The results may be justified by exchange rate risk management theory and internationalization theory which state that going international has to face exchange rate risk in terms of its impact on their cash flows and cost of capital. The unexpected changes in exchange rates cause foreign exchange exposure for firms. This affects the value of firms and ultimately bshareholders, wealth.

7.8 Summary of chapter

The coefficient of the foreign exchange exposure (FEE) of Pak firms is negatively significant which means if the foreign exchange exposure increases, the foreign ownership will decrease. The firms' variable book-to market ratio and theleverage affects the foreign ownership negatively while size, cash ratio and return on equity show a positive effect on it. The effect of stock market return and GDP growth on the foreign ownership is insignificant. These findings show that greater the firm's size, thereturn on equity, and its cash flow position, more will be the foreign stake-holding. The effect of the foreign exchange exposure is also negatively significant at lagged level but it's odd ratio is less than that at contemporary level. This means interest factor has a very slight impact on the measurement of the foreign exchange exposure.

Effect of the foreign exchange exposure in US firms is not significant which means the foreign ownership is not affected by it. This may be due to use of trade-weighted exchange rate index for which changes are very small. Another reason of insignificance of this relationship may be hedging of the exposure. The lagged effect of FE exposure on the foreign exchange exposure is also not significant. The size of firm has a weak negative effect on the foreign ownership. The return on equity and the cash also show negative effect on the foreign ownership in the equity of the firms.

The Pak firms' results are consistent with Urata and Kawai, 2000 & Benassy Quere et al, 2001 who documented negative effect of exchange rate volatility on the foreign ownership and not consistent with Cushman, 185 & Oldberg and Kolstad, 1995 which state that the exchange rate volatility has positive effects on the foreign ownership. This shows a blurred effect of exchange rate volatility on FPI & FDI.

According to Goldberg and Kolstad (1995), an increase in the expected exchange rate may however, reduce current quantum of FDI.

A scant literature finds that foreign investors usually hold more shares of large firms than do local investors (Lin and Shiu, 2003) but Eun et al. (2008) argue that investors can get added gains from international diversification in the foreign small-cap stocks.

7.9 Summary of Views of the CFOs

Interviews of following Chief Finance Officers were conducted on the issues undertaken in this study and their collective views are given thereafter:

Muhammad Amin Pal, FCA, Chartered Accountant/Executive Director, M/S Mahmood Textile Mills Ltd., M/s Masood Fabrics Ltd., M/S Khawaja Tanneries Ltd. and Roomi Enterprises Ltd.

Muhammad Abid, GM (Finance) M/S Colony Textile Mills Ltd.

Muhammad Abid, Chartered Accountant S &P Global, Pakistan.

Muhammad Munir Malik, CFO Fauji Fertilizer Ltd.

Aamir Bashir Ahmad, CFO Habib Sugar Mills Ltd.

7.10 Views of CFOs

The exchange rate fluctuations affect the profitability of firms due to negative impact on the cost of imported raw materials and other items which decreases the firm's cash flows. The stock price is also affected adversely due the decrease in the profitability and cash flows. Companies keep conservative mindset and try to manage the exchange rate risk by forward covering of foreign currency.

When investors make investments in Pakistan, their return is reduced due to the depreciation in Pak Rupee. Therefore, foreign investors are avoiding investing in equity of Pak firms due to frequent exchange rate movements.

The depreciation in a currency is good for export-oriented firms but it is just for a short time period, may be 6 to 8 months. This benefit evaporates, when cost of imported inputs is increased due to the depreciation in the domestic currency. The net importers face losses due to decline in value of domestic currency. Moreover, depreciation in a currency increases inflation, due to which prices of locally available raw materials increases which will decrease profit margin as it may be not possible to pass over all or any part of the price increase to the customers.

High level of fluctuations in the exchange rates adversely affects the revenue, cost, and cash flow of the companies and may trigger them toward financial distress and bankruptcy.

The companies need working capital financing and their management also has expansion plans. If there are fewer earnings, it may not be possible for a firm to fulfill its growth targets and when some expansion plan is delayed, the cost of machinery will increase due to depreciation in domestic currency. Banks also check financial performance of the firms and analyze net earnings, current ratio and the debt-equity ratio at the minimum.

The interest rates in Pakistan are very favorable for the industry and no interest rate risk has been felt during the last decade.

The global financial crisis 2007-09 has not affected too much to the companies due to prudent actions of the State Bank of Pakistan. Investors also felt its threat and foreign investors withdrew their investment due to which stock prices plummeted in the last months of 2008.

The international investors do not invest normally in the equity of firms in Pakistan for the long time due to exchange rate risk. Thus firms' ownership structure does not contain sizeable foreign equity. Foreign investors will only invest in equity of a firm for long time if they may get higher return on their investment.

The management of the companies does not use distress models available in literature as Z-Score, O-Score etc., but they use only different financial ratios for the analysis of performance of their companies.

The firms use forward contracts for their planned imports to save themselves from risks of exchange rate fluctuations.

CHAPTER - 8

CONCLUSION, PRACTICAL IMPLICATIONS, AND FUTURE RECOMMENDATIONS

8.1 Conclusion

We have initially tested significance of the effect of exchange rate changes on the cross sectional stock returns using three models for the sample firms from Pakistan and USA. The %age of significant betas (foreign exchange exposure elasticity) relating to non-financial firms from Pakistan are 2.9%, 7.4 % and 12.5% in the model-1 at 1%, 5%, and 10% level of significance respectively. Almost similar %ages of significant betas are found in the model-2 and model-3 for Pak firms.

The %ages of significant betas for US firms are 21%, 36% and 43.5% at 1%, 5%, and 10% level of significance in the model-1 respectively. The %age of significant betas greatly declined in the presence of the market return variable (3% to 9%) especially in case of US market but not much additional effect is witnessed on significant level of betas (2% to 15%) in the presence of real interest rates as an additional explanatory variable.

The above results depict that though the foreign exchange exposure elasticity has significant effects on the firms' value but the same is minimal. The results show that the foreign exchange exposure of the non-financial firms matters for their stock market prices/returns and ultimately their valuation. It is also noted that the stock market index of USA possesses the market wide effects of relevant variables where as KSE-100 index does not capture all the influence of the economy-wide factors.

Our results depict that exchange rate movements do affect the cross-sectional stock returns of the firms from the sample countries which means exchange rate is likely to be one of the contributing factors in pricing the stocks. All of our three models show that the foreign exchange exposure elasticity of the US firms to their stock returns is higher than those of Pak firms. The effect of market return to the firms' return in case of US firms is also much higher than that of firms from Pakistan while that of interest, it shows more or less similar but minimal effect in both countries.

8.1.1 Financial Distress Analysis: Pakistan

The foreign exchange exposure elasticity shows a significant effect on the financial distress of Pak firms. The retained earnings, the sales and the cash have negatively significant impact whereas the debt is positively related to the financial distress. The effect of the size and foreign sales is not found significant.

In brief, our study concludes that the foreign exchange exposure elasticity significantly affect the financial distress of non-financial firms from Pakistan contemporaneously as well as in the following time period. Increase in the retained earnings, sales and cash will lessen the chances of financial distress but an increase in debt will increase the chances of financial distress. A very high positive impact of debt on the financial distress is found. The foreign sales also affect the distress of the firms negatively. Hence, increase in the retained earnings, the sales and the cash will reduce financial distress of a firm. However, a debt increase will result into more distress showing very high impact on the firm distress. There is no significant effect of the size of firms on their distress. The results about significance of the firm's financial variables remain same as that at the same level, showing positive

coefficients of the retained earnings, the sales and the cash whereas negative coefficient of debt and foreign sales in all the models.

From all the results, we conclude that changes in the foreign exchange exposure do affect the financial distress of the firms contemporaneously whereas the effect is highly significant when the lagged effect is taken. It is further observed that there is no remarkable difference in the results of different exposure models with the exception of foreign sales which is insignificant at contemporaneous level but significant at lag level. The retained earnings, the sale, the cash position, foreign sales and the debt significantly affect the financial distress but size does not.

The above results are consistent with Bortov and Bodnor (1994), Harper and Aggarwal (2005) and Aggarwal and Harper, (2010) up to the lag level but inconsistent with them as far as contemporaneous relationship between exchange rate changes and the firm's returns is concerned. These findings are also in line with the findings of Kim & Kraple (2014) in so far as general relation of these variables is concerned.

8.1.2 Financial Distress Analysis: USA

The results show that the foreign exchange exposure of US manufacturing firms has significant effect on the financial distress in all the three models contemporaneously as well as at lag level of the foreign exchange exposure. We conclude that there is significant positive relation between the foreign exchange exposure and financial distress of US manufacturing firms at all level. All the firm-specific attributes, taken as control variables in all the models show a significant effect on the financial distress where as the debt and the size variables have negative coefficient and other variables have positive coefficients.

The results of US non-manufacturing firms differ from the results of US manufacturing firms. The foreign exchange exposure does have a weak significant impact on the financial distress of the US non-financial firms both at the same level and at the lag level but the total exposure is non-significant. All the firm's fundamental attributes included in the regression model depict significant effect on the financial distress. In non-manufacturing businesses, the size and the debt variables have negative coefficients which mean that size and debt of the firms affect the financial distress positively. The larger the size of a firm, higher will be the distress risk.

The results are in line with Bodnor and Wong (2003), Martin and Mauer (2003) at lag level and Kim and Kraple (2014) for contemporaneous foreign exchange exposure. The results of the total exposure of US manufacturing firms is not consistent with the above studies both at contemporary and lag level. Aggarwal and Harper (2010) argue that the insignificant relation may be due to use of the trade-weighted exchange rate (TWIEXR) and firms may have different level of exposure to different currencies which may not correlate with the currency index.

8.1.3 Global Financial Crisis, Foreign exchange Exposure, and financial distress

We find that the effect of the global financial crisis on the relationship of the foreign exchange exposure and the financial distress of Pak firms is significant only in the year 2009. It is not significant in either of the year 2007 and year 2008. This shows a spill-over effect of the US sub-prime mortgage financial crisis emanated in 2007. This delay in the GFC effect in case of Pakistan is explained by the contagion theory.

The impact of the foreign exchange exposure is found significant on the financial distress of US manufacturing firms in all the three years (2007, 2008, & 2009) when these years are taken as an interactive dummy variable. The impact of the crisis is however; highly significant in the year 2008.The impact of the foreign exchange exposure on the financial distress of the US non-manufacturing firms becomes significant at 10% when year dummy is taken. However, the relationship between the foreign exchange exposure and the financial distress of the firms is not affected in any of the crisis period 2007, 2008, and 2009. This result may be due to small sample size of the non-manufacturing firms or due to nature of business operations of such firms.

It is concluded that the financial crisis did have a significant impact on the relationship between the foreign exchange exposure elasticity and the financial distress of US manufacturing firms in all the three years of the GFC 2007-09 where as it was not significant in US non-manufacturing firms. The effect is significant for Pak firms only in the year 2009. Our results confirm the rationale of contagion theory under which spillover effect is witnessed in case of Pakistan. Our results also support the market integration theory i.e. a different level of integration between different markets determine level of effect of one market on the other markets.

8.1.4 Idiosyncratic Risk & FX Exposure

Our study finds that the foreign exchange exposure of Pak and US firms has positive effect on their idiosyncratic risk. This study also finds that the EGARCH model explains this relationship better than the Fama-French three factor model as its explanatory power is much higher in the EGARCH estimates. It is also found that there is the inverse relationship between size of firms and their idiosyncratic risk,

which means the idiosyncratic risk, is found lower for large firms as compared to small firms. This is logically understandable as large firms can cope well with their risks which constitute the idiosyncratic risk. The leverage affects the idiosyncratic risk negatively i.e. increasing he leverage may decrease the idiosyncratic risk. Similarly cash is negatively correlated with the idiosyncratic risk. The book- to- market ratio and CF/P affect the idiosyncratic risk positively.

8.1.5 Foreign Ownership & FX Exposure

In case of the foreign ownership domain, the coefficient of the foreign exchange exposure (FEE) of Pak firms is negatively significant which means if the foreign exchange exposure increases, the foreign ownership will decrease. The firms' variable book-to market ratio and leverage affects the foreign ownership negatively while the size, cash ratio and the return on equity show a positive effect on it. The effect of the stock market return and the GDP growth on the foreign ownership is insignificant. These findings show that greater the firm's size, the return on equity, and its cash flow position, more will be the foreign stake-holding.

The effect of the foreign exchange exposure is also negatively significant at the lagged level but it's odd ratio is less than that at the contemporary level. The interest factor has a very slight impact on the measurement of the foreign exchange exposure.

The effect of the foreign exchange exposure in the US firms is not significant which means the foreign ownership is not affected by it. This may be due to use of the trade-weighted exchange rate index for which changes are very small. Another reason of insignificance of this relationship may be hedging of the exposure.The lagged effect of FE exposure on the foreign ownership is also not significant. The size of firm has a

weak negative effect on the foreign ownership. The return on equity and the cash also show negative effect on the foreign ownership in the equity of the firms. The results are different for the sample firms from both the countries. These results may get support from studies such as the following arguments:

8.2 Proceedings of the Interviews with CFOs

Interviews were conducted with CFOs of some companies which revealed that large changes in exchange rates do affect cost of their inputs but they use forward covering arrangements with the banks to manage that risk. They however, told that depreciation in the exchange rate of Pak rupee increases their exports but due to increase in cost of imported inputs, it also decreases their profitability and cash flows which in turn affects dividends and stock prices.

They did agree with some impact of global financial crisis on the stock prices but not on cost of the debt as interest rates in Pakistan are reasonably low. They did not see shortage or difficulty in availing financing for working capital as well as for long term purposes. The depreciation in the domestic currency does increase revenues of a firm but for a very short time period. This benefit of depreciation evaporates when they have to pay high amount for their imports of machinery and raw materials. The net importers face losses due to the depreciation in the domestic currency.

8.3 Practical Implications

This study has multi-dimensional policy implications for making foreign portfolio, foreign direct investment, and risk management practices of the non-financial firms. This study is of great significance in understanding the foreign exchange risk and the parameters of the financial stability of the firms in the wake of floating exchange rate movements. It will provide a useful insight to the potential investors in the security markets about the extent to which the foreign exchange changes will affect returns on their equity portfolios in Pakistan and USA. It gives a deep insight to the managers of multinational firms to take care of currency risk which, if not addressed adequately can jeopardize their business operations and compromise their set targets.

This study provides a fresh and unique knowledge to the management of domestic companies who normally assume that their operations are not affected by the movements in exchange rates as they have no international transactions. This study warns about the negative impact of the changes in exchange rates on the financial stability of non-financial firms and warning signals on financial distress and chances of bankruptcy.

The financial institutions and regulators will benefit from this study to watch over the exchange rate movements and their impact on the cost of capital, trade, investment and other financial transactions of the firms. Studies on the exchange rate fluctuations have usually been carried out by the regulators, economists, and scholars at macro level but this study gives a micro view of the exchange rate exposure of firms, its link with their financial stability, idiosyncratic risk and its equity participation by foreign investors.

This study gives signals to the business managers and owners to considering the foreign exchange exposure when evaluating financial position of businesses and making financial planning and forecasting to ensure sustainability of their businesses.

The bankers can benefit from the findings of this study to make lending decisions to corporate sectors for investment and import/export financing both in domestic and foreign companies. This study provides an insight to the investors about the behavioral responses of the corporate managers in their financial decisions regarding managing the exchange risk, firm specific risk and effect of their interaction on the value of firms.

8.4 Recommendations for future research

Our study took non-financial listed firms from Pakistan and USA from different sectors. Research can be carried on finding the foreign exchange exposure of different sectors comparatively over a longer period of time. This study uses bilateral exchange rate between Pak Rupee and the US dollar. Effective exchange rate of Pak Rupee with its major trading partners' may be used to work out foreign exchange exposure of non-financial firms.

This study uses Altman's Z-score for measuring the financial distress of the firms. Future studies may adopt different and preferably country–specific distress measures to carry out research on the issues.

This study used monthly data frequency, which may show less exchange rate elasticity. A future study may be taken with daily data frequency to test any difference in results due the change in the data frequency.

It is proposed that the political uncertainty be taken as a variable in measuring behavior of the currencies exposure and a factor towards inflation which may erode the level of exports resulting into balance of payment deficit. This may cause frequent fluctuations in the exchange rates resulting into high exposure to the firms and affecting the stock market prices negatively.

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Appendixes

Annexure-A

Unstructured Questionnaire:

1. We are investigating an effect of foreign exchange exposure elasticity on the financial distress of firms and finding whether this relation was affected by the global financial crisis(2007-09). The study has also explored effect of the foreign exchange exposure on idiosyncratic risk and foreign ownership in the firms. We are using Z-Score model to work out the financial distress of the sample firms. We have got the required historical data from the financial statements and other sources and analysis has been made by using the secondary data. In order to augment our results thus found, we want first-hand views of senior finance officials preferably CFOs of some firms from our sample on these issues. In this way we will be able to make the proposed study much better.
2. I give below a few questions on various aspects of the relationship under study. The major issues under discussion are financial distress, foreign exchange exposure, idiosyncratic risk, foreign ownership (FDI & FPI), and the financial crisis.
3. What kinds of foreign risks do your company normally faces here in Pakistan e.g. political risk, economic risk, cultural risk, interest rate risk, inflation risk and foreign exchange risk(FER)
4. What other risks affect your company?
5. Can you tell me about specific effects of the foreign exchange risk on the operations of your company?

6. Why your company is affected by the changes in the foreign exchange rates?
7. How and up to what extent foreign exchange risk has affected your company?
8. If you think, foreign exchange risk affects operations of your company, how you think your competitors may face foreign exchange risk in comparison to your company.
9. Which type of companies, you think faces FER the most?
10. Did your company face financial difficulties in some period/year?
11. In the period of financial distress (FD), do you think the effect of FER was comparatively more, same or low as during the normal period.
12. How foreign exchange rate changes affects your financing decisions during financial difficulties?
13. Have you ever considered some of your company's risks other than the market risk?
14. Do the company's risks are influenced by FER and which are more important as compared to others?
15. Do you think that these risks affect your cash flows or/and market price?
16. Which activities of your company are thought to breed risk
17. Which of these risks are related to changes in FER?
18. Does your company have some foreign transactions, business or investments?
19. How FER changes affect your company on account of these foreign operations?
20. How much of your revenue comes from foreign operations i.e, from foreign sales, FDI, FPI?
21. Do you have some policy to minimize FERs?
22. What you feel about financial and credit access to your company?
23. What is level of financial and management skills for analysis of your company?
24. Which government policies affect operations of your company?

25. What type of attitude your company has for risk management?
26. How much foreign investment your company has in any of your subsidiary, affiliates, and joint ventures.
27. Any reinvestment plans (local & international) your company has?
28. Any financial constraints your company has ever faced/facing?
29. Any risk management measures you use in your company?
30. Any financial threats you perceive in the near and distant future?
31. Any scenario building, sensitivity analysis on effect of foreign exchange exposure?
32. Who is responsible for international operations and financial matters? Please inform about their skills, education experience and tools they use to assess financial risks to be faced by your company.
33. What kind of attitude they have towards risk management and how they assess that and tools used by them for risk management.
34. What opportunities and threats you think your company may face in future? What are political and economic factors are taken into consideration?
35. How declining value of Pak rupee affected your domestic and foreign operations and what has been their financial impact .
36. Which duties and other tariffs affect your financial planning and decision making?
37. How interest rate changes and inflation affect your foreign sales/trade and investment?

Annexure-B

a. Relationship between Foreign Exchange Exposure and Financial Distress, At Level: Pakistan: OLS Results

Variables	Model-I	Model-II	Model-III
FEE1	-0.084** (0.029)		
FEE2		-0.049* (025)	
FEE3			-0.056*** (0.024)
SIZEA	-0.011 (0.022)	-0.016 (0.022)	-0.017 (0.022)
RE	9.860*** (0.554)	9.889*** (0.555)	9.861*** (0.555)
SALE	0.427*** (0.047)	0.424*** (0.047)	0.423*** (0.047)
DEBT	-10.179*** (0.181)	-10.183*** (0.181)	-10.185*** (0.181)
CASH	1.389*** (0.074)	1.89*** (0.074)	1.387*** (0.074)
FSALE	-0.269*** (0.122)	-0.263*** (0.123)	1.387*** (0.122)
Adjusted R2	0.800	0.799	0.799
F Value	1172.968***	1169.7847***	1170.904***

b. Relationship between Foreign Exchange Exposure and Financial Distress, At Level: Pakistan: Random Effect Results

Variables	Model-I	Model-II	Model-III
FEE1	-0.0468* (0.0245)		
FEE2		-0.03697 (0.0251)	
FEE3			-0.0269 (0.0200)
SIZEA	-0.0034 (0.0386)	-0.00582 (0.03867)	-0.0070 (0.0385)
RE	10.3169*** (0.4821)	10.32246*** (0.4822)	10.3051*** (0.4823)
SALE	0.2047*** (0.0595)	0.2023*** (0.0595)	0.2024*** (0.0595)
DEBT	-9.3799*** (0.2011)	-9.3806*** (0.2012)	-9.3816*** (0.2012)
CASH	1.2660*** (0.0734)	1.2642*** (0.0734)	1.2647*** (0.0734)
FSALE	-0.1675 (0.1738)	-0.1627 (0.1743)	-0.1647 (0.1743)
Adjusted R2	0.6953	0.695	0.6949
F Value	671.283***	669.75***	670.114***

c. Lag effect of FEE on financial distress of Pak Firms: OLS Results

Variables	Model-I	Model-II	Model-III
F EE1(-1)	-0.115*** (0.029)		
FEE2(-1)		-0.094*** (0.025)	
FEE3(-1)			-0.095*** (0.024)
SIZEA	-0.009 (0.022)	-0.016 (0.022)	-0.017 (0.022)
RE	9.760*** (0.554)	9.834*** (0.554)	9.801*** (0.554)
SALE	0.426*** (0.047)	0.422*** (0.047)	0.420*** (0.047)
DEBT	-10.200*** (0.180)	-10.203*** (0.180)	-10.209*** (0.180)
CASH	1.387*** (0.074)	1.386*** (0.074)	0.382*** (0.074)
FSALE	-0.263*** (0.122)	-0.247** (0.122)	-0.248** (0.122)
Adjusted R2	0.800	0.800	0.800
F Value	1177.099***	1176.360***	1177.082***

d. Lag effect of FEE on financial distress of Pak Firms: Random Effect Results

Variables	Model-I	Model-II	Model-III
FEE1(-1)	-0.0770** (0.0242)		
FEE2(-1)		-0.0859*** (0.0249)	
FEE3(-1)			-0.0651** (0.0199)
SIZEA	0.0043 (0.0386)	0.0048 (0.0387)	0.0022 (0.0386)
RE	10.2632*** (0.4822)	10.2941*** (0.4815)	28.1742*** (0.4818)
SALE	0.2027*** (0.0593)	0.2021*** (0.0593)	0.2032*** (0.05936)
DEBT	-9.4000*** (0.2012)	-9.4170*** (0.2015)	-9.4154*** (0.2015)
CASH	1.2673*** (0.0732)	1.2651*** (0.0732)	1.2634*** (0.0732)
FSALE	-0.1590 (0.1735)	-0.1462 (0.1738)	-0.1466 (0.1737)
Adjusted R2	0.6962	0.6961	0.6961
F Value	673.8***	673.41***	73.465***

e. Relationship between Foreign Exchange Exposure and Financial Distress, USA Manufacturing Firms (at Level): OLS Results

Variables	Model-I	Model-II	Model-III
FEE1	-0.212*** (0.021)		
FEE2		-0.160*** (0.047)	
FEE3			-0.109*** (0.046)
SIZEA	-0.265*** (0.030)	-0.274*** (0.030)	-0.274*** (0.031)
RE	3.500*** (0.138)	3.626*** (0.141)	3.638*** (0.141)
SALE	1.323*** (0.066)	1.335*** (0.068)	1.335*** (0.068)
DEBT	-4.130*** (0.222)	-4.170*** (0.227)	-4.167*** (0.227)
CASH	0.552*** (0.086)	0.468*** (0.087)	0.462*** (0.087)
FSALE	0.883*** (0.112)	0.693*** (0.113)	0.681*** (0.113)
Adjusted R2	0.574	0.556	0.554
F Value	390.375***	362.194***	360.287***

f. Relationship between Foreign Exchange Exposure and Financial Distress, USA Manufacturing Firms (at Level): Random Effect Results

Variables	Model-I	Model-II	Model-III
FEE1	-0.1342*** (0.0156)		
FEE2		-0.0657* (0.0336)	
FEE3			-0.0556* (0.0330)
SIZEA	-0.6083*** (0.0477)	-0.6192*** (0.04872)	-0.6221*** (0.04877)
RE	2.6664*** (0.165074)	2.7060*** (0.1688)	2.7030*** (0.1690)
SALE	1.4032*** (0.1021)	1.4691*** (0.1038)	1.4690*** (0.1039)
DEBT	-5.3857*** (0.2567)	-5.4084*** (0.2613)	-5.4151*** (0.2614)
CASH	0.3715*** (0.0870)	0.3258*** (0.0883)	0.3243*** (0.0883)
FSALE	0.5533*** (0.1753)	0.4172* (0.1781)	0.4151* (0.1784)
Adjusted R2	0.463	0.442	0.442
F Value	248.39***	230.18***	229.84***

g. Relationship between Foreign Exchange Exposure and Financial Distress USA Non-Manufacturing Firms, at Level: OLS Results

Variables	Model-I	Model-II	Model-III
FEE1	0.075 (0.067)		
FEE2		-0.215 (0.138)	
FEE3			-0.225* (0.130)
SIZEA	-0.371*** (0.077)	-0.383*** (0.077)	-0.383*** (0.077)
RE	3.601*** (0.442)	3.471*** (0.442)	3.463*** (0.442)
SALE	0.931*** (0.163)	0.965*** (0.166)	0.975*** (0.166)
DEBT	-11.864*** (0.694)	-11.935*** (0.695)	-11.914*** (0.694)
CASH	0.822*** (0.219)	0.821*** (0.218)	0.830*** (0.217)
FSALE	2.815*** (0.453)	2.901*** (0.446)	2.902*** (0.446)
Adjusted R2	0.712	0.713	0.713
F Value	148.440***	149.024***	149.306***

h. Relationship between Foreign Exchange Exposure and Financial Distress USA Non-Manufacturing Firms, at Level: Fixed effects results

Variables	Model-I	Model-II	Model-III
FEE1	0.0379 (0.0348)		
FEE2		-0.1191* (0.06372)	
FEE3			-0.1277* (0.0605)
SIZEA	0.4189*** (0.1147)	0.4126*** (0.1143)	0.4112*** (0.1142)
RE	5.3850*** (0.3865)	5.3328*** (0.3838)	5.3286*** (0.3833)
SALE	1.7067*** (0.3351)	1.7169*** (0.33298)	1.7558*** (0.3341)
DEBT	-6.5475*** (0.5535)	-6.5432*** (0.5518)	-6.4765*** (0.5522)
CASH	0.7133*** (0.1800)	0.7012*** (0.1789)	0.7139*** (0.1779)
FSALE	-0.3152 (0.9175)	-0.2683 (0.9031)	-0.2928 (0.9023)
Adjusted R2	0.564	0.567	0.568
F Value	83.32***	84.16***	84.51***

i. Lag effect of FEE on Financial Distress, US Manufacturing Firms: OLS Results

Variables	Model-I	Model-II	Model-III
FEE1(-1)	-0.144*** (0.201)		
FEE2(-1)		-0.159*** (0.047)	
FEE3(-1)			-0.109*** (0.046)
SIZEA	-0.268*** (0.030)	-0.274*** (0.030)	-0.274*** (0.031)
RE	3.586*** (0.139)	3.623*** (0.141)	3.635*** (0.141)
SALE	1.318*** (0.067)	1.335*** (0.068)	1.335*** (0.068)
DEBT	-4.145*** (0.225)	-4.165*** (0.227)	-4.171*** (0.227)
CASH	0.517*** (0.087)	0.469*** (0.087)	0.463*** (0.087)
FSALE	0.786*** (0.113)	0.691*** (0.113)	0.680*** (0.113)
Adjusted R2	0.562	0.555	0.554
F Value	372.007***	361.188***	359.297***

j. Lag effect of FEE on Financial Distress, US Manufacturing Firms: Random Effect Results

Variables	Model-I	Model-II	Model-III
FEE1(-1)	-0.0260* (0.0155)		
FEE2(-1)		-0.0658* (0.03361)	
FEE3(-1)			-0.0557* (0.0330)
SIZEA	-0.6062*** (0.0483)	-0.6193*** (0.0487)	-0.6223*** (0.0487)
RE	2.7453*** (0.1682)	2.7061*** (0.1688)	2.7031*** (0.1690)
SALE	1.4504*** (0.1039)	1.4692*** (0.1038)	1.4691*** (0.1040)
DEBT	-5.4166*** (0.2611)	-5.4101*** (0.2615)	-5.4168*** (0.2615)
CASH	0.3294*** (0.0886)	0.3253*** (0.0884)	0.3239*** (0.0884)
FSALE	0.4476* (0.1770)	0.4172* (0.1782)	0.4151* (0.1784)
Adjusted R2	0.443	0.442	0.442
F Value	230.73***	230.18***	229.85***

k. Lag effect of FEE on Financial Distress, US non Manufacturing Firms: OLS Results

Variables	Model-I	Model-II	Model-III
FEE1(-1)	0.042 (0.067)		
FEE2(-1)		-0.204 (0.138)	
FEE3(-1)			-0.204 (0.130)
SIZEA	-0.376*** (0.077)	-0.386*** (0.077)	-0.387*** (0.077)
RE	3.580*** (0.443)	3.480*** (0.442)	3.472*** (0.442)
SALE	0.917*** (0.164)	0.949*** (0.165)	0.958*** (0165)
DEBT	-11.861*** (0.697)	-11.953*** (0.697)	-11.951*** (0.697)
CASH	0.837*** (0.219)	0.823*** (0.218)	0.833*** (0.218)
FSALE	2.855*** (0.453)	2.928*** (0.447)	2.931*** (0.447)
Adjusted R2	0.712	0.713	0.713
F Value	147.609***	148.518***	148.700***

l. Lag effect of FEE on Financial Distress, US non Manufacturing Firms: Random Effect Results

Variables	Model-I	Model-II	Model-III
FEE1(-1)	-0.00018 (0.0333)		
FEE2(-1)		-0.0206 (0.0631)	
FEE3(-1)			-0.007025 (0.06037)
SIZEA	0.4180*** (0.1151)	0.4151*** (0.1154)	0.416929*** (0.115)
RE	5.3444*** (0.3881)	5.3435*** (0.38600)	5.3439*** (0.3860)
SALE	1.6287*** (0.3406)	1.6666*** (0.3343)	1.663*** (0.3353)
DEBT	-6.5481*** (0.5578)	-6.5542*** (0.5553)	-6.5488*** (0.5551)
CASH	0.7419*** (0.1789)	0.7355*** (0.1797)	0.7403*** (0.1792)
FSALE	-0.1392 (0.1789)	-0.15975 (0.9077)	-0.1500 (0.9099)
Adjusted R2	0.562	0.562	0.562
F Value	82.63***	82.67***	82.63***

Annexure-C

Descriptive Statistics of Z-score, Foreign exchange exposure and Control variables of Pak Firms: full sample data (without winsorization)

	Z-score	FEE1	FEE 2	FEE 3	SIZEA	RE	SALE	DEBT	CASH	FSALE
N	2057	2057	2057	2057	2057	2057	2057	2057	2057	2057
Mean	6.46	1.46	1.36	1.41	14.96	0.04	1.24	0.54	0.5	0.32
Median	5.26	0.98	0.87	0.88	0.89	14.87	0.03	1.10	0.57	0.07
Standard Deviation	7.91	1.54	1.53	1.61	1.59	1.11	0.83	0.21	3.66	4.15
Minimum	-86.39	0	0	0	8.77	-10.92	0	0.01	0	0
Maximum	159.17	13.7	14.06	14.03	19.73	47.52	8.97	0.99	123	180.66

Annexure-D

Descriptive Statistics of Z-score, Foreign exchange exposure and Control variables of US Manufacturing Firms: full sample data ((without winsorization)

	Z-score Mfg	FEE1	FEE2	FEE3	SIZA	RE	SALE	DEBT	CASH	FSALE
N	2024	2024	2024	2024	2024	2024	2024	2024	2024	2024
Mean	4.19	1.78	0.96	0.99	16.47	0.4	0.93	0.45	0.57	0.33
Median	3.66	1.46	0.73	0.73	16.44	0.35	0.79	0.44	0.34	0.33
S.D	2.73	1.43	0.9	0.91	1.12	0.47	0.66	0.15	1.24	0.26
Skewness	2.67	1.14	2.31	2.15	0.36	8.37	2.14	0.34	11.78	0.26
Kurtosis	15.75	1.4	10.12	8.53	0.16	113.43	6.24	0.18	177.39	-0.86
Minimum	-3.87	0	0	0	13.94	-0.76	0.13	0.07	-0.08	0
Maximum	35.78	9.88	9.4	9.11	20.5	8.59	4.93	1.08	22.83	1.38

Annexure-E

Descriptive Statistics of Z-score, Foreign exchange exposure and Control variables of US non-manufacturing Firms: full sample data (without winsorization)

	ZNMfg	FEE1	FEE2	FEE3	SIZA	RE	SALE	DEBT	CASH	FSALE
N	418	418	418	418	418	418	418	418	418	418
Mean	3.73	1.53	0.96	0.97	16.74	0.19	0.78	0.44	0.63	0.16
Median	2.69	1.19	0.70	0.73	16.70	0.16	0.54	0.43	0.26	0.08
S.D	2.95	1.32	0.95	0.95	1.28	0.35	0.63	0.15	1.56	0.19
Minimum	-2.68	0.00	0.00	0.01	12.96	-1.48	0.17	0.07	0.00	0.00
Maximum	14.43	9.30	9.77	9.68	19.81	1.86	3.36	1.00	15.94	1.00