Chapter 1

INTRODUCTION

1.1 BACKGROUND AND MOTIVATION

Research in *"Financial Economics"* have depicted that stock prices are effected *systematically* by a number of macro-economic variables, namely interest rates on short term assets, general price level, economic activity level (specifically manufacturing sector), money supply and market interest rate. The stock price sensitivity to macro variables is in turn affected by firm specific micro variables (firms characteristics). This aspect establishes a link that firm characteristics not only affect risk directly but also indirectly via their influence on macro risk factors.

Moreover, since the inception of CAPM (Capital asset pricing model) by Sharpe, Lintner and Markowitz who simplified the complicated problem of optimal portfolio selection by assumption that investors preferences *U* only depends upon first two moments μ and σ^2 (mean and variance) of random liquidification value of their portfolio, the focus of financial research has been risk (the systematic risk (β), firm specific risk) and risk mitigation.

The credit risk and market risks emerged on the horizon when the fragility and collapse of banking and financial sector accounted for nearly all the major *economic crisis* like *"The Great Depression";* (Bernanke 1983); and *financial crisis* (2007-2009, 2011); (Gerali, Neri, Sessa & Signoretti 2010).

Thus for the purpose of giving the aspects of risks the due focus this study intends to investigate, for Pakistan's manufacturing/banking sector, the relationship between the stock returns of firms and macro variables; and firm specific micro variables sensitivity to macro factors by estimating factor betas (systematic risk) through a multifactor macro-economic model developed on the lines of Burmeister & Wall (1986) and Chen, Roll & Ross (1986).

Further after investigating the behavior of stock returns and computing systematic risk, this study develops a two-step logit model to assess the risk of both the manufacturing and banking sector of Pakistan.

In addition to risk assessment of manufacturing sector, this study gives due weightage to portion of literature concerning banking sector which supports the ultimate culmination of event of credit risk; a classified *NPL*, as the appropriate measure of credit risk, this study further intends to analyze Non-performing loans in Pakistan's banking sector and its macroeconomic implications, which needs a brief introduction.

What is common between world's three mega economic and financial crisis, *The Great Depression; The Asian financial crisis of 1997*; and *International financial crisis* (2007-2009, 2011); is that the guilt clause applies to the *"banking sector"*- reason; *massive buildup of NPL's*.

A chain of studies by Bernanke held the banking sector collapse responsible for the depth and persistence of the Depression Crisis, when from 1930-1933 half of US banks failed & financial markets crashed; Bernanke (1983, 86), Bernanke & James (1991), Schreft (1990). Banking sector was the root cause of Asian crisis of 97 when banking sectors of East Asian economies defaulted at an average of 25% of total loan portfolio, the Indonesian economy, where over 60 banks collapsed during the crisis and nonperforming loans represented about 75% of total loan portfolios; Caprio and Klingebiel (2002). The *International financial crisis*, (2007-2009, 2011) where mortgage *NPL's* created enormous liquidity issues in interbank market and led to sudden collapse of major financial institutions. The shocks that erupted in banking sector accounted for the largest share of contraction of economic activity, whereas macro-economic shocks accounted for a limited role; Gerali, Neri, Sessa & Signoretti (2010).

Historically, banking crisis have been linked with gigantic accumulation of nonperforming loans which constituted a sizeable portion of total assets of insolvent financial institutions/banks especially during systematic crisis, a situation where troubled banks account for 20% of aggregate deposits of banking and financial sector. A red alert crisis level of banking which, ironically the world has witnessed *114 episodes* occurring *91 countries* since late 1970's; Dziobek and Pazarbasioglu (1997).

Despite this apparent link between bank crisis and nonperforming loans, the literature on bank crisis focus the macro determinants of bank crisis, ignoring the various sources of *NPL*, which are used as variables to assess the intensity of crisis and critical factor leading to crisis, rather than viewed as *consequence of crisis*. For instance Demirgne-Kunt and Detragiache (1998) classify *financial distress episode as a full-fledge crisis* rather than an *indicator to crisis*, if the *NPL* ratio to total assets exceeds 10%.

Thus this study intends to analyze Non-performing loans in Pakistan's banking sector, as a measure of credit risk, through a multifactor macro-economic model which is an extension to comprehensive credit risk analysis.

1.2 SIGNIFICANCE OF THE STUDY

There are few studies which investigated the macroeconomic variables impact upon stock returns concerning Pakistan such as Nishat and Saghir (1991) who found that there exists a considerably weaker relationship between stock returns and economic activity. Hashmi (1997) analyzed the relationship of stock prices with economic variables and concluded that volatility in KSE has generally been associated with economic instability and unexpected economic shocks are main source of instability in the KSE. Hussain and Mehmood (2001) inferred "unidirectional causality" originating from macro-economic variables to stock returns. Husain (2006) found that stock markets of Pakistan are not developed enough to

exercise their due role in influencing the real economy. Hajra (2001) concluded that financial & economic indicators influence the stock prices in Pakistan; the study also suggests that "unanticipated realizations of financial and economic variables are also the determinants of stock prices". Farooq (2005) concludes that "stock market is related to all macro factors except foreign exchange reserves". Hashmi (2011) proposed bankruptcy prediction model and compared their performance with other established models in literature. The study identified set of firm-specific and macro variables that are important factors in bankruptcy outcome. The firm specific variables identified were level and growth of assets, working capital, net income and receivable to debt ratio. The macroeconomic factors identified were output growth in manufacturing sector, anticipated and unanticipated monetary growth, unexpected inflation and the interest rates risk premium. The study using Portfolio Analysis and CAPM also concluded that bankruptcy risk is systematic in case of KSE. The study incorporated estimated bankruptcy risk and financial constraint in the standard inter-temporal resource allocation problem of firms to derive the investment function and concluded that bankruptcy risk in firms with higher risks of bankruptcy tend to undertake relatively less investment.

The significance of this particular study is that it not only analyzes the relationship between stock returns and macro variables and firm specific micro variables by calculating the factor betas but also, it assess the risk of both the manufacturing and banking sector of Pakistan based on a sound data comprising of *498* firms and *41* banks of private sector over a sample period ranging from *1974-2010*. A broad base risk assessment, based on macro fundamentals concerning the two major pillars of both real and financial sectors is the contribution of this study.

The significance of the study also lies in analyzing *NPL* as an additional measure of credit risk. There are several explanations for *NPL*; *chronic fiscal defaults, balance of payment*

issues in various countries, mismatch between asset/liabilities maturities, demand for short term – high priced financing in the shape of interbank loans, all contributing to accumulation of impaired loans. However for *LDC's* (less developing countries) nonperforming loans are an *exacerbated phenomenon*.

The *NPL* accumulation and banking crisis originating from it have most affected the countries where government were indulged in excessive borrowing from banking sector and owned a sizeable portion of *NPL's* ; Basu (1998).

Furthermore in LDC' where banks exhibit *market power*, and operate in a *concentrated market*, the loans portfolios are *heavily skewed* towards selective and few sectors and economic agents; Brownbridge (1998). In such scenarios economic contraction can occur and even affect those banks which have higher levels of capital base. The absence of deposit insurance mechanism further increases the vulnerabilities.

As all these aspects hold for Pakistan where a *stylized banking sector* operates under *monopolistic competition*, where commercial banks prefer extending *risk free* loan to government for the purpose of improving *CAR (credit adequacy ratio)*, where government *crowds out* the private investment by acquiring sizeable chunks of private sector credit, where banks corporate loan portfolios are *skewed* towards specific sectors/giants, where public sector banks finance the loss making public enterprises, all occurring in a sector which lacks sound *corporate governance, exhibits underpricing of risk and ad-hoc approaches of risk measurement*.

For Pakistan, the prime focus of most of the research concerning the financial aspects and banking sector has been *"Spreads"* (e.g. (Muhammad Ul Hassan Khan 2009, Khawaja & Din 2007 etc.) and *"Pass–through mechanism"* (e.g. Qayyum, Khan and Khawaja 2005, Hassan M. Mohsin 2011)**.** This study intends to investigate an equally important aspect of banking sector with deep macroeconomic implications, the non-performing loans**.**

1.3 HYPOTHESIS

This study attempts to investigate the following hypothesis concerning manufacturing and banking sector of Pakistan.

We will investigate following hypothesis for manufacturing sector of Pakistan:

- **H_0^1:** Stock returns of manufacturing sector are affected by macroeconomic risk factors
- **H_1^1:** Stock returns of manufacturing sector are not affected by macroeconomics risk Factors

- **H_0^2:** The financial distress risk of manufacturing sector of Pakistan is of significant level
- **H_1^2:** The financial distress risk of manufacturing sector of Pakistan is of not of significant level

Concerning NPL's of banking sector of Pakistan, as a measure of credit risk, this study attempts to investigate the following hypothesis for Banking sector of Pakistan:

- **H_0^3:** Non performing loans of banking sector are affected by macroeconomic risk factors
- **H_1^3:** Non performing loans of banking sector are not affected by macro risk factors

- **H_0^4:** Non performing loans of banking sector are affected by bank specific variables
- **H_1^4:** Non performing loans of banking sector are not affected by bank specific variables

- **H_0^5:** The credit risk of banking sector of Pakistan is of significant level
- **H_1^5:** The credit risk of banking sector of Pakistan is of not of significant level

1.4 ORGANIZATION OF THE STUDY

The study is organization in the following sequence:

Chapter 2 deals with the literature review; Chapter 3 is a narrative description of manufacturing & banking sector of Pakistan; Chapter 4 explores the model & methodology; Chapter 5 states data and variable construction; Chapter 6 elaborates the over-all manufacturing sector results; Chapter 7 elaborates the regime wise manufacturing sector results; Chapter 8 explains the sectorial analysis of manufacturing sector; while Chapter 9 states the results of the banking sector & conclusive discussion.

In the next chapter the *literature review* concerning the proposed study is discussed in detail.

Chapter 2

REVIEW OF LITERATURE

2.1 RISK ASSESSMENT OF MANUFACTURING SECTOR

2.1.1The Link between Equity Returns & Risk

One of the major frontiers of modern finance is quantification of risk. Firms and financial institutions are ultimately exposed to macro-economic factors and fluctuations in the economy. Their port folios are typically large enough that idiosyncratic risk (micro) is diversified away by law of large numbers leaving exposure to systematic risk (micro economic) in this content the first inspiring risk approach was classic Black & Scholes (1973) option pricing theory, which proposed that a company's equity is like a call option on underlying company's assets. The value of equity depends among other things, upon market value of company's assets, their volatility, and payment terms of liabilities. Implicit in option value is probability of option being exercised; for equity, its probability of not defaulting on company's liability. This theory presented a coherent frame work for objective measurement of risk and received subsequent elaboration by Merton (1973, 1974), Black & Cox (1976), Ingersoll (1977) and Geske (1977), and eventually to be called as Merton model. The Merton model was empirically implemented in a number of researches; Queen & Roll (1987) proposed that risk can be derived from equity return information, such as return volatility. Empirical studies were conducted by Jones, Mason & Rosenfeld (1984), Ogden (1987) and Jarrow & Van Deventer (1999).

Moreover the approach got studied in a larger perspective of macro models by assessing risk as a function of asset value/equity value changes of firms, when macro variable impact the risk levels through equity returns and asset value.

Fama (1981) called the relation between real stock returns (ex-post) and expected inflation rates (ex-ante) as *"the most anomalous of the negative stock return inflation relations"*.

Researches by Nelson (1976), Lucas (1978), Brock (1979, 1982), Fama (1981), Fisher (1984), Geske & Roll (1983), attempted to establish relation between asset prices, macro variables and associated risk. Most of the researches had a basic valuation formula where stock prices depended upon $D\ (t+k)$; net cash flow of firm for distribution to shareholders at time $t+k$ and δ, the discount rate.

Such researches embraced criticism by Cohin and Modigliani (1979) who claimed that stock returns & risk in such researches are *" undervalued "* for the reason that agents misuse $D\ (t+k)$ in inflationary times; As per them the $D\ (t+k)$ nominal cash flows should be calculated in real terms inflated by similar expected inflation rate that is present in discount rate. The under valuation takes place because agents/managers encounters types of money illusion and confuse nominal and real flows.

The controversy got addressed by path breaking theory of Ross, *Arbitrage pricing theory* (APT) embedded in *Rational Expectation framework*. Which assumes that difference between actual and expected stock return is generated by linear factor model $\tilde{p}(t) - p^{e}(t) = B\ f(\ t\ ) + \varepsilon(t)$, signifying that realized return at end of period differs from expected value at the start of period where the discrepancy is a linear function of factors and a random error.

The rational expectation revolution led to conjecture that only unanticipated changes have real effects. Research prior to rational expectation demonstrated that lagged actual stock returns effect current macro variables [Fisher & Merton (1984), Gultekin (1983)]. In context of rational expectations, such empirical results exist for the reason that actual stock return contains a large unexpected component.

Considering crucially the stock market behavior and its macroeconomics linkages, Fischer and Merton (1984) argued that stock market behavior is of paramount importance in gauging

the discount rate, comprehending business cycle, analyzing the Q – theory of investment (Tobin) and assessing efficient allocation of resources over period of time.

Burmeister & Wall (1986) exhibited that the (*APT) Arbitrage Pricing Theory* is majorly refined when macro variables are introduced instead of original factor analysis, for the reason that primary difficulty with factor analysis is that factor sensitivities do not exhibit economic interpretations, therefore they constructed macro measures of factors $f_k(t)$ which effect stock returns in APT frame work. This exhibit that a major advantage of this macro approach is that co-efficients (estimated) have direct economic interpretations. They concluded that the macro modifications of ATP enhances strategic portfolio management by undertaking more of a particular type of risk or by devising a portfolio of equal expected return with differing risk specifications (like hedging one portfolio against unexpected inflationary risk).

Pesaran (2003) modeled conditional risk as a function of correlated equity returns of obligor firms, based on the theme that assets value changes / equity return changes of firms are linked to a dynamic global macro/econometric model. The study analyzed the impact of stock to a set of macro variables on the loss distribution and found that symmetric shock do not result in symmetric loss due to non-linearity of risk model.

2.1.2 The Risk of the Manufacturing Sector

Sommar & Shahnazarian (2009) in their study presented the argument that market value of equity is a function of current value of all expected future cash flow, which the company anticipates to generate. Macro fundamentals play important role in determining, developing or deteriorating the company cash flows. Therefore it is reasonable to assume that not only equity returns are affected by macro factor but also risk (EDF: expected default frequency) and macro variables display common trends. Their study depicted that there exist a negative correlation between manufacturing output and risk as higher output implies high economic

activity and high corporate earnings. A higher interest rate raises interest expenditure on corporate loans which raises the risk level. A two way link between inflation and risk is emphasized which exists through factor prices and the prices changed by the companies, high factor prices imply high manufacturing costs which impair credit quality of manufacturing sector.

Demirgue–Kunt and Destragiache (1997) in their research of industrial sector crises employed *ten* variables as macro factors in the logit model, the results showed a strong significance of macro factors like *real interest rate (short term), M2 money supply/ international reserves ratio, real GDP growth (quarterly) and inflation* which explains the probability of industrial and financial sector crises.

Tirapat and Nittayagasetwat (1999) in their study developed a logit investigation model employing Thailand financial crisis of 1997. The model is based on firm sensitivities to macro variables and their financial variables. The macro linked micro-crisis model uses the specifications of indirect and direct systematic risk analysis. The model depicts that macro conditions are significant determinants of firm's probabilities of financial crisis. Their results reflected that *systematic risk of a firm exposed to inflation* significantly affect the possibility of firm's financial distress and the firm specific variables of *SETA* (shareholder equity to total assets) and *WCTA* (working capital to total asset) are also significant in determining the probability of financial distress.

Beaver (1966, 1968) and Scott (1981) analyzed the relationship between probability of firm's financial distress/risk scenario and its stock returns. Beavers study depicted that firm stock return declines as firm approaches failure. Whereas Scott (1981) research confirmed that probability of firms bankruptcy depended upon stock returns of the firm.

The selection of financial characteristic of the firm for the risk analysis has been of considerable importance in literature. Altman and Altman et al (1968, 1983, 1984, 1994) the

maestro of financial risk and bankruptcy prediction models, contributed in a particular fashion through a research just on the variable profile selection Altman (1984). He surveyed various studies on distress and bankruptcy models of various countries and analyzed the variable selection of those studies. The most employed financial characteristics were *retained earnings to total assets, sales to total assets, earnings before interest and taxes to total assets, working capital to total assets and market value of equity to total liabilities.*

Moreover Shivaswamy, Hoban and Matsumoto (1993) also analyzed thirteen researches to summarize the frequency of financial ratios employed in those papers. The most frequently used financial ratios were *leverage ratio, current ratio and profitability ratio.* The literature however concerning the area of accounting and finance depicts that majority of researches are usually based on the models of capital, assets, management earnings and liquidity of the firms, which are referred as *CAMEL categories*.

Furthermore Salchenberger, Cinar and Lash (1992) highlighted that the dependence on financial ratios as sole explicators has been subject to criticism in literature for the reason that financial ratios alone are not sufficient to explain firms financial scenario when crisis strike economy as a whole. *"Generally Accepted Accounting Principles" (GAAP),* to which the firms accounting systems are prone to, does not represent a reasonable rationale for firms financial risk and distress due to economic crisis. So the sensitivity of firms to macro-economic factors should be part and portion of explanatory variables of firms risk scenario along with estimated stock returns which also incorporates the firm's sensitivity to macro factors.

Thomson (1992) applies a two-step logit approach to create a link between insolvency and official failure. Theodossiou etal (1996) examines the macro economic factors determining the acquisition of financially distressed firms by using sequential response logit model (SRL).

In the model, the outcomes are presented in a 2 stages sequence (binary outcomes) where healthy/distressed outcomes occur in stage 1 and acquisitions/non acquisition in stage two.

2.2 RISK ASSESSMENT OF BAKING SECTOR

2.2.1 Brief Historical Perspective of Banking/Financial Sector

The publication *"Monetary History of US"* by Friedman & Schwartz (1963) propagated the idea that the key financial aggregate was the money supply because of high positive correlation between output and money supply during *"Great Depression"*. They presented that banks only mattered to an extent of *"creating money"* which was in line with the IS / LM frame work in which money supply is simply controlled by Central Bank - an over simplified perspective.

Later the Modigliani & Miller's (1958) reinforcement of the concept that *"finance is a veil"* gained wide support, where the *"irrelevant hypothesis"* suggested that financial structure of firm's is irrelevant and financial intermediaries redundant. As a consequence finance had no role in all real business cycle models developed subsequently.

The prodigal treatment of finance continued in macro models & it was the earlier studies of Mishkin (1978) & Bernanke (1983) which analyzed the importance of financial factors in Great Depression and concluded that collapse of financial system was a paramount factor in Great Depression.

Another traditional view, the *"Money view"* was confronted by Bernanke & Gertler (1995) who opposed the view with the three puzzles, *magnitude puzzle* which states the fact that *"real economy is highly affected by policy innovations, whereas the effect on interest rate is comparatively small"; the timing puzzle;* which states that *"since the interest rate are the leading force behind real effects, once interest rates go back to normal their effect should*

stop". Yet empirically there is an important lag that *"some important components of spending do not begin to react until after most of interest rate effect is past"* (Bernanke & Gerther 1995, 34), the *composition puzzle;* which states that *"Changes in structure of spending do not correspond to the money view predictions"*. All the three puzzles consistently emerged in empirical analysis but had no explanation. The three puzzles make money view unsatisfactory concept and puzzles are justified only where banking sector is introduced in addition to money aggregate. This gave rise to the new perspective of *"Channels"*, the *"Lending Channel"* (banking) and the *"Balance sheet Channel".*

Upon the issue of money view versus credited view, empirical work presented strong evidence in favor of high correlation among credit supply & economic activity. A chain of studies by Bernanke held the banking sector collapse responsible for the depth and persistence of the Depression Crisis, Bernanke (1983, 86), Bernanke & James (1991), Schreft (1990).

Recent literature advocates that banks perform specialized functions of monitoring, attenuating inter temporal shocks, building relationships with firms, providing liquid insurance, making richer set of contracts, coordinating investment where firm production depends upon aggregate level of investment. Da Rin & Hellmann (2002).

In this context a number of models of 90's and millennium focus on the aspect that the development of financial system, specially banking fosters economic growth. Bernanke & Gertler (1996) and Holmstion & Tivole (1997) establish a clear link between the level of aggregate production and the level of financial imperfection, a lower cost of screening or a high level of monitoring finance leads to high growth rate. Levine (2005) identifies channels through which growth is effected by financial intermediaries which are: monitoring investment, better risk management, providing ex ante info, mobilizing saving & facilitating exchange of goods & services, King & Levine (1993) further establish empirically in a cross

countries analysis that level of financial development is a good predictor of anticipated economic growth.

2.2.2. The Credit Risk of the Banking Sector

Since the inception of International financial crisis, it is evident that there is a strong interaction between the credit and financial markets and rest of the economy, which is crucial for explaining the macroeconomic fluctuations. Shocks erupting in banking sector account for the largest share of contraction of economic activity since 2007, whereas macro-economic shocks account for a limited role.

Up till now this trio of credit market, financial market and the rest of the economy have been majorly dealt from the Credit demand side. Credit spreads in these models reflect and emphasize only the riskiness of the borrower (credit risk), even the perfectly competitive banks also accommodate changing condition on the demand side only (Bernanke, Gertler and Gilchrist 1999).

Ironically, conditions from the supply side of credit are of equal significance. Since banks represent the main source of lending to households and firms, the supply side conditions of banking sector such as degree of competition, rate setting strategies and financial health needs the due focus.

The survey of literature indicates that one of the most crucial variables for assessing the credit risk in banking is *"likelihood of default",* which reflects the credit health and quality and this credit health has a critical link with macro variables.

Several studies address this empirical relation between the fundamentals and credit risk among companies. Sommar & Shahnazarian (2009) estimate a time series vector error correction model (VECM) to predict the future credit quality of corporate sector (including Banks). The model estimates the relationship between credit risks (EDF as a measure) and

three macro variables, Industrial production, short term interest rate and inflation. The results infer a strong relation between fundamentals and financial sector, where higher industrial production is accompanied by lower credit risk, rising inflation leads to higher credit risk and poor credit quality, whereas short term interest rate has the strongest impact on credit risk and quality, a high interest rate implies high risk.

There are models, ones which allow feedback between credit risk and explanatory economic variables and others which do not generate a feedback loop.

Jacobson, Linde & Roszbach (2005) present a time series, feedback effect model that comprises of a system of three blocks. The first is a VAR model of macro-economic variables which includes inflation; domestic output real exchange rate and nominal interest rate as endogenous variables in VAR. the foreign macroeconomic variable along with aggregate credit risk of firms exogenously enter the model. The second block is a logit model of credit risk at the firm level, where macro variables along with balance sheet variables enter in the form of regressors. The third block estimates the dependency of balance sheet variables, of the logit model on the macro variables.

Castven' Dees and Zehar (2007) presented models that allow for influence form explanatory macro variables on credit risk, not the other way around. These models have forecasting power and also take into account the common trend display by credit risk and macro variables.

2.3 NPL –A MEASURE OF CREDIT RISK OF BANKING SECTOR

2.3.1 NPL – An Overview

Non-performing loans refer to those loans which are unable to generate income for a fairly long time period that is outstanding principal/interest of these loans remains un paid for at least ninety days. Caprio and Klingebiel (1999)

There is a variation among criteria for defining non-performing loans across central banks of different regions , owing to multicity of regulators and institutions across countries and marked differences in minimal regulatory capital requirements among countries; Bloem & Gorter (2001). A number of central banks consider the time frame of conversion of standard to substandard loans (including loss/ doubtful loans) to be longer than *90 days*, where substandard loans are the loans which remain unpaid for at least six months and where the debtor is not an a capacity to undertake the repayments. Other central banks assume those loans as nonperforming whose principal/interest remains unpaid for at least three months. However the Basel Commission emphasizes a *standardization* and *internal rating approach* based upon aligning banks' capital requirement with risk management and mitigation techniques. Further to implement comparability among banks, Basel sets forth a minimum qualification criterion of internal rating approaches that establishes the credibility of credit risk assessment (internal) of banks. The standardization will lead to uniformity of *NPL* classification across countries.

Ironically by focus upon *length & time* of default, all the classifications of *NPL* from banks to central banks, to Basel commission are based only upon *loan performance* which practically fails to account for high correlation between banking crisis and economic contraction. The risk exposure not only depends upon the borrower but also upon it *economic activity branch*. The probability of *NPL* is greater when the "economic branch" in which borrower operates is exposed to unanticipated adverse shocks. Gonzalez-Hermosillo et al (1997)

The economic and financial implications of such impaired loans are quite significant. Potentially impaired loans negatively affect the private investment, cause *credit unavailability* or *credit crunch* situation for private sector through reduction of bank capital, increase deposit liabilities followed by a fall in saving rates due to runs on banks, loan accumulation and higher provisioning to compensate for the losses. An impact upon loan to

value *(LTV)* and *capital to asset ratio* is basically a supply side shock that is transmitted to real economy. Gerali, Neri, Sessa & Signoretti (2010)

NPL's not only affect the supply side of credits but also affect the demand side by reducing consumption and are a source of economic shrinkage when deposit insurance mechanism is absent to safeguard small depositors particularly when coupled with credit crunch scenario due to depletion of banks capital assets.

Corta Varria et al (2000) argue that fiscal costs of *NPL's* are significant as well and depend upon the length and scope of crisis. The resolution of impaired loans is normally made through deposit insurance schemes/assets management companies whose main role is to cover nonperforming assets of financially distressed institutions. As discussed by Gonzalez-Hermosillo et al (1997), in most countries these entities are govt. owned and financed through the budget to bail out problem banks; these intermediaries thus exacerbate the pressures on government revenues. Ironically impaired loans have proven un-precedential fiscal costs even when such intermediaries do not intervene or are not govt. entities. When as a response to the cascade of shocks that rampaged the financial markets in 2008, U.S government in an attempt to prevent financial meltdown transmission to real economy, intervened in the markets to bail out the banking sector at such an unprecedented level that was never witnessed before in the history. Gilchrist & Zakrajsek (2012)

2.3.2 Macroeconomics Risk Factors

The literature upon major economies reflects that macro factors affect credit risk. Keeton and Morris (1987) analyzed banking sector data for over 2400 commercial banks of U.S and found that the local economic conditions accounted for variations in loan losses of banks. Empirical studies like; Mueller (2000) Anderson and Sundaresan (2000), Collin-Dufresne

and Goldstein (2001), which analyzed asset price structure also found linkage between deteriorating macroeconomic conditions and credit Risk appreciation.

The essence of the Kent & D' Arcy (2000) study of Australian banks suggested that risk realizes during the business cycle contractionary phase and actually peaks at the top of cycle. Similar evidence was found for Indian Banks by Rajan and Dhal (2003). Argentinian banking system was analyzed by Bercoff, Giovanni & Grimard (2002) study which depicted that credit growth, money multiplier and reserve adequacy affected *NPL's*. The main monetary instrument, the interest rate is also found significant in many studies, for instance, in a study by Fuentes & Maquieira (2003) for Chilean banks, *NPL's*, were affected more by interest rates than business cycle.

Goldstein and Turner (1996) in their study highlight that accumulation of *NPL* is attributable to number of macroeconomic factors including *macro volatility, macro downturns, GDP per capita, exchange rate appreciation, deteriorating terms of trade, higher interest rates and inflation, dependency upon inter bank borrowings and moral hazard*.

Gonzalez-Hermosillo (1999) finds a negative association between *NPL* and *GDP per capita*. A declining per capita income is linked to rising *NPL's*. To an extent that per capita income changes is a proxy of changes in economic growth, the negative relationship of GDP per capita with *NPL's* reflect the cyclical output downturn impact upon banking sector.

Similarly an unanticipated rise in *inflation* in cyclical downturns negatively affects the recovery of loans, and in extreme case scenario hyperinflation causes erosion of banks equity and assets and deteriorates bank's position via the interest rate channel.

Regarding *exchange rate*, Kaminsky and Reinhart (1996) articulate a positive relationship. Real exchange rate appreciation squeezes out profit margins of export orientated industries leading to contraction of economic activity with a direct implication upon performance of

loans. In exchange rate context, Miller (1995) emphasizes that the expectations of economic agents concerning BOP crisis and overvalued exchange rates are of considerable weightage. Runs on the banks will be exacerbated when exchange rate devaluation is anticipated, leading to funds outflow and capital flights.

Theoretically a negative relationship should exist for *broad money multiplier (M_2)* and *NPL's*. Gavin & Hausman (1995) justify that extension of credit to private sector peaks in periods preceding the crisis, which is followed by a fall in credit extension at the outbreak of crisis. With falling credit, the broad money to GDP ratio (M_2) is expected to be low, thus supporting a negative relation between the two. Daumont et al (2004) shows that empirical evidence is consistent with theoretical basis for a number of countries where a considerable decline in credit volumes to private sector was witnessed during the banking crisis.

Emerging literature especially after the international financial crisis of 2007-2009, 2011 has also emphasized the variables of *assets, house prices and unemployment* as another set of macroeconomic variables affected *NPL's* and thus the credit risk.

2.3.3 Bank Specific Factors

Many studies include bank specific factors in addition to macroeconomics factors, for the reason that macro factors in turn depend upon micro factors. Salas & Saurina (2002) analyzed for Spanish banks that in addition to macro variables, *market power, bank size and capital ratio* accounted for variations in *NPL's*. A sizable portion of *NPL* can build up by declining *capital to asset ratio*, a proxy of deterioration of banks assets or a measure of asset quality. The capital to asset ratio provides cushion to absorb shocks during crisis period and is an indication of financial health and soundness. A comparatively low level of capital to asset ratio of banks shows the magnitude of credit risk the banks are exposed to and comparatively low levels of equity illustrates constraint to provisions against potential risks and future

losses. Although as per frame work of international settlement standards, the ratio should exceed *8%* minimum requirement, this threshold is not met for a number of countries.

Bercoff, Giovannio and Grimard (2002) found that sound explanations of *NPL's* are *operating efficiency of banks, asset growth and local loan portfolio.* Hughes et al (1995) also associates credit risk to banks operating efficiency. The argument is presented in a manner that risk averse managers willingly trade off reduced level of earnings for reduced level of risks, especially in a scenario when their wealth is bank performance dependent. For the purpose of improving loan quality, they will incur high monitoring costs, affecting the operating efficiency. Thus it implies that a less efficient bank may as well be the one with lesser risk portfolio. On the same lines, riskier loans can also breed higher costs for banks, thus it's a too way causal relationship.

A number of other bank specific variables also affect risk taking like *moral hazards, agency problems, regulatory actions and ownership structures*. *Moral hazard* in banking sector refers to adverse incentives which are created by prospects of inherent coverage of banks losses by government. Moral hazard is higher when banks capital level is low; such scenario leads to imprudent lending decisions with direct consequences for banks portfolios which tend to incline heavily toward risky projects. When such projects are owned by entrepreneurs/investors, directly/indirectly linked with lenders, it is termed as *insider lending*.

Brownbridge (1998) explains the inverse relation between moral hazard and bank capital, where depleting level of bank capital in turn is one of the sound sources of *NPL*. He highlights that a deliberate policy of maintaining relatively low levels of minimum capital requirements for the purpose of supporting domestic banking system by most of the countries in 90's increased moral hazard and exacerbated banking crisis. Rather moral hazard was singled out as the leading cause of dramatic rise of *NPL's*. Similarly the persistence of higher

and discouraging *real interest rate* can cause a fragile banking sector to cripple via default accumulation on loan payments and through moral hazard channel; Brownbridge (1998).

2.3.4 Feedback Effects

When macro and micro crisis models are presented in a multifactor model, normally a feedback mechanism exists. The feedback effect is difficult to isolate & assess for the reason that it is blurred by direct effect from growth to nonperforming loan to balance sheets and thus one has to recognize a supply stock. However studies emphasize that a *certain portion of financing effect must be at play.*

The feedback effect from banking sector to macro economy has been considered in a number of studies of stress testing in literature. Keeton (1999) found a strong relation between *delinquencies and credit growth,* using a VAR model. Lis et al (2000) found a *negative relationship between loan losses and GDP growth, bank size and credit adequacy ratio,* whereas a *positive relationship of loan losses with loan growth, net interest margin, debt equity, collateral* for Spanish banking sector.

Carling et al (2003) found using multivariate *Granger causality* that corporate sector default is a useful predictor of real economic activity. Jacobson et al (2005) found macro feedback evidence from a panel VAR model of macro factors and likelihood of default of Swedish companies. Von Peter (2004) emphasized the losses feedback to macro economy through lending restrictions that exist due to binding capital constraints.

Peek & Rosengreen (2000) computed a negative relationship between banking sector conditions and investment. Ciccarelli et al (2010) while focusing on the international financial crisis, states a role of banks' "balance sheet constraints" in dipping GDP due to credit unavailability/tighter credit in euro area.

The next chapter gives a *historical-political-economic narrative of the manufacturing & banking sectors of Pakistan,* from inception to the first decade of millennium.

Chapter 3

THE MANUFACTURING & BANKING SECTORS OF PAKISTAN

A HISTORICAL POLITICAL ECONOMIC NARRATIVE

3.1 MANUFACTURING SECTOR

3.1.1 Large Scale Manufacturing Sector

The Manufacturing sector[1] of Pakistan exhibited phenomenal growth in the first decade of inception 1950's. Despite lack of credible foundations the industrial sector kept on doubling the growth rate every few years. The large scale manufacturing sector achieved extraordinary 20% growth rate during 1950-55. Only in 1960's the extraordinary trend of 50's was matched by the large scale manufacturing sector. Overall growth rate of 10% was achieved throughout the 60's which decreased substantially in 70's. The 80's again experienced an impressive annual growth vote of 8.2%.

The *Textile sector* undoubtedly dominated as one of the main sectors over the period, ¼ of total Industrial production comprised of textile production and the share further in increased to a formidable extent if raw cotton activity in added to it. The *Food sector* also contributed a considerable share. The 1970s saw emergence of new sectors of petroleum refining, fiber pressing, ginning, chemicals and transport which contributed whole lot to productions. While manufacturing growth rate remained stable over the five decades, certain sectors remained volatile particularly the *Construction Sector*. This sector experienced mega growth one year and witnessing negative growth in the next year. Commencing of larger project in a year followed by little or no projects in next year accounted such fluctuations. Dams and other private sector projects would hugely invest for a year or two followed by negative growth rate in next year's e.g. in 1960-61 the growth rate of construction sector was astronomical

[1] See Zaidi, S. A., 2005. "Issues in Pakistan's Economy" for detail.

43.3%, witnessing a surprising – 2.6 % in subsequent year. The volatility of sectors became nominal once the economy developed and expended 1977 onwards.

3.1.2 Small Scale Manufacturing Sector

The small scale manufacturing sector, for the initial year 1950-1962, exhibited a consistent trend of 2.3 % per annum growth, followed by a 2.9 % growth rate for next eight years, Bhutto's period registered a growth rate of 7.3% annum. Form 1977 to inception of millennium, a consistent trend of 8.4 % growth rate was witnessed by small scale sector.

The development of the small scale manufacturing sector during the 1960's was a direct consequence of the *"Green Revolution"* and agricultural growth in those times. The green revolution transformed the Industrial, agricultural and economic structure and led to phenomenal growth of small scale manufacturing.

The growth stimulus to SSS (small scale sector) in 1970's was due to shocks suffered by the large scale manufacturing sector under Bhutto's regime *"Possibly the single most important factor in the increase in SSI (small scale industrial) growth rate during the 1970's was the massive devaluation of 1972 and Government's abandoning the multiple exchange rate as a part of the export bonus scheme" ADB Report (1997).*

The import liberalizations of 70's and 80's also generated a positive impact for development of small scale industrial sector in contrast with the 60's when this sector faced serious raw material constraints. Bhutto's Nationalization benefitted the SS in two manners, as Bhutto's Nationalization was targeted towards LSM (large scale manufacturing), the investment funds (private sector) diverted toward small scale sector industries; other goal of nationalization was to boost exports, the industrial capital from LSM was diverted to exports and trade, thus making scenario easier for SSS to secure place in domestic and foreign markets. Other factors which also helped SS industries in Bhutto's times were rupee devaluation, the soft import

policy which allowed free import of cheaper industrial plants against cash and no stricter labor laws for SSS. John Adams and Sabiha Iqbal (1987) argue that SSS developed during Bhutto's times *"not because his government treated the sector in any exaggeratedly special fashion and it was more the absence of favoritism towards the big units that helped them"*

The *"Cottage Industries Act of 1972"* also enhanced the growth of SSS in 70's. As textile sector got most affected by it there occurred a major shift in textiles from LSM to SSS (Ali Cheema (1995). Asad Sayeed (1995) also reinforces that.

"The important qualitative change that the above developments during the Bhutto interregnum brought about was to move small scale manufacturing out of exclusively agrarian servicing activities to the terrain of broader manufacturing in the larger urban agglomerations".

In 1980's Pakistan turned into a *"remittance economy"*. A greater demand for consumer goods was created due to remittances inflows from gulf and higher purchasing power. This demand led expansions and its consequent multiplier effect were fulfilled by the SSS. Construction boom of 80's also served as a catalyst to development of SSS. Increased demand of household goods caused a higher demand for local products to grow and created expansionary efforts on SS industries.

The SSS not only exhibited dynamics in output growth rates and contributed to value addition but also extraordinary growth rates in employment. In the decades of 70's to mid 80's the informal sector share enhanced slightly from 69.1% to 72.7% juxtaposed to the level of employment increase of astronomical 72%, 2.8 million employed in 1972 to 4.9 million in 1985 (Pakistan Economic survey 95-96). During 1976-83 the real growth rate of employment / annum peaked at 10.3% in contrast with – 1.1 % of formal sector in the very same period.

The SSS undoubtedly dominated in terms of employment in various sectors of constructions, transport, hotels, communication, retail and wholesale trading since 1972. It even replaced formal sector domination of urban employment by 1984-85 and continued to dominate urban large scale manufacturing in an unprecedented fashion.

Despite the phenomenal growth of the small scale sector all scholars working upon small manufacturing sector have consensus on the perspective that this sector has been treated with indifference rather contempt by the government of all times.

During the 60's the government policy did not consider the SSS worthy of any developmental role or exhibiting dynamic role. All the policies were inclined towards LSM's, rather discriminatory towards the SSI, Aftab, Khalid & Rahim (1986). Even in the times of 70's and 80's when there was a state bias towards LSM's, the only advantage SSM's achieved from the government in the situation was the *"acknowledgement of its existence"* without any tangible government policy, Asad Sayeed (1995). Thus in the annals of economic history of Pakistan the SSS can hardly be termed as *"marginal to economy"* rather generator of *"employment of last resort"*.

3.1.3 The Public Sector, Nationalization and Privatization

During the time of times of 1950's and 60's, the main role of public sector industrial units were to assist and direct the private sector, for the reason that private sector was considered as the front rower of industrial development. During the times, public sector industries were controlled by PIDC, which was established in 1952 with the ideology of increasing the rate of industrial development. The main goals of PIDC were to invest in areas where private investment was cheaper due to technological issues or lack of immediate profitability. It was also supposed to transfer projects to private enterprises once they showed profitability for the purpose of strengthening private sector. PIDC played a pioneer role and fulfilled its mandate

by successfully establishing industries of jute, heavy engineering, fertilizers and cement, later transferred to private sector.

In 1972 Bhutto's regime initiated the public sector expansions through the nationalization program. The 1972 Nationalization reversed the trends of 50's and 60's and gave public sector the leading driving role of industrial development. The government got massively involved in manufacturing, energy, transportation, insurance and finance, trade, mining & agriculture.

In Zia's regime the role of public sector got diminished as private sector was chosen as leading engine of economic and industrial development. No new public enterprise was established during Zia's era and public sector investment absorbed into on going projects.

In 90's the public sector share got further minimized due to privatization program. Despite the fact that public sector enterprise were not purely modeled on market criteria but also included socio-political goals in their objective function, an ingredient inherent of productivity and profitability fall, the public sector did quite well. It exceeded the overall manufacturing sector even under the Bhutto regime (1972-77) when public sector policies and Nationalization got severely criticized, performed even better during the economically liberalized regime of Zia. There was a considerable increase in productivity and profitability by state owned enterprises in Zia's period due to growth friendly and pro investment environment (Kamal & Kamal 1991). Moreover in Zia's time a number of units installed earlier, started production. Asad Sayeed (1995) reports that the *"weighted average of productivity growth in the public sector was higher than that of the private sector, once the numbers for the Steel Mill are removed from the sample"* Ironically the contribution of publics sector in the economic growth has been continually discredited by world bank and SAP programs which associate public sector with poor performance and inefficiency.

The 90's saw one of the most controversial aspects of SAP programs; the privatization process. In 1990's, large scale privatization was launched by Nawaz Sharif government. 109 industrial units and four out of five nationalized banks (comprising 88% of total deposits) were identified for immediate privatization by the privatization commission.

One of the main reasons behind privatization was to offset decreasing budgetary revenue and to compensate government investment short falls. The goal was to commercialize public enterprise, liberalize economy making it competitive and attractive for private investment. By 1992, management of 49 public sector enterprises was transferred to private sector for an amount of 6 billion that went to govt. By late 95, the telephone, telegraph sector got partially privatized, Allied bank and MCB were sold to its employees and a private business house.

The privatization program came under great criticism. Naqvi & Kamal (1991) questioned the entire ideology of privatization. *"...changing the locus of ownership of industries is by itself neither a necessary nor a sufficient condition for an efficient operation of specific industrial enterprises"* and *"...in Pakistan, there is nothing inherently good or bad about the public sector; or even about the private sector for that matter"*

3.2 BANKING SECTOR

3.2.1 Main Actors

Prior to 1971, the governments were primarily focused upon founding development institutions and commercial banks development in private sector majorly backed by government. During the period of 1971-1990, the private sector development almost halted because of the *"Nationalization Policy"*; the financial sector was under government control.

The 90's saw a paradigm shift in financial sector where government followed liberal and exclusively market based reforms. The current financial sector of Pakistan is a result of financial structuring through the reforms of 1990's, the goals of which were to build a system of market based financial intermediation, efficiently conducted monetary policy with a greater focus on indirect instruments and to increasingly contribute to stock market development.

Pakistan's financial sector comprises of State Bank of Pakistan, commercial banks, insurance companies and non-banking financial institutions (NBFI'S).

The commercial banking sector constitutes of; *nationalized commercial bank (NCB), state owned provincial banks, privatized commercial banks, domestic private banks, foreign banks and Islamic banks.* Commercial banks offer short/medium term financing, retail banking and trade finance. In terms of government securities and asset holdings, bank account for a major portion, however their share in investment and total financial sector loan portfolio is considerably low.

Apart from banks, *NBFI* also constitute important pillar of financial sector. NBFI consist of; *development finance institutions (DFI's), leasing companies, investment banks and Mudarbas.* DFI and specialized bank offer long term finance and institutional lending. For a considerable period of time, DFI's and specialized banks used to rely upon multilateral and

government funding, currently it relies on different schemes to attract savings, 1/3 of DFI's and specialized banks assets comprise of funds that are generated through local deposits.

3.2.2 Banking Sector: A Descriptive Narrative

Pakistan banking sector experienced drastic transformation over a period of *66 years* since independence in 1947. Initially the sector suffered uncertainty because of prevailing socio-economic and political conditions and acute scarcity of resources. Lack of professionalism resulted in poor services and products. State bank was established on July 1, 1948 as the regulator and controller of financial sector which encouraged private sector to take leading role in establishing banks and financial sector in the country.

1950's – The Inception

During the period ***1948-1954***, banking deposits exhibited a growth rate of 61%, closely in line with the astronomical growth of overall economy in the 50's. The aspects which accounted for such a high rate of growth were revival of economy after a sudden halt following partition, the consolidation and rehabilitation of banking sector, influx of Muslim capital celebrating the birth of a Muslim Pakistan, accelerated development activity, specifically in industrial sector which gave rise to higher income earnings and a favorable B.O.P status.

During this specific period of *50's* banking sector exhibited a same trend as of economic activity e.g. banking deposits increased in 1951 due to higher export earnings following Korean War boom and reasonable B.O.P status on foreign account. In 1952 deposits decreased due to decrease in exports income, huge import expenditures and reversal in terms of trade. In 1953, the main focus of banking activity was commerce and trade. The commercial activity received 48 % of the total advances of the banking sector. Huge loans

were extended to commerce, to be financed in retail and wholesale trade of country, the manufacturing sector merely received 16% of the advances.

1960's – The Progression

During the period of 1960-65 (second five year plan) formulation of comprehensive banking laws took place. The deposits of the banks ascended from 2,943 million to 6,883 million rupees, advances rose from 1,458 million to 5,759 million, whereas number of branches sore to a total of 1,591 from 430. During the period of 1965-70 (Third five year plan) the banks exhibited a 91% growth in deposits and a 64% increase in advances. Two new banks of *ADBP* and *IDBP* were incorporated under the regulatory authority of State Bank of Pakistan. The *60's* and *70's* saw a change in pattern of credit allocation. The progression and boom of manufacturing sector in 1960's also altered the credit availability scenario and manufacturing sector received 37% of total credit. In 1972 the share hiked to 50%, textile sector being the prominent gainer. The share of commerce declined from 42% in 1953 to 26% in 1972. Moreover the degree of concentration which was embedded in the banking sector soon reflected itself in terms of ownership and allocation of banking credit e.g. in 1959, only 222 accounts of Rupees one million (and above) comprised of 63% of the total banking credit. Contrary to it advances below Rupees 25,000/- accounted for mere 6% of total credit. Despite this concentrated and non-competitive behavior, the economic flight of 60's could have not been possible without the contribution of banking sector.

1970's – The Nationalization

Next was the decade of *70's*, the *"Nationalization era"*. The *"Bank Nationalization Ordinance"* of 1974 gave Federal government the rights of owning, managing and controlling all banks of Pakistan. Although nationalization took place on the first day of 1974 the roots of nationalization policy originate from the development in banking sector, during the 60's. Apart from overall growth in banking sector, banking malpractices prevailed in the

sector in form of mal-distribution of credit, concentrated credit to a narrow group of big fishes.

The composition of banking sector of Pakistan was such that out of four largest banks, one was state owned and others belonged to families of *Habibs, Adamjee and Saigals*. The four banks owned massive 2/3 earning assets and monopolistic 75% of total deposits of banking sector. Apart from three top private banks, four other banks were owned by Dawoods, Sheikhs, Haji Habib and Fancy's. These seven private banks accounted for 92% of deposits held by total local banks. These family owned banks patronized and promoted self-owned companies by facilitating huge credits. Thus all the forces of collusion and concentration of wealth were in play. State Bank report further revealed that only 88 accounts of Pakistani banks were securing 25% of total bank credit; the accounts of directors or bank themselves. Moreover State Bank lacked legal empowerment to monitor or change structure of ownership of commercial banks; influence the credit portfolio distribution. Thus only the big businesses and affluent private sector flourished and benefitted from banks in 50's and 60's. In the same timeframe, 14 mega banks of India were nationalized which provoked the planners and economists to think on the same lines. They saw nationalization like Indian banks as a meaningful and remedial reform to the existing structure of banking. The economy by that time was in a bad shape and the guilt clause applied to banking sector in particular.

Thus for an equitable distribution of banks credit disbursement and remedial measure for concentration/collusion, 14 banks got nationalized out of which 13 merged into 5 banks. The State Bank was also nationalized; (the only nationalized State Bank in the World history of banking). The nationalization had far reaching effects, both positive and negative.

Certain socio economic goals were met when nationalized banks opened branches all across the country (any township of 2000 residents and above was allocated a branch) even in remote areas and reduced monetized disparity. Disbursement of loans took place on equitable

grounds and those masses have access to credits which were totally out of picture before. The concentration/collusion aspect however prevailed and manifested itself in the form of politically/governmental pressures, where credit evaluation standards were not met, inefficiency, deterioration of service, exercise of monopoly in rate setting strategy, overcrowding and over staffing became a norm due to political reasons. Because of government protection of employees, the nationalized banks performance deteriorated which manifested itself in provision of poor services and low quality products.

1980's – The Islamization

1980's brought an entirely different set of circumstances for banking sector. The period of 80's was the period of extensive Islamize under Zia's regime which also engulfed the financial sector. At the inception of power, Gen. Zia demanded a blue print of interest free economy under Islamic system from the council of Islamic ideology (CII). In 79 governments ordered nationalized commercial banks to extend interest free loans to farmers, fisheries and cooperatives. In 1981 all five nationalized banks had separate counters for accepting *"non-interest profit loss sharing deposits"*. From 1985 onwards, no bank was permitted to accept interest based deposits, except for foreign currency deposit, which only earned a fixed interest rate, whereas all other deposits shared profit or loss. Three Islamic models of financing also got launched in Zia's regime; *musharka; murabeha and mudaraba*. A Mudaraba Ordinance got promulgated in 1980 and two multipurpose mudarabas were offered for share certificates and encouraged mudarabas by giving a number of tax exemptions and mudarabas also paid reasonable returns to the shareholders.

Despite all the attempts to Islamize economy, Pakistan financial and banking sector echoed no true soul and element of Islamic banking and finance except for a name tag. Banks extended loans with a variable interest depending upon product and cliental standing. Banks quoted fixed rate of return on PLS accounts, where loss was only a hypothetical concept; no

rate was quoted as anticipated which is aligned to Islamic standards. Banks were allowed to invest PLS deposits in government interest leasing securities; the bank's equity was all interest based, thus mode of so called Islamic banking was such that the source of all interest free profit were instruments that were purely interest based.

1990's – The Reforms

The *90's* then brought the transformation of SAP into the banking and financial sector. The banking sector reforms of 1990's by Sharif's government altered the financial land scape of the country. As state owned banks lack clear objectives and are unable to judge their performance, Clark et al (2003). Deregulation was pursued and the deregulation of the financial sector and capital market boosted expansion of banking companies in the financial sector, in fact many industrial groups initiated their own banks. The legislation and SBP regulatory authority was improved substantially. The foreign exchange market which was highly guided and regulated through direct exchange controls got liberalized and all dealing got liberalized and all dealing were based on interbank exchange market.

Of the numerous dramatic changes in the banking sector in 90's, a major one was the allowance of new private commercial banks to operate. Prior to 90's the banking sector comprised of 5 nationalized commercial banks (NCB's) and more than 25 foreign banks. In 91, government issued licenses to ten new banks of private sector.

Another major break was decentralization of two NCB's; *MCB* and *Allied Bank*. These two banks significantly improved their performance and cost structure after privation. Due to success story of these two banks, the government decided to privatize all state owned banks (development and commercial banks) with the exception of National Bank. Bids for the privatization of *HBL* were called by the Privatization Commission. However research shows that privatization and financial liberalization in Pakistan accounts for a comparatively lesser improvement in the financial soundness of banks, Khalid (2006), complementing the strands

of literature which articulates that low/middle income countries do not exhibit improvement after banking sector privatization due to debt burden and overstaffing issues, Otchere (2003).

This financial liberalization of the 90's motivated local investor and foreign banks to enter the financial sector and induced competition in the banking sector due to expansion.

2000's – The Crisis

The *millennium* presented different set of circumstances. Since 2007, Pakistan experienced a deteriorating macro economy, root cause not being the global financial crisis rather because of confluence of factors building for a while, majorly due to consistent piling up of macro imbalances. The situation led to the implementation of macro stabilization program in 2008 under the umbrella of IMF.

Though *GFC (global financial crisis)* did not affect Pakistan directly, however in 2009 it manifested in various forms in real economy which eventually hit the banking sector. There occurred a decline in export due to recessionary phase in Pakistan's trading partner economies, also GFC inflicted pressures on capital flows which negatively influenced foreign investment portfolio.

The factor of power shortages causing below capacity industrial utilization, hike in production costs, humongous corporate circular debt, plunge in FDI due to higher inflation, fragile economic fundamentals and security issues blocked the recovery of economy. These factors exerted pressures on domestic industries/firms resulting in their compromised loan repayment capacity. Consequently nearly all the banks experienced a rise of NPL's in their balance sheets. Furthermore, deteriorated fiscal scenario caused public sector to borrow heavily from banks for budgetary needs and commodity operation. Nevertheless banking sector survived the chaos due to the forced buildup of contingency reserves and provision of injected assets (Basel I, II); negative aspects of which are that such Basel remedies have

severely affected banks dividend payments and an exerted continuous pressure on the share prices.

Despite the crisis, the banking sector of current times is significantly altered as compared to any other times. Today, private sector possesses the ownership of nearly *80%* of total banking assets and because of nationalization and privatization processes there exists a professional culture and service orientation in banking sector instead of bureaucratic approach and apathy.

Table 3.2.2: Highlights of The Banking System

	2005	2006	2007	2008	2009
Total Assets	3,660	4,353	5,172	5,628	6,516
Asset Growth in % (Year over Year)	20	17.1	18.8	8.8	15.8
Investments (net)	800	833	1,276	1,087	1,737
Deposits	2,832	3,255	3,854	4,218	4,786
Equity	292	402	544	563	660
Profit before tax	94	124	107	63	81
Profit after tax	63	84	73	43	54
No. of banks in loss	7	7	10	16	18
Non- performing loans	177	218	218	359	446
Non- performing loans (net)	41	39	30	109	134
	Basel-I		**Basel-II**		
Capital Adequacy Ratio - CAR (All banks)	11.3	12.7	13.2	12.3	14.0

Source: State Bank of Pakistan

The banking technology of ATM's, mobile and internet banking, branchless banking, debit cards/smart cards etc. has revolutionized banking which was almost nonexistent in the sector until a few year ago.

3.3 BANKING SECTOR - CREDIT RISK & NPL PROFILE *(2007-12)*

The key challenge and the most significant threat to stability of banking sector is the credit risk. The adverse macro economy and weaknesses of the operating environment account for aggravated credit risk in the recent years.

Banks tried to overcome higher infection by elevating credit criteria, significantly tightening credit to risky sectors and simultaneously investing hugely in government debt. The main factor for fall in advances is risk-averse strategies of the banks in the face of elevated credit

risk. Due to submissive economic activity banks remained cautious in extending credit, visible in the structural shift of their advance portfolio from SME, agriculture and consumer to public sector and corporate giants.

Table 3.3.1: Segment-Wise Distribution of Loans: (Percent share in total loans)

	2007	2008	2009	Growth (2009)
Corporate	56.3	63.2	61.9	2.5
SMEs	16.2	11.7	10.4	-7.2
Agriculture	5.6	4.9	4.7	0.7
Consumer	13.8	10.4	8	-19.1
Commodity	5.5	7.4	12.5	77.8
Miscellaneous	2.7	2.4	2.5	5.1
Percent share in Consumer Loans				
Credit cards	12.6	12.3	11.6	-23.3
Auto loans	30	28.7	24.7	-30.5
Durables	0.3	0.1	0.1	-51.8
Mortgage	18.1	20.2	22.9	-8.1
Personal loans	38.9	38.8	40.7	-15

Source: State Bank of Pakistan

2011-12 witnessed a contraction of Rs.*17 billion* in gross loans despite a low demand from private sector, along with a robust growth of 6% in assets, purely by investing in government papers. The remedies outpaced the growth in *CRWA* (Credit risk weighted average) causing it to drop to *46.35%* in 2011 compared to *48%* in 2010, however the decline is not suggestive of lower credit risk, rather it indicates *"a leap to quality"* amid high non-performing loans. Despite credit tightening and current trend of banks to invest incremental funds in risk free/safer assets, credit risk undoubtedly remains dominant feature in the banking sector risk profile.

The interest rate structure has been a crucial credit risk determinant in the banking sector. For a period of 1992-2010, official discount rate has been 12.78%, recording a historical low of 7.5% in Nov 2002 and a historical high of 20% in Oct 1996. Thus the volatile interest rate, along with elevating interest rate risk also alters the borrowing cost which is crucially linked to borrower's repayment capacity. In this context, chronic fiscal deficits, rampant inflation

and beyond limits government borrowing are hugely to blame for the interest rates remaining in two digits.

Table 3.3.2: Official Interest/Discount Rates in Pakistan (2006-2010)

Years	Months											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
2006	-	-	-	-	-	-	9.50	-	-	-	-	-
2007	-	-	-	-	-	-	-	7.00	-	-	-	-
2008	10.00	10.50	-	-	12.00	-	13.00	-	-	-	15.00	-
2009	-	-	-	14.00	-	-	-	13.00	13.00	-	12.50	-
2010	-	12.50	-	-	12.50	-	13.00	-	13.50	-	14.00	-

Source: State Bank of Pakistan

The fragile macro economy and structural deficiencies severely affected the repayment capacity of borrowers. A major proportion of rise in NPL (see annexure no.1) since 2008 is primarily of cyclical nature due to decelerated GDP growth; imparting negative impacts on income and hence a declined repayment capacity of borrowers. 2009 registered a NPL increase of *87 billion* (Rs) summing up to a total of *446 billion*. Although there was a deceleration in growth rate of NPL from 64.8% (141.3 billion rise in 2008) to 24.2% in 2009, the NPL generation was wit-nessed across the board in the entire banking system. The NPL's of 2012 hiked to 16% along with addition of 12.4 billion (Rs) to the infected assets. More alarming is the figure of NPL booked as loss which escalated by *another 24 billion* due to ageing of prior classified loans. An astronomical *79%* of NPL's are classified in loss category, recovery of which requires herculean efforts by banks.

A NPL breakup in terms of bank groups reveal that midsized LBP's and PSCB's have chronically higher infection ratios compared to other groups. A sector wise analysis reveals that the sluggish economic activity caused a stress scenario for corporate sector in terms of loan repayment capacity. Corporate sector experienced a steep rise in non-performing loans by 43.3% compared to prior years when NPL/Loan ratio of corporate sector was persistently below overall infection ratio. The corporate sector which constitutes *61.9%* of loan portfolio embarked to an infection ratio of 12.6% in 2009 from 8.9% in 2008. As a consequence,

Table 3.3.3: Asset Quality by Bank Category: (Percent)

	Jun-12	Dec-12			
	Infection Ratio	Infection Ratio	Net Infection Ratio	Provision Coverage	Net NPLs to Capital
PSCBs	21.5	21.1	10.1	58.2	41.8
LPBs	13.2	13.8	3.9	74.6	17.1
FBs	9.0	10.4	1.2	89.3	1.9
CBs	14.8	15.3	5.1	69.9	21.6
SBs	31.1	30.1	14.9	59.1	175.0
All banks	15.3	15.7	5.4	69.3	23.1

Source: State Bank of Pakistan

bank's contracted credit disbursements to corporate sector which is evident from a rise of only 2.5% of corporate portfolio in 2009.

The root cause of the deteriorated corporate sector loan portfolio is the *textile sector* loans higher infection ratio. A sector wise loan distribution of private sector reveals that there exists severe *"Credit risk concentration"* as textile and sugar sectors alone comprises *40%* of bank's advances portfolio, thus being a massive source of systematic risk given proportion in total portfolio. Textile sector is the main user of banking credit. Such a large exposure of loan portfolio is comprehendible because of majestic share of textile sector in trade and exports (55.6%). The consistent energy crisis is one of the core reasons for high NPL's in textile and

Table 3.3.4: Trends in Non-Performing Loans (NPLs): (In Billion Rs.)

	2006	2007	2008	2009
Non-Performing Loans (NPLs)	218	218	359	446
Segment-wise NPLs to Loan Ratio of the Banking Sector				
Corporate	6.5	7.2	8.9	12.6
SMEs	8.8	9.4	15.8	22.1
Agriculture	20.8	18.7	15.8	16.5
Consumers	2.2	4.4	6.9	12.2
Commodity finance	0.6	1.0	1.4	1.1
Overall	6.9	7.6	10.5	12.6

Source: State Bank of Pakistan

cement sectors. Continued energy crisis forced the textile and cement industry to operate at below capacity level coupled with increased input costs which crippled the industries and inflicted loan defaults.

The infection rate of textile sector peaked to alarming 27.9% in 2012. If the textile NPL ratio continues to grow as per its trend for the last three years, it will deplete *48 billion* of bank's capital and decrease CAR (Credit adequacy ratio) by 64 basis points.

Table 3.3.5: Credit & Infection Ratios by Industry (2012): (Percent)

Industry	Share in Loans	Infection Ratio	
		Jun-12	Dec-12
Textile	18.2	26.8	27.9
Individuals	9.0	17.2	15.9
Energy	10.0	4.5	3.9
Agribusiness	8.2	7.3	11.7
Chemical & Pharma	4.0	8.6	9.1
Sugar	2.2	11.2	14.3
Cement	2.2	23.1	23.3
Others	46.1	13.9	15.0
Total	100.0	15.3	16.2

Source: State Bank of Pakistan

Energy sector and agribusiness sectors are other leading users of bank's credit, where infection ratios surged. The agribusiness sector infection ratio increased from 7.3% to 11.7%, mainly induced by floods and rains. The sugar sector experienced a decrease in NPL for the reason that the declined loans to sugar sector outpaced the decline in NPL's.

Furthermore, adding to the banking woes in the *"bulk of pending litigations"*. Recovery of

Table 3.3.6: Infection Ratio by Industry (Percent)

Industry	2008	2009
Chemical & Pharmaceuticals	7.7	6.7
Agri business	8.9	8.9
Textile	14.6	19.6
Sugar	9.1	19.6
Cement	6.6	12.2
Shoes & Leather garments	8.6	13.3
Automobiles & Transportation equipment	7.5	16.6
Financial	5.4	12.6
Insurance	0.0	0.1
Electronic & Transmission of energy	3.4	7.4
Others	8.6	10.6

Source: State Bank of Pakistan

NPL's by the banks is a phenomenal task because of huge backlog of pending litigations lying with banking courts. Currently *56,000* recovery suits are pending with banking tribunals and courts, out of which 14,000 are more than 10 years old. These cases cover a massive litigated NPL amount of Rs.*200 billion*. Till now banks have been able to recover *19 billion*

worth of NPL which is merely 3% of total NPL's. Thus a defaulter friendly legal system is in place providing incentive to borrowers to default.

The consequences of rising NPL's resulted in the form of *"insatiate craving of banks"* to invest in safer/risk-free government securities. Banks resorted to a strategy of classifying lion's share of investment in *"available for sale (AFS)"* and a meager proportion for *"Held for Trading (HFT)"*, *"Hold to Maturity (HTM)"*, and investment categories.(see annexure 2)

Table 3.3.7: Classification of Advances by Borrowers: (Billion Rs.)

Borrowers	**2007**	**2008**	**2009**	**2008**	**2009**
Government	77.7	150.5	333.4	93.6	121.6
Non-Financial Public Sector Enterprises(PSEs)	125.4	186.9	225.4	49.0	20.6
Private Sector	1,884.9	2,240.8	2,221.5	18.9	-0.9
- o/w manufacturing	1,091.8	1,299.4	1,282.4	19.0	-1.3
All others	525.2	478.3	411.5	-8.9	-14.0

In 2012 an astounding *84%* of investment portfolio of banks comprised of AFS category, consisting of government securities and a nominal 3% of HFT. The table below shows that government borrowing from commercial banks more than doubled in 2009 compared to 2007; the government borrowing increased by four folds in 2009.

The next chapter elaborates in detail the model and methodology of risk assessment for the purpose of empirical analysis.

Chapter 4

MODEL & METHODOLOGY

4.1 INTRODUCTION

This study investigates the relationship between the stock returns of firms and macro variables and firm specific variable sensitivity to macro factors by estimating factor betas (systematic risk) through a multifactor macro-economic model developed on the lines of Burmeister & Wall (1986) and Chen, Roll & Ross (1986).

ln empirical research, the types of models used to asses risk can be classified broadly as fundamental based models and as market based models. Chan-hau (2006) distinguished four approaches of fundamental based modeling to model risk, *macro based; rating based; accounting based and hybrid models.*

Macro based models, assess risk on basis of macro condition's where macro variables are cyclical indicators like interest rates or GDP growth and financial market parameters for instance, stock market prices and volatilities.

Accounting based models asses risk for individual firms using accounting information, whereas *rating based* models asses risk when rating information is available. *Hybrid models* are combination models of economic, financial ratios and rating data (multi factor)

Chan-hau (2006) highlights the advantages of macro-models, firstly, macro models are appropriate for designing stress scenarios, secondly macro models enable cross country comparative studies because of the reason that long data series are available for most countries.

Further macro models are classified into exogenous and endogenous models i.e., whether the model generates a feedback loop between the risk and explanatory economic variables. The exogenous model assume that economic variables are exogenous and are not affected by risk

level/distress, but the problem with exogenous approach is that the relation between the risk and macro variables is assumed to remain the same during the periods of economic expansion or down turn. The second type considers macro variables to be endogenous and relationship differs as per recession/expansions.

Contrary to macro models, market based models are built on Merton's options-pricing theory and rely on stock prices which have been discussed in literature review.

4.2 THE MODEL

Research in *"Financial Economics"* have depicted that stock prices are effected systematically by a number of macro-economic variables, namely interest rates of short term assets, general price level, economic activity level (specifically manufacturing sector), money supply and market interest rate. The stock price sensitivity to macro variables is in turn influenced by firm specific micro variables (firms characteristics). This aspect establishes a link that firm characteristics not only affect risk directly but also indirectly via their influence on macro risk factors. In order to explore this *"indirect link"* of exposure of firm specific variables to macro factors, the following model is set.

Individual stock prices *Ri* are assumed to follow a model in the form

$$R_{it} = a_i + \sum_{k=1}^{K} \beta_{ik} f_{kt} + e_{it} \qquad (4.1)$$

Where

a_i = *Constant term*

β_{ik} = *firm sensitivity to factor risk K or factor β k for firm i*

f_{kt} = *realization on factor K in time t*

e_{it} = *error term*

In the first step the stock returns *(R_{it})* are regressed on a set of macro variables which affect stock returns systematically. The macro variables are *growth rate of industrial production (DIP), risk premium on return (RP), Interest growth rate (Overnight call money Interbank Rate (DONIR),Trade Openness (TDOPN), unexpected inflation (UI), unanticipated growth in money supply (UDMS), anticipated growth of money supply (ADMS), term structure in financial market (TS) and exchange rate growth rate (EXCH).*

The (eq. 4.1) is estimated for specific macro variables using Thiel's criterion[2] to obtain β_{DIP}, β_{TS}, β_{DONIR}, β_{TDOPN} *and* β_{ADMS} which are systematic factor β's of *DIP, TS, DONIR, TDOPN & ADMS* , whereas e_{it} presents firm specific risk.

4.3 MANUFACTURING SECTOR - METHODOLOGY

4.3.1 Systematic Risk Indirect Approach Model

In the methodology, the multifactor model presents the relationship between the stock returns of firms and firms' sensitivity to macro factors. The process is such where changes in macro factor and firm sensitivity to those changes affect the stock returns, and stock returns in turn impact the probability of firm's higher risk. In this context the association between the probability of firms higher level of risk and firm stock return in such that a firm with high stock returns will have a low level of risk.

Therefore a 2 step logit discriminant analysis is applied as used in Maddala (1986), Thomson (1992) and Theodossiou et al (1996) for the purpose of estimating firm's stock return, the estimated returns will then be used as representation of macro sensitivity indicating firm's risk level. In other words, firms estimated stock returns from multifactor model presents

[2] A variable is termed as irrelevant in equation if "incremental F-value" of additional variable in regression falls short of 1 (see Maddala (1992), 497-502).

macroeconomic effects incorporated in the micro crisis predictive model. The estimated stock return from the multi-factor model is presented as a link to micro-crisis model.

The micro-crisis model and macro factors imply following specifications of indirect test

$$PRFD_{it} = prob\ (Y_{it}=1) = \frac{1}{1+(e^{-zit})} \qquad (4.3)$$

$$Z_{it}=\beta_0+\beta_1 \hat{R}_{it}+\beta_2(SETA)_{it-1}+\beta_3(WCTA)_{it-1}+\beta_4(RETA)_{it-1}+\beta_5(OINS)_{it-1}+\beta_6(NITA)_{it-1}+\beta_7(CHIN)_{it-1} \qquad (4.4)$$

$$R_{it} = \beta_0 + \beta_{DIP}DIP_t + \beta_{TS}TS_t + \beta_{DONIR}DONIR_t + \beta_{ADMS}ADMS_t + \beta_{TDOPN}TDOPN_t + e_{it} \qquad (4.5)$$

Where

Z_{it} = *log odd function*

$PRFD_{it}$ = *Probability of risk of financial distress*

Y_{it} = *is assigned value of 1 if firm is financially riskier & 0 otherwise.*

Three cutoff points or levels are further introduced in Y (risk/distress) by introducing following three *dummy variables* as criterion of differentiation;

INTWO = 1 if net income of firm negative for consecutive 2 years, 0 otherwise.

INTHREE = 1 if net income of firm negative for consecutive 3 years, 0 otherwise.

OENEG = 1 if total liabilities greater than total assets of firm, 0 otherwise.

Y_1 *(primary risk level) =INTWO*

→*(net income –ve for consecutive* ***2*** *yrs)*

Y_2*(secondary risk level)=INTWO+OENEG*

→*(net income –ve for consecutive* ***2*** *yrs+ TL>TA)*

Y_3*(highest risk level)=INTHREE+OENEG*

→*(net income –ve for consecutive* ***3*** *yrs +TL>TA)*

The Y_1 level of risk is synonym to *"bad performance"*, Y_2 level of risk represents *"even worse performance"* and Y_3 level of risk is a connotation of *"expected default"*. The Y_2 and Y_3 levels are amplified deteriorated financial scenario of the firm where negative net income is coupled with an insolvency situation (TL>TA), when a firm is unable to honor its financial commitments.

$$Z_{it=}\beta_0+\beta_1 R^{\wedge}_{it}+\beta_2(SETA)_{it-1}+\beta_3(WCTA)_{it-1}+\beta_4(RETA)_{it-1}+\beta_5(OINS)_{it-1}+\beta_6(NITA)_{it-1}+\beta_7(CHIN)_{it-1} \quad (4.4)$$

Estimated stock returns completely reflect the firm's sensitivity to macro conditions as well as micro. Because the firm's stock returns reflect both the systematic and firm specific risk, the motivation of the two step logit is to isolate the systematic risk in which the firms got affected by economic crises in the economy as a whole.

Actual stock returns R_i present both the systematic risk and firm specific risk, where F

$$R_i = \beta_{0,i} + \beta_{1,i} F + e_i$$

presents systematic factors and e_i presents firm specific risk. As financial characteristics of the firm are related to the firm specific risk, the use of actual stock returns along with financial characteristics as explanatory variables of model will be double consideration of firm specific risk. So the appropriate measure is to find a proxy of systematic risk that corresponds to firms credit/default risk. The estimated R_i will exclude the firm specific risk and will only capture the systematic risk of the firm. Then R_i and financial characteristics combine the systematic and firm specific risk as a presentation of explanatory variables to macro related micro-crisis model without making the firm specific risk redundant.

To estimate stock return, R_{it} is regressed on a set of macro variables as mentioned previously to obtain β macro factors in the form of β_{DIP}, β_{TS}, β_{DONIR}, β_{TDOPN}

$$R_{it} = \beta_0 + \beta_{DIP}DIP_t + \beta_{TS}TS_t + \beta_{DONIR}DONIR_t + \beta_{ADMS}ADMS_t + \beta_{TDOPN}TDOPN_t + e_{it} \quad (4.5)$$

After obtaining $\hat{R}_{it}$ (estimated), Z_{it} (log odd function) equation (4.4) is calculated.

The Indirect specification uses estimated stock returns computed from estimated changes in macro variables, eq.(4.5) and firms sensitivities to those macro variables, eq.(4.4) as proxies of macro factors.

The estimated stock returns of *498* firms of manufacturing sector along with firm specific variable of all firms are used to find the probability of financial riskier/distressed firms.

4.3.2 Manufacturing Sector – Systematic Risk Direct Approach Model

In this approach sensitivities of firms to macro-economic variables are used as proxies for macro β factors. The construction for both financial and economic variables remains the same as of systematic risk indirect approach model. The estimated variations in economic variables, *growth rate of Industrial production (DIP), money supply (ADMS), term structure (TS) and Interest growth rate (Overnight call money Interbank Rate (DONIR) and Trade Openness (TDOPN),* are used to estimate the firm i stock returns.

The direct approach model is given as

$$PRFD_{it} = prob\,(Y_{it}=1) = \frac{1}{1+(e^{-zit})}$$

In the direct test, the explanatory factors of firm's probability of risk of financial distress include the firm sensitivity to macro factors and financial characteristics of firm

$$Z_{it} = \gamma_o + \gamma_{DIP}\beta_{DIP_t} + \gamma_{TS}\beta_{TS_t} + \gamma_{DONIR}\beta_{DONIR_t} + \gamma_{ADMS}\beta_{ADMS_t} + \gamma_{TDOPN}\beta_{TDOPN} + \lambda_1(SETA)_{it-1} + \lambda_2(WCTA)_{it-1} + \lambda_3(RETA)_{it-1} + \lambda_4(OINS)_{it-1} + \lambda_5(NITA)_{it-1} + \lambda_6(CHIN)_{it-1} + \mu_{it} \quad (4.6)$$

Where

βs = *macro factor* βs

Υ = *effect of macro factor* β*'s on log odd of risk (firm)*

λ = *effects of firm specific variable on log odd of risk (firm)*

The macro factors β's for firms are computed from stock return of each of *498* firms. The macro co- efficient (λs) obtained presenting systematic risk along with micro variable presenting firm specific risk of every firm are used to define the probability of level of risk by using logit model.

As previously applied to indirect model, three cutoff points or levels are further introduced in Y (risk/distress) by introducing following two *dummy variables* as criterion of differentiation;

Y_1 (primary risk level) =INTWO

*→(net income –ve for consecutive **2** yrs)*

Y_2(secondary risk level)=INTWO+OENEG

*→(net income –ve for consecutive **2** yrs+ TL>TA)*

Y_3(highest risk level)=INTHREE+OENEG

*→(net income –ve for consecutive **3** yrs +TL>TA)*

4.4 RISK ASSESSMENT OF BANKING SECTOR – METHODOLOGY

4.4.1 NPL – A MEASURE OF CREDIT RISK

The model and methodology of multifactor macro model, systematic risk indirect approach and systematic risk direct approach will be applied to banking sector using a slightly different set of macro variables which include *Discount rate growth rate (DDCR), Growth rate of Inflation (DIF), money supply growth rate (DMS),Term structure (TS), Risk Premium (RP), Trade Openness (TRADEPKR) and Exchange rate growth rate (DEXCH),* and bank specific

financial variables which include *CAMEL* category variables of *Shareholders equity to Total assets (SETA), Retained earnings to Total assets (RETA), Working capital to Total assets (WCTA)* and other banking variables which include *Change in net income (CHIN), Gross advances growth rate (GADVG) & a dummy variable ,1 if net income negative for current year, 0 otherwise (NNI).*

Since banking sector is unique due to its *stylized features; market power; interest rates stickiness: accumulation of bank capital:* is unique due to its *stylized products, loans and deposits contracts; homogeneous financial products from a composite basket, differentiated at different prices:* is also unique due to its *stylized credit risk(only banking and insurance sector have to deal with both the idiosyncratic and systematic risk where the former is non-diversifiable) and balance sheet composition*, we set *Non-performing loans to gross advances ratio (NPLGA)* as a measure of *credit risk of banking sector* (supply side).

Deun Li Kao (2000) articulates that credit risk of banking sector is an *event* where default is the ultimate outcome, but the prior credit events like *distress, risk grade, risk migration* have more significant impact in pricing of credit risk of banking. Contrary to most models which consider default as the only event, the prior spectrum is an appropriate measure. Secondly the balance sheet heads of banking sector only represent the realizations which have occurred in a point in time (i.e. does consider any transitory phases). A non-performing loan on the balance sheet is not a booked loss until it loses its potential of performance which can take place by rescheduling/incurring recovery/litigation costs/write off in course of time. Thus a fresh *NPL* from initial aging report to balance sheet reported *NPL* are all events of credit risk, until booked as a loss. Literature supports this aspects and a number of credit risk models even use *NPL minus provisioning*; Hussein, Saeed & Hassan (2011) as a measure of credit risk of banking sector. Applying the same argument to our logit default probability model,

where the *NPL* is a measure of credit risk, as the realization of default has not taken place and the spectrum in point in time is of credit risk.

The stock returns are not employed in the risk assessment model of banking sector of Pakistan, for the reason that *SBP* restricts banks' exposure to stock market. Banks are limited to place a maximum exposure of *20 %* of their equity at stock market. As a consequence, this trivial banks' exposure to stock market insulates banks from stock market swings. This comparatively small exposure implies that even huge declines in the equity prices do not affect banks' solvency & profitability. Therefore, despite sharp fall in stock prices, banks are able to endure the revaluation losses, incurred on their stock market investment portfolio. Due to the limited exposure, banks can even absorb severe shocks disrupting the stock prices; as per a sensitivity analysis[3], even a drop in listed shares by 50% will only decrease the CAR of the banks by negligible 76 basis points.

4.4.2 The Model

Goldstein and Turner (1996) in their study highlight that accumulation of NPL is attributable to number of macroeconomic factors including *macro volatility, macro downturns, GDP per capita, exchange rate appreciation, deteriorating terms of trade, higher interest rates and inflation, dependency upon inter bank borrowings and moral hazard*. Also studies include bank specific factors in addition to macroeconomics factors, for the reason that macro factors in turn depend upon micro factors.

In order to explore this *"indirect link"* of exposure of bank specific variables to macro factors, the following multi factor model is set.

NPL's are assumed to follow a model in the form

$$NPLGA_{it=} a_i + \sum_{k=1}^{K} \beta_{ik} f_{kt} + e_{it} \qquad (4.7)$$

[3] Risk analysis of banking sector; SBP report H1-CY12

Where

a_i = *Constant term*

β_{ik} = *macro factor βeta k for bank i*

f_{kt} = *realization on factor k in time t*

e_{it} = *error term*

In the first step the $NPLGA_{it}$ are regressed on a set of macro variables which affect *NPL* systematically. The macro explanatory variables are *Discount rate growth rate (DDCR), Growth rate of Inflation (DIF), money supply growth rate (DMS),Term structure (TS), Risk Premium (RP), Trade Openness (TRADEPKR) and Exchange rate growth rate (DEXCH).*

4.4.3 Banking Sector – Systematic Risk Indirect Approach Model

In the methodology, the multifactor model presents the relationship between the *Non-performing loans (NPL's)* of banks and bank's sensitivity to macro factors. The process is such where changes in macro factor and bank sensitivity to those changes affect the *NPL's*, and *NPL's* in turn impact the probability of bank's higher credit risk.

Therefore a 2 step logit discriminant analysis is applied as used in Maddala (1986), Thomson (1992) and Theodossiou et al (1996) for the purpose of estimating bank's *infection ratio*, the *infection ratio* will then be used as representation of macro sensitivity indicating bank's credit risk level. In other words, bank's *Non-performing loan to Gross advances ratio* from multifactor model presents macroeconomic effects incorporated in the micro crisis predictive model. The estimated *NPL's* from the multi-factor model is presented as a link to micro-crisis model.

The micro-crisis model and macro factors imply following specifications of indirect test

$$PRFD_{it} = prob\ (Y_{it}=1) = \frac{1}{1+(e^{-zit})} \qquad (4.8)$$

$$Z_{it}=\beta_0+\beta_1 NPLGA^{\wedge}_{it}+\beta_2(SETA)_{it-1}+\beta_3(RETA)_{it-1}+\beta_4(GADVG)_{it-1}+\beta_5(CHIN)_{it-1} \quad (4.9)$$

Where

Z_{it} = *log odd function*

$X_{j,it}$ = *Financial characteristic j of bank i*

Y_{it} = *is assigned value of 1 if net income of bank negative for current year, 0 otherwise*

Estimated *infection ratio* completely reflects the bank's sensitivity to macro conditions as well as micro. Because the bank's actual *NPL* reflect both the systematic and bank specific risk, the motivation of the two step logit is to isolate the systematic risk in which the banks got affected by economic crises in the economy as a whole.

Actual *NPL's* present both the systematic risk and bank specific risk, where F presents systematic

$$NPL_{\mathrm{i}} = \beta_{0,i} + \beta_{1,i} F + e_i$$

factors and e_i contains bank specific risk. As financial characteristics of the bank are related to the bank specific risk, the use of actual *NPL's* along with financial characteristics as explanatory variables of model will be double consideration of bank specific risk. So the appropriate measure is to find a proxy of systematic risk that corresponds to banks credit risk. The estimated NPL_i will exclude the bank specific risk and will only capture the systematic risk of the bank. Then *Non- performing loan to gross advances ratio* and financial characteristics combine the systematic and bank specific risk as a presentation of explanatory variables to macro related micro-crisis model without making the bank specific risk redundant.

To estimate infection ratio, *NPLGA* is regressed on a set of macro variables as mentioned previously to obtain β macro factors in the form of β_{DDCR}, β_{TS}, β_{RP}, β_{DIF}, β_{DMS}, $\beta_{TRADEPKR}$, β_{DEXCH},

$$NPLGA_{it}=\beta_0+\beta_{DDCR}DDCR_t+\beta_{TS}TS_t+\beta_{RP}RP_t+\beta_{DIF}DIF_t+\beta_{DMS}DMS_t+\beta_{TRADEPKR}TRADEPKR_t$$
$$+\beta_{DEXCH}DEXCH_t+e_{it} \quad (4.10)$$

After obtaining $NPLGA^{\wedge}$ (estimated), Z_{it} (log odd function) equation (4.9) is calculated.

The Indirect specification uses estimated NPL's computed from estimated changes in macro variables, eq. (4.10) and banks sensitivities to those macro variables, eq.(4.9) as proxies of macro factors.

The estimated infection ratios of *41 bank*s of banking sector along with bank specific variables of all banks are used to find the probability of higher credit risk of banks.

4.4.4 Banking Sector – Systematic Risk Direct Approach Model

In this approach bank's sensitivities to macro-economic variables are used as proxies for macro β factors. The construction for both financial and economic variables remains the same as of systematic risk indirect approach model. The estimated changes in economic variables, *Discount rate growth rate (DDCR), Growth rate of Inflation (DIF), money supply growth rate (DMS),Term structure (TS), Risk Premium (RP), Trade Openness (TRADEPKR) and Exchange rate growth rate (DEXCH)* are used to estimate the infection ratio of bank i.

The direct approach model is given as

$$PRFD_{it} = prob\ (Y_{it}=1)=\frac{1}{1+(e^{-zit})}$$

Where in the direct test, the explanatory factors of bank's probability of credit risk include

the banks sensitivity to macro factors and financial characteristics of bank.

$$Z_{it} = \gamma_o + \gamma_{DDCR}\beta_{DDCR_t} + \gamma_{TS}\beta_{TS_t} + \gamma_{TDPKR}\beta_{TDPKR_t} + \gamma_{DMS}\beta_{DMS_t} + \gamma_{RP}\beta_{RP_t} + \gamma_{DEXCH}\beta_{DEXCH_t} + \gamma_{DIF}\beta_{DIF_t} + \lambda_1(SETA)_{it-1} + \lambda_2(RETA)_{it\_1} + \lambda_3(\text{GADVG})_{it-1} + \lambda_4(CHIN)_{it-1} + \mu_{it} \quad (4.11)$$

Where

βs = *macro factor* βs

γ = *effect of macro factor* β*'s on log odd of risk (bank)*

λ = *effects of bank specific variable on log odd of risk (bank)*

The macro factors β's for banks are computed from *Non- performing loan to gross advances ratio* of each of *41* banks. The macro co- efficient (λs) obtained presenting systematic risk along with micro variable presenting bank specific risk of every bank are used to determine the probability of level of risk by using logit model.

Our anticipation is that both macroeconomic and bank specific variables contribute to build up of *NPL's* in Pakistan banking sector. Next chapter will give a detailed analysis of data and construction of variables for both the manufacturing and banking sector.

The next chapter elaborates in detail the data and variable construction for the purpose of empirical analysis.

Chapter 5

DATA & VARIABLE CONSTRUCTION

5.1 DATA SOURCE AND TYPE

5.1.1 Data of Manufacturing Sector of Pakistan

The study is based on a panel data of a sample of *498 KSE* listed firms of manufacturing sector of Pakistan, comprising of stock returns (weighted average) and balance sheet variables (annual). The period of observation is from *1974-2010*, with a restriction that only those firms will constitute the samples, which have a minimum consecutive data of fifteen years. The list of variables of manufacturing sector is given in the list 5.2.1

Table 5.1 Sector Wise Firm Distribution

Sector No.	Industry	Number of Firms
1	Textile-Cotton	206
2	Textile-Synthetic	32
3	Chemicals	37
4	Engineering	45
5	Sugar & Allied	36
6	Paper & Board	17
7	Cement	17
8	Fuel & Energy	21
9	Tobacco	4
10	Jute	8
11	Vanaspati & Allied	13
12	Glass & Ceramics	10
13	Food & Allied	21
14	Others	31
		498

5.1.2 Data of Banking Sector of Pakistan

The study of banking sector is based on a limited panel due to un-availability of data. The sample comprises of *41* banks, the *scheduled commercial banks, foreign banks, public sector banks and specialized banks*, where all the mergers and acquisitions[4] are accounted for. The sample period is from *2001-2012*. The list of variables of banking sector is given in list 5.2.2

[4] Refer to Annexure III for mergers & acquisition detail over the period

5.2 MACRO, FIRM/BANK SPECIFIC VARIABLES AND RISK MEASURES

5.2.1 List of variables for Risk Assessment of Manufacturing Sector of Pakistan

Macro variables

- Annual growth rate of industrial production
- Inflation growth rate
- Risk premium
- Term structure in the financial markets
- Unanticipated growth in money supply
- Anticipated growth in money supply
- Growth rate of interest (call money, overnight interbank rate)
- Trade Openness

Macro variables-betas

- Risk measures of annual growth rate of industrial production
- Risk measures of unexpected inflation rate
- Risk measures of risk premium
- Risk measures of term structure in the financial markets
- Risk measures of unanticipated growth in money supply
- Risk measures of anticipated growth in money supply
- Risk measures of growth rate of interest
- Risk measures of trade openness

Firm specific / micro variables

- Retained earnings to total asset
- Shareholders equity to total asset
- Working capital divided by total assets
- Operating income to net sales
- Net income to total asset
- Change in net income
- A dummy variable, 1 if net income is negative for last *two years* 0 otherwise
- A dummy variable, 1 if net income is negative for last *three years* 0 otherwise
- A dummy variable, 1 if total liabilities exceed total assets, 0 otherwise

5.2.2 List of variables for Credit risk Assessment of Banking Sector of Pakistan

Macro variables

- Discount rate growth rate
- Inflation growth rate
- Money supply growth rate
- Exchange Rate Growth Rate
- Risk premium
- Term structure in the financial markets
- Trade Openness

Macro variables-betas

- Risk measures of interest growth rates
- Risk measures of inflation growth rate
- Risk measures of money supply growth rate
- Risk measures of exchange rate growth rate
- Risk measures of risk premium
- Risk measures of term structure in the financial markets
- Risk measures of trade openness

Bank specific/ micro variables

- Capital
- Assets
- Liquidity
- Gross advances growth rate
- Change in net income
- Debt to equity ratio
- A dummy variable, 1 if net income is negative for current year, 0 otherwise

5.3 VARIABLE CONSTRUCTION

5.3.1 Construction of Macroeconomic Variables

The selection of macroeconomic variables is done after conducting the backward elimination procedure based upon Thiel's criterion; after which a smaller set of variables is selected. The elimination procedure results in producing the macro variables namely risk premium on low

grade bonds, industrial production, money supply, term structure, interest rate and inflation etc. A convention adopted throughout the study is that time subscripts are applied to end of time (period).

The construction of the macro variables[5] are given as:

5.3.1.1 Risk premium

Variable RP_t is constructed as

$$RP_t = LOWGB_t - LGB_t$$

Where, RP_t is the difference of $LOWGB_t$ (low grade bonds return) & LGB_t (long term government bond return). The low grade bonds are more riskier for investors as compared to government bonds for which a considerable market exists, for the reason that low grade bonds (long term assets) are less liquid in nature than government bonds. Their redemption before the due maturity date is conditioned with a penalty. As both these bonds are long term bonds, the return difference of the two exhibits a risk premium estimate outside stock market.

5.3.1.2 Industrial production

In Pakistan, the basic measure of industrial production is the manufacturing *Quantum index numbers*. We use the annual growth rate of industrial production which is computed, based on financial literature, by first differencing in natural logs:

$$DIP_t = \log IP_t - \log IP_{t-1}$$

Where, *DIP* is growth rate of industrial production, IP_t is the industrial production flow in year t, and its lagged value is IP_{t-1} .

5.3.1.3 Money Supply

Two money supply variables are used, the *expected growth in money supply* and the *un-anticipated growth in money supply* (in current period over previous period). First the DMS_t

[5] Refer to Annexure V; variable construction key of macro variables

(growth rate of money supply) is computed as follows.

$$DMS_t = \log MS_t - \log MS_{t-1}$$

The series of UMS_t (unanticipated growth in money supply) is obtained by residuals from the *MA(1)* process on the realized DMS_t series; where the *MA(1)* process is given as:

$$DMS_t = \alpha_0 + \alpha_1 \varepsilon_{t-1} + \varepsilon_t$$

Hence, *UMS(t)* (unanticipated series) is given by

$$UDMS_t = DMS_t - \left[\hat{a}_0 + \hat{a}_1 \hat{\varepsilon}_{t-1} \right] = \hat{\varepsilon}_t$$

where the estimated values are indicated by ^.

The difference between the DMS_t (realized series) and $UDMS_t$ (unanticipated series) then gives the $E[DMS_t/t\text{-}1]($ anticipated growth in money supply series); which is,

$$ADMS_t = DMS_t - UDMS_t = \hat{a}_0 + \hat{a}_1 \hat{\varepsilon}_{t-1}$$

5.3.1.4 Term structure

The influence of the term structure shape is captured by an interest rate characteristic TS_t ; which is defined as:

$$TS_t = LGB_t - TB_{t-1}$$

Where, TB_{t-1} reflects Treasury bill rate at end of period t - 1.

Further we have, $E[UTS(t)|t-1] = 0$, under appropriate form of risk neutrality. The risk neutrality assumption is used only to segregate the pure effect of term structure.

As the T-bills have a comparatively shorter maturity period than long-term government bonds, and since both are viewed safe from investor's angle, the return difference between the two is due to their term structure difference.

5.3.1.5 Inflation

In Pakistan, the basic measure of average price of consumer goods & services is CPI (Consumer price index). We use consumer price index annual rate for measuring inflation rate (INF) which is computed, as per convention in literature, by first differencing in natural logs:

$$INFT_t = \log CPI_t - \log CPI_{t-1}$$

5.3.1.6 Interest rate

In Pakistan, the basic measure of domestic interest rate is Overnight interbank rate (call money); an interest rate for inter-bank borrowing (without security). We use annual growth rate of interest rate (domestic), which is computed, as per convention in literature, by first differencing in natural logs:

$$DIR_t = \log ONIR_t - \log ONIR_{t-1},$$

Where DIR_t represents the growth rate of interest rate.

5.3.1.7 Exchange rate

Exchange rate is the price of the local currency expressed in the terms of foreign currency. Firms which deals in international business are likely to be affected positively or negatively by changes in exchange rates, depending whether they export or import. We use annual growth rate of Exchange rate, calculated following the convention in literature, by taking the first difference in natural logs

$$DEXCH_t = log\ EXCH_t - log\ EXCH_{t-1}$$

Where $DEXCH_t$ is the annual growth rate of Exchange rate.

5.3.1.8 Trade Openness

The variable of Trade Openness is the sum of imports and exports of goods and services meas

-ured as a share of GDP. Expansion of trade openness (export + import) as a share of GDP is associated with increase in overall trade volume of a country, so it is generally used as a proxy of trade liberalization. Trade Openness is constructed as follows,

$TDOPN_t = X_t(Exports)+M_t(Imports)$/GDP

5.3.2 Construction of Firm Specific/Micro[6]

R Stock return where stock prices growth rate is computed

SIZE Log of total assets of firm divided by GDP deflator (base year 2005) This measure is directly linked with distress/bankruptcy risk. Increase in firm size is negatively related to distress risk.

NNI A dummy variable, 1 if net income is negative for current year, 0 otherwise. A

INTWO dummy variable, 1 if net income is negative for consecutive last two years, 0 otherwise, similarly a dummy variable, 1 if net income is negative for last three

INTHREE years consecutively, 0 otherwise This specified net income pattern helps in predicting distress/bankruptcy risk of firm.

GROWTH The net assets growth rate, where,

Net assets = Total Assets – Total liabilities

This variable measures growth rate of a firm.

REC Receivables to inventory ratio. This ratio gauges liquidity of a firm.

YTA Sales to total assets. This ratio demonstrates sales capability and reflects ability of a firm's survival in competitive market.

***RETA** Retained earnings to total assets ratio represents the amounts retained in business, also termed as self-financing ratio.

Retained earnings = reserve accounts + un-appropriated/retained profits

[6] Refer to Annexure V ; variable construction key of firm specific variables.

For RETA, firm's age is implicitly considered as this ratio gauges accumulative Profitability over the period of time. It is worth mentioning that this ratio exhibits biasness as it is inclined towards classifying young firms as distressed, as firms require time to attain a level of cumulative profits. Yet the literature shows an extensive use of RETA on distress/bankruptcy prediction.

***WCTA** Working capital to total asset ratio. This ratio measures firm's net liquid assets relative to total capitalization.

Working Capital = Current Assets – Current liabilities

Working capital to total assets ratio is considered as one of the best indicators of financial distress/bankruptcy. The literature shows an extensive use of this ratio in predicting bankruptcy models e.g. Altman (1968); Ohlson (1980); Triapat & Nittayagasetwat (1999) and depicts statistical significance both in uni-variate and multivariate models.

EBITA Earnings before interest and taxes to total assets ratio measures firm's assets productivity. EBITA is same as operating income, thus considered important for financial distress prediction.

QTA Market value of equity to book value of total liabilities. This measures how much decline in value in firm's assets can take place before total liabilities exceeds total assets and firm becomes insolvent and finally bankrupt.

CLCA Current Liabilities to Current Assets. It measures the financial soundness of a firm in the short run.

***SETA** Book value of shareholder's equity to total assets, also called shareholder's equity ratio. It quantifies the assets on which stock-holders have a residual claim and defines how much stockholders will receive if liquidation of firm takes

place. Un-appropriated profits also form part of a company's equity, and are owned by shareholders. They are also called retained earnings, accumulated profits, undivided profits, and earned surplus.

OENEG A dummy variable, 1 if total liabilities greater than total assets, 0 otherwise. A dummy variable for dividing debt to assets ratio in low/high categories.

CHIN $(NI_t - NI_{t-1})/(|NI_t| + |NI_{t-1}|)$ Where NI_t and NI_{t-1} are current year and previous year net incomes. Where,

NI (each year) = (Net profit before taxation) - (Tax provision)

This variable gauges change in net income and identifies the magnitude as well as the direction of change in firm's income

***OINS** Operating income to net sales. As,

Operating Income = Gross profit – Operating expenses

ONIS = (Gross Profit) – (Operating Expenses)/(Sales)

Operating income considers both COGS (cost of goods sold) and fixed expenses. *Interest and taxes are not deducted from net operating income.*

Net sales refers to the total amount of sales business makes after allowing for deductions for damaged products, returns and discounts

Also called as operating margin it's a measure of firm's operational efficiency, intra-industrial efficiency & pricing strategy.

MEQTL Market value of equity to book value of total liabilities ratio. As,

Mkt value of equity =Total value of all shares of common & preferred stock.

*Book Value of Total Liabilities = **S**um of all current and long-term liabilities from the Balance Sheet.*

MEQTL = Stock prices of all shares (common & preferred) of each year/Total

Liabilities

If stocks are not traded then we can use book value of equity as a proxy for market price of equity.

DBERM Debt to equity ratio. If in MEQTL, liabilities are replaced in denominator by total debt (current + long term), it will become *debt to equity ratio* for companies using debt financing. It is a commonly used variable to calculate debt burden.

GADVG Lagged loans growth. This variable is of eminent importance in literature regarding NPL's and credit risk analysis. It is constructed by taking the growth rate of gross advances.

5.3.3 Construction of Bank Specific/Micro Variables

5.3.3.1 C.A.M.E.L

The literature of Finance & accounting depicts a very sound history of researchers basing their model of credit risk and financial distress of banking sector upon the CAMEL category variables. Following Salchenberger, Cinar, and Lash (1992), financial ratios are categorized only from each element of the CAMEL framework. The set of variables, following the CAMEL categories are;

1. Capital *SETA
2. Assets *RETA
3. Management & Earnings *ONIS
4. Liquidity *WCTA

* The CAMEL category is presented by the right column whose construction has been explained in the table 5.3.2.

The other Banking variables[7] whose construction has been thoroughly explained in table 5.3.2 are *GADVG, DBERM, CHIN, & NNI.*

The next chapter elaborates in detail the overall results of the *risk assessment of manufacturing sector of Pakistan.*

[7] Refer to annexure VI; variable construction key of bank specific variables.

Chapter 6

RISK ASSESSMENT OF MANUFACTURING SECTOR

OVERALL RESULTS

6.1 EMPIRICAL RESULTS

The previous chapter dealt with the estimation technique, variables employed and data. This chapter explains the estimated results comprising of a sample of *498* firms of the manufacturing sector of Pakistan, covering a period of *1974 to 2010*.

The results of the macro-related micro-crisis prediction models, both indirect and direct tests, are presented in *table 6.1* & *6.2*.

First of all, the results of the total sample are obtained by estimating eq. (4.5). The results indicate that the *estimated stock return* variable corresponding to the estimated changes in macroeconomic factors is significantly different from zero. The negative sign suggests that a firm with a higher estimated rate of return has a lower probability of financial distress. The rationale has been pointed out by Beaver (1966) as the declining of a firm's stock return signaling the firm's vulnerability to the possibility of bankruptcy. The significance of this variable at *1%* significance level also indicates the importance of macroeconomic conditions and those conditions can strongly influence the probability of the firm's financial risk level.

6.1.1 Y_1 Results: Indirect & Direct Specification Models

The results obtained for *Y_1; probability of risk of financial distress (primary level*); indirect specification model for the whole sample signify that all the firm specific variables *SETA, RETA, OINS, CHIN* and *NITA* are significant at a striking *1 %* level of significance; consistent with the findings of literature (Chen, Roll & Ross, 1986 and Tirapat, Nittayaga Setwat, 1999). The relationship is such that higher the ratios, the lower the probability of Y_1 level of risk (primary level). A 1 unit increase in *SETA*, *OINS* and *WCTA* will decrease the

Table 6.1: Manufacturing Sector: Systematic Risk Indirect Approach Model

INDIRECT MODEL			
Explanatory Variable	**Estimates of Co-efficient**		
	Y_1	**Y_2**	**Y_3**
Constant	-1.359005 (0.049180)***	-2.608043 (0.067344)***	-2.677350 (0.071884)***
R_{EST}	-0.327505 (0.108206)***	-0.190970 (0.153654)	0.054591 (0.182779)
Financial Characteristics			
1. SETA	-0.668540 (0.096104)***	-2.644881 (0.148982)***	-2.485073 (0.138787)***
2. RETA	46.02400 (3.545228)***	5.933751 (1.935505)***	56.62525 (8.500561)***
3. OINS	-0.173487 (0.036003)***	0.007025 (0.002380)***	0.000675 (0.002616)
4. WCTA	-0.799939 (0.114541)***	-0.964022 (0.146237)***	-0.424285 (0.129593)***
5. CHIN	1.887227 (0.056834)***	1.094427 (0.080465)***	1.105874 (0.087421)***
6. NITA	-54.99658 (3.474958)***	-11.05493 (1.942287)***	-60.74920 (8.482674)***
Total Obs	11273	11273	11273
Obs with Dep=0	8775	10730	10925
Obs with Dep=1	**2498**	**1123**	**932**

Note: For *Indirect model*, $PRFD_{it}=Prob\ (Y_{it}=1)=\frac{1}{1+(e^{-Zit})}$, where $Z_i = a + bR^{\wedge}_i + \sum_j c_j X_{j,i}$. $\boldsymbol{R}_{EST}$ is the estimated monthly stock returns of the firm *i*. *SETA* represents the ratio of stockholders' equity to total assets. *RETA* represents the ratio of retained earnings to total assets. *OINS* represents the ratio of operating income to net sales. *WCTA* represents the ratio of working capital to total assets. *CHIN* represents the change in net income. *NITA* represents net income to total asset ratio. Parentheses include the standard errors in ( ).
***, **, and * denote statistical significance at 1%,5% & 10% respectively.

probability of Y_1 level of risk by 0.66%, 0.17% and 0.79% respectively. The co-efficient value of *NITA* (net income to total assets) reflects the highest magnitude; comprehendible for the reason that any increase in *NITA* is a direct remedial measure of dependent variable Y_1 which is actually negative net income for consecutive two years.

The financial characteristic of *RETA*, although significant at 1% level of significance exhibits a positive sign, implying that a 1 unit increase in *RETA* will increase the Y_1 level of risk by an astounding 46%. There exists a very sound justification of such a behavior of *RETA* for the

manufacturing sector of Pakistan. Studies[8] of the manufacturing sector of Pakistan depict that the manufacturing sector of Pakistan has been credit constrained and investment behavior of firms have not been independent of their internal finance/retained earnings over the period.

The manufacturing sector is facing a continual crowding out in terms of credit allocation by the banking sector since the period of nationalization. Till 1990 the credit constraint of manufacturing sector existed because of diversion of credit to Nationalized/heavy industries, political pressures, and self-interest motives of banking sector. Even after the privatization of 90's firm investment behavior was internal finance/retained earnings dependent. For period of 70's a 1% increase in retained earnings increased investment of firm by 0.22%, for 80's it was 0.27% growth, 90's and millennium decade showed 0.2% increase in investment and growth in physical assets. Especially since 2000 till date one of the main reasons for credit misallocation is the *"insatiate craving of the banks to invest in government securities"* [9] and *"trend of banks to park bulk of their incremental funds in safer assets of government securities"*[9] and with banks *"burgeoning exposure to government debt, the government share has amplified overtime in overall credit portfolio"*[9] peaking to an astronomical *60%*. A scenario where manufacturing sector had no option but to generate and utilize own capital/retained earnings. Thus accumulation of retained earnings by manufacturing sector is actually capital constraint and disinvestment in the firm itself adding to the risk profile.

The estimated stock return variable is also significant at 1% level of significance, implying that a firm with a higher estimated rate of return has a lower probability of risk level Y_1.

The *direct specification model for Y_1 level of risk* reports exactly the same results as of indirect specifications. Again all the financial characteristics of the firms are highly significant in determining the Y_1 level of risk, the greater the ratios, the lower the probability

[8] Mughees Tahir, Thesis (2013), PIDE.
[9] Risk analysis of banking sector; SBP report H1-CY12.

of Y_1 level of risk, even the co-efficient values are approximately the same as in the results of indirect specifications; reinforcing the fact that both the *"estimated stock returns incorporated with systematic risks"* and *"firm sensitivities to macro variables"* are rightful proxies of macro betas which do not alter variable relationships and results when employed in model. As far as macro-factors are concerned, only the systematic risk of the firms exposed to *TS* (term structure) and *TDOPN* (trade-openness) affects the probability of firm's financial distress. The co-efficient of *TDOPN* bears negative sign implying that a 1unit increase in the systematic risk of *TDOPN*[10] will reduce the Y_1 level of risk by 3.6%. This interesting relation of trade openness with risk level (performance) for Pakistan is also evident from other studies and is exclusively a *LDC* (less developed country) phenomenon. The empirical literature presents a number of arguments regarding the impact of trade openness on the probability of domestic firms in open economy. The orientation is that there exists a negative relationship between profitability and import penetration, as foreign competition restrains the exertion of market power by domestic firms. Amjad (1977) reported that for Pakistan's manufacturing, a one point increase in import competition ratio reduces profitability (PCM) ratio by 0.12 points. Umer and Alam (2013) investigated the impact of trade openness and FDI on the

[10] *Amjad (1977) for Pakistan, Kartak (1980) for India, Haddad and Harton (1996) for Morocco and Foroutan (1996) for Turkey gained support for their hypothesis that, industries facing considerable import competition experience decline in profitability as a consequence of trade openness. Rein forcibly Krishna and Mitra (1997) for India, Beng and Yen (1977) for Malaysia and Weiss (1991) for Mexico obtained support for the hypothesis that protection and tariff enable higher domestic probability for procedures.

*Shafauddin (2005) investigated the effect of trade liberalization and reforms since 1980 in developing countries and found that most of the developing countries including Pakistan in the sample exhibited low or moderate performance and no relative change in the structure of GDP, rather low performance increased the vulnerability of developing economies to external factors and worsened the situation.

*Pakistan is not an exception; rather it is a regional phenomenon encompassing developing economies. Barua and Chakraborty (2006) analyzed the industrial sector and export performance of India through openness and high market and inferred that trade openness increase the production costs; decrease industrial output, decrease producer's surplus and increases consumer surplus through the price fall.

*Khan (2007) estimated the impact of liberalization and openness on Bangladesh's growth; the empirical findings suggested that trade liberalization and trade openness negatively affect the long run economic growth

industrial Sector growth of Pakistan for the period 1965-2011 and found that *TO* exhibits a negative long run relationship with industrial growth. They inferred that *"Trade openness exerts strong negative long run impact on industrial growth of Pakistan"* and accounted certain conditionality's associated with *TO* for developing countries, not favorable for initiating high industrial growth demand and product competition effect via which multinationals force domestic firms to exit market. Siddiqui and Iqbal (2005) analyzed the economic impact of *TO* and trade liberalization reforms on Pakistan's GDP growth using fixed investment, trade and population as other main variables. They concluded that *TO* policies and trade liberalization reforms negatively affect GDP growth rate in long run. Atif, Shah and Zaman (2012) using ARDL approach, studied the impact of *TO* measures upon the aggregate export of Pakistan for the period 1972-2010 and found that *TO* shows a very low positive impact (0.17) in long run.

The co-efficient of macro beta of *TS* with a negative sign imply that a 1 unit increase in the systematic risk of *TS* will decrease the level of risk by 2.01%. The spread of term structure[11] influences the risk level of manufacturing sector because the manufacturing sector is highly dependent on the banking sector for its financial needs, massive portion of banking credits are utilized by the manufacturing sector, especially the Textile sector, comprising of both long term and short term credits lines. For banks, the risk of term structure due to money market volatility causes the rate payable on liabilities to rise while the rate earned on assets remains constant; implicitly benefitting the highly dependent manufacturing sector in the shape of rather stagnant spread structure.

The binary results for Y_1 level of risk indicate that out of *11273* observations, *2498* observations belong to the risk profile Y_1 synonym to *"bad performance"* where the criterion for bad performance is *net income negative for consecutive two years*. The Manufacturing

[11] Risk analysis of banking sector; SBP report H1-CY12.

sector overall experiences a substantial primary level risk as *22.15 %* of total observations fall in this level, out of which *12.19%* is purely primary level of risk, whereas rest will formulate part and portion of secondary and high level of risk.

6.1.2 Y_2 Results: Indirect & Direct Specification Models

The results obtained for *Y_2; probability of risk of financial distress (secondary level); indirect specification model* for the whole sample signify that all the firm specific variables *SETA, RETA, WCTA, OINS, CHIN* and *NITA* are highly significant at 1% level of significance again in accordance with literature [12]. The relation is such that higher the ratio, the lower the probability of Y_2 level of risk (secondary level). A 1% increase in *SETA, WCTA* and *NITA* will decline the probability of Y_2 level of risk by 2.64%, 0.96% and 11% respectively. Here in the results for Y_2 level of risk the co-efficient values of *SETA* and *WCTA* are comparatively a little higher than the co-efficient value for Y_1 *SETA* and *WCTA*, signifying that in a far worse risk profile any addition to shareholder equity and working capital will affect the risk profile in a more positive mitigating manner, than in general risk situation.

The financial characteristic of *RETA*, again with a positive sign implies a positive relationship with the Y_2 level of risk; however the co-efficient value of *RETA* is barely 6 as compared to astounding 46 in Y_1 profile. The justification for a lower Y_2 coefficient value of *NITA* - 11.05 as compared to Y_1 value of -54% is strongly evident from the *risk criterion of Y_2 (net income negative for 2 years + TL>TA)* where this financial variable stands most deteriorated, accounting for the fall in the magnitude of co-efficient to 11.05 as compared to 54 in Y_1 level (net income negative for consecutive two years) where only net income is affected. The

[12] For more details see Chen, Roll & Ross (1986),Tirapat and Nittayagasetwat (1999),Burmeister & Wall (1986)

estimated stock return variable is insignificant in the results of Y_2 level of risk. This result is also in accordance with the rationale and findings of Beaver (1966) and Scott (1981) where

Table 6.2: Manufacturing Sector: Systematic Risk Direct Approach Model

DIRECT MODEL			
Explanatory Variable	**Estimates of Co-efficient**		
	Y_1	**Y_2**	**Y_3**
Constant	-1.363659 (0.061769)***	-2.586383 (0.088350)***	-2.713761 (0.094915)***
Macro-Economic Factor			
1. β_{TS}	- 2.010276 (1.200278)*	-5.075173 (1.659117)***	-5.119689 (1.723170)***
2. β_{DIP}	0.023355 (0.016518)	- 0.022059 (0.024141)	0.009856 (0.025431)
3. β_{DONIR}	0.062054 (0.109879)	-0.150693 (0.153594)	-0.232023 (0.164658)
4. β_{ADMS}	-0.013562 (0.012065)	0.010175 (0.018634)	0.027495 (0.019711)
5. β_{TDOPN}	-3.678879 (0.945614)*	-2.601828 (1.411402)*	-3.590196 (1.513458)***
Financial Characteristics			
1. SETA	-0.715085 (0.096695)***	-2.687940 (0.152319)***	-2.465975 (0.139325)***
2. RETA	44.90030 (3.544964)***	5.371706 (1.940871)***	51.25888 (8.401735)***
3. OINS	-0.170792 (0.035664)***	0.006381 (0.002394)***	0.000658 (0.002487)
4. WCTA	-0.744883 (0.114666)***	-0.939396 (0.150228)***	-0.422210 (0.130081)***
5. CHIN	1.889365 (0.056857)***	1.131849 (0.082798)***	1.113727 (0.088707)***
6. NITA	-53.96344 (3.473989)***	-10.51900 (1.948826)***	-55.33219 (8.380814)***
Total Obs	11273	11273	11271
Obs with Dep=0	8775	10150	10339
Obs with Dep=1	**2498**	**1123**	**932**

Note: For *Direct model*, $PRFD_{it}=Prob\ (Y_{it}=1) = \frac{1}{1+(e^{-zit})}$, where $Z_i = a + \sum_k b_k \beta_{k,i} \sum_j c_j X_{j,i} + e_{i..}$ β_{TS} represents the systematic risks or the sensitivity of a firm to the changes in term structure. β_{DIP} represents the systematic risks or the sensitivity of a firm to the changes in industrial production. β_{DONIR} represents the systematic risks or the sensitivity of a firm to the changes in interest rates. β_{ADMS} represents the systematic risks or the sensitivity of a firm to the changes in M2 money supply. β_{TDOPN} represents the systematic risks or the sensitivity of a firm to the changes in trade bulk. *SETA* represents the ratio of stockholders' equity to total assets. *RETA* represents the ratio of retained earnings to total assets. *OINS* represents the ratio of operating income to net sales. *WCTA* represents the ratio of working capital to total assets. *CHIN* represents the change in net income. *NITA* represents net income to total asset ratio. Parentheses include the standard errors in ( ).***, **, and * denote statistical significance at 1%,5% & 10% respectively.

"declining of firm's stock returns signals the firms vulnerability to probability of bankruptcy". As Y_2 level of risk is synonym to *"even worse performance"* where the criterion of worse performance is *"net income negative for consecutive two years in addition to an insolvency situation where total liabilities greater than total assets TL>TA"*. The profile is such where the firm is faced with declining stock returns because of worse performance. Hence in a distressed condition with declining actual stock returns, the estimated stock returns are insignificant in determining the level of risk.

The *direct specification model for Y_2 level of risk* also reports exactly similar results as of indirect specifications; all the financial characteristics of the firms are highly significant in determining the Y_2 level of risk; even the co-efficient values are approximately the same as in the results of indirect specification. Again the macro factors of *TS* & *TDOPN* are significant at 1% & 10% level of significance; underlying explanation the same as mentioned in their significance in Y_1 level results[13].

The binary results of Y_2 level of risk indicate that out of approximately *11273* observations *1123* observations belong to the risk profile Y_2, indicating 9.96% of observations belonging to this risk level, out of which nominal 1.69 % observations are purely secondary level of risk whereas rest will formulate part and portion of high level of risk.

6.1.3 Y_3 Results: Indirect & Direct Specification Models

The results obtained for Y_3 ; probability of risk of financial distress (highest level) ; indirect specification for the whole sample signify that firms variable of *SETA*, *RETA*, *WCTA*, *CHIN* & *NITA* are highly significant at 1% level of significance with the exception of *OINS* which is highly insignificant in the Y_3 level of risk results. The magnitudes of co-efficient of *SETA* & *WCTA* are approximately the same as in Y_2 level results. However the co-efficient values

[13] Refer to foot note 10 & 11 for *TS* and *TDOPN* explanation

of *NITA (-60.7)* & *RETA (56.6)* are close to the co-efficient values of Y_1 results where a unit change in both will bring an abnormal change in the probability of risk. Like the Y_2 level results, the estimated stock return variable is also insignificant in Y_3 level results, reiterating the findings of Beaver (1966), Scott (1981) and Fischer & Merton (1984). The Y_3 level of risk is the highest risk level where the *criterion is net income negative for consecutive three years is addition to total liabilities greater than total assets TL>TA.* The profile is such that if remedial measure not taken, the firms will eventually culminate in default/delisting in the next stage.

The *direct specification model for Y_3 level of risk* also reports exactly similar results as of indirect specification; all the financial variables are highly significant with the exception of *OINS* which is highly insignificant in Y_3 level results. The co-efficient values are also approximately the same as in the result of indirect specifications. Again the macro factors of *TS* & *TDOPN* are significant at 1% level of significance; underlying explanation again the same as previously discussed in Y_1 level results[14].

The binary results for Y3 level of risk indicate that out of approximately *11,273* observations, *932* observations belong to the risk profile of Y_3 , implying that *8.26%* of total observations of the textile-cotton sector is in the category of expected default.

Thus the overall risk assessment of the manufacturing sector of Pakistan depicts a very stylized manufacturing sector, where the macro determinants of risk are betas of TS (term structure);and TDOPN (trade openness) and where ironically the sensitivities of the firms to macro factors of TS & TDOPN exhibit a negative relation with risk of financial distress. The micro determinants of risk are the CAMEL category firms characteristics of SETA, RETA, OINS and WCTA along with CHIN & NITA which are highly significant in all the risk

[14] Refer to foot note 10 & 11 for *TS* and *TDOPN* explanation

profiles, confirming the strong existence of balance sheet channel of firms; while the estimated stock return variable high significance for Y_1 (level of risk), corresponding to the estimated changes in macro factors, is suggestive of strong relation as per literature[15] *where the firm with higher estimated stock return has lower probability of financial distress. Whereas the estimated stock return variable in significance for Y_2 & Y_3 (levels of risk) is in accordance with the rationales*[16] *where declining stock returns at higher risk levels are insignificant in risk mitigation. Moreover the manufacturing sector of Pakistan experiences substantial levels of: primary risk level Y_1 and high risk level Y_3; major contributor to both risk profiles being the ailing Textile sector.*

Mentioned above were the results of all the firms of the manufacturing sector of Pakistan for the period covering *1974-2010*. All the three levels of risk profile were estimated incorporating macro effects in a micro crisis model. In the next section, results under different political regimes are explained.

[15] For more details see Chen, Roll & Ross (1986),Tirapat and Nittayagasetwat (1999),Burmeister & Wall(1986)

[16] Beaver (1966), Scott (1981) & Fischer & Merton (1984).

Chapter 7

RISK ASSESSMENT OF MANUFACTURING SECTOR UNDER DIFFERENT REGIMES

7.1 EMPIRICAL RESULTS

The section analyzes the result obtained from estimating the risk profile of different political regimes since 1971. In literature the division of time period is based on even distribution of time or for the purpose of assessing a particular structural effect via time dummies. This specific analysis performs division on the basis of political regimes of Pakistan to assess risk and its impact for the reason that every political regime exhibits a different mindset. This study follows division of Hussain (2006) where economic history of Pakistan follows four political regimes: *1971-1977; Bhutto's regime, a period of nationalization and bad luck years; 1978-1988; Zia's regime, an era of economic growth, Islamization and prelude to recession, 1989-1999; democratic romanticism of deepening economic and state crisis. 1999-2010; the Musharraf's regime stated as reverberation of history. Hussain(2006).*

7.1.1 Bhutto's Regime

The results for the *Bhutto's era* depict that for all risk levels (Y_1, Y_2, and Y_3) and both direct/indirect specifications models; all the firm specific variables are highly significant at striking 1% level of significance with the exception of *OINS*, whereas all the macro factors are insignificant. The estimated stock returns are also insignificant for Bhutto's era. All the results are very well understandable in the context of Bhutto's economic era, generally termed as the *"bad luck years"*. Bhutto's economic program was a failure because of ill liberal policies, despite the fact that his era saw a GDP growth rate close to 5%, his nationalization was the major cause for a massive downward trend in the majestic growth of Ayub's period. The large nationalized industries taken over by Bhutto were the most in effi-

Table 7.1.1: Bhutto's Regime: 1971 - 1977

Explanatory Variable	INDIRECT MODEL			DIRECT MODEL		
	Estimates of Co-efficient			Estimates of Co-efficient		
	Y_1	Y_2	Y_3	Y_1	Y_2	Y_3
Constant	-2.089429 (0.210399)***	-3.673559 (0.402439)***	-3.354563 (0.336233)***	-2.035972 (0.276125)***	-3.768072 (0.534954)***	-3.420771 (0.463759)
R_{EST}	0.074395 (0.569374)	0.240133 (1.223273)	1.320414 (1.210069)			
Macro Factors						
1. β_{TS}				-3.373255 (3.459969)	0.267332 (5.170083)	-1.223278 (5.476818)
2. β_{DIP}				0.123575 (0.085292)	-0.057708 (0.164826)	-0.016247 (0.168869)
3. β_{DONIR}				0.015638 (0.395477)	-1.158076 (0.832778)	-0.280168 (0.894007)
4. β_{ADMS}				-0.133164 (0.117408)	-0.158937 (0.204985)	-0.179702 (0.206093)
5. β_{TDOPN}				-1.416320 (7.176048)	-14.44278 (13.78909)	-20.07889 (14.23687)
Financial Characteristic						
1. SETA	-1.411866 (0.557544)***	-4.801562 (1.015501)***	-3.734290 (0.882337)***	-1.647831 (0.580316)***	-5.022899 (1.080054)***	-3.992991 (0.942627)***
2. RETA	26.35686 (8.163569)***	170.2849 (82.83428)**	149.3618 (64.17718)**	25.72773 (8.236844)***	181.7613 (94.51215)**	161.7382 (70.13105)**
3. OINS	-0.163041 (0.143262)	0.021620 (0.028435)	0.002702 (0.013918)	-0.162920 (0.148315)	0.021662 (0.028378)	0.002687 (0.016843)
4. WCTA	-2.581544 (0.500013)***	-2.776567 (0.842060)***	-1.477339 (0.868488)*	-2.460262 (0.515265)***	-2.904774 (0.888755)***	-1.471903 (0.935541)*
5. CHIN	2.021342 (0.206739)***	1.530910 (0.416864)***	0.733188 (0.369916)**	2.039381 (0.210240)***	1.509831 (0.421906)***	0.675805 (0.374690)*
6. NITA	-32.41990 (8.134764)***	-177.6852 (82.78079)**	-150.5334 (64.12829)**	-31.70340 (8.146855)***	-188.6449 (94.45894)**	-162.4156 (70.13310)**
Total Obs	1192	1192	1192	1192	1192	1192
Obs with Dep=0	1024	1128	1153	1024	1128	1153
Obs with Dep=1	**168**	**64**	**39**	**168**	**64**	**39**

-cient of industrial sector. The economic loss of east wing; the 1973 OPEC price increase havoc with the import bill and balance of payment of Pakistan; the worldwide recession after 1973 seriously affecting Pakistan exports, recurrent cotton crop failures and floods till 1976, all had worsening economic impact. Despite a downfall of economy and economic shocks,

the industry exhibited a reasonable growth rate of 5% in Bhutto's time which explains for the insignificance of macro factors and significance of firm specific variables. The insignificance *OINS* is also explainable under hamartia of majestic industrial growth rate (Ayub's era) to barely 5%. The reason for estimated stock returns insignificance in Bhutto's era goes back to Ayub's period. Despite the massive growth of 60's, Ayub capitalism was controlled and directed one; overvalued exchange rate, distorted local markets, rationed financial capital and stock market a playground of handful people. The inefficient, nonexistent stock market under illiberal policies retained its characteristics in Bhutto's era, thus playing no role in the risk profile.

The binary results of $Y_1 = 168$, $Y_2 = 64$ *and* $Y_3 = 39$ out of *1192* observations are also consistent with the fact that despite a failing economy the firms performed well and a nominal portion experienced the risk levels of Y_2 & Y_3.

7.1.2 Zia's Regime

The *Zia's regime 1978-88* poses totally different results. For all the risk levels (Y_1, Y_2, and Y_3) and both direct/indirect specifications, again all the firm specific variables are highly significant at 1% level, including *OINS* which was insignificant in Bhutto's regime.

The macro factors of growth rate of industrial production *DIP* and *ADMS* are significant at 5% and 10% level of significance respectively. The estimated stock returns are also significant at 1% level of significance.

Ironically Zia's era was economically liberal rather than politically and reaped the benefits of Bhutto's regime. High rates of industrial growth were achieved from the public sector investment made in Bhutto's times (heavy industries). The Middle East boom initiated by Bhutto kept Zia in power for initial years, making Pakistan a *remittance economy*. Steps were taken to ensure that growth rate increased and liberalization of economy takes place.

Table 7.1.2: Zia's Regime: 1978 - 88

Explanatory Variable	INDIRECT MODEL			DIRECT MODEL		
	Estimates of Co-efficient			Estimates of Co-efficient		
	Y_1	Y_2	Y_3	Y_1	Y_2	Y_3
Constant	-1.694617 (0.125473)***	-2.931770 (0.164116)***	-2.519718 (0.157249)***	-1.642202 (0.162228)***	-3.190905 (0.225692)***	-2.649047 (0.213952)***
R_{EST}	-0.823382 (0.580128)	-1.884771 (0.777319)***	-1.216351 (0.752592)*			
Macro Factors						
1. β_{TS}				-2.419770 (2.699265)	-1.904598 (3.292013)	-2.817048 (3.386334)
2. β_{DIP}				0.063132 (0.042931)	0.109136 (0.054305)**	0.066168 (0.051875)
3. β_{DONIR}				-0.204552 (0.231995)	-0.444599 (0.305024)	-0.274013 (0.298592)
4. β_{ADMS}				-0.017657 (0.079563)	0.192421 (0.105416)*	0.111355 (0.106682)
5. β_{TDOPN}				0.216605 (3.383408)	-0.940153 (4.265819)	-1.428641 (4.367457)
Financial Characteristic						
1. SETA	-1.795536 (0.282507)***	-3.457664 (0.332079)***	-2.919144 (0.307852)***	-1.794645 (0.284408)***	-3.467838 (0.335024)***	-2.906335 (0.310858)***
2. RETA	27.51680 (7.049867)***	8.310703 (2.606524)***	110.8348 (31.24571)***	27.91017 (7.047851)***	8.608195 (2.612120)***	111.7507 (31.34724)***
3. OINS	-0.150523 (0.075920)***	-0.194612 (0.082022)***	-0.150885 (0.067749)**	-0.155078 (0.076966)**	-0.199131 (0.083125)***	-0.151630 (0.069421)**
4. WCTA	-0.732127 (0.262728)***	-1.432804 (0.304012)***	-0.494742 (0.259465)**	-0.729647 (0.264595)***	-1.491958 (0.307722)***	-0.530029 (0.264406)**
5. CHIN	2.098837 (0.148508)***	1.712752 (0.205170)***	1.318902 (0.191831)***	2.119564 (0.149682)***	1.785661 (0.208817)***	1.352565 (0.193688)***
6. NITA	-38.15939 (6.844527)***	-15.59655 (2.888072)***	-114.9511 (31.17576)***	-38.49525 (6.844989)***	-15.85307 (2.907128)***	-115.7442 (31.28145)***
Total Obs	2528	2528	2528	2528	2528	2528
Obs with Dep=0	2048	2216	2265	2048	2216	2265
Obs with Dep=1	**480**	**312**	**263**	**480**	**312**	**263**

Afghan war became a lifeline to Zia's regime where cheap credit/aid poured in Pakistan and launched second economic revolution. Thus macro factor of *DIP* and *ADMS* mattered for firm performance and liberalization of economy enabled the stock market to expand, improve, de-concentrate and reflect firm performance.

The binary results of Y_1= *480/2528,* Y_2= *312/2528 and* Y_3= *263/2528* also reflect that industry was performing well and risk profile were not alarming.

7.1.3 Democratic Era

Next comes the *"Democratic Era" 1989-1999* or rather the *"Era of Structural Adjustment"*. The results for risk profiles Y_1, Y_2, and Y_3 differ a little at each level. The results for Y_1 level of risk (direct/indirect spec) suggest that all the firm specific variables are significant at 1% level of significance except *SETA* which is significant at 10% level. Whereas for the very first time the macro factors of term structure and trade openness are significant along with *ADMS* at 1% level of significance. The estimated stock returns are also highly significant at 1% level of significance in the Y_1 results.

On the contrary the results for Y_2 secondary level of risk (direct/indirect specifications) depict that the firm specific characteristic of *SETA, WCTA* and *CHIN* are significant at 1% level and *NITA* at 5% level of significance with the exception of *RETA* & *OINS* which are insignificant. Whereas the macro factors of *TS* and *TDOPN* are significant at 5% level of significance. The estimated stock returns are insignificant in the Y_2 profile.

The Y_3 highest level of risk, results are quite similar to the Y_2 results, only with the exception that RETA is also significant in Y_3 level which was insignificant in Y_2 level and *TDOPN,* even more significant at 1% level of significance.

The era of 1989-1999 was the era of tutelage under IMF and World Bank, with economic policies tagged as *"economic stabilization, liberalization, and structural adjustment*[17]*"*. The primary focus of *SAP (Structured Adjustment Program)* was fiscal deficit, thus the policies of high taxation (high sales tax + indirect taxes) without widening the tax base; cuts in public expenditure which actually took the form of cut in developmental expenditure rather than cut in wasteful expenses; a continuous rise in the administered prices of utilities (gas, electricity

[17] See Zaidi, S. A., 2005. "Issues in Pakistan's Economy".

Table 7.1.3: Democratic Era: 1989 - 99

Explanatory Variable	INDIRECT MODEL			DIRECT MODEL		
	Estimates of Co-efficient			Estimates of Co-efficient		
	Y_1	Y_2	Y_3	Y_1	Y_2	Y_3
Constant	-1.672085 (0.089677)***	-2.745625 (0.139002)***	-2.723551 (0.128910)***	-1.600975 (0.108085)***	-2.774042 (0.169955)	-2.821044 (0.166205)***
R_{EST}	-0.375009 (0.149576)***	-0.185398 (0.228672)	-0.121311 (0.266915)			
Macro Factors						
1. β_{TS}				-5.943694 (2.144234)***	-6.484462 (3.225951)**	-7.446983 (3.223251)**
2. β_{DIP}				-0.032540 (0.025438)	-0.014665 (0.039204)	-0.003068 (0.039017)
3. β_{DONIR}				-0.142793 (0.183196)	-0.072808 (0.274931)	-0.238006 (0.280114)
4. β_{ADMS}				-0.043502 (0.018672)***	-0.024296 (0.030269)	-0.013628 (0.031131)
5. β_{TDOPN}				-4.543376 (1.496653)***	-5.311589 (2.301699)**	-6.173362 (2.346761)***
Financial Characteristic						
1. SETA	-0.350376 (0.186833)*	-3.860565 (0.339083)***	-2.814266 (0.280858)***	-0.335785 (0.191076)*	-3.840663 (0.341158)***	-2.771869 (0.282948)***
2. RETA	36.84934 (6.161193)***	7.819989 (6.614838)	66.22503 (18.79427)***	34.85258 (6.123292)***	6.538029 (6.413065)	60.71175 (18.39004)***
3. OINS	-0.441289 (0.113115)***	-0.030507 (0.027990)	-0.035515 (0.025986)	-0.427410 (0.113056)***	-0.029492 (0.028402)	-0.032838 (0.026329)
4. WCTA	-1.854205 (0.235907)***	-1.448436 (0.298618)***	-1.144469 (0.260329)***	-1.840258 (0.238372)***	-1.489220 (0.299857)***	-1.232762 (0.263937)***
5. CHIN	1.953562 (0.098101)***	1.283040 (0.162959)***	1.023211 (0.155168)***	1.949507 (0.097966)***	1.271361 (0.162198)***	1.017090 (0.155355)***
6. NITA	-47.76744 (6.010837)***	-14.01642 (6.519798)***	-69.76646 (18.81315)***	-45.94125 (5.976045)***	-12.78631 (6.322947)**	-64.27035 (18.40513)***
Total Obs	4290	4290	4290	4290	4290	4290
Obs with Dep=0	3254	3810	3882	3254	3810	3882
Obs with Dep=1	**1036**	**480**	**408**	**1036**	**480**	**408**

and petroleum products) and privatization by selling off state owned enterprises were aggressively followed as part of adjustment package. On the economic liberalization front, Pakistani rupee was continuously devalued, rupee lost 17 % of its value in 1996 alone; policy of reduction in tariffs was pursued which caused a free fall of tariffs from 125% in 1992 to 45% till the end of democratic era. Such structural and liberalization reforms caused serious

economic crisis of high inflation and de industrialization of economy. One serious hit was the import of great number of goods which were previously produced locally, causing the closure of a considerable number of individual units. Moreover opening economy to foreign competitors without offering any protection and benefits to local industry caused closures and higher unemployment.

In the light of such economic hamartia the results are explainable. The devastating effects of higher inflation and trade reforms caused significance of systematic risks of *ADMS* and *TDOPN* in Y_1 risk profile. An interesting feature of *TDOPN* result is that as the firm exposure to systematic risk of *TDOPN* increases the probability of risk decreases by 4.54 %; validating the aspect that systematic risk of *TDOPN* is interpretable more in a connotation of *Protection & benefits* [18] which give a boost to local industry. The estimated stock return in Y_1 profile are also significant indicating that a 1 unit increase in estimated stock return will decrease the probability of risk by 0.37%.

However for Y_2 and Y_3 level of risk the estimated stock returns are insignificant for the reason that Y_2 level is for sure the level where firm is experiencing declining stock returns, thus causing them to be insignificant in any improvement/dis-improvement of risk level faced by firm. The binary results of Y_1= *1036/4290*, Y_2= *480/4290 and* Y_3= *408/4290* also reflect that industry was experiencing a substantial level of primary risk Y_1 and an alarming level of high risk Y_3 during the Democratic era.

7.1.4 Musharraf's Regime

The *Musharraf's era 2000-2008* also poses different results. The results for Y_1 level of risk (direct/indirect specifications) suggest that all the firm specific variables are significant at 1% level of significance with the exception of *WCTA* which is insignificant. The macro factors of

[18] See Zaidi, S. A., 2005. "Issues in Pakistan's Economy".

Table 7.1.4: Musharraf's Regime: 2000 - 2008

Explanatory Variable	INDIRECT MODEL			DIRECT MODEL		
	Estimates of Co-efficient			Estimates of Co-efficient		
	Y_1	Y_2	Y_3	Y_1	Y_2	Y_3
Constant	-0.995353 (0.085365)***	-2.322652 (0.132502)***	-2.445920 (0.139250)***	-1.118426 (0.116734)***	-2.515645 (0.185108)***	-2.783955 (0.200372)***
R_{EST}	-0.072830 (0.198438)	0.305373 (0.301226)	0.589779 (0.323166)*			
Macro Factors						
1. β_{TS}				6.140307 (2.373517)***	-5.511637 (3.497043)*	-4.432082 (3.716871)
2. β_{DIP}				0.009453 (0.033102)	0.113279 (0.050467)**	0.160045 (0.054221)***
3. β_{DONIR}				0.709070 (0.235813)***	0.490133 (0.349329)	0.324702 (0.373227)
4. β_{ADMS}				0.031603 (0.019258)*	0.054261 (0.030398)*	0.099611 (0.032962)***
5. β_{TDOPN}				0.999033 (1.656175)	-1.924257 (2.610687)	-2.528664 (2.797046)
Financial Characteristic						
1. SETA	-0.639643 (0.144134)***	-1.893742 (0.220650)***	-2.002184 (0.233137)***	-0.684626 (0.146144)***	-1.893905 (0.220906)***	-2.007214 (0.235187)***
2. RETA	73.17021 (8.448459)***	89.70353 (20.92154)***	87.42594 (22.08057)***	72.45320 (8.449711)***	85.62569 (20.91203)***	82.13046 (22.06094)***
3. OINS	-0.107516 (0.039228)***	0.003545 (0.016836)	-0.003132 (0.016027)	-0.113992 (0.039591)***	0.007831 (0.020088)	0.002445 (0.019149)
4. WCTA	-0.135941 (0.162087)	-0.165279 (0.224460)	0.275741 (0.236617)	-0.089269 (0.162308)	-0.118412 (0.224448)	0.304605 (0.237333)
5. CHIN	1.835506 (0.100460)***	1.269520 (0.147623)***	1.151180 (0.157503)***	1.828843 (0.100851)***	1.264828 (0.148939)***	1.143945 (0.159524)***
6. NITA	-78.54572 (8.372849)***	-92.79891 (20.93327)***	-90.36248 (22.09459)***	-77.68920 (8.375805)***	-88.76983 (20.91985)***	-85.15092 (22.06982)***
Total Obs	3161	3161	3160	3161	3160	1192
Obs with Dep=0	2472	2908	2951	2472	2951	1153
Obs with Dep=1	**689**	**253**	**209**	**689**	**209**	**39**

TS and *ONIR* are significant at 1% level of significance and factor beta *ADMS* is significant at 10% level of significance. The estimated returns are insignificant in Y_1 level of risk. On the other hand the results for Y_2 & Y_3 level of risk (direct/indirect specifications) depict that the firm variables of *SETA*, *RETA*, *CHIN* and *OINS* are insignificant. For Y_2 level the significant

macro factors are *DIP* at 5% significance level and *TS & ADMS* at 10% level. Estimated stock returns are again insignificant in Y_2 & Y_3 level of risk.

Musharraf's period has been one of development, sanctions, war on terror, domestic indebtness of government and economic and trade liberalization later on. The period witnessed industrial growth, extreme government financing by banking sector for the purpose of investing in reliable government securities and averting private sector risk and hype and crash of stock market. The banking sector role playing in massive credit allocations to government; peaking to 60%, accounts for the significance of the macro factors of *TS*, *ONIR* and *ADMS* whereas firm specific variables are crucial as per precedent.

The binary results of $Y_1=689/3161$, $Y_2=253/3161$ *and* $Y_3= 209/3161$reflect that the industry was performing well and risk profiles were not alarming.

Next chapter elaborates the *Sectorial Investigation of Manufacturing Sector* of Pakistan.

Chapter 8

RISK ASSESSMENT OF MANUFACTURING SECTOR

A SECTORAL INVESTIGATION

One of the crucial questions concerning the risk-assessment of manufacturing sector of Pakistan is whether risk affects all subgroups of manufacturing sector by the same magnitude or differently. Thus it intrigues to investigate the risk levels of different sub-sectors of manufacturing sector.

This study investigates the risk profiles of *Textile-Cotton*, *Textile-Synthetic* and *Sugar sector*. These sector comprise of considerable numbers of firms, sufficient for a sound risk analysis, and the concentration is on the risk profile assessment of sectors in a consolidated form where each sector comprises of both small and large firms.

8.1 TEXTILE COTTON SECTOR

Pakistan is the fourth largest producer of cotton, has the third largest spinning capacity of *7.6%* in Asia after China and India and *5%* of the global spinning capacity. Textile-Cotton sector is the largest sector of Pakistan's Large Scale Manufacturing (LSM). It contributes around 8% in GDP; 32.6% in large scale manufacturing; provider of 40% employment to industrial labor force and contributes a majestic share of approximately 53% in total exports[19]. Pakistan's textile industry consists of large scale organized sector and highly fragmented cottage/medium and small units. Organized sector includes large number of spinning units (471) and a small number of composite units (50).

During FY12, total textile exports were *US$ 13bln – 53%* of the total exports; whereas total investment made in textile industry during the decade 2001-2011 is estimated to be USD *5.1bln*. Given the sector's significant contribution in exports, the performance of this sector, therefore, has a strong impact on the national economy.

[19] See Economic Survey of Pakistan (2012-2013)

Table 8.1: Pakistan & Textile Industry Exports

	FY12	FY11	FY10	FY09	FY08
Pakistan Exports (USD million)	24.6	25.4	19.7	19.1	20.4
Textile Exports (USD million)	13.0	13.1	10.2	9.8	10.4
Share of Textile in Total Exports	53%	52%	52%	51%	51%

Source: State Bank of Pakistan

Times have witnessed that Pakistan's manufacturing growth has been concentrated in the Textile sector. Hence out of this immense importance, this study analyzes *206 Textile – Cotton sector firms,* covering a period of *1974-2010*.

The results obtained (presented in table *8.1.1*) for *Y_1; probability of risk of financial distress (primary level*); indirect specification model signify that with the exception of *OINS,* all the textile firm specific variables *SETA*, *RETA*, *CHIN* and *NITA* are significant at a striking *1 %* level of significance; again consistent with the findings of literature (Tirapat, Nittayaga Setwat, 1999), exhibiting a relationship where higher the ratios, the lower the probability of Y_1 level of risk (primary level). A 1 unit increase in *SETA, WCTA & NITA* will decrease the probability of Y_1 level of risk by 1.87%, 0.75% and 30% respectively. The co-efficient value of *NITA* (net income to total assets) reflects the highest magnitude, comprehendible for the reason that any increase in *NITA* is a direct remedial measure of dependent variable Y_1 which is actually negative net income for consecutive two years. The financial characteristic of *RETA*, although significant at 1% level of significance exhibits a positive sign, implying that a 1unit rise in *RETA* will increase the Y_1 level of risk by 23%. Sound justification of such a behavior of *RETA* for the manufacturing sector of Pakistan has been thoroughly explained in the earlier chapter[20]. Further studies regarding textile sector of Pakistan reveal that retained earnings and cash flows are an important determinant of investment behavior in textile sector:

[20] Chapter 6:Mughees Tahir, Thesis (2013), PIDE.
Chapter 6:Risk analysis of banking sector; SBP report H1-CY12.

Table 8.1.1: Textile Cotton Sector

Explanatory Variable	INDIRECT MODEL			DIRECT MODEL		
	Estimates of Co-efficient			Estimates of Co-efficient		
	Y_1	Y_2	Y_3	Y_1	Y_2	Y_3
Constant	-1.119255 (0.076970)***	-2.723433 (0.119514)***	-2.667739 (0.112829)***	-1.102664 (0.099885)***	-2.740069 (0.165496)***	-2.773949 (0.161651)***
R_{EST}	-0.551544 (0.160056)***	-0.340248 (0.274001)	-0.025332 (0.282688)			
Macro Factors						
1. β_{TS}				- 3.028858 (1.648219)*	- 5.161420 (2.704386)*	- 4.641437 (2.701107)*
2. β_{DIP}				0.003690 (0.022997)	0.024705 (0.040396)	0.058501 (0.038849)
3. β_{DONIR}				-0.239639 (0.175120)	-0.266740 (0.270310)	-0.202961 (0.273787)
4. β_{ADMS}				-0.024838	0.028838 (0.032034)	0.051643 (0.031815)*
5. β_{TDOPN}				-2.845033 (1.358742)***	-2.14412 (2.257384)	-1.825669 (2.339621)
Financial Characteristic						
1. **SETA**	-1.877141 (0.185967)***	-4.914069 (0.276557)***	-4.405702 (0.251147)***	-1.934407 (0.186409)***	-4.926926 (0.277768)***	-4.423493 (0.253718)***
2. **RETA**	23.11544 (4.441099)***	3.785441 (4.971872)	30.23251 (10.45627)***	23.18726 (4.450226)***	3.846336 (5.012071)	29.24295 (10.24540)***
3. **OINS**	-0.028740 (0.047942)	0.005377 (0.010245)	0.001055 (0.012226)	-0.025209 (0.047050)	0.005163 (0.010811)	-2.61E-05 (0.017184)
4. **WCTA**	-0.759149 (0.179473)***	-1.126133 (0.239525)***	-0.235578 (0.199185)	-0.705830 (0.178522)***	-1.091045 (0.239241)***	-0.217045 (0.201322)
5. **CHIN**	1.728768 (0.078783)***	1.356609 (0.134613)***	1.117540 (1.117540)***	1.734048 (0.078625)***	1.358906 (0.134727)***	1.116171 (0.136145)***
6. **NITA**	-30.07037 (4.345639)***	-7.184032 (4.982343)	-32.59794 (10.42502)***	-30.25784 (4.351697)***	-7.277037 (5.019166)	-31.61312 (10.21286)***
Total Obs	4668	4668	4668	4668	4668	4668
Obs with Dep=0	3420	4118	4224	3420	4118	4224
Obs with Dep=1	**1248**	**550**	**444**	**1248**	**550**	**444**

a 1% permanent increase, in the long run, in cash flow to capital ratio and retained earnings results in the 3% rise in investment spending. Siddiqui et al (2005). The *estimated stock return* variable is also highly significant at 1% level of significance, implying that textile

firms with a higher estimated rate of return by 1unit has a lower probability of risk level Y_1 by 0.55%.

The *direct specification model for Y_1 level of risk* reports exactly the same results as of indirect specifications. Again the financial characteristics of the firms, with the exception of *OINS* are highly significant in determining the Y_1 level of risk, the greater the ratios, the lower the probability of Y_1 level of risk, even the co-efficient values are approximately the same as in the results of indirect specifications; as far as macro-factors are concerned, only the systematic risk of the firms exposed to *TS*[21] (term structure) and *TDOPN* (trade-openness) affects the probability of firms financial distress. The co-efficient of *TDOPN* bears negative sign implying that a 1unit increase in the systematic risk of *TDOPN*[22] *(Amjad 1977; Jayanthakumaran 2002;Shafaeddin 2005; Siddiqui et al 2005; Zaidi 2005; Omar et al 2007; Atif et al 2012; Shaheen et al 2013; Umer et al 2013;)*will reduce the Y_1 level of risk by 2.84% respectively.

The binary results for Y_1 level of risk indicate that out of *4668* observations, *1248* observations of the textile cotton sector belong to the risk profile Y_1 synonym to *"bad performance"* where the criterion for bad performance is *net income negative for consecutive two years*. The Textile- Cotton sector experiences a substantial primary level risk as approximately 27% of total observations fall in this level, out of which 14.9% is purely primary level of risk, whereas rest will formulate part and portion of secondary and high level of risk.

The results obtained for *Y_2; probability of risk of financial distress (secondary level); indirect specification model* for the Textile-Cotton sector signify that the firm specific variables *SETA, WCTA & CHIN* are highly significant at 1% level of significance again in accordance

[21] Refer to foot note 11 of chapter 6 for *TS* explanation
[22] Refer to foot note 10 of chapter 6 for *TDOPN* explanation

with literature[23]. The relation is such that higher the ratio, the lower the probability of Y_2 level

of risk (secondary level). A 1% increase in *SETA & WCTA* will decline the probability of Y_2 level of risk by 4.9% &1.1% respectively. Here in the results for Y_2 level of risk the co-efficient values of *SETA* and *WCTA* are comparatively higher than the co-efficient value for Y_1 *SETA* and *WCTA*, signifying that in a far worse risk profile any addition to shareholder equity, total asset and working capital will affect the risk profile in a more positive mitigating manner, than in general risk situation. The financial characteristic of *RETA*, although insignificant, again bears a positive sign; however the co-efficient value of *RETA* is barely 3.78 as compared to astounding 23 in Y_1 profile. The justification for a lower Y_2 coefficient value of *NITA*, –7.18 as compared to Y_1 value of -30.07 is strongly evident from the *risk criterion of Y_2 (net income negative for 2 years + TL>TA)* where this financial variable stands most deteriorated, accounting for the fall in the magnitude of co-efficient as compared to value in Y_1 level (net income negative for consecutive two years) where only net income is affected.

The estimated stock return variable is insignificant in the results of Y_2 level of risk of textile sector. As Y_2 level of risk is synonym to *"even worse performance"*, the profile is such where the firm is faced with declining stock returns Beaver (1966) and Scott (1981), because of worse performance. Hence in a distressed condition with declining actual stock returns, the estimated stock returns are insignificant in determining the level of risk.

The *direct specification model for Y_2 level of risk* also reports exactly similar results as of indirect specifications regarding firm specific variables; only significant macro-factor in determining the Y_2 level of risk is the sensitivity of the firm to changes in *TS* (term structure) with a co-efficient value of -5.16.

[23] See Chen, Roll & Ross (1986),Tirapat and Nittayagasetwat (1999),Burmeister & Wall (1986)

The binary results of Y_2 level of risk indicate that out of approximately *4668* observations of textile-cotton sector, *550* observations belong to the risk profile Y_2, indicating 11.7% of observations belonging to this risk level, out of which 2.27% observations are purely secondary level of risk whereas rest will formulate part and portion of high level of risk.

The results obtained for Y_3 ; probability of risk of financial distress (highest level) ; indirect specification for the whole sample signify that firms variable of *SETA, RETA,CHIN* & *NITA* are highly significant at 1% level of significance with the exception of *OINS* & *WCTA* which are highly insignificant in the Y_3 level of risk results. The magnitudes of co-efficient of *SETA* & *CHIN* are approximately the same as in Y_2 level results. However the co-efficient values of *NITA (-32.5)* & *RETA (30.2)* are close to the co-efficient values of Y_1 results where a unit change in both will bring an abnormal change in the probability of risk. Like the Y_2 level results, the estimated stock return variable is also insignificant in Y_3 level results, reiterating the fact that the Y_3 level of risk is the highest risk level where the *criterion is net income negative for consecutive three years in addition to total liabilities greater than total assets TL>TA*. The profile is such that if remedial measure not taken, the textile firms will eventually culminate in default/delisting in the next stage.

The *direct specification model for Y_3 level of risk* also reports exactly similar results as of indirect specification in terms of firm specific variables; the co-efficient values are also approximately the same as in the result of indirect specifications. only significant macro-factors in determining the Y_3 level of risk is the sensitivity of the firm to changes in *TS* (term structure) with a co-efficient value of -4.64 at 10% level of significance and sensitivity of the firm to changes in *ADMS* (anticipated growth in money supply) with a co-efficient value of .051 at 10% level of significance. The macro factor of *ADMS* affects the firms via the interest rate and credit channel; as changes in *ADMS* directly affect interest rates and interest rate risk increases the borrowing cost for the firms; moreover as per study of Iqbal (2010), *WALR*

(weighted average lending rate) or cost of funds has a negative relationship with manufacturing sector credit allocation.

The binary results for Y3 level of risk indicate that out of approximately *4668* observations of textile-cotton sector, *444* observations belong to the risk profile of Y_3 , implying that *9.5%* of total observations of the textile-cotton sector is in the category of expected default.

Thus the risk assessment of the largest manufacturing sector of Pakistan depicts a very stylized Textile-Cotton sector, where the macro determinants of risk are betas of TS (term structure); ADMS (anticipated growth in money supply) and TDOPN (trade openness) and where the sensitivities of the firms to macro factors of TS & TDOPN exhibit a negative relation with risk of financial distress. The micro determinants of risk are the CAMEL category firms characteristics of SETA, RETA and WCTA (except for OINS) along with CHIN & NITA; while the estimated stock return variable significance for Y_1 (level of risk), corresponding to the estimated changes in macro factors, is suggestive of relation as per literature where the firm with higher estimated stock return has lower probability of financial distress. The sector exhibits a substantial level of primary risk Y_1 and an alarming level of high risk Y_3.

8.2 TEXTILE - SYNTHETIC SECTOR

Textile–Synthetic sector is a crucial sub-sector of main Textile manufacturing. This study analyzes the *32 firms of Textile–Synthetic sector,* over the period of *1974-2010*. The results are presented in table 8.2.

The results obtained for *Y_1; probability of risk of financial distress (primary level*); signify that with the exception of *SETA*, all the textile firm specific variables *RETA*, *WCTA*, *CHIN* and *NITA* are significant at a striking *1 %* level of significance; whereas *OINS* is significant at 5% level of significance, exhibiting a negative relationship with the probability of Y_1 level of risk (primary level). The estimated stock return variable is insignificant implying insensitivity

Table 8.2: Textile Synthetic Sector

Explanatory Variable	INDIRECT MODEL			DIRECT MODEL		
	Estimates of Co-efficient			Estimates of Co-efficient		
	Y_1	Y_2	Y_3	Y_1	Y_2	Y_3
Constant	-1.995694 (0.221522)***	-4.733979 (0.596572)***	-4.555955 (0.555668)***	-1.977175 (0.305373)***	-5.449801 (0.843722)***	-4.851894 (0.772601)***
R_{EST}	-0.743671 (0.567894)	1.496120 (0.907577)*	2.184907 (0.955891)**			
Macro Factors						
1. β_{TS}				2.499893 (11.10169)	-21.07759 (23.76927)	-32.23884 (24.70646)
2. β_{DIP}				0.018402 (0.116623)	0.443352 (0.263724)*	0.623479 (0.269138)**
3. β_{DONIR}				1.449632 (0.767272)*	-1.632669 (1.386895)	-0.760908 (1.356881)
4. β_{ADMS}				0.115807	0.566354 (0.253375)**	0.524353 (0.258864)**
5. β_{TDOPN}				-0.881882 (6.744125)	-5.974260 (12.35589)	-8.476902 (12.78397)
Financial Characteristic						
1. **SETA**	0.324931 (0.293847)	0.075165 (0.440087)	-0.292531 (0.406833)	0.226119 (0.300957)	0.308236 (0.443256)	-0.188236 (0.413700)
2. **RETA**	63.31140 (20.12168)***	416.4191 (373.9436)	385.7590 (371.7972)	57.03122 (20.48123)***	659.4278 (704.0401)	620.5462 (818.0269)
3. **OINS**	-0.549228 (0.219670)**	0.041004 (0.078599)	-0.016403 (0.075711)	-0.617076 (0.242517)**	-0.078932 (0.113569)	-0.115152 (0.097246)
4. **WCTA**	-1.670168 (0.519595)***	-3.176641 (0.904068)***	-1.952660 (0.754571)***	-1.709594 (0.532372)***	-3.963927 (0.978147)***	-2.749876 (0.850894)***
5. **CHIN**	2.092556 (0.272828)***	2.805568 (0.622727)***	2.566338 (0.604602)***	2.010389 (0.272046)***	2.769547 (0.622606)***	2.547224 (0.603233)***
6. **NITA**	-80.51677 (19.71848)***	-434.9312 (374.1715)	-403.0772 (372.0055)	-73.60187 (20.06853)***	-674.8248 (704.1931)	-634.9818 (818.1801)
Total Obs	691	691	691	691	691	691
Obs with Dep=0	534	621	627	534	621	627
Obs with Dep=1	**157**	**70**	**64**	**157**	**70**	**64**

to risk level. The macro-factor of *DONIR (growth rate of interest)* is significant at 10% level of significance in the Y_1 level of risk results for textile-synthetic sector suggestive of the fact that a 1 unit in the systematic risk of interest rate will increase the Y_1 level of risk by 1.44%. The macro factor of interest rate is operative in case of the textile sector due to the fact that

textile sector is highly dependent on the banking sector for its financial needs, 40% of credit by banks to the manufacturing sector is utilized by the textile sector[24]. Due to this high dependency, interest rate risk increases the borrowing cost for the textile sector. The binary results for Y_1 level of risk indicate that out of *691* observations, *157* observations of the textile-synthetic sector belong to the risk profile Y_1 synonym to *"bad performance"*; approximately 22.7% of total observations fall in this level, out of which 12.5% is purely primary level of risk, whereas rest will formulate part and portion of secondary and high level of risk.

The results obtained for *Y_2; probability of risk of financial distress (secondary level); indirect specification model* for the Textile-Synthetic sector signify that only the firm specific variables *of WCTA & CHIN* are highly significant at 1% level of significance; *WCTA* being more effective in mitigating risk, where a 1 unit increase in *WCTA* will decline the probability of Y_2 level of risk by 3.1%. The estimated stock return variable is also significant at 10% level of significance, implying that textile-synthetic firms risk level responds to changes in stock returns; a higher estimated stock return by 1unit lowers probability of risk level Y_2 by 1.49%. The macro-factors of *ADMS (anticipated growth in money supply) & DIP (growth rate of industrial production)* are significant at 5% & 10% level of significance in the Y_2 level of risk results for textile-synthetic sector suggestive of the fact that a 1unit increase in the systematic risks of the firms exposed to changes in *ADMS*[25] and *DIP w*ill increase the Y_2 level of risk by 0.56% & 0.44%. The macro beta of *growth rate of Industrial production* affects the risk level of the firm through the credit channel that strongly exists especially for larger sub sectors like textile, sugar, cement etc. Falling in line with the study of Iqbal (2010) who found that credit to manufacturing sector of Pakistan is demand driven and sole determinant of credit allocation is the manufacturing sector output, other factors

[24] Risk analysis of banking sector; SBP report H1-CY12
[25] See Iqbal (2010) for detail

having very little influence in credit determination. The crucial finding was that credit disbursement to manufacturing sector is positively related to overall large scale manufacturing sector output and its growth rate. Thus any decline of *DIP* will significantly affect the risk profile of the firms, operative through the credit channel.

The binary results of Y_2 level of risk indicate that out of approximately *691* observations of textile-synthetic sector, *70* observations belong to the risk profile Y_2, out of which nominal 1% is purely secondary level of risk, whereas rest will formulate part and portion of high level of risk.

The results obtained for $Y_{3;}$ probability of risk of financial distress (highest level) are quite similar to Y_2 level where again the firm specific variables *of WCTA & CHIN* are highly significant at 1% level of significance; the macro-factors of *ADMS (anticipated growth in money supply) & DIP(growth rate of industrial production)* are even more significant at 5% level of significance; estimated stock return significant at 5% level of significance, exhibiting a negative relationship & sensitivity to highest risk level, Y_3 . The binary results of Y_3 level of risk indicate that out of approximately *691* observations of textile-synthetic sector, *64* observations belong to the risk profile Y_3, implying that *9.26%* of total observations of the textile-synthetic sector is in the category of expected default.

Hence the risk assessment of Textile-Synthetic sector exhibits that macro determinants of risk for this specific sector are betas of DONIR (growth rate of interest); ADMS (anticipated growth in money supply) and DIP (growth rate of Industrial production) and where the sensitivities of the firms to these macro factors exhibit a positive relation with risk of financial distress. The micro determinants of risk are mainly WCTA & CHIN, and interestingly the crucial variable of SETA is highly insignificant in determining the probability of risk in all the three risk profiles. Whereas the estimated stock return variable significance for Y_2 & Y_3 (levels of risk), corresponding to the estimated changes in macro

factors, is suggestive of a strong relation as per literature, where the firm with higher estimated stock return has lower probability of financial distress. The sector exhibits a substantial level of primary risk Y_1 and high level risk Y_3.

8.3 SUGAR & ALLIED SECTOR

After the Textile sector, Sugar sector is the most significant of manufacturing sectors of Pakistan. Pakistan is an important producer of sugar cane, globally ranked *15^{th}* in terms of sugar production & *5^{th}* in terms of area under cane cultivation; while in the hierarchy of manufacturing sector, Sugar industry is the *2nd largest* agro-based industry after textile. The primary product of the sugar industry (sugar) is used for household consumption, additionally, it's by-products like alcohol and biogases are used in pharmaceutical industry and paper & chip board production while ethanol is used as fuel. This study analyzes the *36 firms of Sugar & Allied sector*, over the period of *1974-2010*. The results are presented in table 8.3.

The results obtained for *Y_1; probability of risk of financial distress (primary level*); signify that with the exception of *WCTA*, all the Sugar firm specific variables *SETA, RETA, CHIN* and *NITA* are significant at a striking *1 %* level of significance; whereas *OINS* is significant at 5% level of significance, exhibiting a negative relationship with the probability of Y_1 level of risk (primary level). The estimated stock return variable is insignificant implying insensitivity to risk level, whereas all the macro factors are insignificant for *Y_1* level of risk of sugar sector.

The binary results for Y_1 level of risk indicate that out of *1030* observations of Sugar sector, *168* observations belong to the risk profile Y_1 synonym to *"bad performance"*; approximately 16.31% of total observations fall in this level, out of which 10.2% is purely primary level of risk, whereas rest will formulate part of secondary and high level of risk.

The results obtained for *Y_2; probability of risk of financial distress (secondary level); indirect*

Table 8.3: Sugar Sector

Explanatory Variable	INDIRECT MODEL			DIRECT MODEL		
	Estimates of Co-efficient			Estimates of Co-efficient		
	Y_1	Y_2	Y_3	Y_1	Y_2	Y_3
Constant	-1.647932 (0.220679)***	-3.134350 (0.383651)***	-3.787742 (0.477767)***	-1.522934 (0.294301)***	-3.655480 (0.551712)***	-4.373508 (0.682085)***
R_{EST}	-0.748175 (0.515270)	-0.288706 (0.893009)	-1.006187 (1.000852)			
Macro Factors						
1. β_{TS}				11.20117 (7.326049)	-7.855906 (15.87935)	-17.00352 (22.14891)
2. β_{DIP}				-0.073401 (0.097752)	-0.063834 (0.158978)	0.114080 (0.203344)
3. β_{DONIR}				0.545742 (0.464724)	1.001887 (0.939436)	1.122078 (1.118985)
4. β_{ADMS}				-0.052682 (0.058306)	-0.415038 (0.201905)**	-0.699238 (0.300298)***
5. β_{TDOPN}				7.967023 (5.937637)	-32.75699 (13.94988)***	-33.36486 (18.14577)*
Financial Characteristic						
1. **SETA**	-1.316740 (0.392743)***	-3.182597 (0.580651)***	-3.284769 (0.622379)***	-1.394335 (0.410198)***	-2.826687 (0.637812)***	-3.300230 (0.749794)***
2. **RETA**	29.11652 (8.971716)***	157.2004 (99.59750)	115.3503 (93.78492)	30.06313 (9.050419)***	168.6337 (99.36864)*	110.8383 (87.30307)
3. **OINS**	-1.787336 (0.752605)***	-0.144391 (0.198236)	-0.101524 (0.253145)	-1.739999 (0.754373)**	-0.308259 (0.229632)	-0.234160 (0.323323)
4. **WCTA**	-0.623877 (0.494944)	0.150882 (0.715796)	0.761506 (0.710141)	-0.548132 (0.494173)	0.057265 (0.785508)	1.001510 (0.807565)
5. **CHIN**	2.286756 (0.221041)***	2.055519 (0.448512)***	2.263549 (0.576175)***	2.311810 (0.222648)***	2.055654 (0.460422)***	2.287077 (0.601963)***
6. **NITA**	-36.32252 (8.770220)***	-168.1847 (99.76648)*	-128.0827 (94.03505)	-37.52617 (8.838467)***	-178.8826 (99.48686)*	-123.5593 (87.38683)
Total Obs	1030	1030	1029	1030	1030	1029
Obs with Dep=0	862	968	981	862	968	981
Obs with Dep=1	**168**	**62**	**48**	**168**	**62**	**48**

specification model for the Sugar sector signify that with the exception of *OINS* &*WCTA,* all the firm specific variables *SETA, RETA,CHIN* and *NITA* are significant at *1 %* & *10%* level of significance; The estimated stock return variable is again insignificant implying insensitivity to risk level Y_2. Only the macro-factor of *ADMS (anticipated growth in money*

supply) is significant at 5% level of significance in the Y_2 level of risk results for Sugar sector suggestive of the fact that a 1unit increase in the systematic risk of the firms exposed to changes in *ADMS Iqbal (2010), w*ill increase the Y_2 level of risk by 0.41%

The binary results of Y_2 level of risk indicate that out of approximately *1030* observations of Sugar sector, *62* observations belong to the risk profile Y_2, out of which nominal 1.35% is purely secondary level of risk, while rest will formulate part and portion of high level of risk.

The results obtained for Y_3; probability of risk of financial distress (highest level) depict that only the firm specific variables *of SETA & CHIN* are highly significant at 1% level of significance, others being insignificant; the macro-factor of *ADMS (anticipated growth in money supply)* is even more significant at 1% level of significance; estimated stock return again insignificant in highest risk level, Y_3. The binary results of Y_3 level of risk indicate that out of approximately *1030* observations of Sugar sector, *48* observations belong to the risk profile Y_3, implying that *4.6%* of total observations of the Sugar sector is in the category of expected default.

Hence the risk assessment of Sugar sector exhibits that macro determinant of risk for this specific sector is beta of ADMS (anticipated growth in money supply). The micro determinants of risk are mainly SETA & CHIN. Whereas surprisingly the estimated stock return variable is totally insignificant throughout the three risk profiles, implying thorough insensitivity to risk level. The sector only exhibits a substantial level of primary risk Y_1.

Mentioned above were the results of Sectorial analysis of the manufacturing sector of Pakistan, for the period covering 1974-2008. All the three levels of risk profile were estimated, sector wise incorporating macro effects in a micro crisis model.

In the next section, risk assessment of the banking sector will be discussed from Non-performing loans perspective.

Chapter 9

RISK ASSESSMENT OF BANKING SECTOR

9.1 EMPERICAL RESULTS

The previous chapters dealt with the *risk assessment of Manufacturing Sector* of Pakistan. This chapter explains the *risk assessment* of the crucial *Banking Sector* of Pakistan via estimated results comprising of a sample of *41 banks*, covering a period of *2001 to 2012*.

The results of the macro-related micro-crisis prediction models, both indirect and direct tests, are presented in *table 9.1*.

The results obtained for *Y; probability of risk of financial distress*; indirect specification model signify that with the exception of *GADVG* the bank specific variables *SETA, RETA & CHIN* are significant at a striking *1 %* level of significance; again consistent with the findings of literature (Tirapat, Nittayaga Setwat, 1999), exhibiting a relationship where higher the ratios, the lower the probability of risk. A 1unit increase in *RETA & CHIN* will decrease the probability of risk by 2.52%, 2.61% respectively whereas a 1unit increase in *SETA* will bring a change of 2.87 % in the risk level.

The estimated *NPLGA* (non-performing loans to gross advances) ratio is also highly significant at 1% level of significance, implying that a higher infection ratio by 1 unit increases the probability of risk level Y by 5.32%. A larger magnitude of *NPLGA* is suggestive that *NPLs* seriously affects the risk, profitability and performance when inspected in the connotation of dependent variable *NNI (net income negative for current year).*

The *direct specification model for Y level of risk* depicts that all the financial characteristics of the bank are highly significant at 1% level of significance in determining the level of risk, exhibiting a relation where greater the ratios, the lower the probability of risk; whereas *GADVG* which was previously insignificant in indirect model is also significant at 5% level

Table 9.1 : Banking Sector: Systematic Risk Direct/Indirect Model

Explanatory Variable	Estimates of Co-efficient	
	Y Direct	**Y Indirect**
Constant	-1.811058 (0.253791)***	-2.784091 (0.321803)***
$NPLGA_{EST}$		5.328617 (1.059658)***
Macro-Economic Factor		
1. β_{DDCR}	-5.042714 (2.000457)***	
2. β_{DEXCH}	-0.501936 (0.442447)	
3. β_{DIF}	-0.072318 (0.167936)	
4. β_{DMS}	-0.131024 (0.225486)	
5. β_{RP}	-77.00603 (30.88373)***	
6. $\beta_{TRADEPKR}$	-2.530009 (6.990009)	
7. β_{TS}	25.95076 (10.89535)***	
Financial Characteristics		
1. SETA	2.518053 (0.728959)***	2.872007 (0.764993)***
2. RETA	-2.413272 (0.693061)***	-2.527188 (0.767329)***
3. GADVG	0.039116 (0.020383)**	0.008686 (0.011105)
4. CHIN	-2.755209 (0.392812)***	-2.613400 (0.379484)***
Total Obs	308	308
Obs with Dep=0	233	233
Obs with Dep=1	**75**	**75**

of significance but with a positive sign implying that a 1unit loans growth increases the risk[26] by .03%; Impact though minimal, is comprehendible for the reason that across the board[27] all banks are experiencing increasing *NPL's* so any growth in loan portfolio signals a nominal growth of *NPL's.*

[26] See Lis et al (2000) Bercoff, Giovannio and Grimard (2002)
[27] See OSEC, 2011"Pakistani Banking Sector". Business Network Switzerland report

As far as macro-factors are concerned, very relevantly for banking sector, the systematic risk of the banks exposed to *TS* (term structure), *DDCR* (discount rate growth rate) and *RP* (risk premium) affects the probability of bank's financial distress.

The co-efficient of macro beta of *DDCR* with a negative sign imply that a 1 unit increase in the systematic risk of *DDCR* will decrease the level of risk by 5%. The effect of *DDCR* is explainable through the pass through mechanism. For Pakistan, there are studies which estimate the pass through mechanism of the T-bill rate on call money rate, saving deposit rates and lending rate (Qayyum, Khan and Khawaja 2005). Concerning the Pass through of discount rate on the weighted average deposit rate, overall, banks pass on only *16%* of the impact of the policy rate to depositors signifying the overall ineffectiveness of monetary policy and significant lag in its completeness. Hassan M. Mohsin (2011). This issue got marginally addressed by the regulator only in recent years when in 2008 state bank set a mandatory minimum benchmark rate of 5% on all saving deposit rate, which was later increased to 6%

However the degree of pass through of discount rate on the weighted average lending rate is moderately high, though the pass through is not complete. Moreover there is an interest insensitive supply of non–remunerative deposits (low cost deposits) to banking sector which is one of the main reasons behind higher banking spreads. *25%* of the total deposits of banking sector are in current accounts (cost less funds) and *60%* of the total saving deposits are low cost/low margin. Khawaja & Din(2007). Thus a banking scenario where due to poor pass through and agents showing liquidity preference by extensive supply of cheap funds in shape of current accounts/deposits, any rise in discount rate is beneficial to bank.

The co-efficient of macro beta of *TS* with a positive sign imply that a 1unit increase in the systematic risk of *TS* will increase the level of risk hugely by 25%. Term structure risk is due to changes in the fixed income structure. The banking sector consistently faces yield risk,

money market volatility causing downward shift of yield curve; banks are exposed to reinvestment risk in the scenario of increasing investments and declining interest rates. The banking sector also experiences term structure risk because of interest rates fixed on liabilities for periods that differ from those on offsetting assets and due to maturity mismatches. Banking sector portfolio composition is such where fixed rate assets are financed with floating rate liabilities, the interest rate volatility[28] (overnight rates) over the period, due to the massive government borrowing from banks, huge oil payments and a persistent fall in foreign financial inflow caused the rate payable on the liabilities to rise while the rate earned on the assets remained constant; causing a direct blow to profitability.

The macro factors of *DIF, DMS & DEXCH* are highly insignificant in determining the risk of financial distress for banking sector of Pakistan.

The binary results of risk indicate that out of *308* observations, *75* observations of the banking sector exhibit financial distress, which constitutes 24.3% of total observations.

The results of *NPL's* as a measure of credit risk shows that Pakistan's banking sector experiences a very alarming level of credit risk; out of *308* observations, *109* observations of the banking sector belong to the *credit risk level 1(primary level)* exhibiting an infection ratio*(NPLGA)* of *10%; 55* observations of the banking sector belong to the *credit risk level 2 (secondary level)* exhibiting an infection ratio of *20%; 20* observations of the banking sector belong to the *credit risk level 3(highest level)* exhibiting an infection ratio of shocking *50%; Thus the risk assessment of the Banking sector of Pakistan depicts that macro determinant of risk are betas of TS (term structure); DDCR (discount rate growth rate) and RP (risk premium) & the micro determinants of risk are the CAMEL category characteristics of SETA,*

[28] For a period of 1992-2010, official discount rate has been 12.78%, recording a historical low of 7.5% in Nov 2002 and a historical high of 20% in Oct 1996. Thus the volatile interest rate, along with elevating interest rate risk also alters the borrowing cost which is crucially linked to borrower's repayment capacity. In this context, chronic fiscal deficits, rampant inflation and beyond limits government borrowing are hugely to blame for the interest rates remaining in two digits. OSEC,2011

*RETA along with CHIN & GADVG exhibiting a negative relation with risk level; while the estimated infection ratio significance for risk, corresponding to the estimated changes in macro factors, is suggestiv*e of the fact that both the *"estimated infection ratio incorporated with systematic risks"* and *"banks sensitivities to macro variables" are rightful proxies of macro betas which do not alter variable relationships and results when employed in model. The banking sector exhibits a high level of credit risk due to piling up of NPL's overtime and their transmission to booked losses category*[29].

[29] See "Risk analysis of the banking sector" *SBP report 2011-2012*

CONCLUSION & POLICY IMPLICATIONS

Using two step *logit* discriminant analysis, as used in Maddala (1986), Thomson (1992) and Theodossiou et al (1996), firm's stock return are estimated from multifactor model for *Manufacturing Sector of Pakistan*. The estimated returns are then used as representation of macro sensitivity and a link to micro-crisis predictive model, indicating firm's risk level.

The macro linked micro-crisis exploration model constructed in this study has two specifications: The *first specification (the indirect test) u*ses firms estimated stock returns computed from estimated changes in macro variables and firms sensitivities to those macro variables as proxies of macro factors; whereas the *second specification (the direct test)* uses firm's sensitivities to macro-economic variables as proxies for macro-factors.

The contribution of the model is bridging firm sensitivities to macro conditions and its financial characteristics for the purpose of investigating the firm's financial distress. The model poses promising results and confirms that macro conditions are crucial factors in determining a firm's risk level & possibility of financial distress.

The overall "risk assessment of the manufacturing sector of Pakistan" depicts a very stylized manufacturing sector, where the macro determinants of risk are betas of TS (term structure);and TDOPN (trade openness) and micro determinants of risk are the CAMEL category firm's characteristics of SETA, RETA, OINS and WCTA along with CHIN & NITA being highly significant in all the risk profiles, confirming the strong existence of balance sheet channel of firms; while the estimated stock return high significance in results obtained for total sample reinforces literature where the firm with higher estimated stock return has lower probability of financial distress & confirms the hypothesis(1) that Stock returns of manufacturing sector are affected by macroeconomic risk factors. Whereas it's in significance for Y_2 *&* Y_3 *(levels of* risk*) is also in line with the rationales where declining*

stock returns at higher risk levels are insignificant in risk mitigation. Moreover the manufacturing sector of Pakistan experiences substantial levels of: primary risk level Y_1 and high risk level Y_3 confirming hypothesis (2) that the financial distress risk of manufacturing sector of Pakistan is of significant level.

The "Regime wise risk assessment of the manufacturing sector of Pakistan" also poses results where risk profiles are in line with the economic history and political ideology. Manufacturing sector risk profiles surviving the bad luck years of Bhutto due to the life line of tremendous growth rates of Ayub's era; risk levels minimal during Zia's regime; deteriorated during the Democratic era under SAP ideology & Bretton Wood Ins. tutelage; under control during Musharaf's times.

The "Sectorial risk assessment of the manufacturing sector of Pakistan" depicts diversity in results where each sector exhibits different dynamics. The results for the Textile sector, the largest manufacturing sector show a very stylized Textile -Cotton sector, where significant determinants of risk are macro-betas of TS (term structure); ADMS (anticipated growth in money supply), TDOPN (trade openness), CAMEL category firms characteristics & estimated stock returns.

Whereas the risk assessment of Textile-Synthetic sector exhibits different determinants of risk, being macro-factors of DONIR (growth rate of interest); ADMS (anticipated growth in money supply), DIP (growth rate of Industrial production), micro characteristics of WCTA & CHIN and estimated stock returns. Both sectors exhibiting a substantial level of primary risk Y_1 and high level risk Y_3.

For Sugar sector determinants of risk are macro-factor of ADMS (anticipated growth in money supply), micro characteristics of SETA & CHIN. While interestingly estimated stock return being totally insignificant throughout the three risk profiles, implying thorough insens

-itivity to risk levels. The Sugar sector only exhibits a substantial level of primary risk Y1.The "Risk assessment of Banking Sector" indicates that Non performing loans are highly affected by macro conditions and micro characteristics, confirming hypothesis (3) & (4) that the Non-performing loans of banking sector are affected by macroeconomic risk factors and Non - performing loans of banking sector are affected by bank specific variables. Also evident from results is that banking sector of Pakistan exhibits a high level of credit risk due to piling up of NPL's overtime, complying with the *hypothesis (5) that the credit risk of banking sector of Pakistan is of significant level.*

In conclusion, the research develops the macro related micro-crisis exploration model for *Manufacturing and Banking sectors* of Pakistan.

POLICY IMPLICATIONS

- The model is useful in providing warning signals of any upcoming crises as it highlights the determinants and magnitude of risk; so that protective measure can be sought for immunizing the economy and protect it from contagious, potentially lethal financial diseases.
- The study is suggestive of the fact that accounting variables under *GAAP (Generally Accepted Accounting Principles),* alone are not adequate enough in exhibiting firm's financial distress, and the firms sensitivities to macro factors should be incorporated to indicate a firm's financial distress.
- A reconsideration approach towards inflation is required as inflation is highly insignificant in majority of manufacturing sector dynamics.

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ANNEXURE – I : BANKING NPL'S

Fig: 3.3.1 Trends in Non-Performing Loans

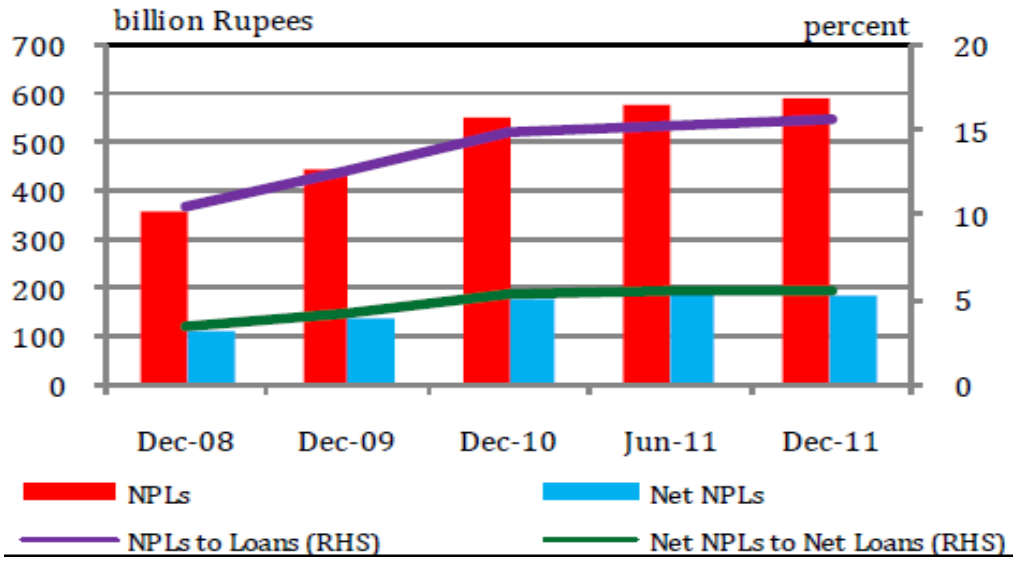
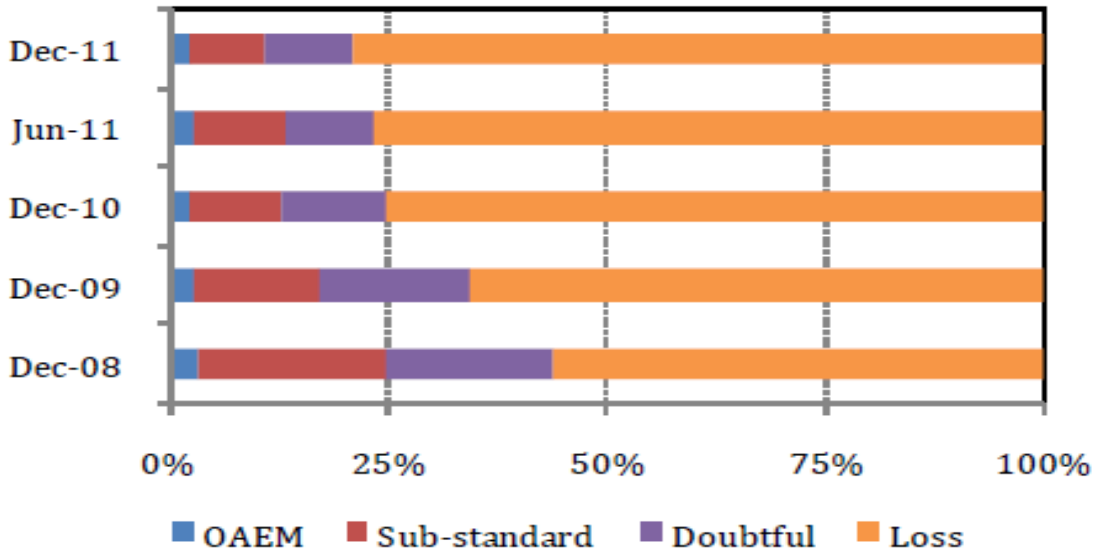


Fig: 3.3.2 Category-Wise Break-up of NPLs



Source: SBP

ANNEXURE – II : BANKING BREAKUP OF INVESTMENTS

Fig: 3.3.3 Break-up of Investments

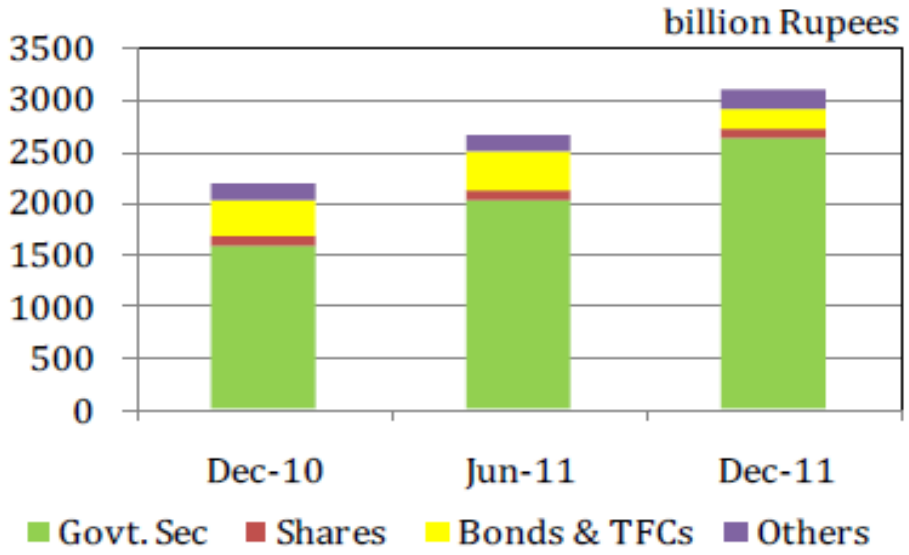
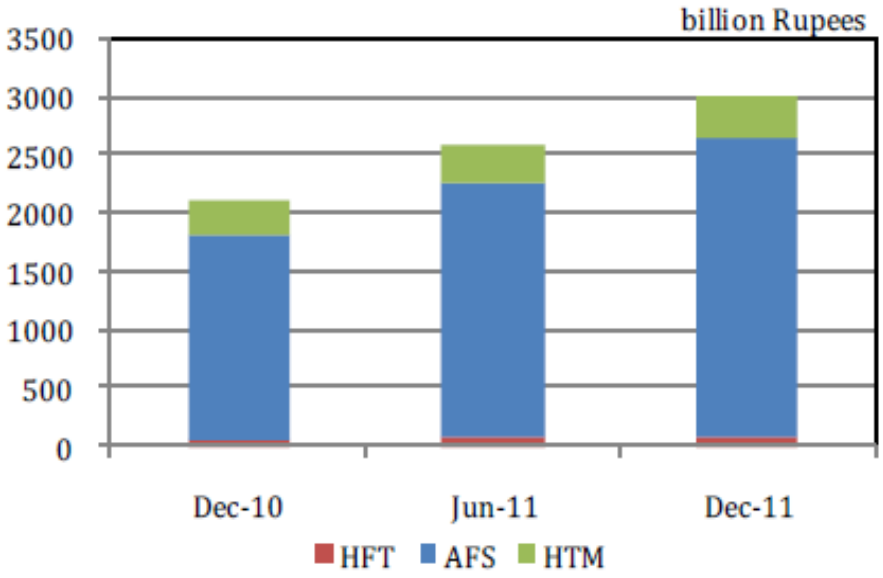


Fig: 3.3.4 Break-up of Investments



Source: SBP

ANNEX III: BANKING MERGERS & AQUASITIONS: 2000-2012

- Atlas Bank acquired the operation of Dawood Bank Ltd. w.e.f 14-2-2006
- After the merger of Metropolitan Bank Ltd and Habib Bank AG Zurich, Habib Metropolitan Bank Ltd. was established w.e.f 16-10-2006
- AEB and Jahangir Siddiqui Investment Bank merged and declared as JS Bank w.e.f. Dec, 06
- merger of Mashreq Bank and Crescent Investment Bank on 9th July 2003, Mashreq Bank Pakistan Ltd. Was established, renamed as Crescent Commercial Bank Ltd. w.e.f. 31st March 2004. Crescent Commercial Bank Ltd was renamed as Samba Bank Ltd. w.e.f 20th October,2008.
- Saudi Pak Commercial Bank Ltd. has changed its name to Silk Bank Ltd effective from June 01, 2009.
- SME declared as a specialized Bank w.e.f Sep 2004
- Standard Chartered Bank (Pakistan) Ltd was established as a result of merger of Union Bank Ltd and Standard Chartered Bank on 19-5-2006.
- Merger of M/s. PICIC Commercial Bank Limited with and into M/s. NIB Bank Limited. 31-12-2007
- Merger of KASB Bank Limited, KASB Capital and Atlas Bank Limited. 07-11-2008
- Merger of Al Baraka Islamic Bank B.S.C Pakistan Branches and Operations with and into Emirates global Islamic Bank Limited. 28-10-2010
- Merger of Atlas Bank Limited with and into Summit Bank Limited. 28-01-2011
- Merger of Mybank Limited with and into Summit Bank Limited. 31-05-2011
- Merger of Faysal bank & RBS. Jan 2011

Source:
Financial Position of the banks 2001-2005; SBP
Competition Commission of Pakistan

ANNEX IV: TOTAL ASSETS & TOTAL LIABILITIES CHART

Total Assets

Fixed Assets
Investments
Cash/balances
Lending
Other/miscellaneous assets

Current Assets

Cash balances
Account Receivables
- Amount due from Debtors
- Unsettled transactions
- Obligations owed to Company

Prepaid expense/accrued revenue
Inventory
Securities

Non - Current Assets

Fixed Assets
Long Term Investments

Total Liabilities

Fixed liabilities
Bills payable
Borrowings
Other liabilities

Current Liabilities

Liabilities to be paid in 1 yr:
Accounts Payable
- Wages
- Dividends
- Taxes

Non - Current Liabilities

Fixed liabilities
Long Term Borrowings

ANNEX V: VARIABLE CONSTRUCTION KEY: FIRM SPECIFIC VARIABLES

Sr. No.	Variable Construction	Name
1.	***SETA=A3/B3+C2**	*Book value of stockholder's equity* to total asset ratio
2.	***RETA= A2/ B3+C2**	Retained earnings to total asset ratio
3.	***OINS=D2-D8/D1**	Operating Income to net sales ratio
4.	***WCTA=B3-B4/ B3+C2**	Working capital to total assets ratio Working Capital = Current Assets – Current liabilities
5.	As: TAM=B3+C2 TAGM=DLOG(TAM) **SIZE= TAGM/GNP DF 1974**	Total Assets Total Assets Growth **Total Assets Growth/ GNP price deflator**
6.	As: NAM= (B3+C2) – (A7+B4) **NAGM= DLOG(NAM)**	Net Assets = Total Assets – Total liabilities **Net Assets Growth**
7.	**MEQTL = R*/A7+B4**	*Mkt. value of equity* to book value of total liabilities ratio
8.	**DBERM=(A7+B4)/A3**	Debt To Equity Ratio
9.	**CLCA =B4/B3**	Current liabilities to Current asset ratio
10.	**YTA=D1/ B3+C2**	Sales to total assets ratio
11.	**EBITA= D2-D8/B3+C2**	Earnings before interest and taxes to total asset ratio
12.	As: **NI=D3 - D5** **CHIN=** $(NI_t - NI_{t-1})/(\lvert NI_t \rvert + \lvert NI_{t-1} \rvert)$	Net Income Change in net income in current year and previous year
13.	**INTWO = 1 if $NI_{t-1} + NI_{t-2} < 0$, 0 otherwise**	A dummy variable, 1 if net income is negative for last two years,0 otherwise
14.	**INTHREE=1 if $NI_{t-1} + NI_{t-2} + NI_{t-3} < 0$, 0 otherwise**	A dummy variable, 1 if net income is negative for last three years,0 otherwise
15.	**OENEG= 1 if (A7+B4)> (B3+C2) 0 otherwise**	A dummy variable, 1 if total liabilities exceed total assets, 0 otherwise

- The first four ratios are ***CAMEL category*** variables, which are:

Capital	****SETA***
Assets	****RETA***
Management & Earnings	****ONIS***
Liquidity	****WCTA***

ANNEX VI: VARIABLE CONSTRUCTION KEY: BANK SPECIFIC VARIABLES

	Variable Construction	**Name**
1.	***SETA=A1+A2+A3/C1+C2+C3+C4+C8+C9+C10**	*Book value of stockholder's equity* to total asset ratio
2.	***RETA=A2+A3/C1+C2+C3+C4+C8+C9+C10**	Retained earnings to total asset ratio
3.	***WCTA=(C1+C2+C3)–(B1+B2+B3)/ C1+C2+C3+C4+C8+C9+C10**	Working capital to total assets ratio Working Capital = Current Assets – Current liabilities
4.	**MEQTL = R*/ B1+B2+B3+B4**	*Mkt. value of equity* to book value of total liabilities ratio
5.	**DBERM= B1+B2+B3+B4/ A1+A2+A3**	Debt To Equity Ratio
6.	GADV = C5 **GADVG = DLOG(GADV)**	Gross advances Gross advances growth rate
7.	As: **NI=D10** **CHIN=** $(NI_t - NI_{t-1})/(\lvert NI_t \rvert + \lvert NI_{t-1} \rvert)$	Net Income Change in net income in current year and previous year
8.	**NNI =1 if $D10_t < 0$, 0 otherwise**	A dummy variable, 1 if net income is negative for current year,0 otherwise
9.	**OENEG= 1 if B > C, 0 otherwise**	A dummy variable, 1 if total liabilities exceed total assets, 0 otherwise

ANNEX VII: VARIABLE CONSTRUCTION KEY: MACRO VARIABLES

	Variable Construction	Name
1.	**RP = F(Column) – E(Column)**	***Risk Premium*** **$RP_t = LOW\ GB_t - LGB_t$**
2.	IP = H (Column) **DIP = DLOG(IP)**	Industrial Production Growth rate $DIP_t = \log IP_t - \log IP_{t-1}$ Industrial Production ***Industrial Production Growth rate***
3. **4.**	MS = C(Column) DMS= DLOG(MS) $UDMS_t = DMS_t - \left[\hat{a}_0 + \hat{a}_1 \hat{\varepsilon}_{t-1}\right] = \hat{\varepsilon}_t$ $DMS_t = \alpha_0 + \alpha_1 \varepsilon_{t-1} + \varepsilon_t$ ← $ADMS_t = DMS_t - UDMS_t = \hat{a}_0 + \hat{a}_1 \hat{\varepsilon}_{t-1}$	Money Supply Money Supply Growth ***Unanticipated Growth in Money Supply*** *in which the term in brackets is obtained by* residuals *from the* ***MA(1) process on the realized DMS_t series.*** ***Anticipated Growth in Money Supply***
5.	INF = I(CPI Column) **DIF = DLOG(INF)**	Inflation Growth Rate $INFT_t = \log CPI_t - \log CPI_{t-1}$ Inflation ***Inflation Growth Rate***
6.	ONIR = D(Column) **DONIR = DLOG(ONIR)**	Interest Growth Rate $DIR_t = \log ONIR_t - \log ONIR_{t-1}$ Overnight (call money) Interbank Rate ***Interest Growth Rate***
7.	EXCH= B(Column) **DEXCH = DLOG(EXCH)**	Exchange Rate Growth Rate $DEXCH = log\ EXCH_t - log\ EXCH_{t-1}$ Exchange Rate ***Exchange Rate Growth Rate***
8.	**TS = E(Column) – G_{t-1}(Column)**	***Term structure*** **$TS_t = LGB_t - TB_{t-1}$**
9.	**TDOPN= J(Column)+K(Column)**	***Trade Openness*** ***$TDOPN=X_t$ (Exports)+M_t(Imports)/GDP***