Impact of Judicial Efficiency on Leverage and Debt-Maturity Structure

By

Attaullah Shah

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Dedicated to

my parents, wife, and lovely daughter

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ABSTRACT

This dissertation studies the impact of judicial efficiency on leverage and debt-maturity structure of 370 firms that are listed on the Karachi Stock Exchange, over the period 2001-2006.In a set of regressions where dependent variable is leverage ratio, baseline results show that leverage ratio increases with size of firm, ratio of fixed-assets-to-total-assets, and decreases with profitability, volatility of net income, dividends payments and growth opportunities. The largest economic effect on leverage ratio is that of the size of firm. These results demonstrate that the trade-off theory and the information asymmetry theory best explains observed capital structure. The results also indicate that leverage ratio decreases when judicial efficiency decreases; however, this relationship is not statistically significant. This is due to the composition effect. Allowing judicial efficiency to interact with the included explanatory variables, the results show that worsening judicial efficiency increases leverage ratios of large firms and decreases leverage ratios of small firms which is an indication of the fact that creditors shift credit away from small firms to large firms in the presence of inefficient judicial system. Results also indicate that the effect of inefficient courts is greater on leverage ratios of firms that have fewer tangible assets as percentage of total assets than on leverage ratios of firms that have more tangible assets. And finally there is some evidence that firms with more volatile net incomes are affected more than firms with less volatile net incomes when judicial efficiency decreases.

In debt-maturity regressions, the baseline results indicate that debt-maturity increases with size, tangible assets, and decreases with the firm's growth opportunities and inefficiency of judiciary; however, volatility of net income and firm's quality do not show any statistically significant relationship with debt-maturity ratio. Allowing for the possibility that judicial inefficiency does not impact all firms alike, the measure of judicial efficiency is interacted with dummy variables that are based on the quartiles of the included explanatory variables. Results of these regressions show that worsening judicial efficiency has far greater negative impact on the debt-maturity ratio of small firms than on the debt-maturity ratio of large firms. Similarly, results show that the effect of inefficient courts is greater on firms that have fewer tangible assets as percentage of total assets than on firms that have more tangible assets. Other firm-specific features like growth opportunities, volatility of net income, and firm's quality do not change the impact of judicial inefficiency on the firms' debt-maturity ratios.

CHAPTER 1

INTRODUCTION

1.1 Introduction and Background of the Study

In making their lending decisions, rational creditors will attempt to ascertain not just the quality of the borrower, but also the legal protection available to them should the borrower default. When the enforcement of lenders' rights is poor or costly in terms of administrative costs and time consumed in legal proceedings, lenders try to protect themselves through an alternative mechanism. For example, lenders ask for the security of fixed assets, require personal guarantees, and choose borrowers with presumably lower default risk such as wealthy individuals or large sized firms, and prefer to extend only short-term loans. A specific claim on fixed assets reduces chances of greater loss in case of default of the borrower. Short-term debt makes it easier for lenders to monitor their borrowers and reduce their misbehavior by threatening not to renew the loan (Demirguc-Kunt and Maksimovic,1999). Under an inefficient judicial system, borrowers without a personal guarantee or collateral of fixed assets may be denied financing. This could result in less lending in the economy. Similarly, the financial structure of many firms could tilt toward short-term financing as lenders would prefer to extend loans only of short maturity.

Recent advancement in the literature of law and finance has highlighted the importance of institutional development and creditors' right protection for the development of capital markets. Various research studies have focused on cross-country differences in the quality of law, regulations, protection available to creditors, minority shareholders and the effects of all these on the development of financial system, corporate governance, and financing patterns (Shleifer and Vishny 1997; La Porta, Lopez-de-Silanes, Shleifer and Vishny, 1996; 1997; 1998; 2000; Dehesa, Druck, and Plekhanov, 2007; Djankov, McLiesh and Shleifer, 2007).

Despite these developments in the area of law and finance, within-country judicial efficiency and its impact on the decisions of leverage and debt-maturity structure used by listed firms have attracted much less attention as observed by Sherwood, Shepherd and De Souza (1994: p.4)

> "Self-evident though it may seem, the proposition that a strong judicial process enhances economic performance is far from proven".

Moreover, the literature does not isolate the effect of legal and judicial efficiency on the pattern of financing. Empirical literature must still enrich itself with regard to identifying the specific impact of judicial efficiency on lenders willingness to increase the flow of credit to firms. A few known studies that provide evidence on within-country judicial efficiency and corporate financial decisions include Magri (2006), Jappelli, Pagano and Bianco (2005) and Pinheiro and Cabral (1999). These studies relate judicial efficiency to the overall level of credit in an economy. But no study exists that measures the impact of within-country judicial efficiency on capital structure of listed firms. The scanty empirical evidence warrants further investigation into the relationship of judicial efficiency and financing decisions. The objective of this dissertation is a step forward in this direction to fill the empirical gap by providing evidence on the efficiency of district high courts and its impact on the capital structure and debt-maturity structures of listed firms in Pakistan.

The motivation for this research comes from the observation of a large number of firms with negative equity figures, and yet a few cases of forced bankruptcies among Pakistani listed firms. The firms with negative equity figures are presumably in financial distress. Theoretically, the large number of firms in financial distress should have led to a higher incidence of forced bankruptcies. However, data from the Securities and Exchange Commission of Pakistan (SECP) show that cases of forced bankruptcies are negligible. The question is "why do creditors of the financially-distressed firms hesitate to go to court against these firms in Pakistan and force their liquidation through judicial process?" One explanation might be that the judicial system is inefficient and the court process is slow and costly in Pakistan. The empirical research shows support for this argument. For

example, Claessens, Djankovand Klapper (2003) used data of 1472 listed firms in five East Asian countries and found that judicial efficiency was an important determinant of whether creditors forced firms into liquidation or not. They argue that creditors use judicial system for firms' bankruptcies only when they know that the loan features and judicial process present good probability of recovery of the loan amount. A direct measure of judicial efficiency in one country relative to other countries is provided by the World Bank in its "Doing Business" report which is published annually to present various analytical accounts of a country's business environment such as how easy or difficult it is to start business in the country, to get credit, to enforce contracts and many other aspects of doing business. The "Doing Business 2010: Pakistan" ranks Pakistan 158 out of 183 countries for overall contract enforcement. The report shows that average number of days taken by courts in resolving commercial disputes is 978 days and cost is 23.8% of the claim. The comparative statistics in the report show that Pakistan is too low on the ranking scale when compared to good countries that have best practices.

Both the negligible number of forced bankruptcies and the World Bank report "Doing Business 2010: Pakistan" indicate that judicial efficiency is low across the board in Pakistan. But it is reasonable to expect that judicial efficiency will vary across different districts because of demand pressure and limited judicial resources in these districts. If judicial efficiency is low or high in different districts in Pakistan, has it anything to do with the pattern of financing of listed firms in these districts? Both theoretical and empirical research, as discussed in detail in Chapter 2, imply that content and enforcement of law have both direct and indirect impact on the financial structures of firms. With all of the above facts and assumptions, Pakistan is a good candidate for testing the impact of within-country judicial efficiency on various aspects of corporate financial decisions. Thus, this dissertation exploits the variation in judicial efficiency across different districts of Pakistan and relates these variations to corporate financial decisions. Specifically, this thesis quantifies the impact of judicial inefficiency on two aspects corporate financial decisions; leverage and debt-maturity.

1.2 Objectives of the Study

The general objective of this study is to take the discussion on the relationship of law and finance one step forward by providing empirical evidence on the impact of judicial efficiency on financing decisions of listed firms. Like highlighted in Section 1.1, the extant literature does not provide much evidence on the dynamics of contract enforcements and firms' financing decisions within a single country. This study will be a good step forward in fulfilling this empirical gap. The specific objectives of the study are:

- To quantify the effect of judicial efficiency on both leverage and debt-maturity decisions of listed firms in Pakistan
- To know the importance of firm-specific characteristics in financing decisions where the judicial efficiency is low
- To highlight the importance of efficient judicial system for the development of capital market in Pakistan

1.3 Contributions of the Study

This study contributes to the literature on several grounds as highlighted below:

- It is a first ever study to present direct as well as decomposition effect of within-country judicial efficiency on leverage ratios of listed firms. The composition effect is determined by interacting a within-country judicial efficiency measure with different quartiles of firms that are classified on the basis of their attributes. The decomposition analysis is helpful in knowing the degree to which worsening judicial efficiency impacts the leverage ratios of small and large firms, firms with more and little collateral, and firms with more and less volatile cash flows. Such an analysis can help in a better policy formulation.

- It is a first attempt to empirically study the determinants of debt-maturity structure of Pakistani firms. similarly, it is a first study in Pakistan and second study throughout the world to quantify the impact of within-country judicial efficiency

on debt-maturity structure of listed firms. Corporate debt-maturity structure is tilted more toward short-term financing in Pakistan. Anecdotal evidence suggests that the main reason for such a high short-term financing ratio is the under-developed nature of capital markets in Pakistan. This study provides first scientific evidence on the determinants of debt-maturity structure and explores the possibility that institutional features like the inefficient judicial system might be a deterring factors of maturity structure of corporate debt.

- The study highlights the importance of judicial efficiency for the development of capital market in Pakistan. The results of this study suggest that judicial efficiency is one of the significant determinants of both leverage and debt-maturity structure of listed firms in Pakistan. As a starting point, policy makers and stakeholders like the Security and Exchange Commission of Pakistan, all the three stock exchanges of Pakistan and the State Bank of Pakistan, need to realize that long-term debt market in Pakistan cannot be developed unless contract enforcement is made effective.

1.4 Limitations of the Study

The study suffers from the following limitations:

- Data for judicial districts was available only from 2001 to 2003. This made it compulsory to use time series average for the judicial statistics in order to match the judicial data with the panel data of firms from 2001 to 2006. Though it is expected that time series averages capture variations in judicial statistics, still time series averages reduced the number of data points in the judicial statistics.

- It is important to mention that the majority of firms (approximately 50% of the total sample) are headquartered in Karachi. Since the study matches the financial data of listed firms with district-wise judicial statistics, such a large number of firms concentrated in one district reduces variation in the data. To account for this bias in the data, this study followed the old classification of Karachi, in

which the city was classified into geographical sections such as Karachi East, Karachi West, Karachi South, and Karachi Central. One high court is located in each of these sub-districts. Using Karachi's old map and the addresses of the firms registered in Karachi, firms could be associated with Karachi East, Karachi West and Karachi Central. No firm could be traced with its head office in the Karachi South. Including these three sub-districts, a total of 27 districts were identified where listed firms have their head offices. Even after this exercise, variation in the data remains an issue.

1.5 Scheme of the Study

The structure of the dissertation is as follows: after introduction to the thesis in Chapter 1, theoretical framework and related literature are discussed in Chapter 2. Methodology, the choice of statistical models, and discussion on and definitions of variables are given in Chapter 3. Results and findings of both leverage and debt-maturity regressions are reported in Chapter 4. And Chapter 5 concludes the dissertation by(i) summarizing findings and (ii) discussing the implications of the results for capital market and overall economy.

CHAPTER 2

THEORETICAL FRAMEWORK AND RELATED LITERATURE

This chapter develops theoretical framework to relate judicial efficiency to financing decisions; namely the level of leverage and maturity structure of debt. In doing so, glimpses from existing conceptual and empirical research are taken and incorporated to form testable hypotheses. Since two aspects of the corporate financing decisions are analyzed in the presence of inefficient judicial system, each aspect is discussed separately in the coming paragraphs in association with judicial inefficiency.

2.1 Judicial Efficiency and Leverage

Legal protection to creditors and enforcement of the same by judicial system play a major role in credit contracts. Legal protection alone may not be sufficient to prevent parties to the credit contract from engaging in opportunistic behavior. As remarked by Galindo (2001, p.16)

> "…If institutions are inadequate it is likely that the benefits that the other parties have to gain from reneging on the debt contract can be pronounced enough to prevent the contract's realization. Hence, the ability of these institutions to align the players' incentives with the clauses of the debt contract can become an engine of promotion of financial breadth…"

Efficient judicial system reduces the chances of opportunistic behavior of borrowers. In an inefficient judicial system borrowers would face lower costs of default. When borrowers know that they can gain more by defaulting on the loan, they will choose to default even if they are solvent (Eaton and Gersovitz, 1981; Jappelli, Pagano and Bianco, 2005). In situation like this where borrowers have lower incentives to repay the loan, lenders will be very cautious and selective in making loans. As a result, the equilibrium amount of credit available in the credit market will be smaller. Bae and Goyal (2009) argue that an inefficient judicial system increases uncertainty about the repayment of loan by the borrower. As the credit risk increases, lenders will charge higher interest rates.

And in some cases lenders will ration borrowers instead of charging higher interest rates (Stiglitz and Weiss 1981). In either case, volume of lending is expected to decline.

Empirically, several studies have found a positive relationship between creditors' rights protection and lending volume, such as Gropp et al. (1997), Freixas (1991), and Fabbri and Padula (2004). Gropp et al. (1997) used U.S. cross-state data to determine the impact of personal bankruptcy laws in various U.S. states on lending to low-assets households; they found a positive relationship between creditor rights protection and lending volume. Freixas (1991) confirmed that in Europe both the cost and the duration of the judicial process to repossess collateral were negatively related to the size of lending to firms and house acquisitions.

Fabbri and Padula (2004) examined the relationship between judicial efficiency and the distribution of credit to households. They used data on Italian households and the performance of judicial districts the proxy for which was the backlog of trials pending in a given district. They found both statistically and economically significant findings that districts where judiciary is inefficient, credit availability to poor households declines but to wealthy households increases. The authors hint that this phenomenon might be due to the fact that poor legal system redistributes credit towards borrowers with more assets.
Several studies have used cross-country data to establish the relationship between law and finance. In two seminal papers, La Porta et al. (1997; 1998) empirically analyzed a large cross-section of data from forty-nine countries to show how the origin of the legal system, the protection available to investors and the efficiency of judicial system influence the development of credit markets and lending volumes. One important finding of their studies is that countries with more efficient judicial systems have wider capital markets and enjoy higher lending volumes.

Laevena and Giovann (2003) studied the effect of judicial efficiency on banks' lending spreads for a large cross section of countries. They used two different set of data to measure bank interest rate spreads. In one data set, they measured the interest rate spread in 106 countries at an aggregate level, and in another set they did the same for 32

countries at the level of individual banks. After controlling for a number of other country-specific features, the authors found that judicial efficiency, in addition to inflation, is the main driver of interest rate spreads across countries. The implication of their findings is that in addition to making the overall macroeconomic conditions better in a country, judicial reforms are vital to lowering the cost of finance for households and firms. Resultantly, a lower cost of credit will lead to an increased level of borrowing. Similarly on the relationship between interest rates and judicial efficiency, Meador (1982) and Jaffee (1985) found evidence that interest rates charged on mortgage were higher in U.S. states where the judicial process to repossess the collateral was lengthy and costly.

Following the above line of arguments and keeping everything else constant, it is expected that leverage ratios of firms will be higher in districts where courts are more efficient.

2.1.1Judicial efficiency and firm attributes

Ex-ante, lenders lend only to borrowers that have the ability to pay back the loan amount and the rate of interest on it. If complete information about the borrower and his investment project is available, lenders can easily distinguish between borrowers that have good credit risk and those that have bad credit risk. In such a case, the problem of an inefficient judicial system may not be severe since lenders themselves can reduce the chances of default by denying credit to borrowers with bad credit risk. However, the problem of asymmetric information does exist in the real world and is exacerbated by judicial inefficiency. When judicial efficiency worsens, lenders react more to asymmetric information problems as the cost of choosing an undesirable borrower increases with the inefficiency of the judicial system. Consequently, lenders would not lend to opaque and risky borrowers or borrowers with low-quality projects under an inefficient judicial system.

The literature suggests that certain firm attributes convey information about a firm and the quality of the projects that the firm undertakes. Size of the firm, returns volatility and collateral offered against a loan are such attributes that can serve as proxies for

information availability about the firm, the firm riskiness and the quality of its investment projects. The former suggests information availability about the firm and the latter two convey information about the riskiness of the firm and the quality of its investment projects.

The following firm attributes have widely been used in capital structure research. These features not only have direct impact on a firm's capital structure, but also their interaction with judicial efficiency can have additional effect on the firm's capital structure.

2.1.1.1 Firm size

The information asymmetry problem is severe with small firms, as they find it costly to produce and distribute information about themselves (Pettit and Singer, 1985). This is why small firms are considered more opaque than large firms. The inadequate supply of information creates problem for lenders to distinguish between high quality and low quality borrowers. This increases the risk of adverse selection. Under poor enforcement of lenders' right by judiciary, lenders will not be able to recover the full amount of their loan from low-quality borrowers. Consequently, borrowers could shy away from lending to small firms.

Moreover, a firm's size can be a proxy for the riskiness of the firm. Large firms are considered to be more diversified and have greater capacity for absorbing negative external shocks due to their significant resource base as compared to small firms (Titman and Wessels, 1988). The most commonly used term to refer to this phenomenon is "too big to fail" which suggests that large firms have a lower probability of falling into financial distress and bankruptcy, the opposite of which is true for small firms. Since poor judicial enforcement makes it difficult for lenders to recover their loan from firms in financial distress, lenders would either impose higher costs on lending to small firms or in some cases simply refuse credit to small firms.

Both of the above arguments about firm size imply that judicial efficiency will matter more for small firms. As the judicial efficiency worsens, credit flow to small firms declines.

2.1.1.2 Collateral

Collateral can solve several problems associated with information asymmetries. Coco (2000) discusses that collateral can solve various problems engendered by asymmetric information in credit contracts, such as issues related to project valuation, uncertainty about quality of the project, riskiness of the borrower, and moral hazards.

Chan and Kanatas (1985) argue that collateral can help lenders and borrowers who disagree about the value of the project due to information asymmetry. As collateral has a more stable value than a project whose cash flows will accrue in the future, lenders feel more confident lending against collateral than they would lending against an uncertain project.

Collateral can also solve problems related to riskiness of the project or the borrower. Opportunistic borrowers will not like to pledge valuable assets as collateral against loans, especially borrowers with risky projects. Studies like Bester (1985), Besanko and Thakor (1987), and Chan and Thakor (1987) show that the value of the collateral and average riskiness of the projects are inversely related; hence, valuable collateral suggests low project risk. By resolving this information asymmetry problem, collateral increases the efficiency of the credit market. Following a similar line of argument, Bester (1985;1987) argues that collateral reveals information about different borrowers and counteracts adverse selection problems. Also, when borrowers know that their misbehavior can result in loss of the valuable collateral, they will preferably not engage in moral hazard activities (Barro, 1976).

In all of the above arguments, collateral either eliminates or at least mitigates problems related to information asymmetries, hence it can be expected that judicial inefficiency would not affect all borrowers alike. Borrowers with valuable collaterals would not face

severe information asymmetry problems and would less be affected as judicial efficiency worsens.

Contrary to the above prediction about collateral, judicial efficiency and leverage, as discussed in Galindo (2001), collateral may lose its significance if lenders feel that they cannot recover it through judicial process. However, Magri (2006) argues that incase of bankruptcy of the borrowers, lenders will face smaller losses if the borrowers have more tangible assets because these assets can serve as collateral. Since growth options become worthless when the borrower faces bankruptcy and only the value of tangible assets can be realized in the market, creditors will prefer to lend to borrowers with more tangible assets. It will be interesting to know which of the above competing arguments stand up in the empirical investigation of judicial efficiency and leverage used by listed firms in Pakistan.

Mixed empirical evidence exists on the relationship of tangible assets and leverage when the former is interacted with a proxy for efficiency of legal system or its judiciary. Fan, Titman, and Twite (2008) use two proxies for tangibility of assets and interact them with an index of corruption which measures how inefficient a legal system of given country is in protecting investors' rights. Their first proxy for tangibility, measured by market-to-book ratio, has significant influence on capital structure of firms in more corrupt countries and weaker legal systems. However, their second proxy, measured by total tangible assets to total assets, is not statistically significant.

An indication of the fact that inefficient judicial system will redistribute credit towards borrowers with more assets is found in the empirical results of Fabbri and Padula (2004). They found that districts where judiciary is inefficient, credit availability to poor households declines but to wealthy households increases. Their results purport that it might be due to the fact that poor legal system redistributes credit towards borrowers with more assets.

2.1.1.3 Earnings volatility

Earnings volatility emanates from business risk in the operations of a firm or from poor management practices. In either case earnings volatility is proxy for the probability of financial distress. All else constant, Bradley, Jarrell, and Kim (1984) argue that firms with more volatile cash flows should have lower leverage. Combined with an inefficient judicial system, earning volatility should decrease the amount of leverage further.

2.1.1.4 Profitability

Myers (1984) argues that firms prefer internally generated funds to external funds and debt finance to equity finance. He calls this preference of firms as pecking order. This is because of asymmetric information; the cost of external funds is higher than internal funds and the cost of raising equity is higher than the cost of debt. Profitable firms are, thus, expected to have lower percentage of debt-financing. A negative relation is also expected between profitability and leverage from the view of double taxation. Auerbach (1979) says that firms have incentives to retain earnings to avoid dividend taxes.

Since information asymmetry is more of an issue where judicial efficiency is poor (Magri, 2006), it is expected that firms will find it difficult to raise external finance and will distribute less profit where courts are inefficient.

Empirically, two studies have found evidence to support the above arguments. The first study by Fan et al. (2008) uses both aggregate and firm level data from 39 countries to examine the influence of institutions on leverage and debt-maturity. Fan et al. (2008) use corruption index as a proxy for efficiency of justice and find that in legal systems that protect investors more, profitability has less of an influence on leverage. The second study by La Porta et al. (2000) reports that firms in civil law countries, where legal protection to investors is higher, pay higher percentage of dividends.

2.1.1.5 Growth

Jensen and Meckling (1976) argue that agency costs of debt are higher for growing firms as mangers in these firms have the incentive to invest sub-optimally and expropriate wealth from bondholders to shareholders. As growing firms have more options to invest in risky projects, lenders fear that such firms may create moral hazards for them. As a result, lenders will either hesitate to lend to growing firms or charge higher interest on lending to growing firms.

Titman and Wessels (1988) also predict inverse relationship between growth opportunities and leverage, but from different angle. They note that since growth opportunities cannot be offered as collateral and do not generate current income, firms that have more capital assets in form of growth opportunities are expected to have lower leverage ratio.

Myers (1977) developed a model of determinants of capital structure wherein he treated growth opportunities as call options. Myers (1977) suggests that growth opportunities are discretionary; hence they should not be financed with costly leverage. On the other hand, fixed assets are sunk costs and they can best be financed with leverage.

In support of the above arguments, several empirical studies found a negative relationship between growth opportunities and firms' leverage ratios. These studies include Titman and Wessels (1988), Barclay and Smith (1995) and Rajan and Zingales (1995).

The future growth opportunities under the framework of Myers (1977) and Jensen and Meckling (1976) can best be proxied by the ratio of market-to-book value of a firm. However, there is an alternative proxy which tracks the annual percentage increase in total assets. The latter is a more stable measure in case of Pakistan because the Karachi Stock Exchange experienced abnormal growth from 2002 and onwards. This overall increase in market values of firms was not necessarily a reflection of their growth opportunities.

Since growth opportunities have lower values as collateral against loans and that they are regarded as proxy for agency costs, it is expected that leverage ratios of growing firms will be lower.

2.1.1.6 Non-Debt Tax Shields (NDTS)

DeAngelo and Mausulis (1980) showed in a theoretical model that depreciation expense, depletion allowance, and investment tax credits serve as substitutes to debt tax shields and lower the firm's optimal debt level. If their model holds, then the observed differences in the debt ratios of different industries can be attributed to some extent to the level of NDTS that each industry bears. To test this hypothesis, Bowen et al. (1982) used cross-sectional industries data and found that the existence of NDTS significantly lowered the debt ratios at industry level.

However, Boquist and Moore (1984) did not find any evidence that supported the NDTS hypothesis. To test the hypothesis they used firm-level data and used a measure of leverage that included only long-term liabilities. The reason for getting different results against the previous studies was due to the use of a different proxy for leverage and the use firm-level data instead of industry-level data.

2.2 Judicial Efficiency And Debt-Maturity

Broadly there are two theories about the determinants of maturity of credit in a financial system. These two theories are related to the power of creditors and information availability. The pioneers and proponents of the first theory are Townsend (1979), Aghion and Bolton (1992), and Hart and Moore (1999). The power theory of creditors postulate that if creditors are powerful, can enforce contracts through judicial system at lower cost and in a short time, get hold of the collateral, or get control of the firm, they will be more willing to increase volume and maturity of loans. The information theory emphasizes on the importance of availability of information about the borrower in the lending decisions. It suggests that lenders will not be too much worried about adverse

selection problems if adequate information is available. The second theory was developed by Jaffee and Russell (1976) and Stiglitz and Weiss (1981).

Inefficient judicial system lowers the probability of loan's recovery from opportunistic borrowers or those borrowers who are in financial distress. This probability sinks further low when the loan has a long maturity. In case of short-term loans, lenders can monitor and review the behavior and financial health of the borrowers at frequent intervals and may refuse to renew the loan upon maturity if the need arises. This ability of the short-term lenders reduces the need of using judicial system for loan recovery. In contrast, lender of long-term loans will have to wait until the maturity of the loan i.e. cannot call back the loan before maturity even if he knows that the financial health of the borrower is deteriorating with the passage of time. This means that lenders of long-term loans cannot employ the early preventive measures of defaults like the lenders of short-term loans do. Rather long-term lenders will have to resort to a court of law if the borrower defaults at the time of maturity. Resultantly, the law protecting the rights of the lenders and the judicial system enforcing the loan contracts will be one of the major determinants of long-term financing. Based on the above arguments, it is hypothesized that the maturity of a firm's debts is positively correlated with efficiency of justice.

In the presence of inefficient judicial system that makes the enforcement of contracts difficult or costly, lenders will prefer to issue short-term debt than long-term debt. Short-term debt leaves borrowers with little opportunity to indulge in activities that can create moral hazards for creditors (Diamond 1991, 1993; Rajan 1992). Specifically, when the maturity of debt is short, borrowers have limited time for opportunistic behavior. If they violate the terms and conditions of the loan contract, creditors will review their behavior upon maturity of the loan, and if necessary, may deny renewal of the credit. Such frequent monitoring lowers the probability of greater losses, which is not possible in long-term loans because in long-term loans the borrowers have sufficiently long period during which their opportunistic behavior may increase the probability of default to a greater extent. In light of the above, the first hypothesis to be tested is that short-term financing ratio will be higher where judicial efficiency is low.

Second hypothesis that is being tested in view of the above discussion is that the straight-forward relationship between judicial efficiency and debt-maturity as portrayed above can be moderated or strengthened by several firm-specific variables such as firm size and the ratio of fixed assets-to-total assets. The second hypothesis is based on the information asymmetry problems and the fact that some firm-specific features are additional guarantees that a firm will not default on its loan. Since lending to undesirable borrowers is more costly in an inefficient judicial system, information availability about borrowers is crucial in lending decisions where judicial efficiency is low. When lenders cannot effectively distinguish between desirable and undesirable borrowers due to asymmetric information, lenders rely on some firm characteristics to derive information about the borrowers. Specifically, firm size and availability of collateral can eliminate or mitigate problems engendered by asymmetric information (Magri, 2006).

The above two hypotheses suggest that debt-maturity of a firm depends not only on the institutional settings around the firm, but also on the firm specific characteristics and the interaction between firm-specific and institutional features.

2.2.1. Judicial efficiency, firm-specific variables and debt-maturity

Besides the above direct relationship between debt-maturity and judicial efficiency, several firm-specific attributes determine the maturity structure of a firm's debt. At the same time, these attributes serve as intervening variables to change the role played by judicial efficiency in debt-maturity structure. For firm specific variables, there are four major theories that try to explain the maturity-structure of a firm's debts. These theories are the agency theory, the maturity-matching theory, the signaling and liquidity risk theory, and the tax advantage theory. The proxies suggested by these theories and philosophical arguments in support of these proxies are discussed next.

2.2.1.1 Firm size

The agency model suggests that smaller firms have higher agency costs because the potential conflict of risk shifting and claim dilution between shareholder and bondholders

is more severe in these firms (Smith and Warner, 1979). This agency cost can be controlled with short-term debt (Barnea et al., 1980). Moreover, the information asymmetry problem is severe with small firms, as they find it costly to produce and distribute information about themselves (Pettit and Singer, 1985). Because of information asymmetry, their access to capital market for long-term debt remains limited. The large fixed cost of flotation of fixed securities relative to the small size of the firm is another impediment that stops small firms from approaching the capital market (Easterwood and Kadapakkam, 1994). Titman and Wessels (1988) also argue that larger firms have easier access to the capital market.

2.2.1.2 Firm size and judicial efficiency

In the presence of asymmetric information problems, lenders are usually more exposed to adverse selection problems. The expected costs of adverse selection are high when judicial efficiency is low. The information asymmetry problem is severe with small firms, as they find it costly to produce and distribute information about themselves (Pettit and Singer, 1985). Thus small firms are considered more opaque than large firms. Ultimately, lenders will hesitate to advance long-term loans to small firms.

Moreover, Titman and Wessels (1988) argue that large firms can withstand large negative external shocks because they are more diversified and have large capital base. This is why the expected probability of financial distress of large firms is lower than the small firms. Recovering loan from a financially-distressed firm requires the involvement of judiciary. If judicial process is costly or inefficient, long-term loans to small firms will not be easily available.

Both of the above arguments about firm size suggest that judicial efficiency could impact small firms more. Where judicial efficiency is low, small firms will have more short-term loans on their balance sheets.

There is some empirical evidence to support the above arguments. Demirguc-Kunt and Maksimovic (1999) studied empirically the maturity of firms' liabilities in thirty developed and developing countries over the period 1980-1991. They showed that only large firms had higher long-term external financing to total assets in countries where judicial efficiency was higher. They found that the effect was also economically very significant. For example, the size of the coefficient suggested that the marginal effect of the difference between a very efficient legal system and an inefficient one was to increase the ratio of large firms' long-term assets to total assets by 0.25.

2.2.1.3 Assets maturity, collateral and judicial efficiency

Myers (1977) suggests that solution to the well-known under-investment problem of agency theory is to match the maturity of a firm's debt to that of its assets. The maturity matching makes it sure that payments of loan are scheduled to correspond with the decline in the value of assets in place. It suggests that current assets should be financed with short-term debt and long-term assets with long-term debt. Stohs and Mauer (1996) also suggest maturity matching but give a different explanation. They say that when a firm has longer maturity of assets than that of its debt, the cash flow from its assets will not be sufficient to meet the debt obligation. Demirguc-Kunt and Maksimovic (1999) add another aspect of asset maturity in relation to debt maturity. They suggest that fixed assets facilitate borrowing by serving as collateral. The above arguments suggest that a positive relationship is expected between the ratio of fixed-assets-to-total-assets and the maturity structure of debt.

2.2.1.4 Collateral and judicial efficiency

As argued in the preceding section 2.1.1.2, collateral solves many asymmetric information problems in credit contracts, such as issues related to project valuation, uncertainty about quality of the project, riskiness of the borrower, and moral hazards. As collateral mitigates the severity of these issues, the impact of judicial inefficiency could

not be the same on the debt-maturity of firms that have more fixed assets to offer as collateral for the loan as compared to firms that have few fixed assets.

2.2.1.5 Growth opportunities

Myers (1977) says that a firm may pass up some profitable investment opportunities in the presence of risky debt. This is known as an under-investment problem. But if the maturity of debt is short, such problems will not arise as the firm will pay the debt before the growth option expires. This suggests that firms with greater growth opportunities could have more short-term debt. Consistent with the above, Barclay and Smith (1995), Guedes and Opler (1996), Barclay, Marx, and Smith (2003) and Varouj, Ying, and Jiaping (2005)all find a negative relationship between growth opportunities and corporate debt maturity.

To measure growth, either market-value or book-value based approach can be used. Though many research studies on debt maturity structure use market-to-book ratio, the study uses the proxy of annual percentage increase in total assets for growth. The reason for this is that the data comes from the years 2001 to 2006. The Karachi Stock Exchange experienced a boom in 2002 and onward where share prices for a majority of companies increased dramatically. If we use market-value based proxy it will unnecessarily indicate that the listed companies experienced abnormal growth in 2002 and onward. In comparison, the book-value approach provides a consistent measure of growth. Under book-value approach, growth opportunities are denoted by the variable $GROWTH_i$, which is a time series mean of annual percentage increases in the total assets of a firm. The time series mean of annual percentage increases in the assets of firm i is calculated to smooth the year-to-year extreme variations. This is why the variable $GROWTH_i$ changes in cross-sections but remains constant over time for firm i.

2.2.1.6 Firm quality

The signaling model suggests that firms generate signals to the outside world about their credit quality or their cash flows when they use a specific type of financing option.

Flannery (1986) says debt-maturity can reduce the costs of information asymmetry between firm managers and investors. He shows that if bond market investors cannot distinguish between good and bad firms, good firms will consider their long-term debt to be under-priced and will, therefore, issue short-term debt. Conversely in the same circumstances, bad firms will sell over-priced bonds. Flannery (1986) further argues that debt maturity serves as a signaling device. Short-term financing subjects a firm to more frequent monitoring; hence higher-quality firms will be more willing than lower-quality firms to use short-term debt. Highlighting the relevance of transaction costs of debt, Mitchell (1991) argues that lower-quality firms have to prefer longer term debt since they cannot mimic the behavior of high-quality firm because of the high transaction costs of rolling over short-term debt. Furthermore, financially strong firms can use more of short-term debt as they are less affected by refinancing and the interest risk of short-term debt (Jun and Jen, 2003).

Guedes and Opler (1996) find empirical support for the above argument and report that financially strong firms issue more short-term nonconvertible debt than firms with speculative grade ratings. Goswami et al. (1995) adds another aspect of temporal distribution of information asymmetry. They say that a firm issues long-term debt when information asymmetry is related to uncertainty of long-term cash flows. However, firm will issue short-term debt when informational asymmetry is randomly distributed across short and long-term debt. Following Barclay and Smith (1995), the proxy of abnormal future earning is used for a firm's quality in this study. It is assumed that a higher-quality firm will have positive future abnormal profit and vice versa. Abnormal profit can be defined as the difference between the earnings at t +1 and t, divided by the earnings in year t. Since year to year fluctuations in percentage terms may be arbitrary and confusing for the debt-maturity regressions, this is why a firm's quality is proxied by a variable $QUALITY_i$ which takes the value of 1 if a firm has positive abnormal profit in most of the sampled years, otherwise 0.

2.3 Testable Hypotheses

In view of the above theoretical framework and empirical evidences, the following set of testable hypotheses is developed where only the alternative hypotheses are listed. The null hypotheses can be derived in usual manner where no relationship is expected between the explained and the explanatory variables.

2.3.1 Testable hypotheses for leverage ratios

H_1 Listed firms have lower leverage ratios in districts where judicial efficiency is low

H_2 Judicial inefficiency reduces the leverage ratios of small firms more than leverage ratios large firms

H_3 In districts where judicial efficiency is low, firms with little collaterals have lower leverage ratios than firms with more collateral

H_4 Growing firms have lower leverage ratios in districts where judicial efficiency is low than non-growing firms

H_5 Judicial inefficiency has greater negative impact on the leverage ratios of firms with more volatile cash flows than on leverage ratios of firms with stable cash flows

H_6 In the presence of judicial inefficiency, more profitable firms will have lower leverage ratios than less profitable firms

H_7 Leverage ratio increases with the size of the firm

H_8 Firms with more collaterals have higher leverage ratios

H_9 Leverage ratio decreases with the profitability of the firm

H_{10} Growth opportunities decreases leverage ratio

H_{11} Leverage ratio is negatively associated with volatility of firm's cash flows

2.3.2 Testable hypotheses for debt-maturity ratios

The following set of testable hypotheses is developed for debt-maturity ratios of listed firms.

H_{12} Short-term financing ratio is higher in districts where judicial efficiency is low

H_{13} In districts where judicial efficiency is low, small firms have higher short-term financing ratios than large firms

H_{14} In districts where judicial efficiency is low, firms with little collaterals have higher short-term financing ratios than firms with more collateral

H_{15} Growing firms have higher short-term financing ratio than non-growing firms in districts where judicial efficiency is low

H_{16} Judicial inefficiency has greater negative impact on the debt-maturity ratios of firms with more volatile cash flows than on debt-maturity ratios of firms with stable cash flows

H_{17} Debt-maturity ratio increases with the size of the firm

H_{18} Firms with more collaterals have higher debt-maturity ratios

H_{19} Growth opportunities decreases debt-maturity ratio

H_{20} debt-maturity ratios is negatively associated with volatility of firm's cash flows

CHAPTER 3

METHODOLOGY

This section discusses the sample framework, sources of data, measurement of explained and explanatory variables, and statistical models.

3.1 The Sample Framework and Data Sources

The sample of years for judicial statistics is primarily determined by the availability of data on judicial districts. The four provincial High courts resumed the publication of their annual reports in the year 2001, while this practice was discontinued for several years. At most, annual reports of the High courts could be obtained up to the year 2003. Hence in this study, the sample period for judicial statistics is from 2001 to 2003. Judicial districts to be included in the sample were determined by location of the head offices of the listed firms. Out of a total of 104 judicial districts, the listed firms were found to be concentrated in 27 districts. Expecting that judicial efficiency remains somehow constant in short period of time in a given district, a time series average of judicial efficiency ratio for each district was calculated based on its three years of judicial efficiency ratios.

The source for the financial data of listed firms is "Balance Sheet Analysis of Stock Exchange Listed Firms" a publication of the State Bank of Pakistan (SBP). The latest data published by SBP is up to 2006. To synchronize the financial data of firms with judicial statistics, the starting year of firms' data was taken to be the year 2000. As it will be discussed in the coming paragraphs, the variables *GROWTH* and *VOL* needed to be calculated from the average of yearly change in total assets and profitability-to-total assets respectively, the year 2000 was taken as a base year for these calculations and was dropped in all other calculations. Resultantly, the financial data for listed firms come from the years 2001 to 2006.

For the sample of firms to be included in the analysis, the study initially planned to include all listed firms. However, firms in financial industries were dropped as their capital structures and debt-maturity structures are totally different from non-financial firms. Also, to remove outliers, the study dropped all firm-year observations that were below 1 percentile or above 99 percentile. The study also removed firms that were presumably in financial distress as denoted by their negative equity figures. Specifically, firms were excluded that had the ratio of total-debt-to-total-assets above 0.95. Finally an unbalanced panel of 370 firms with 1976 firm-year observations could be saved.

3.2 Measurement of Variables

3.2.1 The measure of leverage

The basic notion of leverage implies long-term debt. Short-term debt is often provided to firms by their suppliers for convenience, not as a source of financing. The commonly used term for such type of debt is spontaneous financing that does not involve active decision making of the financial manager with regard to the firm's optimal debt-equity ratio. Earlier studies like Ferri and Jones (1979), Marsh (1982), Castanias (1983), Bradley et al. (1984) and Kim and Sorensen (1986) used only long-term debt as a proxy for leverage with the exception of Titman and Wessels (1988) who also included short-term debt as a proxy for leverage.

However, most of the studies on comparisons and determinants of capital structure using cross-countries data employ a proxy for leverage that includes both short-term and long-term debt e.g. (Rajan and Zingales 1995;Booth, Aivazian, and Demirguc-Kunt, 2001; and Fan et al. 2008). One reason why these studies include short-term debt in leverage ratio might be, as found by Booth et al. (2001), that firms in developing economies mostly rely on bank financing which is usually short-term in nature. Given that, all of the short-term debt cannot be regarded as spontaneous financing especially in developing economies. Since Pakistan is a developing economy where banks remain the major financiers of the corporate sector, short-term financing cannot be ignored in the capital structure research. The measures of leverage used in this study are motivated by these considerations. The

first proxy for leverage (*LEV1*) is the ratio of long-term debt to total assets whereas the second proxy (*LEV2*) is the ratio of long-term debt plus short-term debt to total assets. A third measured used in many empirical studies is a measure of leverage based on the market value instead of book value of equity. The study cannot use this measure due to the bias in the market values of equity in the sample period. The Karachi Stock Exchange experienced several-folds rise from the year 2002 and onwards. If the study uses market-based measure of leverage instead of a measure based on the book values, the persistent yearly increase in share prices would show inflated values of equity which in turn would lower the ratio of debt-to-equity each year, which would increase the chances of heteroscedasticity. On the other hand, measures of leverage based on book values are free from such abrupt fluctuations.

3.2.2 The measure of debt-maturity

Empirically, different proxies have been used for debt-maturity. For example, some studies have used the ratio of debt maturing in more than one year and five years to total debt e.g. Ozkan (2000). Others have used the ratio of debt maturing in more than 3 years to total debt (Barclay and Smith 1995; Varouj, et al., 2005). Given the structure of available data, this study can use only the ratio of debt maturing in more than one year to total debt because the State of Bank of Pakistan's publication '*Balance Sheet Analysis of Joint Stock Companies Listed on the Karachi Stock Exchange*' does not provide data on different maturities of debt. Thus the debt-maturity is the ratio of debt maturing in more than one year to total debt.

3.2.3 The measure of judicial efficiency

To measure judicial efficiency, previous studies have used mainly three types of proxies. In most of the cross-country studies that looked into the relationship of efficiency of justice and finance, (e.g. Modigliani and Perotti,1997; La Porta et al., 1998; Kumar et al. 1999; Giannetti 2001; Giannetti 2003), the authors have used a subjective index either prepared by the authors themselves or by some international organization like the Business International Corporations (BIC).

In studies where judicial efficiency is measured within a single country, more objective measures of judicial efficiency have been used. For example, Fabbri and Padula (2004), Fabbri (2002) and Jappelli et al. (2005) used either a ratio of pending cases to number of disposed-off cases or the ratio of pending cases to number of cases instituted in a one year. A similar proxy of judicial efficiency used by some studies is the ratio of pending cases per 1000 persons in a given district/province (Jappelli et al.,2005). And a third proxy is the average time taken by the district/provincial court from the point of institution of cases up to the point of disposal of the same (Magri, 2006).

Options available to this study do not allow the use of the first proxy because judicial efficiency index like the one prepared by Business International Corporations is not available / suitable for districts in Pakistan. The study cannot use the third proxy as well because data on average time taken in deciding a case by a high court at district level is also not available. Given these constraints, the study can only use the proxy of judicial efficiency where pending cases are normalized by some base figure like number of cases disposed off in a year, number of cases instituted in a year, or population of the given district. This study uses the following measure of judicial efficiency:

$$JE1 = \frac{\text{Number of cases pending in a given district at the end of the year}}{\text{Number of cases initiated during that year}}$$

Other possible proxies for judicial efficiency may include:

$$JE2 = \frac{\text{Number of cases pending in a given district at the end of a year}}{\text{Number of cases disposed-off during that year}}$$

$$JE3 = \frac{\text{Number of cases pending in a given district at the end of the year}}{\text{Population of the district measured in thousands}}$$

$$JE4 = \frac{\text{Number of cases pending in banking court (where such courts are present)}}{\text{Population of the district measured in thousands}}$$

Efficiency of the high court is expected to be lower if we get a higher value for *JE* because greater number of pending cases in relation to number of cases disposed-off, would indicate that the given high court is either slow in deciding cases or unable to meet the demand placed on it in comparison to other district high courts.

As discussed above, another useful proxy of the efficiency of justice can be median time analysis which measures the average time taken by a district high court in solving a case from the point of institution of the case to the point of final decision. However, availability of data in Pakistan on the length of trials is the main constraint in the way of conducting such an analysis. Fortunately, research studies report that proxies of judicial efficiencies based on pending cases and median time are well correlated. For example, using data on 27 Italian districts, Jappelli et al. (2005) report that measures like *JE1* or *JE2* have a correlation of 0.6 with a measure of judicial efficiency based on median time taken by a court in deciding a case.

As mentioned above, the study uses the ratio of pending cases at the end of the year to cases initiated during a year. For simplicity, the *JE1* is simply represented by *JE* in the rest of the thesis. This measure is well correlated with the other measures of judicial efficiency, which indicates that any of these measures can be used to proxy for the efficacy of justice in Pakistan.

3.2.4 Measures of variables

The following table presents list, measurement, and hypothesized signs of the explanatory and explained variables and the interaction terms in light of the discussion in the theoretical framework and literature review Section 2.1.1. These proxies have been widely used in capital structure research.

Table 3.1: Names and Measurements of the Variables

Name of Variable	Denoted by	Measured by
Leverage 1	*LEV1*	Ratio of long-term liabilities to total assets
Leverage 2	*LEV2*	Ratio of total liabilities to total assets
Debt-maturity	*DEMA*	Ratio of long-term liabilities to total liabilities
SIZE	*SIZE*	Natural log of total assets
Profitability	*PROF*	Net income / total assets
Tangibility	*TANG*	Net fixed assets / total assets
Growth1	*GROWTH*	Average of annual percentage change in total assets
Growth2	*MVBV*	Market value per share/ book value per share
Volatility	*VOL*	Coefficient of variation of PROF
Dividends	*DIV*	Amount of dividends / net income
NDTS	NDTS	Depreciation for the year / total assets
Jud. Efficiency	*JE*	Ratio of pending cases at year's end to disposed-off cases during the year
QUALITY	*QUALITY*	Equals 1 if abnormal profit is positive in majority of years, otherwise zero
S1×JE		S1 is equal to 1 if affirm is in the 1st quartile of *SIZE*, otherwise 0
S2×JE		S2 is equal to 1 if affirm is between the 1st and the 2nd quartile of *SIZE*, otherwise 0
S4×JE		S4 is equal to 1 if a firm is above the 3rd quartile of *SIZE*, otherwise 0
T1×JE		T1 is equal to 1 if affirm is in the 1st quartile of *TANG*, otherwise 0
T2×JE		T2 is equal to 1 if affirm is between the 1st and the 2nd quartile of *TANG*, otherwise 0
T4×JE		T4 is equal to 1 if a firm is above the 3rd quartile of *TANG*, otherwise 0
P1×JE		P1 is equal to 1 if *PROF* is equal to or below the 1st quartile, otherwise 0
P2×JE		P2 is equal to 1 if *PROF* is between the 1st and the 2nd quartile, otherwise 0
P4×JE		P4 is equal to 1 if *PROF* is above the 3rd quartile, otherwise 0
G1×JE		G1 is equal to 1 if *MVBV* is equal to or below the 1st quartile, otherwise 0
G2×JE		G2 is equal to 1 if *MVBV* is between the 1st and the 2nd quartile, otherwise 0
G4×JE		G4 is equal to 1 if *MVBV* is above the 3rd quartile, otherwise 0
D1×JE		D1 is equal to 1 if *DIV* is equal to or below the 1st quartile, otherwise 0
Quality×JE		Quality Equals 1 if abnormal profit is positive in majority of years, otherwise zero
SIZE×JED		JED is equal to 1 if *JE1* is above the 50th percentile, otherwise 0
TANG×JED		JED is equal to 1 if *JE1* is above the 50th percentile, otherwise 0
PROF×JED		JED is equal to 1 if *JE1* is above the 50th percentile, otherwise 0
VOL×JED		JED is equal to 1 if *JE1* is above the 50th percentile, otherwise 0

3.3 Specification of the Models

This study uses a panel data framework to analyze the relationship between proxies for firms' financial decisions and a set of explanatory variables including judicial efficiency. Panel data has several distinct advantages over simple cross-sectional or time series data as discussed by Hsiao (1986). For example, panel data allows us to account for unobserved heterogeneity and provides us large data points that results in more degrees of freedom and lower collinearity among explanatory variables. The basic form of the regression equation is as follows:

$$y_{it} = \beta x_{it}^{'} + \alpha z_i + \varepsilon_{it} \qquad (5.1)$$

Where i ranges from 1,2,3,4,…N and t ranges from 1,2,3,4,…T, hence y_{it} is the leverage or debt-maturity ratio of firm i at time t. $x_{it}^{'}$ represents various explanatory variables. $\alpha z_i^{'}$ is individual effect and $z_i^{'}$ denotes a constant term and captures all observable and unobservable variables. If $z_i^{'}$ is constant across all cross-sectional units (i.e the cross-sectional units do not differ among themselves with respect to leverage decisions and/or the constraints they face), then the pooled ordinary least squares(OLS) is a better option to use as OLS will provide consistent and efficient estimates of the coefficients of the explanatory variables under such assumptions.

However, it is reasonable to expect that there will be systematic differences in the leverage ratios of different firms because of industry effects, managers' risk preferences, and/or different incentive structures available to some firms like government subsidized loans (e.g. export refinance scheme of the State Bank of Pakistan that is available only to exporters). If these unobservable effects are not isolated, they will inflate the error term of regression like it happens in the case of omitted variables. To deal with such problems, panel data offers to use either fixed effects or random effects models.

The fixed effects model can be specified in the following form:

$$y_{it} = \beta x_{it} + a_i + \varepsilon_{it} \quad (5.2)$$

Where $\alpha_i = \alpha z'_i$ and captures the firms' fixed effects that are constant over time but varies across cross-sectional units. Fixed-effects model is costly as it loses too many degrees of freedom due to the construction of dummy variables. Random effects models give efficient estimates if it can be assumed that the individual effects are not correlated with the included explanatory variables. Greene (2006) suggests that such a model under a panel data framework may be formulated as under:

$$y_{it} = \beta x_{it} + [az'_i] + \{az'_i - E[az'_i]\} + \varepsilon_{it} \quad (5.3)$$

This could be simplified to the form

$$y_{it} = \beta x'_{it} + a + u_i + \varepsilon_{it} \quad (5.4)$$

The above random effect formulation considers the u_i to be group specific random element.

To choose between fixed-effects model and random-effects model in an objective manner, Hausman (1978) suggested a test which has a null hypothesis that fixed effects and random effects estimators do not differ systematically. If the null hypothesis is rejected, then the fixed effects model is the best one.

Using the above panel data framework, the study estimates two types of regression equations. In a restricted model, first it is assumed that the influence of judicial efficiency is uniform on all firms. And then in a less restricted model, the study allows for the possibility that judicial efficiency has differential impact on the leverage decisions of firms that are classified in quartiles on basis of their selected attributes. To avoid the problem of simultaneity, all such explanatory variables are lagged one period back excluding *VOL* and *GROWTH*.

Since this study tests mainly two hypotheses, the panel data models are first estimated without including the interaction terms between explanatory variables and *JE* (Baseline estimation). Then for testing the effect of interactions between explanatory variables and *JE* on leverage and debt-maturity ratios, differential panel data models are estimated by including interaction terms between *JE* and the explanatory variables (Differential regressions).

3.3.1 Baseline Estimation

Under the assumption that judicial efficiency has uniform effect on all firms, following restricted model is specified for the leverage regressions.

$$Y_{it} = a + \beta_1 SIZE_{i,t-1} + \beta_2 TANG_{i,t-1} + \beta_3 PROF_{i,t-1} + \beta_4 MVBV_{i,t-1} + \beta_5 VOL_i + \beta_6 NDTS_{i,t-1} + \beta_7 DVD_{i,t-1} + \beta_8 JE_i + \eta_{1-5} YRS_i + \lambda_{1-27} IND_i + \varepsilon_{it} \quad (2.5),$$

For the debt-maturity regression, the following model is estimated.

$$Y_{it} = a + \beta_1 SIZE_{i,t-1} + \beta_2 TANG_{i,t-1} + \beta_3 GRWOTH_{i,} + \beta_4 VOL_i + \beta_5 QUALITY + \beta_6 JE_i + \eta_{1-5} YRS_i + \lambda_{1-27} IND_i + \varepsilon_{it} \quad (2.6),$$

Where Y_{it} is the leverage/debt-maturity ratio for firm i at time t and *SIZE*, *TANG*, *PROF*, *MVBV*, *NDTS*, and *DIV* are explanatory variables that have been lagged one period whereas *VOL* remains constant throughout the sample period for a given firm and hence does not need to be lagged. *QUALITY* is a dummy variable that takes the value of 1 if a firm has positive changes in its net income in most of the years; otherwise it takes the value of 0. *JE* is the measure of judicial efficiency. *YRS* are five dummy variables for years with one reference category to capture aggregate shocks that affect all firms alike and hence remain constant across firms but vary across time. *IND* represents dummy variables for each industry. There are twenty-eight industries in the sample. List of these industries is given in Table 4.4. All of these dummy variables are tested for their joint significance in each regression model.

3.3.2 Differential Impact of Judicial Efficiency

In the less restricted model, it is assumed that the relationship between judicial efficiency and leverage/debt-maturity is not linear for all firms as discussed in detail in the theoretical framework section. To check this possibility, this study introduces interaction terms between the measures of judicial efficiency and dummy variables that are based on the quartiles of selected explanatory variables. For an explanatory variable, three dummy variables and one referent category are defined. Against the referent category the other variables are compared. For example, if we specify *S3* as the 3rd quartile of the variable *SIZE* to be the referent category, the other three dummy variables *S1, S2, S4* corresponding to 1st , 2nd and 4th quartiles of the variable *SIZE* are defined as follows:

$$S1 = \begin{cases} 1 \text{ if SIZE value is in the 1st quartile} \\ 0 \text{ otherwise} \end{cases}$$

$$S2 = \begin{cases} 1 \text{ if SIZE value is in the 2nd quartile} \\ 0 \text{ otherwise} \end{cases}$$

.

$$S4 = \begin{cases} 1 \text{ if SIZE value is in the 4th quartile} \\ 0 \text{ otherwise} \end{cases}$$

These definitions yield the following values for each of the *SIZE* quartiles:

Quartile of *SIZE*	S1	S2	S4
1	1	0	0
2	0	1	0
3	0	0	0
4	0	0	1

The definitions and symbols of the dummy variables for the quartiles of other explanatory variables are given in Table 3.1. To avoid the problem of multicollinearity, interaction terms for all variables are not included in one regression model. Rather separate regressions are run to include interaction terms between a single explanatory

variable and the *JE*. Each regression model is estimated twice this way; one for fixed effects and the other for random effects. All specifications include full set of dummy variables for years and industries.

To test the differential effect of judicial efficiency on the leverage and debt-maturity decisions of firms that are classified into quartiles on the basis of their selected attributes, the study includes three interaction terms between the dummy variables based on quartiles of the selected variables and the measure of judicial efficiency. The missing variable, which is a reference category, is represented by the variable *JE*. Since this analysis is focused on knowing the impact of judicial efficiency on the leverage and debt-maturity decision of small and large firms, firm having more and less tangible assets etc., it will be better that the referent category is one of the middle quartiles dummy variables against which the interactive effects of the 1^{st} and the 4^{th} quartiles can be compared. This is why the 3^{rd} quartile is selected to be referent category in all regression models.

CHAPTER 4

RESULTS AND DISCUSSIONS

This chapter presents and discusses descriptive statistics and results from various regressions for both leverage and debt-maturity structure.

4.1 Descriptive Statistics

4.1.1 Descriptive statistics of firm-specific variables

Tables 4.1 and 4.2 show the descriptive statistics for the variables included in the regressions. The correlations among these variables are reported in Table 4.3. Table 4.1 utilizes panel data capabilities by displaying panel level descriptive statistics where variations in the selected variables are measured at three levels. The 'overall' refers to statistics calculated for a given variable across all firm and over the entire sample period. The 'between' refers to statistics calculated on the mean values of all cross-sectional units. And the 'within' refers to variations of individual observations around the global mean. The values under the columns Maximum and Minimum with the row 'overall' represent the maximum and minimum values of a given variable. Under the same columns and with the row 'between', values show the minimum and maximum means across cross-sectional units, whereas the 'between' shows the minimum and maximum deviations of individual observations from the global mean of a selected variable.

The mean values of *LEV1* and *LEV2* are 0.1297 and 0.5686 across all firms and time periods. *LEV1* has a standard deviation of 0.1459 and has a global minimum of 0.000 and maximum of 0.8450. The mean value of *LEV1*, which represents long-term debt to book value of total assets, is not a complete departure from what was found in other empirical studies. Rajan and Zingales (1995) report mean *LEV1* of .0980 for Germany, 0.1210 for Italy, 0.1240 for U.K., 0.1570 for France, 0.1890 for Japan, 0.2330 for U.S.A., and 0.2810 for Canada (see Table II of Rajan and Zingales). The mean value of total debt to

book value of assets ratio (*LEV2*) seems to be lower by about 5-10 percentage points as compared to what Rajan and Zingales (1995) found for a sample of firms in G7 countries. However, Booth et al. (2001), who studied the capital structure choices in 10 developing countries, report much higher ratios for both *LEV1* (0.260) and *LEV2*(0.656) for a sample of 96 Pakistani listed firms. One possible explanation for this might be that their sample contained only 96 firms that were included in the Karachi Stock Exchange 100 Index. Firms included in KSE 100 Index are the largest firms either in their respective sectors or in the whole lot of listed firms. This is why the sample of firms included in the study of Booth et al. (2001) were predominantly large firms. It is thus expected that those firms had higher leverage ratios just like the information asymmetry and trade-off theories suggest. On the other hand, the sample used in this study is larger and includes firms of all sizes.

The descriptive statistics for several other variables warrant attention. For example, the maximum value for tangibility (*TANG*) is 0.9876 which means that the firm has only 1.24% current assets. It seems quite odd. This value is for Pakistan Cement Ltd. which was previously known as Chakwal Cement Company Ltd. It is important to mention that the firm had no production during the period under review i.e. 2001-2006. Hence, current assets were negligible. To remove all such outliers, all corresponding rows where *TANG* was above 0.95 were dropped. This exercise resulted in eliminating 18 observations. However, this dropout had no significant impact on the results.

The variable *PROF* (profitability) has a minimum of −0.758 and a maximum of 0.864. After a pooled OLS regression with *LEV1* and *LEV2* as dependent variables and *PROF* explanatory variable, residuals plot against PROF showed that there were only 3 values of *PROF* which were less than –0.5 and were outlier in the plot and 3 values greater than 0.70 which were also outliers. After removing these values, the new mean value for *PROF* did not change. However, the global minimum and maximum values were -0.4865 and 0.5678 respectively. Similar procedure was repeated for other variables to remove outliers and influential observations from the data set. This exercise resulted in losing 126 observations. All regressions were estimated after all outliers were purged out.

Table 4.1: Descriptive Statistics of Variables

Variables		Median	Mean	Std. Dev.	Minimum	Maximum
LEV1	Overall	.097	0.1297	0.1459	0.0000	0.8450
	Between			0.1313	0.0000	0.7636
	Within			0.0764	–0.1906	0.6205
LEV2	Overall	0.596	0.5686	0.2062	0.0029	0.9489
	Between			0.1903	0.0036	0.9449
	Within			0.0913	0.0565	0.9269
SIZE	Overall	6.874	6.9734	1.4832	2.3609	11.9228
	Between			1.4522	2.5114	11.8366
	Within			0.3320	5.6695	8.5770
PROF	Overall	.0312	0.0419	0.1058	–1.1463	0.7701
	Between			0.0808	–0.3283	0.4249
	Within			0.0721	–0.9219	0.6796
TANG	Overall	0.503	0.4990	0.2227	0.0024	0.9876
	Between			0.2159	0.0036	0.9756
	Within			0.0680	0.0145	0.8450
VOL	Overall	0.705	1.1893	1.1637	0.0225	4.9265
	Between			1.2548	0.0225	4.9265
	Within			0.0035	1.0545	1.2342
GROWTH	Overall	0.130	0.1538	0.1517	–0.2673	1.3545
	Between			0.1650	–0.2673	1.3545
	Within			0.0027	0.1189	0.2583
NDTS	Overall	0.046	0.0509	0.0451	0.0000	0.7256
	Between			0.0287	0.0007	0.2760
	Within			0.0355	–0.2242	0.6341
MVBV	Overall	0.74	1.3067	1.7167	0.0009	11.5000
	Between			1.4680	0.0092	11.5000
	Within			0.8408	–4.1600	10.4645
DIV	Overall	0.000	0.2527	0.3576	0.0000	2.4474
	Between			0.2346	0.0000	1.0000
	Within			0.2716	–0.7004	2.1201

Table 4.1 reports descriptive statistics of variables using panel data capabilities for a sample of 370 firms listed on KSE over the period 2001-2006.*LEV1* is the ratio of long-term debt to total assets whereas *LEV2* is the ratio of total debt to total assets. *SIZE* is the natural logarithm of total assets. *PROF* is the ratio of net income to total assets. *TANG* is the value of net fixed assets over total assets. *VOL* is the coefficient of variation of *PROF*. *GROWTH i*s the average of annual percentage change in total assets. *MVBV* is the ratio of market value per share to book value per share. *NDTS* represents non-debt tax shields and is measured as the ratio of depreciation for the year over total assets. The 'between' refers to statistics calculated on the mean values of all cross-sectional units. And the 'within' refers to variations of individual observations around the global mean.

To see industry-wise variations in all variables, the study reports means and standard deviations of the selected variables in Table 2.3. The study follows the Karachi Stock Exchange that classifies all listed firm in 35 industries. The complete list of these industries is given in Table 2.5. Since the first 7 industries belong to financial sector, the study excludes firm in these industries from the analysis. Table 2.3 shows that there are sizeable variations in all variables across industries. This is one reason that pooling all firms together under constant coefficient model will be inappropriate. Keeping in view this fact, the study includes a separate dummy variable for each industry in regressions and test their significance accordingly.

The mean value of *LEV2* is above 0.7 only in three industries that are Textile Weaving, Vanaspati and Allied Industries and Refineries. Interestingly, Textile Weaving has the lowest profitability ratio of -0.02, followed by Vanaspati and Allied industries which has profitability of 0.01. In light of this observation, it is reasonable to suspect that the highest leverage ratios in these two industries are not discretionary, but a result of continuous erosion in the equity base due to accumulated losses that occur year after year. If so, negative profitability will be associated with higher leverage ratio which would imply that there is a negative relationship between the two. But such an association between leverage and profitability is completely different from what the pecking order theory predicts. Such a relationship does not reflect active decision making of the management with regard to choosing optimal leverage ratio; rather it reflects the inability of management to control financial affairs of the firm. To control for this bias in data, in follow-up regressions it will checked whether negative relationship between leverage and profitability is robust to eliminating all observations of firms where accumulated losses appear in their balance sheets.

The most profitable industries are Tobacco, Fertilizers and Oil and Gas Exploration companies with *PROF* mean values of 0.15, 0.15, and 0.13 respectively. *LEV1* and *LEV2* ratios in all these industries are below the global means of *LEV1* and *LEV2*. This observation partially supports the prediction of pecking order theory.

Descriptive statistics in Table 4.14 reveals that in most of the industries where *SIZE* is above its global mean value of 6.9734, *LEV1* and *LEV2* ratios are also above their global means values of 0.1297 and 0.5686 respectively. However, there is one notable exception of Fertilizer sector where the *SIZE* has the maximum value of 9.66 among all industries but *LEV2* has a value of 0.49. To explore this in detail, it is important to note that in the sample of this study there are only four firms in the Fertilizer sector which are Fauji Fertilizer Company, Fauji Fertilizer Bin Qasim Ltd, Dawood Hercules Chemicals Ltd., and Engro Chemical Pakistan Ltd. Of these four, Dawood Hercules Chemicals Ltd. has zero mean value for *LEV1* and a very low ratio of 0.2126 for *LEV2*. This is why the average mean values of *LEV1* and *LEV2* for the Fertilizer sector are lower. Overall, in most of the industries excluding the Fertilizers sector, proxies for leverage and size of the firms are positively related at industry-level which support the predictions of the trade-off theory and the information asymmetry theory.

In Table 4.9, the matrix of correlations among the variables used in the regressions indicates that there is no serious issue of multicollinearity among the explanatory variables. *LEV1*and *LEV2* are negatively correlated with *PROF*, *GROWTH*, *NDTS* and *DIV* whereas they are positively correlated with *SIZE*, *TANG*, and *VOL*. These relationships are in line with the expectations, except the proxy for volatility of net income i.e. *VOL* which according to trade-off theory should be negatively associated with leverage. It is not possible to isolate unobserved fixed effects in simple correlation; the study will be able to check the robustness and the significance of this positive relationship between *VOL* and leverage under various specifications of regression models in the next section. Relationships between explanatory variables show that large firms have more tangible assets, are more profitable, comparatively grow more than small firms, have higher market-to-book ratios, pay more dividends and have less volatile net incomes.

Table 4.2: Means and Standard Deviations of Variables by Industries

Ind	*No. Firms*		*LEV1*	*LEV2*	*SIZE*	*TANG*	*PROF*	*MVBV*	*GRTH*	*VOL*	*NDTS*	*DIV*	*Obs.*
8	87	**Mean**	0.17	0.62	6.63	0.58	0.01	0.62	0.17	1.26	0.04	0.19	465
8		**Std.Dev**	0.15	0.18	1.01	0.18	0.08	0.71	0.16	1.25	0.03	0.37	465
9	7	**Mean**	0.18	0.72	6.79	0.53	-0.02	1.15	0.15	1.42	0.05	0.40	40
9		**Std.Dev**	0.09	0.10	0.64	0.11	0.18	2.03	0.08	1.80	0.02	0.61	40
10	46	**Mean**	0.16	0.63	7.25	0.54	0.05	0.64	0.19	0.99	0.06	0.16	226
10		**Std.Dev**	0.12	0.15	1.42	0.17	0.11	0.48	0.14	1.12	0.06	0.24	226
11	2	**Mean**	0.15	0.50	6.12	0.46	0.02	0.64	0.04	0.59	0.03	0.19	10
11		**Std.Dev**	0.21	0.32	0.37	0.19	0.04	0.41	0.02	0.09	0.01	0.31	10
12	13	**Mean**	0.15	0.57	7.39	0.57	0.00	0.87	0.06	1.09	0.05	0.31	74
12		**Std.Dev**	0.16	0.22	1.44	0.19	0.15	0.57	0.10	0.80	0.04	0.47	74
13	3	**Mean**	0.03	0.44	6.05	0.47	0.05	0.32	0.10	2.56	0.04	0.23	18
13		**Std.Dev**	0.03	0.18	1.14	0.31	0.14	0.24	0.16	1.57	0.03	0.29	18
14	30	**Mean**	0.12	0.59	6.96	0.53	0.02	0.76	0.17	1.37	0.04	0.17	155
14		**Std.Dev**	0.13	0.24	0.71	0.17	0.09	0.61	0.13	1.08	0.01	0.30	155
15	18	**Mean**	0.25	0.58	8.08	0.72	0.04	2.00	0.17	1.46	0.03	0.21	95
15		**Std.Dev**	0.21	0.19	0.96	0.17	0.11	2.09	0.17	0.96	0.02	0.33	95
16	3	**Mean**	0.02	0.52	6.92	0.37	0.15	2.92	0.09	0.90	0.06	0.31	18
16		**Std.Dev**	0.03	0.16	2.52	0.11	0.11	1.50	0.05	0.46	0.03	0.27	18
17	4	**Mean**	0.05	0.71	9.36	0.21	0.07	2.20	0.16	0.81	0.05	0.37	18
17		**Std.Dev**	0.08	0.09	0.50	0.15	0.06	2.47	0.12	0.41	0.02	0.34	18
18	11	**Mean**	0.23	0.43	7.72	0.64	0.01	0.76	-0.01	1.45	0.04	0.27	62
18		**Std.Dev**	0.25	0.27	1.93	0.21	0.07	0.61	0.06	1.26	0.03	0.38	62
19	5	**Mean**	0.06	0.65	9.58	0.44	0.07	2.48	0.15	0.83	0.06	0.63	30
19		**Std.Dev**	0.08	0.08	1.76	0.19	0.04	1.95	0.05	0.75	0.01	0.27	30
20	4	**Mean**	0.05	0.52	8.16	0.35	0.13	2.47	0.16	0.59	0.06	0.50	21
20		**Std.Dev**	0.06	0.21	2.49	0.09	0.14	1.60	0.13	0.28	0.01	0.36	21
21	8	**Mean**	0.11	0.58	6.67	0.38	0.06	1.41	0.16	1.02	0.05	0.29	41
21		**Std.Dev**	0.15	0.22	1.04	0.13	0.05	0.95	0.14	1.01	0.05	0.35	41

Table 4.2 Continued …

Ind	No. firms		*LEV1*	*LEV2*	*SIZE*	*TANG*	*PROF*	*MVBV*	*GRTH*	*VOL*	*NDTS*	*DIV*	*Obs.*
22	14	**Mean**	0.05	0.59	7.57	0.30	0.10	1.87	0.26	0.96	0.08	0.23	64
22		**Std.Dev**	0.08	0.14	1.44	0.2	0.08	1.04	0.09	0.85	0.12	0.3	64
23	9	**Mean**	0.06	0.49	5.93	0.36	0.05	2.02	0.18	0.88	0.04	0.3	52
23		**Std.Dev**	0.06	0.14	0.93	0.19	0.11	2.26	0.25	0.4	0.02	0.35	52
24	7	**Mean**	0.06	0.66	7.16	0.31	0.05	1.48	0.22	1.28	0.05	0.34	35
24		**Std.Dev**	0.07	0.12	1.22	0.21	0.07	1.23	0.11	0.78	0.02	0.39	35
25	3	**Mean**	0.31	0.63	9.25	0.47	0.07	2.2	0.21	2.1	0.07	0.12	13
25		**Std.Dev**	0.17	0.24	1.26	0.27	0.1	1.1	0.13	1.68	0.04	0.28	13
26	7	**Mean**	0.05	0.42	8.03	0.46	0.08	1.74	0.15	1.35	0.09	0.22	30
26		**Std.Dev**	0.07	0.15	2.13	0.2	0.1	2.27	0.21	1.06	0.06	0.3	30
27	4	**Meaan**	0.13	0.49	9.66	0.39	0.15	2.99	0.14	0.55	0.04	0.52	23
27		**Std.Dev**	0.16	0.18	0.49	0.25	0.08	1.66	0.1	0.33	0.01	0.32	23
28	7	**Mean**	0.03	0.39	7.15	0.3	0.14	2.95	0.17	0.39	0.06	0.37	42
28		**Std.Dev**	0.06	0.19	1.02	0.14	0.08	3.27	0.09	0.11	0.01	0.22	42
29	22	**Mean**	0.09	0.59	6.59	0.46	0.04	1.26	0.08	1.24	0.06	0.29	122
29		**Std.Dev**	0.12	0.16	1.56	0.26	0.12	0.99	0.1	1.27	0.08	0.32	122
30	10	**Mean**	0.1	0.37	6.22	0.45	0.08	0.98	0.2	1.38	0.05	0.36	54
30		**Std.Dev**	0.12	0.19	1.59	0.23	0.15	0.56	0.16	1.68	0.04	0.3	54
31	4	**Mean**	0.17	0.74	5.73	0.43	0.01	1.45	0.05	1.8	0.04	0.04	19
31		**Std.Dev**	0.17	0.17	0.42	0.21	0.12	1.83	0.04	1.16	0.02	0.12	19
32	5	**Mean**	0.03	0.65	6.43	0.2	0.01	0.58	0.02	1.25	0.04	0.4	26
32		**Std.Dev**	0.04	0.19	1.12	0.1	0.05	0.34	0.1	1.49	0.01	0.36	26
33	18	**Mean**	0.06	0.51	6.34	0.36	0.11	3.97	0.16	0.68	0.07	0.4	98
33		**Std.Dev**	0.09	0.18	1.44	0.19	0.1	3.72	0.14	0.47	0.03	0.36	98
34	7	**Mean**	0.12	0.58	6.65	0.54	0.06	1.38	0.21	0.79	0.05	0.26	37
34		**Std.Dev**	0.07	0.21	0.54	0.13	0.09	1.02	0.2	0.6	0.02	0.33	37
35	14	**Mean**	0.07	0.35	5.8	0.48	0.02	1.76	0.13	1.83	0.04	0.24	88
35		**Std.Dev**	0.12	0.22	1.39	0.33	0.07	2.24	0.16	1.54	0.03	0.41	88

The table reports descriptive statistics of variables grouped by industries for a sample of 370 firms listed on KSE over the period 2001-2006. The column Indus* shows serial number of industries the complete details of which are given in Table 2.5. *LEV1* is the ratio of long-term debt to total assets whereas *LEV2* is the ratio of total debt to total assets. *SIZE* is the natural logarithm of total assets. *PROF* is the ratio of net income to total assets. *TANG* is the value of net fixed assets over total assets. *VOL* is the coefficient of variation of *PROF*. *GROWTH i*s the average of annual percentage change in total assets. *MVBV* is the ratio of market value per share to book value per share. *NDTS* represents non-debt tax shields and is measured as a ratio of depreciation for the year over total assets. *DIV* is the dividend payout ratio.

Table 4.3: Matrix of Correlation among the Variables

	LEV1	*LEV2*	*SIZE*	*TANG*	PROF	MVBV	GROWTH	VOL	NDTS	DIV
LEV1	1									
LEV2	0.521	1								
SIZE	0.1923	0.1373	1							
TANG	0.5157	0.1908	0.0614	1						
PROF	-0.255	-0.3656	0.2109	-0.2751	1					
MVBV	-0.0807	0.0001	0.1791	-0.1614	0.3057	1				
GROWTH	-0.0113	0.0271	0.1941	-0.0336	0.274	0.1132	1			
VOL	0.0687	0.0356	-0.2714	0.1763	-0.342	-0.1138	-0.3173	1		
NDTS	-0.1911	-0.057	0.1333	-0.2613	0.2265	0.2237	0.2377	-0.1381	1	
DIV	-0.2273	-0.2343	0.1483	-0.2626	0.2892	0.1765	0.059	-0.2303	0.1812	1

Table 4.3 reports matrix of correlation between the included variables for a sample of 370 firms listed on KSE over the period 2001-2006. *LEV1* is the ratio of long-term debt to total assets whereas *LEV2* is the ratio of total debt to total assets. *SIZE* is the natural logarithm of total assets. *PROF* is the ratio of net income to total assets. *TANG* is the value of net fixed assets over total assets. *VOL* is the coefficient of variation of *PROF*.*GROWTH i*s the average of annual percentage change in total assets. *MVBV* is the ratio of market value per share to book value per share. *NDTS* represents non-debt tax shields and is measured as a ratio of depreciation for the year over total assets.

Table 4.4: Classification of Industries

S.No.	Name of the industry
1	*Open-End-Mutual Funds
2	*Closed-End-Mutual Funds
3	*Modarabas
4	*Leasing Companies
5	*Investment Banks/cos./Securities
6	*Commercial Banks
7	*Insurance
8	Textile Spinning
9	Textile Weaving
10	Textile Composite
11	Woolen
12	Synthetic and Rayon
13	Jute
14	Sugar and Allied Industries
15	Cement
16	Tobacco
17	Refinery
18	Power Generation and Distribution
19	Oil and gas Marketing Companies
20	Oil and gas Exploration Companies
21	Engineering
22	Automobile Assembler
23	Automobile Parts and Accessories
24	Cable and Electrical Goods
25	Transport
26	Technology and Communication
27	Fertilizer
28	Pharmaceuticals
29	Chemicals
30	Paper and Board
31	Vanaspati and Allied industries
32	Leather and Tanneries
33	Food and Personal Care-Products
34	Glass and Ceramics
35	Miscellaneous

Table 4.4 shows serial numbers and names of the industries. Following the Karachi Stock Exchange, all firms are classified in to 35 industries including open-end mutual funds. However, the study excluded the first seven industries from analysis because these industries are in financial sector where capital structure and debt-maturity structure choices are different from that of industries in non-financial sector. The*shows that these industries have been excluded from the analysis because they are in financial sector.

4.1.2 Descriptive statistics of the judicial efficiency

Table 4.6 provides descriptive statistics for alternative measures of judicial efficiency while Table 4.6 reports the matrix of correlation among these measures.

Judicial efficiency in different districts as measured by the ratio of pending cases at the end of the year to cases instituted during the year (*JE1*) had a mean value of 0.794 and standard deviation of 0.326. The minimum value of this measure was 0.29 (for the Lasbella district) while the maximum value was 1.309 (for the Gujranwala district). The second measure of judicial efficiency—the ratio of pending cases at the end of the year to cases disposed of during the year (*JE2*)—demonstrate similar statistics, with a minimum value of 0.28 and a maximum of 1.43 for the same districts (i.e., Lasbella and Gujranwala, respectively). These statistics suggest that, as Lasbella is a less developed district in Baluchistan and has a smaller population, has a much smaller demand for judicial resources in comparison to other developed cities; moreover, when judicial efficiency is measured as a ratio of pending cases per thousand persons (*JE3*), Lasbella still has the lowest ratio.

While *JE4* is similar to *JE2*, the only difference is that it replaces the high courts' statistics data with Special Banking Courts data in districts where such courts are operational.

The standard deviations of all the proxies of judicial efficiency show that there are reasonable variations in the efficiency of justice across the sample districts. The matrix of correlation between *JE1, JE2* and *JE4*in Table 4.6 shows that these measures are well correlated. Such a higher correlation indicates that it will matter less to replace one measure with others. Similarly, such a property also satisfies the conditions for instrumental variables i.e. one variable can be instrumented with the others.

Table 4.5: Descriptive Statistics for the Alternative Measures of Judicial Efficiency

Variable	Median	Mean	Std. Dev.	Min	Max
JE1	0.673	0.794	0.326	0.291	1.309
JE2	0.727	0.835	0.341	0.287	1.438
JE3	.019	0.023	0.021	0.003	0.05
JE4	0.813	1.004	0.645	0.159	2.755

Table 4.6: Matrix of Correlation among the Measures of Judicial Efficiency

	JE1	*JE2*	*JE3*	*JE4*
JE1	1			
JE2	0.969	1		
JE3	0.416	0.352	1	
JE4	0.457	0.492	0.112	1

Table 4.5 and 4.6 show descriptive statistics and matrix of correlation of alternative measures of judicial efficiency. These statistics are based on time series averages of 3 years judicial data of 27 districts. *JE1 is* the ratio of all pending cases to cases instituted during a year. *JE2* is the ratio of pending cases to disposed-off cases during a year.*JE3* is the ratio of pending cases at the end of a year in a judicial district high court normalized by the district population which is measured in thousands. While *JE4* is similar to *JE2*, the only difference is that it replaces the high courts' statistics data with Special Banking Courts data in districts where such courts are operational.

4.2 Regression Results

This section presents and discusses results of the regression models. The sequence of presentation and discussion is the same as have been followed in this dissertation so far, i.e. first results from leverage regressions are presented and discussed, and then from debt-maturity regressions.

4.2.1 Results from leverage regressions

4.2.1.1 Results of the main effects model

Table 4.7 presents results of main effects model which tests the hypothesis that worsening judicial efficiency affects leverage ratios of all firms alike. The table reports regression results of both fixed effects model and random effects. The first column of Table 4.7 shows names of the explanatory variables. The second and the third columns show coefficients of these variables from fixed effects and random effects models where the dependent variable is *LEV1*. Similarly, the fourth and the fifth columns show coefficients of the explanatory variables from fixed effects and random effects models where the dependent variable is *LEV2*. Robust standard errors are given in parentheses. Lower part of Table 4.7 presents R^2, F-statistics for fixed-effects model, Wald-Chi^2 for random effects model, and results of the Hausman test. Each regression specification includes five dummy variables for years and twenty-seven dummy variables for industries. In all regressions, all dummy variables were found to be jointly significant at 1%.

In both *LEV1* and *LEV2* regressions, results of the Hausman tests indicate that the null hypothesis of no systematic differences in the estimators of fixed and random effects models can safely be rejected.

To know the relative significance of each variable, the study ran another set of regressions on standardized values of the explained and explanatory variables and

calculated beta coefficients of the explanatory variables. Theses beta coefficients from fixed-effects models are reported in Table 4.8.

Consistent with the information asymmetry and the trade-off theories, the firm size is positively correlated with leverage in all specifications. The coefficients of the variable $SIZE_{i,t-1}$ are significant at the 1% level in all regressions, irrespective of whether leverage is measured as a ratio of long-term debt-to-total-assets (*LEV1*) or total debt to total assets (*LEV2*). In addition to its statistical significance, the size of a firm also has the largest economic significance. As shown in Table 4.8 (column *LEV1*), the beta coefficient estimated by the fixed effects model indicates that one standard deviation increase in $SIZE_{i,t-1}$ will increase *LEV1* by approximately 0.796 standard deviations. In the second regression in which the dependent variable is *LEV2*, the size of a firm still has the largest economic significance i.e., one standard deviation increase in $SIZE_{i,t-1}$ increases *LEV2* by 0.516 standard deviations.

The coefficient for $TANG_{i,t-1}$ is positive and statistically significant in three regressions. However, it is insignificant in the fixed-effects model in which the dependent variable is *LEV2*. The results suggest that the tangibility of assets matters only in the case of long-term financing. Since *LEV2* is a ratio of total-debt-to-assets, it includes all types of short-term and long-term liabilities. Short-term liabilities also include spontaneous financing such as wages payable, utilities and overhead expenses payable, and other accounts payable. The persons and/or organizations to whom these accounts are payable usually do not ask for collateral or see how many fixed assets the firm have. This may be one reason why $TANG_{i,t-1}$ is not significantly related to *LEV2*.

Table 4.7: Results of the Main Effects Model

Variables	*LEV1*		*LEV2*	
	Fixed-effects	Random-effects	Fixed-effects	Random-effects
$SIZE_{i,t-1}$	0.075(0.012)*	0.028(0.004)*	0.071(0.015)*	0.028(0.007)*
$TANG_{i,t-1}$	0.09(0.042)**	0.175(0.025)*	0.059(0.049)	0.103(0.034)*
$PROF_{i,t-1}$	−0.039(0.04)	−0.1(0.035)*	−0.165(0.061)*	−0.261(0.06)*
$MVBV_{i,t-1}$	0.014(0.004)*	0.008(0.003)**	0.017(0.005)*	0.015(0.004)*
VOL_i	−0.063(0.017)*	−0.002(0.005)	0.03(0.014)**	0.009(0.008)
$NDTS_{i,t-1}$	−0.196(0.207)	−0.396(0.175)**	−0.181(0.263)	−0.272(0.229)
$DIV_{i,t-1}$	−0.029(0.009)*	−0.039(0.009)*	−0.023(0.012)**	−0.043(0.011)*
JE_i	−0.123(0.155)	−0.001(0.028)	−0.182(0.121)	0.046(0.045)
Constant	−0.169(0.182)	−0.029(0.089)	0.125(0.188)	0.269(0.125)**
R^2 – *Within*	0.075	0.052	0.067	0.054
- *Between*	0.087	0.424	0.027	0.343
- *Overall*	0.078	0.345	0.041	0.314
F-Statistics / Wald Chi^2	5.930 (0.00)	367 (0.00)	5.97 (0.000	254 (0.00)
Hausman - Chi^2	25.66 (0.00)		61.91 (0.00)	

Table 4.7 presents results of main effects models where leverage ratio of 370 KSE listed firms are regressed on a measure of judicial efficiency, *JE* and other control variables over the period 2001-2006. The second and the third columns show coefficients of these variables from fixed effects and random effects models where the dependent variable is *LEV1*. Similarly, the fourth and the fifth columns show coefficients of the explanatory variables from fixed effects and random effects models where the dependent variable is *LEV2*. Robust standard errors are given in parentheses. The *, **, and *** show statistical significance at 1% level, 5% level, and 10% level respectively Lower part of table presents R^2, F-statistics for fixed-effects model and Wald-Chi^2 for random effects model, and results of the Hausman test. P-values for these tests are given in parentheses.. Each regression specification includes five dummy variables for years and twenty-seven dummy variables for industries. *LEV1* is the ratio of long-term debt to total assets whereas *LEV2* is the ratio of total debt to total assets. *SIZE* is the natural logarithm of total assets. *PROF* is the ratio of net income to total assets. *TANG* is the value of net fixed assets over total assets. *VOL* is the coefficient of variation of *PROF*. *MVBV* is the ratio of market value per share to book value per share. *NDTS* represents non-debt tax shields and is measured as a ratio of depreciation for the year over total assets.*DIV* is the ratio of dividends divided by net income.

The economic significance of the relationship between $TANG_{i,t-1}$ and *LEV2* is also negligible. For example, one standard deviation increase in $TANG_{i,t-1}$will lead to a mere 0.064 deviations increase in *LEV2*.

The results of Table 4.7 lend mixed support to the pecking order theory. The variable $PROF_{i,t-1}$is significantly related to *LEV1* and *LEV2* in three regressions at 1% level of significance whereas its coefficient is not significant in the fixed effects model where the dependent variable is *LEV1*. The sign of $PROF_{i,t-1}$in all regression models is negative which is line with the prediction of the pecking-order theory. However, the variable itself has the lowest economic significance among all explanatory variables. One standard deviation increase the profitability of a firm relative to total assets will reduce *LEV1* and *LEV2* by only 0.025 and 0.073 standard deviations respectively.

Table 4.8: Regression Results of Standardized Variables

Variables	*LEV1* Beta Coefficients	*LEV2* Beta Coefficients
$SIZE_{i,t-1}$	0.796	0.516
$TANG_{i,t-1}$	0.141	0.064
$PROF_{i,t-1}$	−0.025	−0.073
$MVBV_{i,t-1}$	0.105	0.084
VOL_i	−0.507	0.164
$NDTS_{i,t-1}$	−0.028	−0.018
$DIV_{i,t-1}$	−0.067	−0.037
JE_i	−0.185	−0.187

Table 4.8 presents regression results of standardized variables of 370 KSE listed firms, regressing leverage ratios on measure of judicial efficiency and other control variables over the period 2001-2006. The second and the third columns show coefficients of these variables from fixed effects model where the dependent variables are *LEV1*and *LEV2* respectively. Each regression specification includes five dummy variables for years and twenty-seven dummy variables for industries. *LEV1* is the ratio of long-term debt to total assets whereas *LEV2* is the ratio of total debt to total assets. *SIZE* is the natural logarithm of total assets. *PROF* is the ratio of net income to total assets. *TANG* is the value of net fixed assets over total assets. *VOL* is the coefficient of variation of *PROF*. *GROWTH i*s the average of annual percentage change in total assets. *MVBV* is the ratio of market value per share to book value per share. *NDTS* represents non-debt tax shields and is measured as a ratio of depreciation for the year over total assets.*DIV* is the ratio of dividends divided by net income.

The variable $MVBV_{i,t-1}$ is positively correlated with *LEV1* and *LEV2* in all fixed-effects and random-effects models. However, the direction of the relationship becomes negative when growth opportunities are measured as the average percentage increase in total assets (denoted by the variable *GROWTH*). This shows that the relationship between growth opportunities and leverage is not robust to the alternative proxies of growth opportunities. The beta coefficient of $MVBV_{i,t-1}$ indicates that a positive change of one standard deviation will increase *LEV1* by 0.105 standard deviations and *LEV2* by 0.084 standard deviations.

The results of Table 4.8 indicate that firms with more volatile incomes have lower long-term leverage ratios. The coefficient of VOL_i is negative in *LEV1* regressions and positive in *LEV2* regressions and the statistical and economic significance of VOL_i is greater for *LEV1* than for *LEV2*. The results suggest that the volatility of net income-to-total-assets will negatively influence only long-term leverage, possibly because long-term debt has greater default risk than short-term debt, and because return volatility, as one of the key sources of default risk, is more a matter of concern for the providers of long-term financing. The positive coefficient of the proxy for return volatility in *LEV2* regression contradicts the prediction of trade-off theory. VOL_i is statistically significant at the 1% level of significance in the regression when the dependent variable is *LEV1* and at the 5% level in the regression when the dependent variable is *LEV2*. Likewise its statistical significance, the economic significance of VOL_i is also dramatic for *LEV1*; for example, an increase of one standard deviation in VOL_i will reduce*LEV1* by 0.507 standard deviations. As far as the variable non-debt tax shields (*NDTS*) is concerned, it is almost insignificant in all models.

Results indicate that firms that pay more in dividends and retain less of their net profits have lower leverage ratios. Theoretically, if a firm distributes a higher percentage of its net profit in dividends, it will require more outside financing, which according to pecking order theory, should be first debt-financing and then equity financing. This way, the proxy for dividends ($DIV_{i,t-1}$) and leverage should be positively correlated. In contrast to this line of argument, however, one interesting aspect of the relationship between

dividends and leverage is highlighted here. Firms that pay dividends are *presumably* profitable firms, while those that do not pay dividends are either less profitable or not profitable at all. A firm that is more profitable and distributes less than 100% of its net income will retain more in rupee terms than a firm that is less profitable or not profitable whatsoever. If so, it will need less outside financing than the one that retains nothing because of its lower or zero net profit. Resultantly, the relationship between dividends and leverage is negative. In the regressions, such a possibility cannot be completely ruled out because analysis of the data reveals that there are approximately 30 percent observations of the total sample where the *PROF* has value closer to zero or below zero. Moreover, out of total sample, dividend is zero in more than 50 percent of observations. The average profitability in all these observations is −0.3%. Testing a relationship between dividends and leverage ratio like the one discussed above requires the development of proper interaction terms between profitability and dividends. However, since the focus of the present study is on testing the relationship between judicial efficiency and leverage, the study leaves testing the above hypothesis to future research.

Finally the influence of judicial inefficiency on leverage ratios of firms included in the sample is negative; however, the relationship is statistically insignificant at any conventional level. The negative sign of the coefficient of the variable JE_i is in accordance with the theoretical predictions of this study, but its statistical insignificance suggests that its standard error is larger than the acceptable threshold level. This might be due to the composition effect i.e. firms in different quartiles of *SIZE*, *TANG*, *PROF*, *MVBV*, *VOL* and *DIV* are not uniformly influenced by the worsening judicial efficiency. To explore this possibility, the study partitions the effect of inefficiency of courts on the leverage ratios of firms belonging to the four quartiles of the explanatory variables in the following set of regressions.

4.2.1.2 Results of regressions with interaction terms

This section discusses the results of regression models that interacted dummy variables based on the quartiles of selected firm attributes with the measure of judicial efficiency. The results are reported in Table 4.9 and Table 4.10. Table 4.9 presents results of regression models where the dependent variable is long-term debt-to-total-assets (*LEV1*) and Table 4.10 presents regression results of regression models where the dependent variable is total debt-to-total-assets (*LEV2*). The heads of the tables display names of the explanatory variables for which interaction terms were included to test the differential impact of judicial efficiency on the leverage ratios of firms belonging to the four quartiles of these variables. The differential impact of each selected variable in the leverage equation is estimated with both fixed effects and random effects models. For instance, second column of Table 4.9 shows results obtained interacting *SIZE* quartiles with *JE* from fixed effects model whereas third column shows results of the same interactions from random effects model.

Robust standard errors are given in parentheses with coefficient of each variable. Lower panels of the Table 4.9 and Table 4.10 present goodness of fit statistics i.e. R^2, F-statistics for fixed-effects model and Wald-Chi^2 for random effects model, and results of the Hausman test. P-values for these tests are given in parentheses.. Each regression specification includes five dummy variables for years and twenty-seven dummy variables for industries. The joint significance the years' dummies and industries' dummies is tested with Wald-test. In all of the regressions, all these dummy variables were found to be jointly significant at 1%. Wald-test is also applied to the interaction terms in each regression to test the joint significance of these interactions. In lower panels of Table 4.9 and Table 4.10, p-values are given in parentheses with the reported values of the given tests.

In all regressions, results of the Hausman test indicate that the null hypothesis of no systematic differences in the estimators of fixed and random effects models can safely be rejected. Therefore, preferred models would be fixed-effects models in this section.

Since the third quartiles of each variable were dropped so that the missing quartile serves as a reference category, the coefficient of *JE* represents slope of judicial efficiency for firms in the third quartile of a given variable in all regressions of Table 4.9 and Table 4.10. For example, coefficient of *JE* in Table 4.9: Panel A under the head of column *SIZE* is actually the slope of the judicial efficiency for firms belonging to the third quartile of *SIZE*. Coefficients of the interaction terms like *S1*JE*, *S2*JE* and *S4*JE* are the incremental slopes of judicial efficiency above (if coefficient of the interaction term is positive) or below (if coefficient of the interaction term is negative) the slope of *JE* (comprehensive discussion on testing and interpreting interaction terms is given in the seminal book by Cohen, Cohen, West, and Aiken (2003).. Normal t-test can be used to find the statistical significance of these interaction terms.

Table 4.9: Panel A - Regression Results with Interaction Effects

	SIZE		*TANG*	
Variables	Fixed	Random	Fixed	Random
$SIZE_{i,t-1}$	0.056(0.012)*	0.008(0.005)	0.072(0.012)*	0.027(0.004)*
$TANG_{i,t-1}$	0.078(0.041)***	0.17(0.025)*	0.07(0.042)***	0.112(0.03)*
$PROF_{i,t-1}$	−0.056(0.039)	−0.114(0.035)*	−0.03(0.039)	−0.094(0.034)*
$MVBV_{i,t-1}$	0.013(0.004)*	0.008(0.003)**	0.014(0.004)*	0.009(0.003)*
VOL_i	−0.069(0.017)*	0.00(0.005)	−0.068(0.017)*	−0.003(.005)
$NDTS_{i,t-1}$	−0.211(0.2)	−0.4(0.171)**	−0.172(0.203)	−0.365(.174)**
$DIV_{i,t-1}$	−0.029(0.009)*	−0.037(0.008)*	−0.029(0.009)*	−0.038(0.008)*
JE_i	−0.029(0.158)	0.015(0.029)	−0.155(0.155)	−0.002(0.029)
$S1 \times JE$	−0.065(0.019)*	−0.046(0.014)*		
$S2 \times JE$	−0.025(0.01)*	−0.018(0.008)**		
$S4 \times JE$	0.04(0.012)*	0.045(0.01)*		
$T1 \times JE$			−.021(.013)***	−0.026(.011)**
$T2 \times JE$			−0.012(0.008)	−0.017(.007)**
$T4 \times JE$			0.034(0.009)*	0.033(0.008)*
Constant	−0.087(0.182)	0.088(0.089)	−0.05(0.18)	−0.024(0.092)
R^2 - Within	0.0948	0.0684	0.0928	0.0739
- Between	0.0854	0.4346	0.1232	0.4237
- Overall	0.0786	0.3567	0.1107	0.3534
F-Statistics/	5.79(0.00)	-	5.19(0.00)	-
Wald Chi^2	-	405(0.00)	-	383.2(0.00)
Wald (Joint)	5.04(0.00)	25.1(0.00)	4.36(0.00)	23.82(0.00)
Hausman - Chi^2	39.0(0.00)		26.38(0.00)	

Table 4.9: Panel A, Panel B and Panel C presents results of regression models with interaction effects where leverage ratio (*LEV1*) of 370 KSE listed firms is regressed on a measure of judicial efficiency as well as on the interaction terms of *JE* quartiles of explanatory variables over the period 2001-2006. The second and the third columns show coefficients of these variables from fixed effects and random effects models where the dependent variable is *LEV1*. Similarly, the fourth and the fifth columns show coefficients of the explanatory variables from fixed effects and random effects models where the dependent variable is *LEV2*. Robust standard errors are given in parentheses. The *, **, and *** show statistical significance at 1% level, 5% level, and 10% level respectively. Lower part of the table presents R^2, F-statistics for fixed-effects model and Wald-Chi^2 for random effects model, and results of the Hausman test. Each regression specification includes five dummy variables for years and twenty-seven dummy variables for industries. *LEV1* is the ratio of long-term debt to total assets whereas *LEV2* is the ratio of total debt to total assets. *SIZE* is the natural logarithm of total assets. *PROF* is the ratio of net income to total assets. *TANG* is the value of net fixed assets over total assets. *VOL* is the coefficient of variation of *PROF*.*NDTS* represents non-debt tax shields and is measured as a ratio of depreciation for the year over total assets.*DIV* is the ratio of dividends divided by net income.

Table 4.9: Panel B - Regression Results with Interaction Effects

	PROF		*DIV*	
Variables	Fixed	Random	Fixed	Random
$SIZE_{i,t-1}$	0.073(0.012)*	0.028(0.004)*	0.074(0.012)*	0.029(0.004)*
$TANG_{i,t-1}$	0.083(0.042)**	0.167(0.025)*	0.088(0.041)**	0.169(0.025)*
$PROF_{i,t-1}$	−0.028(0.04)	−0.069(.036)**	−0.032(0.039)	−0.087(0.035)*
$MVBV_{i,t-1}$	0.015(0.004)*	0.01(0.003)*	0.014(0.004)*	0.009(0.003)*
VOL_i	−0.065(0.016)*	−0.004(.005)	−0.063(0.017)*	−0.003(0.005)
$NDTS_{i,t-1}$	−0.201(0.207)	−0.383(.174)**	−0.197(0.209)	−0.385(0.175)**
$DIV_{i,t-1}$	−0.028(0.009)*	−0.036(0.008)*	−0.029(0.009)*	−0.037(0.008)*
JE_i	−0.12(0.15)	−0.003(0.028)	−0.124(0.153)	0.006(0.028)
$P1 \times JE$	0.007(0.008)	0.016(0.008)**		
$P2 \times JE$	0.009(0.008)	0.015(0.007)**		
$P4 \times JE$	−0.017(0.007)**	−0.021(0.006)*		
$D1 \times JE$			−0.016(0.006)*	−0.018(0.005)*
Constant	−0.116(0.178)	−0.023(0.091)	−0.163(0.181)	−0.027(0.09)
R^2 - Within	0.0827	0.0621	0.081	0.0595
- Between	0.1012	0.4404	0.0967	0.4251
- Overall	0.0913	0.3581	0.0865	0.3465
F-Statistics/	5.34(0.00)	-	5.73(0.00)	-
Wald Chi^2	-	395(0.00)	-	372(0.00)
Wald (Joint)	2.17(0.07)	21.77(0.00)	3.57(0.03)	9.6(0.00)
Hausman - Chi^2	47.43(0.00)		40.39(0.00)	

Details of the variables and tests reported in Panel B are given under Panel A of Table 4.9. Panel B reports the regression results where *JE* was interacted with the dummy variables based on *PROF* and *DIV*.

Table 4.9: Panel C

Variables	*VOL*		*MVBV*	
	Fixed	Random	Fixed	Random
$SIZE_{i,t-1}$	0.075(0.012)*	0.026(0.004)*	0.075(0.012)*	0.027(0.004)*
$TANG_{i,t-1}$	0.09(0.042)**	0.179(0.025)*	0.09(0.041)**	0.173(0.025)*
$PROF_{i,t-1}$	−0.039(0.04)	−0.1(0.034)*	−0.051(0.039)	−0.111(0.034)*
$MVBV_{i,t-1}$	0.014(0.004)*	0.008(0.003)**	0.012(0.004)*	0.004(0.003)
VOL_i	−0.008(0.016)	0.01(0.009)	−0.07(0.018)*	−0.001(0.005)
$NDTS_{i,t-1}$	−0.196(0.207)	−0.416(0.174)**	−0.214(0.208)	−0.42(0.177)**
$DIV_{i,t-1}$	−0.029(0.009)*	−0.04(0.009)*	−0.03(0.009)*	−0.041(0.009)*
JE_i	0.207(0.087)**	−0.013(0.029)	−0.107(0.162)	0.013(0.029)
$V1 \times JE$	−0.061(0.046)	0.046(0.016)*		
$V2 \times JE$	−0.398(0.138)*	0.025(0.015)***		
$V4 \times JE$	−0.261(0.067)*	−0.012(0.024)		
$M1 \times JE$			−0.042(0.01)*	−0.036(0.008)*
$M2 \times JE$			−0.021(0.008)*	−0.02(0.007)*
$M4 \times JE$			0(0.007)	0(0.007)
Constant	−0.495(0.22)**	−0.081(0.071)	−0.156(.184)	−0.027(0.029)
R^2– Within	0.0754	0.0537	0.0927	0.0677
- Between	0.0876	0.3526	0.0765	0.4255
- Overall	0.0783	0.3263	0.0701	0.3518
F-Statistics/	5.93(0.00)	-	5.51(0.00)	-
Wald Chi^2	-	261.3(0.00)	-	380.88(0.00)
Wald (joint)	16.86(0.00)	8.3(0.08)	4.42(0.00)	17.85(0.00)
Hausman - Chi^2	55.1(0.00)		42.1(0.00)	

Details of the variables and tests reported in Panel B are given under Panel A of Table 4.9. Panel B reports the regression results where *JE* was interacted with the dummy variables based on *VOL* and *MVBV*.

Results reported in the second and third columns of Table 4.9:Panel A suggest that the coefficients of *S1*JE*, *S2*JE* and *S4*JE* are significantly different from the reference category. The Wald-test shows that these interactions terms are jointly significant. Specifically, coefficients of the first and the second interacted variables are negative while coefficient of the fourth variable is positive indicating that, other things remaining constant, leverage ratios of firms belonging to the first and second quartiles of *SIZE* will significantly be lower than firms belonging to the third quartile when judicial efficiency worsens and, at the same time, leverage ratios of firms belonging to the fourth quartile of *SIZE* will significantly be higher than firms in the third quartile. For example, the estimated coefficient of *JE* indicate that with one hundred percentage points increase in *JE*, leverage ratio (*LEV1*) of a firm belonging to the third quartile of *SIZE* will decrease by 2.9%, whereas the decrease in *LEV1* will be 9.4% (i.e. (−2.9%) + (−6.5%)) and 5.4% (i.e. (−2.9%) +(−2.5%)), for firms in the first quartile and the second quartiles respectively (a quick review on obtaining and interpreting normal and differential coefficients of interactions terms between dummy variables and continuous variables is given in Yip and Tsang (2007))[1]

Interestingly, worsening judicial efficiency has positive impact on the leverage ratios of firms belonging to the fourth quartile of *SIZE*. For example, the slope of *S4*JE* is .04 which indicate that one hundred percentage points increase in *JE* will lead to 1.1% (i.e. –2.9% + 4%) increase in the leverage ratio of firms belonging to the fourth quartile of *SIZE*. This is an indication that lenders reduce credit to small firms and redistribute the same to large firms when judicial efficiency deteriorates. This finding has some resemblance to the findings of Gropp et al. (1997) who used U.S. cross-state data to determine the impact of personal bankruptcy laws in various U.S. states in relation to lending to low-assets households. They found that lending to households with low-assets intensity was lower in states with more exemptions than to households with high-assets intensity.

[1] Detailed discussion on the alternative methods of using and interpreting interaction terms is given in Cohen, Cohen, West, and Aiken (2003).

These results have also similarity with the findings of Fabbri and Padula (2004) who found that inefficient enforcement of credit contracts redistributes credit from poor households to wealthy households. These results are robust to whether leverage is measured by the ratio of long-term-debt-to-total-assets (*LEV1*) or the ratio of total-debt-to-total-assets (*LEV2*). Results of the regressions where the dependent variable is *LEV2* are reported in Table 4.10.

As far as the relevance of tangible assets in the leverage equation is concerned, there is some evidence in support of the hypothesis of this study. Results of the fixed-effects model in Table 4.9 (Panel A) demonstrate that in the presence of inefficient courts, firms in the first quartile of *TANG* will have lower leverage ratios (*LEV1*) than firms in the third quartile, and firms in the fourth quartile of *TANG* will have higher leverage ratios than firms in the third quartile. The differential slope of *T1*JE* and *T4*JE* are significant at 10% and 1% whereas *T2*JE* is insignificant. Similar to the results of the main effects model, Table 4.10 (Panel A) shows that there is no clear indication that tangibility matters in total-debts-to-total-assets (*LEV2*) ratio. In all fixed-effects models of the Table 4.10 (Panel A), the coefficients of *TANG* are insignificant at conventional levels which implies that tangibility does not influence total-debt-to-total-assets ratio when *JE* is zero.

Past profitability has explanatory power only in *LEV2* regressions as shown in Table 4.10: Panel B. Results of the fixed-effects models in Table 4.9: Panel B reveal that neither the coefficient of $PROF_{i,\,t-1}$ nor its interaction terms is significantly different from zero. This confirms the results of the main effects model where profitability had a poor explanatory power in *LEV1* regression. The interaction terms between *PROF* and *JE* in Panel B of Table 4.10 imply that one hundred percentage increases in *JE* will reduce the leverage ratio of a firm in the third quartile of profitability by 5.8 percentage points. Similarly, at the same time, firm in the fourth quartile of profitability will have 3.9 percentage points lower leverage ratio than a firm in the third quartile. These results are consistent with the hypothesis that in the presence of poor enforcement of creditors' rights, the problem of information asymmetry and the adverse selection could be severe

and pecking order theory would strictly hold. However, it is not clear why profitability matters in total-debt-to-assets ratio and not in long-term-debt-to-assets ratio.

To test the relevance of pecking-order theory in less efficient judicial system from another angle, the next proxy is $DIV_{i,t-1}$. According to pecking-order theory, a firm that pays higher percentage of its profit in dividends will use more debt-financing. This way the relationship between dividends and leverage should be positive. It is important to mention that out of the total of 1850 observations in the sample, $DIV_{i,t-1}$ has a value of zero in 928 observations. The average profitability is −0.3% in all observations where $DIV_{i,t-1}$ is zero. These results lend support to the earlier postulation that a negative relationship may be expected between dividends and leverage if some firms do not pay dividends due to losses or zero operating profits while others distribute less than 100% of their net incomes in dividends. Since the values of $DIV_{i,t-1}$ are zero up to the second quartile, all firms were distributed only in two groups: one that pays out dividends and the other that does not. *D1* in the interaction term represents dummy variable for firms that pay dividends whereas the missing category is represented by the coefficient of *JE*.

Results from both *LEV1* and *LEV2* (Table 4.9: Panel B and Table 4.10: Panel B) regressions indicate that in the presence of judicial inefficiency, dividends paying firms have lower leverage ratios than those that do not pay dividends. Seemingly odd, but the results are line with the pecking-order theory as par the explanation given above.

As far as volatility of net income is concerned, its sign and significance are not stable under different specifications. In *LEV1* regressions (Table 4.9: Panel C), the coefficient of VOL_i is not statistically significant in the fixed effects model whereas result of the Wald-test demonstrate that its interaction terms are jointly insignificant in both fixed-effects and random-effects models. In *LEV2* regressions, its coefficient and interaction terms are insignificant yet again in the random-effects model. Only in the fixed effects models of *LEV2*, results indicate that under poor enforcement of contracts firms in the fourth quartile of *VOL* have lower leverage ratios as compared to the ones in the third

quartile; and firms in the first quartile of *VOL* have higher leverage ratios than firms in the third quartile.

The proxy for growth opportunities, *MVBV*, exhibits very interesting phenomenon. Its positive coefficient throughout all specifications contradicts the predictions of the agency model developed by Jensen and Meckling (1976). The results are also inconsistent with the argument of Titman and Wessels (1988) who say that growth opportunities should not increase leverage because they cannot serve as collateral to debts. In fact, the positive coefficient of $MVBV_{i,t-1}$suggests that in the absence of judicial inefficiency, growth opportunities increase leverage. However, when dummy variables based on the quartiles of *MVBV* are interacted with *JE*, the results show that when faced with inefficient judicial system, more growing firms will have lower leverage ratio than less growing firms.

Table 4.10: Panel A- Regression Results With Interaction Effects

	SIZE		*TANG*	
Variables	Fixed	Random	Fixed	Random
$SIZE_{i,t-1}$	0.048(0.016)*	0.007(0.009)	0.077(0.015)*	0.029(0.007)*
$TANG_{i,t-1}$	0.041(0.048)	0.096(0.034)*	0.09(0.048)***	0.16(0.038)*
$PROF_{i,t-1}$	−0.186(0.06)*	−0.276(0.059)*	−0.167(0.06)*	−0.261(0.059)*
$MVBV_{i,t-1}$	0.015(0.005)*	0.014(0.004)*	0.017(0.005)*	0.015(0.004)*
VOL_i	0.022(0.014)	0.011(0.008)	0.029(0.014)**	0.01(0.008)
$NDTS_{i,t-1}$	−0.214(0.256)	−0.298(0.226)	−0.171(0.254)	−0.277(0.225)
$DIV_{i,t-1}$	−0.023(0.012)**	−0.042(0.011)*	−0.023(.012)***	−0.043(0.011)*
JE_i	−0.057(0.125)	0.081(0.046)***	−0.188(0.123)	0.028(0.045)
$S1 \times JE$	−0.09(0.024)*	−0.063(0.02)*		
$S2 \times JE$	−0.056(0.014)*	−0.044(0.012)*		
$S4 \times JE$	0.037(0.016)**	0.03(0.013)**		
$T1 \times JE$			0.073(0.016)*	0.057(0.015)*
$T2 \times JE$			0.04(0.01)*	0.03(0.009)*
$T4 \times JE$			−0.006(0.012)	−0.004(0.011)
Constant	0.231(0.186)	0.395(0.127)*	0.071(0.182)	0.258(0.14)***
R^2–Within	0.0908	0.0737	0.0885	0.0704
- Between	0.0207	0.3327	0.0136	0.339
- Overall	0.038	0.3117	0.0294	0.3146
F-Statistics/	6.38(0.00)	-	6.47(0.00)	-
Wald Chi^2	-	280.95(0.00)	-	269.6(0.00)
Wald (joint)	2.17(0.07)	21.77(0.00)	3.57(0.03)	9.6(0.00)
Hausman - Chi^2	65.31(0.00)		100.6(0.00)	

Tables 6.4: Panel A, Panel and B present results of regression models with interaction effects where leverage ratio (*LEV2*) of 370 KSE listed firms is regressed on a measure of judicial efficiency, as well as on the interaction terms of *JE* quartiles of explanatory variables over the period 2001-2006. The second and the third columns show coefficients of these variables from fixed effects and random effects models where the dependent variable is *LEV1*. Similarly, the fourth and the fifth columns show coefficients of the explanatory variables from fixed effects and random effects models where the dependent variable is *LEV2*. Robust standard errors are given in parentheses. The *, **, and *** show statistical significance at 1% level, 5% level, and 10% level respectively. Lower part of the table presents R^2, F-statistics for fixed-effects model and Wald-Chi^2 for random effects model, and results of the Hausman test. P-values for these tests are given in parentheses.. P-values for these tests are given in parentheses. Each regression specification includes five dummy variables for years and twenty-seven dummy variables for industries. *LEV1* is the ratio of long-term debt to total assets whereas *LEV2* is the ratio of total debt to total assets. *SIZE* is the natural logarithm of total assets. *PROF* is the ratio of net income to total assets. *TANG* is the value of net fixed assets over total assets. *VOL* is the coefficient of variation of *PROF*. *NDTS* represents non-debt tax shields and is measured as a ratio of depreciation for the year over total assets.*DIV* is the ratio of dividends divided by net income.

Table 4.10: Panel B

	PROF		*DIV*	
Variables	Fixed	Random	Fixed	Random
$SIZE_{i,t-1}$	0.061(0.015)*	0.028(0.007)*	0.07(0.015)*	0.029(0.007)*
$TANG_{i,t-1}$	0.033(0.047)	0.077(0.034)**	0.055(0.048)	0.093(0.034)*
$PROF_{i,t-1}$	−0.128(0.059)**	−0.188(0.056)*	−0.153(0.06)*	−0.24(0.059)*
$MVBV_{i,t-1}$	0.021(0.005)*	0.021(0.005)*	0.017(0.005)*	0.015(0.004)*
VOL_i	0.025(0.013)**	0(0.008)	0.03(0.014)**	0.005(0.008)
$NDTS_{i,t-1}$	−0.213(0.251)	−0.255(0.22)	−0.183(0.263)	−0.258(0.228)
$DIV_{i,t-1}$	−0.02(0.012)***	−0.035(0.011)*	−0.023(.012)**	−0.04(0.011)*
JE_i	−0.192(0.099)**	0.029(0.043)	−0.185(0.118)	0.063(0.045)
$P1 \times JE$	0.058(0.01)*	0.071(0.01)*		
$P2 \times JE$	0.046(0.008)*	0.055(0.008)*		
$P4 \times JE$	−0.039(0.011)*	−0.046(0.01)*		
$D1 \times JE$			−0.028(0.008)*	−0.035(0.007)*
Constant	0.297(0.181)***	0.133(2.4)*	0.136(0.187)	0.257(0.126)**
R^2 - Within	0.1292	0.1212	0.0783	0.0664
- Between	0.1053	0.4161	0.0391	0.3577
- Overall	0.1288	0.3838	0.0548	0.3283
F-Statistics/	10.27(0.00)	-	6.46(0.00)	-
Wald Chi^2	-	422.1(0.00)	-	290.42(0.00)
Wald (Joint)	2.17(0.07)	23.47(0.00)	4.21(.03)	8.7(0.014)
Hausman - Chi^2	27.02 (.001)		18.16(.052)	

Details of the variables and tests reported in Panel B are given under Panel A of Table 4.10. Panel B reports the regression results where *JE* was interacted with the dummy variables based on *PROF* and *DIV*.

4.2.2.3 Robustness checks

To check robustness of the results, several alternative methods are employed next.

Results of regression involving JE dummies

First of these checks is to divide the sample of judicial districts into two groups. Group one includes districts where the *JE1* is above the 50th percentile while group two has districts where *JE1* is below the 50th percentile. Using a dummy variable scheme of *g-1*, a dummy variable *JED* is defined for the first group. This *JED* variable is interacted with the included explanatory variables. The interaction terms will highlight the significance of a variable of interest for leverage ratios in districts where judicial efficiency is below the 50thpercentile. Based on the discussion in the theoretical framework section, it is expected that interaction terms involving *TANG*, *SIZE*, and *DIV* will have positive differential slopes whereas *PROF*, *VOL*, and *MVBV* will have negative differential slopes. Moreover, the coefficient of the dummy variable *JE* is expected to be negative. Since almost in all previous regressions, the Hausman test favored the use of fixed-effects models, this section reports only the results of fixed-effects regressions where the dependent variable is *LEV1*. The results are shown in Table 4.11.

In panel A of Table 4.11, the results indicate that the interaction terms of *SIZE* and *TANG* are significant and, as expected, positive. Interaction terms of other variables are either insignificant or unexplainable.

In panel A of Table 4.11, the second column presents result of regression where *SIZE* was interacted with *JED*. The coefficient of the variable *SIZE* shows that under efficient judicial system (where *JE1* is below the 50th percentile) one unit change in *SIZE* will cause the *LEV1* ratio of firms to change by 0.065 in the same direction. But under an inefficient judicial system (where *JE1* is above the 50th percentile) one unit increase in *SIZE* increases the *LEV1* ratio by 0.095. This is evident from the coefficient of the interaction term *JED*SIZE*. The interaction term has a coefficient of 0.031 which indicates that *SIZE* increases *LEV1* ratio of firms by an additional 3.1% in an inefficient

judicial system. The coefficient of *TANG*, which is a proxy for firm fixed-assets-to-total-assets, shows similar results. The coefficient of the variable *TANG* demonstrates that under efficient judicial system (where *JE1* is below the 50th percentile) one unit change in *TANG* will cause the *LEV1* to change by 0.074 positively. However, when the firm is faced with an inefficient judicial system (where the *JE1* is above the 50th percentile) one unit increase in *TANG* increases the *LEV1* ratio by a value of 0.193. This 0.193 value is the sum of the coefficients of the interaction term *TANG*JED* and *TANG*. The interaction term has a coefficient of 0.119 and is significant at 5% level of significance. The coefficient of the interaction term indicates that *TANG* increases *LEV1* ratio of firms by an additional 11.9% in an inefficient judicial system.

The interaction terms for other variables are either insignificant or show inconsistent results.

Banking courts

To resolve the issue of non-performing loans of commercial banks, many policy measures were taken by the government of Pakistan in the recent past. Among these measures, one was to promulgate a new law titled "The Financial Institutions (Recovery of Finance) Ordinance 2001". This law chalked out many ways to expedite the recovery of non-performing loans. It enabled the financial institutions to foreclose and sale collateral property without having to go court and obtain orders from there. The law also allowed the federal government to establish as many banking courts as may be required for early and quick resolution of cases related to recovery of loans.

Presently, there are 29 banking courts in 14 cities. These banking courts handle cases related to default on loans by banks' customers or breach of any terms of the loan contract. Where such banks are not existent, the city high court handles cases related to recovery of banks' loans. Since these banks are dedicated solely to handling loans recovery cases and other matters related to banks' loans, it is reasonable to expect that creditors (banks) will feel confident that their loan amount can be recovered quickly and

hence at lower cost. This confidence should increase their willingness to extend lending to even smaller firms and firms with little collaterals.

Table 4.11 - Regression with *JE* Dummies and Interaction Terms

Variables	*SIZE*	*TANG*	*PROF*	*VOL*
$SIZE_{i,t-1}$	0.065(0.013)*	0.074(0.012)*	0.073(0.012)*	0.075(0.012)*
$TANG_{i,t-1}$	0.095(0.041)**	0.074(0.042)***	0.084(0.042)**	0.09(0.042)**
$PROF_{i,t-1}$	−0.05(0.04)	−0.031(0.04)	−0.042(0.04)	−0.039(0.04)
$MVBV_{i,t-1}$	0.013(0.004)*	0.014(0.004)*	0.015(0.004)*	0.014(0.004)*
VOL_i	−0.03(0.009)*	−0.028(0.009)*	−0.029(0.009)*	−0.029(0.009)*
$NDTS_{i,t-1}$	−0.012(0.004)*	−0.013(0.005)*	−.009(0.004)**	−0.174(0.024)*
$DIV_{i,t-1}$	−0.202(0.202)	−0.203(0.203)	−0.199(0.208)	−0.196(0.207)
JED	−0.184(0.082)**	−0.064(0.039)***	0.012(0.013)	−0.736(0.099)*
SIZE×*JED*	0.031(0.013)**			
TANG×*JED*		0.119(0.056)**		
PROF×*JED*			−0.101(0.066)	
VOL×*JED*				0.175(0.017)*
Constant	−0.59(0.155)*	−0.503(.161)*	−.537(0.159)*	.140(0.08)***
R^2 – Within	0.0813	0.0802	0.0782	0.0754
- Between	0.0611	0.1106	0.093	0.0876
- Overall	0.0534	0.0973	0.083	0.0783
F-Statistics	6.42(0.00)	-	5.74(0.00)	-
Wald Chi^2	-	5.89(0.00)	-	5.93(0.00)
Wald(Joint)	3.17(.04)	2.88(.05)	1.71(.18)	55(0.00)

Table 4.11 presents results of regression models with interaction effects where leverage ratios (*LEV1*) of 370 listed firms are regressed on JE which is a dummy variable that assumes the value of 1 if a given firm has its office in a district where *JE* value is above the 50^{th} percentile. Robust standard errors are given in parentheses. The *, **, and *** show statistical significance at 1% level, 5% level, and 10% level respectively. Lower part of the table presents R^2, F-statistics for fixed-effects model. Each regression specification includes five dummy variables for years and twenty-seven dummy variables for industries. *LEV1* is the ratio of long-term debt to total assets whereas. *SIZE* is the natural logarithm of total assets. *PROF* is the ratio of net income to total assets. *TANG* is the value of net fixed assets over total assets. *VOL* is the coefficient of variation of *PROF*. *MVBV* is the ratio of market value per share to book value per share. *NDTS* represents non-debt tax shields and is measured as a ratio of depreciation for the year over total assets.

Other things being equal, this confidence should increase leverage ratios and debt-maturities of firms in areas where these courts are functional. However, the efficiency of these courts will influence the leverage decisions in similar fashion as other courts do. To check for these possibilities, the next Section discuses results from a set of regression models that follow similar methodology as was applied in the preceding Section, the only difference being the data set used. In these regression models, the study uses a judicial efficiency proxy which is based on the pending cases of banking courts (*JE4*). If a banking court is not present in a given city, then judicial statists for that city are derived from the high court data files. It is important to mention that the banking courts data have some limitations. For example, data on pending cases, total cases instituted, and cases resolved are available only for the year 2006. Such a short period exposes the analysis to the possibility of baseness. Second, since most of the companies have their head offices in Karachi, such a single big city can potentially reduce variability in data and hence can create huge biasness in the results. In previous Section, the study divided the Karachi city in four regions where a high court was present in each region. That classification helped in increasing variation in data. But such classification was not possible in the case of banking courts. With all these limitations, the study performs this robustness check and hope that it can at least give an idea of whether the estimates drawn from the analysis based on data of banking courts deviate substantially from earlier results. Results of regression models using banking courts data are presented in Panel A and B of Table 4.12.

Regression outputs reported in panel A and B of Table 4.12 show that results drawn from banking courts data are almost in line with the main findings of the study. For example, the variable *SIZE* and *TANG* have positive coefficients and their interactions terms exhibit similar behavior as their counterparts did in the preceding analysis.

Table 4.12: Panel A - Regression Results Interacting Firm Variables with *JE* Based on Data of Banking Courts

	SIZE		*TANG*	
	Fixed	Random	Fixed	Random
$SIZE_{i,t-1}$	0.052(0.011)*	0.012(0.005)**	0.061(0.011)*	0.027(0.004)*
$TANG_{i,t-1}$	0.081(0.036)**	0.152(0.022)*	0.064(0.038)***	0.092(0.027)*
$PROF_{i,t-1}$	−0.018(0.023)	−0.078(0.024)*	−0.004(0.023)	−0.07(0.024)*
$MVBV_{i,\ t-1}$	0.01(0.002)*	0.005(0.002)**	0.011(0.002)*	0.006(0.002)*
VOL_i	−0.083(0.007)*	−0.003(0.005)	.059(.014)*	−0.004(0.005)
$NDTS_{i,t-1}$	−0.051(0.043)	−0.058(0.045)	−0.045(0.044)	−0.051(0.045)
$DIV_{i,t-1}$	−0.024(0.008)*	−0.032(0.007)*	−0.024(0.007)*	−0.031(0.007)*
JE_i	0.015(0.013)	0.007(0.009)	0.004(0.013)	0.005(0.01)
$S1 \times JE$	−0.038(0.011)*	−0.028(0.009)*		
$S2 \times JE$	−.011(.006)***	−0.006(0.005)		
$S4 \times JE$	0.018(0.008)**	0.02(0.006)*		
$T1 \times JE$			−0.01(0.008)	−0.014(0.006)**
$T2 \times JE$			−0.009(0.004)***	−0.012(0.004)*
$T4 \times JE$			0.027(0.006)*	0.025(0.005)*
Constant	−0.016(0.094)	0.046(0.084)	−0.28(0.107)*	−0.033(0.091)
R^2 - Within	0.0816	0.0572	0.089	0.0719
- Between	0.0957	0.4194	0.1237	0.4093
- Overall	0.0913	0.3453	0.1206	0.3428
F-Statistics	5.27(0.00)	-	6.37(0.00)	-
Wald Chi^2	-	386(0.00)	-	385.94(0.00)
Hausman - Chi^2	16.25(0.234)	-	81.75(0.00)	-

Table 4.12 presents results of regression models with interaction effects where leverage ratios (*LEV1*) of 370 listed firms is regressed on, *JE* which is based on banking courts data, firm-specific variables and the interaction terms between *JE* and quartile dummies of firm-specific variables. Robust standard errors are given in parentheses. The *, **, and *** show statistical significance at 1% level, 5% level, and 10% level respectively. Lower part of the table presents R^2, F-statistics for fixed-effects model and Wald-Chi^2 for random effects model, and results of the Hausman test. P-values for these tests are given in parentheses.. Each regression specification includes five dummy variables for years and twenty-seven dummy variables for industries. *LEV1* is the ratio of long-term debt to total assets whereas. *SIZE* is the natural logarithm of total assets. *PROF* is the ratio of net income to total assets. *TANG* is the value of net fixed assets over total assets. *VOL* is the coefficient of variation of *PROF*. *MVBV* is the ratio of market value per share to book value per share. *NDTS* represents non-debt tax shields and is measured as a ratio of depreciation for the year over total assets.

Table 4.12: Panel B

	PROF		*DIV*	
	Fixed	Random	Fixed	Random
$SIZE_{i,t-1}$	0.061(0.011)*	0.026(0.003)*	0.066(0.011)*	0.029(0.004)*
$TANG_{i,t-1}$	0.081(0.037)**	0.141(0.022)*	0.091(0.036)*	0.15(0.022)*
$PROF_{i,t-1}$	0(0.024)	−0.04(.023)***	−0.003(0.023)	−0.063(0.024)*
$MVBV_{i,\ t-1}$	0.011(0.002)*	0.007(0.002)*	0.01(0.002)*	0.005(0.002)**
VOL_i	0.179(0.066)*	0.001(0.038)	0.067(0.054)	−0.005(0.039)
$NDTS_{i,t-1}$	−0.065(0.007)*	−0.006(0.005)	0.063(0.015)*	−0.004(0.005)
$DIV_{i,t-1}$	−0.05(0.045)	−0.053(0.044)	−0.05(0.043)	−0.056(0.045)
JE_i	−0.022(0.008)*	−0.028(0.006)*	−0.026(0.008)*	−0.032(0.007)*
$SIZE_{i,t-1}$	0.005(0.013)	0(0.009)	0.002(0.013)	−0.003(0.009)
$P1 \times JE$	0.009(0.005)**	0.017(0.004)*		
$P2 \times JE$	0.009(0.004)**	0.013(0.004)*		
$P4 \times JE$	−0.016(0.004)*	−0.02(0.004)*		
$D1 \times JE$			0.01(0.004)**	0.012(0.004)*
Constant	−0.035(0.095)	−0.071(0.086)	−0.338(0.112)*	−0.049(0.084)
R^2 - Within	0.0797	0.0627	0.074	0.0538
- Between	0.1329	0.4456	0.1064	0.412
- Overall	0.1222	0.3632	0.0982	0.3374
F-Statistics	5.9(0.00)	-	4.99(0.00)	-
Wald Chi^2	-	431(0.00)	-	374(0.00)
Hausman - Chi^2	157(0.00)	-	280.42(0.00)	-

Details of the variables and tests reported in Panel B are given under Panel A of Table 4.12. Panel B reports the regression results where *JE* was interacted with the dummy variables based on *PROF* and *DIV*.

4.2.2 Results of the debt-maturity regressions

4.2.2.1 Results of the main effects model

Table 4.13 reports the results of the main effects model where the dependent variable is the ratio of long-term debt to total debt. First column of the table displays the names of the variable whereas the second and third columns report the coefficient of the fixed-effects model and beta coefficients respectively. Beta coefficients have been calculated on the standardized value of the explanatory and the explained variables to show the relative importance of the explanatory variables on a standardized scale.

Table 4.13: Baseline Estimation

Variables	Fixed-Effects	Beta-coefficients
$SIZE_{i,t-1}$	0.093(0.017)*	0.694(0.017)*
$TANG_{i,t-1}$	0.136(0.061)**	0.148(0.061)**
$GROWTH_i$	−0.165(0.069)**	−0.112(0.069)**
VOL_i	0.019(0.012)	0.108(0.012)
QUALITY	0.005(0.034)	0.011(0.034)
JE_i	−0.155(0.057)*	−0.162(0.057)*
Constant	0.01(0.122)	0.01(0.122)
R^2-		
Within	0.0432	
Between	0.1244	
Overall	0.101	
F-Statistics	6.48 (0.00)	

Table 4.13 presents results of main effects models where debt-maturity ratio of 370 KSE listed firms is regressed on a measure of judicial efficiency, *JE,* and other control variables over the period 2001-2006. The second and the third columns show coefficients of these variables from fixed effects model and their beta coefficients. Robust standard errors are given in parentheses. The *, **, and *** show statistical significance at 1% level, 5% level, and 10% level respectively. Lower part of the table presents R^2, and F-statistics for fixed-effects model. The regression specification includes five dummy variables for years and twenty-seven dummy variables for industries. The explained variable $DEMA_{it}$ is the ratio of long-term debt to total debt. *SIZE* is the natural logarithm of total assets. *TANG* is the value of net fixed assets over total assets. *GROWTH i*s the average of annual percentage change in total assets.*VOL* is the coefficient of variation of *PROF*. *QUALITY* is a dummy variable that takes the value of 1 if a firm has positive abnormal profit in most of the sampled years; otherwise 0.*JE* is the ratio of pending cases at the end of the year to cases initiated during a year.

debt-maturity ratio. The standard errors and t-statistics are the same for both the usual and beta-coefficients. Standard errors are shown in parenthesis with each explanatory variable.

As expected, firm size has positive coefficient. Its beta coefficient shows that firm size has the largest economic impact on the firms' debt-maturity ratios. For example, one standard deviation increase in firm size increases the debt-maturity ratio by 0.694 standard deviations. This confirms to the well-established signaling and trade-off theories of debt-maturity structure.

Similar to the effect of firm size on debt-maturity structure, the second variable *TANG* also has positive and statistically significant coefficient. Its coefficient in the fixed-effects model shows that 100 percentage points increase in the ratio of fixed assets-to-total assets increases the debt-maturity ratio by 13.6 percentage points. Its relative economic significance is given by its beta coefficient which is 0.148, being third largest coefficient after *SIZE* and *JE*. This statistically and economically significant coefficient confirms the maturity-matching hypothesis.

The variable $GROWTH_i$ has negative coefficient and is significant only 5% level. And the next two variables do not have any statistical significance. The results indicate that volatility of net income (*VOL*) and a firm's quality ($QUALITY_i$) are not associated with the maturity structure of the firm's debt at reasonable level of statistical significance. Also their economic significance is the lowest among all explanatory variables.

Finally, the coefficient of *JE* suggests that worsening judicial efficiency is associated with lower debt-maturity ratios. The relationship is significant at 1% level of significance. Besides the high statistical significance, the coefficient of *JE* is also economically large, being the second largest after *SIZE*. For example, one standard deviation increase in judicial inefficiency results in 0.162 standard deviation decrease in

the long-term debt-to-total-debt ratio. This confirms the hypothesis that lenders hesitate to extend long-term debt when judicial efficiency is low.

6.2.2 Results of regressions with interaction terms

To explore the possibility that worsening judicial efficiency does not impact all firms equally with respect to their debt maturity level, interaction terms among the selected explanatory variables and the measure of judicial efficiency are used in the next set of regressions. To avoid the problem of multicollinearly, interaction terms for all variables are not included in one regression. Rather a separate regression is estimated to interact three dummy variables based on the quartile of a selected variable with the measure of judicial efficiency. The three dummy variables are based on the 1^{st}, 2^{nd}, and 4^{th}quartile of the included explanatory variables where the missing 3rd quartile serves as reference category. Since the variable *QUALITY* is a dummy variable, the concept of quartile does not apply here, which means that only one interaction terms is available for it.

Results of these separate regressions are reported in Panel A and B of Table 4.14. The heads of the columns show the names of the variable for which the interaction terms have been included. Each regression specification includes five dummy variables for years and twenty-seven dummy variables for industries. The joint significance the years' dummies and industries' dummies is tested with Wald-test. In all regressions, all these dummy variables were found to be jointly significant at 1%. Wald-test is also applied to the interaction terms in each regression to test the joint significance of these interactions.

Since results of the Hausman test in all regression models in leverage regressions indicated that fixed effects model better fit the data, random effects models are not estimated and reported in debt-maturity regressions for the sake of parsimony. Dummy variables for the third quartile of included variables are not included in the regression so that the missing quartile serves as a reference category, the coefficient of *JE* represents slope of judicial efficiency for firms in the third quartile of the given variable in all regressions of Panel A and B of Table 4.14. For example, coefficient of *JE* in Table 4.14

under the column *SIZE* is actually the slope of the judicial efficiency for firms belonging to the third quartile of *SIZE*.

Table 4.14: Panel A - Differential Impact of *JE* on Debt-Maturity

Variables	*SIZE*	*TANG*	*GROWTH*
$SIZE_{i,t-1}$	0.07(0.018)*	0.087(0.018)*	0.093(0.017)*
$TANG_{i,t-1}$	0.125(0.06)**	0.092(0.063)	0.136(0.061)**
$GROWTH_i$	−0.175(0.07)*	−0.262(0.072)*	0.000(0.00)
VOL_i	0.006(0.015)	0.024(0.012)***	−0.04(0.02)**
QUALITY	−0.001(0.032)	0.013(0.035)	0.005(0.034)
JE_i	−0.144(0.05)*	−0.206(0.056)*	−0.012(0.164)
S1×JE	−0.072(0.029)*		
S2×JE	−0.02(0.015)		
S4×JE	0.063(0.018)*		
T1×JE		−0.046(0.02)**	
T2×JE		−0.029(0.012)**	
T4×JE		0.069(0.013)*	
GT×JE			0.056(0.08)
G2×JE			0.077(0.061)
G4×JE			0.11(0.115)
Constant	0.073(0.076)	0.073(0.076)	0.059(0.123)
R^2 - Within	0.0597	0.0432	0.0774
Between	0.1234	0.1244	0.2029
Overall	0.1019	0.101	0.1709
F-Statistics	5.10 (0.00)	5.52 (0.00)	4.20 (0.00)

Table 4.14: Panel A and Panel B present results of regression models with interaction terms where debt-maturity ratio of 370 KSE listed firms is regressed on a measure of judicial efficiency, *JE*, firm-specific variables, and the interaction terms between quartile dummies of the explanatory variables and the variable *JE* over the period 2001-2006. Robust standard errors are given in parentheses. The *, **, and *** show statistical significance at 1% level, 5% level, and 10% level respectively. Lower part of the table presents R^2, and F-statistics for fixed-effects model. The regression specification includes five dummy variables for years and twenty-seven dummy variables for industries. The explained variable $DEMA_{it}$ is the ratio of long-term debt to total debt. *SIZE* is the natural logarithm of total assets. *TANG* is the value of net fixed assets over total assets. *GROWTH i*s the average of annual percentage change in total assets. *VOL* is the coefficient of variation of *PROF*. *QUALITY* is a dummy variable that takes the value of 1 if a firm has positive abnormal profit in most of the sampled years; otherwise 0.*JE* is the ratio of pending cases at the end of the year to cases initiated during a year.

Coefficients of the interaction terms like *S1*JE*, *S2*JE* and *S4*JE* are the incremental slopes of judicial efficiency above (if coefficient of the interaction term is positive) or below (if coefficient of the interaction term is negative) the slope of *JE.* Similar interpretations apply to other variables in their respective columns.

The differential slopes of the interaction term *S1*JE* and *S4*JE* are significantly different from the reference category at 1% level of significance. Coefficients of the first two interaction terms, *S1*JE* and*S2*JE,* are negative while coefficient of the last interaction term *S4*JE* is positive. As mentioned above, *JE* represents the coefficient of *JE* for firms belonging to the 3rd quartile of *SIZE*. The coefficient of *JE* is –0.144 indicating that 100 percentage points drop in judicial efficiency reduces debt-maturity ratio of firms in the 3rd quartile of *SIZE* by 14.4 percentage points. This effect is severe for firms that belong to the 1st quartile of *SIZE*. This is evident from the differential coefficient of *S1*JE*, which is –0.072. This negative coefficient suggests that worsening judicial efficiency has an additional negative effect of 7.2 percentage points on the debt-maturity ratio of firms in the 1st quartile of *SIZE* as compared to its effect on debt-maturity ratio of firms in the 3rd quartile of *SIZE*. The overall impact of judicial inefficiency on the debt-maturity of firms in the 1st quartile of *SIZE* is −21.6 percentage points (−14.4 −7.2). This impact is far greater than the impact of worsening judicial efficiency on the debt-maturity ratios of firms in the 4th quartile of *SIZE*. For example, the impact of worsening judicial efficiency on debt-maturity of firms in the 4th quartile of *SIZE* is only −9.1 percentage points (−14.4 + 6.3). These findings are in line with the hypothesis that firm size reduces information asymmetries and serves as a proxy for the firm's ability to absorb unexpected shocks. Such features of borrowers reduce the lenders' concern about the adverse selection and subsequent borrowers' delinquency.

The differential coefficients in the third column of Table 4.14 for the variable *TANG* indicate almost similar results as discussed above. The results indicate that poor enforcement of contracts has smaller negative impact on the debt-maturity levels of firms that have more fixed assets-to-total assets as compared to firms that have less fixed assets-to-total assets. For example, the overall impact of judicial inefficiency on the debt-

maturity level is only −0.137 for firms in the 4th quartile of *TANG* whereas it is −0.252, −0.235, and −0.206 for firms in the 1st, 2nd and 3rd quartile of *TANG* respectively. These results indicate that firms having more fixed assets as a percentage of total assets are affected less by worsening judicial efficiency.

Table 4.14: Panel B

	VOL	*QUALITY*
$SIZE_{i,t-1}$	0.093(0.017)*	0.093(0.017)*
$TANG_{i,t-1}$	0.136(0.061)**	0.14(0.061)**
$GROWTH_i$	-0.649(0.15)*	−0.41(0.167)*
VOL_i	0.012(0.025)	−0.047(0.027)***
QUALITY	0.005(0.034)	−0.091(0.138)
JE_i	0.333(0.079)*	0.001(0.248)
V1×*JE*	−0.547(0.098)*	
V2×*JE*	0.009(0.039)	
V4×*JE*	−0.173(0.062)*	
Q×*JE*		0.111(0.135)
Constant	−0.474(0.22)**	0.059(0.1)*
		0.057(0.05)
R^2 - Within	0.0432	0.0439
Between	0.1244	0.1239
Overall	0.101	0.102
F-Statistics	5.52 (0.00)	4.84 (0.00)

Table 4.14: Panel B present results of regression models with interaction terms where debt-maturity ratio of 370 KSE listed firms is regressed on a measure of judicial efficiency, *JE,* firm-specific variables, and the interaction terms between quartile dummies of *VOL and QUALITY* and the variable *JE* over the period 2001-2006. Robust standard errors are given in parentheses. The *, **, and *** show statistical significance at 1% level, 5% level, and 10% level respectively. Lower part of the table presents R^2, and F-statistics for fixed-effects model. The regression specification includes five dummy variables for years and twenty-seven dummy variables for industries. The explained variable $DEMA_{it}$ is the ratio of long-term debt to total debt. *SIZE* is the natural logarithm of total assets. *TANG* is the value of net fixed assets over total assets. *GROWTH i*s the average of annual percentage change in total assets. *VOL* is the coefficient of variation of *PROF*. *QUALITY* is a dummy variable that takes the value of 1 if a firm has positive abnormal profit in most of the sampled years; otherwise 0.*JE* is the ratio of pending cases at the end of the year to cases initiated during a year.

The variable *GROWTH* was dropped by the econometric software STATA when interaction terms of its quartiles were included. This may be because of high collinearity between *GROWTH* and its interaction terms. To test it in an alternative way, a dummy

GT variable was created based on the 50th percentile of *GROWTH*. *GT* assumed a value of 1 if a firm had a *GROWTH* value of more than the 50th percentile of *GROWTH*, otherwise 0. *GT* was interacted with the *JE*. A separate regression was estimated to include this interaction term *GT*JE* instead of including the dummy variables based on the quartiles of *GROWTH*. Results of the regression showed that *GT*JE* has a negative and statistically significant value of −0.298. However, the main variable *GROWTH* showed an insignificant coefficient. Thus growth opportunities and their interaction terms do not present a clear picture in the differential equation of debt-maturity structure.

The last two variables, reported in Panel B of Table 4.14, do not show consistent or significant results as well. For example, the coefficient of *VOL* is not statistically significant at any conventional level. Its interaction terms, though statistically significant, do not demonstrate a consistent pattern. Debt-maturity ratios of firm in the 1st, 2nd, 3rd, and 4th quartiles of *VOL* change by −0.214, 0.3339, 0.333, and 0.16 units when there is one unit positive change in the *JE* (positive change in *JE* shows deterioration in the efficiency of justice). And finally, neither the variable *QUALITY* nor its interaction term is significant at conventional levels of 1%, 5% or 10%.

CHAPTER 5

CONCLUSIONS AND POLICY IMPLICATIONS

5.1 Conclusions

The main objectives of this dissertation were to: (i) quantify the effect of judicial efficiency on both leverage and debt-maturity structure of firms listed at KSE; (ii) know the importance of firm-specific characteristics in leverage and debt-maturity structure when the judicial efficiency worsens; and (iii) highlight the importance of efficient judicial system for the development of capital market. The dissertation accomplishes these objectives by analyzing the impact of judicial efficiency and other firms-specific factors on leverage and debt-maturity structure of 370 KSE-listed non-financial firms over the period 2001-2006.

In the baseline estimation, all important firm-specific determinants of leverage ratios are included with the measure of judicial efficiency. The baseline results indicate that leverage ratios increase with the size of the firm, ratio of fixed-assets-to-total assets, and decreases with profitability, net income volatility, dividends payments and growth opportunities. The largest economic effect on leverage ratio is that of the size of a firm. The trade-off theory and the information asymmetry theory appear to be best explaining leverage ratios. Interestingly, the judicial inefficiency does not have any statistically significant association with leverage ratios. This might be due to the composition effect which means that judicial efficiency does not influence all firms alike. To check for such a possibility, differential slopes were estimated by interacting the measure of judicial efficiency with dummy variables that were based on the quartiles of the included explanatory variables. Results of these regressions show that worsening judicial efficiency increases leverage ratios of large firms and decrease leverage ratios of small firms which is an indication that creditors shift credit away from small firms to large firms in the presence of inefficient judicial system. Results also indicate that the effect of inefficient courts is greater on leverage ratios of firms that have fewer tangible assets as a

percentage of total assets than on leverage ratios of firms that have more tangible assets. And finally there is some evidence that firms with more volatile net incomes are affected more than firms with less volatile net incomes when judicial efficiency decreases.

In the debt-maturity regressions, the baseline results show that large firms and firms with more tangible assets have more long-term debts whereas growing firms have more short-term debt. The results clearly indicate that debt-maturity decreases with inefficiency of judiciary; however, volatility of net income and firm's quality do not show any statistically significant relationship with debt-maturity ratio. Results of the next set of regressions that include interaction terms between judicial efficiency and dummy variables based on the quartiles of the included explanatory variables show that debt-maturity level of small firms falls more than the fall in the debt-maturity ratio of large firms when judicial efficiency deteriorates. Similarly, worsening judicial efficiency has greater negative impact on the debt-maturity ratios of firms with fewer tangible assets than on firms with more tangible assets.

5.2 Policy Implications

Results of both leverage and debt-maturity regressions have important implications for financial deepening and capital-market development. Results indicate that overall level of leverage in the economy is not affected by inefficiency of the judicial system. However, this does not mean that judicial efficiency has no impact on leverage ratios. The results indicate that under inefficient judicial system creditors reduce their lending to small firms and firms with little collateral and redistribute the credit to large firms. This is why judicial inefficiency does not change volume of credit, but changes distribution of the credit. Results also suggest that inefficient judicial system not only reduces debt-maturity at aggregate level, but it also has an additional negative impact on the debt-maturity ratios of small firms and firms with little collaterals. These results highlight the importance of judicial efficiency for small firms both in their capital structures and debt-maturity structures. Being unable to borrow and achieve optimum capital structure, small firms lose one important and cheaper sources of capital. Second, small firms under

inefficient judicial system will find it difficult to borrow for the long-term. The excessive use of short-term financing may be very risky for small firms because their cash flows are more likely to fluctuate than those of large firms. Second, in developing countries like Pakistan, small firms are considered to be the engine of economic growth. Difficulty in accessing long-term financing means that their growth opportunities remain limited. In addition, if they finance long-term projects with short-term debts, it will create a maturity mismatch between assets and liabilities, increasing the chances of financial distress which will subject such firms to those many indirect costs of financial distress/bankruptcy like lower expenditure on research and development and employees training, deterioration in quality of goods and services and decline in sales. The inability of small firms to borrow optimally for exploiting grow opportunities will translate into economic stagnation of the overall economy.

These results also have implications for the diversification of loan portfolios of the banking sector. Under inefficient judicial system the banks' loan portfolios will have greater percentage of investment held in large firms. This engenders two main issues regarding diversification of loan portfolios. First, the banks' loan portfolios will remain undiversified across different sizes of firms and across firms with different collateral ratios. Second, and the most important one, is that lending to large firms will concentrate large amounts in fewer loans. This will violate the golden principle of banks in diversification "small loans to large number of borrowers"

Several measures can be suggested to mitigate the negative impact of judicial inefficiency. The first measure, of course, is to expedite the process of pending cases resolution at all levels of the high courts. Since this requires huge allocation of additional resources, one alternative is to focus specifically on the efficiency of banking courts. Banking courts are limited in number and hence can be targeted even with limited resources. Second, the network of banking courts can be increased to lighten the burden on the existing courts. In the meantime, as the results suggest that information availability about the borrowers plays an important role both in the leverage and the debt-maturity decisions of creditors, information sharing among financial institution should be

encouraged and banks credit monitoring systems should be strengthened. At present, the Credit Information Bureau (CIB) is performing the duty of obtaining and disseminating information related to credit history of the borrowers. CIB is helpful in reducing the adverse selection problem however, results of the study indicate that information unavailability is still a big issue in lending decisions. This highlights the need for improvement in the functioning of CIB . The second problem of information asymmetry i-e moral hazards, can be overcome by strengthening the monitoring system.

5.3 Suggestions for Future Research

The results of this study can be improved or validated by using several alternative measures of the variables used in this study. First, when data on median time analysis are available, it should be used as a proxy for judicial efficiency. With the automation project of the district high courts, such data are expected to be available in couple of years. Median time measures the time taken by a court of law in deciding a case from the time of filing a suit to the time of its solution. Such a measure is considered more reliable..

Second alternative measure of judicial efficiency can be in the form of an index that assigns values to various aspects of the judicial process. For example, such an index can include information like number of judges in a district high court, number of other employees, and the district high court's annual budget etc.

Besides the tools and techniques used in this study, a stochastic frontier approach can also be used to study the relationship between judicial efficiency and firms' financial structures. Stochastic frontier approach can greatly help in accounting for the limited variation in the judicial statistics.

This study identified judicial districts where listed firms have head offices. An alternative to this can be to identify judicial districts where listed firms have factories. This can increase the number of judicial districts and thus increase variation in the data. This is

because many firms have head offices in big cities like Karachi, Lahore, and Rawalpindi where their factories are dispersed throughout the country.

It will also be interesting to study whether firms react to inefficient judicial system in their investment decisions. For example, liquid assets like cash and cash equivalents do not generate accounting returns. Consequently, firms are naturally tempted to invest less in liquids in order to maximize the wealth of shareholders. But insufficient balance of liquid assets can lead to financial distress and ultimate bankruptcy of the firm. However, if judicial efficiency is low, firms will manage to survive even with little cash on hand. Thus it can be expected that cash to total assets ratios will be lower in districts where judicial efficiency is low. Such a practice will create moral hazard problems for lenders. In a future research, this possibility can be checked in a similar way as in this study.

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APPENDICES

Figure A.1: Ratio of Pending Cases/Disposed-Off Cases (*JE1*) across Judicial Districts

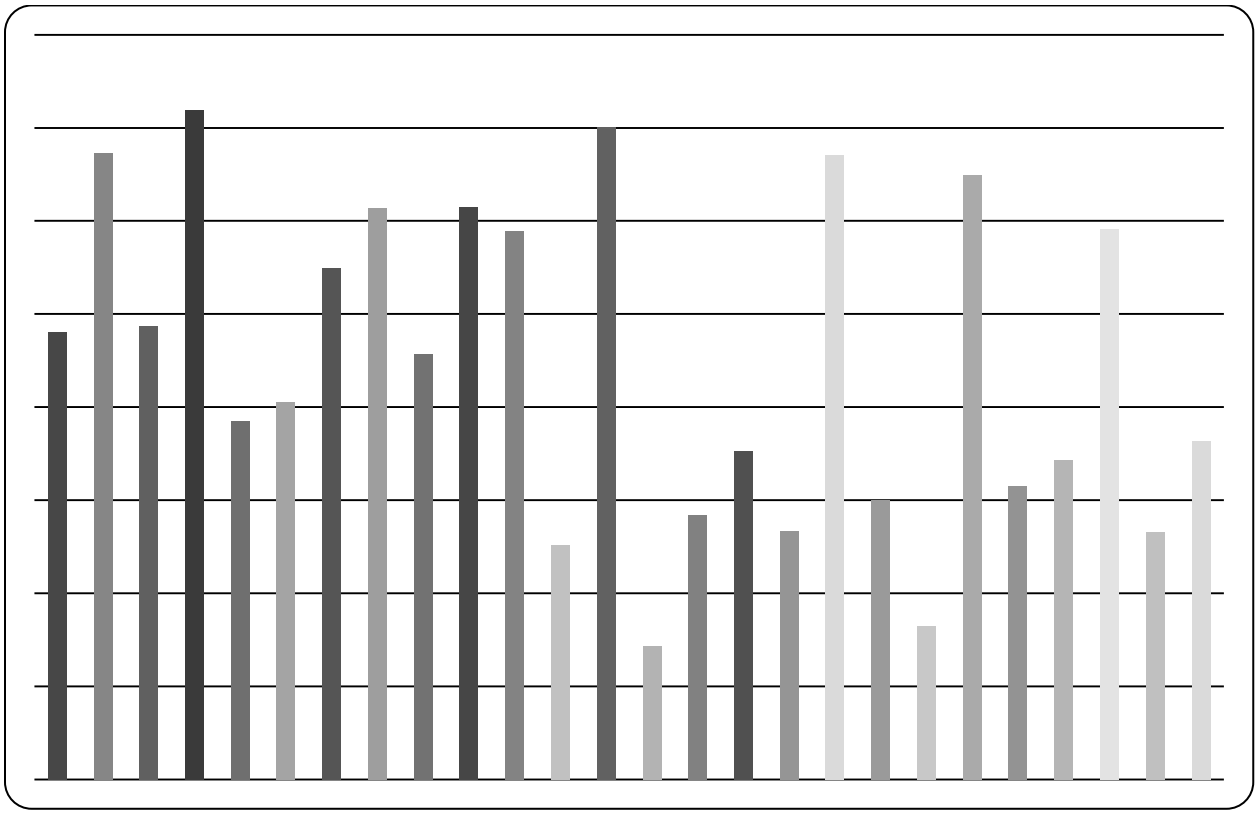

Figure A.2: Ratio of Pending Cases/Incoming Cases (*JE2*) across Judicial Districts

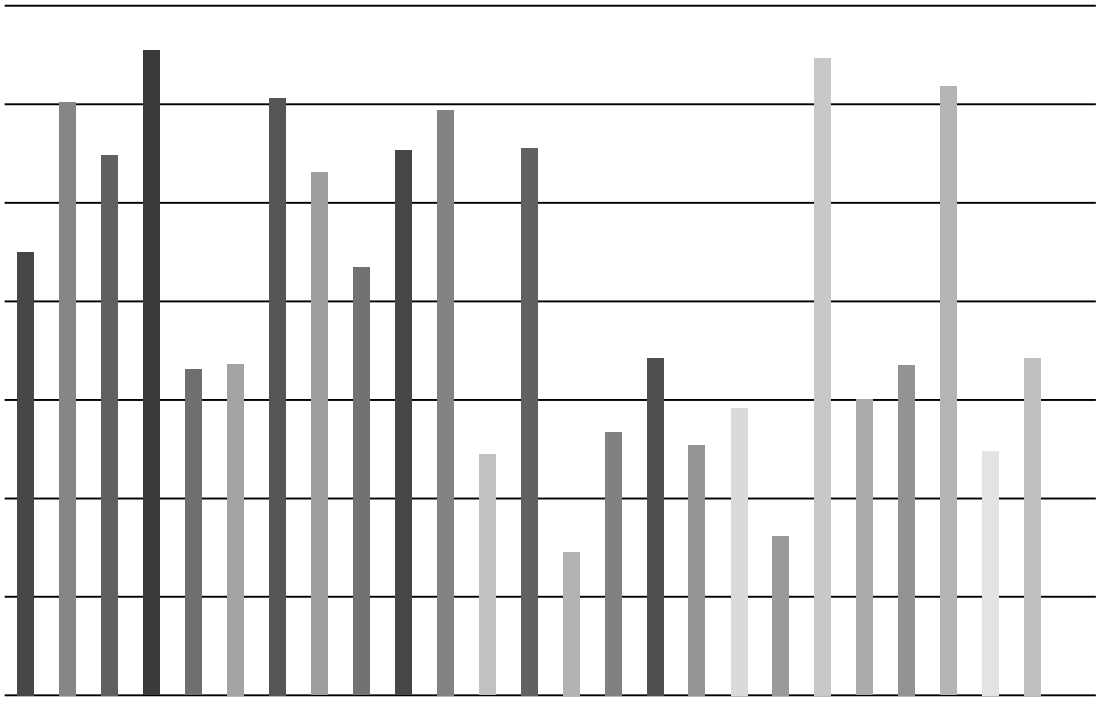

Figure A.3: Ratio of Pending Cases/Population (*JE3*) Across Judicial Districts

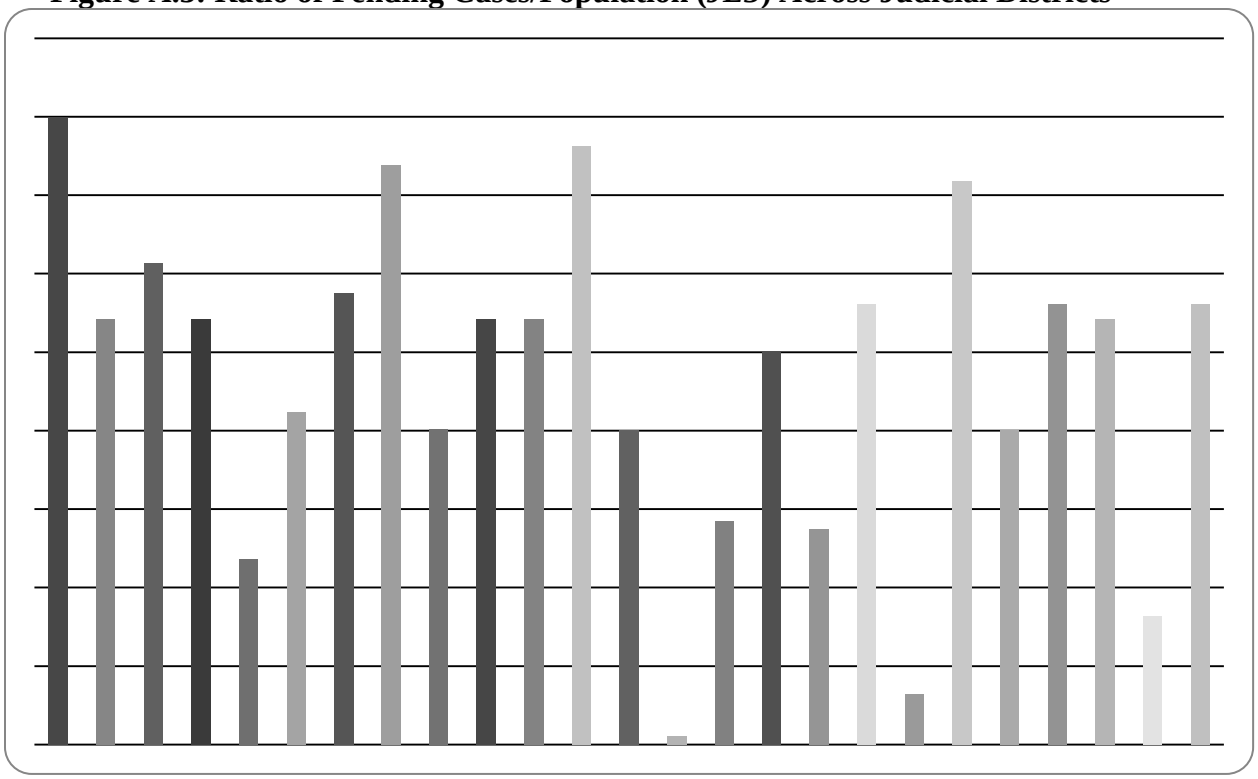

Table A.1: List of Firms Included in the Analysis

S. No	KSE Symbol	Industry Codes as per Table 4.4 pp.38	Name of the Firm
1	ABOT	28	Abbott Laboratories (Pakistan) Ltd.
2	ADAMS	14	Adam Sugar Mills Ltd.
3	ADPP	12	Adil Polypropylene Products Ltd.
4	ADTM	8	Adil Textile Mills Ltd.
5	ADOS	21	Ados Pakistan Ltd.
6	AGIL	23	Agriauto Industries Ltd.
7	AHTM	10	Ahmed Hassan Textile Mills Ltd.
8	AHSP	8	Ahmed Spinning Mills Ltd.
9	AACIL	15	Al-Abbas Cement Industries Ltd.
10	AABS	14	Al-Abbas Sugar Mills Ltd.
11	AASM	12	Al-Abid Silk Mills Ltd.
12	AZTM	8	Al-Azhar Textile Mills Ltd.
13	AGTL	22	Al-Ghazi Tractors Ltd.
14	AATM	8	Ali Asghar Textile Mills Ltd.
15	AKGL	35	Al-Khair Gadoon Ltd.
16	AWTX	8	Allawasaya Textile & Finishing Mills Ltd.
17	AEIL	22	Allwin Engineering Industries Ltd.
18	ALNRS	14	Al-Noor Sugar Mills Ltd.
19	ALQT	8	Al-Qadir Textile Mills Ltd.
20	AQTM	8	Al-Qaim Textile Mills Ltd.
21	ALTN	18	Altern Energy Ltd.
22	ANSS	14	Ansari Sugar Mills Ltd.
23	APOT	8	Apollo Textile Mills Ltd.
24	ARPAK	35	Arpak International Investment Ltd.
24	ARPAK	35	Arpak International InvestmentsLtd.
25	ADMM	10	Artistic Denim Mills Ltd.
26	ARUJ	10	Aruj Garment Accessories Ltd.
27	ASHT	9	Ashfaq Textile Mills Ltd.
28	ASTM	8	Asim Textile Mills Ltd.
29	AIL	32	Associated Industries Ltd.
30	ATBA	23	Atlas Battery Ltd.
31	ATLH	22	Atlas Honda Ltd.
32	ACPL	15	Attock Cement Pakistan Ltd
33	ATRL	17	Attock Refinery Ltd.
34	ABC	23	Automotive Battery Co. Ltd.
35	APT	29	Aventis Pharma (Pakistan) Ltd.
36	AYTM	8	Ayesha Textile Mills Ltd.

37	AZAMT	8	Azam Textile Mills Ltd.
38	KTML	10	Kohinoor Weaving Mills Ltd.
38	BAFS	14	Baba Farid Sugar Mills Ltd.
39	BCML	8	Babri Cotton Mills Ltd.
40	BSML	8	Baig Spinning Mills Ltd.
41	BGL	34	Baluchistan Glass Ltd.
42	BWHL	23	Baluchistan Wheels Ltd.
43	BNWM	11	Bannu Woollen Mills Ltd.
44	BATA	32	Bata Pakistan Ltd.
45	BAPL	29	Bawany Air Products Ltd.
46	BELA	23	Bela Automotives Ltd.
47	BERG	29	Berger Paints Pakistan Ltd.
48	BWCL	15	Bestway Cement Ltd.
49	BHAT	10	Bhanero Textile Mills Ltd.
50	BIFO	29	Biafo Industries Ltd.
51	BILF	8	Bilal Fibres Ltd.
52	BTL	10	Blessed Textiles Ltd.
53	BOC	29	BOC Pakistan Ltd,
54	BCL	21	Bolan Castings Ltd.
55	BOSI	17	Bosicor Pakistan Limited.
56	BROT	8	Brothers Textile Mills Ltd.
57	BUXL	29	Buxly Paints Ltd.
58	CTTL	26	Callmate Telips Telocom Ltd.
59	CARF	10	Carvan East Fabrics Ltd.
60	CEFP	30	Central Forest Products Ltd.
61	CEPB	30	Century Paper & Board Mills Ltd.
62	CWSM	8	Chakwal Spinning Mills Ltd.
63	CHAS	14	Chashma Sugar Mills Ltd.
64	CHCC	15	Cherat Cement Company Ltd.
65	CPSL	30	Cherat Papersack Ltd.
66	CPL	29	Clariant Pakistan Ltd.
67	CLOV	33	Clover Pakistan Ltd.
68	COLG	29	Colgate-Palmolive (Pakistan) Ltd.
69	CML	10	Colony Textile Mills Ltd.
69	CML	10	Colony Mills Ltd. (Colony Textile Mills Ltd.)
70	CRSM	8	Crescent Spinning Mills Ltd.
71	CSAP	21	Crescent Steel And Allied Products Ltd.
72	CSMD	14	Crescent Sugar Mills And Distillery Ltd.
73	DGKC	15	D.G. Khan Cement Company Ltd.
74	DMTX	8	D.M. Textile Mills Ltd.
75	DBCI	15	Dadabhoy Cement Industries Ltd.
76	DBSL	30	Dadabhoy Sack Ltd.

77	DADX	21	Dadex Eternit Ltd.
78	DNCC	15	Dandot Cement Company Ltd.
79	DSML	8	Dar Es Salaam Textile Mills Ltd.
80	DAAG	29	Data Agro Ltd.
81	DATM	8	Dawood Cotton Mills Ltd.
82	DAWH	27	Dawood Hercules Chemicals Ltd.
83	DWAE	23	Dewan Automotive Engineering Ltd.
84	DCL	15	Dewan Cement Ltd. (Pakland Cement Ltd.)
85	DFML	22	Dewan Farooque Motors Ltd.
86	DKTM	8	Dewan Khalid Textile Mills Ltd.
87	DMTM	8	Dewan Mushtaq Textile Mills Ltd.
88	DSFL	12	Dewan Salman Fibre Ltd.
89	DWSM	14	Dewan Sugar Mills Ltd.
90	DWTM	8	Dewan Textile Mills Ltd.
91	DIIL	35	Diamond Industries Ltd.
92	DINT	8	Din Textile Mills Ltd.
93	DREL	35	Dreamworld Ltd.
94	DYNO	29	Dynea Pakistan Ltd.
95	ECOP	35	Eco Pack Ltd.(Plastobag Ltd.)
96	ELSM	8	Ellcot Spinning Mills Ltd.
97	EMCO	34	Emco Industries Ltd.
98	ENGRO	27	Engro Chemical Pakistan Ltd.
99	EXIDE	23	Exide Pakistan Ltd.
100	FASM	10	Faisal Spinning Mills Ltd.
101	FRSM	14	Faran Sugar Mills Ltd.
102	FSWL	10	Fateh Sports Wear Ltd.
103	FTHM	10	Fateh Textile Mills Ltd.
104	FAEL	8	Fatima Enterprises Ltd.
105	FCCL	15	Fauji Cement Company Ltd.
106	FFBL	27	Fauji Fertilizer Bin Qasim Ltd
107	FFC	27	Fauji Fertilizer Company Ltd.
108	FTM	8	Fawad Textile Mills Ltd.
109	FZCM	8	Fazal Cloth Mills Ltd.
110	FZTM	8	Fazal Textile Mills Ltd.
111	FECTC	15	Fecto Cement Ltd.
112	FECS	14	Fecto Sugar Mills Ltd.
113	FEROZ	28	Ferozsons Laboratories Ltd.
114	FRCL	34	Frontier Ceramics Ltd.
115	GADT	8	Gadoon Textile Mills Ltd.
116	GAMON	35	Gammon Pakistan Ltd.
117	GATI	12	Gatron (Industries) Ltd.
118	GHNI	22	Ghandhara Industries Ltd.

119	GHNL	22	Ghandhara Nissan Ltd.
120	GAIL	22	Ghani Automobiles Ltd.
120	GAIL	22	Ghani Automobiles Industries Ltd.
121	GHGL	34	Ghani Glass Ltd.
122	GWLC	15	Gharibwal Cement Ltd.
123	GFIL	10	Ghazi Fabrics International Ltd.
124	GLPL	33	Gillette Pakistan Ltd.
125	GLAT	8	Glamour Textile Mills Ltd.
126	GLAXO	28	Glaxosmithkline (Pakistan) Ltd.
127	GOEM	8	Globe Textile Mills (OE) Ltd.
128	GLOT	8	Globe Textile Mills Ltd.
129	GLIN	33	Goodluck Industries Ltd.
130	GRAYS	35	Grays Of Cambridge (Pakistan) Ltd.
131	GATM	10	Gul Ahmed Textile Mills Ltd.
132	GUSM	8	Gulistan Spinning Mills Ltd.
133	GUTM	8	Gulistan Textile Mills Ltd.
134	GSPM	8	Gulshan Spinning Mills Ltd.
135	HAL	14	Habib - ADM Ltd.(Habib Arkady LTD.)
136	HABSM	14	Habib Sugar Mills Ltd.
138	HMIM	8	Haji Mohammad Ismail Mills Ltd.
139	HAJT	8	Hajra Textile Mills Ltd.
140	HLEL	10	Hala Enterprises Ltd.
141	HATM	10	Hamid Textile Mills Ltd.
142	HOL	20	Haroon Oils Ltd.
143	HWQS	14	Haseeb Waqas Sugar Mills Ltd.
144	HACC	35	Hashimi Can Company Ltd.
145	HADC	35	Haydari Construction Company Ltd.
146	HINOON	28	Highnoon Laboratories Ltd.
147	HINO	22	Hinopak Motors Ltd.
148	HIRAT	8	Honda Atlas Cars (Pakistan) Ltd.
149	HSPI	21	Huffaz Seamless Pipe Industries Ltd.
150	HUSI	10	Husein Industries Ltd.
151	HUSS	14	Husein Sugar Mills Ltd.
152	IBFL	12	Ibrahim Fibres Ltd.
153	ICCT	9	ICC Textiles Ltd.
154	ICI	29	ICI Pakistan Ltd.
155	IDEN	18	Ideal Energy Ltd.
156	IDSM	8	Ideal Spinning Mills Ltd.
157	IDRT	8	Idrees Textile Mills Ltd.
158	IDYM	8	Indus Dyeing & Manufacturing Co. Ltd.
159	INDF	33	Indus Fruit Products Ltd.
160	INDU	22	Indus Motor Company Ltd.

161	INDP	12	Indus Polyester Company Ltd.
162	INIL	21	International Industries Ltd.
163	INKL	10	International Knitwear Ltd.
164	ISTM	10	Ishaq Textile Mills Ltd.
165	ISHT	8	Ishtiaq Textile Mills Ltd.
166	ILTM	8	Island Textile Mills Ltd.
167	ISIL	33	Ismail Industries Ltd.
168	ICL	29	Ittehad Chemicals Ltd.
169	JATM	8	J.A. Textile Mills Ltd.
170	JKSM	8	J.K. Spinning Mills Ltd.
171	JDMT	8	Janana De Malucho Textile Mills Ltd.
172	JPGL	18	Japan Power Generation Ltd.
173	JVDC	15	Javedan Cement Ltd.
174	JDWS	14	JDW Sugar Mills Ltd.
175	JOPP	24	Johnson & Philips (Pakistan) Ltd.
176	JUBS	10	Jubilee Spinning & Weaving Mills Ltd.
177	KPL	31	Kakakhel Pakistan Ltd.
178	KCL	34	Karam Ceramics Ltd.
179	KOE	30	Kashmir Edible Oils Ltd.
180	KPUS	14	Khairpur Sugar Mills Ltd.
181	KSTM	8	Khalid Siraj Textile Mills Ltd.
182	KHYT	10	Khyber Textile Mills Ltd.
183	KOHC	15	Kohat Cement Ltd.
184	KOHTM	8	Kohat Textile Mills Ltd.
185	KOHE	18	Kohinoor Energy Ltd.
186	KOIL	10	Kohinoor Industries Ltd.
187	KOHP	18	Kohinoor Power Company Ltd.
188	KOSM	8	Kohinoor Spinning Mills Ltd.
189	KOHS	14	Kohinoor Sugar Mills Ltd.
190	KTML	10	Kohinoor Textile Mills Ltd.
191	KSBP	23	KSB Pumps Company Ltd.
192	LAKST	16	Lakson Tobacco Company Ltd.
193	LATM	13	Latif Jute Mills Ltd.
194	LEUL	32	Leather Up Ltd.
195	ANL	8	Legler-Nafees Denim Mills Ltd.
196	LPGL	29	Leiner Pak Gelatine Ltd.
197	LIBT	10	Libaas Textile Ltd.
198	LIBM	12	Liberty Mills Ltd.
199	LUCK	15	Lucky Cement Ltd.
200	MTM	8	Mahmood Textile Mills Ltd.
201	MLCF	15	Maple Leaf Cement Factory Ltd.
202	MQTM	8	Maqbool Textile Mills Ltd.

203	MARI	20	Mari Gas Company Ltd.
204	MSOT	10	Masood Textile Mills Ltd.
205	MDTM	8	Mehr Dastagir Textile Mills Ltd.
206	MRNS	14	Mehran Sugar Mills Ltd.
207	MERIT	30	Merit Packaging Ltd.
208	MTIL	10	Mian Textile Industries Ltd.
209	MTL	22	Millat Tractors Ltd.
210	MIRKS	14	Mirpurkhas Sugar Mills Ltd.
211	MFFL	33	Mitchell'S Fruit Farms Ltd.
212	MFTM	10	Mohammad Farooq Textile Mills Ltd.
213	MOON	11	Moonlite (Pak) Ltd.
214	MUBT	10	Mubarak Textile Mills Ltd.
215	MUKT	8	Mukhtar Textile Mills Ltd.
216	MUREB	33	Murree Brewery Company Ltd.
217	MUCL	15	Mustehkam Cement Ltd.
218	NPSM	8	N.P. Spinning Mills Ltd.
219	NATM	8	Nadeem Textile Mills Ltd.
220	NAGC	8	Nagina Cotton Mills Ltd.
221	NAKI	9	Nakshbandi Industries Ltd.
222	NATF	33	National Foods Ltd.
223	NRL	17	National Refinery Ltd.
224	HTML	8	Nayab Spinning & Weaving Mills Ltd.
224	HTML	8	Nayab Spin.& Weav. Mills Ltd
225	NESTLE	33	Nestle Milkpak Ltd
226	NICL	29	Nimir Industrial Chemicals Ltd.
227	NIRE	29	Nimir Resins Ltd.
228	NINA	10	Nina Industries Ltd.
229	NML	10	Nishat Mills Ltd.
230	NCL	10	Nishat(Chunian) Ltd.
231	NOPK	33	Noon Pakistan Ltd.
232	NONS	14	Noon Sugar Mills Ltd.
233	NTM	8	Noon Textile Mills Ltd.
234	OGDC	20	Oil & Gas Development Corp. (OGDC)
235	OLSM	8	Olympia Spinning & Weaving Mills Ltd.
236	OLTM	8	Olympia Textile Mills Ltd.
237	OTSU	28	Otsuka Pakistan Ltd.
238	PKGS	30	Packages Ltd.
239	PAKD	26	Pak Datacom Ltd.
240	PAEL	24	Pak Elektron Ltd.
241	PLC	32	Pak Leather Crafts Ltd.
242	PSMC	22	Pak Suzuki Motor Company Ltd.
243	PCAL	24	Pakistan Cables Ltd.

244	CWSM	8	Pakistan Cement Ltd.(Chakwal Cement Co. Ltd.)
245	PECO	21	Pakistan Engineering Company Ltd.
246	PGCL	29	Pakistan Gum & Chemicals Ltd.
247	PHDL	35	Pakistan Hotels Developers Ltd.
248	PHL	35	Pakistan House International Ltd.
249	PICT	25	Pakistan Int. Container Ltd.
250	PIAA	25	Pakistan International Airlines Corporation Ltd.
251	PNSC	25	Pakistan National Shipping Corporation.
252	POL	20	Pakistan Oilfields Ltd.
253	PPP	30	Pakistan Paper Products Ltd.
254	PPC	30	Pakistan Papersack Corporation Ltd.
255	PPTA	29	Pakistan PTA Ltd.
256	PPVC	29	Pakistan PVC Ltd.
257	PRL	17	Pakistan Refinery Ltd.
258	PSEL	35	Pakistan Services Ltd.
259	PSC	15	Pakistan Slag Cement Industries Ltd.
260	PSO	19	Pakistan State Oil Company Ltd.
261	PSYL	12	Pakistan Synthetics Ltd.
262	PTC	26	Pakistan Telecommunication Company Ltd.
263	PTEC	24	Pakistan Telephone Cables Ltd.
264	PAKT	16	Pakistan Tobacco Company Ltd.
265	PASM	10	Paramount Spinning Mills Ltd.
266	PIOC	15	Pioneer Cement Ltd.
267	PRET	8	Premium Textile Mills Ltd.
268	PRWM	9	Prosperity Weaving Mills Ltd.
269	PUNO	31	Punjab Oil Mills Ltd.
270	QUSW	21	Quality Steel Works Ltd.
271	QUAT	8	Quality Textile Mills Ltd.
272	QUET	10	Quetta Textile Mills Ltd.
273	QUICE	33	Quice Food Industries Ltd.
274	RBF	33	Rafhan Best Foods Ltd.
275	QUICE	33	Rafhan Maize Products Co. Ltd.
276	RAVT	8	Ravi Textile Mills Ltd.
277	REDT	10	Redco Textiles Ltd.
278	REGT	8	Regent Textile Industries Ltd.
279	RCML	8	Reliance Cotton Spinning Mills Ltd.
280	REWM	10	Reliance Weaving Mills Ltd.
281	REST	8	Resham Textile Industries Ltd.
282	RUBY	8	Ruby Textile Mills Ltd.
283	RUPL	12	Rupali Polyester Ltd.
284	SGFL	12	S.G. Fibres Ltd.
285	SGPL	18	S.G. Power Ltd.

286	SSOM	31	S.S. Oil Mills Ltd.
287	SFAT	10	Safa Textiles Ltd.
288	SAIF	8	Saif Textile Mills Ltd.
289	SJTM	8	Sajjad Textile Mills Ltd.
290	SKRS	14	Sakrand Sugar Mills Ltd.
291	SALT	8	Salfi Textile Mills Ltd.
292	SANE	8	Salman Noman Enterprises Ltd.
293	SMTM	9	Samin Textiles Ltd.
294	SNAI	8	Sana Industries Ltd.
295	SANSM	14	Sanghar Sugar Mills Ltd.
296	SFL	10	Sapphire Fibres Ltd.
297	SAPT	10	Sapphire Textile Mills Ltd.
298	SARD	29	Sardar Chemical Industries Ltd.
299	SRSM	8	Sargodha Spinning Mills Ltd.
300	SCI	16	Sarhad Cigarette Industries Ltd.
301	SSML	8	Saritow Spinning Mills Ltd.
302	SAZEW	22	Sazgar Engineering Works Ltd.
303	SEARL	28	Searle Pakistan Ltd.
304	SEPL	30	Security Papers Ltd.
305	SRVI	32	Service Industries Ltd.
306	STCL	34	Shabbir Tiles And Ceramics Ltd.
307	SHDT	8	Shadab Textile Mills Ltd.
308	SHCM	8	Shadman Cotton Mills Ltd.
309	SCIL	29	Shaffi Chemical Industries Ltd.
310	SCML	8	Shaheen Cotton Mills Ltd.
311	SHSML	14	Shahmurad Sugar Mills Ltd.
312	SHJS	14	Shahtaj Sugar Mills Ltd.
313	STJT	9	Shahtaj Textile Ltd.
314	STM	8	Shahzad Textile Mills Ltd.
315	SGML	14	Shakarganj Mills Ltd.
316	STML	10	Shams Textile Mills Ltd.
317	SGLL	19	Shell Gas Lpg (Pakistan) Ltd.
318	SHEL	19	Shell Pakistan Ltd.
319	SHEZ	33	Shezan International Ltd.
320	SCL	33	Shield Corporation Ltd.(Transpak Corp.)
321	SHFA	35	Shifa International Hospitals Ltd.
322	SIEM	24	Siemens (Pakistan) Engineering Co.Ltd.
323	SFTM	8	Sind Fine Textile Mills Ltd.
324	SASML	14	Sindh Abadgar'S Sugar Mills Ltd.
325	SING	24	Singer Pakistan Ltd.
326	SITC	29	Sitara Chemical Industries Ltd.
327	SEL	18	Sitara Energy Ltd.

328	SEPCO	18	Southern Electric Power Co. Ltd.
329	SNL	26	Southern Networks Ltd.
330	SUHJ	13	Suhail Jute Mills Ltd.
331	SNGP	19	Sui Northern Gas Pipelines Ltd.
332	SSGC	19	Sui Southern Gas Co. Ltd.
333	SUTM	8	Sunrays Textile Mills Ltd.
334	SURC	10	Suraj Cotton Mills Ltd.
335	SMP	22	Suzuki Motorcycles Pakistan Ltd.
336	THAS	8	Taha Spinning Mills Ltd.
337	TAJT	10	Taj Textile Mills Ltd.
338	TSML	14	Tandlianwala Sugar Mills Ltd.
339	TGL	34	Tariq Glass Industries Ltd.
340	TATM	8	Tata Textile Mills Ltd.
341	TEL	26	Telecard Ltd.
342	THALL	13	Thal Limited (Thal Jute Mills Ltd.)
343	CLIM	24	The Climax Engineering Company Ltd.
344	CRTM	10	The Crescent Textile Mills
345	FSMLO	14	The Frontier Sugar Mills & Distillery Ltd.
346	GTYR	23	The General Tyre & Rubber Co. Of Pakistan Ltd.
347	HUBC	18	The Hub Power Company Ltd.
348	KESC	18	The Karachi Electric Supply Corporation Ltd.
349	NSRM	12	The National Silk and Rayon Mills Ltd.
350	PMRS	14	The Premier Sugar Mills & Distillery Co. Ltd.
351	TICL	14	The Thal Industries Corporation Ltd.
352	TOWL	10	Towellers Ltd.
353	TREET	33	Treet Corporation Ltd.
354	TRG	26	TRG Pakistan Ltd
355	TRIPF	35	Tri-Pack Films Ltd.
356	TRPOL	12	Tri-Star Polyester Ltd.
357	TSPL	18	Tri-Star Power Ltd.
358	ULEVER	33	Unilever Pakistan Ltd.
359	UDPL	35	United Distributors Pakistan Ltd.
360	USMT	10	Usman Textile Mills Ltd.
361	WAHN	29	Wah Nobel Chemicals Ltd.
362	WAZIR	31	Wazir Ali Industries Ltd.
363	WTL	26	WorldCall Communications Ltd.
364	WYETH	28	Wyeth Pakistan Ltd.
365	YOUW	9	Yousaf Weaving Mills Ltd.
366	ZAHT	10	Zahidjee Textile Mills Ltd.
367	ZLFI	33	Zulfeqar Industries Ltd.
368	KTML	10	Kohinoor Weaving Mills Ltd.
369	GATI	12	Generteck Pakistan Ltd.

370	DATM	8	Data Textiles Ltd.