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Importance of Judicial Efficiency in Capital Structure Decisions of Small Firms: Evidence from Pakistan

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Empirical evidence to identify factors that are responsible for the sluggish development of bond and capital markets in Pakistan remains scanty. This paper is a step forward in this direction. Specifically, this paper draws on the recent developments in the area of law and finance to formulate several propositions on how judicial efficiency can have a differential impact on corporate capital structures of small and large firms. These propositions are tested using data of 370 firms listed at the Karachi Stock Exchange (KSE) and 27 districts high courts of Pakistan. The results 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. 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. These results highlight the importance of judicial efficiency for small firms in the determination of their capital structures.

JEL Classification: G10, G21, G32
Keywords: Judicial Efficiency, Leverage, KSE, Capital Market Development, Law and Finance.

1. INTRODUCTION

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 alternative mechanisms. For example, lenders might ask for the security of fixed assets, require personal guarantees, 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

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case of default of the borrower. Short-term debt makes it easier for lenders to monitor their borrowers and reduce their misbehaviour 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 creditor rights 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 paper is to go a step forward in this direction to fill the empirical gap by providing evidence on impact of the efficiency of district high courts on the capital structure of listed firms in Pakistan.

The presence of large number of firms with negative equity and few cases of forced bankruptcies in Pakistan motivates us to investigate the impact of judicial efficiency on leverage. If a firm has negative equity, the firm is considered to be technically bankrupt. The presence of a large number of firms with negative shareholders' equities in Pakistan naturally provokes the question as "why do creditors of the bankrupted firms shy away from going to court against such firms?" It is likely that the judicial efficiency is low in Pakistan in terms of time and cost, which makes the recovery of loans uneconomical for creditors. In fact, Claessens, Djankov and Klapper (2003) provide empirical support to this argument from 1472 listed firms in five East Asian countries. They report that efficiency of a judicial system serves as a critical in determining the creditors' choice to recover their funds through judicial systems or through other mechanisms.

Given that resource endowments and demand for judicial services vary across different districts, it is reasonable to expect that judicial efficiency will vary across different districts. Therefore, Pakistan is a good candidate to study the impact of within-country judicial efficiency on capital structure decisions of firms. Therefore, this study exploits variations in judicial efficiency across different districts of Pakistan and relates these variations to corporate leverage. Additionally, this paper also explores the possibility that worsening judicial efficiency has differential impact on leverage ratio of small and large firms. Small firms are more susceptible to information asymmetry problems and external macroeconomic shocks. These two features make small firms more sensitive to variations in judicial efficiency. Hence, it is expected that deterioration in judicial efficiency will have greater negative impact on leverage ratios of small firms compared to that of the large firms.

The rest of the paper is organised as follows. The next section reviews the law and finance literature to draw testable hypotheses. Section 3 discusses data, the model specifications, and variables. Section 4 reports and discusses results of regression analysis, while Section 5 presents the conclusion and policy implications.

2. RELATED LITERATURE

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 behaviour. 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 realisation. 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 behaviour 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 analysed 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.

2.2. Judicial 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.

2.2.1. *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.

2.2.2. *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 misbehaviour 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 in case 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 realised 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.

2.2.3. *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.

2.2.4. *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 leverage. 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 the firms in civil law countries, where legal protection to investors is higher, pay higher percentage of dividends.

2.2.5. *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.

2.2.6. *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.

2.3. Testable Hypotheses

- H_1 Firms will 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 In efficient judicial districts, firms leverage ratio will be more sensitive to coefficient of income volatility.
- 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} Volatility of a firm's cash flows will negatively affect leverage ratio of the firm.

3. METHODOLOGY

3.1. Data Sources and Sample

The four provincial high courts (Peshawar, Lahore, Sindh, and Baluchistan) restarted publication of their annual reports in the year 2001 after many years. Therefore, we have chosen the year 2001 as a starting point of our data collection of the judicial statistics. For selection of judicial districts, we used the criteria of the location of head office of the listed firms. We found that listed firms are head-quartered in a total of 27 districts out of the total of 104 judicial districts. It is expected that efficiency of a judicial district does not change in short period of time. Therefore, we calculated a time series average for each district.

We obtained the firms' financial data from "*Balance Sheet Analysis of Stock Exchange Listed Firms*" a publication of the State Bank of Pakistan (SBP). The sample is collected from years 2000 to 2006. We started with the inclusion of all non-financial firms in the analysis. However, we removed outlier observations that were below 1 percentile or above 99 percentile. We also excluded firms with negative equity figures as these firms do not show normal behaviour. Finally, we were left with an unbalanced panel of 370 firms.

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 employed a proxy for leverage that included 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 included 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 Judicial Efficiency*

Extant literature suggests different types of proxies to measure judicial efficiency. In majority of the international studies, [see, Modigliani and Perotti (1997); Giannetti (2003); Kumar, *et al*. (1999); Giannetti (2001)], a subjective index of judicial efficiency is used. Such an index was either developed by the researchers themselves or was borrowed from other organisations such as the Business International Corporations (BIC). Other studies have used more objective measures of judicial efficiency. For example, Fabbri (2002) and Fabbri, and Padula (2004) have used the fraction of pending cases to total settled cases or the fraction of pending cases to case started during a year. Shah and Shah (2016) have used three different measures of judicial efficiency which are (a) inverse of time in days that a judicial court takes in resolving a case (b) number of procedures involved in registering a case till the final decision implemented by a court, and (c) costs incurred on a judicial case as a percentage of the recovery amount. Due to data availability issues, we use the proxy of judicial efficiency where pending cases are scaled by some base figure such as judicial cases decided in a year, total cases started in a year, or population of a district. Therefore, we use the following measures 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:

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

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

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

Higher value of *JE* shows inefficiency of a judicial court because larger number of pending cases as percentage of disposed-off cases shows that the court takes a longer time in deciding cases or is not capable of meeting the demand faced by it in comparison to other courts.

For simplicity, the *JE1* is simply represented by *JE* in the rest of the paper. *JE1* is found to be highly correlated with *JE2*, *JE3*, and *JE4*. This implies that all these measures of judicial efficiency are good alternatives. We use *JE1* as a primary proxy for judicial efficiency throughout this paper.

3.2.3. *Measurement of the Intendent Variables*

We include all important determinants of the corporate leverage as control variables. These variables include size, collateral, profitability, net income volatility, growth, dividends, and non-debt tax shield benefits. Names, symbols, and measures of these variables are reported in Table 1A.

Table 1A

Names and Measurement of the Variables

Name of Variable	Denoted by	Measured by
Leverage	*LEV1*	Long-term debt to total assets
Leverage 2	*LEV2*	Total debts to total assets
SIZE	*SZ*	log of assets
Tangibility	*TG*	Net fixed assets divided by assets
Growth1	*GROWTH*	Average percentage change in assets
Growth2	*MVBV*	Market-to-book ratio
Volatility	*VOL*	Coefficient of variation of profitability
Profitability	*PROF*	Net income / total assets
Dividends	*DIV*	Amount of dividends / net income
NDTS	*NDTS*	Depreciation for the year / total assets

3.3. Model Specification

We use a panel data framework to study the relationship between corporate leverage and judicial efficiency. The basic form of a panel regression is given in Equation (1).

$$y_{it} = \beta x'_{it} + \alpha z_i + \varepsilon_{it} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

Where y_{it} is the leverage ratio of firm i at time t. x'_{it} is the vector of the independent variables. $\alpha z'_i$ represent idiosyncratic effects and z'_i represent a constant term that absorbs all observable and unobservable heterogeneity. If z'_i does not vary across panel units, then OLS will yield consistent estimates. However, firms might vary from one another due to industry differences or managers aptitude towards risk. Therefore, it is rather a strict assumption that systematic difference across firms do not exist. Panel data models provide a wide array of options to deal with unobserved heterogeneity. The most common of these models is the fixed effects model, which is given below.

$$y_{it} = \beta x_{it} + a_i + \varepsilon_{it} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

The term α_i in Equation (2) is equal $\alpha z'_i$ in Equation (1). This term absorbs firm-specific effects that do not vary across time for a given firm. One common disadvantage of fixed-effects models is that we lose many degrees of freedom in defining dummy variables for each firm. On other hand, another commonly used model is the random effects model. This model yield efficient estimates when the firm-specific effects have low or no correlation with the independent variables. Random effects model can be written in the following form [Greene (2006)].

$$y_{it} = \beta x_{it} + [az'_i] + \{az'_i - E[az'_i]\} + \varepsilon_{it} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

A simplified version of the above equation is given below.

$$y_{it} = \beta x'_{it} + a + u_i + \varepsilon_{it} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (4)$$

Equation (4) treats the term u_i to be random element for each specific panel unit.

The question of selecting a better model that fits the data is both empirical and theoretical. Hausman (1978) proposed a test that identifies systematic differences in the estimates of fixed and random effects. If systematic differences exist, then the use of fixed effects model is preferred.

Using panel data framework, we estimate two types of regression equations. First, we assume that judicial efficiency uniformly influences firms in their capital structure decision. We call it a restricted model. Second, we assume that firm-specific factors moderate the impact of judicial efficiency on firm capital structure decisions. We call this model as a less-restricted model. For the less-restricted model, we estimate differential panel data models by including interaction terms between *JE* and the independent variables. To avoid the problem of simultaneity, all explanatory variables are lagged one period back excluding volatility and *GROWTH*.

3.3.1. *Baseline Estimation*

As mentioned previously, we estimated a restricted and less-restricted model. Assuming that judicial efficiency has an equal influence on all types of firms, the following restricted model is estimated.

$$\begin{aligned} Y_{it} &= a+\beta_1 SZ_{i,t-1}+\beta_2 TG_{i,t-1}+\beta_3 PROF_{i,t-1}+\beta_4 MVBV_{i,t-1}+\beta_5 VOL_i \\ &\quad +\beta_6 NDTS_{i,t-1}+\beta_7 DVD_{i,t-1}+\beta_8 JE_i+\eta_{1-5} YRS_i+\lambda_{1-27} IND_i+\varepsilon_{it} \quad \ldots \quad (5) \end{aligned}$$

Where Y_{it} is the leverage ratio for firm i at time t and *SZ*, *TG*, *PROF*, *MVBV*, *NTDS*, and *DVD*, are lagged independent variables whereas. *JE* measures efficiency of a judicial district. *YRS* represent year dummies. Industry dummies are represent by the variable *IND*. A total of 28 industries are included in the sample. Wald-joint significance test is used for testing the joint significance of the dummy variables.

3.2.2. Differential Impact of Judicial Efficiency

Assuming that firm-specific factors might moderate the impact of judicial efficiency on leverage, we introduce interaction terms between the measures of judicial efficiency and dummy variables that are based on the quartiles of selected explanatory variables. We define three dummy variables and one base category for the selected explanatory variables. For example, to interact judicial efficiency with firm size, we define four dummies for firm size as follows:

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

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

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

If we include all interaction terms between judicial efficiency and the dummies, it might create the problem of high multicollinearity. To avoid it, we estimate separate regressions that include interaction terms between dummies of a single explanatory variable and the *JE*. All specifications include full set of dummy variables for years and industries. Since we are interested in investigating the impact of judicial efficiency on the leverage decision of small and large firms, it will be better that the referent category is one of the middle quartiles dummy variables against which the interactive effects of the 1st and the 4th quartiles can be compared. This is why the 3rd quartile is selected to be referent category in all regression models.

4. RESULTS AND DISCUSSION

4.1. Descriptive Statistics

Table 1B reports the descriptive statistics of the variables used in this study. The mean values of *LEV1* and *LEV2* are 0.1297 and 0.5686 across all firms and time periods. 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) was 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 percent 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. 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 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 1B

Descriptive Statistics of Variables

Variables	Median	Mean	Std. Dev.	Minimum	Maximum
LEV1	0.097	0.1297	0.1459	0	0.845
LEV2	0.596	0.5686	0.2062	0.0029	0.9489
SZ	6.874	6.9734	1.4832	2.3609	11.9228
PROF	0.0312	0.0419	0.1058	–1.1463	0.7701
TANG	0.503	0.499	0.2227	0.0024	0.9876
VOL	0.705	1.1893	1.1637	0.0225	4.9265
GROWTH	0.13	0.1538	0.1517	–0.2673	1.3545
NDTS	0.046	0.0509	0.0451	0	0.7256
MVBV	0.74	1.3067	1.7167	0.0009	11.5
DIV	0.00	0.2527	0.3576	0	2.4474

Table 1B reports descriptive statistics of variables using panel data capabilities for a sample of 370 firms listed on KSE. *LEV1* is the ratio of long-term debt to total assets whereas *LEV2* is the ratio of total debt to total assets. *SZ* 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* is 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.

In Table 1C, 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 *SZ*, *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 1C

Matrix of Correlation among the Variables

	LEV1	*LEV2*	*SZ*	*TANG*	PROF	MVBV	GROWTH	VOL	NDTS	DIV
LEV1	1									
LEV2	0.521	1								
SZ	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

4.1.2. Descriptive Statistics of the Judicial Efficiency

Table 1D provides descriptive statistics for alternative measures of judicial efficiency while Table 1E 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 1E 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 1D

Descriptive Statistics of 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 1E

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 1D and Table 1E, show descriptive statistics, and matrix of correlation of alternative measures of the 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 normalised 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. Results of the Main Effects Model

Results of baseline regression model are reported in Table 2. This model 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 2 shows names of the explanatory variables. The 2nd and the 3rd columns reports coefficients of the explanatory variables from fixed 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*. Standard errors (robust) are reported inside the parentheses. In both *LEV1* and *LEV2* regressions, the Hausman test rejects the null hypothesis of no systematic differences in the estimators of fixed and random effects. To know the relative significance of each variable, the study ran another set of regressions on standardised 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 3.

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 $SZ_{i,t-1}$ are significant at the 1 percent 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 3 (column *LEV1*), the beta coefficient estimated by the fixed effects model indicates that one standard deviation increase in $SZ_{i,t-1}$ 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 $SZ_{i,t-1}$ increases *LEV2* by 0.516 standard deviations.

The coefficient for $TG_{i,t-1}$ 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 organisations 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 $TG_{i,t-1}$ is not significantly related to *LEV2*.

Table 2

Results of the Main Effects Model

	LEV1		*LEV2*	
Variables	Fixed-effects	Random-effects	Fixed-effects	Random-effects
$SZ_{i,t-1}$	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)	

The second and the third columns show coefficients of these variables from fixed 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*. Standard errors (robust) are reported inside the parentheses. Symbols *, **, and *** indicate significance level at 1 percent level, 5 percent level, and 10 percent level respectively. *LEV1* is the ratio of long-term debt to total assets whereas *LEV2* is the ratio of total debt to total assets. *SZ* is the natural logarithm of total assets. *PROF* is the ratio of net income to total assets. *TG* 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 $TG_{i,t-1}$ and *LEV2* is also negligible. For example, one standard deviation increase in $TG_{i,t-1}$will lead to a mere 0.064 deviations increase in *LEV2*.

The results of Table 2 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 percent 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 3

Regression Results of Standardised Variables

Variables	*LEV1* Beta Coefficients	*LEV2* Beta Coefficients
$SZ_{i,t-1}$	0.796	0.516
$TG_{i,t-1}$	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 3 presents regression results of standardised variables of 370 KSE listed firms, regressing leverage ratios on measure of judicial efficiency and other control variables. The second and the third columns show coefficients of these variables from fixed effects model where the dependent variables are *LEV1*and *LEV2* respectively. *LEV1* is the ratio of long-term debt to total assets whereas *LEV2* is the ratio of total debt to total assets. *SZ* is the natural logarithm of total assets. *PROF* is the ratio of net income to total assets. *TG* 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 3 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 percent level of significance in the regression when the dependent variable is *LEV1* and at the 5 percent 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 wills 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 percent 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 percent. 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 *SZ, TG, 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.

4.3. Results of Regressions with Interaction Terms

This section discusses the results of regression models that interacted with dummy variables based on the quartiles of selected firm attributes with the measure of judicial efficiency. The results are reported in Table 4 and Table 5. Table 4 presents results of regression models where the dependent variable is long-term debt-to-total-assets (*LEV1*) and Table 5 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 shows results obtained interacting *SZ* quartiles with *JE* from fixed effects model whereas third column shows results of the same interactions from random effects model. Standard errors are reported inside the parentheses. Wald-test is also applied to the interaction terms in each regression to test the joint significance of these interactions. 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, the coefficient of *JE* shows how judicial efficiency affects the leverage decision of firms that are in the 3rd quartile of a selected explanatory variable. For example, coefficient of *JE* in Table 4: Panel A under the head of column *SZ* is actually the slope of the judicial efficiency for firms belonging to the third quartile of *SZ*. 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. Details of the variables and tests reported in Panel B are given under Panel A of Table 4. Panel B reports the regression results where JE was interacted with the dummy variables based on *PROF* and *DIV*.

Results reported in the second and third columns of Table 4: 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 *SZ* 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 *SZ* 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 *SZ* will decrease by 2.9 percent, whereas the decrease in *LEV1* will be 9.4 percent (i.e. (−2.9 percent) + (−6.5 percent)) and 5.4 percent (i.e. (−2.9 percent) +(−2.5 percent)), 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]

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

Table 4

Panel A - Regression Results with Interaction Effects

	SIZE		*TANG*	
Variables	Fixed	Random	Fixed	Random
$SZ_{i,t-1}$	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: 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. 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*. Standard errors (robust) are reported inside the parentheses. Symbols *, **, and *** indicate significance level at 1 percent level, 5 percent level, and 10 percent level respectively. We include year and industry dummies in each regression. *LEV1* is the ratio of long-term debt to total assets whereas *LEV2* is the ratio of total debt to total assets. *SZ* is the natural logarithm of total assets. *PROF* is the ratio of net income to total assets. *TG* 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

Panel B - Regression Results with Interaction Effects

Variables	*PROF* Fixed	*PROF* Random	*DIV* Fixed	*DIV* Random
$SZ_{i,t-1}$	0.073(0.012)*	0.028(0.004)*	0.074(0.012)*	0.029(0.004)*
$TG_{i,t-1}$	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. Panel B reports the regression results where *JE* was interacted with the dummy variables based on *VOL* and *MVBV*.

Interestingly, worsening judicial efficiency has positive impact on the leverage ratios of firms belonging to the fourth quartile of *SZ*. For example, the slope of *S4*JE* is .04 which indicate that one hundred percentage points increase in *JE* will lead to 1.1 percent (i.e. −2.9 percent + 4 percent) increase in the leverage ratio of firms belonging to the fourth quartile of *SZ*. 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.

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 5.

Table 4: Panel C

Regression Results with Interaction Effects

	VOL		*MVBV*	
Variables	Fixed	Random	Fixed	Random
$SZ_{i,t-1}$	0.075(0.012)*	0.026(0.004)*	0.075(0.012)*	0.027(0.004)*
$TG_{i,t-1}$	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)	

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 (Panel A) demonstrate that in the presence of inefficient courts, firms in the first quartile of *TG* will have lower leverage ratios (*LEV1*) than firms in the third quartile, and firms in the fourth quartile of *TG* will have higher leverage ratios than firms in the third quartile. The differential slope of *T1*JE* and *T4*JE* are significant at 10 percent and 1 percent whereas *T2*JE* is insignificant. Similar to the results of the main effects model, Table 5 (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 5 (Panel A), the coefficients of *TG* 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 5: Panel B. Results of the fixed-effects models in Table 4: 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 5 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 percent 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 percent 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: Panel B and Table 5: 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: 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 5: Panel A

Regression Results with Interaction Effects
(Using Long-term Debt/Assets as Dependent Variable)

	SZ		*TG*	
Variables	Fixed	Random	Fixed	Random
$SZ_{i,t-1}$	0.048(0.016)*	0.007(0.009)	0.077(0.015)*	0.029(0.007)*
$TG_{i,t-1}$	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 5: 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. 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*. Standard errors (robust) are reported inside the parentheses. Symbols *, **, and *** indicate significance level at 1 percent level, 5 percent level, and 10 percent level respectively. We include year and industry dummies in each regression. *LEV1* is the ratio of long-term debt to total assets whereas *LEV2* is the ratio of total debt to total assets. *SZ* is the natural logarithm of total assets. *PROF* is the ratio of net income to total assets. *TG* 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 5: Panel B

Regression Results with Interaction Effects
(Using Long-term Debt/Assets as Dependent Variable)

	PROF		DIV	
Variables	Fixed	Random	Fixed	Random
$SZ_{i,t-1}$	0.061(0.015)*	0.028(0.007)*	0.07(0.015)*	0.029(0.007)*
$TG_{i,t-1}$	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 5. Panel B reports the regression results where *JE* was interacted with the dummy variables based on *PROF* and *DIV*.

4.4. Robustness Checks

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

4.4.1. *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 50th percentile. Based on the discussion in the theoretical framework section, it is expected that interaction terms involving *TG*, *SZ*, 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 favoured 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 6.

In Table 6, the results indicate that the interaction terms of *SZ* and *TG* are significant and, as expected, positive. Interaction terms of other variables are either insignificant or unexplainable.

Table 6

Regression with JE Dummies and Interaction Terms

Variables	*SZ*	*TG*	*PROF*	*VOL*
$SZ_{i,t-1}$	0.065(0.013)*	0.074(0.012)*	0.073(0.012)*	0.075(0.012)*
$TG_{i,t-1}$	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)*
SZ×JED	0.031(0.013)**			
TG×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 6 presents results of regression models with interaction effects where total leverage/assets ratios (*LEV1*) of 370 listed firms are regressed on *JE* which is a dummy variable that assumes 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 percent level, 5 percent level, and 10 percent level respectively. We include year and industry dummies in each regression. *LEV1* is the ratio of long-term debt to total assets whereas. *SZ* is the natural logarithm of total assets. *PROF* is the ratio of net income to total assets. *TG* 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.

In Table 6, the second column presents result of regression where *SZ* was interacted with *JED*. The coefficient of the variable *SZ* shows that under efficient judicial system (where *JE1* is below the 50th percentile) one unit change in *SZ* 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 *SZ* increases the *LEV1* ratio by 0.095. This is evident from the coefficient of the interaction term *JED**SZ*. The interaction term has a coefficient of 0.031 which indicates that *SZ* increases *LEV1* ratio of firms by an additional 3.1 percent in an inefficient judicial system. The coefficient of *TG*, which is a proxy for firm fixed-assets-to-total-assets, shows similar results. The coefficient of the variable *TG* demonstrates that under efficient judicial system (where *JE1* is below the 50^{th} percentile) one unit change in *TG* 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 *TG* increases the *LEV1* ratio by a value of 0.193. This 0.193 value is the sum of the coefficients of the interaction term *TG*JED* and *TG*. The interaction term has a coefficient of 0.119 and is significant at 5 percent level of significance. The coefficient of the interaction term indicates that *TG* increases *LEV1* ratio of firms by an additional 11.9 percent in an inefficient judicial system.

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

4.4.2. *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 to 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 would 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. Other things being equal, this confidence should increase leverage ratios 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 biasness. 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 7.

Regression outputs reported in panel A and B of Table 7 show that results drawn from banking courts data are almost in line with the main findings of the study. For example, the variable *SZ* and *TG* have positive coefficients and their interactions terms exhibit similar behaviour as their counterparts did in the preceding analysis.

Table 7: Panel A

Regression Results Interacting Firm Variables with JE based on Data of Banking Courts

	SZ		*TG*	
Variables	Fixed	Random	Fixed	Random
$SZ_{i,t-1}$	0.052(0.011)*	0.012(0.005)**	0.061(0.011)*	0.027(0.004)*
$TG_{i,t-1}$	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 7 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. Standard errors are reported inside the parentheses. We include year and industry dummies in each regression. *LEV1* is the ratio of long-term debt to total assets whereas. *SZ* is the natural logarithm of total assets. *PROF* is the ratio of net income to total assets. *TG* 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 7: Panel B

Regression Results Interacting Firm Variables with JE based on Data of Banking Courts

	PROF		*DIV*	
Variables	Fixed	Random	Fixed	Random
$SZ_{i,t-1}$	0.061(0.011)*	0.026(0.003)*	0.066(0.011)*	0.029(0.004)*
$TG_{i,t-1}$	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)*
$SZ_{i,t-1}$	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 7. Panel B reports the regression results where *JE* was interacted with the dummy variables based on *PROF* and *DIV*.

5. CONCLUSION

In this paper, we have investigated both the direct and indirect effects of judicial efficiency of district high courts in Pakistan on leverage ratios of 370 KSE-listed firms. 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.

Policy Implications

Findings of this study have important policy implications concerning the development of the capital market in Pakistan. 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. These findings show the importance of judicial efficiency for small firms in determining their optimal capital structures. Being unable to borrow and achieve optimum capital structure, small firms lose an important and inexpensive source of capital. Small firms play a pivotal role in the development of a country. If these firms face difficulty in obtaining cheaper source of financing, their growth opportunities remain limited, this in turn may negatively influence economic development of the country.

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".

The poor state of judicial efficiency warrants quick resolution of pending cases at all levels of the high courts. However, given the dynamics of the institutional settings and resource endowments, it is not likely to happen soon or easily. Alternatively, the government can focus specifically on improving the efficiency of banking courts. This alternative is comparatively less resource-intensive as banking is limited in number. The government can also increase the number of banking courts and extend this facility to cities where such courts are non-existent. This will not only lighten the burden on the existing courts, but will also send a positive signal to fund suppliers that they can easily recover their funds through these courts should the borrower default.

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