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# The Impact of Market Discipline on Charter Value of Commercial Banks: Empirical Evidence from Pakistan Stock Exchange

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## Abstract

To tranquilize the devastating impact of unnecessary risk-taking behavior of banks towards the economy for maximizing their profits that usually arises due to widely known 'moral-hazard' problem originating from market competition and intensified by bank's limited liability, the banking system is strongly monitored across all countries of the world. The goal of controlling would become more feasible if there exist some self-discipline and motivations which could safeguard the banks' charter value through the mechanism of market discipline. Therefore, our study is aimed to scrutinize the relation between market discipline and charter value of local commercial banks that are registered on the Pakistan Stock Exchange by analyzing a balanced panel data from the year 2007 to 2019. Deposit growth, interbank deposits, and subordinate debt are taken as proxies to measure market discipline whereas Tobin's Q theory is applied for calculating the charter value. Generalized Least Square Regression with Fixed Effect Model is used for evaluation. The outcomes reveal that in the existence of control variables, all proxies of market discipline have a significant positive impact on bank charter value. Our research has important policy implications for monitoring and supervising financial intermediaries for their stability and soundness by offsetting the complications of moral-hazard in the financial systems.

**Keywords:** Moral Hazard, Market Discipline, Bank Charter Value, Tobin's Q Theory, Commercial Banks, Pakistan

**JEL Classification Code:** G20, G21

## 1. Introduction

A sound banking system is always believed to be the most vital sector of the economy of any country as it is deemed as the "lifeblood" of economic activity (Tran & Nguyen, 2020). Its role as a collector of deposits and providing finance to states, businesses, and households is inevitable (Banna et al., 2017). However, to maximize profits, excessive risk-taking activities have been induced by the banks at the cost of funds of the general public, creditors, investors, and other stakeholders due to the widely known 'moral hazard' problem originating from the market competition and encouraged by the bank's limited liability (Haq et al., 2019). Moreover, it is intensified through 'too-big-to-fail' behavior by the larger banks of the country (Labonte, 2014).

The problem of 'moral hazard' takes place as one party initiates more risks because others will bear the consequences of those risks (Nier & Baumann, 2006). Le and Diep (2020) demonstrated that the returns on the deposits that are payable to the depositors have low value for the banks as compared to the banks' risk-taking activities for their own profit-earning motives at the cost of the funds of depositors that may result in repaying the depositors by any deposit insurance company or the government in case of any misfortune. There is broad consensus that excessive risk-taking by banks contributed to the global financial crisis. Equally important were lapses in the regulatory framework that failed to prevent such risk-taking. They take the risk by levering up to engage in risky 'side activities' (such as market-based investments) alongside the core business. A more profitable core business allows a bank to borrow more and take side risks on a larger scale, offsetting lower incentives to take risks of a given size. Consequently, more profitable banks may have higher risk-taking incentives (Bollen et al., 2015).

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The prophecy of the moral hazard theory has spurred researchers to pursuit for reasons that would temperate the moral hazard treatment of the commercial banks and such inducements have been found in the charter value of the banks that was first explored by Marcus in 1984 (Haq et al., 2019). The deposit and loan market concentration exerts a significant effect on the charter value, suggestive of a strong link between competition and charter value. Among the traditional banking activities, bank size and efficiency are found to be important determinants of charter value (Ghosh 2009).

Marcus elaborated that escalated competition in the banking industry encouraged banks to take excessive risks that erode banks' charter values, but such unnecessary risk-taking incentives can be mitigated if there is something to lose by the banks, for instance, in case of liquidation, their charter value (Haq et al., 2019). The need is to have such market-based disciplinary tools that rely on lucidity and disclosure of risks associated with the businesses that can restrict banks to take excessive risk and the resulting improvement in charter value (Pathan et al., 2016).

In this context, substantial importance has been delegated to market discipline both at the regulatory and the market levels because it is a market-based awareness of transparency and clarity with disclosures of all types of risks that are correlated with the going concerns (Coskun, 2016). Basel Committee for Banking Supervision (BCBS) also accentuated MD as Pillar-3 of banking regulations and it has been acknowledged that Pillar-3, has the potential to strengthen the minimum capital requirements (Pillar-1) as well as to Pillar-2 known as the supervisory review process (Bakkar et al., 2017).

The objective of the introduction of MD by BCBS is to develop an arrangement of disclosure requirements that would permit participants of the market to evaluate the necessary information for capital adequacy, management processes, risk exposures, and risk assessment associated with the financial institution and to develop the stability and soundness of banking sector (Tabash, 2019). It is considered to be a more effective controlling and monitoring tool against bank risk-taking behaviors as compared to direct regulatory oversight (Goyal, 2005).

Banks bear market discipline when they collect deposits from the depositors, borrow money from subordinate debtors and manage funds requirements through the arrangement of interbank deposits facilities (Haq et al., 2019) because current reforms in disclosure of risks taking activities of the banks and their transparency of financial records have made the depositors and money lenders detect and influence upon the risky business activities of banks more effectively through demanding high rate of returns on the deposits that are held with the banks (Beyhaghi et al., 2014). However, government guarantee or deposit insurance schemes perform vital a role in such situations where funds providers may desire higher returns for the reason of ensuring the safekeeping of the deposits against excessive risk-taking behavior (Bollen et al., 2015).

The subordinated loan would be helpful to control a bank's risk-taking attitude whether the bank has been committed or not committed to a certain level of risk-taking activities (Chen & Hasan, 2011). In the mechanism of interbank-deposits borrowing relationship, the lending banks monitor the risk-taking activities of borrowing banks as lender's own funds have been involved in the risky activities of the borrowing ban; therefore, the lender bank not only fulfills the requirements of the funds for the borrowing bank but also safeguard it from insolvency by monitoring its risk profile (Affinito, 2012).

Regardless of the importance of disclosure of risks especially after the crisis of 2007-2008 in the banking industry, the research work on the Pakistani commercial banks' practices on disclosure of risk is very rare; the reasons could be less impacts of that event in Pakistan (Naz & Ayub, 2017), however, risk-taking behavior of commercial Banks (Naz & Ayub, 2017), managing liquidity and capital adequacy as per Basel II (Afzal & Arshad, 2020), and capital regulation upon capital ratio in Asian countries including Pakistan (Hunjra et al., 2020) had been investigated but none of the studies is available where the impact market discipline on charter value has been analyzed in the context of Pakistan.

In the scenario of Pakistan, the State Bank of Pakistan is the only regulatory authority for monitoring the affairs of the entire banking sector (Afzal & Arshad, 2020) to improve the charter value of the banks. For more stabilizing the banking sector, there is a need to highlight the importance of the concept of charter value through the implication MD so that the fund providers may resist the unnecessary risk-taking activities of the banks that would result in the betterment of the charter value (Haq et al., 2019). To fill this gap we have decided to conduct this study in the banking sector of Pakistan that has not been studied earlier. So, this study aims to discover the influence of those determinants of market discipline that would serve to restrict the banks from exposure to unnecessary risks to avoid the likelihood of their insolvency and for improving their bank charter value.

## 2. Literature Review

### 2.1. Moral Hazard

Rudolph (2020) stated that moral hazard is the risk that a party has not entered into a contract in good faith or has provided misleading information about its assets, liabilities, or credit capacity. Besides, moral hazard also may mean a party has an incentive to take unusual risks in a desperate attempt to earn a profit before the contract settles It also includes having hidden plans to take unusual risks without

disclosing to other parties of the contract, to earn maximum profit negating the larger benefit of all the parties before the settlement of the contract (Islam & Nishiyama, 2019).

A moral hazard takes place when one party decides to take additional risks considering the cost of these risks would be divided into all the parties under contract (Purwono et al., 2019). Such decisions are usually based on getting the highest level of benefits without considering morality and are mostly found in financial institutions like banks and insurance companies (Nier & Baumann 2006).

## 2.2. Bank Charter Value

Haq et al. (2019) described bank charter value as the worth of future profits which a bank may expect to earn as a going concern and it also depicts the bank's cost of disaster due to the loss of future income in case of its bankruptcy. The charter value of a bank is broadly defined as the value that would be foregone due to a closure. Therefore, banks are compelled not to indulge in excessive risk-taking activities for minimizing the likelihood of failure of their business (De Rynck, 2016). Similarly, Pathan et al. (2016) explained charter value as the authority of a bank to continue to do its business in the future and it is a sort of bank's intangible asset that will be demolished in case of bank's liquidation.

## 2.3. Market Discipline

Market Discipline (MD) has been described in the literature in different ways but broadly, it may be defined as the mechanism by which participants of the market observe, monitor, and restraint unnecessary risk-taking activities of the banks (Stephanou, 2010). The phrase "market discipline" has been turned into a very famous concept in academics and for bankers, supervisors, and regulatory authorities (Afzal et al., 2020). Flannery (2001) explained that this term has been used usually to integrate two different phenomena; first is the ability of the market participants like investors, depositors, and creditors, to access, observe and identify the variation in the financial position of the bank due to the bank activities and second, is their capability and capacity to impact on the firm's action being stakeholders.

The prime responsibility of the banks and the financial institutions to do business while safeguarding the potential risks of the stakeholders (Usman, 2015). Market discipline refers to the obligation by banks and financial institutions to manage their stakeholders' risk in the course of their day-to-day operations. (Hamid & Yunus, 2017). Banks and financial companies are required to prepare publicly-available financial and operational documentation pursuant to federal regulations to ensure financial transparency and disclosure of information. In this way, MD discourages banks and financial companies from assuming excessive or dangerous levels of risk. Doing so might affect not only their ability to make loans but also compromise the interests of existing stockholders and clients (Afzal et al., 2020). Market discipline places constraints on banks' and financial companies' level of risk because such risk would be reflected in financial statements and may deter prospective clients and investors. (Hal et al., 2019).

### 2.3.1. Deposit Growth and Bank Charter Value

Ha (2019) described deposit growth as a 'change in total deposits with respect to total assets in a specific time period' and elaborated that usually, depositors withdraw their deposits from the banks when they thought that such banks are riskier for their funds. Therefore, banks are forced indirectly by customers to demand higher interest rates for leaving their money with such risky banks as compensation for their risk and in this way, depositors restrict banks from higher risk-taking activities and penalize the bank by requiring high-interest rates and/or withdrawing their deposits (Yan et al., 2014). Iyer et al. (2016) examined heterogeneity in depositor responses to solvency risk using depositor-level data for a bank that faced two different runs. They found that depositors with loans and bank staff are less likely to run than others during a low-solvency-risk shock, but are more likely to run during a high-solvency-risk shock. Uninsured depositors are also sensitive to bank solvency. In contrast, depositors with older accounts run less, and those with frequent past transactions run more, irrespective of the underlying risk. Their results showed that the fragility of a bank depends on the composition of its deposit base (Chernykh & Cole 2011). However, Karas et al. (2013) claimed that the sensitivity of households to bank capitalization diminishes markedly after the introduction of deposit insurance. The traditional wake-up call effect of a crisis is muted by this numbing effect of deposit insurance.

On the other hand, Cubillas et al. (2012) explained that if a bank has market power, due to any reason, in the market of deposits, it can acquire a large amount of deposits at cheaper rates as compared to the other banks having low market power and such bank usually does not bother for obtaining insurance cover for the deposits and in this way for reducing the cost of deposits, the bank increases its risk-taking profile to maximize its profits.

Fonseca and González (2010) analyzed the bank and country determinants of capital buffers using panel data of 1337 banks in 70 countries between 1992 and 2002. After controlling for adjustment costs and the endogeneity of explanatory variables, the results showed that capital buffers are positively related to the cost of deposits and bank market power, although the relations vary across countries depending on regulation, supervision, and institutions.

Their impact is the result of two generally opposing effects: restrictions on bank activities and official supervision reduce the incentives to hold capital buffers by weakening market discipline, but at the same time they promote higher capital buffers by increasing market power. Institutional quality has two opposite effects. Better accounting disclosure and less generous deposit insurance, however, have a clear positive effect on capital buffers by both strengthening market discipline and making charter value better able to reduce risk-taking incentives. Similarly, Uchida and Satake (2009) also gave evidence that depositors were the main cause of MD on the banks after analyzing the influence of MD enforced through depositors and investors upon banks of Japan for the period from 2000 to 2005.

***H1:*** *Depositors have an impact on the bank charter value of the commercial banks of Pakistan in the mechanism of market discipline.*

### 2.3.2. Subordinated Debts and Bank Charter Value

The subordinated debt holders have subordinate status as compared to normal debts and it is argued that subordinated loans have a direct influence upon bank risk because of the higher cost of funds that riskier banks bear considering derived discipline (Zhang et al., 2014). It is obvious that subordinated debt lenders demand a higher yield from riskier banks as a reward for greater risks they tolerate because subordinated debt holders are refunded after the payment of all other obligations in case of default by the bank (Flannery, 2001).

However, Chen and Hasan (2011) demonstrated that subordinated debt regulation can be an effective mechanism for disciplining banks. By reducing the chance that managers of distressed banks can take value-destroying actions to benefit themselves, subordinated debt regulation may encourage banks to lower asset risk. Moreover, subordinated debt regulation and bank capital requirements can be complements for alleviating the banks' moral hazard problems. To make subordinated debt regulation effective, regulators may need to impose ceilings on the interest rates of subordinated debt, prohibit collusion between banks and subordinated debt investors, and require subordinated debt to convert into the issuing bank's equity when the government assists the bank.

Goyal (2005) investigated this question – "Do bank debtholders discipline excessive risk-taking?" by examining how a bank's incentives to take risks affect offering yield spreads and restrictive covenants in their debt contracts. Results suggested that bank charter values, which determine a bank's risk-taking incentives, significantly affect the likelihood of restrictive covenants in bank debt contracts. This effect was most pronounced during the 1980s when greater competition and relatively less-stringent regulation increased the severity of moral hazard problems in the US banking industry. Overall, the results suggest that an important channel for market investors to discipline bank risk-taking is through writing restrictive covenants in bank debt (John et al., 2010).

Blum (2002) demonstrated the ambiguous impact of subordinated debt on the risk-taking incentives of banks. It was shown that in comparison with full deposit insurance, subordinated debt reduces risk only if banks can credibly commit to a given level of risk. If, however, banks are not able to commit, subordinated debt leads to an increase in risk. This is because due to limited liability banks always have an incentive to increase their risk after the interest rate is contracted to reduce the expected costs of debt. Rational debt holders anticipate this behavior and accordingly require a higher risk premium ex-ante. The higher interest rates in turn further aggravate the excessive risk-taking incentives of banks.

***H2:*** *Subordinated debt holder effect upon the bank charter value of the commercial banks of Pakistan in the enforcement of market discipline.*

### 2.3.3. Interbank Deposits and Bank Charter Value

Uninsured deposits like interbank deposits and subordinated loans are positively related to the bank charter value (Cuong & Vinh, 2019). However, government-owned banks are usually not disciplined as they are backed by the government guarantee and interbank deposits restrict high risk-taking and reduce the insolvency of the banks (Distinguin et al., 2013). The exposures of interbank deposits demonstrate cautious market behaviors that decrease the likelihood of systemic risk and bank disaster (Freixas et al., 2000). However, it has been observed that high risk-taking banks usually have to pay additional returns than large banks for obtaining interbank debts and that is why they use this option very little to fulfill their needs of liquidly (King, 2008).

In the literature of banking, interbank deposits are commonly assumed the costliest liability while considering expected return is the price of equity (Hakenes & Schnabel 2011). The bankers often claim that greater capital requirements would raise the cost of funding as funds providers demand higher returns and the banking industry does not show more interest in enhancing its capital adequacy ratio (Admati & Pfleiderer, 2010).

In the mechanism of interbank borrowing relationship, the lender banks monitor the borrower banks for their unnecessary risk-taking activities and the lending bank not only fulfill the liquidly requirements of the borrowing bank but also safeguard if form insolvency by monitoring its risk

profile resulting in a positive influence on the charter value (Affinito, 2012).

***H3:*** *Interbank deposits influence the bank charter value of the commercial banks of Pakistan in the mechanism of market discipline.*

However, in short, by analyzing many empirical research and studies it can be expected that there is a positive relationship between market discipline and bank charter value.

## 4. Conceptual Framework

The review of literature has made helpful in developing a conceptual framework based on theories for the current research to be conducted. The following conceptual framework describes the relationship of each determinant used in this study in a diagrammatic form.

Here, the independent variable is market discipline and the dependent variable is bank charter value whereas bank-specific and country-level variables are considered to be control variables. A detailed description of all these variables is mentioned below:

### 4.1. Dependent Variable

Bank charter value is the dependent variable and can be measured by Tobin's Q ratio (Keeley, 1990). Charter value presents market capitalization and current and future business environs where a bank conducts its business operations and the subscripts (i & t) explaining an individual bank 'i' at a time '*t*'.

$$\text{Bank Charter Value}_{i,t} = \frac{\text{Market Value of Total Equity}_{i,t} + \text{Book Value of Total Liabilities}_{i,t}}{\text{Book Value of Total Assets}_{i,t}}$$

Keeley (1990) demonstrated that it will be an important element of bank charter value if the bank has the ability to collect funds from the fund providers at a cheaper interest rate as compared to the prevailing rate of interest in the market. A similar argument has been constructed by Neumark and Sharpe, (1992). They showed that bank deposit interest rates reveal asymmetric impacts of market concentration on the dynamic adjustment of prices to shocks. Banks in concentrated markets are slower to raise interest rates on deposits in response to rising market interest rates but are faster to reduce them in response to declining market interest rates. Thus, banks with market power skim off surplus on movements in both directions. Since deposit interest rates are inversely related to the price charged by banks for deposits, the results suggested that downward price rigidity and upward price flexibility are a consequence of market concentration.

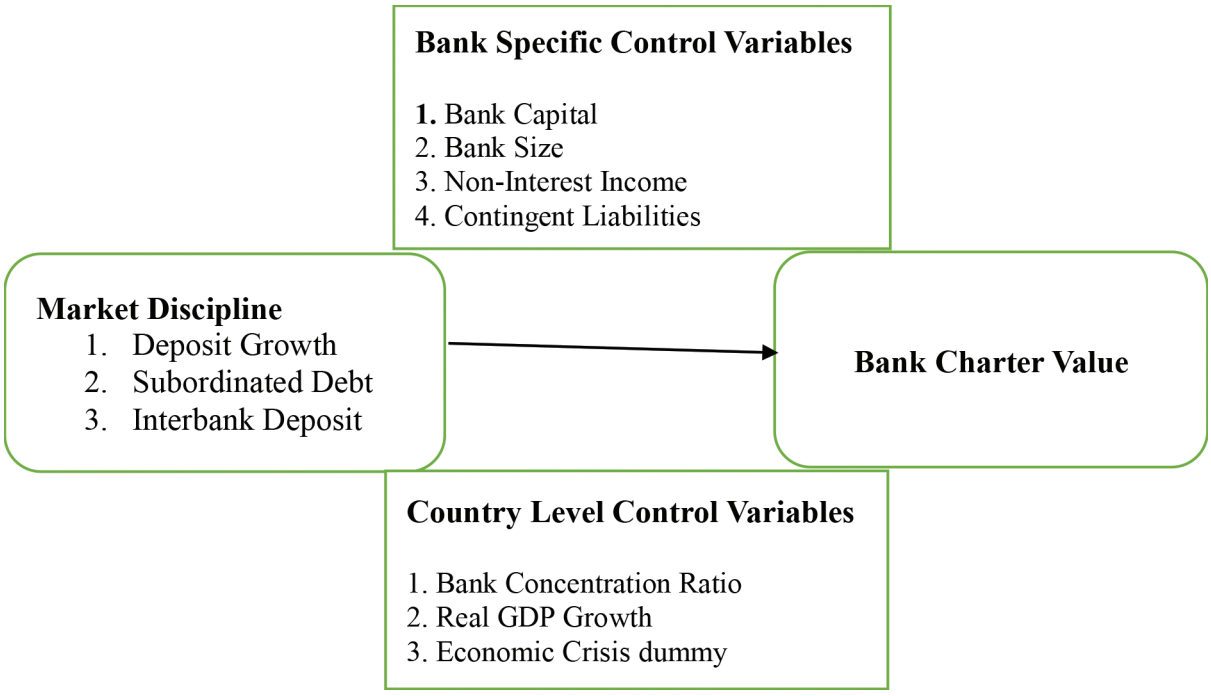


**Figure 1:** Conceptual Model

### 4.2 Independent Variables

This paper examined Market discipline (MD) as a potential determinant of BCV and the proxies for MD consists of deposit growth, subordinated debt, and interbank deposits. Deposit growth is the ratio of change in deposit and short-term funding to the gross domestic product (GDP) deflator (Demirgüç-Kunt & Huizinga, 2004). Subordinated debt is measured by total subordinated debt to total liabilities (Nier & Baumann, 2006) and finally, the inter-bank deposit is measured by dividing total interbank deposits by total liabilities (Haq et al., 2019).

### 4.3. Bank Specific Control Variables

Bank capital (Tier 1) is measured by common equity relative to risk-adjusted assets (Angkinand et al., 2010). Contingent liabilities (CL) are measured by the total amount of off-balance sheet balances against total liabilities appearing in the financial statements. Off-balance sheet items or contingent liabilities include managed securitized assets, guarantees, acceptances, documentary credits, committed credit lines, and other contingent liabilities (Haq et al., 2019). Revenue diversity is captured by non-interest income (NII), calculated as net fees and commission against total operating income for individual banks (Stiroh & Rumble 2006). Bank's profitability is the ratio of net income divided by return on average shareholder equity (ROAE) (Allen & Powell, 2012). Finally, bank size (SZ) and bank size squared ($SZ^2$) are measured by the natural logarithm of the total asset (Saleem & Usman, 2021), to capture any effects of size differences among the sample banks (Dinger & Hagen, 2009).

### 4.4. Country-Level Control Variables

The charter value of the banks may be affected by some country-level determinants. Therefore, they have also been incorporated in the research work to analyze their effects upon bank charter value. These factors are the degree of bank concentration (BKCON), real GDP growth rate (RGDP), and economic crisis dummy (if exists).

To analyze cross-country level variation in the banking sector's structure, the ratio of bank concentration (BKCON) has been incorporated. It is measured by the assets of the three largest local banks as a share of assets of all local commercial banks of Pakistan. The bank concentration depends upon the intensity of competition among the banks. Therefore, the expected relation of the risk of the bank with bank concentration can be negative or positive. Theoretically, considering the bank's risk perspective, due to the 'too big to fail' problem, there exists a very harmful impact of higher competition on the stability of the financial system because it motivates banks to adopt more risk-taking policies that would result in diminishing the charter values of the banks. On the other hand, it is considered that there will be a lower likelihood of systemic risk if the banking system is more concentrated and that will result in more stability and soundness of the banking system (Beck et al., 2006).

Further, the factor of real GDP growth (RGDP) is incorporated as the macroeconomic control variable. It will capture the effects of macroeconomic shocks that adversely affect bank performance by increasing risk. A positive relationship has been anticipated with charter value (Hagendorff & Keasey, 2009). Finally, a crisis dummy (Crisis) has been included which is equals to '1' for the period if any crisis exists in the country and otherwise treated as '0' (Haq et al., 2019).

## 5. Research Methodology

The population of the study includes all the banks listed on PSX. 26 banks are working in Pakistan. For obtaining accurate and valid research results, all the commercial banks that are 21 in number and listed on Pakistan Stock Exchange have been selected as a sample for conducting this study with a balanced panel data of 273 bank-year observations from 2007 to 2019. It also covers the time period of the global financial crisis (2007 – 2008). The panel study design is used which is the combination of time series and cross-sectional data.

There are different kinds of banks working in Pakistan like microfinance banks, investment banks, and different specialized banks for the development of agriculture, general industry, and mortgage finance. But, only commercial banks are selected for this study, the reason being that commercial banks are performing almost all types of functions to cater to the financial needs of the customers. Moreover, very rare literature is available on the Pakistani banking sector where bank charter value has been analyzed in the context of market discipline.

This study is based on secondary data. To ensure the reliability of data, banks related information is collected from the official website of the State Bank of Pakistan (SBP). Websites of The World Bank, SBP, and other Government Departments have also been consulted for getting accurate data related to the economy like GDP, GDP Deflator, etc. Regression analysis is performed to analyze the relationship between the concerned variables.

### 5.1. Specification of the Models

To analyze the effect of MD on the charter value of the banks, we have estimated the following panel data models applying both for individual bank and time fixed effects (Haq et al., 2019).

**A. Equation for Model - I**

To determine the impact of market discipline (MD) by using the proxy of deposit growth (DG) on bank charter value (BCV):

$$BCV_{i,t} = \alpha_0 + \beta_1 MD(DG)_{i,t} + \beta_2 Tier1_{i,t} + \beta_3 OBS_{i,t} + \beta_4 ROAE_{i,t} + \beta_5 NII_{i,t} + \beta_6 Size_{i,t} + \beta_7 Size^2_{i,t} + \gamma_1 BKCON_{i,t} + \gamma_2 GDPGr_{i,t} + \delta_1 Crisis_t + \varepsilon_{i,t}$$

**B. Equation for Model - II**

To determine the impact of market discipline (MD) by using the proxy of subordinated debt (SD) on bank charter value (BCV):

$$BCV_{i,t} = \alpha_0 + \beta_1 MD(SD)_{i,t} + \beta_2 Tier1_{i,t} + \beta_3 OBS_{i,t} + \beta_4 ROAE_{i,t} + \beta_5 NII_{i,t} + \beta_6 Size_{i,t} + \beta_7 Size^2_{i,t} + \gamma_1 BKCON_{i,t} + \gamma_2 GDPGr_{i,t} + \delta_1 Crisis_t + \varepsilon_{i,t}$$

**C. Equation for Model – III**

To determine the impact of market discipline (MD) by using the proxy of interbank deposits (ID) on bank charter value (BCV):

$$BCV_{i,t} = \alpha_0 + \beta_1 MD(ID)_{i,t} + \beta_2 Tier1_{i,t} + \beta_3 OBS_{i,t} + \beta_4 ROAE_{i,t} + \beta_5 NII_{i,t} + \beta_6 Size_{i,t} + \beta_7 Size^2_{i,t} + \gamma_1 BKCON_{i,t} + \gamma_2 GDPGr_{i,t} + \delta_1 Crisis_t + \varepsilon_{i,t}$$

Here, MD = market discipline; Tier 1 = bank capital; OBS = contingent liabilities; ROAE = return on average equity; NII = non-interest income; Size = total assets; BKCON = bank concentration; GDPGr = real GDP growth rate; Crisis = crisis dummy; $\varepsilon$ = remaining disturbance term, '$i$' represents individual banks; '$t$' for time period; '$\alpha$' represents intercept term whereas '$\beta$' and '$\gamma$' are coefficient of regression.

## 6. Results

### 6.1. Descriptive Analysis

Before analyzing the variables that impact the bank charter value, it would be valuable to analyze the primary features of the data that has been used in the research work. So that the scrutinizing process may become more accurate. This goal is achieved by conducting a descriptive analysis.

Using descriptive statistics, we can describe and understand the characteristics of a particular set of data that is the depiction of the complete population. Descriptive statistics is broken down into measures of central tendency and measures of variability (spread). Measures of central tendency include the mean, median, and mode, while measures of variability include standard deviation, variance, minimum and maximum variables, and kurtosis and skewness. Descriptive statistics of all the determinants are mentioned in the below table.

It has been observed that the commercials banks have maintained higher charter values, up to the maximum value of 1.5892. The average growth in the deposits of the banks has a value of 0.4567 during the last ten years. It explains

**Table 2:** Descriptive Statistics

| Variables | Mean | Maximum | Minimum | S.D. |
|---|---|---|---|---|
| **Bank Risk Measures** | | | | |
| Charter value | 1.0023 | 1.5892 | 0.6522 | 0.0935 |
| **Explanatory Variables** | | | | |
| Market discipline – Deposit growth | 0.4567 | 5.9974 | -0.5426 | 0.8644 |
| Market discipline – Subordinated debt | 0.0058 | 0.0287 | 0.0000 | 0.0075 |
| Market discipline – Interbank deposits | 0.0335 | 0.2605 | 0.0002 | 0.0382 |
| Bank capital | 0.1727 | 3.4687 | 0.0028 | 0.3292 |
| Contingent liabilities | 0.2172 | 0.6333 | 0.0000 | 0.1064 |
| Return on average equity | 0.0702 | 0.3182 | -0.9844 | 0.2126 |
| Non-interest income | 0.4247 | 6.6670 | -2.0338 | 0.8511 |
| Size | 19.319 | 21.5961 | 16.4860 | 1.1301 |
| Bank concentration rate | 0.4101 | 0.4307 | 0.3972 | 0.0104 |
| Real GDP growth ratio | 0.0376 | 0.0554 | 0.0036 | 0.0136 |

**Table 3:** Results of Model 1

| Variables | Coefficient | Std. Error | *t*-Statistic | Prob. |
|---|---|---|---|---|
| Deposit Growth | 0.3738 | 0.1040 | 3.5942 | 0.0502 |
| Intercept | 1.5526 | 1.0643 | 1.4587 | 0.1463 |
| Size | 0.2145 | 0.0537 | 3.9944 | 0.0474 |
| Size$^2$ | 0.1496 | 0.0258 | 3.7984 | 0.0741 |
| Tier-1 ratio | 0.0113 | 0.0024 | 2.6904 | 0.0223 |
| ROAE | 0.0105 | 0.0035 | 5.0882 | 0.0204 |
| Non-Interest Income | 0.0522 | 0.0096 | 6.4375 | 0.0172 |
| Real GDP Growth | 0.0720 | 0.0267 | 2.6966 | 0.0901 |
| Contingent Liabilities | 0.0319 | 0.0143 | 2.2307 | 0.0818 |
| Bank Concentration | 0.5695 | 0.1922 | 5.0630 | 0.0337 |
| *R*-squared | 0.5152 | Adjusted *R*-squared | | 0.4783 |
| Prob. (*F*-statistic) | 0.0000 | Durbin Watson stat. | | 1.9536 |

that the banks have a sufficient supply of funds and as such do not face liquidity risk (Neumark & Sharpe, 1992).

The banking system has wholesale funding consisting of an interbank deposits ratio that has a maximum value of 26 percent that shows that mechanism of borrowing among the banks in Pakistan fulfills the requirements of funds and the SBP acts as the lender of the last resort. However, a higher wholesale ratio does not necessarily indicate higher funding risk because the maturity and diversity of wholesale funding may differ. After all, some of them may be long-term (Flannery, 1998).

Pakistani banks are not much active in the subordinated debt market as evident from the maximum value of 0.0287 which is much lower than the average value of interbank deposits.

In general, banks in our sample hold Tier 1 ratio well above the minimum capital requirement of 10 percent. The macroeconomic variable real GDP growth rate reflects only normal periods as the country's economy did not suffer any crisis. The average growth rate of the economy is 3 percent.

The bank concentration ratio shows that the top three banks in the industry held from 39 to 43 percent of bank assets, with a mean value of 41 percent indicating that commercial banks are operating in a concentrated market. In this study, a statistically significant positive relationship has been observed of deposit growth, subordinated debt, and interbank deposit with bank charter value as evident from tables for Model I, II, and III respectively that are mentioned on the next pages.

## 6.2. Empirical Results

The influence of the proxies of market discipline on the bank charter value has been analyzed by using the technique of GLS regression. All the results are graded at 0.01 to 0.05 significance level. The results of the equations of all three models through the regression analysis have been discussed below.

### 6.2.1. Impact of Market Discipline (Deposit Growth) on Bank Charter Value

The outcomes of Model – I are shown in Table 3. It explains that the *P*-values of *F*-statistics is 0.0000 that is below the significance level of 0.01. Therefore, it is obvious that as a whole the model is well fitted. Further, explanatory variables have shown a significance level of 1 percent. This shows that the coefficient of the deposit growth along with the alternative measures of the charter value is not only positive but also significant. It shows the level of significance is almost 5 percent. These outcomes are not deviating from the argument that the banks are disciplined by the depositors when they involve in greater risk-taking activities (Martinez & Schmukler, 2001). $R^2$ has a value of 0.5152 that shows the variation in the dependent variable (CV) is strongly defined by the independent variables. The value of Durbin Watson is 1.9536 and it is acceptable. Moreover, it shows there is no autocorrelation problem.

### 6.2.2. Impact of Subordinated Debt on Bank Charter Value

Table 4 explains that Model – II is fitted well as the probability of *F*-statistics is 0.000. The value of $R^2$ is 0.4319 in this model which indicates that the dependent variable (CV) is well explained by the independent variables. According to the subordinated debt variable, a positive

**Table 4:** Results of Model 2

| Variables | Coefficient | Std. Error | *t*-Statistic | Prob. |
|---|---|---|---|---|
| Subordinated Debt | 0.6376 | 0.1192 | 5.3489 | 0.0199 |
| Intercept | 3.0920 | 1.4248 | 2.1701 | 0.3140 |
| Tier-1 ratio | 0.0775 | 0.0191 | 4.0576 | 0.0425 |
| $Size^2$ | 0.0781 | 0.0170 | 4.5941 | 0.0105 |
| Size | 0.3304 | 0.0493 | 6.7018 | 0.0076 |
| ROAE | 0.0172 | 0.0059 | 2.9152 | 0.0565 |
| Non-Interest Income | 0.0833 | 0.0070 | 3.1742 | 0.0419 |
| Real GDP Growth | 0.0158 | 0.6602 | 3.5385 | 0.0258 |
| Contingent Liabilities | 0.0253 | 0.0101 | 4.5049 | 0.0114 |
| Bank Concentration | 0.4348 | 0.0839 | 3.1823 | 0.0308 |
| *R*-squared | 0.4319 | Adjusted *R*-squared | | 0.3355 |
| Prob. (*F*-statistic) | 0.0000 | Durbin Watson stat. | | 1.9945 |

**Table 5:** Results of Model 3

| Variables | Coefficient | Std. Error | *t*-Statistic | Prob. |
|---|---|---|---|---|
| Interbank Deposits | 0.4673 | 0.0929 | 5.0301 | 0.0000 |
| Intercept | 2.1563 | 0.7484 | 2.8812 | 0.4560 |
| Non-Interest Income | 0.0320 | 0.0041 | 7.8049 | 0.0000 |
| ROAE | 0.0330 | 0.0048 | 6.8750 | 0.0055 |
| Size | 0.2756 | 0.0327 | 8.4281 | 0.0008 |
| $Size^2$ | 0.0064 | 0.0031 | 2.0413 | 0.0028 |
| Tier-1 ratio | 0.0060 | 0.0029 | 2.0689 | 0.0635 |
| Real GDP Growth | 0.3725 | 0.2419 | 1.5398 | 0.0756 |
| Contingent Liabilities | 0.0215 | 0.0061 | 3.5246 | 0.0551 |
| Bank Concentration | 0.4932 | 0.1277 | 3.8622 | 0.0646 |
| *R*-squared | 0.6474 | Adjusted *R*-squared | | 0.5856 |
| Prob. (*F*-statistic) | 0.0000 | Durbin Watson stat. | | 1.8248 |

relation has been found between subordinated debt and bank charter value. This result is in line with the disciplining role of the subordinated debt (Kato & Hagendorff, 2010). This explains that there is a rise in charter value because of the restriction imposed by the subordinated debt holders in case of increased risk-taking by the banks. This will more strengthen the claim that with an increase in the uninsured funding, there exists a great amount of probability that the market discipline will have a greater cost impact (Kato & Hagendorff, 2010).

### 6.2.3. Impact of Interbank Deposits on Bank Charter Value

The outcomes of Model –III have been described in Table 5. The coefficient of the interbank deposits along with the alternative measures of the charter value is not only positive but also statistically highly significant. These results verify the argument that interbank deposits restrict high risk-taking and reduce the insolvency of the banks (Distinguin et al., 2013). Moreover, the exposures of interbank deposits demonstrate

prudent market behavior that reduces the likelihood of bank disaster and systemic risk (Freixas et al., 2000).

Each of the reported specifications in the above Tables 3, 4 & 5 show that higher bank capital translates into higher charter value. As can be seen from the results of the models that the coefficient of the Tier 1 ratio is positive and statistically significant with alternative market discipline measures, indicating the presence of the market rent effect. Thus, if bank charter value arises from market power, then banks will hold higher levels of capital to preserve their access to monopoly rents (Allen & Powell, 1996). To gain some sense of the economic relevance of the coefficients, it has been noted that an increase in bank capital by one standard deviation would significantly increase the bank charter value. This further confirms that a market-based measure of charter value may be important to regulators and supervisors because it infers the true condition of a bank; this measure encourages regulators to act sooner and avoid costly delays (Flannery, 2001).

Besides, a positive and statistically significant association between contingent liabilities and charter value has been observed. This suggests that contingent liabilities increase the bank charter value and these liabilities may not be as risky as perceived. One explanation could be that the sample banks are only moderately involved in contingent liabilities. This finding is not only statistically significant but also economically significant. Across all market discipline proxies, with Keeley's measure of charter value, the coefficient on non-interest income is also positive and statistically significant, indicating that the market judges more diversified banks to have a higher return potential (Baele et al., 2007; Haq et al., 2014) other than interest base income, hence, considered a significant source of improving charter value. Thus, banks in Pakistan benefit from revenue-based diversification. However, this finding is contrary to Mercieca et al. (2007) on small European banks and Stiroh and Rumble (2006) on US banks. One possible explanation may be the scope of the sample. The Pakistani banking landscapes differ from that of the USA and other European banks. Besides, Pakistani financial supervisors (SBP) have a long tradition of cooperation across different functional areas, which may have reduced the agency costs for the institution as well as the customers. Consequently, the investors appear to base their valuation on the potential income of nontraditional revenue sources.

The greater the return on average equity, the higher the level of bank charter value, suggesting that more profitable banks may raise equity through retained earnings; similarly, less profitable banks face the cost of issuing equity that may lead to a lower bank charter value than their peers. The finding is consistent with Fonseca and Gonzalez (2010) and Nier and Baumann (2006).

With regard to the country-level variables, the coefficient of real GDP growth rate is positive and statistically significant. This outcome is consistent with the argument that banks operating in a country with a higher rate of GDP growth extract greater rents from market power in deposit markets (De Jonghe & Vennet, 2008).

## 7. Conclusion

This study investigates the impact of market discipline on bank charter value. To this end, evidence is sought as to how this relationship depends based on the bank-specific variables like bank's capital, contingent liabilities, non-interest income, return on average equity, etc. Similarly, evidence is also sought on the effect of bank regulation and other bank characteristics by considering the country-level variables. Using a sample of 21 commercial banks that are listed on the Pakistan Stock Exchange for the period from 2007 to 2019, the research results suggest that, on an average, market discipline increases bank charter value, although the influence of market discipline varies depending on other bank-specific characteristics, including bank capital, contingent liabilities and fee income, as well as the real GDP and concentration ratio, etc. More specifically, we found that the three proxies of marker discipline, that is, Deposit growth, Subordinated debt, and interbank deposits positively impact charter value.

The finding of this research may help regulators and policymakers to develop a better understanding of the charter value in offsetting the effects of the moral hazard problem in the financial system. This study is helpful for the general public, depositors, borrowers, and investors that how to make a suitable decision of investments because the findings of this study provide awareness as to how market participants can influence the stability, profitability, and strength of the going concern. By using the outcomes of this research work, banks' management may able to self-examine and analyze the financial and operational activities, for finding out the strength and weaknesses of their organizations that would help set new horizons for growth and profit maximization for all stakeholders. This study analyzed the impact of market discipline on bank charter value by choosing the sample of the country's local commercial banks only. Therefore, investment banks, specialized banks, and foreign commercial banks may be studied during future research/studies. The examination of the trade-off regarding customer service, branding, accessibility, and risk is beyond the scope of this study. Such trade-offs that can guide the preparation for regulatory policies are still not explored in empirical banking literature and can provide direction for future research.

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