ISSN 2223-0025

THE LAHORE JOURNAL OF BUSINESS

Lahore School of Economics

Volume 09, No.01 **Apr-Sep, 2020**

THE LAHORE JOURNAL OF BUSINESS

Indexing/Abstracting	*EBSCO Host, IndexCopernicus Master List*
Editorial Staff:	Tele. No: 0092 - 42 – 111-656-111 Ext. 286
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Publisher:	Lahore School of Economics, Lahore, Pakistan.

Correspondence relating to subscriptions and changes of address should be sent to *The Lahore Journal of Business*, Intersection Main Boulevard Phase VI DHA and Burki Road, Burki Lahore - 53200 – Pakistan.
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09 2020

THE LAHORE JOURNAL OF BUSINESS

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Lahore Journal of Business – Call for Papers

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Key Areas of Interest: *Accounting, Banking, Management, Marketing, Finance, Strategy, Human Resource Management, Organizational Behavior etc.*

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Printed by Lahore School of Economics Press

The Lahore Journal of Business
9 : 1 (Autumn 2020): pp. 1–31

Do Payout Policies and Channel Preferences of Banking Industries Shift during the Tranquil Periods? Evidence from Emerging Market

Sagheer Muhammad[*], Sehrish Mubeen[**] and Mah Noor Shahzadi[***]

Abstract

This study investigates whether the dividend policy (the decision to distribute funds, and the distribution channel preferences) of the banking sector of Pakistan is affected during any periods of domestic and global financial crisis. Using a sample of publically listed commercial banks, between the periods of 2002 till 2015, this research document that, unlike other countries, the banks in Pakistan fail to indicate a decline in the level of funds that are distributed to the investors. Even though the importance of the other means of distribution has increased over time, a major portion of the total payout is still covered by the cash dividends. Moreover, the results of the multinomial logit model, demonstrate that the payout policy of the commercial banks listed on the PSX, is not influenced by the global financial crisis. Furthermore, the analysis reveals that more liquid, profitable, and growth oriented banks have a higher tendency to pay dividends, than the other banks that do not fall in this category. The empirical results also indicate that the signaling hypothesis is a relevant economic phenomenon. These findings provide insights to different stakeholders in developing the relevant policies needed to cope up with crisis situations, such as the current ongoing Coronavirus pandemic.

Keywords: Payout policy, payout channel preferences, financial crises, Multinomial Logit Mode.

JEL Classification: G35, G32, G30.

1. Introduction

Since the past few centuries, financial institutions, especially banks, are considered to be the heart of any country's economic system. In

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emerging and transitioning economies, the position of a well- performing banking region has been recognized as the engine of economic development and growth (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2002). The overall performance of a bank is largely dependent upon the key strategic decisions that are made by its corporate managers. Among all the strategic decision made at the board level, designing the optimal dividend policy still remains a vital and challenging task for corporate managers. The puzzling decisions about the distribution of funds, become even more complex in situations of financial turmoil. As the ultimate goal of the financial managers is to make corporate decisions that lead towards a higher share price, an optimal dividend policy has always fascinated researchers, because it is known to be one of the fundamental determinants of shareholders wealth maximization. Seneque (1978) defined dividends as, the proportion of the profit earned by a company, which is given to its shareholders. Whereas, the payout policy is said to be the strategy that the managers pursue, while making payout decisions. In general, the payout policies consist of the payout levels, and the payout channels through which the firm returns capital to its shareholders (Samet & Jarboui, 2017). The presence of different costs, such as the flotation cost, interest rates, absent binding covenants, and time restrictions, make the capital markets more complex. This, in turn, forces firms to finance various investment opportunities that pop up in the market, only through the internal sources of the funds (mostly retained earnings) (DeAngelo & DeAngelo, 1990; Donaldson, 1961; Myers & Majluf, 1984). Under these conditions, the management has to make serious efforts, while deciding what proportion of the earnings should be distributed as dividends, and what should be retained in the business, for the forthcoming perspective projects (Denis & Osobov, 2008; Van Horne & McDonald, 1971).

Recognizing that dividends play a critical role in the banking sector, Floyed, Li and Skinner (2015) state that "by paying and increasing dividends, bank managers signal to external constituents, including depositors and short-term creditors, that they are confident about bank solvency'. For investors, this means that banks can be considered reliable dividend payers, and are likely to continue to increase their dividends over time. But, it is noteworthy that bank shareholders are not just receiving a direct deposit after every quarter, rather, they are receiving a message. In the wake of a crisis situation, investors' residual skepticism about financial firms' health only serves as a means to make dividends more important for banks—to the extent that it often surprises the researchers. Hence, it can be concurred that dividends are considered to be pervasive for banks, in a context that does not apply to other types of firms (Floyd et al., 2015).

There are numerous theoretical models, and empirical studies available in the literature, which are associated with the dividend conundrum. Specifically, two schools of thought (dividend irrelevance and dividend relevance) are noteworthy, regarding the change in a firm's value, caused by its dividend policy. Accordingly, in this context, the dividend irrelevance theory states that, under a fully competitive market, the only element that can affect a firm's value is an investment decision, while the dividend decision remains unrelated to this resolute (Miller & Modigliani, 1961). On the other hand, the dividend relevance theory provides an alternative explanation, and demonstrates that a firm's dividend related decisions can significantly affect its market and organizational value. This theory is based on a rationale that there is a presence of numerous factors (taxes, agency cost, transaction cost, agency cost, flotation cost, and behavioral factors) that contribute towards making capital markets imperfect. Furthermore, many researchers in the extant literatures have proposed several other hypotheses (signaling hypothesis, agency theory, tax preference hypothesis, and clientele effect hypotheses), which support the rationale of the relevance theory (Gordon, 1963; Lintner, 1962; Walter, 1963). However, even after an extensive amount of research done by researchers, the dividend behavior is still a confusing discipline for theorists and researchers. Black (1976) famously quoted 'The harder we look at the dividend picture, the more it seems like a puzzle, with pieces that just do not fit together' (Bushra, 2012).

The economic crisis of 2007-2009 was driven by the major banks' weakness in the US financial market, which eventually turned into one of the most impactful global financial crisis of today's day and age. According to the World Bank report of 2009, the economies of developing countries, including Pakistan, were highly affected by this crisis. Despite a major drop of 17% in the KSE index, the commercial banks in Pakistan were among those that confronted the detrimental impact of the financial crisis with a head on approach. Albeit none of the banks collapsed due to the crisis, it still left considerable and significant impact on the financial performance, patterns, and operational policies of the banks (Nazir, Abdullah, & Nawaz, 2012). Meanwhile, in the wake of the financial crisis, the Basel committee developed a new reform (Basel III). This reform incorporated more conservative and challenging capital requirements for the banks, forcing them to cut down the dividends, and plow back their earnings (Abreu & Gulamhussen, 2013).

Following the financial distress, and the forthcoming shifts in the regulatory reforms (Basel III), a fundamental question had been raised:

Does the payout policy of commercial banks tend to change, following a financial collapse? Hence, in this research, we aim to study commercial banks rather than financial institutions, because banks are essential for the survival of the economic system, their payout policy receives significant interest during the crisis period, and they are more homogenous in nature, as compared to any other financial institution.

For this study, we have analyzed the dividend paying behavior of the banks listed in Pakistan, over a period spanning from the year 2002-2015, and have emphasized on two key aspects. Firstly, we have examined the decision of the bank to pay dividends. Secondly, we have analyzed the payout channel preferences i.e. cash dividends, stock dividend, or mixed dividend of the banks during the time of the financial meltdown.

After analyzing many different settings, we have come to the conclusion, that most of the banks in Pakistan use dividends, as a medium of distributing profits to their shareholders. Moreover, the results of the multinomial logit model demonstrate that, the payout policy of commercial banks that are listed on the PSX is not influenced by the global financial crisis. Whereas, the results regarding the changes in the channel choices suggest that the cash dividend gets an eminent status after a financial crisis has passed. It also reveals that liquid, profitable, and growing banks have a greater tendency to pay out the dividends to their investors. In short, the evidence presented above is consistent with the idea that, banks use dividends to signal their financial strength in the market.

This study complements the growing literature that is based on the pay-out policies that are used by the banks in many ways; firstly, even though an ample amount of studies exist on the determinants and effects of the payout policy (Ahmad & Javid, 2009; Bushra & Mirza, 2015; Khan, 2012; Mbulawa, Okurut, Ntsosa, & Sinha, 2020; Roomi, Chaudhry, & Azeem, 2011), the extent of our knowledge tells us that this is the first study of its kind which investigates the choice of the earning distribution channel (cash dividends, stock dividend or mixed dividend of) by the commercial banks in Pakistan. Secondly, the financial crisis and the payout policy are always presented as two separate topics in literature, and no study has been done based on the association between them. To fill in this gap, the present study thoroughly addresses the dividend policy of the banks during the global financial crisis of 2007-2009, and provides a unique setting for the study pertaining to the decisions related to corporate finance. Furthermore, most of the studies available on this topic are carried out in developed countries; hence, we investigate this particular phenomenon in the emerging market of

Pakistan, which is assumed to possess different characteristics. Finally, recent studies available in the literature mostly concentrate on the dividend policy of the nonfinancial sector. Therefore, this study tries to analyze the payout policy of the financial sector, with a focus, specifically, on the commercial banks.

Meanwhile, the findings of the current study will shed critical light on the corporate finance theories, and will also help investors to make investments in firms whose payout policy matches their style. Additionally, it will also work as a guide for corporations that, by developing their payout policy, under the light of the evidence presented in this study, can increase a firm's value and reduce conflicts between the management and the shareholders.

The remainder of the paper is organized as follows. Section II reviews the related literature, while section III provide the complete detail about the sample and methodology. Section IV discusses the results of the empirical analysis, and finally, the concluding remarks are present in section V.

2. Literature Review

An important question that is often put up pertains to why firms pay dividends, and what are the main factors that can influence a firm's dividend decision? The majority of the extant theoretical and empirical literature is available on the dividend policy and announcement effects. As per Miller and Modigliani's (1961) Dividend Irrelevance Theorem, given an efficient market, ideally dividend decisions should be a matter of indifference to the shareholders and firms. Black, Fisher, and Scholes (1974) also provide evidence in support of the dividend irrelevance hypothesis. Specifically, by examining the stock returns, and the dividend yield relationship, they showed that the stock price does not affect a firm's dividend policy. On the other hand, a counter-argument also exists with regards to the relationship between the dividend policy, and the firm's value. At a more theoretical level, an extensive amount of literature focuses on how the existence of market inefficiencies, investor irrationality, and limits of arbitrage, may render the dividend policy irrelevant to a firm's valuation. Apart from the evidence presented above, DeAngelo and DeAngelo (2006) provide a new explanation of the payout policy. Their results show, that a firm's decision to distribute funds is dependent on the Life-Cycle theory. Based on this premise, a mature firm distributes it's earning to the shareholders, in the form of dividends, than a growth one,

because it has fewer investment opportunities to finance. Lintner's (1956) partial adjustment model also provides a foundation for the so-called signaling hypothesis. The theory assumes that managers use dividends, deliberately, to convey a signal about the firm's future performance. Therefore, when firms set a target payout ratio, the shifts in earnings translate into the shifts in the payout policy. Accordingly, many interpretations of why dividends exist, are rested on the agency theory, as coined in by Jensen and Meckling (1976). Under this theory, dividends reduce the level of cash that a can firm hold, which in turn forces the capital market to acquire external funds, when trying to finance new investment opportunities. This induces strict external monitoring, thus, reducing the problems with the agency. Meanwhile, the clientele effect, or the tax hypothesis provides the basis for the assumption that, the dividend policy is relevant, or has an effect on the firm's value. The theory asserts that, different dividend policies attract investors from having different preferences. Moreover, because of the tax disadvantage associated with dividends, firms frequently use a conservative payout policy (Elton & Gruber, 1970).

As far as the distribution channels are concerned, it is said that cash dividends are inductive of the future financial performance of the firm, which increases a firm's ability to have easier access to funds from the external market. Moreover, it also argues that cash dividends are a sign of treasury for shareholders, and the retention of earnings is not appreciated by the investors. Lee and Xiao (2004), and Chen, Jian, and Xu (2009) suggest that the cash dividends are important for firms that intend to acquire funds by equity issuance, after the IPO. Taking investor irrationality into consideration, it is claimed that investors favor cash dividends, over others. The theory is based on the idea that, for some investors, self-control is assumed to be a major trigger of choosing cash dividends, because they wish to avoid regret. Specifically, when investors receive cash dividends, they can consume them, and the utility they gain in this case, will be more than the utility they will get through future capital gains that are uncertain (Shefrin & Statmen, 1984). Like cash dividends, stock dividends, and mixed dividends are known to be important channels that a firm uses, in order to distribute their earnings to shareholders. David and Ginlinger (2016) demonstrate that firms prefer stock dividends, in the time of an economic setback, in order to maintain confidence in the market. Tax based explanation suggests that both firms and investors prefer a payout method, which yields the most favorable text treatment. Wang, Manry, and Wandler (2011) highlight taxes as another reason why firms prefer stock dividends, over cash dividends. They further argue that the tax on cash dividends is

higher than the tax on capital gain, thus, investors choose to receive shares. Consistent with the dividend clientele effect, firms alter their payout policies, based on changes in the tax system. This is because the incentives of the shareholders and managers are highly affected by the new tax reforms (Korkeamaki, Liljeblom, & Pasternack, 2010). David and Ginglinger (2016), after linking the payout channel choices, with the agency theory, illustrate that firms with major institutional investors are more likely to pay out the stock dividends in downturns of an economy. They believe that by doing so, these firms can increase the ownership of the investors, with long term horizons, who are not affected by the short term fluctuation in the share prices. The agency theory suggests that, investors in growing firms that establish effective governance mechanisms, are ready to accept a large amount of retention, and a lower level of cash dividends (Chen, Chadam, Jiang, & Zheng, 2008). After analyzing the possible impact of the share repurchases on a firm's total payout, Andres, Doumet, Fernau, and Theissen (2015) suggest that buyback is not a perfect substitute for dividends, and the dividends are assumed to be stickier then the total payouts.

Extensive research has shown that the dividend decision is related to certain characteristics that a firm possesses. It is documented that a firm's profitability influences the dividend policy (Akbar & Baig, 2010; Bushra & Mirza, 2015; Fahim, Khurshid & Tahir., 2015; Kouser, Luqman, Yaseen, & Azeem, 2015; Malkawi, 2008). According to Carroll (1995), the positive association between earnings and payout is discernable. That is to say that, as earnings increase, the dividend payments become higher, while, decreases in the earnings, lead towards dividend cuts. When focusing on the firm size and liquidity, it is indicated that both these variables are positively related to the dividend policy. Lee, Singal, and Kang (2013) reveal that, because of the easy access to external finance, and also due to the lower growth opportunities, larger firms are more inclined towards paying out the dividends to their stakeholders. The likelihood of paying cash dividend is higher for companies that hold a large sum of money, as compared those that have just enough money to fulfill their working capital requirements (Ho, 2003). Moreover, it is also stated that leveraging negatively tends to have an adverse effect on the payout policy of a firm. In their paper, Agrawal and Jayaraman (1994) describe that leveraged firms prefer to maintain internal funds, in order to make timely payments to creditors, rather than distributing the payments to their shareholders. Likewise, growing firms are less likely to pay out the dividends to their shareholders (Trojanowski & Reneeboog, 2005). This empirical finding is explained by the observation that the probability of dividend omission is greater for firms having a higher growth potential,

because they choose to keep cash in order to finance any additional investment opportunities in the future.

Several empirical studies have highlighted the possible shifts in the corporate payout policy, caused by the recent global financial crisis. This global financial crisis had been considered as an exogenous shock to the companies, which was assumed to have affected the dividend policy as well (Basse, 2019; Hilliard, Jahera, & Zhang, 2019; Mbulawa et al., 2020; Tran, Alphonse, & Nguyen, 2017). Moreover, a large number of financial institutions collapsed during the years spanning from 2007 to 2009. This meant that the banking institutions paid heavy penalties in terms of the adverse effects that they encountered. Using the Logistic Regression Model, Hauser (2013) showed that in order to avoid financial risks, in the midst of financial meltdowns, firms prefer to increase their cash ratio, rather than maintaining the dividend policy. Likewise, opposite to dividend signaling or dividend smoothing hypothesis, insurance companies in Europe cut down the dividend payments, in order to preserve their capital, and to comply with the regulatory standards when experiencing a severe liquidity crisis (Reddemann, Basse, & Schulenburg, 2010). Contrary to the facts presented above, Floyd, Li, and Skinner (2015) provided evidence regarding the observation that the declining propensity to distribute funds is not evident in the case of banks, especially during periods of tranquility. The plausible explanation of the reluctance to cut dividends is that, dividends are used by banks to signal their financial strength in the market. Recently, a study was organized to carry out an empirical analysis of the dividend smoothing behavior of the firms that are listed in Oman. When testing this theory with Lintner's (1956) Partial adjustment model, the findings revealed that the financial crisis does not significantly influence the dividend policy, and firms are less likely to cut dividends, even after a major setback, which comes in the form of a crisis (Al-Malkawi, Bhatti, & Magableh, 2014). Similarly, after analyzing the Italian insurance sector, Reddemann et al. (2010) highlighted, that the act of dividend omission is a less attractive, and relatively less preferred measure for the firm. This is primarily because it stems the apprehension that, the probable dividend cuts could be interpreted by the investors in a negative manner.

3. Data Description and Methodology

3.1 Sample and Data collection:

In order to carry out an effective empirical analysis, our sample covers the banks that are listed in Pakistan Stock Exchange, over the period

that spans between the years 2002-2015. Moreover, we have focused on commercial banks, because they are important in their own right, and also, with a market capitalization of 1.2 trillion PKR, they are considered to be the hub of the financial services sector in Pakistan. Inclusion in the sample required that the data related to the variables must be available during the time period between the years 2002-2015. Furthermore, as this study is quantitative in nature, secondary data is utilized, for the purpose of a deeper understanding and investigation of the intricacies involved in this context. The data is drawn from two main sources. Our first, and primary source is the financial reports, while any additional data has been acquired from the analysis of the financial statements, as published by SBP.

3.2 Econometric Model

In order to examine the impact, of the recent financial crisis, on the payout policies (Decision to pay, and Payout Channel preferences) of banks, we have used the Multinomial Logit Model (MNL). The reasons for selecting a Multinomial logit model, over other models are twofold. Firstly, it handles all types of non-linear relationships. Secondly, it is often preferred by the researchers, as compared to the more sophisticated probit (Dow & Endersby, 2004), which is likely to experience a weak identification problem in the model. Following the work of Reneeboog (2005) and, Geailer and Reeneboog (2016), the dependent variable in our study is computing out to be the payout policy, which can be presented in 4 forms; no dividend, cash dividends, stock dividend, and mixed dividend. Each of these outcomes is coded as 0, 1, 2, and 3, respectively. Along with this, the total payout ratio (total payout scaled by net income), and the dividend payout ratio (cash dividends scaled by net income) are have also been utilized, in order to observe the trend and preferred mode of distribution.

The major explanatory variable in this study, is the recent global financial crisis (2007-2010). Therefore, to take into consideration the effects of the financial crisis, on the payout policy of the banks listed in Pakistan, we have further sub-divided our sample into three periods; 2002-2006 (pre-crisis phase), 2007-2010 (crisis phase), and 2011-2015 (post-crisis phase). We have then constructed a series of dummy variables, in order to identify whether a particular observation falls into a particular sub-period.

Furthermore, a set of firm specific characteristics, which are controlled in this study, comprise of certain variables that will be used to deduce the results that are required. One of the prime variables include the firm size (SIZE). The firm size is defined as a natural logarithm of total

assets, which is expected to have a positive effect on the dividend payouts, as large diversified firms have more stable cash flows. It is noteworthy that such firms are likely to have low probability of bankruptcy, which puts them in a better position to distribute funds (Asghar, Shah, Hamid, & Suleman, 2011; Shepherd & Scott, 1975). Contrary to the positive effects, by investigating the listed companies in Pakistan, Bushra and Mirza (2015) argued that larger firms are more likely to retain cash, in order to meet their debt obligations. Similarly, the variable of profitability is also taken as an independent variable, and is measured through the return on assets. The return on assets is also expected to be positively related with the dividend payout, which indicates that more profitable firms tend to distribute more dividends (Ahmad & Javid, 2008; Ben Naceur, Goaied, & Belanes, 2006; Tahir & Mushtaq, 2016). Moving further in the understanding of this context, it is observed that organizations with more investment opportunities tend to pay fewer dividends. Moreover, in order to avoid the external financing cost, growing firms prefer internal financing, and therefore, the variable of investment opportunities carries an inverse relationship with the pay outs. However, some research findings indicate that, in heavily debt driven industries, the variable of investment carries an insignificant relationship with the dividends. Fahim and Zhu. (2015) measured investment opportunities, which can also be termed as growth opportunities of the firm, by analyzing the accumulated retained earnings, and the total assets. Thus, the same approach has been adopted in this study, as the literature very strongly supports the preference of internal financing for exploiting the opportunities that exist in the market. Leverage is also another important factor that needs to be studied in detail. Literature indicates that firms that are highly leveraged, tend to have a lower level of payout, due to the heavy external financing costs and the transition costs. As a result, leveraged firms do not declare regular dividends. Moreover, the capital ratio is used to measure leverage, and represents the amount of assets on which shareholders can exercise residual claim. Moving on, the liquidity shows how quickly the assets of the company can be converted into cash, in order to fulfill its liabilities. This is applicable if, by any chance, these assets crystalize altogether. Ben Naceur, Goaied, and Belanes (2006), state that, liquid organizations are ideally supposed to have more cash, or easily convertible assets, and therefore, as a usual practice, they are in better position to issue dividends.

Keeping all these insights under consideration, the econometric equation of the logistic function is as follows,

$$P(Y_{i,t}) = \frac{1}{1+e^{-\pi(i,t)}} \quad (3.1)$$

A multinomial logit model that can be used in order to examine the payout policy of banks during a financial crisis, where payout policy has j = 4 alternatives, can be expressed as follows:

$$\frac{Pr[Y = m]}{Pr[Y = K]} = \frac{1}{1 + e^{-Pij,t}}$$

Here, the variable m; (m=1,…, m) represents all the 4 alternative choices that are made by the banks, and the variable K represents the reference category. Furthermore,

$$P_{ij,t} = \alpha + \beta_1 P_{i,t} + \beta_2 S_{i,t} + \beta_3 I_{i,t} + \beta_4 PLi_{i,t} + \beta_5 Le_{i,t} + \beta_6 PreC_{i,t} + \beta_7 C_{i,t} + \beta_8 PostC_{i,t} + \varepsilon_{i,t}$$

The dependent variable P, represents the 4 forms of payout policy of the banks. These policies state that, (1) the bank pays no dividend, (2) the bank pays cash dividends, (3) the bank pays stock dividend, and (4) the bank pays a mixed dividend. These outcomes are coded as 0, 1, 2, and 3, respectively. The main variable of interest is the dummy variable (financial crisis; PreC, C, and PostC) which takes a value of 1, if a particular observation falls into a particular sub-period, and otherwise it is 0. In addition to this, the control variables are selected using a framework that has been suggested by Trojanowski and Reneeboog (2005), and Case, Hardin, and Wu (2012). These include the P (profitability), S (size), I (investment opportunities), Li (liquidity), and the Le (leverage).

4. Results and Discussion

In order to carry out the empirical investigation, the data analysis is carried out in four stages; these entail the descriptive statistics, the propensity to distribute funds (analyzing the most promising payout channel), the payout trends (the size of the payout during, and across crisis) and the multinomial logit regression (to observe the various factors that can significantly affect the payout policy of the banks).

4.1 Descriptive statistics

Table 1 represents the summary statistics of the variables used in the empirical analysis. For the banks that have been included in the sample, the mean value of the Liquidity which primarily entails the estimated ratio of

the advances, to the total deposits, is 90.64%, with a standard deviation of 6.29%. Furthermore, with respect to the firm size, a mean value of 8.33, with a standard deviation 0.45, indicates that, on average the commercial banks in Pakistan have a high market capitalization. Other than this, the average value of the ROA (a measure of firm profitability) is 1.06%, with a deviate of 0.82%, which depicts the high profitability of banks during the sample period that is taken into account. In addition to this, the findings also reveal that the average value of Investment is 1.3%. Similarly, the mean value of a bank's leverage, which is 8.68%, represents a very high percentage of debt in the capital structure. Lastly, the average value of the dividend payout ratio (i.e., the cash dividends only), and the total payout ratios are 24.58% and 42.74%, respectively. In their entirety, the findings indicate that even though banks use stock dividends as a means of distribution, a major portion of the total payout is still covered by cash dividends.

Table 1: Summary Statistics

Statistics	ROA	Liquidity	Leverage	TPO	Size	Investment	DPO
Mean	90.64%	8.33	1.06%	1.30%	8.68%	24.58%	42.74%
Median	92.02%	8.37	1.04%	1.02%	7.14%	17.39%	52.11%
Std. Dev.	6.29%	0.45	0.82%	18.70%	7.32%	49.01%	32.58%
Observations	308	308	308	308	308	308	308

4.1.1 Averages Classified according to different Sub-Sample Periods

Table 2 reports the averages of the variables during the three different sub-periods which were identified as the pre-crisis, crisis, and the post-crisis periods. The objective was to verify the possible implications of the global financial crisis, on the different aspects that are part of the banks' operations. The results revealed that the highest average of the liquidity ratio falls within the crisis period (90.64%), followed by the post-crisis period (91.10%) and then finally in the pre-crisis period (89.81%). This was an indication that the management of the banks prefer to keep more cash in hand, in order to deal with any sudden surges, or ups and downs in the crisis (Hauser, 2013). Furthermore, the average value of the Size in the pre-crisis period (7.88) is marginally lower than that in the crisis, and the post-crisis period (8.33 & 8.6). These results are consistent with the expectation, that the size of the banks keep on increasing. With respect to profitability, the mean value of 0.49, in the crisis period, is lower than the mean value in the pre and post-crisis periods (1.32 & 1.06). Similarly, it is evident by the negative value of -0.54% that the growth opportunities of the banks tend to squeeze at the time of the crisis. Additionally, the average value of the

Leverage is lower in the crisis, and post-crisis periods, relative to the pre-crisis period. Consistent with the signaling hypothesis, the mean value of both the dividend payout ratio, and the total payout ratio, is higher during the crisis period, than the other two periods. This implies that banks use dividends to convey signals in the market about their financial strength, especially during the times in which market turmoil is at its peak.

Table 2: Average Classified according to different Sub-Sample Periods.

	Pre-Crises (2002-2006)		Crises (2007-2010)		Post-Crises (2011-2015)	
	Mean %	Median %	Mean %	Median %	Mean %	Median %
Liquidity	89.81	92.96	90.64	92.02	91.10	92.01
Size	7.88	7.96	8.33	8.37	8.6	8.65
Profitability	1.32	1.3	0.49	1.23	1.06	1.04
Investment	0.19	0.27	(0.54)	1.12	3.88	1.35
Leverage	7.04	5.79	8.42	7.39	8.68	7.14
DPO	44.25	40.49	57.65	51.47	42.74	52.11
TPO	19.86	8.90	24.07	17.39	29.7	36.97

4.1.2 Propensity to Pay (Dominant Payout Channel by Firms)

Table 3 exhibits the decision to distribute funds, and the channel preferences of the commercial banks from the year 2002 through 2015. The findings show that the payout policy of the banks have fluctuated substantially over the given time period. The results reveal that 33.33% of the banks preferred to cut down their dividends in the year 2002. The trend of no dividend reached its minimum in the year 2007 and 2008, where only 13.33% of banks decided not to announce their dividends. Following the liquidity crisis, the banks decided, again, not to distribute funds to their shareholders. Besides this, 20% of the banks chose to pay their earnings to the investors through cash dividends in the year 2002, but this proportion decreased to 6.67% in the year 2010, with a slight increase to 13.33% in the year 2008. After this, there was a gradual increase which went up to 60% in the year 2015, which reveals that after the crises period had passed, the banks preferred to distribute the funds by utilizing the channel of cash dividends. When shifting the focus on the stock dividends, it is evident from the table that up till the year 2003, it was not a preferable mode of payment for the banks. However, later on in the year 2004, it became the second most utilized payout channel, with a 40% weightage. Whereas, till the end of the year 2015, it again became less popular among the banks, as compared to the cash dividends. Similarly, the mixed dividend policy has

slightly changed from the year 2002 to 2013, and has shown a gradual decrease in the year 2014. In short, our results contradict the findings of Denis and Osobov (2008), and Fama and French (2001), who claim that the number of US firms, that pay a dividend to their shareholders, substantially declined over the last quarter of a century. However, these results were consistent with the results of Floyd et al. (2015), and Al-Malkawi et al. (2014).

Table 3: Propensity to Pay (Dominant Payout Channel by Banks)

Year	No Dividend	Cash Dividend	Stock Dividend	Mixed Dividend
2002	33.33	20	13.33	33.33
2003	46.67	N/A	N/A	53.33
2004	20	13.33	40	26.67
2005	20	13.33	20	46.67
2006	26.67	6.67	26.67	40
2007	13.33	6.67	20	60
2008	13.33	13.33	26.67	46.67
2009	33.33	6.67	13.33	46.67
2010	33.33	6.67	26.67	33.33
2011	20	20	20	40
2012	26.67	26.67	13.33	33.33
2013	26.67	33.33	13.33	26.67
2014	26.67	46.67	13.33	13.33
2015	33.33	60	6.67	N/A

4.1.3 Year by Year Percentage Change in Payout Trend or Size of Payout

Table 4 reports the average amounts spent on cash dividends, and the total payout that is made to the shareholders by commercial banks every year. As it is evident from the table that the dividend payout ratio remains volatile over the complete span of the sample period. Moreover, as expected, every increasing trend is accompanied by a decline in the subsequent year. Likewise, the total payout ratio also exhibits inconsistent behavior throughout the complete sample period that is taken into consideration. Keeping in mind the results, our findings are contradictory to DeAngelo, DeAngelo, and Stulz (2004), as they argue that, on an average, the amount spent by firms on dividends has increased over time. However, our findings lend some support to the results that were revealed by Zhou, Bhooth, and Chang (2013).

Table 4: Year by Year Percentage Change in Payout Trend or Size of Payout

Year	Dividend Payout Policy		Total Payout Policy	
	Mean	Median	Mean	Median
2002	22.3	25.56	37.56	39.57
2003	16.76	18.93	33.51	24.45
2004	16.35	29.02	50.24	44.04
2005	29.98	66.9	57.78	36.3
2006	13.92	20.86	42.16	45.92
2007	17.34	17.1	58.36	46.24
2008	16.04	128.52	62.66	54.43
2009	26.57	33.26	43.85	49.9
2010	36.32	80.95	65.71	54.82
2011	28.2	26.05	53.03	53.32
2012	33.92	30.97	50.41	59.17
2013	27.8	26.6	42.07	52.11
2014	26.72	24.4	32.07	42.37
2015	31.82	30.29	36.14	52.36

4.2 Financial Crises and Payout Channels

In this study, a multinomial logistic model is used to explain the likelihood of a firm, opting to distribute funds in the three different sub-periods that have been defined. The Wald statistics in the pre-crisis, crisis, and the post-crisis period (176.31, 185.82, &188.32), with a P-value of 0.000, imply that the overall model is significant in nature. To be specific, it indicates that the predictor considerably defines the log-odds of the dependent variable. Moreover, the log-likelihood in the pre-crisis is -195.0196, in the crisis, it is -190.26689, and in the post-crisis period, it is -189.01754, which shows the probability of observing a given set of observations, given the value of the parameters that are taken into account.

4.2.1 Payout Policy of Commercial Banks in Pre-Crises Period

It is evident from the table 5 that in the pre-crisis period, the log odds of paying cash dividend, relative to no dividend, have increased by 0.83, with an increase that is experienced in the profitability. These results support the findings of Carroll (1995), who documents that when the profitability increases banks prefer to distribute funds to their shareholders in the form of cash dividends. Moreover, the probability of dividend cuts is higher for leveraged banks. Contrary to the facts presented by Trojanowski and Reneeboog (2005), the results reveal that the likelihood of the dividend payment being made is positively related to the corporate investment. While

a negative association is found between the payout policy and the firm's liquidity, the probability of paying cash dividends to no-dividend increases by 0.08. While the likelihood of paying stock dividend, vs no-dividend increases by 0.27. Interestingly, panel B and C of 5 provide some additional insights regarding the channel preferences of banks. It is documented that the size of the bank is positively associated with the probability of the earnings being distributed to the investors through the mean value of the cash dividend, rather than using the stock or the mixed dividends. Furthermore, it is noteworthy that profitable banks prefer mixed dividends over other means of distribution. However, for leveraged banks, cash dividends are the most important channel of distribution, as the odds of making the payments in the form of mixed dividends and the stock dividends decreases by -0.08 and -0.3, respectively. When taking into consideration the increase in liquidity and investments, banks prefer to use other means of distribution rather than paying cash dividends. Lastly, the coefficient of the pre-crisis dummy indicates that banks prefer to distribute their earnings in the form of dividends (either cash or mixed), rather than retaining them in the business.

Table 5: Payout Policy of Commercial Banks in Pre-Crises

	Panel A: Base-case outcome is No Dividends						Panel B: Base-case outcome is Cash Dividend				Panel C: base-case outcome is Bonus Issue	
	Dividends		*Stock*		*Mixed*		*Stock*		*Mixed*		*Mixed*	
Intercept	(19.5312)	(1.20)	(1.90985)	(0.35)	(8.86002)	(0.64)	17.62135	1.06	10.67119	0.60	(6.95016)	(0.49)
Firm size	***1.314433***	***1.40***	***(2.77764)***	***(3.05)***	***(1.85199)***	***(2.06)***	***(4.092082)***	***(4.02)***	***(3.166423)***	***(3.35)***	***.9256593***	***1.11***
Profitability	***(.092021)***	***(0.34)***	***(.144760)***	***(0.51)***	*.8308925*	*2.99*	***(.0527391)***	***(0.15)***	*.9229135*	*2.58*	*.9756526*	*2.61*
Leverage	***.0286076***	***0.18***	*(.060403)*	*(0.17)*	*(.283804)*	*(1.72)*	*(.089011)*	*(0.51)*	*(.3124115)*	*(1.57)*	*(.223400)*	*(1.33)*
Liquidity	*.0885145*	*0.69*	*.2741384*	*3.17*	*.2626512*	*2.01*	*.185624*	*1.26*	*.1741367*	*1.14*	***(.011487)***	***(0.08)***
Investment	*.7012074*	*2.96*	*1.008437*	*3.83*	*1.577618*	*5.99*	*.3072297*	*1.09*	*.8764111*	*3.68*	*5691814*	*2.09*
Pre-crisis	***(.206069)***	***(0.29)***	***(.883288)***	***(1.28)***	*(.017622)*	*(0.03)*	***(.6772196)***	***(0.92)***	***.1884465***	***0.28***	***.8656661***	***1.36***
	Model Summary				**Log likelihood**		**Number of observation**		**Wald test statistic**			
					(195.01962)		**210**		**176.31**			

4.2.2 Payout Policy of Commercial Banks in Crises Period

Table 6 explains a bank's policy decision, regarding the dividend distribution to the shareholders in the crisis period. The result documents that a firm's size is positively related to the cash dividend that are paid out, as the log odds of cash dividends vs no dividends increase by a value of 1.2. In addition to this, parallel to the result of the pre-crisis, with an increase in the profits, the probability of paying mixed dividends, relative to no dividends, also increases by a value of 1.02. The paying out of mixed dividends, however, is an aggrandized strategy, over the no dividends policy for profitable banks. These observations and results appear to be in line with the findings of the previous studies (Ahmad & Javid, 2008; Fatemi & Bildik, 2012; Malkawi, 2008; Nissim & Ziv, 2001). Moreover, it is also observed that a high leverage firm is less likely to be a dividend payer (Agrawal & Jayaraman, 1994), as the log odds of paying the stock dividends and the mixed dividends, vs no dividends, also decrease by a value of 0.7 and 0.4, respectively. As reported in the table, both the liquidity and the investment, positively affect a firm's payout decision. Similarly, panel B and C also reveal that, as far as the channel preferences are concerned, profitable banks often use mixed dividends as a means of distribution. The likelihood of paying a mixed dividend is higher in the case of both the cash dividend and the stock dividend. Interestingly, the variable of leverage also appears as a critical determinant of whether a cash dividend will be paid out or not. Results reveal that mixed dividends are the least promising means of distribution, as their probability relative to the cash dividends decreases by a value of -0.33.

Moreover, as far as the time is concerned, the estimates of the dummy variable (crisis) reveal that the log odds of paying the mixed dividends, as compared to the cash dividends, and the stock dividends increased by a value of 1.65. Our findings have come out to be in line with David and Ginlinger's (2016) analysis, which reports that in crisis periods, the firms Prefer to distribute funds through the channel which entails the mixed dividends.

Table 6: Payout Policy of Commercial Banks in Crises

	Panel A: Base-case outcome is No Dividends						Panel B: Base-case outcome is Cash Dividend				Panel C: base-case outcome is Bonus Issue	
	Dividends		*Stock*		*Mixed*		*Stock*		*Mixed*		*Mixed*	
Intercept	*(20.4590)*	*(1.58)*	*(3.53966)*	*(0.6)*	*(4.74016)*	*(0.57)*	*16.91942*	*1.22*	*15.71892*	*1.12*	*(1.20049)*	*(0.13)*
Firm size	***1.203626***	***1.48***	***(2.32750)***	***(2.91)***	***(1.99198)***	***(2.53)***	***(3.531134)***	***(3.98)***	***(3.195608)***	***(3.82)***	***.3355258***	***0.46***
Profitability	***(.079681)***	***(0.29)***	***(.072882)***	***(0.63)***	*1.023883*	*3.65*	***(.0865689)***	***(0.25)***	*1.103564*	*3.07*	*1.190133*	*3.32*
Leverage	*.0468635*	*0.37*	*(.072882)*	*(0.81)*	*(.406979)*	*(3.04)*	*(.1197458)*	*(0.80)*	*(.4538427)*	*(2.70)*	*(.334096)*	*(2.38)*
Liquidity	*.1068372*	*0.93*	*.2458993*	*2.85*	*.2321753*	*2.34*	*.139062*	*1.04*	*.125338*	*0.94*	***(.013724)***	***(0.13)***
Investment	*.7171894*	*3.06*	*1.030756*	*3.84*	*1.614174*	*6.1*	*.3135667*	*1.10*	*.896985*	*3.60*	*.5834184*	*2.15*
Crisis	***(.275191)***	***(0.36)***	***1.076554***	***1.57***	***1.376182***	***2.02***	***1.351745***	***2.15***	*1.651374*	*2.87*	***.2996281***	***0.60***
	Model Summary				**Log likelihood**		**Number of observation**		**Wald test statistic**			
					(190.26689)		**210**		**185.82**			

4.2.3 Payout Policy of Commercial Banks in Post-Crises Period

Table 7 presents the results of the multinomial logit model, which is estimated to determine the payout policy of the banks in the post-crisis period. The findings of this study show that the firm size is significantly and positively associated with the dividend policy. Similarly, with an increase in the profit, the probability of paying the cash dividends and the mixed dividends, vs no dividends, also increases by a value of 0.02 and 0.78, respectively. However, the probability of paying a stock dividend, relative to no dividend, decreases by a value of 0.27. Furthermore, the variable of leverage is also has a significantly negative relationship with the payout policy in the post-crisis period. As reported by Ahmad and Javid (2008), it is found that liquidity leads to an increase in the odds of declaring the cash dividends by a value of 0.036, the stock dividends by 0.23, and the mixed dividends by 0.26. This is in comparison to the no dividend policy, indicating that liquid banks are more likely to be dividend payers. Similarly, investments show a positive relationship with the payout decision, as the log odds of paying cash dividends, stock dividends, and the mixed dividends, vs no dividends increases by 0.719, 1.032, and 1.544 respectively (La Porta et al., 2002). With regard to the time period that is taken under consideration, the estimates of the dummy variable (post-crisis) reveal that after the financial crisis, cash dividends are the most utilized source of payout for commercial banks.

The results of panels B and C demonstrate that big firms prefer cash dividends over other alternatives (i.e., the stock dividends and the mixed dividends). Interestingly, the analysis reveals that the mixed dividends are the most preferred channel of distribution for profitable banks, as the probability of paying the mixed dividends as compared to the cash dividends and the stock dividends increases by 0.78 and 1.05, respectively. While on the other hand, for highly leveraged banks, the mixed dividend is the least preferred channel, as the log odds of paying the mixed dividend vs the cash dividend, are decreased by -0.18.

Finally, the likelihood that a bank pays cash dividends decreases, when there is an increase experienced in both the liquidity and investments.

Overall, we have found that the likelihood of receiving funds is higher for more profitable, highly liquid, and less levered banks (Fama & French, 2001). However, in contrast to the observations made by Hauser (2013), and Reddemann et al. (2010), the global financial crisis, at different

periods of time, have had no significant impact on the payout policy of the banks. The evidence presented above resonates with the results of Floyd et al. (2015), and Al-Malkawi et al. (2014), who claim that the declining propensity to distribute funds is not evident for the banks, especially at the time when the market turmoil is at its peak. The possible justification that explains the reluctance of the banks, to cut off the dividends amidst a crisis, could entail that banks use the dividends' tool to give away signals in the market, which are meant to show the propensity of their financial strength.

Table 7: Payout Policy of Commercial Banks in Post-Crises

	Panel A: Base-case outcome is No Dividends						Panel B: Base-case outcome is Cash Dividend				Panel C: base-case outcome is Bonus Issue	
Dividends		*Stock*			*Mixed*		*Stock*		*Mixed*		*Mixed*	
Intercept	(11.3688)	(0.75)	(4.76600)	(0.67)	(16.2612)	(1.09)	6.602853	0.42	(4.8924)	(0.28)	(11.4952)	(0.76)
Firm size	**.8994922**	**0.94**	**(2.0630)**	**(2.34)**	**(.944050)**	**(1.08)**	**(2.962509)**	**(2.95)**	**(1.843543)**	**(1.97)**	**1.11896**	**1.39**
Profitability	**.0020727**	**0.01**	(.271072)	(1.05)	.7827297	2.96	**(.2731453)**	**(0.77)**	.780657	2.18	1.053802	3
Leverage	**(.044851)**	**(0.28)**	(.050075)	(0.54)	(.235918)	(1.41)	**(.0052239)**	**(0.03)**	(.1910662)	(1.00)	(.185842)	(1.09)
Liquidity	.0386043	0.32	.2391207	2.55	.2636997	1.85	.2005163	1.43	.2250953	1.48	**.024579**	**0.17**
Investment	.7192117	2.88	1.032189	3.84	1.544733	5.73	.3129773	1.08	.8255215	3.25	.5125443	1.87
Post-crisis	**.3764003**	**0.58**	**(.308180)**	**(0.46)**	**(1.65466)**	**(2.40)**	**(.6845805)**	**(1.07)**	(2.031067)	(3.46)	**(1.34648)**	**(2.10)**
		Model Summary			**Log likelihood**		**Number of observation**		**Wald test statistic**			
					(-189.01754)		**210**		**188.32**			

5. Policy Implications in Global Turmoil & COVID-19 Situation

The entire focus of this paper has been to address the key issue of how exactly financial institutions, especially commercial banks, should behave when it comes to the dividend distribution and the channel preferences, during a national or global crisis situation. Results have shown that the pay-out ratio, and the preferred distribution mode remain unaffected, despite the significant losses in the global economic system. In such cases, Pakistani banks have usually showed the willingness to distribute dividends, primarily to signal regarding their financial strength to various parties, such as depositors and creditors. Moreover, another reason to consider payout, in the times of a national or global crisis, is to keep their shareholder's confidence intact, especially when it comes to the bank's solvency during the period of financial distress. In order to deal with global financial crises in the past years, the government and the SBP undertook some key reforms in the foreign exchange, and the public debt markets. In addition to this, an aggressive macroeconomic stabilization programme, with the help of International Monetary Fund (IMF), was also initiated, so as to put the economy back on track. Due to the stringent measures taken by the government and the regulatory bodies, the global financial crises 2007-2010 only left a minor impact on the country's economy, and its financial system. Despite the level of shocks transmitted into the Pakistani economy, regulators still need to formulate flexible policies when it comes to the dividend payments and the capital requirements, so that the financial sector can be taken out of trouble, especially when it is in a state of extreme uncertainty and predicament.

Now, taking in to account the on-going global pandemic, in the context of the corporate dividends policy, there was a crises which ascended due to the outbreak of the novel Corona Virus (COVID-19) in Wuhan city of China, in December 2019. This global phenomenon has been posing as a great threat to the national health systems, and makes the world's economic system, more vulnerable. In this regard, the International Monetary Fund (IMF) recently revised its World Economic Outlook, whereby the growth of 3.3% in 2020, eventually turned into severe economic contractions, with the global economy falling sharply by 3%. Hence, in IMF's words: "This makes the Great Lockdown the worst recession since the Great Depression, and far worse than the Global Financial Crisis (GFC). Since the outbreak of the Covid-19 pandemic, authorities worldwide have taken the required measures to ensure that the banking sector can continue to lend to the real economy. For this purpose, the regulators in Pakistan should also allow the firms to use a capital buffer

to absorb the losses. Capital distribution, whether through dividends, share buybacks or discretionary bonuses, should be restricted through supervisory action which may help the firms to support the real economy in case of a national or global crisis.

6. Conclusion

Researchers in corporate finance are intrigued about what the banking sector entails, mainly because of the heightened governance that it offers, its agency issues, and its significance for the well-functioning of a country's economic system. Moreover, the unique macroeconomic setting, and the regulatory shift caused by the recent global financial crisis of 2007-2009 have further enhanced this interest. The current study probes deeper into defining the impact of the global financial crisis on the payout policy adopted by banks in Pakistan. For the empirical investigation, a sample of commercial banks listed in the Pakistan Stock Exchange, spanning over the time period between the years of 2002-2015, has been analyzed. The multinomial logit regression model is estimated to examine the probability of a firm distributing its earnings to the shareholders, and the probability of a firm selecting a particular channel of distribution (Cash dividend, Stock dividend & mixed dividend).

The analysis reveals that a majority of the banks (65%) prefer to pay out their earnings in the form of dividends, rather than going for the retention strategy. Moreover, unlike other countries, the commercial banks in Pakistan do not show a diminishing propensity to distribute funds to its shareholders. As far as the preference for the particular channel is concerned, although the importance of the other means of distribution is increasing, cash dividends still cover a large part of the total payout.

We have also documented, via our findings, that the likelihood of a bank distributing its funds (as a dividend) is positively related to the firm's characteristics, such as its profitability, liquidity, and investment. While, on the other hand, it is also negatively affected by the leverage (Fama & French, 2001). As consistently experienced in the extant literature, (Abreu & Gulamhussen, 2013; Al-Malkawi et al., 2014; Floyd et al., 2015) the payout policy of commercial banks in Pakistan does not appear to be significantly influenced by the changes in the macroeconomic environment (pre-crisis, crisis, & post-crisis). Interestingly, this is despite the existence of strict regulatory standards, and the argument that dividend cuts are the only way to improve financial strength. Moreover, our findings still support the rationale provided by the signaling hypothesis. Banks

distribute the pay dividends in order to signal their financial strength to various parties such as the depositors and creditors. Furthermore, they also take this route to keep their shareholder's confidence about the banks' solvency during any periods of financial distress. Overall, our results show that the commercial banks in Pakistan exhibit a reluctance to cut dividends, primarily because of the fear that investors may interpret it as a sign for future problems. Taken together, the fact presented here is consistent with the view that, in emerging countries such as Pakistan, with a weak enforcement environment, dividends may be considered as a substitute for poor shareholder protection and governance practices.

Lastly, the empirical evidence presented in this study offers useful implications for corporate finance and the corporate governance mechanism. Other than that, it will also enable investors to invest in those where the payout channel choices cater and resonate with the payout needs, and also work as a guide for policymakers while developing the regulatory reforms.

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The Lahore Journal of Business
9 : 1 (Autumn 2020): pp. 33–58

Attributes of Internal Audit and Prevention, Detection and Assessment of Fraud in Pakistan

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Abstract

With it being considered as a value-added activity, the Internal Audit function (IAF) of a firm is one of the most important functions in an organization. During the last decade, the role of this particular function has become very useful, especially in creating awareness regarding the Prevention, Detection and Assessment (PD&A) of fraudulent activities. In many countries, carrying out an Internal Audit is a legal compulsion for public companies, in order to establish an effective, and efficient IAF. This study aims to explore the relationship between the various attributes of IAF (effectiveness, independence, staff training, qualification and experience), and the PD&A of fraudulent activities in Pakistan. For this purpose, the convenient sampling technique, for data collection, is used and the questionnaires are collected from the respondents belonging to Pakistan. The questionnaire has been prepared in the form of a Likert scale. Respondents for this study include (1) staff members working in the Internal Audit (IA), finance and accounting departments of the companies listed on the Pakistan Stock Exchange (PSX), and (2) staff members of firms that are engaged in external statutory audit in Pakistan. Descriptive statistics show the details regarding the demographic questions, IAF and PD&A of the fraudulent activities that take place in the companies. Moreover, in order to get to the effective and relevant results, the regression analysis is performed in order to find out if there exists any relationship between these variables. The results show that all five independent variables positively affect the PD&A of fraudulent activities. However, three of the independent variables (IAE, IAT, and IAQ) are statistically significant, whereas two of the variables taken into account (IAI, and IAE) are statistically insignificant. It is recommended that the IAF should be more independent, and effective so as to attain the required results. Moreover, firms should also focus on the qualifications and proper training of the staff that are responsible for executing the IAF.

Keywords: Internal auditor, training, independence, qualification.

JEL Classification: M41, M42, M49

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1. Introduction

With the rise in crime, fraudulent practices, and a general attitude of dishonesty in individuals, seeping into every aspect of our life, the global communities have also experienced a dramatic increase in the illegal and fraudulent conduct of businesses (Repousis, Lois, & Veli, 2019). As a result, fraud has become one of the most critical obstacles that hinder the growth and progressive development of an organization (Azim & Azam, 2016). Over a period of time, fraud has become a key issue in many corporate bodies (George, Theofanis, & Konstantinos 2015), and is now a global business risk affecting the profitability of the organizations. Gates, Prachyl, & Sullivan, (2016) studied that seventy percent of businesses reported at least one fraudulent practice in its internal operations. The factors that contribute towards an activity, qualifying as fraud, are weak corporate governance, functional irregularities, weak internal control systems, insatiability, and the lack of business values and ethics (Soltani, 2014). There are multiple mediums that can be used in order to detect fraudulent activities and practices in organizations. Some of these include whistleblowing, tips, and an internal and external audit, to name a few (Lee & Fargher, 2013).

Due to the exponential increase in the fraudulent scandals, and the often occurring financial crisis, there is now more demand for an Internal Audit Function (IAF) in the companies (Bekiaris, Efthymiou & Koutoupis, 2013). Leung, Cooper, and Perera (2011) explained that an Internal Audit (IA) is an independent activity that is resorted to, in order to add value in the organizations' operations, primarily by bringing a systematic and disciplined approach towards the operations of the company. A disciplined and systematic approach towards conducting the IAF proves to be beneficial for the organization, in order to achieve the goals of transparency. An effective IAF proves helpful, (1) to improve the risk management systems of an organization (El-Sayed Ebaid, 2011), (2) in the application of the accounting system in the organization, (3) in the effective implementation of auditing standards (Balaciu, Bogdana, Feleaga & Popa, 2014), (4) for the executive directors, and the employees in performing their responsibilities (Daniela, 2013), (5) to support the assessment of the work, and suggest improvements in the control and governance processes, (6) in reducing fraudulent financial reporting, and lastly, (7) in reporting weaknesses in Internal Control (IC) systems (Prawitt, Sharp & Wood, 2012).

A person who is responsible for conducting for audits is called an Internal Auditor. The basic role of an Internal Auditor (I-Auditor) is the

PD&A of fraudulent activities. The effectiveness of the IAF depends upon the competence of the staff members, support by the top management, and the independence of the IAF (George et al., 2015). The access to ample training opportunities, and the subsequent practical abilities of the members may also enhance the performance of the IAF (Alvarez, 2012). The independent and impartial IAF can provide guidance to the management for making sure that there are consistently successful and flawless operations of the company. In their study, Drogalas, Pazarskis, Anagnostopoulou, and Papachristou (2017) explained that the basic purpose of the IAF is to ensure that the accounting system, as well as the IC system, are functioning appropriately at all times. The IAF is responsible for various activities that help ensure the smooth operations of a firm. The first one of these is to safeguard the assets of the company. The second one is to prevent the manipulation of funds, while the third one is to detect and prevent any fraudulent activities. Lastly, the fourth activity is to minimize the losses which occur due to any negligence in practice of safe and effective business operations (Al Matarneh, 2011; Monisola, 2013).

1.1 Significance of this study for Pakistan

In the year 2018, the Association of Fraud Examiners (ACFE) conducted a study which included 5 countries from South Asia, including Afghanistan, Bangladesh, India, Maldives, and Pakistan. A total of 96 fraud cases from these countries (including 13 cases from Pakistan) were brought under critical examination. Moreover, a Median Loss of USD 100,000, due to occupational fraud, was reported from the cases examined in these countries. Keeping in view the significance of the ACFE study, in the context of Pakistan, it seems that fraudulent activities put forth multiple complications for Pakistan's corporate sector. These complications include issues such as wastage of monetary resources, and the weak performance of the organizations (Omoolorun & Abilogun, 2017). As a result, institutions in Pakistan face many adverse consequences, in terms of their competitiveness and reputation. Due to the aforementioned facts, the objective of our study is to explore the relationship between multiple attributes of the IAF and PD&A of fraudulent activities, in the companies that are listed on the Pakistan Stock Exchange (PSX). Moreover, this study aims to identify the attributes that can significantly enhance the performance of IAF, and also to explain the significance of the attributes that make up the IAF in the PD&A of the listed companies in Pakistan, that are taken into consideration. In terms of its empirical viability, this study will also prove to be helpful for internal audit professionals, in implementing effective internal audit systems, for the PD&A of frauds, in

the corporate sector of Pakistan. Additionally, the case study of Pakistan may also be used as a proxy for other developing countries, which may aid in the generalizing the findings of this research to a wider scale setting.

2. Literature Review

There is enough literature available in the archives when it comes to the role of the IAF and the PD&A of fraudulent activities in various parts of the world. The Institute of Internal Auditors IA (2019) defines fraud as "*an intentional activity which is designed to deceive someone for obtaining any illegal advantage*". Sharma and Panigrahi (2013) stated in their study, that the capacity of the firms regarding the PD&A of fraudulent activities, proves to be helpful, when the aim of organizations is to attain the goals/objectives of organizational accountability, and the most efficient use of their resources. In the recent past, more attention is being given to the I-Auditors, for the PD&A of fraud, because in many organizations IA is now regarded as an important corporate tool which is used to address the threats of fraudulent practices (Salem, 2012). I-Auditors are the custodians for the IDF, which is primarily responsible for the PD&A of fraudulent activities. Mui (2010) indicated that fraud consists of the intentional misrepresentation of facts and figure, in order to induce or incite someone to act in a deceitful manner. IA holds much value and significance for businesses, because it evaluates the adequacy of the IC system, and also makes efficient recommendations for the management to improve their control measures (Repousis et al., 2019).

When an External Auditor (E-Auditor) investigates the frauds that may have taken place in an organization, they focus more on the financial statement frauds. However, the I-Auditors focus on the wide variety of fraudulent practices, including misappropriation of assets as well (Badara & Saidin, 2013). Fraud can also be defined as a duplicitous activity, involving criminal deception, in order to achieve an illegal advantage. According to Changwony (2015), in all the definitions of fraud, the one variable that is common, is the presence of deceit or dishonesty. In this context, IA is also known as the eye of the top management within the organization, which is used to counter any deceitful or dishonest practices that might go against the organizations code of ethics (Badara & Saidin, 2013). Nardo (2011) stated that independence of the auditor is critically important for the IAF and the PD&A of fraudulent activities to be effective. It is the management of the organization that influences the scope of the work that is crafted for the I-Auditors. An I-Auditor is considered to be an employee of the business, so it is difficult for this individual to be

independent from his employer. So, practically it is a challenging task for an I-Auditor to become an impartial stakeholder in the whole process (Turetken, Jethefer, & Ozkan, 2019).

2.1 IA Effectiveness and the PD&A of Fraud

When it comes to the IA effectiveness, and the PD&A of fraudulent activities, a conducive control environment, and the hiring of qualified and trusted individuals are important factors that need to be taken care of, in the context of the IAF (Mihret & Yismaw, 2007). After the recruitment of individuals in the IAF, it is important that they must be trained continuously, so that they are able to take informed, effective and efficient decisions, and also make use of any special measures for PD&A of fraudulent activities in a more systematic manner (Chang, Chen, Cheng & Chi, 2019). Monisola (2013) identified a positive relationship between the PD&A of fraudulent activities, and the effectiveness of the IAF. He also pointed out that there must be additional controls on errors, frauds, and irregularities in organizations with active IAF measures. Coram, Ferguson, and Moroney (2008) depicted that companies with proper IAF were able to detect more fraudulent activities, than those who did not choose to get the provision of IAF facilities. Hence, we can formulate our first hypothesis as;

H1: *A + ive relationship exists between IA effectiveness and the PD&A of fraudulent activities.*

2.2 I-Auditor Independence and the PD&A of Fraudulent Activities

Most of the extant literature that has been consulted for the purpose of this paper discusses the independence of an E-Auditor in the auditing process (Cohen & Sayag, 2010). Later on, the critical role of an independent I-Auditor was considered to be a major factor for the effectiveness of the IA (Stewart & Subramaniam, 2010). If the I-Auditor is a competent and efficient individual, then there are more chances of maintaining a superior quality of the PD&A of fraudulent activities in any organization (Mugwe, 2012). According to Abu-Azza (2012) independence means the ability of the I-Auditor to give his calculated viewpoint, sans any external pressure, and also to give an opinion in an unbiased manner.

Following in the same stride, the audit committee must also contain independent directors. Moreover, the audit committee should play a critical role in the independence of the I-Auditor (Ali & Handayani, 2019). In order to enhance the independence of the I-Auditor (Stewart & Subramaniam, 2010), it would be beneficial to have a strong liaison

between the I-Auditor and the audit committee (Goodwin-Stewart & Kent, 2006b). If the IAF is independent, and impartial, then it is more effective to ensure the PD&A of fraudulent activities. So, in this context, we can formulate our second hypothesis to be:

H2: A + ive relationship exists between the I-Auditor independence and the PD&A of fraudulent activities.

2.3 Training of the IAF Staff

It does not come as a surprise that the IA department will be manifold efficient if its staff members are trained on a continuous basis. It is expected of an effective, and efficient, I-Auditor to possess relevant qualifications, knowledge, skills, ability, and the knowhow to carry out the required tasks, that will yield the most accurate results in the least amount of time and precious resources spent (McKee, 2006). One of the major reasons that I-Auditors potentially fails in their efforts to carry out the PD&A of fraudulent activities, is the lack of training. Hence, the I-Auditor must be trained rigorously to gain sufficient knowledge and experience, in order to handle difficult situations that might emerge as a result of fraudulent activities (Hammersley, Johnstone, & Kadous, 2011). Lloyd, Hunton and Thibodeau (2012) explained that I-Auditors, who have been trained for the PD&A of fraudulent activities are more helpful than those who have not availed any training sessions. The primary reason for this is that during the training process of the I-Auditors, it is common for some individuals to be provided courses that are specifically about the PD&A of fraudulent activities, while the others are provided general auditing courses. After examining the I-Auditor participation in training programs, researchers have pointed out that auditors who attend the programs that are specifically designed on the intricacies of the PD&A of fraudulent activities, are more likely to detect fraud, instead of the others who have only been exposed to the general audit training programs. Thus, keeping in consideration these nuances, our third hypothesis can be:

H3: *A + ive relationship exists between I-Auditor training and the PD&A of fraudulent activities.*

2.4 Qualification of the IA Staff

Suitable and relevant qualifications of the IA staff is an essential characteristic that is mandatory for an effective IAF. Professionally qualified I-Auditors immensely improve the quality of the IA, in any dynamic business environment. Following the same stance, the head of the

I-Audit should be highly and appropriately qualified, and must possess relevant certifications in the processes pertaining to auditing, fraud and risk management. Examples of these certifications can include the CIA[1], CFE[2] and FRM[3], to name a few. If the auditor is qualified, then he should be able to make better decisions in a short span of time (Hutchinson & Zain, 2009). Thus, assuming that this holds valid, out fourth hypothesis can be:

H4: *A + ive relationship exists between the I-Auditor's qualification and the PD&A of fraudulent activities.*

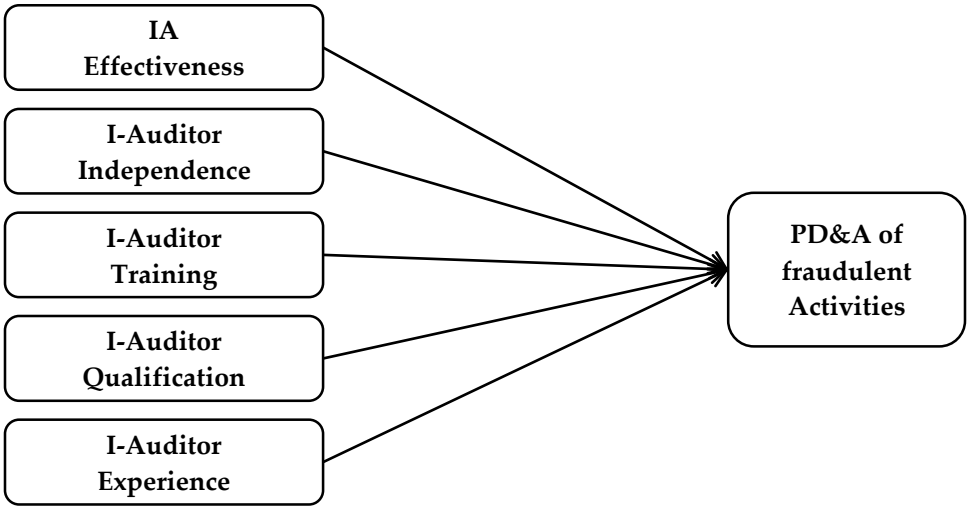
2.5 Experience of the IA Staff

It is no surprise that just like any other profession, relevant experience in the field of auditing increases the competency of the I-Auditors. An I-Auditor, with a substantial amount of years invested into the audit experience, is in a better position to make the most accurate and calculated decisions for the organization. Moreover, such an individual is also prone to taking prompt actions due to a clear understanding of the PD&A of fraudulent activities (Davidson, Goodwin-Stewart, & Kent, 2005). Furthermore, experienced I-Auditors tend to make it a priority to deliver their tasks with attention to superior quality. Hutchinson and Zain (2009) explored the relationship between the professional experience of an I-Auditor, and the firm's performance after an IA. Results revealed that experienced I-Auditors are vigilant enough to swiftly detect any non-compliance, and don't hesitate to take prompt actions for the PD&A of fraudulent activities (Shaver, 2005; Zanzig & Flesher, 2011). For the betterment of business operations, the implementation of internal controls, and the effective PD&A of fraudulent activities, all team members of the IAF should possess work experience that is relevant to the activities of an Internal Audit. Keeping these assumptions in consideration, our fifth hypothesis is:

H5: *A + ive relationship exists between I-Auditor experience and PD&A of fraudulent activities.*

[1] Certified Internal Auditor
[2] Certified Fraud Examiner
[3] Financial Risk Manager

3. Conceptual Framework



4. Research Methodology

This study aims to explore the relationship between the typical attributes of the IAF and the PD&A of fraudulent activities. The sampling frame of this study consists of the staff members of the Internal Audit departments of the various listed companies of Pakistan. As the study is based on the employee's responses, there are less chances that a sampling bias would occur. The LIKERT scale based questionnaires have been used to collect the primary data, through the convenient sampling technique. Moreover, the overall target population of this research consists of the I-Auditors, the staff of the IAF in companies, professionals who have an experience in the Accounting/Finance/IA industry, and faculty members who are teaching Accounting and Auditing. On addition to this, the sample size of this study was 291 respondents.

Section 1 of the questionnaire was based on questions pertaining to the demographic representation of individuals in this study. While section 2 is about the PD&A of fraudulent activities (Dependent Variable) and the IA effectiveness, I-Auditor's independence, I-Auditor's training, I-Auditor's qualification, and the I-Auditor's professional experience (Independent Variables). In order to analyze the data, the SPSS tool was deemed to be the most appropriate to read the results. The reliability and consistency of the instrument has been checked through the Cronbach Alpha (Field, 2009). Moreover, the regression analysis technique is used to determine the relationship between the above mentioned variables, and also to test the hypothesis.

To test the research hypothesis, the following model is formulated:

FD = f (IAE, IAI, IAT, IAQ, IAE)

This model is empirically tested using the following equation:

$FD=\beta 0+ \beta 1IAE+\beta 2IA\text{I}+\beta 3IAT+ \beta 4IA\text{Q}+ \beta 5IA\text{E} +\varepsilon$

Where:

FD	=	PD&A of fraudulent activities Variable
$\beta 0$	=	Constant Term
$\beta 1$ to $\beta 5$	=	The Coefficients
IAE	=	I-Auditor Effectiveness
$IA\text{I}$	=	I-Auditor Independence
IAT	=	I-Auditor Training
$IA\text{Q}$	=	I-Auditor Qualification
$IA\text{E}$	=	I-Auditor Experience
ε	=	The Error Term

5. Research Findings: Analysis and Discussion

The purpose of this study is to investigate the relationship between the attributes of the IAFs and the PD&A of fraudulent activities. Therefore, this section explains the analysis and discussion of the research results obtained with the help of the questionnaire. The study begins with the demographic characteristics of the respondents. These include information on the respondents' gender, age, profession, sector and level of education. Then, it explains about the descriptive statistics, factor analysis results, reliability analysis and then finally, the regression analysis results are reported.

5.1 Demographic Characteristics

The questionnaires were distributed amongst Audit firms that were engaged in I-Audit, the staff of the IAF employed in companies, professionals who were experienced in Accounting/Finance/I-Audit, and faculty members teaching Accounting and Auditing in various institutions. About 300 questionnaires were distributed amongst the respondents, out of which 291 questionnaires were collected from 253 male respondents, and 38 female respondents. Out of this figure, 63.9% of the respondents belonged to the branch of audit, while the rest of the respondents fell under the category of accounting (10%), management (5.5%), and finance (20.6%).

Table 1: Respondents general profile

Position					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	IA	204	70.1	70.1	70.1
	AP	87	29.9	29.9	100.0
	Total	291	100.0	100.0	
Gender					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Male	253	86.9	86.9	86.9
	Female	38	13.1	13.1	100.0
	Total	291	100.0	100.0	
Age					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	20-29	25	8.6	8.6	8.6
	30-39	179	61.5	61.5	70.1
	40-49	87	29.9	29.9	100.0
	Total	291	100.0	100.0	
Field					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	AGT	29	10.0	10.0	10.0
	MNGT	16	5.5	5.5	15.5
	AUDT	186	63.9	63.9	79.4
	FIN	60	20.6	20.6	100.0
	Total	291	100.0	100.0	

5.2 Descriptive Statistics

The first section of questionnaire revolves around the PD&A of fraudulent activities. A total of ten questions were asked (Q1-Q10) regarding the detection of fraudulent activities, seven questions were asked (Q11-Q17) about the IA effectiveness, eight questions were asked (Q18-Q25) about independence of the I-Auditor, five questions were asked (Q26-Q30) about training of the I-Auditor, seven questions were asked (Q31-Q37) about the qualifications of the I-Auditor, and six questions were asked (Q38-Q43) about experience of the I-Auditor. The mean response of all the questions had a value less than 3.00, which indicates that all of the respondents concurred that the attributes of the IAFs are helpful in the detection of fraudulent activities. Moreover, the results of the standard deviations of Q5, Q16, Q17, Q24, Q25, Q26, Q30, Q34 and Q43 were greater than 1.00, which indicated that the perceptions of different respondents were different from each other in these particular questions. For other

questions the SD was computed to be less than 1.00, which shows that the respondents' perceptions were closer to each other. The descriptive statistics of all questions are shown in the following table:

Table 2: Descriptive statistics

Question #	Mean (SD)	Question #	Mean (SD)
1	1.72 (0.66)	23	2.28 (0.98)
2	1.92 (0.81)	**24**	2.71 (**1.06**)
3	1.97 (0.76)	**25**	2.78 (**1.15**)
4	2.13 (0.95)	**26**	2.22 (**1.06**)
5	2.31 (**1.01**)	27	1.98 (0.90)
6	2.02 (0.79)	28	2.08 (0.92)
7	2.42 (0.88)	29	2.08 (0.91)
8	2.29 (0.90)	**30**	2.28 (**1.01**)
9	2.10 (0.94)	31	1.91 (0.87)
10	2.15 (0.98)	32	2.24 (0.89)
11	2.06 (0.86)	33	1.92 (0.85)
12	2.43 (0.83)	**34**	2.42 (**1.09**)
13	2.14 (0.91)	35	2.27 (0.89)
14	2.43 (0.98)	36	2.26 (0.94)
15	2.10 (0.82)	37	2.18 (0.99)
16	2.43 (**1.01**)	38	1.90 (0.86)
17	2.30 (**1.04**)	39	1.95 (0.75)
18	2.46 (0.99)	40	2.20 (0.89)
19	2.43 (0.84)	41	2.31 (0.96)
20	2.31 (0.93)	42	1.99 (0.90)
21	2.16 (0.90)	**43**	2.42 (**1.05**)
22	1.96 (0.81)		

***Source**: Authors' Calculations*

5.3 Reliability Analysis

The LIKERT scale type questionnaire was used to measure the reliability of the questionnaire. For this purpose, the Cronbach Alpha has calculated, which is essential for the overall reliability of the constructs. The calculated value of Cronbach alpha (0.893) shows that the responses which were generated from all the variables were reliable for data analysis.

Table 3: Reliability Analysis

Reliability Statistics	
Cronbach's Alpha	N of Items
.893	43

5.4 Correlations Matrix

Furthermore, the Correlation Matrix was also examined to assess the reliability of the study. Ideally, the values should be between 0.30 and 0.8. For this particular study, the values of most of the variables fell within the range, which showed that there is an adequate and sufficient correlation between the items of the responses. For all the variables defined, the values computed were less than 0.8, hence, this was a confirmation that the factor analysis may be used for reliable results.

Table 4: Correlations Matrix

		DETA	EFFA	INDA	TRNA	QUAA	EXPA
Pearson	DETA	1.000	.518	.274	.366	.326	.291
Correlation	EFFA	.518	1.000	.399	.404	.346	.385
	INDA	.274	.399	1.000	.436	.314	.402
	TRNA	.366	.404	.436	1.000	.525	.476
	QUAA	.326	.346	.314	.525	1.000	.452
	EXPA	.291	.385	.402	.476	.452	1.000
Sig. (1-tailed)	DETA	.	.000	.000	.000	.000	.000
	EFFA	.000	.	.000	.000	.000	.000
	INDA	.000	.000	.	.000	.000	.000
	TRNA	.000	.000	.000	.	.000	.000
	QUAA	.000	.000	.000	.000	.	.000
	EXPA	.000	.000	.000	.000	.000	.
N	DETA	291	291	291	291	291	291
	EFFA	291	291	291	291	291	291
	INDA	291	291	291	291	291	291
	TRNA	291	291	291	291	291	291
	QUAA	291	291	291	291	291	291
	EXPA	291	291	291	291	291	291

***Source**: Authors' Calculations*

5.5 Factor Analysis Results and Factor Loading

The most common method which is used to examine the construct validity, is the Factor Analysis (Hyuncheol, 2013). The major purpose of Factor Analysis is the reduction and filtration of the data. This helps to understand the key factors that need to be extracted, so as to gauge which ones leave a major impact on the study results. Factor Analysis has two common types; the first one is the Exploratory Factor Analysis, and the second one is the Confirmatory Factor Analysis. The Exploratory Factor Analysis is used when the questionnaire is not tested previously by any researchers of the study. And, the Confirmatory Factor Analysis is used in the studies where the questionnaire has been tested prior to distribution.

We used the Exploratory Factor Analysis because the questionnaire was not previously tested by any other researcher. The use of the exploratory Factor Analysis is beneficial in order to understand the structure of the variables, besides also measuring the accuracy of the results.

The appropriateness of the collected data must be tested further, in order to conduct the Factor Analysis, and the sample size taken into consideration must also be sufficient for the accuracy of the results. The adequacy of sampling is determined by conducting the Kaiser-Meyer-Olkin (KMO). The sample size of this research (n=291), and the KMO result of 0.783, indicates good sampling adequacy. The Principal Component Analysis (PCA) method has been used for the extraction of the factors to in order to show "how a particular variable contributes to that component".

Table 5: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.783
Bartlett's Test of Sphericity	Approx. Chi-Square	3113.880
	Df	903
	Sig.	.000

After the extraction of the relevant factors, factor loading was applied to show which variables load on to these defined factors. After examining the extraction of the factors with the extraction method PCA, there are some variables that had a higher factor loading on a specific factor, while smaller loading on the other factors. The factor loading values that were more than 0.4 were considered to have a higher participation rate (Hair et al., 1995). Moreover, the Varimax rotation methodology has also been used for a better interpretation of the results in the factor analysis. After the factor loading process, it has been observed that the questions with a value that went above 0.4 had a high participation, but questions such as Q3, Q8, Q12, Q13, Q15, Q18, Q22, Q25, Q32, Q34, Q35, Q37, Q40, Q42 and Q43, had a lesser participation in the factors, because their value was less than 0.4.

The Factor Analysis results and Factor Loadings are depicted in Appendix-1 and 2

5.6 Regression Results and Hypothesis Testing

The primary purpose of the regression results is to explore the relationship between different variables, as identified in the research model. The model summary (Table 6) identifies the relationship between the attributes of the IAF and the PD&A of fraudulent activities. The model

is considered to be stealthy if the value of the R square is larger. It is noteworthy that this study is dependent on the perception of the respondents. This perception is collected through the questionnaire that was circulated in the target sample. Results reveal that the R square value is more than 25%, which means that it is considered as a good to fit value (Thompson, 2002). The assumptions of autocorrelation are tested with the help of the Durbin-Watson test, the value for which is closer to 2, and is acceptable (Field, 2009). The result of the DW test of this study has come out to be 1.677, which is closer to 2, and reflects the absence of autocorrelation among the residuals.

Table 6: Regression results

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin - Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.553[a]	.306	.294	.36934	.306	25.144	5	285	.000	1.677

a. Predictors: (Constant), EXPA, EFFA, INDA, QUAA, TRNA
b. Dependent Variable: DETA

The ANOVA table (Table 7) shows the model significance by considering the F-statistics value, (F=25.144) which shows that there exists a sturdy relationship between the predictors, and the outcome of the regression variables. So, this validates that it is the best model to predict the PD&A of fraudulent activities.

Table 7: ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	17.150	5	3.430	25.144	.000[b]
	Residual	38.877	285	.136		
	Total	56.027	290			

a. Dependent Variable: DETA
b. Predictors: (Constant), EXPA, EFFA, INDA, QUAA, TRNA

Furthermore, the tolerance (t value) of all the variables is greater than a value of 0.10, and the VIF value is less than 10. The correlation table shows that all the paired values are less than 0.8. Hence, this indicates that there is no multicollinearity between the factors that are considered.

Table 8: Collinearity Statistics

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.870	.130		6.667	.000					
	EFFA	.355	.049	.419	7.311	.000	.518	.397	.361	.740	1.351
	INDA	.009	.048	.011	.192	.848	.274	.011	.009	.722	1.385
	TRNA	.090	.044	.131	2.040	.042	.366	.120	.101	.593	1.688
	QUAA	.082	.050	.100	1.656	.099	.326	.098	.082	.662	1.510
	EXPA	.015	.051	.018	.295	.768	.291	.017	.015	.664	1.506

a. Dependent Variable: DETA

The Coefficient table (Table 8) shows that the three independent variables (IA Effectiveness, I-Auditor Training, and I-Auditor Qualification) were positively and significantly contributing to the dependent variable (the PD&A of fraudulent activities). But two of the independent variables (I-Auditor Independence, and I-Auditor Experience) were positively, but not significantly contributing to the dependent variable. The Beta sign came out to be positive, so the entire proposed hypothesis became acceptable. This is because all the five hypotheses stated that there is a positive relationship with the dependent variable. In a nutshell, based on the statistical significance, only three of the independent variables contributed significantly, and the remaining two independent variables could not make a significant contribution to the dependent variable.

Keeping in view the results and the foregoing discussion, it is evident that the PD&A of fraudulent activities attracts more attention during the period of an economic crises. In business organizations, the IAF is considered as a major tool that is utilized to prevent, as well as detect frauds. This department evaluates the effective operations of the accounting function in an organization. Most commonly, the individuals who resort to committing fraud are members of the administration, or the employees. So, the active role of the I-Auditor is expected for fraud curtailment in these companies. The department of IA must be efficient in maintaining the quality and reliability of the financial reporting systems of the businesses. In order to preclude such problems, companies must take into account certain key measures to make sure that fraudulent activities do not become successful in their organizations. For instance, companies should establish a strong IC and audit system, they should only hire those IA individuals who have ample experience in the field, and are trusted by the organization, and also create a positive IC environment. Training of IA is a mandatory practice that is used to develop the skill set required to prevent, and detect the fraud. Due to these factors, the recovery costs can be high for the companies that have been victim of frauds. In order to secure the financial data, there must be an effective and efficient system of IA, in order to identify the financial irregularities in the system. The results of this study contribute in the form of imperative insights that delve into which variables play a significant roles in the PD&A of fraudulent activities.

6. Concluding Remarks

This research is conducted in order to investigate the relationship between the attributes of the IAF and the PD&A of fraudulent activities.

The questionnaires were collected from respondents belonged to the companies listed on Pakistan Stock Exchange. Moreover, the data was collected using the Convenient Sampling Technique, and the Likert scale was used to prepare the questionnaire. The results of the descriptive statistics revealed the details regarding the demographic questions, the IAF and the PD&A of fraudulent activities. Furthermore, the results of the regression analysis revealed that all of the five independent variables positively affected the PD&A of fraudulent activities. However, three of the independent variables (IAE, IAT, and IAQ) were statistically significant, whereas two of the variables (IAI, and IAE) were statistically insignificant. In the light of these results, it is recommended that the IAF should be more independent, and effective in order to attain the required results. Additionally, Firms should also focus on the required qualifications and proper professional training of the staff of IAF.

In empirical terms, this study is important for policy makers, regulators and businesses in general. The owners, founders and HR managers can benefit from this study during the hiring process of the IA staff, especially in terms of putting critical importance on their professional certifications and experience. Companies should also invest in the training of their audit staff, not only to establish effective IA systems and procedures, but also to create an effective control environment. This study has many recommendations for the business and organizational world. For instance, it proposes that more independence should be given to the I-Auditors, which is only possible with the support of the senior management. The management of organizations should also introduce modern technologies and software packages for effective working of the IA department. Certified and experienced staff should be put through a rigorous hiring process.

Keeping in mind the results of this study, we can now shed some light on the limitations that are put forth. Firstly, this study is limited to the employee's responses, which may not always be objective and unbiased. Moreover, the effectiveness of the IA on a firm's overall performance is not examined, for which future studies are recommended to be undertaken. Additionally, extensive studies for other developing countries may also be conducted, in order to determine the relationship between the PD&A of fraudulent activities and the IAF.

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Appendix-1

Factor Analysis Results

Component Matrix[a]

Questions	Component					
	1	2	3	4	5	6
@1	.362	.015	**.443**	-.097	.105	-.119
@2	.324	.029	**.432**	-.104	.203	.022
@3	.292	.150	.338	-.275	.291	.075
@4	.291	**.403**	.351	.089	.260	.096
@5	.224	**.473**	.399	.027	.259	-.088
@6	.303	-.121	**.477**	.207	.153	-.195
@7	.348	**.461**	.095	-.208	.044	-.248
@8	.392	-.098	.086	-.167	-.160	.278
@9	.311	-.093	.206	.089	-.240	**.446**
@10	**.493**	-.052	.176	.017	-.316	.089
@11	**.482**	-.117	.230	-.036	-.164	.229
@12	.396	-.208	.138	-.200	-.172	.229
@13	.344	.045	.302	.093	-.114	.276
@14	**.454**	.376	-.033	-.034	-.261	.124
@15	.349	-.054	.176	-.153	-.008	.180
@16	.374	**.475**	.021	-.020	-.275	.065
@17	.409	**.464**	.014	.038	-.191	-.112
@18	.214	.026	-.065	.231	-.059	-.195
@19	.216	-.086	.070	**.567**	-.052	-.059
@20	.327	.406	.000	**.448**	-.120	-.224
@21	**.409**	-.128	.142	.236	-.051	-.017
@22	.343	-.125	-.203	.054	-.005	-.207
@23	**.536**	-.051	-.386	-.055	-.064	.090
@24	.289	**.457**	-.333	.306	.166	.165
@25	.348	.257	-.423	.046	.228	.176
@26	**.605**	-.089	-.237	-.157	-.001	-.006
@27	**.518**	-.136	-.184	.158	-.020	-.172
@28	**.538**	-.119	-.156	.202	-.053	.015
@29	**.515**	-.216	.088	.031	-.068	-.028
@30	**.416**	.314	-.254	-.217	.073	-.125
@31	**.522**	-.338	-.065	-.116	.209	-.066
@32	.366	-.313	-.182	-.211	.094	-.022
@33	**.444**	-.199	-.054	.155	.142	-.347
@34	.366	.326	-.379	-.150	-.046	-.084

Questions	Component					
	1	**2**	**3**	**4**	**5**	**6**
@35	.389	-.246	.202	-.088	-.344	-.385
@36	**.431**	-.292	.108	-.107	-.168	-.380
@37	.365	-.102	-.061	-.297	.126	-.257
@38	**.469**	.154	.025	-.183	.231	.076
@39	.355	-.141	-.002	.219	**.535**	.123
@40	.342	-.300	-.069	.188	.268	.198
@41	**.438**	-.393	-.275	-.109	.158	.136
@42	.374	-.246	-.119	.321	-.067	.176
@43	.365	.288	-.279	-.173	-.081	.072

Extraction Method: Principal Component Analysis.

Appendix-2

Factor loadings

	Factors/ Items Description Factor Loadings	
Detection of fraudulent activities		
1.	The I-Auditor detects unauthorized transactions	.443
2.	The I-Auditor detects falsifying of financial statements	.432
3.	The I-Auditor detects false valuation of company assets	-
4	The I-Auditor detects fraud by employees	.403
5	The I-Auditor detects bribery and/or kickbacks	.473
6	The I-Auditor detects payroll inaccuracy	.477
7	The I-Auditor detects skimming of incoming funds	.461
8	The I-Auditor applies techniques to detect fraud	-
9	System of IC prevents mistakes	.446
10	System of IC detects fraud effectively	.493
IA Effectiveness		
11	The IA system improves the operation of the business	.482
12	The staff of IA is deemed sufficient	-
13	IA ensures the economical, effective and efficient use of resources	-
14	The audit procedures and evidence collections are completed on time	.454
15	There are disciplinary consequences to perpetrators of fraud	-
16	There are special control services in all departments of the business	.475
17	The safeguards of the control system prevent illegal activities	.464
I-Auditor Independence		
18	There is independence of the I-Auditor	-
19	There is cooperation of the I-Auditor with the members of administration	.567
20	I-Auditor report directly to administration about finding errors	.448
21	IA is carried out only by staff of IA	.409
22	The top administration hires E-Auditor for check	-
23	I-Auditor staff receive full cooperation, access to records and information	.536
24	The I-Auditor perform auditing activities without any interference from anybody	.457
25	I-Auditor feel free to include any audit finding in audit report	-
I-Auditor Training		
26	The staff of IA is trained continuously	.605
27	Training provided of I-Auditor are helpful to improve skills	.518

	Factors/ Items Description	Factor Loadings
28	Training to IAF are helpful for PD&A of fraudulent activities	.538
29	The management introduce IA with new technology, policy and procedures	.515
30	Training are helpful to carrying out IC function	.416
	I-Auditor Qualification	
31	I-Auditor are certified	.522
32	Most of I-Auditors have certification in auditing	-
33	The qualification of I-Auditor enhances the quality of IA	.444
34	The I-Auditor who has high qualification can deal with any issue inside the department of IA	-
35	The qualification of I-Auditor help to identify any noncompliance activities	-
36	The qualification of I-Auditor help to performed with modern technology	.431
37	Qualified I-Auditors perform IA services in accordance with the International Standards for the Professional Practice of IA	-
	I-Auditor Experience	
38	The staff of IA is experienced	.469
39	I-Auditor provide useful recommendation on control systems	.535
40	The I-Auditors are capable to determine the nature and frequency of noncompliance activities	-
41	I-Auditors have the experience and expertise to address corporate risk management problems within the organization	.438
42	The recommendation, criticism and information provided by IA used for decision making	-
43	The IA report are highly considered for decision making	-

The Lahore Journal of Business
9 : 1 (Autumn 2020): pp. 59–85

Noise Trading and Single Stock Futures: Modifying Sentana & Wadhwani's Model

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Abstract

Derivatives, and their influence on the dynamics of underlying stock markets, is an interesting topic of debate, which predates their introduction. The unresolved influence of derivatives on their underlying stock markets still intrigues many. In this regard, researchers/stakeholders are still curious about the (de)stabilizing influence of derivatives on the overall market. In disposition of these observations, two contradicting hypothesis have been studied widely and have remained the focus of attention in several theoretical and empirical studies. These hypotheses are explained in several ways. Among many, one explanation refers to the destabilizing influence of derivatives, due to the enhanced involvement of noise traders, after the introduction of derivatives. This aspect remains the topic of discussion for this study. After the formal introduction of the SSFs (Single Stock Futures) in Pakistan, this topic became a cause of concern for the stakeholders of this market as well. Hence, this study attempts to tap into this aspect of the de(stabilization) debate, by proposing a modified version of the famous Sentana & Wadhwani (1982) model. In order to tap the potential shortcomings of the S&W model, this study contributes to the extant literature in several ways: 1) It adds the feature of trading volume in the model to analyze and study the potential movement of noise traders from spot to futures market, due to the ease of trading that the futures markets offer, 2) the new, modified model adds a lagged term for returns in order to tap the potential asynchronous inefficiencies, 3) it considers the Generalized Error Distribution (GED) instead of the Gaussian Distribution, in order to realize the fact that returns are not normally distributed. Generally speaking, the modified version of the model not only extends the original model in terms of its explanation, but also empirically tests this aspect in the Single Stock Futures (SSFs) market of Pakistan. This model tested whether SSFs promote, or inhibit the noise trading post-SSFs. After putting it to test, the newer model did not report any negative or positive impact of the introduction of SSFs on the underlying stocks. This may conclude that the proclaimed (de)stabilizing role of the SSFs, in the context of Pakistan, is not justified. This may also imply that the

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stringent regulatory frameworks, post the Global Financial Crisis, (GFC) for the resumed SSFs, are not justified and require revision.

Keywords: Noise trading; SSFs, S&W model, leptokurtic.

JEL Classification: G13, G14, G15, G17

1. Introduction

It is widely accepted that the enhanced regulations can never completely eliminate the risk that trickles down and is inherited due to economic activities (Kuprianov, 1995). The extant literature of financial economics consists of comprehensive discussions on the different aspects, and forms of risk. These discussions include, for example, the nature of the risk, different forms and their interconnectedness with other market dynamics etc., and the very reason of its existence, and how to reduce it, to highlight a few. The risk associated to the financial markets is often termed as volatility. The debate on this topic comes into the lime light whenever the market witnesses a severe form of volatility. When it comes to exposing the inherent nature of risk averse investors (individual or institutional), the volatility in the prices of assets of interest, tends to be a factor that causes unrest for them. Risk, volatility, destabilization are the common terminologies that are often used interchangeably in the literature that concerns this topic. Therefore, this study follows the same approach.

When it comes to observing and analyzing the activities of noise traders and futures markets, the extant literature that will help to connect the missing dots is scarce. Since their introduction in the late 1970's, the futures markets and their (de)stabilizing impact has remained a topic of attention for the concerned stakeholders of the market. Due to the importance of the futures markets, and their potential ability to destabilize the market, researchers have tried to give this area of study critical importance. The futures markets act as the stimuli that affect the trading behavior of the market participants. Broadly speaking, the rational and irrational speculators[1] are the categories of traders that trade in the markets. In this context, rational speculators base their investing decisions on the accounting and/or economic fundamentals. On the other hand, irrational investors, often termed as noise traders, make their decisions based on the market noise (Black, 1986). They often make use of

[1] The terms irrational speculators and noise traders are used interchangeably throughout this manuscript, while positive feedback trading and negative feedback trading defined as different forms of noise trading.

technical analysis tools to identify the trends and patterns in the market. The strategies used by noise traders could be fragmented and simplified down to two simple classifications - positive feedback trading strategies, and/or negative feedback trading strategies. One common aspect of these trading strategies lies in their ability to follow the trend chasing strategies. If an investor buys stocks on uptick and sells on downtick, it is referred to as positive feedback trading strategy. On the contrary, if an investor buys on downtick and sells on uptick, it is termed as negative feedback trading strategy. The probability that the activities of the feedback traders will deteriorate the market functioning is higher than the vice versa happening. Research has established that the presence of noise traders provides liquidity to the market, while also being an anecdote to market destabilization. This aspect is the baseline that is set when it comes to the stabilization and destabilization hypothesis concerning the futures markets.

The interaction of rational and irrational traders stimulates the price movements. Moreover, the activities of rational traders are supposed to stabilize the market in terms of the reduction in the volatility, which might be the result of noise trading (De Long, Shleifer, Summers, & Waldmann, 1990). Yet, this phenomenon might not always be this common. It seems plausible that the interaction of rational and irrational traders may trigger the movement of prices towards or away from their intrinsic values. In this situation, there is a possibility that irrational traders may liquidate their position, which will return the prices to the level of equilibrium (Delong et al., 1990b). The interaction of rational and irrational investors is modelled by Sentana and Wadhwani (1992), who introduced, and laid the basis of the heterogonous trading model. This model observes and identifies the activities of noise traders. By use of this model for the US market, they identified positive feedback traders who actively influenced the market.

Several studies (Cutler, Poterba, & Summers, 1990; De Long et al., 1990a; Lebaron 1992; Shiller, Fischer , & Friedman, 1984, Shiller, 1990; Thaler, 1999) model the activities and the interaction of utility maximizers and noise traders. The work of the aforementioned authors led Sentana and Wadhwani (1992) to formulate a new framework, which is famously known as the heterogeneous trading model. This model concurs and then describes that autocorrelation is synonymous to the presence of the feedback traders. Furthermore, this model also links autocorrelation with volatility, which implies that the presence of feedback traders can be correlated with the instability in the market. Following this line of

observation and arguments, this paper is an attempt to propose a newer model that investigates the association of the migration of feedback traders with the (de)stabilization hypothesis. It is noteworthy that the current S&W model does not discuss the migration/transfer of investors, who follow feedback trading strategies, and tend to associate it with the introduction of futures markets. This scenario leaves ample room for the contribution that this study aims to make. In a jest, the objective of this study is to look for migration of feedback traders in post-futures period from the spot market to futures markets, and it also attempts to observe whether this particular migration of traders stabilizes the spot market or not. This study modifies S&W's (1982) model by adding the features and measures to observe the migration of feedback trading activities from one market to another, by referring to and making use of the concept of trading volume. This study highlights Sharpe (1964) and Lintner's (1965) CAPM framework for rational traders, instead of referring to the mean-variance equation, which has been used by the original version of the SW's model, so as to depict the behavior of a rational investor. The CAPM framework by Sharpe (1964) and Lintner (1965) is better in the sense that they make presumptions about the existence of the risk free rate for efficient portfolio diversification, as well as the consensus on the distribution of stock returns. Hence, using the CAPM framework will help us better understand the phenomenon of migration of feedback traders from one market to another, and the corresponding (de)stabilization that is caused due to this.

There are several studies that make use of the first and the second order moment of the distribution of stock prices in order to check the aspect of derivatives markets and (de)stabilization hypothesis. Although the use of first moments helps in predictability, at the same time, it lacks the ability to explain the change in the efficiency aspect. Recent studies mostly refer to the second moment in order to measure the change in volatility, and interpret the increase in volatility as de-stability. The change in volatility observed by using the second moment could be attributed to noise trading, and not to the prompt arrival of critical information. This study contributes in the literature that pertains especially to derivatives by attempting to validate the hypothesized association of migration of feedback, with the (de)stabilization in the underlying market. An increase in the feedback trading is expected post-SSFs if, and only if, the presumption of the use of SSFs by positive feedback traders is held true. Also, if volatility experiences an increase post SSFs, this would support the idea that that the introduction of SSFs brings upon de-stability in the market. On the contrary, if the utility

maximizing agents use the SSFs for arbitraging activities, which may help in bringing the stock prices close to their intrinsic values, then positive feedback trading should ideally experience a decrease, post SSFs. This result would be in support of the claim (Cox, 1976) that future markets tend to provide an additional route of information. And, the simultaneous increase in the volatility will affirm the argument (Ross, 1989) that the futures market helps stabilize the overall market. To do the same, this study makes use of a framework that associates the autocorrelation patterns with volatility. The autocorrelation pattern could be the results of market frictions, and/or the strategies followed by feedback traders. This is an aspect that is also considered in the proposed model in this study. Thus, this model accounts for market frictions as well as the measure of feedback trading strategies. The research questions arising from this discussion are: Does the introduction of SSFs serve as a catalyst for noise traders to migrate from spot markets to futures markets? And, do these migration changes destabilize their counterparts?

Once the SSFs were introduced in Pakistan Stock Exchange (PSX) in July 2001, the stakeholders of the futures markets showed their concern with regards to their influence on the overall market. In this context, when the role of the hedging instruments, after banning of short selling was taken into consideration, the SSFs were looked upon as a benefitting instrument in the market. This led to immense trading activity in these instruments between the years of 2004 and 2005. To the extent that the SSFs constituted about 40 to 50% volume of the overall market. It is imperative to understand that the futures markets are easy to trade in. They have low transaction costs, which tends to attract noise traders. With this ability to attract noise traders, it also creates problems for the regulators of the market. Obviously, in order to present efficient and un-exploitable trading opportunities, the market makers have to observe and direct the market mechanism. Interestingly, the same happened in PSX, after it witnessed a crisis in 2005 and 2008. The market participants, and the other observers started blaming the nature and trading tactics of the noise traders in the market. This scenario occurred in response to the influence of national/ international crisis at that time. This observation is also based upon some previous empirical evidences that came into the lime light, as concurred by Bohl and Siklos (2008). They claimed that the frontier and emerging economies usually more likely to fall prey to the activities of the noise traders, as compared to the economies of developed countries.

After freezing the futures markets during the Global Financial Crisis, and the overall market for quite some time, the resumption of

market had a new story to tell. The SSFs were resumed, but with strict regulations in comparison to the former ones. The strict regulations appear to be the resultant of the operational drag/ or overprotective attitude by the Pakistan Stock Exchange. The resumed SSFs, but with strict regulations, not only hamper the futures ability to provide liquidity, but also shatters its image as an effective risk hedging tool. On the other hand, the natural settings provide a situation to study the role of the futures' markets, with respect to their ability to engage noise traders and their activities. Initially, a few studies[2] were conducted in order to observe and check the role of the stringent regulations on the resumed/new SSFs, from different dimensions. These studies showed a beneficial impact of the futures during the time of the crises. This leads us to raise another question, with respect to the role of the former SSFs, during the deteriorating time of the PSX in 2008. Hence, with this disposition, this study is also an attempt to investigate the stability impact of the parallel SSFs on the underlying stocks, with an old model that is modified for its value in this natural experiment. The study achieves this objective by taking a sample of the SSFs and non-SSFs in PSX, at the time of their introduction in July 2001. By applying the modified version of the S&W model, this study tested the potential movement of the noise traders from spot to futures markets. This is considering these traders in their capacity as individuals who may decrease the volatility in the underlying stocks, post-SSFs. This study concludes that there is no convincing evidence of the migration of noise traders from spot to futures markets. Therefore, the study concludes that the introduction of SSFs cannot be attributed to the change in volatility in the underlying market. Hence, the stringent regulations for the newer SSFs are not justified. These results will be helpful to SECP and KSE in reviewing the regulations for the newer, yet under-explored status of the futures markets in Pakistan.

The organization of this paper is as follows: The review of futures markets (SSFS, index futures and USFs), noise trading, trading volume and volatility dynamics are summarized in section 2. This is followed by section 3, which elaborates the data and methodology of the paper, while extending/modifying the S&W model. Section 4 critically reviews the analysis of the results. Conclusion and policy recommendations for the SECP and PSX are provided in section 5.

[2] Malik, Shah and Khan (2019; 2013, 2012), Malik and Shah (2018, 2017, 2016, 2014) Khan, Shah and Abbas (2011) and Khan (2006)..

2. Review of Relevant Literature:

This section provides an insight into the extant literature written on the topic which revolves around the different aspects of futures markets, and their influence on the spot market. The history of evolution of futures markets shows scarce work done on the topic under consideration. Although the discussion undertaken in the previous studies predates the introduction of futures, yet shown exponential growth after the formal introduction of futures markets with respect to some areas than others. The main argument that is linked with the introduction of the futures market is its potential for (de)stabilization of the market. Owing to a variety of reasons, this potential for (de)stabilization has been hypothesized and tested in different markets, from different dimensions. Theory suggests that apart from providing liquidity, the presence of the futures markets attract noise traders, mainly due to their lucrative characteristics. Noise traders possess a strong tendency to increase the volatility of the market. Another argument (Cox 1976; Ross, 1989) elaborates that since the futures provide an alternative route of transferring information to the spot market, they should ideally be considered beneficial for the market. This benefit comes into play as the existence of the futures tend to act as a stabilizing agent, which helps to increase the market efficiency. These contradicting theories require empirical testing, for them to hold true and serve as a basis for effective policy making.

The following sections provide the details needed to understand the theoretical underpinnings, and main aspects of the model. The first section, named "Autocorrelation and feedback trading", puts forth the revelation that autocorrelation patterns in the stock returns represent the presence of feedback traders in the market. The studies included in this section show the chronological evolution of this argument. The second section describes that these feedback traders are the main reason for the de-stabilty experienced by the market. The studies added in this section also provide empirical evidence of the linkages that exist between the presence of noise traders, and the destabilization of the market. The third section is based on the Lead-Lag Relationship between the spot and the futures markets. The studies included in this section are aimed at identifying the leading and lagging markets that exist among the spot and futures markets. Since the trading volume is added in this study to fathom whether these noise traders migrate from spot to futures markets, the next section titled as Autocorrelation, Volume and Volatility, is added to observe the linkages among these three terms. This discussion is critical in order to understand the S&W model, as well as its modified form, which is the core concept of this manuscript.

2.1. Autocorrelation and Feedback Trading:

The studies show that autocorrelation patters can be a result of feedback trading strategies that are being adopted by individual, and institutional investors, in any financial market. The positive and negative autocorrelations have their particular interpretations in the context of the matters that pertain to the discipline of finance. They can show movement away and the movement towards the ideal equilibrium point. This study links the futures markets with the activities of the feedback traders, and the destabilization caused by them. Thus, this is the reason why the model proposed in this study takes into consideration the market frictions and the feedback trading activities, separately, and then incorporate them in the model accordingly and appropriately. This helps us identify the nature of the noise traders that the market deals with, and their potential impact on the underlying market as well.

Some of the studies that were found to be relevant tended to shed light on the association of autocorrelation with feedback trading. For example, Vetale (2000) commends that noise trading activities follow trend chasing strategies. As mentioned earlier, previous work gauges feedback trading through the autocorrelation of stock returns, and the studies of LeBaron (1992) and Campbell, Grossman and Wang (1993), along with many others, reflected this for the US market. The extant literature written about financial futures presents different conceptual frameworks that show the evolution, and the presence of feedback trading strategies, especially when considering the concept of asset prices. These studies are typically built upon one another, and the theories presented in them are interlinked. Various studies on the discipline (Cutler et al., 1991; Shiller et al., 1984) validate the presence of autocorrelation in the asset prices, and argue that this confirms the presence of feedback trading strategies. On the other hand, there are also a few studies that attempt to link autocorrelation patterns with the changes in volatility. For example, LeBaron (1992) made use of mean and variance equations to indicate that the values of autocorrelation change with volatility. This implies that feedback trading strategies may possibly be linked with destabilization in the market. This relationship is discussed and validated in other studies[3] as well. Hence, the model of S&W is also an extension of this relationship.

[3] Xie, C., Zhu, Z., & Yu, C. (2012).

2.2. Noise Trading and Destabilization:

Extant literature presents a few studies[4] that have attempted to provide evidence of the existence of linkages between noise trading and volatility. For example, Hou and Li (2014), Antoniou, Koutmos, and Pericli (2005) and Antoniou et al., (1998) studied the futures markets, and linked them with volatility and feedback trading. They support the notion that the futures markets stimulate the influence of rational traders, over irrational ones. When taking into consideration the concept of index futures, Koutmos (2002) affirms that the investors in futures markets are actively involved in feedback trading strategies. Recently, Antoniou et al. (2005) used Sentana and Wadhwani's (1992) framework to re-confirm the association that exists among the various feedback trading strategies and the simultaneous destabilization caused in the six countries that are inn question. By using the index data of these countries, they show a decrease in the feedback trading, post the introduction of index futures. Similarly, Antoniou, Koutmos and Pescetto (2011) have also tested Shiller's (1990) hypothesis to test the memory of feedback traders, and affirm that they indeed possess a longer memory time. Recently, Chau, Holmes, and Paudyal (2008) also provided limited evidence of investors following feedback trading in the Universal Stock Futures (USFs), for both pre- and post-USFs. They argue that futures stabilize the market by reducing the activities carried out by of noise traders.

2.3. Lead-Lag Relationship and Futures Markets:

Various empirical analysis are still being conducted in the active markets around the globe in order to understand the solid foundations for futures' role, in influencing the underlying market. The first strand of the studies[5] analyzed focus on the aspect of lead-lag relationships. For example, a few studies[6] favor futures markets over spot markets when it comes to leading the overall market, and they also have their plausible explanations to it. On the other hand, a few studies[7] have found evidence that is contradictory to this, and show that futures do elevate the volatility in the market. Because futures have some inherent flexibilities for investors, they absorb and process information quicker than their

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[4] Alan, N. S., Karagozoglu, A. K., & Korkmaz, S. (2016), Miles, S. (2013), Gregory, R. P., Rochelle, C. F., & Rochelle, S. G. (2013)

5 Ullah, H., & Shah, A. (2013), Kang, S. H., Cheong, C., & Yoon, S. M. (2013), Jamal, N., & Fraz, A. (2013).

6 Stoll & Whaley (1990) and (Kawaller, Koch, & Koch, 1987), Xu, F., & Wan, D. (2015).

7 Antoniou et al (1998) and Antoniou and Holmes (1995)

counterparts. Albeit, this could lead to market destabilization as well, which at times may be called economical destabilization. They explain the phenomenon of increased volatility after the introduction of futures as an act to provide the underlying market with an additional route to derive the information, thus supporting the work of Ross (1989). On the other hand, it is argued[8] that derivatives do not destabilize the market (Bohl, Diesteldorf, & Siklos, 2008; Edwards, 1988a, b; Schwert, 1990). In an attempt to conclude this enigma, Kumar and Mukhopadhyay (2007) conclude that the futures do change the structure of volatility. This discussion is still an ongoing debate in the academic circles of the relevant concerned parties.

2.4. Autocorrelation, Volume and Volatility:

As this study adds a new variable to evaluate the actual migration of feedback traders from one market to another, it is important to review a few studies[9] that have taken care of trading volume, as an influence in this framework. When it comes to testing the relationship between trading volume and volatility, Gygax, Henker, Liu and Loong (2008) tried to establish that they have checked the specific movement of noise traders in the spot and futures markets. They reported a decrease in the trading volume and volatility after the SSFs contracts' had been listed. Taking into account several markets, Chen, Firth and Rui (2001) came up with the empirical evidence of the existence of a relationship between the trading volumes and the change in the structure of volatility. In the same manner, Girard and Biswas (2007) also found a negative relationship among the stated variables, when studying the emerging and mature markets. Moreover, evidence of this has also been shown by Chen and Daigler (2008), who attempted to empirically observe the association between the trading volume and the structure of volatility. Their findings show similarities with some older studies that date back to the decades of the 80's and 90's. Furthermore, there are some other studies as well, which aim to run the empirical checks to find any similar aspects in other respective economies. For example, while studying this relationship across the introduction of different futures markets, Danielsen, Van Ness and Warr (2009) reported similar results as discussed before. They established that it is the futures markets that attract the short selling activity from spot to futures markets. These studies depict that there exists a relationship between volume and volatility as well. Recently,

8 Ergen, I., & Rizvanoghlu, I. (2016),
9 Xu, C. (2014), Siddiqi, M. F., Nouman, M., Khan, S., & Khan, F. (2012)

Foucault, Sraer and Thesmar (2011) concurred that the trading activity (trading volume) of noise traders is related with the volatility in the market. The addition of trading volume in the S&W framework is expected to help in the identification of the migration of feedback traders. Moreover, it is also going to help gauge the moderating impact of volatility, especially in the presence of feedback traders.

When it comes to the relationship between autocorrelation and trading volume, Laopodis (2005) and Campbell et al. (1993) concluded that the autocorrelation increases as there is a decline in the trading volume. These findings are in accordance with the trading behavior of rational traders, in the sense that they accommodate the destabilizing behavior of irrational traders. Change in the demand for stocks by noise traders can occur in both low and high frequencies. High frequency shifts in demand are signaled by the daily trading volumes. With the help of volume, the changes in demand at lower rates cannot easily be detected because there could possibly be some other reasons for specific trends in volume to prevail e.g. deregulations of commissions, institutional trading, etc.

The literature review suggests that this framework has been studied in different fragments, within different markets, over time. From these fragmented pieces of work, this study formulates and provides a new framework that links all the above mentioned aspects. This will help in the formulation of an extended theoretical framework, as well as new a methodological dimension to study this aspect, in the domain of interest.

3. Data & Methodology:

SSFs were introduced in Pakistan in middle of the year 2001. On the onset, only 10 stocks made it through to be recommended for trading on the futures market. This later on accumulated to 46 stocks, up until the era of GFC hit the Pakistani market as well. It is the prerogative of the Securities and Exchange Commission of Pakistan (SECP), and the PSX that they can review and revise the trading regulations for Pakistan's financial market as a whole. Also, it must be known that these decisions are reviewed and re- implemented after every six months. These revisions essentially decide the fate of a stock, for its trading on and off the market. This paper considers only those stocks, for which two years' worth of data is available for both sides of the contract's listing date. Since every SSF has a different introduction date, the accumulation of the data ranges from 1999 to 2008. This study includes data that spans over the period from June 1999 to March 2008. The input variables for the model are the daily closing

prices, trading volumes and the risk-free rates. Moreover, this study uses high frequency data of the daily closing prices and the trading volumes. Also, these variables are collected for both SSFs, and non-SSFs. This criterion to collect this specific data was met by 23 SSFs stocks only. To take care of the accuracy of the risk-free rate, 3 month's T- bill rates were taken into consideration. Information of the bi-monthly RFR are available with State Bank of Pakistan (SBP). There was a possibility that the endogeneity bias would occur if we only used the main sample for SSFs, therefore, this study made use of the control samples as well. This was done by selecting the non-SSF against each of the SSF's considered. This activity is called control sampling. The criterion used for the selection of the control sample is to take a measure of the firm size, trading volume, and sector, with respect to the event date of SSFs. The selection of SSFs over the index futures owes to the following two aspects. Firstly, the data that is based on the index futures is not available for the period under study. Secondly, as mentioned by McKenzie, Brailsford and Faff (2001), unlike the SSFs, the direct trade of index futures is not empirically possible. Furthermore, it is easier to alter the regulations of SSFs, as compared to those of the index. The daily prices are converted into daily returns in order to avoid the issue of stationarity.

In order to answer the aforementioned question, the following empirical model was extended[10] on to the framework of the S&W model. The proposed model checks the validation of whether the volatility structure changes in the underlying stocks, owing to the corresponding SSFs contracts' listings. The algebraic expression of the proposed model is as follows:

$$ER_{it} = \propto + \beta_1 VarER_{it} + \{\varphi_{0,1} + \varphi_{0,2}(D_t)\}ER_{it-1} + \{\varphi_{1,1} + \varphi_{1,2}(D_t)VarER_{it}ER_{it-1} + \{\varphi_{2,1} + \varphi_{2,2}(D_t)\}Vol_{it} + \varepsilon_t;\ \varepsilon_t \sim N, t, or\ GED(0, \sigma_t^2) \quad (3.1)$$

This equation is different from that of the S&W model in the sense that it makes use of the trading volume in order to analyze whether there is a migration of feedback traders from one market to another. The following variance equation is used to observe the changes in the volatility structure after the introduction of SSFs.

$$\sigma_t^2 = \alpha_{0,1} + \alpha_{0,2}D_t + \alpha_1\varepsilon_{t-1}^2 + \beta\sigma_{t-1}^2 + \delta X_{t-1}\varepsilon_{t-1}^2 \quad (3.2)$$

[10] The workings of the derivation of this equation are not added in this paper. The derivation of the model can be obtained from the authors of this study.

This variance equation is called the GJR-GARCH process, which is used to study dynamic volatility. This study makes use of the non-parametric WSRT and MWUT for further analysis, which summarizes the results of the regression for each stock.

4. Results

The results of this study are presented in the form of descriptive and inferential statistics. The first two tables (Table 1 & 2)[11] show the descriptive statistics of this study, while the remaining tables show the inferential statistics of the study.

The proceeding tables (3 and 4) show if there exists an ARCH effect in the series of return or not. The coefficients of the proposed model are as follows:$\propto, \beta_1, \varphi_{0,1}, \varphi_{0,2}, \varphi_{1,1}, \varphi_{1,2}, \varphi_{2,1}, \varphi_{2,2}\ \alpha_{0,1}, \alpha_{0,2}, \alpha_1, \beta, \delta$. These coefficients are tested for their statistical significance. The general overview affirms the use of the GARCH model with GED distribution.

The results of the SSFs and non-SSFs are presented in Table 5. It is observed that the average returns of SSFS, as well as non-SSFs are negative for the values of $\varphi_{0,1}$ and $\varphi_{0,2}$. Twenty two percent of the SSFs are significant with a negative sign for $\varphi_{0,1}$, while only one stock (i.e., MCB) possesses a positive sign, while twenty six percent of the SSFs are significant for the value of $\varphi_{0,2}$. The market frictions measured for the values of $\varphi_{0,1}$ and $\varphi_{0,1} + \varphi_{0,2}$ are -2.25 (0.02). This result shows that the market frictions are not same in pre- and post-SSFs market conditions. Moreover, twenty three percent of the non-SSFs are significant, with a negative value for $\varphi_{0,1}$, while only two stocks (i.e., Dawood and Pkdata01) carry a positive sign. Furthermore, eighteen percent of the non-SSFs are significant, with a negative value for $\varphi_{0,2}$, while only two (i.e., sel and shell) stocks carry a positive sign. The market frictions measured for $\varphi_{0,1}$ and $\varphi_{0,1} + \varphi_{0,2}$ are -.05 (0.10). These values reveal that the market frictions are not the same in pre- and post- market conditions of non-SSFs. The results of the MWUT show a value of 0.05 (0.96). This value is sufficient for us to believe that the change for both SSFs and non-SSFs can be considered to be the same.

The coefficients $\varphi_{1,1} and\ \varphi_{1,2}$ are used to measure the effect of the feedback trading strategies. The average values of both $\varphi_{1,1} and\ \varphi_{1,2}$ are positive, as denoted in the relevant table. It can be observed that the value

[11] These tables (3 & 4) could be obtained from the authors of the study.

of $\varphi_{1,1}$ is insignificant for all the cases, yet the value of $\varphi_{1,2}$ is significant for only one non-SSF. The results of the SSFs show that there is no change in the feedback trading level from the market conditions that were pre to post SSFs. This could be confirmed from the WSRT value of -1.34 (0.18), for the pre and post coefficients of $\varphi_{1,1,}\, and\, \varphi_{1,1,} + \varphi_{1,2}$. Moreover, the averages values for $\varphi_{1,1} and\, \varphi_{1,2}$ are also positive in nature. It is obvious to note that twenty three percent of the stocks are negative and significant for the value of $\varphi_{1,1}$, while only one stock (i.e., shell) shows a significant and positive value. Moreover, eighteen percent of the stocks show a positive and significant value for non-SSFs for the value of $\varphi_{1,2}$, but eighteen percent of the stocks show a negative sign, and are significant for the value of $\varphi_{1,2}$. The study employed MWUT in order to test whether SSFs actually promote the feedback traders, or do they behave otherwise. The MWUT value for this test is -0.50 (0.62). This value can be deemed enough to refute the claims against SSFs parallel standing with noise trading.

The movement of feedback trading activities from the underlying stocks to SSFs is measured through the values of $\varphi_{2,1}$and $\varphi_{2,2}$. It can be observed in the tables that the averages for these coefficients are near zero. The results of the non-parametric WSRT test show that there is no change in the feedback trading activities from pre- to post-SSFs. This implies that there is no change in the feedback trading activities from pre- to post-SSFs, in the underlying stocks. The coefficient $\varphi_{2,1}$ is significant for ninety one stocks, while sixty one percent of the stocks are significant for the value of $\varphi_{2,2}$. This shows that a good percentage of stocks are statistically significant for the variable of interest. A similar scenario is observed for non-SSFs. The average values for $\varphi_{2,1}$and $\varphi_{2,2}$ are positive, and near zero. However, eighty two percent of them are positive and significant for the value of $\varphi_{2,1}$. Similar results are also obtained for the value of $\varphi_{2,2}$. This shows that eighty-six percent of non-SSFs are statistically significant for this particular coefficient. Again MWUT is used to check the statistical significance of change in the trading volume (attributed to migration of feedback trading activities due to the introduction of SSFs). The estimates show that the changes experienced in the post-SSFs period, corresponding to post-non-SSFs, is insignificant. This leads us to believe that the introduction of SSFs are not the reason for the migration of the feedback trading activity from spot to futures market. There might be some other reasons as well, which are brought into the focus of this study. These reasons can be studied separately in the future studies.

This paragraph discusses the change in the volatility coefficients from pre- to post-SSFs periods, for both SSFs and non-SSFs. This unconditional volatility in the variance equation is used as the coefficient in order to observe the destabilizing impact. As a general observation, again the averages are near zero from both the dimensions (negative and positive). For the purpose of validating the potential changes in the pre- to post-SSFs, again the non-parametric WSRT is used on the values of $\alpha_{0,1}$ and $\alpha_{0,1} + \alpha_{0,2}$. The results reveal that the introduction of SSFs neither stabilized, nor destabilized the underlying stocks. It is interesting to note that a hundred percent of the SSFs stocks are significant, yet only thirteen percent have a significant value of $\alpha_{0,2}$. In the case of non-SSFs, the scenario does not deviate much. As is obvious in Table 5, eighty six percent of non-SSFs show significant volatility, yet only twenty three percent have a significant $\alpha_{0,2}$. This coefficient is also analyzed by the WSRT for recording the changes across the introduction of SSFs, for non-SSFs stocks. The probability value shows that the changes across non-SSFs, against the contracts' listing dates is also insignificant. Finally, the non-parametric value of MWUT reveals that unconditional volatility in post periods for both the panels is the same, and no statistically significant difference is identified. This implies that it is a challenging task to link the concept of the migration of feedback trading, to the changes in the dynamics of volatility of the futures market. The claim of stakeholders of the market is thus nullified, and strict regulations for newer SSFs do not make their valid case.

It is interesting to note that the literature is scarce when it comes to checking the ability of futures in the promotion/inhibition of noise trading. Only a few studies exist that are relevant to this critical aspect. The results of this study contradict the results of Chau et al. (2008). They show that USFs reduce the potential impact of noise traders, which means that futures stabilize the market by promoting rational traders to trade in the market. In another study, Chau et al. (2011), report that noise traders are a part of ETFs, in the overall trade in the US market. The results of this study are also in contrast to the observations of Antoniou et al. (2005). Unlike the studies of Chau et al. (2008) and also in the case of this very study, they blame the index futures to be the main reason for the increase in noise trading. They believe that in developed economies, the futures markets can stimulate the destabilizing impact of the futures markets. It is interesting to note that the feedback trading strategies are considered to be more prominent in emerging and frontier markets, as was substantiated by the observations of Bohl and Siklos (2008). However, this seems not to be the case in PSX.

5. Conclusion and implications:

This paper contributes to the existing literature by extending the work of the S&W model. The model takes care of the migration effect of feedback traders from futures to spot market, and the non-normal behavior of stock returns. The migration effect confirms the hypothesis that it is the feedback traders, who are the actual reason of (de)stabilization of the market. Whereas, taking care of the non-normality of the data improves the estimation performance of the model. Furthermore, the evidence for these results is taken from an economy that has already observed the introduction and resumption episode of SSFs. Stringent regulations implemented on the notion of the activities of noise traders make it a perfect case for the testing of a newer and improved model. As part of the N11 countries, Pakistan has also shown a bright potential to become a better and more prosperous economy. After taking a lead from the studies conducted for the resumption episode of SSFs, this paper investigates the influence of noise trading on the financial markets of Pakistan, with the introduction of SSFs. The results have shown some new insights that will be helpful in the decision making processes of investors and policy makers. Based upon the results of the study, the following conclusions can be drawn: Firstly, the results of the study do not provide any convincing evidence of futures markets attracting noise traders. The idea that noise traders may have moved towards SSFs is still doubtful. This is consistent with the notion that the banning of SSFs, and the stringent regulations by SECP and PSX for newer SSFs, needs re-establishment and revision. The stringent regulations appear to be the outcome of the operational drag (when any entity over reacts in response to the occurrence of an unfavorable event). This situation is confirmed for both the SSFs and the non-SSFs. This may also suggest that policy makers at SECP and PSX need to loosen the regulations for investors to consider investing in the markets and eventually attract economic growth. This will help in the provision of accessible liquidity to the market, alongside it being a hedging instrument as well. Secondly, the newer model has an advantage over the previous model. This model also shows whether or not the noise traders move from spot to futures markets. This addition in the newer model can help the analysts at SECP and PSX to determine the trading pattern/behavior of the noise traders in the market. This information can also be used for the purpose of awareness in the public, as well as the development and implementation of rules and regulations to nullify the negative impacts of noise traders. The same could also be said about the use of the non-normal GED distribution. Several studies have validated the fact that

assuming or guessing the normal distribution of stock returns results in biased estimates. The use of other non-normal distributions improves the estimation performance of these econometric techniques. This aspect will be helpful for analysts who are associated with independent firms, as well as SECP and PSX. In the same vein, the original model did not consider the asynchronous trading patterns of the time series data that might have been understood as an indication of feedback trading in the previous model. This model also took care of that by adding a lagged term, hence, improving the overall estimation performance of the model. Therefore, it could be asserted that this study has important policy implications for independent analysts (mutual fund and pension fund managers etc.) and the regulatory bodies of PSX.

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Table 1: Preliminary Stats – Full Panel of SSFs

Sr #:	Stock	Mean	Median	Minimum	Maximum	Skewness	Kurtosis	Jarque-Berra	Prob.
1.	ACBL	0.000	-0.000	-0.133	0.037	-2.522	31.254	34254.700	0.000
2.	BOP	0.000	-0.000	-0.093	0.044	-0.962	10.324	2386.922	0.000
3.	DGKC	0.001	-0.000	-0.073	0.050	-0.178	5.308	226.968	0.000
4.	DSFL	-0.001	-0.000	-0.213	0.065	-2.936	48.221	86559.690	0.000
5.	ECL	-0.000	-0.000	-0.085	0.083	-0.245	11.496	3014.491	0.000
6.	FABL	0.001	-0.000	-0.083	0.039	-0.930	9.774	2053.738	0.000
7.	FFC	0.000	-0.000	-0.034	0.034	-0.039	7.035	678.058	0.000
8.	HUBC	-0.000	-0.000	-0.075	0.064	-0.326	8.845	1439.940	0.000
9.	IBFL	0.000	-0.000	-0.120	0.058	-0.606	17.365	8650.505	0.000
10.	KESC	-0.001	-0.000	-0.059	0.082	1.119	9.262	1840.783	0.000
11.	LUCK	0.001	-0.000	-0.040	0.045	0.259	3.965	49.986	0.000
12.	MCB	-0.000	-0.000	-0.070	0.057	-0.377	7.479	858.653	0.000
13.	MLCF	0.001	-0.000	-0.049	0.055	0.315	3.927	52.308	0.000
14.	NBP	0.000	0.000	-0.077	0.031	-0.845	10.088	2209.776	0.000
15.	NML	0.000	-0.000	-0.125	0.067	-0.487	11.087	2761.653	0.000
16.	PIA	-0.000	-0.000	-0.069	0.109	0.841	8.633	1438.719	0.000

Table 1: Preliminary Stats – Full Panel of SSFs (Continued…)

Sr #:	Stock	Mean	Median	Minimum	Maximum	Skewness	Kurtosis	Jarque-Berra	Prob.
17.	PIOC	0.000	-0.000	-0.0860	0.039	-0.090	4.857	144.946	0.000
18.	POL	0.001	0.001	-0.021	0.025	-0.500	5.003	208.679	0.000
19.	PSO	-0.000	-0.0003	-0.079	0.055	-0.220	8.797	1407.039	0.000
20.	PTCL	-0.000	-0.0003	-0.055	0.061	0.004	8.717	1360.679	0.000
21.	SNGPL	0.000	-0.0003	-0.076	0.096	0.103	10.246	2187.600	0.000
22.	SSGC	0.000	-0.0002	-0.047	0.035	0.238	4.138	63.322	0.000
23.	TELE	-0.000	-0.0003	-0.136	0.047	-0.489	11.722	3203.425	0.000

Table 1 shows preliminary statistics for the panel of Single Stock Futures (SSFs). The preliminary statistics include some of the descriptive statistics about first four moments as well assumption of normality.

Table 2: Preliminary Stats – Full Panel of non-SSFs

Sr #:	Stock	Mean	Median	Minimum	Maximum	Skewness	Kurtosis	Jarque-Berra	Prob.
1.	GARTON	-0.000	-0.000	-0.105	0.041	-3.349	36.274	47952.280	0.000
2.	BKHB06	0.000	-0.000	-0.153	0.031	-5.924	78.493	243070.400	0.000
3.	CHERAT	0.000	-0.000	-0.096	0.031	-0.501	9.970	2063.763	0.000
4.	CRESCENT	0.000	-0.000	-0.201	0.176	-0.320	32.044	35129.490	0.000
5.	DAWOOD	-0.000	-0.000	-0.148	0.010	-1.743	34.298	41279.200	0.000
6.	FECTO	0.002	-0.000	-0.073	0.073	0.340	5.985	390.157	0.000
7.	GARTON	0.001	-0.000	-0.105	0.123	0.651	15.389	6459.198	0.000
8.	HMBL	0.000	-0.000	-0.147	0.031	-3.418	45.052	75553.120	0.000
9.	KEL01	0.000	-0.000	-0.092	0.055	-0.335	10.810	2557.415	0.000
10.	KEL06	-0.000	-0.000	-0.026	0.028	0.208	4.213	68.399	0.000
11.	KOHAT	-0.000	-0.000	-0.171	0.031	-3.604	46.061	79346.830	0.000
12.	MARI	0.000	-0.000	-0.025	0.031	0.314	3.347	21.389	0.000
13.	PKDATA01	-0.000	-0.000	-0.125	0.196	0.720	28.676	27527.540	0.000
14.	PKDATA04	0.002	-0.000	-0.041	0.064	0.448	4.792	167.022	0.000
15.	PNSC	0.001	-0.000	-0.160	0.221	1.179	15.185	6411.223	0.000
16.	SECPL	-0.001	-0.000	-0.062	0.076	0.537	8.0006	1088.916	0.000
17.	SEL	-0.001	-0.000	-0.036	0.037	0.127	3.695	22.672	0.000
18.	SHELL	0.000	-0.000	-0.100	0.031	-0.900	18.402	10010.990	0.000
19.	SILKBANK	0.000	-0.000	-0.065	0.084	0.540	6.374	522.429	0.000
20.	SONERI	0.000	-0.000	-0.136	0.039	-3.759	46.113	79724.330	0.000
21.	SSGC	0.000	-0.000	-0.071	0.137	1.375	22.054	15426.940	0.000
22.	TELE	0.000	-0.0003	-0.071	0.137	1.375	22.054	15426.940	0.000

Table 2 shows preliminary statistics for the panel of Single Stock Futures (non-SSFs). The preliminary statistics include some of the descriptive statistics about first four moments as well assumption of normality.

Table 3 and 4:

Can be available upon request.

Table 5: Inferential Statistics for Panel A: SSFs and Panel B: non-SSFs

Averages	**Panel A: SSFs**	**Panel B: non-SSFs**
$\varphi_{0,1}$	-.0423 (-.0309)	-.0620 (-.049)
$\varphi_{0,2}$	-.0259 (-.019)	.004 (-.002)
Comparison across event dates	-2.251 (.024)	-.049 (.961)
Stock count $\varphi_{0,1}$	6	7
Stock count $\varphi_{0,2}$	6	6
Stock Count +ve (-ve) $\varphi_{0,1}$	1 (5)	2 (5)
Stock Count +ve (-ve) $\varphi_{0,2}$	0 (6)	2 (4)
Comparison – Post Analysis	-1.635 (.102)	
$\varphi_{1,1}$	3.380E1 (2.305E1)	1.146E2 (2.475E0)
$\varphi_{1,2}$	6.154E1 (3.517E1)	4.221E1 (1.795E1)
Comparison across event dates	-1.338 (.181)	-.373 (.709)
Stock Count $\varphi_{1,1}$	0	8
Stock Count $\varphi_{1,2}$	1	8
Stock Count +ve (-ve) $\varphi_{1,1}$	0 (0)	3 (5)
Stock Count +ve (-ve) $\varphi_{1,2}$	1 (0)	4 (4)
Comparison – Post Analysis	-.500 (.617)	
$\varphi_{2,1}$	.000 (.000)	.000 (.000)
$\varphi_{2,2}$	.000 (.000)	.000 (.000)
Comparison across events	.000 (1.000)	.000 (1.000)
Stock count $\varphi_{2,1}$	21	18
Stock count $\varphi_{2,2}$	14	19
Stock count +ve (-ve) $\varphi_{2,1}$	21 (0)	18 (0)
Stock count +ve (-ve) $\varphi_{2,2}$	14 (0)	19 (0)
Comparison – Post analysis	.000 (1.000)	
$\alpha_{0,1}$	.000 (.000)	.000 (.000)
$\alpha_{0,2}$	-.000 (.000)	-.000 (.000)
Comparison across event dates	.000 (1.000)	-.272 (.785)
Stock count $\alpha_{0,1}$	23	19
Stock count $\alpha_{0,2}$	3	5
Stock count +ve (-ve) $\alpha_{0,1}$	23 (0)	19 (0)
Stock count +ve (-ve) $\alpha_{0,2}$	3 (0)	5 (0)
Comparison – Post Analysis	-.604 (.546)	

The Lahore Journal of Business
9 : 1 (Autumn 2020): pp. 87–103

Risk Management & Financial Performance of Commercial Banks in Pakistan

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Abstract

The main objective of this study is to find out how, the two different types of risks, i.e. Liquidity Risk & Credit Risk, affect the overall profitability/financial performance of commercial banks in Pakistan. We used methods that were applicable on a panel data for long run and short run time specifications. Thirty-three scheduled banks listed with the SBP, as of December 2018 have been used for the purpose of the data analysis. The panel data that is used for this study stretches across a period of 10 years, with 33 cross sections. The findings of this current study revealed that the financial performance of the banks present in Pakistan is negatively, and significantly influenced by the credit risk. In addition to this, it was revealed that the lesser the non-performing loans, the lower the risk factor that is experienced. The financial risk comprising of credit risk and liquidity risk tends to have a significantly robust impact on the overall enactment of the commercial banks in Pakistan. This study will prove beneficial for the top management of the financial institutions developing economies, as it will enhance their existing knowledge regarding the impact of financial risk, which will eventually infiltrate into the intensity and quality of the financial performance of the banks. This will also enable banks, and other financial institutions to involve all the relevant stakeholders, in order to determine how they can minimize the effects of the financial risk, so as to maximize the overall returns.

Keywords: Credit risk, liquidity risk, financial performance, commercial banks, risk management

JEL Classification: G30, G32, L25

1. Introduction

It is a well-known fact that banks, and banking institutions, play an integral part in the financial sector of any economy as they perform a considerable amount of critical activities on both the flanks of the balance

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sheet. An efficient banking sector is crucial for the economic growth of any nation. Moreover, the divisions in banking sector across the world are now becoming more integrated, with every passing day. This is, therefore, resulting in an increased complexity of the operational framework of the banking institutions. Considering that the same trend will follow suit, regulators are now regularly working on finding techniques for better risk management. This is being considered, in order to minimize the effect of the various types of risks that might have an effect on the overall profitability & financial performance of the banking institutions. In this context, Diamond and Rajan (2001) asserted that, on the assets side, the banks manage the flow of funds by lending cash to the users, while augmenting the credit flow in the economy. Moreover, it provides liquidity to the investors when the liability side of the balance sheet is considered. Banks also perform various other activities. For instance, facilitating the settlement and payment systems, supporting the transfer of several goods and services, etc. This diverse nature of activities performed by the banks, unearth and expose them to different kinds of risks.

SBP has defined risk as (2003), "the adverse influence on profitability of various discrete causes of uncertainty". Al-Tamimi and Al-Mazrooei (2007) emphasized that researchers have proclaimed that risk can be classified in two categories; unsystematic risk and systematic risk. The authors state that the systematic risk is linked to the entire market, or the overall economy. It is also known as "undiversifiable", "volatility" or "market" risk. This type of risk affects the overall market, and not just a particular industry, and it cannot be eluded by diversification. Whereas, unsystematic risk is associated with only a particular firm, or a certain asset, and it can be avoided with the aid of diversification activities. In addition to this, it may also be known as "diversifiable" risk (Al-Tamimi & Al-Mazrooei, 2007).

It is intriguing to realise that all the financial institutions tend to experience financial risks that are common in nature. For instance, banks and microfinance institutions share common risks, that are most likely to be credit risks, and liquidity risks. Liquidity risk, as proclaimed by (Jenkinson, 2008), constitutes of a situation where a bank may not meet its debts, as the creditors may demand their funds in an untimely manner. This eventually leads to the sale of assets on an urgent basis, which in turn, adversely affects the profitability of the bank (Chaplin, Emblow & Michael. 2000). Lopez and Saidenberg (2000) asserted that credit risk is essentially demarcated as the level of fluctuations in the value of the derivatives and

the liability instruments, due to the variabilities in the credit quality of the debtors, as well as their counterparties.

We can assess from the earlier review of the literature that prior research has been conducted in the discipline pertaining to bank risks. However, there is a lack of comprehensive insight that is available in any of the extant studies that are based on the topic of risk. Most of the research mentioned above is primarily concentrated towards credit risk, and misses out the elements of other risks that a bank might be exposed to. The current study has a broader scope, and has covered two major risks, i.e. the credit risk and liquidity risk, that are faced by the banking sector. Therefore, this approach and decision has made the current study more comprehensive in nature. Moreover, when considering the Pakistani context, I found only a few studies which seem to have captured the effect of these risks, on the financial performance of the banks. Also, this study has used the most recent data from the year 2008 to 2018, mainly in order to evaluate the impact of the risks on the financial performance of the commercial banks in Pakistan. Furthermore, in order to check for the robustness, we have also tested all the models in a fixed time and fixed cross-sectional settings. Therefore, the current study is aimed towards filling up the existing gaps by evaluating the effect of the two types of risks on the financial performance of commercial banks in Pakistan. For the purpose of this study, the population that is considered, includes all the commercial banks, which are registered and are operational during the years 2017 till 2018. Other than that, the time series & the cross-sectional data available in the annual reports that are published by the banks and various publications of SBP have been used for the purpose of carrying out the secondary data analysis.

This study helps the regulators and policy makers to get a better understanding of the overall scope of the financial risks, and also checks the suitability of the risk management system that they have put in place for the industry. Also, this study could provide a foundation for quantifying the risk exposures. It will also prove to be beneficial for the top management of the financial institutions of developing economies, as it will enhance their existing knowledge regarding the influence of financial risks on financial enactment of the banks.

The rest of the paper is organized as follows. Section 2 highlights the previous studies. Moving on, section 3 of the study describes the data and the methodology used. Section 4 presents the results and the empirical findings, and also discusses the revelations that have been made. Lastly, section 5 provides the conclusion and the future research directions.

2. Literature Review

In their study, Cebenoyan and Strahan (2004) asserted that banking is the only sector of the economy where several risks are managed on a simultaneous basis. On a usual basis, banks and financial institutions are known to handle various, and ostensibly contrasting needs. In this regard, Kashyap, Rajan and Stein (2002) proclaimed that banks are always prepared to offer liquidity through the checking account, especially when their depositors demand for it. In addition to this, they are always ready to extend credit and liquidity to the debtors, by making sure that the lines of credit are not disrupted. Due to these diverse roles of banks, they are always apprehensive about the liquidity and solvency issues that they might have to encounter.

Drehmann, Sorensen and Stringa (2010) emphasized on the importance of credit risk, which is one of the most significant risks that are encountered by the banks. The authors asserted that the profitability, and net worth of the banks are not only dependent upon the default risks, but also upon the overall quality of the credit, items of the off-balance sheet, liabilities and the repricing characteristics of its book.

The bank's profitability is dependent upon the capability of the bank to predict, evade and evaluate risks. Keeping this in mind, an increasing number of banks have been reported to over-stretch their current human resource capacity, as asserted by Sanusi (2002). This has lead to various problems which include a poor credit appraisal system, accrual of poor credit quality, and financial crimes, etc. Consequently, this has also resulted in a growing number of banks that are distressed and crumbling under the pressure to perform. The author also identified certain other factors such as poor management, opposing ownership effects, and other types of insider exploitations, combined with political concerns and extended court processes regarding debt recovery, which escalate these systematic failures of banking intuitions. Another study conducted by Abiola and Olausi (2014) shed light on the influence of credit risk management on the banks' profitability in Nigeria. The findings of this study suggested that there is a significant connection between the banks' effectiveness, and the management of credit risk. Similarly, Cooper et al. (2003) conjectured that the variations in the health of the banks' credit portfolio might be imitated by the variations in the credit risk, which could well have an impact on the performance of the banks. A research conducted by Pasiouras (2008) estimated a negative connection between the credit risk and the banks' profitability. This primarily means that the

more the banks were exposed to the high risk loans, the greater the accrual of unpaid loans, and therefore, the lesser the profitability of the banks.

Moreover, a study conducted by Musyoki and Kadubo (2012) highlighted the influence of credit risk management on the banks' financial performance in Kenya. The findings revealed that there was an inverse influence of all the parameters of risk management, on the financial enactment of the banks. In addition to this, it was revealed that the default rate had the utmost influence on the performance of the banks as well. Similarly, a study conducted on the banking sector of Pakistan by Abbas, Haider and Rana (2014) estimated the impact of credit risk on the banks' performance. The authors concluded that this particular risk has a negative influence on the performance, and the success of a bank is dependent upon the effective management of this risk.

According to the Central Bank of Barbodas (2008), liquidity issues might affect the earnings, as well as the bank's capital. In situations that are even worse, it may also result in the solvent bank's downfall. In the course of ongoing liquidity issues, banks tend to arrange funds from the financial market, even under the highest cost that is being offered to them. This extra borrowing may eventually put the capital of the bank at risk. Moreover, this will result in an increased debt-equity ratio, which will eventually hinder the banks' capacity to maintain an optimal capital structure.

Falconer (2001) conjectured that liquidity risk could result in the fire sale of assets that could weaken the banks' capital base as well. Similarly, Diamond and Rajan (2001) also asserted that, in order to keep their position secure, banks tend to display a refusal to borrow funds, even if they have high liquidity needs. This results in the opportunity cost to the banks. Moreover, Holmstrom and Tirole (2000) proclaimed that a bank would never invest all its assets in long-term investments. The authors also asserted that various resources are only invested in short-term liquid investments. This strategy offers a cushion over the expected liquidity shock that might come around in the future. At another instance, Athanasoglou, Delis and Staikouras (2006) viewed liquidity risk as a significant factor, defining the banks' productivity, simply due to the notion that liquidity risk can be a valid cause of bank failure. The liquidity risk arises due to the incompetence of the banks to manage the reductions on the liability side of their balance sheet, or the surges erupting on the assets' side of their balance sheet. Banks often tend to hold liquid assets that can be easily converted into cash, mainly in order to avoid bankruptcy. Nonetheless, liquid assets are commonly linked to a lower rate of return, therefore, the higher the liquidity, the lower the profitability. These findings are in line with the revelations that have

been made by Goddard, Molyneux and Wilson (2004), who proved that there happens to be a negative association between the liquidity level and the banks' performance. Furthermore, Arif and Anees (2012) evaluated the liquidity risk and the banking system performance in Pakistan. The results showed that the banks' performance is significantly affected by the liquidity risk, along-with two other factors, i.e. the liquidity gap and the NPLs, which play a significant role in aggravating the liquidity risk. In addition to this, these two factors have a negative association with the profitability of a bank.

3. Methodology

3.1 Data

For the purpose of this study, we utilised the secondary data that was available to us; the data was gathered from the financial statements and the banks' annual reports, over a time period spanning to a total of ten years. The panel data was then analysed using the regression equations that were solved in Eviews7. Moving on, 33 scheduled banks were listed with the SBP, as of Dec 2018. Among these banks, there were 5 full fledge Islamic banks, which were also being included for the purpose of this study. It is noteworthy here that other commercial banks are also offering Islamic banking services to the masses, but for reporting purposes their financials have been consolidated and count not be bifurcated. Therefore, all the other scheduled banks listed with the SBP, as of Dec 2018, which includes 5 "Public Sector Commercial Banks", 4 "Specialized Banks", 15 "Domestic Private banks" & 4 "Foreign banks" have been considered as the target population for this study.

3.2 Model Specification

We utilised the panel data in order to include the time effects that were applicable to this study. One of the major advantages of using the panel data is their ability to control the individual heterogeneity.

In order to evaluate the impact of the risk on the financial enactment of the banks, this study applied the short run panel model, and the long run panel model. The long run model assumed that the performance of the current period was not affected by the last period's performance. Whereas, the short run model assumed that the last period's performance left an impact on the performance of the current period. Thus, the lagged dependant explanatory variable was incorporated in the short run model.

3.1.1. Panel Model 1

The first goal of this study was to examine the stimulus credit risk, and its impact on the financial enactment of the commercial banks that are situated in Pakistan. In the first model, the financial performance was taken as the dependent variable, and the indicators of the credit risk were taken as the independent variables. We also assumed that there happens to be a multiplicative Cobb Douglas functional relationship between the independent and the dependent variables, as shown in equation 1:

ROE = f (CAR, LLP, AQ, LDR)

Therefore, keeping this under consideration, the long run model would be:

$$ROE_{it} = \beta_o + \beta_1 CAR_{i,t} + \beta_2 LLP_{i,t} + \beta_3 AQ_{i,t} + \beta_4 LDR_{i,t} + \alpha_i + \varepsilon_{i,t} \quad (1)$$

And the short run would be:

$$ROE_{it} = \beta_o + \lambda ROE_{it-1} + \beta_1 CAR_{i,t} + \beta_2 LLP_{i,t} + \beta_3 AQ_{i,t} + \beta_4 LDR_{i,t} + \alpha_i + \varepsilon_{i,t} \quad (2)$$

Here, i = 1,2, … t= 1, 2….10

In the above model, the ROE_{it} signifies the performance of the bank, which is denoted by I, at time t, β_o is the constant, and β_i represents the co-efficient of all the independent variables. The ROE_{it-1} represents the lagged performance of the bank.

3.1.2. Panel Model 2

The second goal of this study was to examine the influence of the liquidity risk on the financial performance of the bank. For this, the model used was:

ROE = f (DTAR, EA_TA, NE_Deposits)

The long run model was:

$$ROE_{it} = \lambda_o + \lambda_1 DTAR_{i,t} + \lambda_2 EA\_TA_{i,t+} \lambda_3 NE\_Deposits_{i,t+} \theta_i + \varepsilon_{i,t} \quad (3)$$

And the short run was:

$$ROE_{it} = \lambda_o + \lambda ROE_{it-1} + \lambda_1 DTAR_{i,t} + \lambda_2 EA\_TA_{i,t+} \lambda_3 NE\_Deposits_i + \theta_i + \varepsilon_{i,t} \quad (4)$$

In the above model, ROE_{it} signifies the performance of bank I, at time t, λ_o is the constant, and λ_i represented the co-efficient of all the independent variables. The ROE_{it-1} is the lagged performance of the bank. Moreover, DTAR is the deposits to total assets ratio, EA_TA is the earning

assets to total assets ratio, and NE_Deposits (Net equity to deposits) is the proxy used for "net stable funding ratio" of bank, at a particular time period t. $\varepsilon_{i,t}$ is the error term.

3.3 Descriptive Statistics

The following section highlights the descriptive analysis of the data used for the study variables. The summary of the statistics of the data is appended below.

Table 1: Summary of Descriptive

Variables	Obs.	Mean	Std. Dev.	Max.	Min.
ROE	344	0.045	0.267	0.373	-2.001
NPLR	344	0.085	0.097	1.000	0.000
LDR	344	0.690	1.233	23.111	0.013
LLPR	344	0.003	0.005	0.045	0.000
NE_DEPOSITS	344	1.269	17.506	323.778	0.004
CAR	344	0.558	3.406	46.206	-0.064
DTAR	344	0.701	0.165	0.909	0.002
EA_TA	344	0.834	0.137	0.979	0.048

The table above shows the summary of the statistics for the variables that have been used. The overall mean values of the ROE, CAR, NLPR, LLPR, LDR, DTAR were 4.5%, 55.8%, 8.5%, 0.3%, 6.90%, 70.1% respectively, as visible in Table 4.2. Therefore, over time, the banks in Pakistan have shown a positive trend of profitability, and they remain effectively capitalized. However, the asset quality seems to have declined over time.

4. Results and Empirical Findings

4.1. Panel Regression Results

This section presents the results of the main regressions that are tested in order to assess the relationship between the different risks, and the subsequent performance of Pakistani banks. Firstly, the Hausman test was conducted to assess whether the random or the fixed effect model was appropriate in order to evaluate both the long run and the short run model. We conducted the Hausman test before every long run and short run model. Irrespective of Hausman's test, a fixed-fixed model was also conducted, in order to enhance or improve our results. The impact of each

risk on the ROE of the commercial banks in Pakistan has also been examined in this study. The following section presents the summary of all the proposed models. Moreover, the Hypothesis have been tested in both the long run, and the short run.

4.1.1. Influence of Credit Risk on Financial Performance

In order to test the first hypothesis, that too both in the long run and the short run, equation 1 and equation 2, in the Panel Model 1, had been tested. Firstly, we conducted the Hausman test on the long run model, comprising of the credit risk components as the independent variables, and the ROE as the dependant variables.

The null hypothesis for Hausman test was:

- H_0: The Random Effect model is appropriate.

Moreover, we also conducted the Hausman test in Eviews7, and the results of the Hausman test are shown below in Table 2

Table 2: (Panel Model 1) – Long Run and Short Run (Hausman Test)

	Chi-Sq. Statistic	**Prob.**
Long Run	37.750	0.000
Short Run	6.216	0.286

From the table above, we can assess that the p-value is less than 0.1, so the null hypothesis is rejected. This primarily means that the random effect model is not appropriate for the long run model, so we concluded that the fixed effect specification should be preferred over the random effect condition. Also, we could also assess that the p-value is greater than 0.1 in the case of the short run model. So, we failed to reject the null hypothesis of the Hausman test. This means that the random effect model is apt for the short run model, and it should thus be inferred. The fixed effect model and the random effect model was thus conducted in order to test the connection between the credit risk components and the ROE, in the end. Table 3 highlights the results of the fixed effect model, and Table 4 reflects the results for the random effect model for the short-run model.

Table 3: (Panel Model 1) Fixed effects Estimates – Long Run

Variable	Coefficient	Prob.	t-Statistic	Std. Error
C	0.122906	0.0000	5.107919	0.024062
CAR	0.033525	0.0000	4.469117	0.007501
LLPR	10.90943	0.0002	3.815661	2.859120
NPLR	-1.383508	0.0000	-6.469873	0.213838
LDR	-0.021201	0.1855	-1.326896	0.015978
R^2	0.221979			

We can clearly see that all dimensions of credit risk happen to have a significant link with the ROE, except that in the Loan-deposit ratio. Moreover, all the other dimensions considered have a statistically significant link, with the return on the equity, with a p-value of 0.000. However, the relationship between CAR, LLPR and ROE are positive. This means that the greater the CAR and LLPR ratio, the greater the ROE, and thus, the greater the performance of the commercial banks. Whereas, the NPLR and LDR are negatively related with the ROE. The co-efficient of the CAR is 0.0335, with a p-value of 0.000, which means that a one-unit increase in the capital adequacy ratio increases the return on the equity by 0.03 units, while holding all the other aspects constant.

Furthermore, the table also shows that the asset quality, which is being measured through the non-performing loans ratio, has a negative link with the return on equity. The co-efficient is -1.38, with a corresponding p-value of 0.000. This means that there exists a significant, negative relationship with the return on equity. It indicates that the higher loan losses leads to a drop in the profitability of the banks. Now, the loan-deposit ratio has a negative, but insignificant relationship with the return on equity, as indicated by the p-value, which did not come out to be significant at any level of significance. This indicates that in the long run, the loan-deposit ratio has no influence on the performance of the commercial banks in Pakistan. Whereas, the LLPR ratio ended up having a positive association with the performance of the banks with a co-efficient of 10.91, and it is significant at a 1% significance level.

Table 4: (Panel Model 1) - Random Effect Estimates– Short Run

Variable	Coefficient	Prob.	t-Statistic	Std. Error
C	0.044869	0.0393	2.070374	0.021672
ROE(-1)	0.660185	0.0000	18.84279	0.035036
CAR	0.009361	0.0756	1.782916	0.005250
LLPR	4.302408	0.0247	2.257024	1.906231
NPLR	-0.369423	0.0177	-2.384297	0.154940
LDR	-0.007700	0.4595	-0.740564	0.010397
R^2	0.601618			

In the short run model, the lagged variable of the Return on Equity had been added to the model. It is evident from the table that the lagged ROE has a significant impact on the current period's ROE. Similar to the long run model, the components of the credit risk had the same relationship with the return on equity, but with different corresponding p-values. For instance, the CAR ratio was significant at a10 percent significance level, as the p-value is now 0.07. The loan-deposit ratio remained insignificant, in even short run model. However, the LLPR also has a changed significance level in the short run model, as indicated by the p value of 0.02, which is greater than 0.01. Thus, the LLPR is now significant at a 5% level.

Irrespective of the Hausman test, we conducted a fixed-fixed model for the long run specifications, as well as the short run specification. The results are shown in the table 5 below.

Table 5: (Panel Model 1) Fixed-Fixed Estimates – Long Run and Short run

	Variable	Coefficient	Prob.	t-Statistic	Std. Error
	C	0.161264	0.0000	5.927493	0.027206
Long Run	CAR	0.047767	0.0000	4.362542	0.010949
	LLPR	7.448398	0.0220	2.301857	3.235821
	NPLR	-1.795110	0.0000	-5.847039	0.307012
	LDR	-0.021373	0.1338	-1.503526	0.014215
	R^2	0.560542			
	C	0.111847	0.0000	4.549548	0.024584
	ROE(-1)	0.457844	0.0000	10.35113	0.044231
Short Run	CAR	0.033203	0.0005	3.552742	0.009346
	LLPR	5.158557	0.0553	1.924845	2.679986
	NPLR	-1.129036	0.0000	-4.134927	0.273049
	LDR	-0.019084	0.0850	-1.728792	0.011039
	R^2	0.723552			

Here, in the above table you can see that the association between each component of the credit risk, and the return on the equity has not changed, as indicated by the sign of each of the co-efficient. Moreover, the significance has not changed as well, in both the long run and the short run models. However, it is evident from the table above, that the R-squared has shown a considerable improvement from 60.1 percent to 72.3 percent. This means that the discrepancy in the ROE is now more enlightened by the independent variables that are present in our short run model. Similarly, the same scenario is applicable to the long run model as well.

5.1.3 Influence of Liquidity Risk on Financial Performance

In order to test the hypothesis, both in the long run and the short run, equations 3 and 4 in the Panel Model 2 have been tested. For this purpose we initially conducted the Hausman test on the long run model, comprising of the liquidity risk components that were taken as the independent variables, and the ROE as the dependant variables.

The null hypothesis for the Hausman test remained the same. The outcomes of the Hausman test are displayed below in Table 6.

Table 6: (Panel Model 2) – Long Run and Short Run (Hausman Test)

	Chi-Sq. Statistic	**Prob.**
Long Run	14.709	0.002
Short Run	2.610	0.6251

From the table above, we can assess that the p-value is less than 0.1, therefore, we are able to reject the null hypothesis. It means that the random effect model is not appropriate for the long run model. Also, we can also assess that the p-value is greater than 0.1, in case of the short run model, so we fail to reject the null hypothesis of the Hausman test. Thus, we concluded that the fixed effect specification should ideally be preferred over the random effect specification in the case where the long run is taken into consideration, and the random effect model is suitable for the short run model. The results of the fixed effect model, and the random effect model are shown in table 7 and table 8, respectively.

Table 7: (Panel Model 2) - Fixed Effect Estimates - Long Run

Variable	Coefficient	Prob.	t-Statistic	Std. Error
C	0.069015	0.4582	0.742657	0.092930
DTAR	-0.089342	0.3931	-0.855131	0.104478
EA_TA	0.047112	0.7202	0.358474	0.131424
NE_DEPOSITS	-0.000632	0.4689	-0.725058	0.000872
R^2	0.093914			

We could infer from the results that all the dimensions of the liquidity risk do not have a significant association with return on equity. Therefore, this indicates that in the long run, the deposits to the total assets ratio (DTAR), the earning assets to the total assets ratio, and the net equity to the total deposits, do not have a significant influence on the performance of the commercial banks in Pakistan.

Table 8: (Panel Model 2) - Random Effect Estimates– Short Run

Variable	Coefficient	Prob.	t-Statistic	Std. Error
C	-0.027251	0.6668	-0.430902	0.063241
ROE(-1)	0.694533	0.0000	20.80325	0.033386
DTAR	-0.071504	0.2740	-1.095770	0.065255
EA_TA	0.121963	0.1437	1.465904	0.083200
NE_DEPOSITS	-0.000103	0.8447	-0.196097	0.000525
R^2	0.591191			

In the short run model, it is evident from the table that the lagged ROE has a significant impact on the current period's ROE. All the three components of the liquidity risk have turned out to have a non-significant relationship with the return on equity. Moreover, all the components remained insignificant, even in the short run model.

Regardless of the Hausman test, we conducted a fixed-fixed model for the long run, as well as the short run specifications. The results are shown in the table 9 below:

Table 9: (Panel Model 2) - Fixed - Fixed Estimates– Long Run

	Variable	Coefficient	Prob.	t-Statistic	Std. Error
	C	0.640555	0.0025	3.043500	0.210467
Long Run	DTAR	-0.523627	0.0031	-2.977557	0.175858
	EA_TA	-0.274458	0.2323	-1.196991	0.229290
	NE_DEPOSITS	-0.000752	0.2795	-1.083436	0.000694
	R^2	0.526179			
	C	0.309657	0.1225	1.549347	0.199863
	ROE(-1)	0.495333	0.0000	11.21764	0.044157
Short Run	DTAR	-0.258003	0.0813	-1.750130	0.147419
	EA_TA	-0.112652	0.6267	-0.486983	0.231326
	NE_DEPOSITS	-0.000388	0.4593	-0.741097	0.000524
	R^2	0.708653			

In the above table you can see that the relationship between the components of liquidity risk and the return on equity is showing slight nuances of change. For instance, the relationship between the DTAR and the ROE has now become negatively significant, at a 1% significance level. The association between the EA_TA, NE_Deposits and the ROE, however, remained insignificant, even in this model. Also, in the short run model, the relationship between the DTAR and the ROE has now become negatively significant at a 10% significance level. Furthermore, the association between the EA_TA, NE_Deposits and the ROE, however, have remained insignificant even in this model.

5. Conclusion

This section elucidates the summary of the main conclusions of this study, and the plausible directives for the future researches that will follow. The summary is conducted in accordance with the aims of the study, centred on the results of the statistical analysis that is channelled to investigate the hypothesis that has been proposed herein. The findings of this current study reveal that the financial performance of the banks present in Pakistan is negatively, and significantly influenced by the credit risk. This means that the profits experience a reduction when the banks are more exposed to the credit risk. The negative link between the NPLR and the ROE is quite evident by the fact that the commercial banks accept the deposits, and utilize these deposits in order to provide loans, and cover the costs that are linked to the loans. This too tends to diminish the banks' profitability margin. Our study, however, reveals that the lesser the non-performing loans, the lower the risk factor. The deposits to total assets ratio, the earning assets to total assets ratio, and the net equity to total

deposits ratio have been used as a proxies for the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR). The deposits to total assets ratio have come out to be negatively associated with the ROE in the fixed-fixed model. Therefore, to sum up, the financial risk comprising of the credit risk and the liquidity risk has a strong impact on the overall enactment of the commercial banks in Pakistan.

The current study facilitates in analyzing how the financial performance of the banks is impacted by the overall financial risk. However, it cannot include all the risks that are associated with commercial banks, and there is a dire need to examine the impact of those other risks as well. This includes the risks that could be imposed on the banks for instance, reputational, technological, legal and other strategic risks, etc. The current study only utilizes the date from the fiscal year 2008 to the fiscal year 2018. Another study can capture an even longer period of time that dates back to before the fiscal year 2008. Also, a similar research can be conducted on other depository institutions for instance, the microfinance banks, and savings institutions, as a comparison study can also be undertaken in this context, as these institutions are giving major competition to the commercial banks. Also a comparison between the Islamic and Conventional banks can also be done, in order to capture the differences in the risk impact that is imposed on both types of banks.

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The Lahore Journal of Business
9 : 1 (Autumn 2020): pp. 105–144

Determining the Impact of Intangible Assets on Intellectual Capital and Competitive Advantage in Banking

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Abstract

This paper carries out the empirical tests in order to validate the hypothesis that resource intangibility, in the form of intangible assets, contributes towards the intellectual capital, and the competitive advantage in the banking sector. Furthermore, it also determines whether the intangibility of a banks' resources contribute towards the sustainability of the competitive advantage. Finally, it determines which aspects of the banking performance, the intangible assets actually contribute to. In this context, this research utilizes the secondary data, which is extracted from the annual reports of commercial banks that are listed on the primary stock exchanges of Pakistan. The sample that is taken into consideration is divided into two main categories in order to carry out the analysis. These categories include the classification into the Islamic banks and the conventional banks. The Islamic window operations have not been included in the analysis, as the details required for the variable calculations are not consistently available. Moreover, this bifurcation in the sample is also a unique aspect of this research, as the prior literature primarily focuses on the determinants of the intellectual capital in the banking sector. However though, there is no direct study regarding the differences in the resource intangibility in the Islamic banks and the conventional banks, and their subsequent impact on the intellectual capital and competitive advantage. The time frame for the analysis is taken from the year FY2008-FY2018. Also, the findings of this study lead to striking implications for both the Islamic banking theory and the managerial practices in the banking sector of Pakistan. The resource intangibility is to be managed very differently across both categories. Where the intangible assets represent a significant contribution to both the intellectual capital and the competitive advantage for Islamic banks, they also represent a negligible impact on the intellectual capital, and the competitive advantage for conventional banks. This holds true for the conventional performance measures that are taken for the banking sector as well, as shown in the robustness analysis. Future studies may

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focus on additional countries to determine the consistency of these patterns. Furthermore, the additional explorations are possible, especially when considering this phenomenon. These include the impact of the bank size, the market position, and the country of location, etc.

Keywords: Banking, CAMELS, competitiveness, intangible assets, intellectual capital, resource intangibility, Tobin's Q, VAIC.

JEL Classification: G21, M41, O34.

1. Introduction

A fundamental question in the corporate strategy and industrial organizations, pertains to how the strategic financial management decisions affect the firms' performance. While the existing literature extensively analyzes the non-financial firms' perspectives of strategic financial management, there is very little work that has been done on the resource intangibility, diversification, and risk impacts on the intellectual capital, and the competitive advantage. From a performance perspective, the development of intellectual capital, and its associated resources, can ensure sustainability in the business. Whereas, from a practical perspective, survival in any industry also requires maintaining a competitive advantage. When paired together, these two measures can be undertaken through a strategy of value addition and value creation. By analyzing the intangible assets, diversification, and risk results on the intellectual capital and competitive advantage, this framework can indeed be explored further.

There is a growing significance of the intangible assets, and their contribution to the firms' performance and productivity. This consequently affects the decision-making process as well. Moreover, this has proven to be especially true in developed economies, where the competition is based on the extent of innovation and progress. Interestingly, a considerable amount of efforts have been devoted to accurately identifying the intangible assets, and their subsequent functionality in the process development and productivity.

When we consider the intangible assets in research, this category includes all the immaterial resources which are an essential part of the value creation process, but cannot be accounted for in physical terms. This includes all the internal aspects of the process and design, from blueprints to equity, software to intellect, and human resource ability. The external

aspects of the process, and the design may include patents, copyrights, and licenses as well. Moreover, some extant research has gone a step further to incorporate the economic competencies that have been obtained through various consultancies.

It is imperative to mention here that all the empirical studies show that the intangible capital represents an essential and emergent component of the total assets. This validates the necessity of using intangibles as a determinant of productivity. Research shows that the investment in intangible assets is almost equivalent to the investment that is done in tangible assets in US firms (Corrado et al., 2006). This indicates that the developed economies consider intangible assets as equal contributors to value. Likewise, an analysis of research and development intensive firms in the US, shows that the value of the total assets increases by 57%, when R&D expenditures and the organizational capital is considered in addition to the conventional financial accounts (Hulten & Hao, 2008). For the Italian manufacturing firms, Bontempi and Mairesse (2008) calculated that the intangible capital amounts to one-third of the tangible stocks. This consistency not only indicates towards the significance of intangible assets in firm value, but also considers its increasing occurrence and the resulting value addition. It is, therefore, reasonable to argue that as markets develop, the intangible assets become a necessary element in maintaining a competitive advantage.

Diversification inevitably leads to the expansion into services and industries that are not a part of the core function of the banks. In the instance where the expansion is in a particular sector, with significantly high levels of competition, or where the bank lacks proficiency, the subsequent information asymmetry may result in risk-adjusted performance that is worse that before (Carlson, 2001; Mercieca, Schaeck, & Wolfe, 2007).

(Albaity Mallek, &Noman, 2019) determined the impact of competition on the stability in the banking institutions that are listed in the MENA region. For a time frame between the years2006 to 2015, these banking institutions have held a control in terms of the financial inclusion, productivity, and the macroeconomic instability. They also incorporated the bank-level controls, such as size, efficiency, diversification, and leverage. Thus, the findings show that those banks that tend to face lower levels of competition, ultimately have higher profitability, and are also exposed to lower levels of credit risk and insolvency risk. When considering this phenomenon across the Islamic banks and conventional

banks, the effect is more pronounced in the preceding category (Albaity et al., 2019).

Another study attempting to understand the effects of revenue diversification, measured as the non-interest income, and asset diversification, on the profitability in Gulf Cooperation Council (GCC), for a time frame between 2003 to 2005, finds that the income diversification hurts the performance, while the asset diversification, in fact, leaves a positive impact on performance. It also shows that the investors do not perceive the high levels of asset diversification in a positive manner. This is intriguing, as it indicates that there is an optimal level of diversification that is acceptable to the investors. From the perspective of the Islamic banking system, as well as the conventional one, the asset diversification has a particularly strong, positive impact on the Islamic banks' performance (AlKhouri & Arouri, 2019). This is important, as it indicates which category of a bank is better able to achieve a systematic advantage from the diversification.

Existing research on the intangible assets, most commonly focuses on the developed economies (specifically US-based firms, UK based firms, and the EU based firms). These studies also tend to be sector-specific, with most of the studies covering the information technology, pharmaceuticals, and the chemical sectors. Studies conducted on the intellectual capital, test its impact on the fundamental measures of performance. Once again, they consider this perspective from a fundamental performance perspective. Only one prior study was identified by the author that connected the intellectual capital and resource intangibility (El - Bannany, 2008). However, this research only analyzed the banks that have been listed in the UK. In terms of dividing the sample into Islamic banks and conventional banks, this is also a unique aspect of this research, as the prior literature primarily focuses on the determinants of the intellectual capital in the banking sector. However, there is no direct study regarding the differences in the intangibility of the resources that are utilized and demanded, in the Islamic banks and conventional banks, and their subsequent impact on the intellectual capital and the competitive advantage. Therefore, an essential gap that needs to be filled in the existing literature is that of addressing the impact of the intangible assets on the intellectual capital and competitive advantage.

This paper contributes towards both the literature and the policy in three ways. Firstly, it will be the first paper to address the prevalence of intangible assets in the banking sector, that too across a set of developing

economies. Moreover, it will also be the first study to break down and analyzethe impact of the intangible assets on the intellectual capital, and the competitive advantage in this sample. Other than that, this paper contributes to the empiricalpolicy in two ways. Firstly, it will show the prevalence of intangible assets, and diversification across the banking sectors, and their subsequent impact on the intellectual capital, andthe competitive advantage that will follow. Following this, thepolicymakers can address which components of the intangible assets, and the intellectual capital require an additional amount of investment, in order to increase the performance. Secondly, this research will also show if, and to what extent, the intellectual capital and the competitive advantage will affect the risk profiles for the banks.

This paper empirically tests the hypothesis that resource intangibility, in the form of intangible assets, contributes towards achieving a competitive advantage in the banking sector. Furthermore, it also determines whether the intangibility of a banks' resources contributes to the sustainability of the competitive advantage. Finally, it determines whether the intangible assets contribute towards the bank's performance.

The objective of this study is to determine the impact of the resource intangibility on the intellectual capital and the competitive advantage in the banking sector. Furthermore, it also attempts to determine if the impact differs significantly across the conventional banks and the Islamic banks.

1.1 Research Questions

To achieve this objective, this study postulates the following research questions:

a) Does the resource intangibility affect the intellectual capital and the competitive advantage?

b) Does the effect of the resource intangibility on the intellectual capital differ significantly across the conventional and Islamic banks?

To test the targeted objective in light of the above literature review, this study proposes the following hypotheses in order to understand the implications of the resource intangibility on the intellectual capital and the competitive advantage:

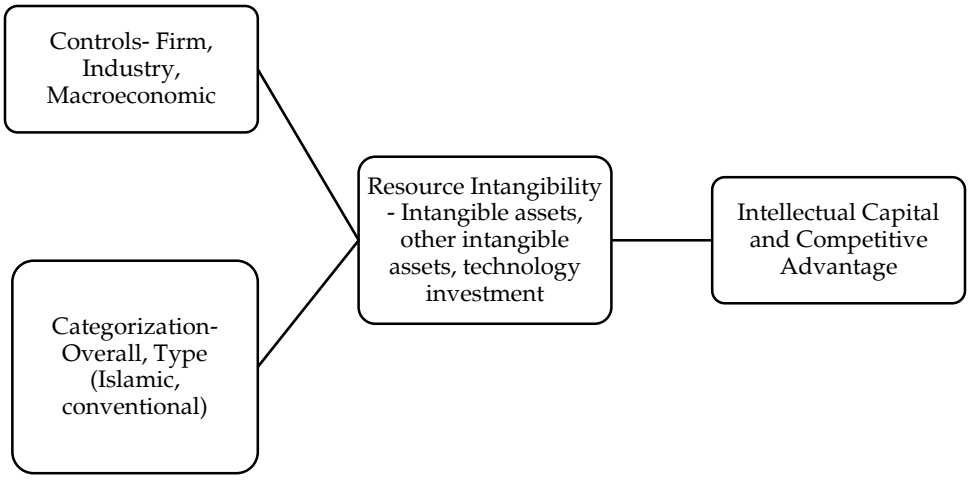
H1a: The resource intangibility has a significant impact on the intellectual capital, and hence, a competitive advantage.

H1b: The effect of the resource intangibility on the intellectual capital and the competitive advantage differs significantly across the conventional and the Islamic banks.

1.2. Conceptual Framework

Figure 1 outlines the research objective, in terms of the variables that are taken into account.

Figure 1: Conceptual Framework



2. Literature Review and Theoretical Framework

2.1. Resource Intangibility - Understanding IAS 38

The objective of the IAS 38 is to prescribe the accounting treatment for the intangible assets that are not dealt with specifically in another IFRS. This standard defines the intangible assets as "an identifiable non-monetary asset, without any physical substance. An asset is a resource that is controlled by the entity as a result of the past events (for example, purchase or self-creation), and from which certain future economic benefits (inflows of cash, or other assets) are expected [IAS 38.8].

On this basis, the standard further elaborates that three key attributes must be present for an asset to be categorized as intangible. That is to say that, first, it must be identifiable (separate and contractual). Second, the firm must have control of the asset, to the extent that it has the authority to derive advantages from that particular asset. And lastly, it

must generate some form of advantage for the future benefit, either by reducing future costs or by providing future revenues.

As per the standard, intangibles we the include patented technology, computer software, databases and trade secrets, trademarks, domains, licensing, royalty and standstill agreements, etc. These intangible assets can be acquired through a separate purchase or business acquisition, the exchange of assets, government grants or internal generation of funds.

2.2 Measuring intangible assets

An "Intangible" asset is a rather broad term, and therefore, in order to assess its impact on a firm's performance and productivity, it is essential to define intangible assets in an accurate manner. When studying the existing literature, there seem to be two main methods that emerge for this purpose. These include the categorization by proxies, and the balance sheet measures. The categorization by proxies is done in two ways. Some researchers choose to identify intellectual capital as a primary form of intangible assets, and make further subdivisions which include partitioning into human capital, structural capital, and one or more of the additional forms of relational capital (Sveiby, 1997). The underlying logic of this approach is that the development of intangible assets is concurrent to the knowledge acquisition, implementation, and subsequent tangible asset development, in a cyclical process

When considering the tangible assets, a firm simply accounts for the various categories of assets, and reports them accordingly. However, research shows that more and more value is derived from intangible assets, especially in the chemical, pharmaceutical, and the IT-oriented sectors. The reason for this happening is that, this is precisely where the observable growth in the market value is not sustained by the tangible assets alone. Previously, the investments in intangible assets were expensed rather than depreciated. This caused subsequent issues when taking into consideration, the long term projects, or high growth industries (Anthony & Reece, 1983; Lev, 1999). Over time, this accounting treatment tends to become one of the main causes for liquidity problems, as the healthier firms with strong prospects face higher costs of capital. Therefore, this realization necessitated a revision of the policy. Hence, the intangibles were no longer to be expensed; rather, they were to be amortized like their tangible counterparts.

The Existing literature that is developed on the behavior of the intangible assets analyzes both the profitability, and performance that is associated with them. However, its contribution to the differences in profits remains relatively unexplored. Some research that is on the profit persistence identifies the need to explore the underlying factors that are responsible for this perseverance in performance (McGahan & Porter, 1999, 2003; Mueller, 1977, 1986). Further research has shown that the causes of profitability may not necessarily contribute to its persistence, specifying that the firm-specific factors must be explored, rather than the dwelling into the industry-specific factors (Cubbin & Geroski, 1987; Jacobsen, 1988).

The emerging-market crisis of 1997/98 showed that the ownership structures were considered to be fundamental, in order to reroute the cash resources (Jian & Wong, 2010). In this regard, Johnson et al. (2000) suggested controlling the stakeholders' benefits from the asset sales or through the purchases that take place in the European market. Thus, keeping this trend in consideration, it becomes necessary to determine the impact of these transactions on the firms' financial performance. This is especially relevant in terms of taking cues from the earlier studies that have examined the incentives underlying the corporate decisions, in order to pursue certain types of RPTs (Watts & Zimmerman, 1986). Several studies have analyzed how the volume of the RPTs affects the management of the earnings (DeAngelo, 1988; Jones, 1991; Teoh, Welch & Wong, 1998a, 1998b), and then review the preceding implications for the accounting standard setters and regulators (Healy & Wahlen, 1999).

2.3. Resource Intangibility and Firm Performance

Intangible assets are valued according to their intellectual, and legal right, and serve the function of value-addition to the other tangible assets. They were initially considered difficult to identify, and categorize (Conner & Prahalad, 1996; Kogut & Zander, 1992). Research also shows that intangible assets served their true purpose in the imperfect factor markets (Barney, 1996), and also exhibited complementarities to them (Athey & Stern, 1998; Milgrom et al., 1991; Rivkin, 2000). The ultimate consequence of this was a classification of the assets that were both difficult to obtain, develop, and replicate (Itami, 1987; Winter, 1987). Thus, these characteristics contributed towards a competitive edge for some firms (Dierickx & Cool, 1989; Nelson, 1991; Rumelt, 1984). This uncertain imitability is what makes the intangible assets valuable, and prone to be the basis of sustainable competitive advantage for a firm (Lippman & Rumelt, 1982; Hall, 1993b).

It is not possible to completely, and comprehensively understand the implications of the intangible assets on the firms' performance and the competitive advantage that is offered, without taking into context the Resource-Based View (RBV). This theory tends to indicate that all the resources that a firm possesses, have ultimately contributed towards its true value. This further indicates that if some portion of the value cannot be matched by the tangible assets, then it is naturally determined by the intangible assets. The combination of the tangible and intangible assets contributes towards the sustainability of the performance that a firm exhibits. A fundamental drawback of this perspective is that, in this form it is very challenging to operationalize and test its true effectiveness. For example, it is nearly impossible to identify the extent of the impact that the industry factors have on the firms' performance. Moreover, it also becomes necessary to segregate the tangibles and the intangibles, in relative proportion, in order to understand their contribution to the performance of the firm.

When considering the RBV as the underlying presumption of the determinants of firm performance, all the resources, that pertain to the implicit knowledge and understanding of the business, and the real activities and the interdependencies of the implicit and explicit resources, are considered to be characteristics that can be expected to translate into a greater degree of intangibility of the firm's resources. Furthermore, the inimitability is, in turn, responsible for the greater sustainability that is expected under the RBV umbrella.

If the intangible assets help to sustain the differences in the firm performance, across firms, by enhancing the sustainability of competitive advantage, the competitive disadvantages must either stay constant, or also persist in time. Extant research has been analyzing the role of the RBV, in the sustainability of the firms' performance. This literature shows that, the asset composition contributes towards a competitive disadvantage, just as much as it contributes to the competitive advantage. In this regard, research also shows that existing capabilities that contribute to firm performance can be eradicated with radical innovation (Henderson & Clark, 1990). From another perspective, Leonard-Barton (1992) identifies those aspects of the core capabilities that primarily hinder innovation and the development of intangibles in a firm.

2.4 Industry effects on the impact of intangibles on sustainability

In the existing literature on the intangible assets, the resource-based perspective recognizes that the sustainability of a firm's performance

differs in terms of the utility of the intangible assets. This can be attributed to various underlying factors. When considering the industry as a factor of difference, it is essential to note that the utility of the intangible assets, as a source of competitive advantage, will differ significantly across the industries, mainly due to the nature of their business. Also referred to as the strategic industry factors, these resources represent the benchmark for the industry participants (Amit & Shoemaker, 1993). When considering the firm characteristics, an individual organization's ability to efficiently utilize tangible, and intangible assets, in order to maintain a competitive edge, is as essential as ensuring that the industry-specific strategic factors are prevalent for the sustainability of the firms' performance.

Secondly, it is necessary to note that the efficient utilization of the intangible assets varies due to their existence, operation and contribution at various levels within the firm. RBV identifies that the intangible assets may exist at operational levels, as processes or projects, or at resource levels, such as functions, teams, or employees (Grant, 1991; Nelsons & Winter, 1982). Most of the analysis of the intangible assets, based on the resource perspective, does not differentiate between the firm as a whole and these sub-divisions have been created to analyze the role of each function in isolation (Nelson, 1991; Rumelt, 1991). Some industries may require the appropriation of specific areas of intangibles, thereby affecting the efficiency and utility across the various industries, differently. This has also been explored by Levin et al. (1987) who discovered that the proportion of the return to R&D, varies significantly across the industries.

3. Methodology

This research will utilize the secondary data that has been extracted from the annual reports of the commercial banks that are listed on the primary stock exchange of Pakistan (PSX). The time frame for the analysis will be from FY2008-FY2018. The eleven-year time frame will allow for the adequate observations, so as to study the various aspects that have been proposed in the research objective. As no centralized database exists, therefore, it must be collected from the company annual reports. Moreover, this study will use the panel data analysis, in order to determine the econometric methodology, as per the nature of the data and variables. The sample size will allow the researcher to determine the prevalence of the intangible assets over a period of time.

The independent variable in this study is the resource intangibility, while the dependent variables are the intellectual capital and the

competitive advantage. For the robustness, we have tested the impact of the resource intangibility, on the standard banking performance measures, such as Tobin's Q, and CAMELS. Furthermore, the control variables in this study include the firm-level controls (leverage, firm size), industry controls (concentration HHI), and the macroeconomic controls (GDP per capita).

3.1 Variable Description

3.1.1 Independent Variables

3.1.1.1 Resource intangibility

The extant research available on this aspect of company asset analysis, utilizes two main methods of identifying intangible assets. The first one of these is based on the R&D expenditures, training and the innovation expenditures, while the second one is pertaining to the intangible assets that are listed on the balance sheet (Bontempi & Mairesse, 2008). Therefore, the study will utilize the balance sheet measures of the intangible assets, with a specific reference to the various associated standard measures such as the International Accounting Standards (IAS), and the International Financial Reporting Standards (IFRS).In doing so, we differ from the existing literature of this area. According to the standards:

IAS 38 Intangible Assets outlines the accounting requirements for intangible assets, which are non-monetary assets that are without physical substance and identifiable (either being separable or arising from contractual or other legal rights). Intangible assets meeting the relevant recognition criteria are initially measured at cost, subsequently measured at cost or using the revaluation model, and amortized on a systematic basis over their useful lives (unless the asset has an indefinite useful life, in which case it is not amortized)." This approach has been selected, as the economies in the sample use either the IFRS standards, or the national accounting standard, that is derived from the IFRS. It also follows the variables, as they have been identified in the studies put forth by Arrighetti et al. (2014) and Villalonga (2004).

This measure is used to represent the intangible capital intensity of the firm, and is calculated as a percentage of the intangible assets, divided by the total assets. This means, that at any point in time, it represents a proxy of intangible assets that are accumulated by the bank. The intangible asset investment (IAI) is measured as the change in the intangible assets, from one year to the next – that is to say, that this measure will

simultaneously account for the amortization of the existing intangible assets, as well as the new investments in the intangible assets, and represents a crucial variable in our analysis.

Table 1: Independent Variables

Variable	Formula	Reference
Intangible Assets - IA	Intangible Assets/Total Assets	Arrighetti et. al. (2014), Villalonga, (2004)
Intangible Asset Investment – IAI	(IAt-IAt-1)/IAt-1	Arrighetti et. al. (2014) Villalonga (2004)
Other Intangible Assets –OIA	Intangible Assets other than	Author's calculation

Ghemawat (1991) proposes a specific vehicle through which the characteristics of the intangible resources translate into the sustainability of the competitive advantages for the firms. In his view, the intangible assets, because of their lower trade-ability and higher stickiness, are particularly prone to be a source of commitment, which he defines as the tendency of the strategies to persist over time. Commitment, in turn, is "the only general explanation for sustained differences in the performance of organizations". If the intangibles help sustain the performance differences across firms, by enhancing the sustainability of the competitive advantage, the competitive disadvantages must either stay constant, or also persist during the course of the time. Some RBV studies indicate that the latter is in fact the case. Henderson and Clark (1990) argue that the radical innovation destroys the usefulness of the firms' existing capabilities, or in other words, the "architectural knowledge". Leonard-Barton (1992) coined the term "core rigidities" in order to refer to the innovation-inhibiting downside of the core capabilities. Christensen (1993) describes how the know-how, and the customer base that gave certain hard disk drive manufacturers a competitive advantage, eventually became the liabilities that led them to be displaced by a newer generation of firms.

3.1.2 Control Variables

The Control Variables include three categories – the firm-level, industry level, and the country-level controls. The firm-level controls include the size and leverage. Whereas, the Industry-level control is the concentration ratio, and the country-level control is the GDP per capita.

3.1.2.1 Bank Size

The bank size is generally used to measure the economies or diseconomies of scale in the banking sector. For the purpose of this study, we assume that as the bank size becomes larger, it would become more stable. The cost differences may cause a positive relationship between the size and the bank's performance, especially if there are significant economies of scale present (Bourke, 1989; Goddard et al., 2004; Molyneux & Thornton, 1992). Also, as Short (1979) argues, the size of the bank is closely related to its capital adequacy, since relatively larger banks tend to raise less expensive capital and, hence, appear to be more profitable. In the previous extant literature, some studies have found the existence of the scale economies for large banks (Berger & Humphrey, 1997; Altunbaş et al., 2001; Athanasoglou et al., 2006; Zopounidis & Kosmidou, 2008), while the others have found diseconomies for larger banks (Kosmidou et al., 2005; Pasiouras & Kosmidou, 2007). However, Eichengreen and Gibson (2001) indicated that the effect of a growing bank's size on the profitability may be positive, only up to a certain limit. Beyond this point, the effect of the size could be negative due to the bureaucratic intricacies that exist. Thus, the relationship may be expected to be non-linear. Therefore, like the previous studies, we use the natural logarithm of the bank's total assets (SIZE) as a proxy for the size.

3.1.2.2 Leverage

Literature addressing capital structure of financial sector is scarce owing to capital regulations view; claiming that capital regulation requirement is the prime determinant of capital structure in financial sector. Ftiti et. al. (2013) and Trad et. al., (2017) find that leverage has a significant impact on firm performance. Therefore, like previous studies, we use the ratio of total liabilities to total asset (LEV) as a proxy for leverage.

3.1.2.3 Concentration Ratio

Regarding the industry concentration, we have referred to the Herfindahl Hirschman Index. The Herfindahl-Hirschman Index (HHI) is a commonly accepted measure of market concentration. It is calculated by squaring the market share of each firm that is competing in a market, and then summing the resulting numbers. Also, it can range from close to zero to 10,000. Besides, the higher the value is, the lesser competition they have. According to the structure-conduct-performance (SCP) hypothesis, the

banks in highly concentrated markets tend to collude, and thus, ted to earn monopoly profits (Gilbert, 1984; Molyneux et al., 1996; Short, 1979). The previous studies have indicated that the collusion may cause the higher interest rates to spread (higher interest rates being charged on the loans and the lower interest rates being paid on the deposits), and also, a higher fees being charged (Goddard et al., 2011; Goldberg & Rai, 1996).

3.1.2.4 GDP per Capita

In order to capture the effect of the macroeconomic environment, the macroeconomic variable used in this study is the annual GDP per capita (GDP). The GDP is a measure of the total economic activity within an economy. The higher economic growth encourages the banks to lend more, and permits them to charge higher margins, therefore, improving the quality of their assets. Previous studies have revealed that the economic growth has a positive effect on a bank's performance (Athanasoglou et al., 2008; Kosmidou et al., 2005; Kosmidou, 2008; Pasiouras & Kosmidou, 2007). Thus, the GDP is expected to have a positive impact on bank performance.

Table 2: Control Variables

Variable	Formula	Reference
Size of the firm – Size	lnTotal Assets	Ftiti et. al. (2013) Trad et. al., (2017)
Level of leveraging of a firm – Lev	Total liabilities/Total Assets	Ftiti et. al. (2013) Trad et. al., (2017)
Concentration within the industry – Conc	HHI (Herfindahl Hirshman Index)	Ftiti et. al. (2013) Trad et. al., (2017)
GDP per capita – GDP		Ftiti et. al. (2013) Trad et. al., (2017)

3.1.3 Dependent Variables

3.1.3.1 Value Added Intellectual Capital

Pulic (2000) quantifies the value addition from the components of the intellectual capital, as well as the physical capital. He proposed the VAIC model, which accounts for the total resource base of the organizations, and does not solely rely on the physical capital Possessed by the firm.

The first step in calculating the VAIC involves quantifying the value addition, which is the difference between the output, measured as the sales revenue, and the input, measured as the total operational expense, excluding the employees' cost.

VA= output – Input

The second step involves calculating the human capital. In his study, Pulic (2000) uses the total employee cost as the best proxy for human capital.

HC = Total Employee cost

The next step refers to quantifying the value addition from each unit of the employee cost.

HCVA= VA/HC

The fourth step involves quantifying the value addition from the structural capital. The Structural capital is obtained by deducting the total employee costs from the value addition.

SC= VA-HC

Since the structural capital and the human capital have an inverse relationship, the value-added efficiency of the structural capital is quantified in a slightly different manner as compared to thevalue-added efficiency of the human capital.

SCVA = SC/VA

Now that the value-added efficiency of the human, as well as the structural capital is quantified, adding both of these variables together gives the value-added efficiency of the intellectual capital.

ICVA= HCVA + SCVA

Once the value-added efficiency of the physical capital is calculated, the sum of both the variables will be used to measure the value-added efficiency that is derived from the firms' complete resource base. Therefore, the physical capital is calculated as the total net assets, less any intangible assets.

PC = Non-Current Assets + Current Assets – Intangible Assets – Current Liabilities

The value-added efficiency of the physical capital is quantified in the same way as that of the value-added efficiency of the human capital.

PCVA = VA/PC

Thus VAIC is the sum of the value added efficiency of the physical capital, structural capital, as well as the human capital.

VAIC = PCVA + ICVA

3.1.3.2 Competitive Advantage

A firm's competitive advantage (disadvantage) is the degree to which it outperforms (underperforms) its competitors. If the performance is measured by the profitability, the difference between a firm's profitability, and the average profitability of its industry is thus a direct indicator of its competitive advantage. The Positive sign represents a position of advantage, while the negative sign represents a position of disadvantage (Villalonga, 2004).

Table 3: Dependent Variables

Variable	Formula	Reference
Intellectual Capital - VAIC	VAIC= PCVA + SCVA + HCVA	Pulic (2000)
Competitive Advantage - ComAdv	ROAco - AvgROAind	Villalonga (2004)

3.2 Robustness Analysis – Dependent Variables

3.2.1 Tobin's Q

It is no surprise that a company's primary goal is to maximize its profits– this concept is often used synonymously with the shareholders' wealth maximization (Husnan, 2002). These two goals are applied simultaneously, in the sense that, as the value of a company increases, it will logically position itself in a higher tier with an increase experienced in its share value, which translates into a benefit for the shareholder. The wealth of the shareholders and the companies is represented by the market price of its shares, which are a reflection of the investment decisions, funding

(financing), and the asset management that has taken place in the company. Therefore, we use Tobin's Q as a dependent variable in this study, in order to measure the performance quotient. Tobin's Q is calculated by comparing the ratio of the market value of the company shares, with the book value of the company equity (Smithers & Wright, 2007).

3.2.2 CAMELS

Although a non-unique set of indicators exist, the CAMELS indicators appear to have a significant capacity to assess the soundness of the bank, with the combination of the indicators (Wanke et al. 2016). Therefore, for the purpose of this study, we have adopted the CAMELS combination as a proxy of the financial stability. The financial dimensions of this combination are employed by the regulators and the supervisors, in order to assess the banks' overall health (Avkiran & Cai, 2012; Buch et al., 2016; Calabrese et al., 2017; Klomp & De Haan, 2012; Wanke et al., 2015; Wanke et al., 2016). However, the original criteria of the categories of the CAMELS ratings are undisclosed and unavailable to the public. Hence, the proxy of each category is selected based on the data availability and the prior studies (Avkiran & Cai, 2012; Jin et al., 2011; Wanke et al., 2016).

The components of the CAMELS are as follows: the Capital adequacy (C) is captured by the total equity to the total assets, and is treated as a desirable output. Ideally, it should be maximized when, more equity is conducive to less financial distress. The asset quality (A) is captured by the ratio of the non-performing loans (NPLs) to the total loans, which is an undesirable input, and should ideally be minimized. Similarly, the management efficiency (M) acts as a proxy in the form of the operating assets to the total assets, and is regarded as an undesirable input. However, the quality of the earnings (E) has a proxy in the form of the return on assets (ROA), whereas, the return on equity (ROE) is maximized as a desirable output. Moving further, the liquidity (L) is another desirable output that has a proxy in the form of liquid assets, to the short term liabilities. The sensitivity to the market risk (S) is measured by the ratio of the bank assets to the sector assets, as they are treated as a desirable output, because of the role of the total assets in impeding the default risk (Dincer & Dincer, 2013; Ghasemi & Rostami, 2015; Wanke et al., 2016).

All these robustness variables are described in Table 4.

Table 4: Dependent variables for Robustness Check

Variable	Formula	Reference
Tobin's Q – TQ	MV of Assets/BV of Assets	McGahan (1999, 2003, Lang & Stulz (1994)
Capital - C	Equity to total assets	Ghasemi & Rostami (2015) Dincer et. al, (2011)
Asset management – A	NPLs to total loans	Ghasemi & Rostami (2015) Dincer et. al, 2011
Management quality - M	Operating assets to total assets	Ghasemi & Rostami (2015) Dincer et. al, 2011
Earnings1 – E1	ROA = Net Income/Total	Ghasemi & Rostami (2015)
Earnings2 – E2	ROE= Net Income/Total Equity	Dincer et. al, 2011
Liquidity – L	Liquid assets to short term liabilities	Ghasemi & Rostami (2015) Dincer et. al, 2011
Sensitivity – S	Bank assets to sector assets	Ghasemi & Rostami (2015) Dincer et. al, 2011

3.3 Model:

- For H1a

$$VAIC = \alpha_i + \beta_0 VAIC_{it-1} + \beta_1 IAIB_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$$
$$ComAdv = \alpha_i + \beta_0 ComAdv_{it-1} + \beta_1 IAIB_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$$

- For H1b

$$VAIC = \alpha_i + \beta_0 VAIC_{it-1} + \beta_1 IAIB_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$$
$$ComAdv = \alpha_i + \beta_0 ComAdv_{it-1} + \beta_1 IAIB_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$$
$$VAIC = \alpha_i + \beta_0 VAIC_{it-1} + \beta_1 IACB_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$$
$$ComAdv = \alpha_i + \beta_0 ComAdv_{it-1} + \beta_1 IACB_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$$

The equations represent the dynamic panel data model (Anderson & Hsiao, 1982), where a fixed effect approach is utilized in order to account for the potential correlation of the regressor (IA) with the firm-specific components of the error term. This is done, so as to account for all those intangibles that may not be explicitly indicated in the accounting variable, but would still affect the outcome. This potential correlation may result in a Nickell bias (Nickell, 1981). There are three possible solutions to this problem – the first solution is to take the deviations from the firm means, and correct the OLS estimates using the original formula (McGahan & Porter, 1999; Waring, 1996). Alternatively, it is possible to use the first-differencing, so as to eliminate the intercept and incorporate the lagged

exogenous regressors (ΔXt−1, ΔXt−2, ...) and the predetermined variables (Δyt−2, ... , or yt−2, ...) as instruments for the lagged dependent variable (Δyt−1) (Anderson& Hsiao, 1982). Finally, it is also possible to use the generalized method of moments (estimator) (Arellano & Bond, 1991; Arellano & Bover, 1995). This method has proven to have higher levels of efficacy, in comparison to the other two alternatives. In the panel data research, determining the impact of various firm-specific factors on the value and performance of a firm, the GMM estimator has proven to be the most appropriate method for estimation. In this study, since the primary purpose is to test the proposed hypothesis, therefore, the efficiency considerations are paramount.

4. Results and Discussion

Appendix Table 5 reports the descriptive statistics for the intellectual capital performance, and the independent variables selected in this study. The mean intangible assets in the banking sector are 0.039, while the other intangible assets, and intangible asset investment for the sample banks throughout the study period are 0.0049, and 11.50, respectively. The independent variables represented by the VAIC (along with its subcomponents HCVA, SCVA, ICVA, and PCVA) and the competitive advantage, all vary as well, and this should increase the confidence level in the results as argued by Naser and Al-Khatib (2000).

The factor of multicollinearity exists when the independent variables correlate significantly with each other. The multicollinearity in the data set was investigated by the correlation matrix of the independent variables that are shown in Appendix Table 6. The highest correlation coefficient value came out to be between the HCVA and the Competitive Advantage, and was less than 0.99 (it is 0.78), which means that the multicollinearity should not be considered as acritical factor as argued by El-Bannany (2002). Furthermore, Neter, et. al. (1985) stated:

"[. . .] propagated the fact that if some, or all independent variables are correlated among themselves, it does not, in general, inhibit our ability to obtain a good fit, nor does it tend to affect the inferences about the mean responses or predictions of new observations. This condition applies, provided these inferences are made within the region of the observations.

Moreover, Neter (1985) also stated that "deleting some variables to reduce multicollinearity reduces the model's explanatory power and may lead to specification errors".

An initial analysis of the mean resource intangibility and the intellectual capital profiles of the banks across the selected time frame (see Appendix Figure 2 – Figure 9), helps to identify the basic patterns that can be expected.

When taking into account Pakistani banks, we can concur that Bank Al Habib Limited has the highest mean exposure to insolvency risk, while Summit Bank, SilkBank, and the Bank of Punjab have the lowest mean exposure to insolvency risk (see Figure 2). Furthermore, Samba Bank has the highest mean exposure to the credit risk1, while the Bank of Punjab, Askari Bank, and Bank AlFalah Limited have the lowest mean exposure to credit risk1 (see Figure 3). Additionally, Bank Islami and Summit Bank have the highest mean exposure to the credit risk2, while Meezan Bank, Bank AlHabib Limited, and JS Bank have the lowest mean exposure to credit risk2 (see Figure 4). Banks which possess positive competitive advantages are considered to be advantaged, while the banks with negative competitive advantages are considered to be disadvantaged. Moving forward, the Allied Bank, Bank AlHabib Limited, Bank of Khyber, Faysal Bank, Habib Bank Limited, Habib Metropolitan Bank, MCB, Meezan Bank, National Bank, Soneri Bank, and United Bank, all fall under the category of advantaged banks (see Figure 5).

Taking the same concept forward, Meezan Bank has the highest VAIC, while Samba Bank has the lowest VAIC. In the sample that is taken into account, only the BOP and Samba Bank seem to demonstrate a negative VAIC, thereby indicating a serious lack of value addition for these banks (see Figure 6). Besides, Meezan Bank has the highest HCVA, while the BOP has the lowest HCVA. Only the BOP, Samba Bank, and the Summit Bank exhibit a negative HCVA, indicating that the intellectual capital in these firms does not, in fact, contribute towards the process of value addition (see Figure 7). Additionally, the SCVA is the highest for Silkbank and Bank AlFalah Limited; and the lowest for Bank Islami, Habib Metropolitan, and Meezan Bank (see Figure 8). Moreover, Meezan Bank also has the highest ICVA, directly as a result of the high levels of the HCVA and the SCVA. Only the BOP exhibits a negative mean ICVA, thereby indicating a critical strategic delinquency for this bank (see Figure 9).

The results presented in Appendix Table 7 to Appendix Table 12 show that the various aspects of the regression model are significant, however, a thorough analysis of the intricate interrelationships is still necessary. The overall analysis in Appendix Table 7 shows that the intangible assets or the resource intangibility, and the other intangible

assets do not have a significant impact on the VAIC. However, it is significant in the HCVA, PCVA, and competitive advantage. The investment in the intangible assets has a negligible, but significant impact on both the PCVA and the competitive advantage.

To further answer our research question, we bifurcated the sample into two categories of banks- the Islamic banks and the conventional banks. Due to the extensively detailed nature of the variables, the Islamic window operations have not been taken into consideration in the final sample. Similarly, in order to maintain a highly balanced sample across our panel data, we only incorporated those full-fledged Islamic banks, which have been operational for at least a period of 5 years. When considering the subcategory of the Islamic banks, the results came out to be very thought-provoking (see Appendix Table 8). The intangible assets/resource intangibility is revealed to have a positively significant impact on every aspect of the intellectual capital and the competitive advantage. These results are in line with the previous research (Ghemawat, 1991), which indicates that for Islamic banks, the resource intangibility contributes to the sustainability of the intellectual capital and the competitive advantage. From a managerial perspective, this indicates that the strategic management of the assets, and maintaining a competitive advantage in the Islamic banking system is directly associated with the proportion of intangible assets that the banks have invested into. However, there is a threshold to this – here, more is not particularly merrier, as the intangible asset investment has a consistently negative significant impact on all the aspects of the intellectual capital, as well as a competitive advantage. Surprisingly, while the level of the other intangible assets is very small, and may appear to be insignificant in the preliminary analysis, it also has a consistently negative impact on all the aspects of the intellectual capital, as well as the presence of a competitive advantage. This indicates that the banking institutions should focus on the resource intangibility that is applicable to only the ERP and the IT investments. This is in line with the previous research (Leonard-Barton, 1992) which further enforces the fact that resource intangibility in the intangible assets, other than the ERP and the IT investments for banking, may lead to the innovation inhibiting downside of the core capabilities of a firm. This is further reinforced by an extension on the RBV, which indicates that in some cases – depending on the type of resource intangibility or the speed of innovation, the resource intangibility may destroy the usefulness of the firms' existing capabilities or their architectural knowledge (Henderson & Clark, 1990). From a managerial and strategic perspective, this indicates that in the banking

sector, the resource intangibility should be focused upon, when it comes to the need-based investments.

When considering the subcategory of the conventional banks, the results are just as unique (see Appendix Table 9). The intangible assets/ the resource intangibility is completely insignificant to all the aspects of the intellectual capital and the competitive advantage. Other intangible assets have a positive impact on only the HCVA and the PCVA, but a negative significant impact on the competitive advantage that a bank might gain. This reinforces the studies present in the prior literature, and the perspective of the sustainability of the intellectual capital, and the competitive advantage that is achieved through resource intangibility (Ghemawat, 1990). While the contribution of the human capital towards the sustainability is also supported by the RBV, a unique finding of this study shows that the physical capital is just as essential in the banking sector, and may be directly linked to the core function of this sector. The intangible asset investment has a negligible, but significant impact on both the PCVA and the competitive advantage. This indicates that the consistent increases in the resource intangibility over time are necessary, in order to maintain a competitive advantage.

The results also consistently show a reinforcement of the endogenous nature of the intellectual capital, as well as the competitive advantage, which supports the selection of the linear GMM as the method of analysis.

For robustness/comparison sake, we determine the impact of the resource intangibility, on the standard performance measures, including a market-based measure – Tobin's Q (TQ), capital adequacy (C), asset management (A), management quality (M), earning (E1 = ROA, E2 = ROE), liquidity (L), and the sensitivity (S). The overall analysis in Appendix Table 10 shows that the intangible assets/resource intangibility has a positive significant impact on the management quality and the earnings. Other intangible assets have a positive significant impact on Tobin's Q, and asset management, but a negative significant impact on the management quality and earnings in terms of the ROA. The intangible asset investment has a negligible but significant impact on the asset management, earnings, liquidity, and the sensitivity.

When considering the subcategory of Islamic banks (see Appendix Table 11), the resource intangibility/intangible assets have a positive significant impact on the management quality and earnings, but a negative

significant impact on the liquidity, and sensitivity. Other intangible assets have a positive significant impact on the capital adequacy and asset management, but a negative significant impact on Tobin's Q, and the earnings. Lastly, the intangible asset investment has a positive significant impact on Tobin's Q, capital adequacy, asset management, and the management quality. However, there is a consistent negative significant impact on the earnings, and liquidity. This variation in the results can be attributed to two factors – resource allocation, and the time it takes to benefit from the resource intangibility. Firstly, whenever investment in intangible assets is made, they require large initial investments, that too with very little prospect of immediate returns. Secondly, as the returns are generated gradually, the initial resource allocation tends to negatively affect both the earnings and liquidity.

When considering the subcategory of conventional banks (see Appendix Table 12), the resource intangibility/intangible assets have a positive significant impact on the capital adequacy and the earnings, in terms of the ROE. Moreover, the other intangible assets have a positive significant impact, in terms of Tobin's Q, and asset management, but a negative significant impact in terms of the management quality, and earnings in terms of the ROA. The intangible asset investment has a negligible but significant impact on the asset management, earnings, liquidity, and sensitivity.

The results of the robustness analysis closely mirror those of the initial analysis, with notable exceptions in the Islamic banking sub-category. This indicates that, while the strategic decisions driving the expansion and competitive advantage in conventional banks may be well established, the indications in Islamic banking are very different from what actually is.

5. Conclusion

This paper empirically tests the hypothesis that, the resource intangibility, in the form of intangible assets, contributes towards a competitive advantage in the banking sector. Moreover, it determines whether the intangibility of a banks' resources contributes towards the sustainability of the competitive advantage. Finally, it also determines whether the intangible assets contribute towards the banks' performance.

This paper contributes to both the literature and the policy, in three ways. Firstly, it is the first paper to address the prevalence of intangible assets in the banking sector, across a set of developing economies. It is also

the first of its kind to study the impact of the intangible assets on the intellectual capital and competitive advantage that is specific to this sample. This paper contributes to the practical policy in two ways. Firstly, it will show the prevalence of the intangible assets and the resource intangibility in the banking sector, and their subsequent impact on the intellectual capital and competitive advantage. As such, the policymakers can address which components of the intangible assets and intellectual capital require additional investment, in order to increase the quotient of performance. Secondly, this research also show if, and to what extent, the intellectual capital and competitive advantage affects the risk profiles for the banks.

The findings of this study lead to striking implications for both the Islamic banking theory and the managerial practices in the banking sector. Resource intangibility is to be managed very differently across both the defined categories. Where intangible assets represent a significant contribution to both the intellectual capital and the competitive advantage for Islamic banks, they tend to represent a negligible impact on the intellectual capital and the competitive advantage for conventional banks.

Furthermore, as a measure of performance, they indicate that while the VAIC measures intellectual capital, that too rather well, it may not always be equated with performance, per se. Rather, it is a unique perspective of analysis that must be measured for strategic management purposes. This uniqueness explains a large proportion of the variation in performance results that are attributed to Islamic banks and conventional banks – the performance itself is linked to the intellectual capital foundations which were not included in the prior studies. This also indicates that it is too early to disregard the standard performance measures, especially in the banking sector, where the majority of the market share remains with conventional banks. While Islamic banks have seen an incredible growth and customer acceptance in the last decade, the overall proportion is not yet enough to disregard the longstanding major players in the industry.

Future studies may focus on additional countries, so as to determine the consistency of these patterns. Furthermore, additional explorations are also possible when considering this phenomenon –such as the impact of the bank size, market position, country of location, etc.

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Appendix

Table 5: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
IA	231	0.03987	0.08636	1.88E-07	0.732457
OIA	231	0.004965	0.05584	0	0.846039
IAI	230	11.50162	136.6502	9.12E-05	2071.543
VAIC	214	2.737398	3.008855	-9.23198	35.94936
HCVA	214	1.878431	1.751211	-10.1933	4.781796
SCVA	231	0.823629	2.579706	-1.79322	35.97894
PCVA	231	0.038016	0.036401	-0.13684	0.303507
ComAdv	231	-6.67E-18	1.323494	-6.04964	3.793561
TQ	231	0.086414	0.062828	0.010185	0.393321
C	231	9.713191	7.14068	-2.8815	64.03647
A	219	0.081809	0.048778	0.011885	0.287166
M	223	0.159661	0.08043	0.042792	0.850442
E1	231	0.814285	1.505967	-6.56372	6.093946
E2	231	8.679952	29.73932	-204.713	182.4883
L	231	0.560013	0.09853	-0.03434	0.996826
S	231	0.044248	0.042374	0.000608	0.171686
Size	231	12.54439	1.176596	8.020158	14.88329
Lev	231	11.81095	13.93093	-168.216	62.47228
Concent	231	931.7509	45.42899	887.7113	1051.621
GDPpercapi~e	211	4421.181	443.4679	3914.612	5249.206

Table 6 : Correlation Coefficients

	IA	OIA	IAI	VAIC	HCVA	SCVA	PCVA	ComAdv	TQ	C	A	M	E1	E2	L	S	Size	Lev	Concent	GDPper~e
IA	1.00																			
OIA	-0.02	1.00																		
IAI	-0.03	-0.01	1.00																	
VAIC	0.14	0.01	0.03	1.00																
HCVA	-0.18	0.03	0.06	0.46	1.00															
SCVA	0.26	-0.01	0.00	0.82	-0.14	1.00														
PCVA	0.36	0.01	0.00	0.42	0.67	0.02	1.00													
ComAdv	-0.17	-0.32	0.01	0.26	0.58	-0.09	0.56	1.00												
TQ	0.28	-0.01	-0.02	0.15	0.11	0.09	0.50	0.38	1.00											
C	0.41	0.00	-0.03	-0.05	-0.08	-0.01	0.13	-0.01	0.41	1.00										
A	0.25	0.07	0.04	0.03	-0.36	0.27	-0.06	-0.27	0.06	-0.08	1.00									
M	0.43	-0.01	-0.06	-0.13	-0.38	0.10	-0.18	-0.27	0.09	0.33	0.24	1.00								
E1	-0.20	-0.35	0.02	0.28	0.65	-0.11	0.60	0.90	0.29	-0.11	-0.24	-0.36	1.00							
E2	-0.13	-0.13	0.02	0.27	0.66	-0.13	0.52	0.70	0.15	0.03	-0.38	-0.31	0.82	1.00						
L	-0.11	0.01	0.02	0.09	0.29	-0.09	0.08	0.08	-0.03	0.07	0.00	-0.30	0.07	0.07	1.00					
S	-0.17	-0.08	-0.01	0.14	0.33	-0.06	0.29	0.46	0.25	-0.14	0.06	-0.02	0.41	0.23	0.04	1.00				
Size	-0.43	-0.13	0.05	0.16	0.50	-0.14	0.27	0.41	0.05	-0.43	-0.06	-0.36	0.51	0.33	0.09	0.79	1.00			
Lev	-0.25	-0.04	0.00	-0.20	-0.39	0.03	-0.42	-0.41	-0.43	-0.58	0.25	-0.13	-0.34	-0.45	-0.17	-0.09	0.14	1.00		
Concent	0.16	0.04	-0.06	-0.15	-0.40	0.09	-0.20	-0.02	0.15	0.34	-0.05	0.28	-0.27	-0.22	-0.13	-0.03	-0.43	-0.08	1.00	
GDPpercapi~e	-0.13	-0.06	0.09	0.10	0.34	-0.11	0.18	0.02	0.01	-0.27	0.01	-0.26	0.30	0.26	0.10	0.05	0.44	0.03	-0.71	1.00

Figure 2: Mean IA

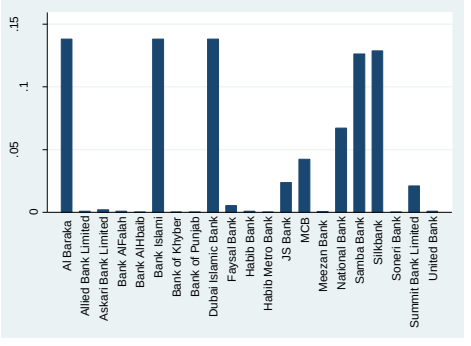

Figure 3: Mean OIA

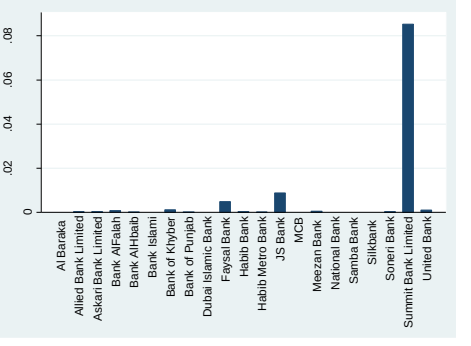

Figure 4: Mean IAI

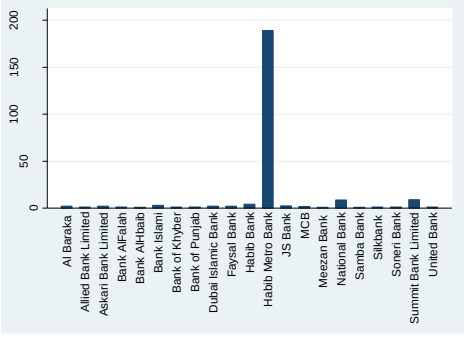

Figure 5: Mean ComAdv

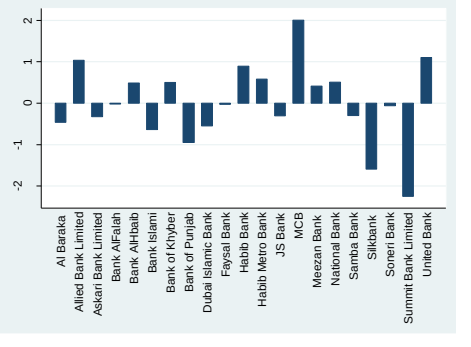

Figure 6: Mean VAIC

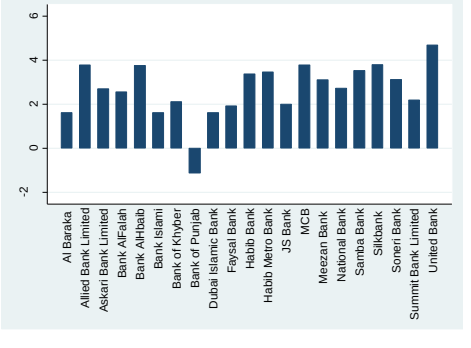

Figure 7: Mean HCVA

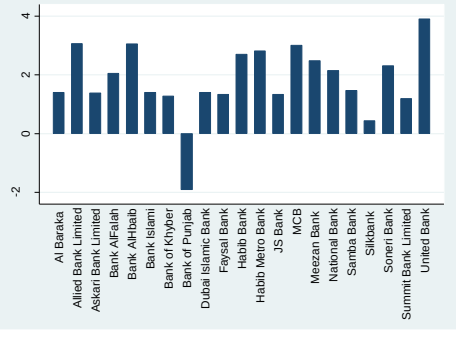

Figure 8: Mean SCVA

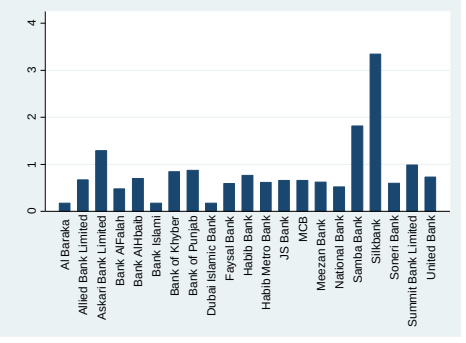

Figure 9: Mean PCVA

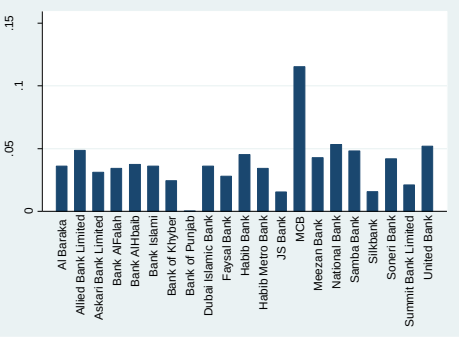

Table 7 : Results - Overall banks

	Overall					
	VAIC	HCVA	SCVA	ICVA	PCVA	ComAdv
IA	0.235	1.342**	-0.608	0.085	0.142***	1.037***
	-0.928	-0.543	-1.556	-0.98	-0.011	-0.255
OIA	2.24	6.403***	-0.768	2.027	0.129***	-4.140***
	-3.992	-0.647	-0.641	-4.114	-0.009	-1.244
IAI	0	0	0	0	-0.000**	-0.000***
	0	0	0	0	0	0
Size	0.4	0.758	-1.592	0.45	0.024***	0.433
	-1.381	-0.766	-2.316	-1.366	-0.007	-0.298
Lev	-0.231	0.024	-0.003	-0.231	-0.000***	-0.005***
	-0.296	-0.045	-0.006	-0.295	0	-0.002
Concent	-0.029*	-0.013***	-0.019	-0.028*	-0.000**	0.004
	-0.016	-0.004	-0.019	-0.016	0	-0.003
GDPpercapi~e	-0.002***	-0.001***	0	-0.002***	-0.000***	0
	0	0	-0.001	0	0	0
_cons	33.911	7.734	39.855	33.063	-0.031	-7.509**
	-33.957	-10.472	-44.604	-33.851	-0.117	-3.6
N	132	132	169	132	169	169
chi2	526.3	2271.5	150.9	500.7	6765.1	828.1

Note: Coefficient is reported with standard error. Significance is denoted as follows: *** p <0.01, **p<0.05, *p<0.10. VAIC, SCVA, ICVA, PCVA, and competitive advantage are dependent variables. Intangible assets, other intangible assets, and intangible asset investment are independent variables. Control variables include size, leverage, and concentration.

Table 8 : Results - Islamic banks

	Islamic Banks					
	VAIC	HCVA	SCVA	ICVA	PCVA	ComAdv
IA	6.485***	3.262***	2.203***	6.259***	0.178***	4.644***
	-0.007	-0.231	-0.343	-0.029	-0.019	-1.168
OIA	-139.521**	-75.728***	-69.325***	-142.150**	-4.607***	-776.533***
	-58.001	-25.29	-24.124	-59.239	-0.903	-158.663
IAI	-0.211***	-0.130***	-0.090***	-0.210***	-0.003***	-0.138*
	-0.005	-0.02	-0.015	-0.007	0	-0.076
Size	0.176***	0.597	0.001	0.202***	0.012	-1.821**
	-0.033	-0.556	-0.281	0	-0.01	-0.836
Lev	0.563***	0.186***	0.246***	0.550***	0.006*	0.531***
	-0.024	-0.044	-0.014	-0.029	-0.003	-0.107
Concent	-0.022***	-0.010***	-0.010***	-0.022***	0	-0.024***
	-0.003	-0.003	-0.001	-0.003	0	-0.008
GDPpercapi~e	-0.004***	-0.002***	-0.002***	-0.004***	-0.000***	-0.002
	0	0	-0.001	0	0	-0.001
_cons	33.288***	12.383	13.972***	32.623***	0.085	45.403***
	-4.031	-7.865	-0.221	-3.697	-0.197	-8.636
N	32	32	32	32	32	32
Chi2	5.786	8.966	8.258	6.83E+14	26.04	670.3

Note: Coefficient is reported with standard error. Significance is denoted as follows: *** p <0.01, **p<0.05, *p<0.10. VAIC, SCVA, ICVA, PCVA, and competitive advantage are dependent variables. The intangible assets, other intangible assets, and intangible asset investment are independent variables. The control variables include size, leverage, and concentration.

Table 9 : Results - Conventional banks

	Conventional Banks					
	VAIC	HCVA	SCVA	ICVA	PCVA	ComAdv
IA	-82.958	-1.947	-22.844	-83.474	0.124	5.89
	-69.893	-11.903	-30.354	-70.018	-0.131	-7.879
OIA	4.479	6.410***	0.764	4.153	0.145***	-5.804***
	-3.224	-0.801	-2.165	-3.5	-0.019	-0.27
IAI	0	0	0	0	-0.000***	-0.000***
	-0.001	0	0	-0.001	0	0
Size	0.798	1.185	-2.144	0.858	0.033***	0.006
	-2.072	-0.968	-3.009	-2.114	-0.009	-0.222
Lev	-0.235	0.019	-0.001	-0.236	-0.000***	-0.005***
	-0.278	-0.047	-0.006	-0.279	0	-0.001
Concent	-0.032	-0.013***	-0.021	-0.031	-0.000**	0.007***
	-0.02	-0.004	-0.022	-0.02	0	-0.002
GDPpercapi~e	-0.003*	-0.001***	0	-0.003*	-0.000***	0
	-0.001	0	-0.001	-0.002	0	0
_cons	39.691	3.45	49.18	38.486	-0.121	-8.219***
	-46.628	-12.92	-56.621	-47.173	-0.133	-2.69
N	103	103	137	103	137	137
chi2	119.9	2160.9	224.6	138.8	202	1726.5

Note: The coefficient is reported with a standard error. The significance is denoted as follows: *** p <0.01 , **p<0.05, *p<0.10. The VAIC, SCVA, ICVA, PCVA, and competitive advantage are the dependent variables. The intangible assets, other intangible assets, and intangible asset investment are the independent variables. The control variables include size, leverage, and concentration.

Table 10 : Robustness Analysis – Overall banks

	Overall							
	TQ	C	A	M	E1	E2	L	S
IA	-0.008	0.548	0.035	1.500***	1.470***	32.112***	0.071	0
	-0.02	-2.322	-0.09	-0.186	-0.444	-8.18	-0.06	-0.004
OIA	0.047***	0.581	0.048***	-0.103***	-5.690***	7.916	0.052	0.002
	-0.015	-2.567	-0.009	-0.029	-1.167	-19.515	-0.106	-0.002
IAI	0	0	-0.000***	0	-0.000**	-0.005*	0.000*	-0.000*
	0	0	0	0	0	-0.003	0	0
Size	0.011	-1.439	-0.007	-0.038	-0.124	0.288	0.008	0.010**
	-0.01	-1.111	-0.008	-0.025	-0.403	-11.036	-0.023	-0.004
Lev	-0.000**	0.031***	0	-0.000***	0.001	0.159	0.001***	0
	0	-0.009	0	0	-0.003	-0.101	0	0
Concent	0.001***	-0.014	0	0	-0.016***	-0.276	-0.000**	0
	0	-0.01	0	0	-0.005	-0.17	0	0
GDPpercapi~e	0.000***	-0.001	0	0	-0.001	-0.009*	0	-0.000***
	0	-0.001	0	0	0	-0.005	0	0
_cons	-0.660***	41.117**	0.037	0.479	18.678**	292.914	0.820***	-0.083
	-0.238	-16.753	-0.119	-0.366	-7.935	-266.596	-0.284	-0.054
N	169	169	155	163	169	169	169	169
chi2	78.75	1988.6	1006.1	1679.7	625	3083.2	228	198.4

Note: The coefficient is reported with a standard error. The significance is denoted as follows: *** p <0.01 , **p<0.05, *p<0.10. Tobin's Q and capital adequacy, asset management, management quality, earnings, liquidity, and sensitivity (CAMELS) are the dependent variables. The intangible assets, other intangible assets, and the intangible asset investment are the independent variables. The control variables include size, leverage, concentration, and the GDP per capita.

Table 11 : Robustness Analysis – Islamic banks

	Islamic Banks							
	TQ	C	A	M	E1	E2	L	S
IA	-0.021	1.793	-0.017	1.389***	5.550***	46.418***	-0.062**	-0.016***
	-0.017	-6.669	-0.011	-0.035	-1.354	-14.894	-0.028	-0.003
OIA	-6.323*	2781.827**	13.071***	-1.327	-737.530***	-1880.009***	-4.013	0.145
	-3.531	-1217.123	-0.291	-15.789	-179.474	-491.799	-2.972	-0.603
IAI	0.002**	0.242**	0.003**	0.027***	-0.305***	-2.642***	-0.003***	0
	-0.001	-0.098	-0.002	-0.005	-0.073	-0.482	-0.001	0
Size	0.057***	7.012***	-0.070***	-0.063	-0.199	6.971***	0.078***	0.014***
	-0.002	-2.476	-0.009	-0.041	-0.451	-1.599	-0.01	-0.001
Lev	-0.006**	-0.359	0.010***	0.003	0.475***	2.388*	-0.014***	-0.002***
	-0.003	-0.787	-0.002	-0.004	-0.128	-1.361	-0.005	0
Concent	0.001***	0.011*	0	0	-0.037***	-0.186***	0.000**	0
	0	-0.006	0	0	-0.01	-0.065	0	0
GDPpercapi~e	0	-0.013***	0	0	-0.004**	-0.027***	0	-0.000***
	0	-0.004	0	0	-0.001	-0.01	0	0
_cons	-1.263***	-27.809	0.721***	0.974	46.410***	187.740*	0.005	-0.133***
	-0.152	-34.931	-0.115	-0.735	-10.239	-101.298	-0.078	-0.011
N	32	32	32	32	32	32	32	32
chi2	3.206	26.11	2020.3	1711.3	137	2681.9	1.823	4634.4

Note: The coefficient is reported with a standard error. The significance is denoted as follows: *** p <0.01, **p<0.05, *p<0.10. Tobin's Q and capital adequacy, asset management, management quality, earnings, liquidity, and sensitivity (CAMELS) are the dependent variables. The intangible assets, other intangible assets, and intangible asset investment are the independent variables. The control variables include size, leverage, concentration, and the GDP per capita.

Table 12 : Robustness Analysis – Conventional banks

	Conventional Banks							
	TQ	C	A	M	E1	E2	L	S
IA	-0.085	87.574***	0.242	0.202	9.761	318.114**	0.365	0.022
	-0.154	-17.846	-0.175	-0.294	-7.14	-138.521	-1.162	-0.022
OIA	0.033***	-0.052	0.046***	-0.125***	-7.392***	9.606	0.036	0.001
	-0.011	-1.414	-0.014	-0.025	-0.644	-13.608	-0.096	-0.003
IAI	0	0	-0.000***	0	-0.000**	-0.005**	0.000***	-0.000*
	0	0	0	0	0	-0.002	0	0
Size	-0.003	-1.767**	-0.007	-0.050***	-0.395	6.709	0.006	0.010*
	-0.014	-0.806	-0.008	-0.019	-0.485	-12.607	-0.035	-0.005
Lev	-0.000*	0.025***	0	-0.000**	0	0.124	0.001***	0
	0	-0.004	0	0	-0.004	-0.102	0	0
Concent	0.000**	-0.006	0	0	-0.012**	-0.288	-0.000**	0
	0	-0.008	0	0	-0.005	-0.197	0	0
GDPpercapi~e	0.000***	0.001	0	0	0	-0.012**	0	-0.000***
	0	-0.001	0	0	0	-0.006	0	0
_cons	-0.49	28.747**	0.046	0.542***	16.279	228.603	0.923**	-0.084
	-0.317	-13.05	-0.126	-0.159	-10.175	-313.364	-0.46	-0.065
N	137	137	134	137	137	137	137	137
chi2	641.6	2083.3	388.4	391.5	6585.5	4687.6	421.9	563.4

Note: The coefficient is reported with a standard error. The significance is denoted as follows: *** p <0.01, **p<0.05, *p<0.10. Tobin's Q and capital adequacy, asset management, management quality, earnings, liquidity, and sensitivity(CAMELS) are the dependent variables. The intangible assets, other intangible assets, and intangible asset investment are the independent variables. The control variables include size, leverage, concentration, and the GDP per capita.