BANK PARIKRAMA

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Volume XLVIII, Nos. 3 & 4, September & December 2023

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Monetary Policy and its Coordination with Fiscal and Trade Policies

- Mohammed Farashuddin, Ph.D.*

1. Introduction

1.1 Why is money so powerful

Money is a powerful element in the economic sphere. Primarily because, money is a medium of exchange and an appropriate amount can even buy 'the tiger's eye'. At the same time, a fixity or paucity of the money income in a declining phase of purchasing power through inflation, the poor and the lower middle class may suffer miseries. Professor Friedman in a 2004 symposium held in celebration of the 40th anniversary of the publication intitled A Monetary History described the essence of that seminal work as "money does matter."

1.2 Quantity Theory of Money Revisited

In the meantime, Milton Friedman continued his vigorous opposition to the Keynesian position blaming the private sector for the Great Depression of 1929. He thus revived the Equation of Exchange MV = PT in his book called A Quantity Theory of Money- a Restatement published in 1956. This slightly modified version of the original Equation of Exchange replaced Q, the real output with T the number of sales (transaction). When sold out, Q and summation of T are the same. The new formulation of the quantity theory as interpreted by Friedman states that the amount of base money supply M in the economy multiplied by the velocity (speed) at which it circulates equals prices multiplied by the number of sales (or transactions).

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A careful look would also make it clear that the right-hand side of the equation MV = PT represents the money cost of the real or supply side of the aggregate output which must be matched, in an equilibrium by the aggregate demand expressed in terms of base money, M multiplied by V the velocity of money circulation. One of the interpretations of the Keynesianism is that the velocity of money circulation is very unstable; when it slows down, a liquidity trap is created; when it doubles up, inflation is inevitable.

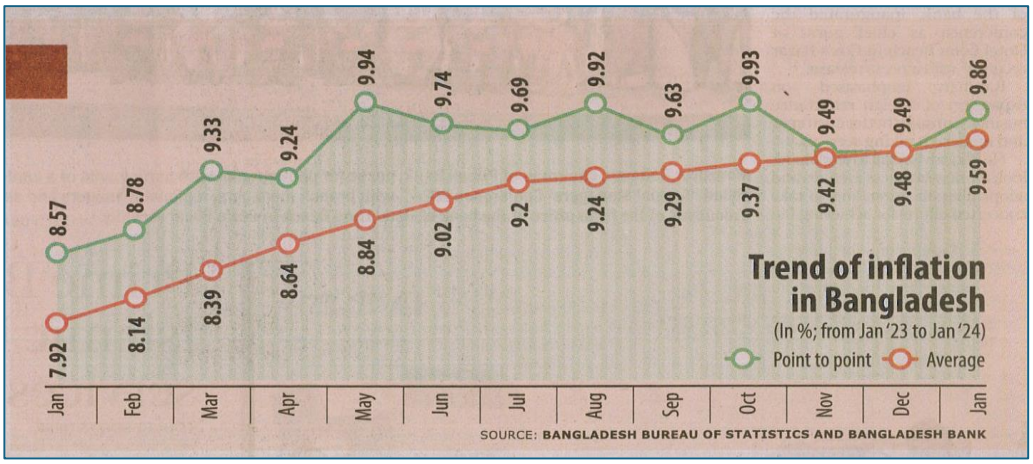
2. Importance of Monetary Policy in a Developing Country

2.1 In any country, developed or developing the central bank is tasked with the responsibility to protect the value of the local currency. Thus a low or no inflation, a stable exchange rate and a non-fluctuating interest rate together protect the value of the local currency and are viewed to be essential ingredients of a stable macroeconomic situation. In Bangladesh, inclusive growth over the years prior to the Covid Pandemic has been cited by the World Bank MD as inspiration to other developing countries. Even in 2020-21, the first year of the COVID, Bangladesh was amongst only a few counties that recorded a positive GDP growth rate of a 3.21%. However, a sudden 25%+ depreciation of Taka in 15 months starting middle of 2022 spiraled inflation rate nearing double digit over the last year; this has shaken the confidence of the efficacy of the monetary policy stance. Point to point inflation rate showed upward treat from 8.57 in January 2023 to 9.86 percent in January 2024. Naturally the annual average inflation rate during the same 12-month period also showed an upward trend from 7.92 percent in January 2023 to 9.59% in January 2024. But the annual budget 2023-24 still projected an average inflation rate of 6.5% ignoring the realities. Similarly, the insistence on a 6-9 policy meaning a 6% limit on deposit rate and not more than 9% lending rate has also been a policy that was neither copybook nor realistic. It discouraged savings because of a negative real interest rate and did not result in any obvious increase in private sector investment.

2.2 The 6-9 policy has harmed the bank deposit without bringing any positive to the new investment arena. Most economists and bankers agree that cheap credit may cause loans to flow to unworthy projects and ultimately add to the default loans. Some are of the view that when the lending rates are high, only responsible borrowers seek bank credits in the high productivity projects for them to be able to ensure high returns for repayment in time. Given that the bank borrowing may not be more than 50% of the total cost the higher cost in borrowing in a 3-5% higher lending rate may be not so significant if other costs like delayed approval, escalated cost due to appreciation of taka etc. could be reined in. Appreciation of taka without compensating fund assistance has become a major source of cost escalation of projects. Major problems created by the diversion of cheap bank credit and ultimate default through money laundering and conspicuous consumption. In a regime of repeated reschedulement at an abnormally low interest rate, a 2% down payment by defaulters seeking reschedulement compared to the 10% cash downpayment in advance by law abiding regular borrowers is a major flaw in the monetary policy.

3. Is the Monetary Policy Delivering in Bangladesh

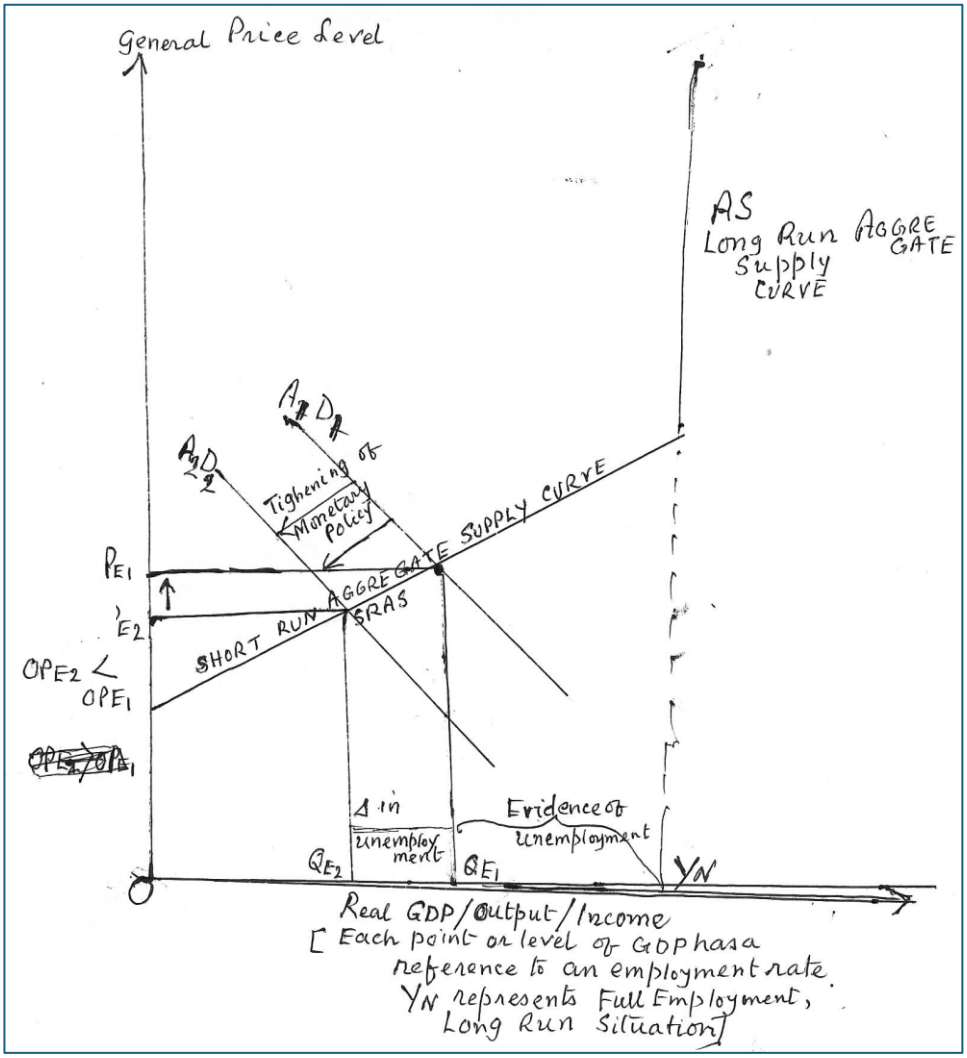
3.1 As observed in the diagram below, the inflation rate (point to point) reduced slightly to 9.49 in November and December 2023 but rose again to 9.86 in January 2024.



Source: *Inflation edges up despite monetary tightening. Why?* The Daily Star, 25 February, 2024

In January 2024 the central bank abandoned the 6-9 policy in favour of a tight monetary policy raising the policy rate by 25 basic points to 8%. Whether or not this rate hike has caused the desired effect of ultimately falling price levels will be known later. But the heat in the market has apparently even increased due to the advent of Shab-e-Barat and the Ramadan. Despite the rise in the interest rate on loans in the Six-Monthly Average Rate of Treasury (SMART) bills, the benchmark for the banks to fix lending rates. SMART advanced to 8.8% in January, a new high since its introduction in July 2023. Analysts do recognize only a mild impact on the price levels. The International Monetary Fund (IMF) has predicted that the global inflation would have fallen to 6.6% in 2023 compared to 8.8% in 2022; it may ease further to 4.3% in 2024. Bangladesh as a net importer should have benefited from this declining global price levels. Apparently, it has not so far.

3.2 The market observes in Bangladesh as well as BBS do not see any reason to expect a cooling down of the market in near future. Some economists and international observers also point out to ensuring reliable data from BBS for meaningful projections and objectively planning of future course of action. Given that the market in Bangladesh is under the influence of the syndicates, hoarders and other supply side hazards, the demand management through interest rate mechanism alone is unlikely to be effective. It also confirms the general perception that monetary policy alone is not capable of containing inflation. Moreover, in a situation of high underemployment as in Bangladesh which is at 38% or so (it would translate into a significant unemployment rate) perhaps applying the contractory monetary policy may exacerbate the unemployment situation as graphed below:



If the economy in the short run is in an equilibrium at QE, where the Short Run Aggregate Supply equals the Aggregate Demand Curve A.D, we see existence of unemployment underemployment equality Q_E-Y_N. A Contractionary monetary policy will reduce the general price level by PPE1 i.e from OPE1to OPE2 via a reduction in short run aggregate demand curve from A1D1 to A2D2. The Equation of Exchange or the simple Quantity Theory of Money will also yield the same result in price level reduction.

$PQ = MV$

$P = \frac{MV}{Q}$

reduction in aggregate money supply will cause

$(M-\triangle M)V \Rightarrow (M-\triangle M)V < MV \Rightarrow \frac{(M-\Delta M)V}{Q} < \frac{MV}{Q}$

i.e General Price level has decreased due to tight monetary policy.

if we accept the classical assumption Q & V are constant. However, if the Keynesian interpretation of the velocity of money circulation being unstable is applied, the conclusion of price reduction due to a lowering of the basic money supply may not necessarily hold. Keynes also asserted Q is not constant in the short run as there is unemployment in the economy.

3.3 The Coordination Council

The Coordination Council set up and activated a decade and half ago comprises of the following:

1. Hon'ble Minister of Finance: Chairman
2. Hon'ble Minister/ State Minister of Commerce: Vice Chairman
3. Governor, Bangladesh Bank: Member
4. Finance Secretary: Member
5. Chairman, National Board of Revenue: Member
6. Secretary, Economic Relations Division: Member
7. Member (GED) Planning Commission: Member

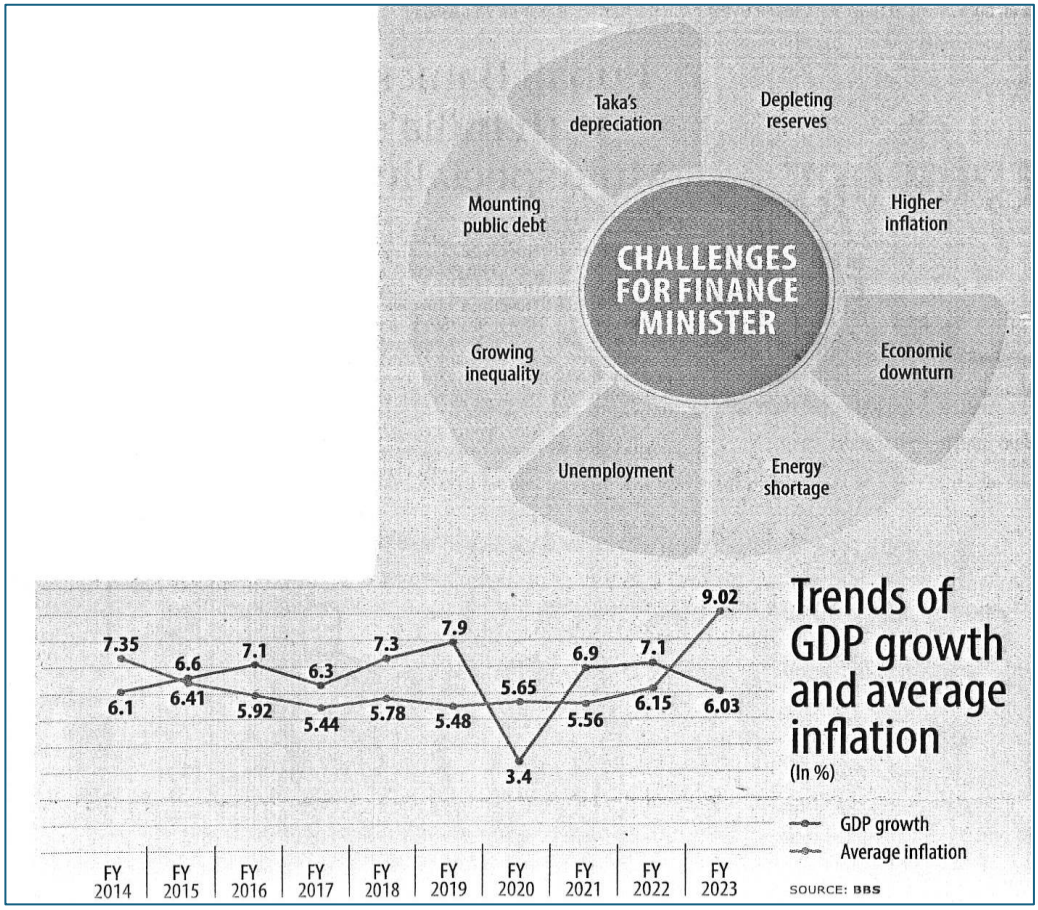
Bangladesh Bank provides the secretariat assistance to the council.

The composition of the council clearly indicates that GDP growth, revenue collection, external trade and monetary aggregates are all linked to each other in predicting the general price level. However, if the council would assert its authority under a general goodwill of the government, market would possibly see visible actions throughout the year and better outcomes thereof.

A Coordinating Monetary, Fiscal and Trade Policy

4.1 In the national Budget Document 2023-24 Towards Smart Bangladesh, Resource Mobilization and a rationalized aggregate expenditure, inter alia, were singled out for particular attention. Revenue: GDP ratio in Bangladesh is less than 10 percent. Out of the 7.8 million upper income persons, only 0.9 million pay taxes (CPD). Over the years, budget deficit kept on increasing as expenditure control remained only on papers. The two combined for bigger and bigger budget deficit as the political necessity to formulate larger budgets continued. Even on a rational basis the annual budget is still 15-18% of GDP and has to increase until it is 20%. Of the sources of resources for deficit financing: external borrowing, loaning from the banking system within and direct debt to the people, government has been preferring the bank borrowing option. Borrowing from the central bank is highly inflationary because $\triangle M$ has to be printed. $\underline{(M+\triangle M)V}$ is higher than MV. Happily, GOB appears to have stopped borrowing openly from the central bank as it heeded the advices and stopped forcing the central bank to print for that purpose. But borrowing from the scheduled banks elbows out the private sector whose investment level is at best stagnant. Thus, there is an impact on investment caused by fiscal budget deficit from the scheduled banks. The best option is to increase revenue collection by convincing the 6.9 million well to do citizens to pay taxes for the benefit of the country which is also directly or indirectly beneficial to them.

4.2 There are positive indications that policy initiatives, at least some of these have yielded results. Exports revenues are on the increase which may further kick up in the May-June reinvigoration of the global economy. RMG and knitwear exports are also going up albeit at a slower pace than we would like. However, the graph below rightfully reflects that the worries of the government that look over on 11 January 2024 are manifold.



Source: BBS

4.3 The taka for US Dollar swap between the central bank and the scheduled banks is apparently providing a breathing space. Two questions remain, however. Are the scheduled banks procuring the US Dollars from the middlemen who launder money by way of buying foreign currency from the remitters (because of the apparent `incentive') and bringing these back home through the unofficial channels. That may translate into a position to the Bangladesh Bank promoting money laundering. I do not wish to believe this is true but will need clarification about the source of the 'excess' foreign currency with the scheduled banks. The second question is about the sustainability of the mechanism when, of necessity, the authorities will have to put a brake on money laundering. There is also the issue about the source

of the central bank's swap taka amounts. If the source is increasing money supply, △M by printing notes, inflation may be fueled to hyper level as described in 4.1.

5. Recommendations

5.1 An action plan should be presented to the Coordination Council (perhaps with the inclusion of a non-government member as proposed by me) showing the causes, effects and remedies bearing in mind that (a) the GDP growth rate of 5.8% computed by the World Bank does not slip any further, (b) analyzing why interest rate mechanism which has worked in 08 of the 09 countries in taming inflation as shown in the table below has not worked in Bangladesh, (c) why more and more exports revenues are being held up (12% now) abroad over and beyond the Retention Quotas, (d) reasons for continuing with multiple exchange rates which has long been abandoned in the world is still in vogue in Bangladesh, (e) the reason for lack of progress is exports diversification and (f) how best can the monetary policy, fiscal and trade policies be coordinated.

Country	Inflation in Jan 2022	Inflation in Aug 2023	Interest Rate in Jan 2022	Interest Rate in Aug 2023
Canada	5.1%	4%	0.5%	5%
China	0.9%	0.1%	3.7%	3.45%
Euro area	5.1%	5.2%	0%	4.25%
Germany	4.9%	6.1%	0%	4.25%
India	6%	6.83%	4%	6.5%
Japan	0.5%	3.2%	-0.1%	-0.1%
UK	5.5%	6.7%	0.25%	5.25%
US	7.5%	3.7%	0.08%	5.38%
Bangladesh	5.86%	9.92%	5%	6.5%

Source: STATISTICA

5.2 We recommend adoption of an unified exchange rate computed on the basis of the Real Effective Exchange Rate (REER) factoring in to weighted average calculation of the exchange rate of the trade partners and the export competitors. During 1998-2001, REER was the basis for three devaluations often described by the Asian Development Bank as accurate. So there is no need to abandon 'Managed Float Yet.'

5.3 As these are prone to misuse by the middlemen in money laundering, the so-called "remittance incentives" should be merged with the united exchange rate which should be as close as possible to the Curb Market Rate (not more taka 3 difference). A cushion may be added to make the unified exchange rate attractive this may temporarily further fuel inflation though.

5.4 Using the Bangladesh Financial Intelligence Unit (BFIU) as the leader in an effectively combined Money Laundering Prevention Team comprising of the NBR, Ministry of Civil Aviation, Ministry of Home and the Intelligence Agencies, money laundering should be reduced significantly. There is perhaps a need for a through overhaul of the entire presence of officials and staff at the Shahjalal International Airport. Are not there too many Authorized Dealers in SIA and other airports. Newspapers very often publish sensational involvement of 'insiders' in the air ports in gold and drug smuggling and in money laundering.

5.5 National level efforts may be waged to convince the citizens who earn taxable income to pay their shares of the taxes. As per the findings of the Boston Consulting Group, 25 million people have per capita income of $5000 or above and therefore, subject to income taxation. Potential taxpayers very often ask embarrassing questions about the well-publicized corruption incidents of the heavyweights remaining unpunished. Thus a vigorous anti-corruption campaign is also a need of the hour.

5.6 Let the cost estimates of programmes and projects be carefully made during the pre-feasibility (it is a must for publicly funded project) and feasibility exercises. Any time overruns should actually be penalized as in most countries of the world. In Bangladesh, very often time and cost overrans go together; this cannot be acceptable.

5.7 Seriously examining a negotiated slow-down and reschedulement of some infrastructure project loans may be necessary in view of the interest rate payments on foreign loans doubling in the last six months. The situation is still under control and reference to Srilanka episode is uncalled for.

5.8 Consider a Compensation Mechanism for the project borrowers experiencing cost escalation for the budget component of the project in foreign exchange at the time of a taka depreciation.

5.9 We do not think it will be safe to go to a Free Float Exchange Rate until and unless there is a usable foreign exchange reserve (IMF definition) of five months. There can be a review of the matter when reserves rise to a level of $35 billion.

5.10 On the most immediately urgent problem of persistent high inflation, it is advisable to slow down on mere threats to the abnormal profit / economic rent seeking traders and to take some concrete actions described as under:

a) In 1972 creating TCB with 2000 or so employees, Bangabandhu Government built up a public sector buffer stock of essentials and issued these at very very low price through the newly set up Consumers Supplies Corporation (COSCOR), Statutory Rationing and Modified Rationing until the high inflation (global price levels were extremely high) started moderating. In 1998 after the long-standing devastating flood, Prime Minister Sheikh Hasina's statesman like guidelines were implemented by the Finance Minister SAMS Kibria assisted by the Agriculture Minister, Agriculture Secretary and the Governor Bangladesh Bank in feeding 15 million flood affected food starved through VGD+VGF programmes for 09 (nine) months from a 10 lakh ton foodgrains buffer stock that had been built up for the purpose. During 1998-2001, inflation averaged 2.8% and in 2000-01, it actually came down to 1.7%. GOB may build up a big buffer stock of rice + wheat, edible oil, sugar and onion and multiply the ongoing open market operations at least ten times for 3 / 4 months. This rather than rhetorics will force the hoarders to sell their illegal stock for the scare of price crash. The hoarders have to be dealt with under their nasty mechanism.

b) Number of licensees of these and other essential commodities may be enlarged at least 10 times so that no cartel is formed. This will also prevent the benefit of import duty reduction flowing to the hoarders themselves.

c) Formation of Grower cum Marketing cooperatives in Gram Bangla with access to easy concessional credit at 3% or so interest rate and to the GOB godowns (capacity may be increased to 3 million tons from the present 2.2 million tons). This will enable the growers to buy their own surplus during the harvesting seasons, storing these in GOB Godowns and selling the stocks throughout the year at stable and reasonable prices for the growers and the consumers to benefit simultaneously. In the medium term of two years, this cooperative system vigorously advocated by the Father of the Nation can be a permanent frillwork against the middlemen hoarders.

d) Much has been written and stated on the grave situation for the deterioration default loan and interest accumulation waivers. The government remains unconvinced. Net result amongst other things, is a liquidity crunch in the scheduled banks as the natural process of revolving credits is hindered by portions shunted out by repeated defaulters and interest waivers (often arbitrary and very little record or recovery). It is time that the government think about the grave consequences and act upon to firmly put an end to the default culture as was successfully done in the second half of the 1990s.

e) Long term credit giving unposed in the early 1990s on the scheduled banks (due to unwise advise of a multilateral development partner) should be eased out over time. Interest waivers are fraught with moral hazard and should better be discontinued.

f) A financial reforms commission may be set with appropriately high power to analyze the issues in the banking insurance revenue and expenditure sectors and the interrelationships therein. The recommendations to be received in a year or so should be considered seriously as long-term remedies ailing the vital sector.

g) Like in other South Asian countries a price commission must be set up to (i) collect contemporary global price range of all goods and services procured under public funds and (ii) enforce bids and auctions to be within these ranges.

h) It is high time, Bangladesh restores its financial year to January-December. There is absolutely no reason in support of the July-June year facilitating pilferage of 'REPAIRS' done in a hurry in April-June rains and river erosion.

i) In consultation with Wulama-e kerama, a 32 hour work week Monday-Friday (half day 8:00am-12.30pm) in conformity with international practice.

6. Bangladesh Bank Reforms

a. This is time to consider a gubernatorial appointment from within.

b. In the last one and a half decade, the size of the economy the bank deposits and bank advances has doubled without a numerical increase in the bank. Thus there is a need to increase the number of ADs and DDs and escalate their capacity.

c. Since the general manager have been renamed as Director, it may sound more reasonable to designate the Bangladesh Bank Board Directors as BB MEMBERS.

d. When would the government deem it fit to categorize the government position as a Statutory one. Until that time, should we not have a one term six years tenure or the Governor. Do we expect the government to once again allow a separate pay scale for Bangladesh Bank employees whose work is uniquely different than others. This will take only a small fraction of the annual project of the central bank.

e. Remembering that the foreign exchange reserves are the property of the people of Bangladesh, GOB and BB are only custodians/ manager, utmost care will have been taken in allowing project funding under the reserves resources if at all.

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The Service Climate and Organizational Performance Using Balanced Scorecard Approach: Implications for Banks

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- Abu Rashed Osman[**]
- Ashraf Al Mamun, Ph.D.[***]

Abstract

The purpose of the study is to investigate how organizational performance, primarily in the banking services industry, is impacted by the service climate. To achieve the objective, a sample of 308 respondents' replies was used to test the hypotheses. All of the respondents were at the mid to senior level executives of both private and public sector banks in Bangladesh. The data were analyzed using T-tests, ANOVA, and multiple regression. The findings revealed a statistically significant link between organizational performance and Work Facilitation (WF), managerial support, and Customer Orientation (CO). Because the beta value is 0.68 at a p 0.001 level, the Customer Orientation (CO) is highly important. Three aspects of the service atmosphere were simultaneously combined into this study to assess Bangladesh's banking performance. The study's findings will aid bank management in realizing the value of the service climate in improving the performance of banking services. Management should carefully nurture the work facilitation, managerial support, and customer orientation variables because they reveal a statistically significant impact on organizational performance.

Keywords: Service Climate, Organizational Performance, Balanced Scorecard
JEL Classification: M10, M49

1. Introduction

In the advent of rising global competition, business organizations are continuously trying to cope with the customers' changing expectations level. It may be difficult for the organizations to sustain if they fail to respond to customers' expectations. Considering this, Prajogo, Toy, Bhattacharya, and Cheng (2018) opined that each organization should devotedly focus on their performance as it permits a company to achieve its financial and market-oriented goals which is a very crucial measure for long-term sustainability.

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According to Singh, Darwish, and Potocnik (2016), organizational performance is defined as progress made by the organization through high yield and notable development. Organizations are constantly seeking for innovative ways to increase their productivity and gain market supremacy (Chen, 2005). According to Mandy (2009), performance is the result of implementing an well-organized management process. Greenberg (2011) viewed that performance is a combination of both monetary and non-monetary measures. Similar to this, financial indicators—which are linked to rising sales, investment, and profit—were stressed by Hilman and Abubakar (2017). Numerous constructs have been examined in a variety of domains, including human resource management, intellectual capital, human resource practices, leadership styles, information technology and innovation, overall quality management, organizational functions, and others.

Plenty of investigations were carried out in numerous nations, but recent developments have indicated that there is a clear lack of studies in this area that have demonstrated a direct relationship between the dimensions of service climate and organizational performance from multiple angles. Briggs, Deretti and Kato (2020) studied on service orientation and retail business performance, some study focused on organizational climate and employee performance (Kassem, Wahba & Khourshed, 2021; Lalu, Lalu Rosi & Hermanto, 2021; Pradoto, Haryono, & Wahyuningsih, 2022; Quansah, Cobbinah & Danso, 2020). Study on Mutonyi, Slatten and Lien (2020) emphasized on organizational climate and creative performance in the public sector. Obeng, et al. (2021) observes the organizational climate and job performance. Other study also focused on the organizational climate and the performance of educational institute (Rahmat, et, al., 2020). However, study on service climate and banks performace are mostly overlooked by the researchers. Therefore, the service environment and organizational performance in the context of Bangladeshi financial services is clarified by this study.

This study's integration of the "Balanced Score Card (BSC)" method, which includes monetary and non-monetary components of organizational performance, is another important strength. This method was developed by Kaplan and Norton

in 1992. The Balanced Scorecard (BSC), a strategic performance-management instrument that established major organizational objectives for organizations' priorities (Ferreira 2017), played an important role in this process. Numerous renowned companies began to use the BSC after discovering that it helped them improve performance by uniting all members of the organization in a common effort to achieve the company's overall goals and objectives (Yancy, 2017).

More competition encourages enterprises to play a substantial role in terms of production efficiency, customer retention and better product quality, (Khan et al. 2010a). Hence, any organizations should also use non-monetary dimensions along with other several performance measurement techniques like BSC to capture these elements. Karathanos and Karathanos (2005) revealed that BSC is a widespread tool applied by different organizations to measure their financial and non-financial performance in several aspects. The BSC was created to break organizations' reliance on financial performance indicators alone to measure their performance (Hussein, Mazen, and Thierry, 2012). It emphasized on the notion that managers should use both monetary and operational measures; as a result, four perspectives were identified as future determinants of overall business performance including customer viewpoint, internal process perspective, financial outlook and learning & growth dimension.

Based on the contextual background, the study aims to examine the influence of the service climate's magnitudes on organizational performance from the perspective of banking services in Bangladesh. The remainder of the paper is proceeds with literature review, methodology, results and analysis, implications, limitations, recommendations and conclusion.

2. Literature Review

2.1 Service Climate

Organizational climate serves as a device for management to understand the overall sagacity of service excellence and output in order to attract and retain talented human resources (Pradoto, Haryono & Wahyuningsih, 2022). This common topic in service marketing works in a sense that firms should create and maintain an environment that encourages employees to efficiently give

exceptional services (He et al., 2011). According to Lovelock (2001), various quality efforts were undertaken, however the majority of them failed due to their objectives. As a result, arguments convey the idea that quality initiatives that lack a thorough understanding of an organization's climate are doomed to fail. Schneider *et al.* (1994) stressed that organizations are required to be aware of three distinct styles of organizational atmosphere so as to create a positive image of quality enhancement efforts: *an environment for service, an environment for innovation, and an environment for workers' welfare*. Furthermore, a good organizational climate for service, according to Davidson (2003), provided the best possible setting for quality service to be delivered. Schneider, White, and Paul (1998) claimed that the service climate is dependent on an appropriate context in which it may be created. Employees in such an environment are well-trained, have the apparatuses they need to perform their jobs, have the scope to engage in decisions making process that affect how they complete their tasks, and obtain the service and support they desire from other associates of the organization in order to provide excellent customer service.

2.2 Organizational Performance

One of the most important management tasks is evaluating organizational performance because it serves as a prerequisite for evaluating the business's ongoing improvement (Kurdi, & Alshurideh, 2020). Many firms are using a variety of strategies to measure their organizational performance by realizing the importance of performance evaluation (Fernandes et al., 2006). Organizations that evaluated performance solely emphasizing on financial measures between 1850 and 1975 have come under fire for encouraging a short-term outlook, lacking a strategic focus, being unable to obtain data for qualitative issues, openness, and flexibility, which encourages a positive dimension, and failing to identify what customers desire and the caliber of competitors' performance. The four BSC characteristics have been chosen as a foundation for analyzing organizational performance in this study because of how inclusive it is for evaluating performance and how often it is used to strategic management issues. According to a logical set of performance standards, BSC provides managers with a comprehensive outline for changing the business strategy (Kaplan and Norton,

1992; Rafiq et, al. 2020). Due to its financial and non-financial features to cover a wide variety of actual performance indicators, Yasin et al. (2004) fully approved the usage of BSC for measuring organizational performance. The effectiveness of the banking services is assessed in this study by means of four BSC aspects: financial viewpoint, customer viewpoint, internal process perspective, and learning & growth perspective.

2.3 Service Climate and Organizational Performance

Employees' perceptions of the organization's rules, procedures, and management behavior defined the service climate. As a result, organization employees recognize the value of service quality and prefer to provide high-performance service. According to research findings (Jianhua & Yongqiang, 2010), organizational environment has a noteworthy impact on employee performance, team performance, and business performance. The business performance is significantly impacted by the service climate, as Jiang, Hu, Hong, Liao, and Liu (2016) empirically demonstrated. According to Aysen (2018), there is a strong correlation between perceived organizational performance and organizational atmosphere. To the best of our knowledge, there aren't many books that discuss dimension-wise inquiry. Therefore, future researchers would unquestionably find this type of study to be a helpful resource for validating organizational effectiveness. Study done by Nunes, Martins and Mozzicafreddo (2018) also found a strong positive relationship between organizational performance and service climate for the public organization.

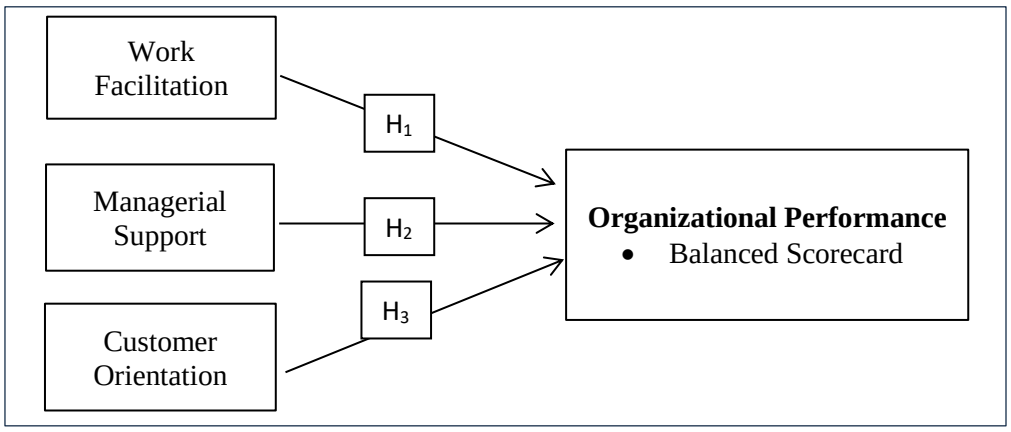
2.4 Theoretical Underpinnings and Framework

Stakeholder theory, which contends that managers should alter their policies in order to appease various stakeholders, is the foundation of the conceptual framework for this attempt. According to the thesis, an organization achieves success when it has satisfied all of its stakeholders (Freeman, 1984). Two categories of stakeholders, such as employees and customers, have received special attention in this conceptual model. The goal of the stakeholder theory is to improve interactions with stakeholders and raise overall organizational performance. In every way, it is essential. In all productions, increasing

shareholder value will strengthen the firm. Stakeholder theory asserts that an organization is virtually successful when it provides value to its stakeholders, which can manifest in a variety of ways other than financial gains (Freeman, 1984). Furthermore, Jones (1995) claimed that businesses engage in frequent interactions with stakeholders based on trust and collaboration in order to motivate employees to act ethically, as such behavior benefits businesses.

Based on the literature mentioned in the paper, this study highlighted service atmosphere and its three dimensions as one of the most significant factors affecting organizational success since they offer value for stakeholders. Figure 1 illustrates the conceptual framework of organizational performance with several service climate dimensions.

Figure 1: Service Climate and Organizational Performance Service Climate



2.5 Research Hypotheses

The study's conceptual framework and literature review demand an inevitable link between various service climate variables and organizational performance. Based on these backgrounds, the following hypotheses are established:

H1: Work facilitation is positively connected to organizational performance.
H2: Managerial support is positively connected to organizational performance.
H3: Customer orientation is positively connected to organizational performance.

3. Methodology

This study examines the association between service climate and organizational performance specially for the banking sector in Bangladesh. In this study, service climate is defined through three dimensions such as work facilitation, managerial support, and customer orientation. On the other hand, organizational performance is measured through the dimensions of a balanced scorecard. financial performance, customer perspective, internal process perspective, and learning and growth perspective are all used to measure organizational performance. The four components in the financial perspective were taken from Kaplan and Norton (1992) and Chan (2004), respectively. Chan (2004), Fuentes-Fuentes (2004), Kanji (2002), and Kaplan and Norton (1996) were all used as sources for the four items that make up customer focus. Chan (2004), Fuentes-Fuentes (2002), Kaplan and Norton (1996), and Weerakoon (1996) were used as inspiration for the internal process, which consisted of four things. Chan (2004), Fuentes-Fuentes (2002), Kanji (2002), and Kaplan and Norton (1996) were all used as inspiration for the four components in the learning and growth category. According to reliability analysis, this instrument's Cronbach's alpha coefficients for several aspects of service climate and organizational performance, which were thought to be reliable, ranged from 0.819 to 0.922 (Hair et al., 2010).

The unit of analysis was the bank officials who has at least 5 years or more banking experiences. Responses were collected from 39 commercial banks. To generalize the study objective, both male and female bankers were surveyed from public and private sector banks in Bangladesh. To collect primary data, a well-organized survey questionnaire was deployed to gather the intended information from the respondents using the purposive sampling technique. The questionnaire is comprised of two sections, demographic attributes and service climate and organizational performance. A 5-point Likert Scale affixed by "strongly disagree" to "strongly agree" was used for measuring the responses.

The questionnaires were delivered randomly to 400 bank employees at Bangladesh Institute of Bank Management located in Dhaka, where mid to senior level bank executives enroll for formal banking training. A total of 314

questionnaires were received, and it was discovered that 6 questionnaires had missing values. Finally, a total of 308 samples were approved for statistical analysis. Each participant was given a brief explanation of the goal of the questionnaire before beginning to fill it out. To complete the questionnaire accurately, relevant instructions were included on the questionnaire as a precaution. Regression, ANOVA, and T-Test were performed to analyze the data using the SPSS program.

4. Results and Analysis

Demographic Profile of Respondent and Normality Assessment

In the 308 respondents, there were 77.6% men and 22.4% women. Of the respondents, 11.36% (35) were main officers, 33.76% (104) senior officers, 7.79% (24) AVPs, and 47.07% (145) were officers. In this study, samples from public banks made up 40.9% (126) and samples from private banks made up 59.1% (182). The highest mean related with managerial support was shown in Table 1. In comparison to other criteria, respondents' perception of this factor is high. Skewness and kurtosis were used to show how to determine normality. According to Geotge and Mallery (2010), skewness and kurtosis must have values between -1 and +1 and -2 and +2, respectively in order to show a normal distribution.

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
WF	308	1.00	5	3.2541	0.9333	-0.355	-0.564
MS	308	1.25	5	3.3734	0.9682	-0.176	-0.798
CO	308	1.17	5	3.2911	0.9964	-0.417	-0.777
org. Performance	308	1.50	5	3.2108	0.8990	-0.326	-0.943

4.1 Reliability and Validity

All of the variables were subjected to a reliability study using Cronbach's alpha. According to Sekaran (2010), it evaluates the internal consistency of respondents' responses to all of the items in a measure. Cronbach's alpha has a lower limit of 0.70 and can be reduced to 0.60 for exploratory study, according to Hair et al. (2010). As a result, a Cronbach's alpha value of 0.60 or above accurately reflected internal consistency (Table-2). Convergent validity can be evaluated using AVE (average variance extracted) to ascertain concept validity. Reliable variables may only account for less than 50% of the explained variance (AVE), according to Fornell and Larcker's 1981 hypothesis. Validity has been verified.

Table 2: Reliability and Validity

Latent Variables	Factor Loadings	Cronbach's Alpha	AVE
SF	0.661-0.740	0.819	0.49
MS	0.680-0.768	0.850	0.52
CO	0.746-0.818	0.922	0.61
FIN	0.667-0.835	0.857	0.61
CUS	0.737-0.834	0.888	0.63
INP	0.737-0.776	0.860	0.57
LG	0.718-0.839	0.887	0.59

4.2 Gender Impact on Performance

The mean difference between male and female respondents on organizational effectiveness is evaluated using a T-test (Table-3). The t-test result indicates that there is no significant difference in the mean answer between the two groups.

Table 3: Independent Sample T-Test

Group	Mean	Mean Difference	Significant
Male	3.1851	0.1147	0.279^{NS}
Female	3.2998		

Note: NS=Not significant at $p < 0.05$ level

Table 4: Correlation Matrix

	WF	MS	CO	FIN	CUS	INP	LG
WF	1.00						
MS	0.846**	1.00					
CO	0.806**	0.829**	1.00				
FIN	0.727**	0.770**	0.828**	1.00			
CUS	0.775**	0.746**	0.846**	0.864**	1.00		
INP	0.726**	0.733**	0.781**	0.827**	0.809**	1.00	
LG	0.681**	0.691**	0.691**	0.834**	0.848**	0.833**	1.00

**Significant at p value < 0.001 level

Table-5 shows that, with an adjusted R^2 of 0.786, Work Facilitation (WF), Management Support (MS), and Customer Orientation (CO) account for 78.6% of the variation. As a result, these factors are more important in defining organizational performance. The correlation coefficient (R) between the independent variables (WF, MS, and CO) and the dependent variable (organizational performance) is 0.890, indicating a significant and positive correlation.

Table 5: Model Summary of Regression Analysis

Model	R	R-Square	Adjusted Square
1	0.890	0.792	0.786

Table-6 shows the value of F is 376.64 and it is significant at p value 1.000, which means that all predictors are truly predicting organizational performance. Thus the selection of independent variables (WF, MS, and CO) in this study is fairly reasonable.

Table 6: ANOVA[b]

Model	Sum of Square	Df	Mean Square	F	Sig.
1 Regression	195.53	3	65.18	376.64	0.000[a]
Residual	52.61	304	0.17		
Total	248.13	307			

Notes: a Predictors: WF, MS, CO b. Dependent Variable: Org. Performance

The beta values of WF (0.145), MS (0.098), and CO (0.680) are shown in Table-7, and all three are statistically significant at p values of 0.05, 0.10, and 0.001, respectively. As a result, the study provides evidence in favor of hypotheses H1, H2, and H3. Typically, a variable's influence on a dependent variable is inversely correlated with its value. In this instance, among the independent variables, Customer Orientation (CO) has demonstrated the highest value, followed by Work Facilitation (WF). As a result, in the context of Bangladesh bank services, managerial support should not be neglected while giving top emphasis to client orientation.

Table 7: Coefficients[a]

Model	Unstandardized Coefficients	Standardized Coefficients		T	Sig.
	B	Std. Error	Beta		
1 (constant)	0.427	0.096		4.75	0.000
WF	0.141	0.051	0.146	2.766	0.006**
MS	0.091	0.052	0.098	1.751	0.081*
CO	0.613	0.045	0.680	13.494	0.000***

Note: *=significant at p<0.10, **= significant at p<0.05 and ***=significant at p<0.0001 level. a. Dependent Variable: Org. Performance

5. Implications

Work facilitation and customer focus are two recommended criteria for enhancing organizational performance, and this study further defines these concepts in the context of academic research. The study makes a substantial theoretical advance by convincingly showing how the service atmosphere affects organizational performance. This discovery might in some ways add to the body of literature already in existence. Alternatively speaking, the results of this study may support bank managers, officers, other policy makers, and policy execution authorities in ensuring appropriate and satisfactory assessment of work facilitation, managerial support, and customer focus with prompt responses that can result in greater performance for the organization.

6. Limitations

Every study contains certain flaws, and the current study is no exception. This is a regular occurrence. First, the study gathered cross-sectional data from Bangladeshi financial services, which cannot in any way be generalized. As a result, there is still room for more research in other sectors. Furthermore, the responders were executives. Non-executive personnel were simply and knowingly eliminated. As a result, it is still uncertain if the conclusions can be generalized. The possibility of measuring inaccuracies exists, too. The tool relied solely on self-reports and respondents' perceptions, and the study entirely focused on those perceptions. This might have caused some perceptual exaggeration in the self-evaluation results.

7. Recommendations and Conclusion

This study set out to investigate how service climate affects organizational performance. Three hypotheses based on three aspects of the service climate were explored in order to verify this. Importantly, findings show that Work Facilitation (WF), Managerial Support (MS), and Customer Orientation (CO) all statistically influence organizational performance, and all three hypotheses are statistically significant. Therefore, from a banking services perspective, we firmly believe that work facilitation, managerial assistance, and customer orientation are all

desired components for boosting organizational performance. Customer Orientation (CO) is, however, highly important in this instance because the beta value is 0.68 at the p 0.001 level. In order to improve organizational performance, client orientation should be handled with great care. The conceptual model of this study can be validated by additional research that is conducted concurrently with industry in different parts of the world. The present literature would benefit from more accurate findings.

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Value Relevance for Nonfinancial along with Financial Information: A Study of Selected Listed Companies of Bangladesh

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Abstract

The purposes of this study are to observe the status of disclosing nonfinancial information in corporate annual reports of Bangladesh, to test any need for disclosing more such information and to substantiate value relevance for disclosing nonfinancial along with financial inform ation disclosures. To assess information disclosures, researcher constructed index for nonfinancial information materials has been used in this study. Content analysis of corporate annual reports has been adopted for the quantification of information disclosures. Besides, a regression model has been applied for examination of value relevance for nonfinancial along with financial information. It has been proved by this research that Bangladeshi listed companies can have positive impact on share price by disclosing more nonfinancial along with financial information in their annual reports. The support of this study for the inclusion of nonfinancial with financial information for assessing share price can be an important contribution to the corporate theoretical share valuation concept.

Keywords: Corporate Disclosures, Nonfinancial Information, Value Relevance
JEL Classification: C12, C31, M14

1. Introduction

There are various interpretations to the value relevance for corporate information disclosures. The interpretation means that value relevance is counted in terms of news, and that value relevant information alters stock prices as it causes investors to adjust their anticipations. The apparent significance to investors of financial information motivates at least certain portion of disclosure action that expects disclosures of financial information itself. This understanding does not demand that financial statement be the primitive basis of information. It is reliable with the value relevance of financial information skimming from the financial statements. The prior studies relating to alterations of value relevance throughout times add to perceiving whether the current

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financial reporting models are sufficient to show the company performance in the present technologically developed business environment.

The value relevance model, used in prior researches, illustrates the firm value as a linear function of financial information including earnings, book value and additional information releases. Financial information refers to the information relating to company accounts. Reporting financial information only in the annual report does not offer investor the firm's future valuation and the ability to know its prospects and dangers. Nonfinancial information (NFI), since associated with financial information, can offer precious understanding into the aggregate nature of management, an important alternative in the evaluation of corporate financial forecasts. Nonfinancial Information can be defined as " … Non-financial information belonging to the narrative part of any annual report are an addition to the financial information and disclosed voluntarily for serving better interests of the stakeholders of a company" (Islam and Saleem, 2014: p.310). To fortify financial information supplied by corporate traditional accounting, nonfinancial information reporting offers information that assists in putting historic performance into one setting and representing prospects as well as dangers for the firm in future. Though, lots of theoretical discussions in previous researches indicate the value relevance of financial or nonfinancial information, there is hardly any prior study that added a variable for nonfinancial taking place of the same for additional information to the value relevance model for financial information. Therefore, this study has taken an attempt to examine the worth of releasing nonfinancial along with financial information in the annual reports of listed companies of Bangladesh by using a modified value relevance model.

2. Objectives of the Research

The objectives of this research are:

i. developing an index containing different categories of nonfinancial information (NFI);
ii. observing the extent of disclosed NFI in the company annual reports of Bangladesh;

iii. examining the need for disclosing more NFI in corporate reporting of Bangladesh; and

iv. inspecting any value relevance of reporting NFI along with financial information.

3. Literature Review

From the study of Ball and Brown (1968), researchers have engendered several works evidencing a relation between earnings and share returns of a company. Later, research on value relevance of financial information has been extended to include measures of both income statement and balance sheet using Ohlson's (1995) approach (Chen et al., 2001). Most of studies of the United States outline value relevance as the capacity of financial extents to include materials that mark company value. Having this meaning, researchers constantly count value relevance as the link between financial measures and share price (Hung, 2001). Stock return is the most vital one in evaluating the financial performance of a company. Any positive sock return in a fiscal year refers to an increase in the wealth of stockholders. Increasing the wealth of stockholders is considered to be the main objective of a business unit; such a unit needs to run its business in a way that increases the wealth of stockholders by gaining suitable return.

James A. Ohlson had a notable contribution to assess the value relevance of financial information by bringing out a stringent valuation approach. Ohlson (1995) developed and studied the model of share price as firm's equity value that relates to the income statement item of earning and the balance sheet item of book value. Furthermore, Ohlson declared that the valuation approach gratifies many pleasing aspects and offers a valuable standard when an individual conceptualizes how market value links to financial data and additional information.

Ohlson's value relevance model (1995) – per share basis

$$P_{it+1} = \alpha_0 + \alpha_1 E_{it} + \alpha_2 BV_{it} + \alpha_3 V_t$$

P_{it+1} : Share Price of firm i, at date later than t

α_0 : Intercept

E_i : Earning Per Share for the period completing date of t of company i

BV_{it} : Book value Per Share of company i at date t

V_t : Additional information at date t

Chen et al. (2001) addressed a research question of whether financial information is value relevant to local share market. By following many studies on value relevance, they used the Ohlson's (1995) model. Findings of the research proved that financial information is observed as value relevant by the investors in China. The research deduces that the financial information as found in the income statement and the balance sheet is value relevant to local investors in the Chinese stock market. Their used value relevant model unveils that both earning and book value per share are value relevant for measuring share price of a company. Ibrahim et al. (2009) testified that financial information had a significant role in the valuation of Malaysian companies even in a period of financial crisis. Their findings advocate that earnings and book value cover maximum information that is pertinent to measure the company financial information. Again, they enunciate that coefficient for other than financial i.e., additional information is more valued during the financial crisis compared to after the financial crisis.

Value relevance is considered mainly with respects to the expounding power of traditional financial variables for stock returns. Unfortunately, this traditional value relevance concept has had only inadequate practical implications because of the emerging need for nonfinancial information disclosure in corporate reporting. For example, Chan, Martin and Kensinger (1990) as well as Chauvin and Hirschey (1993) found positive valuation impact of research and development (R&D) costs for a wide sample of companies. Likewise, Lev and Sougiannis (1996) estimated R&D investment for a big sample of companies, and found that such assessments are value relevant to potential investors. Positive effects of R&D cost declarations on share market returns had also been reported by Sundaram, John and John (1996), amongst others.

Corporate legitimacy theory is broadly used to recognize the motivations behind voluntary environmental and societal reporting (Brown and Deegan, 1998; Deegan and Rankin, 1996; Deegan, 2002; Deegan, Rankin and Tobin, 2002; Gray et al., 1995; Guthrie and Parker, 1989; Mathews, 1993; Milne and Patten, 2002). Noticeably, the release of social information turns into a reaction to environmental factors (Preston and Post, 1975). Further, varying social values and norms create incentive for organizational change and generate a basis for force of company legitimization (Dowling and Pfeffer, 1975). While majority of the empirical literatures presents evidence to advocate that a certain incidence is tracked by the variations in the level of environmental or societal information, most academic literature emphases on clarifying that companies disclosing environmental or societal information to legitimize their behaviors to the society as a whole and to ascertain compliance with what is supposed to be publicly acceptable. In such perspective, the release of nonfinancial (like R&D, environmental and societal) information appears to be an evident way for companies to supply information on their actions to legitimize their behaviors.

Brown et al. (1999) documented an enduring reduction in the importance of financial information as a significant factor of the market value of a company. They found that there had been an intense fall in the value relevance of financial information during the period of post-World War II. This and allied outcomes have provided a rising concern amongst both experts and researchers that company financial statements have missed a major part of their significance for investors (Francis and Schipper, 1999). Their study has effects for those who are more thoughtful about reporting a model for the financial information. Their objective was to examine and explain some of the experimental inferences of the assertion that financial statement information has missed out its importance with time. Results specify that for some financial statement items there has statistically been an important fall in value relevance. The proof of dropped value relevance of financial information over time, like finding of the study conducted by Goodwin and Ahmad (2006), advocates that those conventional financial statements do not sufficiently reproduce the actual value building business activities with technological improvements. Furthermore, downfall to identifying the common intangible assets produced inside the companies may

cause value relevance to decline. Literature related to financial reporting discloses that firms progressively rely more on additional or deliberate disclosure than mere accounting figures for reporting intangible asset information. Muhammad and Ali (2010) supplied proof that the improved level of voluntary disclosures of private entities are paid with advanced valuations by the market of Jordanian listed firms over a 9-year period, 1996-2004.

Although the early studies evidenced the accounting figures are value relevant, the worth of financial information in the recent market is suspicious. Accounting academics have usually assessed the utilities of accounting exercises by the level of their accord with a specific diagnostic model. The value relevance to investors of financial information of autonomous cellular firms was inspected by Amir and Lev (1996). They found that financial information alone is not mostly relevant for the valuation of cellular firms. Conversely, when joint with nonfinancial like intangible asset information, those variables do participate much to the manifestation of firm valuation. This outcome exhibits the complementarities between nonfinancial and financial information. Additionally, the outcome informed that the value relevance of other than financial i.e., nonfinancial information overcomes that of customary financial signs. Orens and Lybaert (2015) uttered that the drop in the significance of financial statement information to weigh companies leads to demands from corporate stakeholders to communicate nonfinancial information for the purpose of being capable for ascertaining companies' financial performances. Accordingly, Krištofik et al. (2016) reported in their study that CSR (a category of non-financial information materials) reporting is growing significantly in Asia, 25.6% in 2012 and 23.1% in 2010 of the surveyed organizations. However, the outcome of the research of Belenesi et al. (2021) addressed that there is a sluggish but stable growth of Romanian companies in reporting and revealing some of the nonfinancial information materials.

The prior researches pointed out value relevance of some (alike company governance, research & development, intangible asset, environmental and societal, CSR) of the nonfinancial information materials without covering other emerging items like company strategy and forward-thinking information. The

complete findings of the previous researches pertinent to value relevance of financial information do not offer clean proof that the financial information is only value relevant in all market settings. Though, the balancing between financial and nonfinancial information delivers sufficient proof that the corporate reporting model should be composed of both financial as well as nonfinancial information.

4. Research Scope

4.1 Scope for Developing Nonfinancial Information (NFI) Index

Bangladesh has own standards for reporting corporate information particularly on financial and governance issues. However, no complete standard or set of guidelines have been provided by any professional body or standard setting institution for reporting maximum number of nonfinancial information materials. Most of the international professional bodies and the regulatory bodies of Bangladesh are more concerned about financial as well as some of nonfinancial information including company governance, social responsibility, R&D, and environmental categories. Further, they only demonstrated the major categories without mentioning quality items under each category of nonfinancial information. Even categories of nonfinancial information are scattered in different studies rather clustered in one specific study. So, it is needed to integrate all relevant nonfinancial materials suggested by prior studies and the guidelines of professional as well as regulatory bodies. Hence, there is a scope to develop an index by incorporating maximum number of nonfinancial appropriate items in one place and then assorting them under their major categories.

4.2 Scope for Examining the Extent of NFI Disclosed

Literature review shows the evidence that disclosing more relevant nonfinancial information is an incentive to the companies. From the discussion of such review, it has also been found that some studies regarding the investigation for extent of disclosing some categories of nonfinancial information have been conducted on developed countries. A very few research

concerning even the same has been done on developing countries. Thus, a scope of research can be found to observe the extent of disclosing nonfinancial information materials by the companies of a developing country like Bangladesh.

4.3 Scope for Testing the Necessity of Disclosing More NFI

Prior literatures related to corporate information reporting reveal that companies increasingly depend on more disclosures than only on traditional financial information. Almost very few researches were conducted for testing the need for disclosing more nonfinancial information in corporate annual reports. Thus, a scope for testing such need has been developed.

4.4 Scope for Testing the Value Relevance of NFI Disclosure

Most of the prior researchers focused on value relevance of financial information (book value and/or earning per share). There were minor discussions in the prior literatures for the value relevance of nonfinancial along with financial information disclosures. So, there is a space in prior literatures mainly in examining the value relevance of nonfinancial along with financial information disclosures. This exposure is important for rethinking the value relevance model including nonfinancial items along with financial information. Hence, this study intends to examine whether the disclosure of nonfinancial information along with financial information has an influence on determining corporate share prices.

5. Research Methodology and Hypotheses

The research of this study includes developing an index for relevant nonfinancial information disclosures, observing the extent of corporate nonfinancial information disclosures, examining the need for disclosing more nonfinancial information in the corporate annual reports as well as inspecting value relevance for disclosing such information along with financial information.

5.1 Methodology for Observing Information Disclosures

In this study, contents of the corporate annual reports have been studied for finding out the extent of disclosures of an index for relevant nonfinancial information items. Then, nonfinancial information disclosures have been identified and then quantified in this research.

5.1.1 Index Methodology

In developing an index for nonfinancial information items, the researcher investigated the directions of different professional bodies like AccountAbility (2018), BEIS [Business, Energy & Industrial Strategy] (2020), GRI [Global Reporting Initiative] (2022). The overall framework for disclosing corporate information in Bangladesh was also examined as reporting environment of Bangladesh is the context of this research. There is hardly a settled theory on the selection and the number of information materials to incorporate in a corporate disclosure index (Wallace et al., 1994). In the researcher-constructed index, different categories of nonfinancial information materials were identified by reviewing prior literatures. Afterward, relevant information items were incorporated under each of such categories. This study has adopted narrow approach by focusing on only nonfinancial information but detailed approach while incorporating various categories of such information into an index. In this study, the researcher has developed an index to determine the extent of corporate nonfinancial information disclosures.

5.1.2 Content Analysis Research Method

Content analysis is a procedure that comprises of classifying qualitative information in subjective form into groups in order to develop quantitative measures of changing levels of difficulty (Abbott and Monsen, 1979). Many researchers employed content analysis method to examine the level of information disclosures in the corporate annual reports (Inchausti, 1997). This study has used content analysis so as to fold experiential evidence on the extent of nonfinancial information revealed by the Bangladeshi listed companies.

5.1.3 Population and Sample for Content Analysis

The population for content analysis of annual reports of this study includes all listed companies of Bangladesh. The Dhaka Stock Exchange (DSE), situated in Bangladesh, has been chosen as sample area to collect sample of this research. The DSE is the major one between two stock exchanges in Bangladesh. Hence, it can be demanded that sample taken from the DSE be representative of the whole population. The sample companies of this study are chosen from the corporate entities listed at DSE under eight industries namely: banks, engineering, non-banking financial institutions, food & allied, fuel & power, insurance, pharmaceuticals & chemicals and textile. The industries having less than 10 companies have been regarded as small sectors. Therefore, those have been discarded in collecting sample companies. More samples are selected from financial sectors including banks, insurance and non-banking financial institutions. These types of firms are financially rich in nature and donate more in corporate social responsibility activities. Consequently, they are expected to disclose such type of nonfinancial information in their annual reports. The number of corporate entities in the population and the corresponding sample (under each of the industries) are presented in the Table-1 below:

Table 1: Population and Sample for Content Analysis

Selected Industry Sectors	Population Number of Corporate Entities Listed up to June 2020	Sample Number of Corporate Entities
Bank	33	26
Engineering	42	10
Non-banking Financial Institutions	23	15
Food and Allied	21	4
Fuel and Power	23	6
Insurance	53	23
Pharmaceuticals and Chemicals	32	5
Textile	58	12
Total	**285**	**101**

Source: Sample size for corporate data survey (2020-2021)

When forming a sample size of 101 companies for testing different hypotheses of this study, the companies having outliers of data variables for

regression were eliminated initially to get statistically significant normally distributed curve. An outlier is a look that stays an unusual away from other points in a random sample from a population which alter database statement.

In addition, firms listed primary at the first time in the period of 2020-2021 are omitted as newly listed ones may quiet be emerging their information release exercise, same with the study of Leventis and Weetman (2004). Furthermore, firms delivered partial annual reports are discarded. Lastly, firms with shares traded infrequently are not considered. Consequently, mere the firms whose shares have been traded actively in the share market are considered for this research. The ultimate sample of the research has reached to its size of 101 companies (around 35% of the population) after selecting them on stratified sampling technique.

5.1.4 Data Collection Source for Content Analysis

For the objective of the content analysis carried out in this study, secondary data source is used. Information release literature has got that the corporate annual reports are identified to be the most vital ways for the firms to spread information to the public (Hines, 1982; Chang and Most, 1981). Hence, the corporate annual reports have been surveyed in this research to determine the levels of nonfinancial information materials released by the Bangladeshi listed firms. These annual reports were gathered through DSE and corporate web-sites.

5.1.5 Data Collection Instrument for Content Analysis

The tool used for gathering secondary data is an investigator constructed index of nonfinancial information. A ground of using the index is that this can be adopted when there is no clear weighting technique available in which case identical weights are given to each information group. To know the level of nonfinancial information disclosed by the companies, the information materials comprised of the index are examined in the annual reports of sample firms. The use of such information release list was also seen in the prior researches (for instance, Singhvi, 1968; Singhvi and Desai, 1971).

5.1.6 Data Period for Content Analysis

The corporate annual reports examined in line of this research are all reports that are publicly made available in the single period of 2020-2021 (the most recent) for each of the 101 listed sample companies. The single period is principally because of the interest of eliminating the challenges of economic fluctuations over multiple periods.

5.1.7 Approach for Scoring Information Disclosures

There is a significant debatable issue in prior studies on the recording of information release materials (Barako, 2007). The issue is whether the information release materials should be weighted or un-weighted. Barako (2007) claims that both the methods have been complained. The weighted method may initiate favoritism towards specific user-position. The un-weighted method settles on the central supposition that all things are similarly weighty, which may not essentially be real. An un-weighted dichotomous method is accepted in this research for the scoring purpose. This was also adopted by the earlier studies (e.g. Cooke, 1989, 1992, 1998; Ahmed and Nicholls, 1994; Hossain et al., 1995; Raffournier, 1995; Wallace and Naser, 1995; Suwaidan and El-Khouri, 2000; Leventis and Weetman, 2004; Suwaidan et al., 2004; Hassan et al., 2006) of corporate information release. Since Cooke (1989) is the foremost to offer the un-weighted method, it is usually denoted to as Cooke index method. Un-weighted method is favored at this is grounded on a supposition that apiece item of information release is uniformly significant, this lessens bias and this supplies an impartial valuation of information items. This method employs a dichotomous technique to form a recording design that ascertains the extent of information release in the annual reports.

5.1.8 Scoring Procedure for Disclosure Score

Using the checklist of selected index for relevant nonfinancial information disclosures, the annual reports of 101 sample firms were examined. A dichotomous technique was applied to mark individually the information release issues. A firm was awarded a mark of “1” if it seems to have released an appropriate information item and of “0” if it doesn’t. Thus, the equation under a

useful way to count any score of a firm for disclosing nonfinancial information is presented below:

Nonfinancial Information (NFI) Disclosure Score = $\sum_{j=1}^{m} d_j$

Where, d = 1 if issue d_j is released
d = 0 if issue d_j is not released
m = the sum of issues really released
n = sum of indexed issues which the firm is anticipated to release
$m \leq n$

The percentage of Nonfinancial Information (NFI) released by each of sample firms is then calculated by employing the below formula:

$$= \frac{\text{Sum of the Score of a Particular Firm for Releasing Nonfinancial Information}}{\text{Highest Possible Score Attainable by an Individual Firm (n)}} \times 100$$

5.2 Methodology for Research Hypotheses

The key research theme of this research is to examine the need for disclosing more nonfinancial information along with financial information in corporate reporting. Both such information are examined.

5.2.1 Hypotheses Development

Based on prior literature investigation, the following two research hypotheses are considered.

The 1st hypothesis: There is a positive connotation between share price and nonfinancial information releases.

The 2nd hypothesis: There is a value relevance of nonfinancial information along with financial information releases.

The justification for developing above hypotheses is that finding out any significant positive effect of disclosing nonfinancial materials on share price would validate the need for disclosing more nonfinancial information in corporate reporting. Also, any statistical significance of modified model [of the model of Ohlson (1995) with incorporating nonfinancial information as additional information] would substantiate the value relevance of nonfinancial information along with financial information disclosures.

5.2.2 Developing Regression Model

The Ohlson (1995) value relevance model (as indicated under literature review) is modified to develop new regression model for testing the above hypotheses.

The *additional information* (symbolized as 'V_t' in the original model) is phased out and replaced with nonfinancial information (NFI) score to form a new model relevant for current study.

Modified regression model (to test the research hypotheses)

$$SP_{it} = \alpha_0 + \alpha_1 EPS_i + \alpha_2 BVS_i + \alpha_3 NFI_i + €_i$$

α_0 : Intercept
SP_{it} : Price of a share of company i, at the date on which the annual report is issued
EPS_i : Earning per share of company i [Net Profit after Tax ÷ Outstanding Shares (OS)]
BVS_i : Book value per share of company i [(Total Assets -Total Liabilities) ÷ OS)]
NFI_i : Total nonfinancial information disclosure score received for company i
$€_i$: Identically and independently disturbed error term

5.2.3 Sample Data for Examining the Value Relevance of NFI Disclosures

The secondary source is applied to collect data for testing the hypotheses formulated for research of this study. The sample companies employed for testing the value relevance are same to that utilized for finding out the level of nonfinancial information disclosures. Further, summarized information regarding data collection methodology for examining the value relevance of nonfinancial information is mentioned below:

Population	: Companies listed at DSE of Bangladesh
Number of selected industries	: 8 out of 18 industries (i.e. about 44%)
Method for selecting sample	: Stratified sampling from selected industries

Sample size	: 101 out of 285 companies (i.e. about 35%)
Sample collection period	: Annual report publication year of 2020-2021

The database relevant to the test for value relevance of nonfinancial information is formed by gathering the following data for each of the sample firms.

- Closing Share Price (SP) at the issue date of annual report
- Earnings Per Share (EPS)
- Book Value per Share (BVS)
- Nonfinancial Information (NFI) score measured by using un-weighted dichotomous approach (score one for disclosed and zero for not disclosed). The total of nonfinancial disclosures is determined by adding the scores given to an individual company for disclosing the items of selected index for nonfinancial information disclosures.

The data are collected from the web sites of the selected companies, the DSE web site and by analyzing the annual reports of the sample companies. A one-year cross sectional sample is employed for minimizing the impact of changes from year to year in economic situations.

6. Data Reporting and Analysis

6.1 Nonfinancial Information (NFI) Index

The researcher of this study has developed an index in order to use for current study. The index enclosed a broad range of nonfinancial information materials that might appear in the corporate annual reports. Relevant to using disclosure index of this study, many prior researches on voluntary disclosure were conducted, especially in the developing countries including China (Yuen et al., 2009), India (Singhvi, 1968), Jordan (Naser et al., 2002), Kenya (Barako et al., 2006), Kuwait (Hossain et al., 1994), Malaysia (Yusoff and Hanefaf, 1995), Mexico (Chow and Wong-Boren, 1987), Nigeria (Wallace, 1988), and

South Africa (Fire and Meth, 1986). The researcher constructed NFI index used in this study has been provided under Appendix-1.

6.2 Status of Nonfinancial Information Disclosures

To get the status of revealing nonfinancial information by Bangladeshi companies, 101 listed companies from 8 different industry sectors were selected for sample as indicated under methodology part of this study.

6.2.1 Nonfinancial Information Disclosure Score

For nonfinancial disclosure score, every item on the checklist of the developed index is given a weight of '1' if it is released and '0' if the same is not released in the annual report of each of the sample companies. In the research of this study, disclosure score for each of the 101 sample companies has been constructed. Then percentage of disclosures is calculated by the physical score given to a specific company as a percentage of highest achievable scores for releasing the materials of the researcher constructed index. Thus, the lowest score for a company can be zero percentage, if such company does not release any information material and the highest can be 100%, if the same releases all the information materials of the index.

6.2.2 Extent of Nonfinancial Information Disclosures

The sample companies' scores for disclosing nonfinancial information are computed in this study. Using the scores, nonfinancial category-wise average disclosure items have been figured out for each of the industry sectors. Afterward, average disclosure percentages have been calculated by measuring the average items disclosed as a percentage of information items under particular nonfinancial category of the researcher constructed index. The calculated such percentages are exhibited in the following table II below:

Table-2: Extent of Disclosures for Nonfinancial Information Categories ***Inner***
(figures show average actual disclosures in percentage)

Nonfinancial Information Categories	***INDUSTRY SECTORS***								***Aggregated Average (%)***
	Bank	**Engg.**	**NFI**	**FP**	**FA**	**Ins.**	**PC**	**Tex.**	
Company Strategy	84	43	57	78	48	70	99	62	67.63
Overall Company Info	83	45	73	59	66	75	84	60	68.13
Company Governance	85	55	84	59	52	80	71	61	68.50
Risk and Trend Info	90	50	78	59	69	78	73	50	68.38
Customer Gratification	49	22	42	73	42	47	80	35	48.75
Supply Chain Info	47	21	39	50	48	54	86	50	49.38
Environmental & Societal	57	17	30	36	11	18	46	13	28.50
Intangible Asset Info	45	30	47	66	51	49	62	44	49.25
Human Capital Info	57	15	46	49	16	32	54	19	36.00
Company's Industry Info	54	35	38	68	42	53	80	54	53.00
Forward-thinking Info	55	33	51	66	51	53	78	36	52.88
Aggregated Average (%)	**64**	**33**	**53**	**60**	**45**	**55**	**74**	**44**	**54%**

Source: *Corporate disclosed (2020-2021) NFI items as a percentage of index items.*
Notes: Some adjustments are done to get round figures in the percentages.
Bank: Banking; Engg.: Engineering; NFI: Non-banking Financial Institutions; FP: Fuel & Power; FA: Food & Allied; Ins.: Insurance; PC: Pharmaceuticals and Chemicals; Tex.: Textile.

The above Table-2 reports that the average nonfinancial information disclosure in the sample companies is at moderate level with 54%. It also indicates that, in the sample companies' annual reports, the utmost disclosures were under the categories of Company Strategy, Overall Company Information, Company Governance, and Risk & Trend Information (with about 68% under all four categories).

6.3 Regression Model Hypotheses Testing

Since share price is the indicator for wealth maximization of corporate shareholders, the main objective of a company is to maximize the wealth of its shareholders. So, any such positive impact between share price and nonfinancial information disclosure would ultimately be caused for encouraging the companies to release more nonfinancial information in their annual reports.

6.3.1 The Value Relevance Model

The above-mentioned hypotheses are examined by employing the Ohlson's (1995) value relevance model, adjusted to adopt the effect of nonfinancial

information releases. The model would help, as well, in measuring the association of nonfinancial information disclosure with share price.

6.3.2 Dataset for Testing the Value Relevance Model

The data-set used for testing the model includes share price, earning per share, book value per share and nonfinancial information disclosure score. Among the four types of data, share price is regarded as dependent variable and earning per share, book value per share as well as nonfinancial information disclosures are considered as independent variables for multiple regression analysis.

6.4 Assumptions Tests for the Value Relevance Regression Model

There are four key assumptions which validate the practice of multiple-linear regression model for the drive of prediction and rationality of any conclusion articulated. However, all assumptions are not appropriate for the data study of this research. Similar, the assumption of no autocorrelation is inappropriate as the data set is not time series rather cross-sectional (Berenson et al., 2005). However, possible multicollinearity of the independent variables, one of the vital difficulties in the use of multiple regression, is added to the tests of principal assumptions. The discussions for the assumption-tests with results are outlined below:

6.4.1 Linearity

Residual plots make it easy to check the linearity of a bivariate relationship. The regression residual is the difference between the factual and the anticipated dependent variable values (Wooldridge, 2002). The residual plots should evenly be dispersed around a diagonal line (Hair et al., 2006). A normal P-P plot of regression residuals (Appendix-2), a graphical tool, was used to test the linearity of the regression equation employed in this research work. The symmetrical distribution around a diagonal line was then cautiously watched. No insights were presented opposite to the linearity assumption.

6.4.2 Normality

The normal distribution creates a straight diagonal line and the plotted residuals are compared with the diagonal. If the distribution is normal, the residuals carefully follow the diagonal (Hair et al., 2006). Placing the residuals against the dependent variable values and comparing them to the diagonal line showed a consistent pattern in the scatter plot as shown in the Appendix-2 of this study. In accordance with the result for the test of normality assumption, it can be deduced that the dataset of this study is well qualified for linear regression analysis.

6.4.3 Homoscedasticity (No Heteroscedasticity)

Heteroscedasticity (i.e., violation of homoscedasticity) implies a condition in which the change of the dependent variable differs across the data. The Breusch-Pagan (BP) test was conducted to confirm that there is no heteroscedasticity problem with the regression model. For this drive, a new regression was run where square of residuals was dependent variable together with the same independent variables of the initial model. At that point, it was got F-statistic (probability) value of 0.1055 that was bigger than 0.05 (at 5% significance level). Thus, the null hypothesis of homoskedasticity could not have been rejected. Hence, there was no prove for hetroscedasticity issue in the regression model of this study.

6.4.4 No Multicollinearity

Multicollinearity occurs when two or more of the independent variables are connected. The result is that the specific p values of the variables can be confusing, driving to high p-values even in spite of the fact that the variable is critical. To take note of any multicollinearity problem, the correlation-coefficients of the independent variables were computed and their significances were also considered before modeling the multiple regression equation. In order to find out the coefficients, *Pearson's Correlation* test was adopted because of the earlier findings for normally distributed observed data of the variables. The test results are exhibited in the Table-3 below.

Table 3: Pearson's Correlation Coefficients of Independent Variables

Independent Variables for Regression Equation	Earning Per Share	Book Value Per Share
Book Value Per Share	- 0.192 (0.056)	1 .
Nonfinancial Information score	- 0.001 (0.988)	- 0.128 (0.204)

Source: *Output of bivariate correlate test*
Note: Numbers in the parentheses represent p-values (2-tailed sig.)

The above table reports that independent variables are not significantly correlated at 5% level. All the probability values are more than 0.05 for 2-tailed significance. As a result, the multicollinearity problem does not exist in the dataset used for multiple regression equation of this study.

7. Hypotheses Testing

The foremost purposes of this study are to test the need for disclosing more nonfinancial information (NFI) in corporate annual reports and the value relevance of disclosing such information along with financial disclosures. These are tested by employing the Ohlson's (1995) value relevance model, improved however the model to cover the effect of nonfinancial information releases. The modified regression model following the research hypotheses is as follows.

The 1st hypothesis: *There is a positive connection between share price and nonfinancial information releases.*

The 2nd hypothesis: *There is a value relevance of nonfinancial information along with financial information releases.*

Regression model: Value relevance of NFI with financial disclosures

$$SP_{it} = \alpha_0 + \alpha_1 EPS_i + \alpha_2 BVS_i + \alpha_3 NFI_i + €$$

The above model considers Share Price (SP) as dependent variable and Earning per Share (EPS), Book Value per Share (BVS) as well as NonFinancial Information (NFI) score as independent variables. This study regressed share price on independent variables of EPS, BVS and NFI score. The results for

regression of the model are presented in the Table-4 below and discussed in the following part.

Table 4: Output for Model

Dependent Variable: Share Price ; Method: OLS ; Included observations: 101

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	12.013	6.029	1.992	0.049
Earnings Per Share	1.533	0.560	2.738	0.007
Book Value Per Share	0.203	0.029	7.102	0.000
Nonfinancial Information Score	0.218	0.094	2.321	0.022
R-squared	0.361	F-statistic		18.111
Adjusted R-squared	0.341	Prob. (F-statistic)		0.000

Source: output using Bangladeshi companies' data of 2020-2021

R-squared value of 0.361 means that 31.6% variation in the dependent variable is described by the independent variables. Further, reasonable explanatory power of the model is stated because of 34.1% as adjusted R-squared. Moreover, each of the t values is more than the table value of 1.96 at 5% level of significance. Hence, following equation can be derived from the aftermath of regression analysis using the coefficients exhibited in the table 4 above and the equation can be used to estimate the share prices of Bangladeshi companies.

Estimated equation: Value relevance of NFI with financial disclosures

$$SP_{it} = \underset{(0.049)}{12.013} + \underset{(0.007)}{1.533}\ EPS_i + \underset{(0.000)}{0.203}\ BVS_i + \underset{(0.022)}{0.218}\ NFI_i + \epsilon_i$$

Source: equation derived by using full sample Bangladeshi companies' data (2020-2021)

[Numbers in the parentheses represent p-values]

The above estimated equation for the value relevance of financial along with nonfinancial information reports that the coefficient of *NFI* is positive and statistically significant as probability value of 0.022 is less than 0.05 at 5% level. Therefore, the first research hypothesis of *positive association between share price and nonfinancial* information *disclosures* is accepted. This indicates

that disclosing more nonfinancial information has positive impact on share price.

Indeed, all the coefficients of independent variables and constant are statistically significant as their p-values are less than 0.05. The estimated coefficients of financial information including earning per share and book value are statistically significant at 1% percent level. However, estimated coefficient of nonfinancial information score is statistically significant at 5% level. Furthermore, the F-statistic applied to examine the total fit of the model is 18.111 (as shown in the Table-4 above) which is highly significant with p-value at 1% level. The coefficients of all independent variables have positive signs, indicating that they are positively correlated with share prices. In a nutshell, increasing share prices of Bangladeshi companies can be the result of their disclosing more financial along with nonfinancial information. As a result, the second hypothesis of *value relevance of nonfinancial information along with financial information* is accepted.

8. Research Findings

The results of this study revealed that financial information is more value relevant than nonfinancial information. The statistical significances, as shown by p-values, were at 1% in the multiple regression model that tested financial information including earning per share and book value per share. The finding of higher value relevance of financial information offers support for Francis and Schipper's (1999) research. Further, the results proved the fact that nonfinancial information disclosures are also value relevant for Bangladeshi companies. This finding gives support for the past US and Australian studies, supporting the inference that investors would perhaps progressively depend upon additional information sources (Brimble and Hodgson, 2007; Brown et al., 1999; Collins et al., 1997; Francis and Schipper, 1999).

The outcomes of value relevance of financial along with nonfinancial information disclosures are consistent with prior studies. For instance, the finding is similar with Amir and Lev's (1996) study indicating the complementarities between financial and nonfinancial information materials.

Further, the result is reliable to Han and Manry (2004), who observed that the market may take the information about Research & Development (R&D) (i.e., a type of nonfinancial information) whether expended or capitalized, creating release is vital for value creation. In addition, Franzen and Radhakrishnan (2009) as well as Wu et al. (2010) testified R&D cost as positively related with share price. The findings of this study also in favor of the results of Ritter and Wells (2006) and Dahmash et al. (2009). Ritter and Wells (2006) specified that there was an important relationship between identifiable intangible asset disclosures (also regarded as nonfinancial information category) and share prices in an Australian research study from 1979 to 1997. Dahmash et al. (2009) confirmed that information given with regard to intangible assets in Australia for the ten-year period from 1994 to 2003 are value relevant. Results of the current study fortify prior research outcomes with the result that there are significant nonfinancial information releases in the corporate annual reports and that those releases are value relevant for the market.

9. Contribution of the Study

This study could lead the way to guide corporate management with a view to improving disclosure practices in annual reports. The major outcome of this study for value relevance of nonfinancial information is a worthy input to the advancement of reporting more such information in the corporate annual reports. Such a comprehensive corporate reporting practice may lead to additional fund supply to capital markets by delivering extra relevant information to the prospective investors. Thus, an effective distribution of funds in the capital markets will be augmented by recognizing additional type of challenging information in the corporate reporting practice in addition to financial information.

10. Limitations of the Study

This study collected corporate data for a single period (i.e., cross sectional dataset) from merely 8 industry sectors and of the companies listed only with Dhaka Stock Exchange (DSE) in Bangladesh. The said sample collection boundaries may limit the generalization of findings of this study to the entire listed companies of Bangladesh. Furthermore, this study considered corporate

annual report as the only source in case of examining corporate disclosure of NFI. Though annual reports can primarily be taken as the utmost formal part of providing corporate information, the reality that other sources (such as press release, website, etc.) have been ignored. This can also be regarded as limitation of the study. An un-weighted approach was used in this study on scoring corporate NFI disclosures with a supposition that all NFI materials are similarly important, which may not essentially be correct. Though it is a debatable issue of providing different weights for different categories of NFI items, the non-consideration of weighted approach is another limitation to the study.

11. Conclusion, Recommendations and Future Research Directions

This study increases the understanding of relevance for nonfinancial information reporting. In this study, extents of disclosing nonfinancial information by Bangladeshi sample companies were examined using researcher-constructed a disclosure index. Bangladeshi sample companies have disclosed, on an average, 54% of the nonfinancial information materials included under the researcher constructed index. Thus, the companies are disclosing moderate level of nonfinancial information materials in their annual reports. Perhaps, the companies are not convinced enough for revealing additional nonfinancial information in their annual reports. Again, financial information cannot be ignored any way according to the prior literature discussion. Therefore, the main issue addressed in this study is whether nonfinancial along with financial information is value relevant for Bangladeshi companies. Or, in other words, whether that information can positively affect share prices of respective companies. In the experimental analysis of this study, the broadly used Ohlson (1995) model was employed. The model was improved to match the objective of this study by incorporating *NFI disclosure score* in replacing with *additional information* variable. The model has been modified to enable capturing the impact of nonfinancial along with financial information disclosures on corporate share price. In particular, corporate disclosure score for NFI has been introduced as a third variable in place with ‘additional information’ to the initial model. This adjustment can be regarded as a unique input to this study on corporate information disclosures. The overall results provided in this study

evidence that financial information including earning and book value per share are the major variables while nonfinancial information is the least but considerable variable in determining the share prices of Bangladeshi companies. Thus, it has been proved in this research that there is a need for disclosing more nonfinancial along with financial information in the corporate annual reports of Bangladesh. The finding of this study delivers support for preceding US and Australian researches and the deduction that investors perhaps progressively depend upon additional information for investment decision making. The value relevance of nonfinancial information releases of the present study is somewhat similar with the study of Haddad et al. (2009) where there is a positive relation between level of voluntary information releases and share market liquidity. Further, nonfinancial information disclosures on which this study has concentrated are mostly voluntarily in nature. So, Bangladeshi companies should take necessary steps for disclosing more relevant nonfinancial information so that they would maximize the wealth of their shareholders by having additional increases in the share prices and thereby engender stakeholders' loyalties in the long run. The limitations of this study can highlight potential future research emphasizing on inclusion of the small industry sectors along with big industry sectors in examining corporate data for several periods with a view to analyzing for time series.

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Appendices

Appendix 1: Index for Nonfinancial Information Materials

I. Information about Company Strategy

1. Company goals, objectives and strategies
2. Explanation for employee motivation (financial and/or nonfinancial) plan
3. Tactical information for business growth/expansion

II. Overall Company Information

4. Company mission and vision
5. Date of establishment more especially listing with stock exchange date
6. Short explanation for company activities comprising of its major service/ product
7. Authorized address/listed address/corresponding address
8. Prime organizational chart/structure
9. Important matters during the year
10. Summarized past history of the company
11. Company networks and its economic and political settings
12. Common economic information
13. Company success and its input to the domestic economy

III. Company Governance Information

14. Size and structure of the board of directors
15. Nomination/selection procedure of the board Directors
16. No. of shares owned by each of the directors
17. Details of the independent director(s)
18. Background (education, profession and business experience) of the directors
19. Directors' associations with other companies
20. Director's report insight
21. Particulars of the company chairman
22. Nomination/selection status of the chairman and the CEO
23. Information about the CEO (Chief Executive officer)
24. Executive directors' functions and their roles
25. Auditor selection, rotation and audit fee
26. Corporate code of conduct
27. Audit committee information
28. Auditing procedure and management control system
29. Credentials of head of internal audit, company secretary and chief financial officer
30. List of high officials/senior managers
31. Senior management compensation package
32. Professional expertise of the senior executives

IV. Company's Risk and Trend Information

33. Business risk statistics and risk management framework
34. Facts on current year business growth
35. Cause(s) of varying company's financial flexibility
36. Significant trends and prospects
37. Cause(s) of varying company's prevailing economic condition
38. Justification for associations and variations in data

V. Client/Customer Gratification Information

39. Variety of service or product information
40. Product fault, maintenance, return or despair of service information
41. Information on service excellence or product security
42. Client gratification and withholding plus principal customers' information
43. Brand insight and market status
44. Information on service or product improvement
45. Marketing drive(s) success

VI. Supply Chain Information

46. Information about supply of product/service availability
47. Information about service or product safety/security from its provider
48. Information about supplier, broker, dealer, and service provider

VII. Environmental and Societal Information

49. Supporting public program and community events
50. Sponsoring charitable entities
51. Taken environmental action/drive
52. Funding community health, games or entertaining schemes
53. Donations to government-backed agencies

VIII. Intangible Asset Information

54. Information about management excellence
55. Notable brand, license, patent/copyright information
56. Information about employee expertise
57. Information about service grade or brand status

IX. Human Capital Information

58. Occupational health and security
59. Workplace culture for the employees
60. Employee/Human rights information
61. Employee retention and commitment
62. Employee growth and Development

X. Company's Industry Information

63. Sustainable competitive advantage and unfavorable business position
64. Company's associations with others

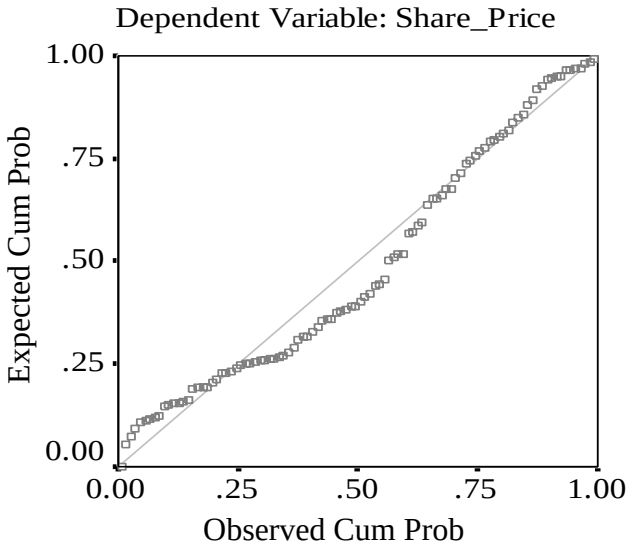
65. Technology and competition changes in the market
66. Market structure of the company
67. Company ranking position and market share in its industry
68. Development or shrinking in the market share
69. Company's competitors and their rankings in the industry

XI. Company's Forward-thinking Information

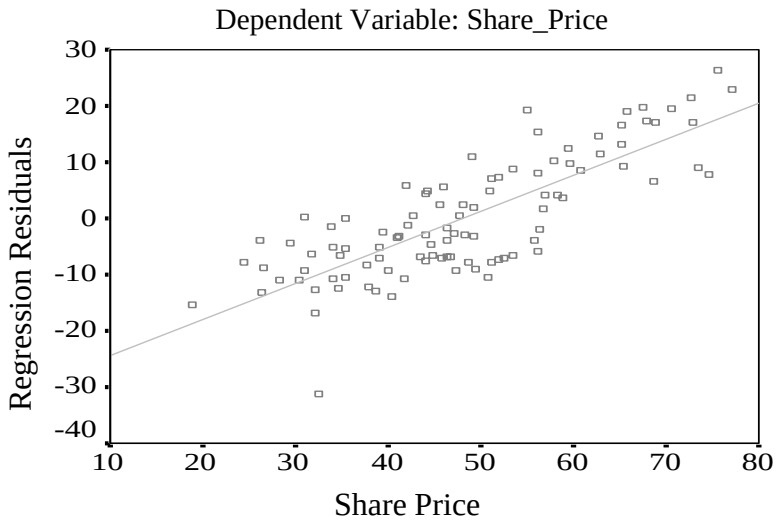
70. Qualitative forecasting of profits, sales and cash flow
71. Issues that may lead to the future performance
72. Plan for marketing and distribution method
73. Potential information about predicting the data
74. Trend forecasting research and development

Appendix 2: Test Results for Regression Assumptions

Linearity Assumption for Regression Equation Test
Normal P-P Plot of the Regression Residuals



Normality Assumption for Regression Equation Test
Scatter Plot for Residuals and Dependent Variable



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Resiliency and Performance during COVID-19: Evidence of Islamic Banking in Bangladesh

- Tofayel Ahmed*

Abstract

Every component of the global banking system has suffered serious harm due to COVID-19, and Bangladesh is no exception. As a result, its financial stability and profitability have suffered. In this study, we investigate the resiliency and profitability of Islamic banks as compared to conventional banks in Bangladesh due to the adverse impact of COVID-19. The study uses balanced panel data of 26 listed banks in Bangladesh, of which 20 conventional banks and 6 Islamic banks for 2012-2021. The study employs the Z-score to measure bank stability and Return on Asset (ROA) as a profitability measure. The study employs a random effect model for the estimation of the models. Also, it uses panel-corrected standard errors to verify the robustness of the estimation obtained from the initial random-effect model. According to the empirical results of this study, first, it cannot be said that COVID has a greater impact on the resilience of Islamic banks than conventional banks. Moreover, it cannot be concluded that Islamic banks are more profitable than traditional banks during COVID-19 Finally, the results also show that higher Capital Adequacy Ratios (CAR) and Return on Assets (ROA) had a favorable impact on resiliency. In contrast, a greater Cost to Income Ratio (CIR) indicates worse profitability due to COVID-19. Information from this study is useful to investors, regulators, and bank executives, particularly during times of crises and pandemics.

Keywords: Resiliency, Profitability, COVID Period, Islamic Banks, Random Effect Model, Panel Corrected Standard Errors
JEL Classification: G21

1. Introduction

Unprecedented destruction brought on by the COVID-19 epidemic has sparked concerns about the viability of the world's financial system. To contain the COVID-19 virus, numerous countries enacted social isolation, travel restrictions, and lockdowns. COVID-19 disrupted the input-output of goods and services globally (Alon et al., 2020). Banks were forced to close their physical branches shortly after the virus first appeared. For instance, JP Morgan cut almost 1,000 locations in the US, whereas Citigroup shuttered only 100 branches (Subbanna, 2020).

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According to the most recent WHO weekly epidemiological bulletin, published on December 25, 2021, COVID-19 has invaded 222 countries and territories, resulting in roughly 279 million illnesses and more than 5.4 million fatalities globally (WHO, 2021). The financial sector has been harmed by this shock. Due to the severity of the crisis, the relevant authorities and regulators were thinking of measures to keep the economy afloat at the beginning of the epidemic rather than accelerating their wheel of advanced economic growth. Due to its involvement in and execution of the majority of the economic activities of human civilization, whether directly or indirectly, the financial sector is more susceptible to the present pandemic (Wojcik & Ioannou, 2020 and Banna et al., 2020).

Furthermore, the stability of the banking industry affects the economic stability of a nation. Therefore, preserving the stability of the banking sectors (both conventional and sharia-based) is essential to guaranteeing the sustainability of global finance (Salami et al., 2020). However, according to Kao et al. (2019), different banks have different characteristics regarding capital and the ability of financial institutions to handle any crisis (2019). Around 1,400 Islamic financial institutions are active in more than 80 countries, and the global market for Islamic banking is now worth USD 2.4 trillion. The asset size is projected to reach over $4 trillion by 2030 (Meo et al., 2021).

Following the financial crisis of 2007–2008, numerous studies concluded that Islamic banking was more resilient than conventional banking because Islamic banking rules prevent excessive speculation and gambling (Beck et al., 2013). For instance, the top 500 Islamic banks' assets went up by 28.6 percent. At the same time, many multinational financial institutions experienced a decreasing trend in assets during the financial crisis of 2007-2008 (Ayub 2012). However, Flögel and Gärtner (2020) suggested that COVID-19 is distinct from the previous global financial crisis as it has already affected both sectors of the economies around the globe, the financial and real sectors.

Following the discovery of the first pandemic on March 8, 2020, and the first occurrence of pandemic-related death on March 18, 2020, the government of Bangladesh launched several actions to lower the infection rates. For instance,

the government issued a "General Holiday" (i.e., a general lockdown) on March 26, 2020, which was in effect until May 30, 2020. But on April 5, 2021, the Bangladeshi government imposed a second lockdown, which was extended until June 16, 2021, in response to an increase in confirmed cases and fatalities. As of May 29, 2022, Bangladesh had 1.95 million confirmed illnesses and 29,131 fatalities (WHO, 2022).

COVID-19 exerted macroeconomic and microeconomic shocks on the economy and population of Bangladesh. Compared to the anticipated GDP growth rate at the start of 2020, Bangladesh's GDP declined by 2.91% by the end of the year. Bangladesh's financial industry has not been significantly impacted by the COVID-19 outbreak (Karim et al. 2021). Bangladesh has a high percentage of Non-performing Loans (NPL) compared to other emerging nations, and it increased by more than 7% from the fourth quarter of 2020 to the first quarter of 2021. (Paul, 2021). More information about this topic is explored in the literature review section.

Recently, sustainability has received a lot of attention in academic publications (Subbaredy & Reddy, 2017). Sustainability challenges and the financial performance of banks are closely related. Banks have a significant impact on the sustainability of their performance, claim Moufty et al. (2021). For instance, non-performing loans make it difficult for banks to maintain a stable financial position. According to Weber et al. (2010), using sustainable criteria while making loan decisions might reduce banks' risk exposure.

The majority of study has concentrated on the factors affecting the financial performance of private commercial banks as a result of COVID-19, even though few studies have been undertaken to assess the impact of COVID-19 on the banking sector in Bangladesh. According to a thorough examination of the literature, no study has been done to compare Islamic banks' resilience (financial stability) and financial performance to those of conventional during COVID-19.

However, the study offers three key contributions to the existing literature. First, it adds to the emerging literature in the financial sector that simultaneously examines the impact of COVID-19 on financial stability and profitability.

Second, the study addresses the key factors that affect the ranking stability and profitability of banks during COVID-19. Last but not least, it supports and expands the literature on Islamic banking and finance throughout the crisis. With these practical implications, the specific objectives of the study are to compare the resiliency and profitability of Islamic banks as compared to conventional banks due to COVID-19.

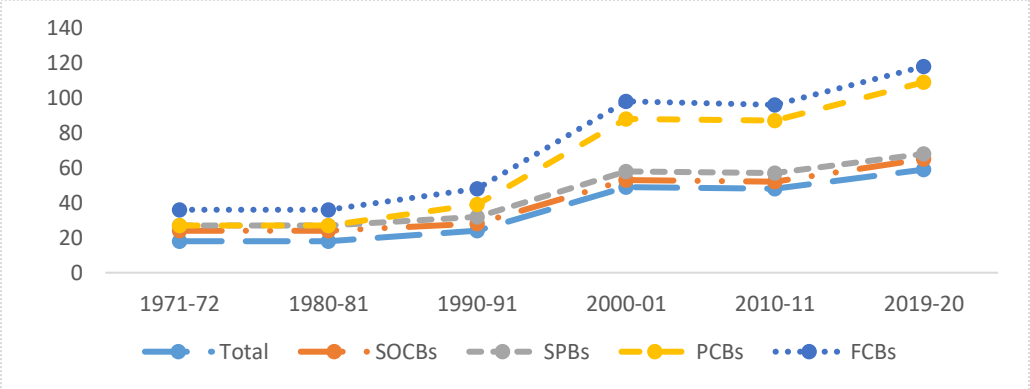
Following on from the introduction in chapter one, the second chapter provides a brief overview of Bangladesh's banking sector and previous studies on financial stability and performance during COVID. Section three deals with the data and the methodology. Descriptive statistics and empirical findings are discussed in section four. Section five's policy recommendations serve as the conclusion.

2. Financial System of Bangladesh

There are three types of financial systems in Bangladesh: formal, semi-formal, and informal. Banks, non-bank Financial Institutions (FIs), insurance firms, and capital market intermediaries including brokerage firms, merchant banks, and microfinance institutions are all considered to be part of the formal sector (MFIs). Semi-formal institutions are those that are subject to some type of regulation but are not under the control of the Central Bank, the Insurance Authority, the Securities and Exchange Commission, or any other statutory financial regulator. Finally, the unregulated private intermediaries are included in the unofficial sector.

State-owned and foreign commercial banks were the country's first financial institutions after it gained independence in 1971. There were 9 (nine) state-owned and 9 (nine) foreign commercial banks after independence. Early in the 1980s, local private commercial banks began to conduct banking operations. Moreover, significantly increased banking operations after that. All of the nation's financial institutions, both banking and non-banking, are governed and supervised by Bangladesh Bank. 61 banks having licenses from Bangladesh Bank, are currently operating (BB, 2022). Figure-1 shows how the number of banks has changed in terms of size and structure from 1971–1972 to 2019–20.

Figure 1: Changing Structure and Size in Terms of Number of Banks from 1971-72 to 2019-20



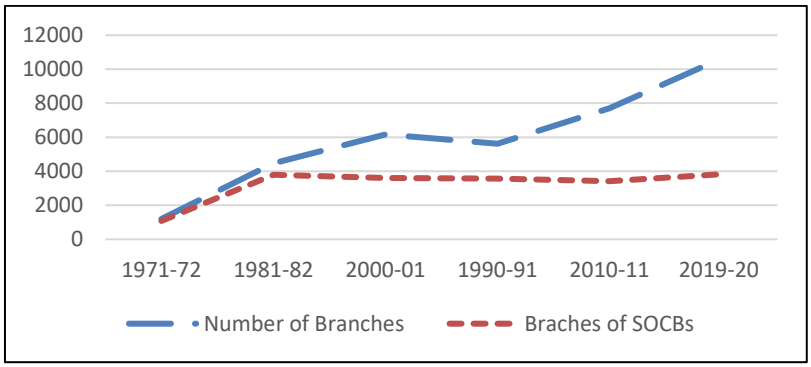
Source: Bangladesh Bank, 2022

Notes: Total indicates total number of banks, SOCBs indicate State-Owned Commercial Banks, SPBs indicate Specialized Banks, PCBs indicate Private Commercial Banks, and FCBs indicate Foreign Commercial Banks

Since the government was eager to increase banking services in rural Bangladesh, government-owned banks rapidly developed in the first decade of the 20th century, primarily in rural areas. In 1972, there were only 1116 bank branches nationwide, with 38% of them situated in rural areas. By the end of 1980, there were 3,748 bank branches, with 63% of them being found in rural areas (Chowdhury et al., 2014). By the end of 2019–20, there was roughly 48 percent of rural bank branches. With the establishment of PCBs, government-owned banks (SOCBs and SPBs) lost their market dominance (Figure-2).

The majority of branches are held by state-owned commercial banks, with Private Commercial Banks (PCBs) coming in second (49 percent). For 2020–2021, only 1% of the country's branches are operated by Foreign Commercial Banks (FCBs), while PCBs control two-thirds of all banking assets (MoF, 2022). As of the end of 2020–2021, SOCBs, Private Commercial Banks (PCBs), Specialized Banks (SPBs), and Foreign Commercial Banks (FCBs) held market shares of 36%, 49%, 14%, and 1%, respectively, in terms of branch count. PCBs also held two-thirds of all banking assets (MoF, 2022).

Figure 2: Expansion of Bank Branch for the Periods 1971 to 2020

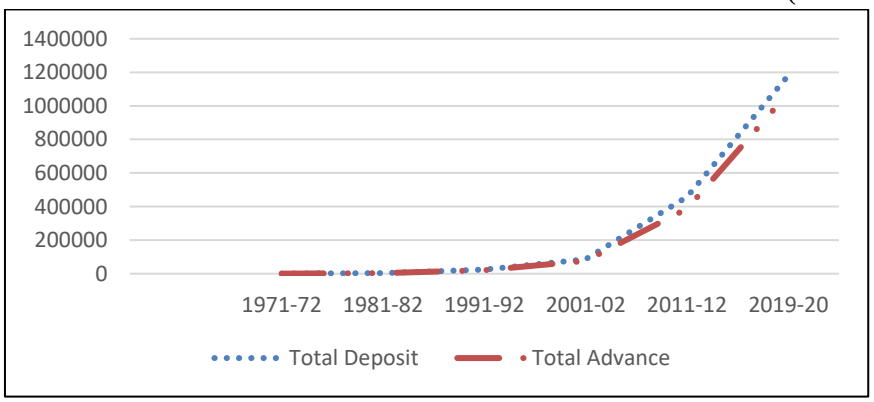


Source: Bangladesh Bank, 2022

Advance growth picked up steam in the first decade of Bangladesh's independence due to policy measures. Total advances climbed from BDT 388 crores in 1972-73 to BDT 3091 crores in 1980-81. Deposit growth grew subsequently (primarily after 1980-81) as the economy began to recover from the war's devastation and reap the benefits of the country's first five-year plan's economic reconstruction programs. Since the mid-1990s, the PCBs' deposits and advances have expanded with their market share gains in the group. As of 2019-20, the PCBs were responsible for over two-thirds of all bank deposits and advances (Figures-3 and 4).

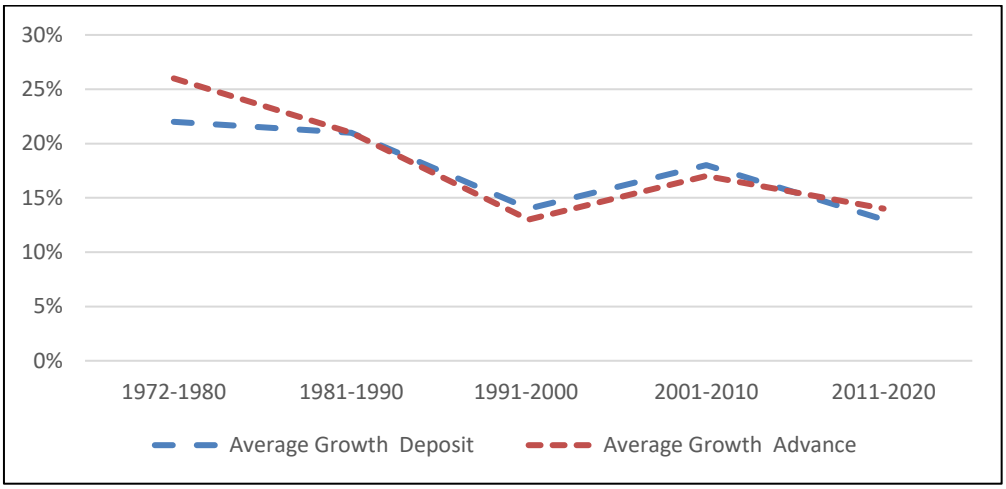
Figure 3: Total Deposit and Advance Growth for the Periods of 1971 to 2020

(in BDT Crore)



Source: Bangladesh Bank, 2022

Figure 4: Total Deposit and Advance Growth for the Periods of 1971 to 2020 (in Percentage)



Source: Bangladesh Bank, 2022

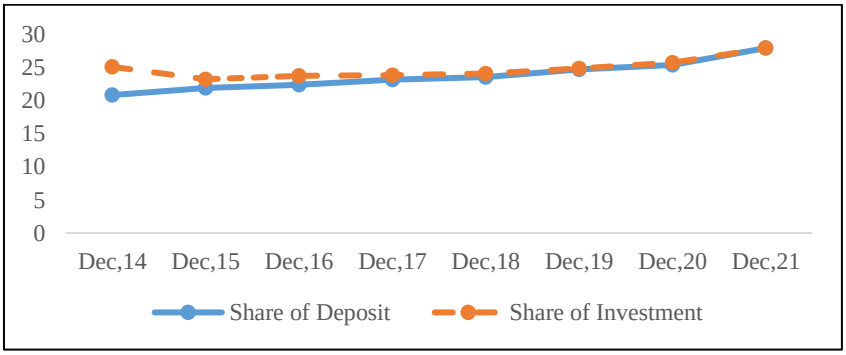
2.1 Market Share of Islamic Banking in Bangladesh

The financial activities in Islamic banks are governed by the bans on "Riba" (interest), "Ghararar" (excessive risk), and a few other activities like betting and drinking. It is commonly acknowledged in the literature that Islamic banking methods are the primary source of income for Islamic banks (Bukhari & Qudous, 2012). The funding strategies used by Islamic banks are divided into two major categories. The first includes the "Murabaha" and "Musharakah" types of investment contracts, which are founded on the principles of equity and profit-and-loss sharing. The second group mainly consists of various contract kinds like "Ijarah" and "Salam," which are based on the cost-plus/profit-margin principle derived from the debt-based premise.

Islamic and conventional banking are combined in Bangladesh's financial system. Islamic banks are currently essential for Bangladesh's deposit mobilization and financing of important economic sectors including manufacturing and services. Bangladesh Bank (BB), regulates all banking activity. Ten full-fledged Islamic banks are currently in operation, with 1619 branches spread throughout 10803 locations. Additionally, Bangladesh Bank permits Islamic banking operations upon request from conventional banks. 13

(thirteen) conventional banks are operating Islamic banking activities, through separate Islamic banking branches, as a result of this legislation. (BB, 2022). Islamic banks in Bangladesh account for a sizeable portion of all deposits and investments (Figure-5).

Figure 5: Market Share of Deposit and Investment of Islamic Banks in Bangladesh



Source: Bangladesh Bank, 2022

The Islamic banking sector's market share has progressively increased over time, as seen in Figure-5. As a result, any catastrophe, such as COVID-19, is likely to impact the financial industry severely. In this view, it is crucial to assess the performance and soundness of Islamic banking compared to conventional banking during COVID-19 in Bangladesh.

2.2 Resiliency and Profitability of Banks: A Literature Review

Numerous empirical studies reveal that capital formation positively affects banks' resiliency. For example, Laeven and Levine (2009) used a Z-score model to investigate bank resilience. The analysis examined capital adequacy measures such as capital adequacy ratio, bank size, and country-level macroeconomic variables. They showed that capital adequacy measures improve the stability of banks. Using the Z-score methodology, Abdel-Baki (2012) evaluated the effect of Basel Capital Framework III on the emerging economies of 47 countries. According to Vazquez and Federico (2015), the amount of capital in a bank boosts its resilience dramatically.

Using panel data from 2007 to 2014, Hossain et al. (2018) examined the impact of additional capital ratios of Basel Capital Framework III on the stability of BRICS economies' banks. The results suggested a positive and significant impact on the stability of banks due to Capital Adequacy Ratio (CAR) and Leverage Ratio (LEV). According to the findings, the CAR appears robust in terms of increasing bank resilience.

Ghosh and Saima (2021) investigated the resilience of Bangladesh's commercial banks due to COVID-19. Their findings give evidence of more vulnerability in banks with lower capital, lower liquidity, and higher Non-Performing Loans (NPLs). Moudud-Ul-Huq et al. (2021) also studied the relationship between financial stability and capital adequacy measures during COVID-19 in Bangladesh. Petria et al. (2015) looked at the key drivers of bank profitability in the EU27 from 2004 to 2011 by banks' profitability measures, ROA and ROE. Their findings reveal that NPL, Advance Deposit Ratio (ADR), and Cost Income Ratio affect banks' profitability. Findings also suggest that an increase in NPLs reduces ROA and ROE. Table-1 shows the factors affecting banks' profitability and their expected impact on bank performance.

Table 1: List of the Variables: Dependent Variable: Return on Asset (ROA)

Variables	Priori Expectation	Sources
Total Asset(TA)	+/-	Kosmidou, 2008
Capital Adequacy Ratio(CAR)	+/-	Akbas, 2012
Non-Performing Loan(NPL)	-	Mansur et al., 1993
Cost Income Efficiency Measures	-	Akbas, 2012
Inflation(INF)	+/-	Abdel-Baki, 2012
Macroeconomic Variable	+	Chalermchatvichien et al., 2014

Source: Authors' Compilation from Various Journal Articles

2.3 Islamic Versus Conventional Banks' Financial Resiliency and Performance: Literature Review

Numerous types of research provided empirical support for the negative impact of COVID-19 on stock markets and investor confidence (Kinateder et al. 2021; Hassan et al., 2021). The COVID-19 problem is anticipated to affect banks in the form of riskier borrowers withdrawing liquid assets, increasing credit risk,

and increasing the amount of non-performing loans (Acharya and Steffen, 2020; Goodell, 2020; Perotti, 2020).

In COVID-19, Ashraf et al. (2022) compared the resilience of Islamic banks to conventional banks for the member states of the Gulf Cooperation Council (GCC). They found that after COVID-19, stock market investors did not believe that Islamic banks were superior to those that were conventional. According to their research, there is no proof that during the COVID-19 shock, investors valued Islamic banks' equities differently than conventional banks' stocks.

But in 2022, Akkas and Al Samman (2021) looked into how the COVID-19 epidemic affected Islamic and Conventional financial institutions as well as Islamic windows in the GCC nations. According to their findings, Islamic banks are less resistant to the COVID-19 epidemic than they were during the 2008 financial crisis.

Danisman et al. (2021) used a sample of 66 nations from January 2020 to July 2020 to investigate whether regional variations in banking market systems affect local stock market resilience to the COVID-19 pandemic. According to the report, nations with concentrated banking systems and a bigger proportion of Islamic banks are more able to withstand the pandemic.

The financial stability of Islamic banking and conventional banking in Indonesia during the COVID-19 epidemic from 2019Q1 to 2021Q2 for 80 banks is compared by Wijana & Wayan (2022). Both before and after the COVID-19 outbreak, Islamic banking showed greater resilience than conventional banking.

The Gulf Cooperation Council's Islamic banking industry was affected by both the COVID-19 epidemic and the Global Financial Crisis, according to Grasa et al. (2022). 32 Islamic banks between the years 2006 and 2020. The study found that compared to the global financial crisis, the COVID-19 pandemic has negatively impacted Islamic banks' profitability and resilience.

In their study published in 2022, Mirzaei et al. (2022) assessed the stock performance of 426 banks from 48 nations during the first stage of the COVID-19 crisis in comparison to their conventional equivalents. According to their

research, Islamic banks' stock returns were 10–13% greater than those of regular banks. El-Chaarani et al. (2022) examined the important variables that might have an impact on the performance of conventional and Islamic banks in the Gulf Cooperative Council from 2017 to 2020, particularly before and mostly during the COVID-19 pandemic period. This study demonstrates that during the COVID-19 pandemic, conventional banks outperformed their Islamic counterparts in terms of financial performance and liquidity.

In Bangladesh, Miah et al. (2021) evaluated COVID-19's effects on the Islamic banking sector in Bangladesh and investigated if Islamic banks are more at risk as a result of their function as a source of "commercial capital." Their findings showed that Islamic banks' investment patterns are oriented toward commerce and merchant lending. Additionally, they demonstrated how severely susceptible Islamic banks are to the economic shock brought on by COVID-19.

Barua and Barua (2021) looked at how COVID-19 would affect Bangladesh's banking industry. The results of this study indicated that both at the sectoral and individual bank levels, risk-weighted asset values, capital adequacy ratios, and interest income are anticipated to decrease for all banks.

During COVID-19, Rizwan et al. (2022) investigated any variations in the systemic risk profiles of conventional and Islamic banks. Their analyses showed that Islamic banks shared similar systemic vulnerabilities to systematic and idiosyncratic causes. However, compared to conventional banks, Islamic banks have substantially less of an impact on other parties despite generating extraordinary returns.

For 32 commercial banks in Bangladesh, Moudud-Ul-Huq et al. (2021) studied the link between capital regulation and financial stability about the effects of COVID-19 over the years 2000–2020. The study's conclusions demonstrate a negative and reciprocal relationship between capital regulation and financial stability. More significantly, COVID-19 weakens banks and necessitates higher capital requirements for risk absorption. When the authors take ownership structure into account, the COVID-19 effect is uneven.

Gazi et al. (2022) looked into how COVID-19 affected the financial success and profitability of Bangladesh's listed private commercial banks. The banks that had superior pre-pandemic COVID-19 performance also had better pre-pandemic COVID-19 performance.

The effect of COVID-19 on Bangladesh's banking industry from 2019 to 2020 was studied by Kashem (2022). All different kinds of banks in Bangladesh have suffered devasting and uniform effects as a result of the pandemic. Efficiency and profitability were largely unaffected by the pandemic.

2.4 Theoretical Model

Based on a few macroeconomic indicators and a few bank-specific variables, the conventional model of the financial stability and profitability of banks uses these variables. The Capital Adequacy Ratio (CAR), Return on Asset (ROE), and a few macroeconomic indicators like inflation and GDP are examples of bank-specific variables, also referred to as internal factors by academics Chalermchatvichien et al. (2014). The mathematical functions for financial stability and bank profitability can be written as follows because this study primarily compares Islamic banks to conventional banks in terms of their financial stability and bank performance during COVID-19:

$\text{Ln(Z)}=f(\text{Islamic}_i, \text{COVID}_t, \text{Islamic}_i * \text{COVID}_t, \text{ROA}_{it}, \text{CAR}_{it}, \text{LnTA}_{it}, \text{LnNPL}_{it}, \text{Growth rate of GDP}_t, \text{INF}_t)$

$\text{ROA}=f(\text{Islamic}_i, \text{COVID}_t, \text{Islamic}_i * \text{COVID}, \text{CIR}_{it}, \text{CAR}_{it}, \text{LnTA}_{it}, \text{LnNPL}_{it}, \text{Growth rate of GDP}_t, \text{INF}_t)$

Where

Ln(Z)= log of Z score

ROA= Return on Asset

Islamic_i = 1 for Islamic Banks, 0 for Conventional Bank

$Covid_t$, = 1 for the COVID period (sample period from 2020 to 2021, otherwise, pre-COVID period (sample period from 2012 to 2019)

$\text{Islamic}_i * \text{COVID}_t$ = 1 for Islamic Banks for COVID Period, otherwise pre-COVID period

ROA_{it} = Return on Asset for ith observation at time t

CAR_{it} = Capital Adequacy Ratio for ith observation at time t

$LnTA_{it}$ = Log of Total Asset for ith observation at time t

$LnNPL_{it}$ = Non-Performing Loan Ration for for ith observation at time t

GDP_t = Growth rate of Gross Domestic Product at time t

INF_t = Yearly Inflation at time t

2.5 Hypothesis

With the objectives in chapter one and the literature review in chapter two, the study aims to compare the resiliency of the Islamic and conventional banks during the COVID-period. It also intends to compare the profitability of the Islamic and conventional banks during the COVID-period. Hence, the hypothesis can be set as follows:

H1: Islamic banks are more resilient than conventional banks during COVID

H2: Islamic banks are more profitable than conventional banks during COVID

3. Data and Methodology

3.1 Data

The study relies on secondary data at the bank level. Bank-level data are collected from the banks' websites. The bank-level data are collected for the periods of 2012 through 2021. Data on the external factors, inflation, and GDP growth rate are collected from the World Bank database. Data for macroeconomic factors such as inflation and GDP growth rate are collected from the World Bank's database. 6 (six) Islamic Banks and 20 (twenty) conventional banks are included in the study in the study. The sampled banks have been listed on the Dhaka Stock Exchange (DSE) (Appendix-1) for more than ten years. The sample period is then separated into two groups of banks, Islamic and Conventional, using the dummy variable approach to attain the objectives. Furthermore, the sample period is

divided into a pre-COVID period (2012 to 2019) and a during-COVID period (2020 to 2021). Before the estimation, all series are turned into a natural logarithm except growth rate of GDP and rate of inflation. Table-2 lists the variables used in the model specification in the next section. The study derives the Z-score in the following manner following

$$\text{Z} - \text{score} = \frac{ROA + CAR}{\sigma(\text{ROA})}$$

σ(ROA) measures the standard deviation of ROA. In theory, banks show more resiliency with a higher Z-score. The study uses a natural logarithm of the Z-score.

Table 2: List of Variables

Variables	Description	Unit of Measurement	Sources
Ln(Z)	Z-score	Log of Z-score	Laeven and Levine (2009)
ROA	Net Income/Total Asset	Percent	Audited Annual Reports
CAR	Regulatory capital/total risk-weighted assets.	Percent	Audited Annual Reports
CIR	Total Operating Expense/ Operating Income	Percent	Audited Annual Reports
NPL	Non-Performing Loan	Percent	Audited Annual Reports
GDP	GDP Annual Growth Rate	Percent	World Bank
INF	Annual Inflation	Percent	World Bank
Islamic	Islamic Bank=1, and Conventional Banks=0	Dummy	Audited Annual Reports
COVID	During COVID-Period = 1, and Pre-COVID Period =0	Dummy	

Correlation analysis has been used to determine whether the major explanatory variables are substantially correlated before model estimation. Before estimating models, the correlation pattern among the independent variables was confirmed. The correlation matrix in Table-3 shows that LTA and LNPL have a correlation of 0.52 and that LTA and inflation have a correlation of -0.50.

Table 3: Correlation Matrix

	CAR	CIR	LTA	LNPL	GDP	INF
CAR	1					
CIR	-0.21	1				
LTA	0.23	0.13	1			
LNPL	0.11	-0.07	0.52	1		
GDP	-0.05	-0.10	0.04	0.09	1	
INF	-0.25	-0.10	-0.50	-0.30	-0.30	1

Notes: Sample period: 2012 to 2021, All series above are transformed into a natural logarithm except GDP growth rate and inflation.

3.2 Model Specifications

The study uses panel data to compare the resiliency of Islamic banks with conventional banks during COVID regimes. Panel data are also used to compare the profitability of the Islamic banks with conventional banks during COVID regimes. An interaction between Islamic and COVID is required to retain the research objectives. The paper utilizes two models, one is for resiliency measurement, and the other is for profitability measurement. Consequently, the model specification is as follows:

To investigate the resiliency of the Islamic banks with conventional banks in the pre-COVID regime and during the COVID regime, the econometric model becomes as follows:

$$Ln(Z_{it}) = \beta_0 + \beta_1\ Islamic_i + \beta_2\ Covid_t + \beta_3\ Islamic_i * Covid_t + \beta_4\ ROA_{it} + \beta_5\ CAR_{it} + \beta_6\ LnTA_{it} + \beta_7\ LnNPL_{it} + \beta_8\ GDP_t + \beta_9\ INF_t + v_i + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

To investigate the profitability the resiliency of the Islamic banks with conventional banks in the pre-COVID regime and during the COVID regime, the econometric model becomes as follows:

$$ROA_{it} = \beta_0 + \beta_1\ Islamic_i + \beta_2\ Covid_t + \beta_3\ Islamic_i * Covid_t + \beta_4\ CIR_{it} + \beta_5\ CAR_{it} + \beta_6\ LnTA_{it} + \beta_7\ LnNPL_{it} + \beta_8\ GDP_{it} + \beta_9\ INF_t + u_i + e_{it} \ldots\ldots\ldots(2)$$

Where

Ln	:	Natural logarithm
Z	:	Z-score, Resiliency Indicator
ROA_i	:	Year-End Return on Average Asset of Bank Balance Sheet, 31 December of each year
Islamic	:	=1 for Islamic Banks, 0 for Conventional Bank
COVID	:	=1 for the COVID period (sample period from 2020 to 2021, otherwise, pre-COVID period (sample period from 2012 to 2019)
CAR	:	Year-End Capital Adequacy Ratio of Bank Balance Sheet, 31 December of each year
CIR	:	Year-End Cost Income Ratio of Bank Balance Sheet, 31 December of each year
TA	:	Year-End, 31 December of each year, Total Asset of Bank Balance sheet in Bangladeshi Taka (BDT)
NPL	:	Year-End Amount of Non-Performing Loan in Bank Balance sheet, 31 December of each year
GDP	:	Annual GDP Growth Rate
INF	:	Annual Inflation

The first model depicts the relationship between Islamic and conventional bank resiliency. It also expresses independent variables by bank group-wise (total asset size, managerial efficiency, credit risk and capital adequacy measures). The model also considers external factors like the yearly GDP growth rate and inflation.

The second model demonstrates the relationship between the profitability of Islamic and conventional banks. It also breaks down independent variables into bank groups (total asset size, managerial efficiency, credit risk and capital adequacy measures). The model also considers external factors such as annual GDP growth and inflation.

4. Results and Discussion

4.1 Descriptive Statistics

The following Table-4 exhibits descriptive statistics of the sample banks for 2012 to 2021. From Table-4, Islamic banks show a higher z-score (4.02) and Lower Cost to Income Ratio (47.87 percent. However, the average performance of ROA, log of Total Asset, log of Non-Performing Loans, and Capital Adequacy Ratio remains the same in the two banking categories.

Table 4: Descriptive Statistics for Islamic and Conventional Banks

Variable	Observation	Mean	Standard Deviation	Min.	Max.
LnZ Score					
Islamic Banks	60	4.02	0.36	3.39	4.81
Conventional Banks	200	3.84	0.69	2.52	5.72
ROA					
Islamic Banks	60	0.01	0.00	0.00	0.01
Conventional Banks	200	0.01	0.00	0.00	0.02
CIR					
Islamic Banks	60	47.87	8.85	33.99	76.20
Conventional Banks	200	52.31	11.09	34.08	89.71
LnTA					
Islamic Banks	60	11.50	0.26	11.06	12.06
Conventional Banks	200	11.37	0.20	10.93	11.90
LnNPL					
Islamic Banks	60	9.94	0.41	8.68	10.55
Conventional Banks	200	9.71	0.47	8.31	10.66
CAR					
Islamic Banks	60	12.62	1.60	10.13	16.65
Conventional Banks	200	12.54	1.87	7.00	17.28
GDP	60	6.65	1.26	3.50	8.20
INF	60	6.04	0.67	5.50	7.50

Note: Sample period: 2012 to 2021. Ln indicates the transformation of a series into a natural logarithm. Where LnZ= Log of Z score, ROA=Return on Average Asset, CIR=Cost Income Ratio, LnTA= Natural log of Total Asset, LnNPL=log of Non-Performing Loans, CAR= Capital Adequacy Ratio, GDP= Annual Gross Domestic Product Growth Rate, INF= Annual Inflation

4.2 Variance Inflation Test

The Variance Inflation Factor (VIF) test is used to establish if multicollinearity is a problem or not. As per Hair et al. (2014), the maximum mean VIF should be 10, i.e., the tolerance value (1/VIF) should not be greater than 0.1. There is no issue of multicollinearity in the regressors, as shown in table 5 of the VIF test because the mean VIF of both z-score and ROA is less than 10.

Table 5: Variance Inflation Factor (VIF) Test

Dependent Variable: Ln(z)			Dependent Variable: ROA		
Variable	**VIF**	**1/VIF**	**Variable**	**VIF**	**1/VIF**
ROA	2.24	0.44	Z score	1.33	0.75
LTA	2.05	0.48	LTA	2.17	0.46
INF	1.63	0.61	INF	1.63	0.61
LNPL	1.48	0.67	LNPL	1.47	0.67

Dependent Variable: Ln(z)			Dependent Variable: ROA		
Variable	**VIF**	**1/VIF**	**Variable**	**VIF**	**1/VIF**
EA	1.37	0.73	EA	1.3	0.76
CAR	1.34	0.74	CAR	1.42	0.70
TRA	1.3	0.76	TRA	1..35	0.74
CIR	1.29	0.77	CIR	1.24	0.80
GDP	1.19	0.84	GDP	1.18	0.84
Mean VIF	1.59			1.46	

4.3 Empirical Results

The Hausman test is used to determine if fixed effects or random effects are the best estimating approach. Outputs of Pooled OLS and Fixed Effect are given in Appendix-2 and 3, respectively. The Hausman test suggests random effect as an appropriate method to estimate both panel regression models. Table 6 compares the resiliency and profitability of Islamic and conventional banks in the pre-COVID and COVID periods using panel regression outputs of two dependent variables, Ln (Z), z-score, and ROA, profitability measure. The interaction of Islamic and COVID is included in the model to investigate the influence during the COVID period on the resiliency of Islamic banks.

Table 6: Panel Regression Outputs: Dependent Variable Ln (Z)

	Dependent variables	
Independent variables	**Ln(Z)**	**ROA**
Islamic	0.1917	-0.0017
	(0.49)	(0.14)
COVID	0.0025	-.0011
	(0.79)	(0.35)
Islamic_COVID	-0.0114	-0.0003
	(0.19)	(0.75)
ROA	7.9191***	-
	(0.00)	
CIR	-	-0.0001***
		(0.00)
CAR	0.07520***	0.0002*
	(0.00)	(0.10)
LTA	0.0169	-0.0036**
	(0.35)	(0.06)
LNPL	-0.0061	-0.0005
	(0.36)	(0.50)
GDP	0.0007	-.00001
	(0.69)	(0.50)
INF	0.0064*	0.0001

	Dependent variables	
Independent variables	**Ln(Z)**	**ROA**
	(0.05)	(0.80)
Constant	2.6480***	0.0581***
	(0.00)	(0.0)
Observations	260	260
F-statistics	4320***	64.2100***
	(0.00)	(0.00)
Wald Test	$X^{2 = 0.53}$ (0.76)	$X^{2 = 3.32}$ (0.19)

Note: p-values are shown in parentheses. ***, **, and * are significant are 1 percent, 5 percent, and 10 cent levels of significance.

According to Table-6, the interaction of Islamic and COVID is insignificant, implying that COVID does not affect the resiliency of Islamic banks. Azim et al. 2017 found the reverse when they investigated the resiliency of Islamic and conventional banks in Bangladesh throughout the global financial crisis and pre-crisis of 2007-2008. Furthermore, the results suggest that Islamic banks are no more resilient than regular banks in the absence of interaction. Similarly, the COVID period does not give more robustness to the banks.

Table-6 also represents panel regression outputs of ROA as a profitability measure to compare the profitability of the Islamic banks in pre-COVID and during COVID-period. In investigating the impact of during COVID period on the profitability of Islamic banks, the interaction of Islamic and COVID is also added to the model. From table 6 the interaction of Islamic and COVID is insignificant, meaning that COVID does not impact the profitability of Islamic banks. However, some findings were not observed by Azim et al. 2017 while examining the profitability between Islamic banks and conventional banks in Bangladesh during the global financial crisis and pre-crisis of 2007-2008.

Moreover, without interaction of Islamic and COVID, the result shows that Islamic banks do not show more profitability than conventional banks. In the same way, the COVID period also does not exhibit more profitability for the banks as a whole.

The key objective is to show the resiliency and profitability of Islamic and conventional banks in the pre-COVID and during the COVID period. Table-6 shows significant positive relationship between ROA and CAR, meaning that a greater value of CAR significantly increase banks' resilience, which is consistent

with the findings of Abdel-Baki (2012). Table-6 shows a significant negative relationship between CIR and ROA and provides a significant negative relationship between Bank size and ROA. The findings are consistent with the study of Gazi et al. (2022).

Moreover, CAR and ROA provide a significant negative association, which means banks with more capital show more profitability. The results are also consistent with the findings of Petria et al. (2015). NPL and GDP do not show any significant impact on the resiliency and profitability of banks.

4.4 Robustness Check

Table-7 presents the robustness of the estimation; the study uses panel-corrected standard errors to estimate both models. Both models, the resiliency model, and profitability model show overall significance, the same as the original models. The coefficients of panel corrected standard errors also provide almost the same significance with the same sign. From Table-7, it cannot be concluded that COVID impacts the resiliency and profitability of Islamic banks. It can be said that COVID impacts the resiliency of both categories of banks, as COVID have a significant positive relationship with resiliency in the banks.

Table 7: Robustness Check Output: When Dependent Variable: Ln(Z) and ROA

Independent Variables	Dependent Variable	
	Ln(Z)	**ROA**
Islamic	0.3000***	-0.0010***
	(0.00)	(0.01)
COVID	0.2520***	-.002
	(0.00)	(0.17)
Islamic_COVID	-0.0030	-0.0003
	(0.96)	(0.84)
ROA	-25.57**	-
	(0.03)	
CAR	0.102***	0.00057***
	(0.00)	(0.00)
CIR	-	-0.0001***
		(0.00)
LTA	-1.455***	-.0030**
	(0.00)	(0.02)
LNPL	0.0798	-.0002
	(0.30)	(0.75)

Independent Variables	Dependent Variable	
	Ln(Z)	**ROA**
GDP	0.04	-.0001
	(0.12)	(0.52)
INF	-0.0903*	.0004
	(0.07)	(0.53)
Constant	18.76***	0.04140***
	(0.00)	(0.00)
Observations	260	260
F-statistics	216.36***	112.37
	(0.00)	(0.00)
R-squared	0.194	0.26

Note: p-values are shown in parentheses. ***, **, and * are significant at 1 percent, 5 percent, and 10 percent significance levels.

5. Conclusion and Recommendations

The study's main goal is to see if Islamic banks' resiliency and profitability are higher than conventional banks' due to the pandemic. The study employs the Z-score model as the dependent variable to measure resiliency and ROA as a profitability measure to achieve the research objectives.

The empirical results of this study do not support hypothesis H1 since it is not possible to conclude that COVID has a greater impact on the resilience of Islamic banks than conventional banks. Moreover, it cannot be concluded that Islamic banks are more profitable than traditional banks during COVID-19. However, the findings provide that a greater Capital Adequacy Ratio (CAR) and greater Return of Asset (ROA) positively affect the resiliency of the banking sector for the sampled banks. In contrast, a higher Cost to Income Ratio (CIR) poses lower profitability for the banking sector as a whole of the banking sector as a whole for the sampled banks.

The results of this study offer useful information for the future to policymakers, regulators, and lenders even if the real effects of COVID won't be known until the pandemic is finished. Policymakers should focus more on the Capital Adequacy Ratio and Return on Asset to make banks more robust. The cost-to-income ratio and quality assets of the banks should receive more attention from bankers in terms of performance indicators. The research examines the resilience and profitability of Islamic banks in Bangladesh in comparison to

conventional banks during COVID using empirical methodologies. The pandemic persists despite the study finding no effect of COVID on the stability and performance of Islamic banks during-COVID periods. To generate a more thorough and clear answer, an additional study with more data for the variables and different sample banks is required.

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Appendices

Appendix Table 1: List of the Sampled Banks for the Study

Serial Number	Name of the Bank	Type of the Bank
1.	Alarafah Islami Bank Ltd	Islamic
2.	Export and Import Bank of Bangladesh	Islamic
3.	First Security Islami Bank Limited	Islamic
4.	Islami Bank Bangladesh Limited	Islamic
5.	Shahajalal Islami Bank Limited	Islamic
6.	Social Islami Bank Limited	Islamic
7.	AB Bank Limited	Conventional
8.	Bank Asia Limited	Conventional
9.	BRAC Bank Limited	Conventional
10.	Dhaka Bank Limited	Conventional
11.	Dutch Bangla Bank Limited	Conventional
12.	IFIC Bank Limited	Conventional
13.	Mutual Trust Bank Limited	Conventional
14.	National Bank Limited	Conventional
15.	Premier Bank Limited	Conventional
16.	Prime Bank Limited	Conventional
17.	Pubali Bank Limited	Conventional
18.	Rupali Bank Limited	Conventional
19.	Uttara Bank Limited	Conventional
20.	Mercantile Bank Limited	Conventional
21.	The City Bank Limited	Conventional
22.	Jamuna Bank Limited	Conventional
23.	NCC Bank Limited	Conventional
24.	ONE Bank Limited	Conventional
25.	Trust Bank Limited	Conventional
26.	United Commercial Bank Limited	Conventional

Appendix Table 2

	Pooled OLS	**Fixed Effect**
Independent Variables	Dependent Variable Ln(Z)	Dependent Variable Ln(Z)
Islamic	.1938419	-
COVID	-0.0059	-0.0060
ROA	7.9194***	7.9281***
CAR	.0751***	0.5791***
LTA	0.0155	0.0162
LNPL	-0.0047	-.0047
GDP	0.0007	.0007
INF	0.0065**	0.0066**
Constant	2.6486***	2.6859
Observations	260	260
p-value of F-statistics	0.000	0.000

Note: *** and ** indicate 1 percent and 5 percent levels of significance

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Determinants of the Financial Health of Non-Bank Financial Institutions in Bangladesh USING Altman's Z-Score Model

- Md. Saiful Islam*

Abstract

Non-banking Financial Institutions (NBFI) are growing very fast in Bangladesh after their first establishment in 1981. Due to some recent unwanted and vulnerable events, it is important to determine the financial health condition of NBFIs. The main focus of this study is to determine the financial health condition of NBFIs in Bangladesh using Altman's Z''-Score Model and the impact of different financial ratios on the calculated Z''-Score. A data set is considered for a 5-year (2015-2019) period for 21 NBFIs in Bangladesh. The study result shows that presently more than 80% of NBFIs are in financially distressed conditions. As per the best-fitted regression model, 'Random Effect Model', among the different financial ratios, Non-performing Loans (NPL) and Deposit Ratios (DR) are the most impactful and negatively related to the company's financial distress condition. It is recommended to strongly control the non-performing loan and mobilize the deposit efficiently for better financial health.

Keywords: Z''-Score, Cost to Income Ratio (CIR), Deposit Ratio (DR), Non-Performing Loan (NPL), Loan Ratio (LR), NBFI.
JEL Classification: G17, G23, G32, G33

1. Introduction

1.1 Background of the Study

Following independence, Bangladesh's banking sector began with six domestic commercial banks, three state-owned banks, and nine international banks. The banking industry expanded significantly in 1980, when private banks started their operations in Bangladesh. In 1981, Non-bank Financial Institutions (NBFI) started their journey in Bangladesh. The Financial Institution Act of 1993 regulates non-bank financial institutions, which are governed by the Central Bank. 34 Financial Institutions (FIs) are working at present. Out of the total, two are wholly owned by the government, fifteen were started through private domestic initiative, fifteen through joint venture initiative, and one is a subsidiary of a state-controlled commercial bank. Term deposits, call money,

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bonds, securitization, and credit facilities from banks and other Fis make up the majority of the sources of funding for financial institutions.

Banks and NBFIs differ from one another in significant ways. NBFIs are prohibited from issuing pay orders, cheques, or demand drafts, participating in foreign exchange financing, or accepting demand deposits under Bangladesh Bank regulations. On the other hand, NBFIs are able to carry out private equity placements, securitization instruments, lease financing, syndicated financing bridge financing, and more (Bangladesh Bank, n.d.).

In Bangladesh, NBFIs constitute an important part of the nation's financial system. NBFIs fulfill the limitations of bank financing by providing diversified financial investments across the country. Moreover, NBFIs enhance the growth of the economy by providing additional facilities offered by commercial banks, and NBFIs play a positive role in the health of the capital market (Sufian, 2007).

In terms of profitability, some NBFIs are doing well and some are not. For example, more than 85% of NBFIs are in distress, considering 15 NBFIs from 2011 to 2015 (Tania and Farzana, 2016). The media make it clear that People's Leasing and Financial Services Limited (PLFSL) and International Lesing and Financial Services Limited (ILFSL) have been put into liquidation. PLFSL and Bangladesh Industrial Finance Company Limited (BIFC) are nearly same.

2. Literature Review, Research Objectives and Hypothesis

2.1 Literature Review

The Altman Z''-Score Model investigation of the financial health of Bangladesh's NBFIs found that 15 of the country's total of 23 NBFIs are in financial trouble. Some NBFIs have a good reputation nationally and internationally, but according to Z''-Score model, their financial health is not up to par (Hamid et al., 2016). This study does not provide an analysis of why NBFIs are in distress or which factors are affecting most of the Z''-Score value. This study recommends that Bangladesh Bank should regulate these distressed NBFIs for financial health improvement, but how it can be done or whether Bangladesh Bank should focus on which factors is not mentioned here.

A study on the financial distress analysis of private commercial banks in Bangladesh found that only 24% of the 25 selected commercial banks are in a safe zone (Mostofa et al., 2016). It is observed that the ratio of earnings before interest and taxes (EBTI) to total assets is the most impactful variable considering the other three required variables to calculate the Z''-Score. The mean Z''-Score has been shown in this paper, which does not carry any significant importance for the study results. The authors of this article stated that the excess disbursement of non-performing loans is reducing operating profit. But the article does not contain proper analysis regarding this statement.

It is observed that day by day, the number of distressed non-banking financial institutions in Bangladesh is increasing. As independent variables, return on assets and return on equity have been taken into account. On the other hand, as dependent variables, Altman's Z''-Score and leverage have been taken. After the analysis, it was found that Z''-Score has a positive relationship with a company's portability (Jahan and Kabir, 2019). The author used the generalized least squares (GLS) method rather than the ordinary least squares (OLS) regression method as there was heteroscedasticity present in the data set. This study also recommended taking the necessary steps to increase the company's Z''-Score. But there is no clear recommendation on which factor the company's management should focus on to increase the Z''-Score.

A study on measuring the financial distress of NBFIs in Bangladesh using Altman's Z-score model found that in 2018, about 90% of NBFIs were in distressed condition, whereas it was 100% in 2016 of 20 selected NBFIs (Rahman et al., 2020). Besides this analysis, the authors also showed the different category lists of NBFIs in Bangladesh according to the Dhaka Stock Exchange (DSE). Thirteen NBFIs fall under category "A," which is able to hold annual general meetings and declare dividends each fiscal year. Four NBFIs fall under category "B," which can still hold annual general meetings even though they didn't report the required minimum dividend. Three NBFIs fall under category 'Z' which failed to declare dividends and was also not able to organize an annual general meeting. The authors recommended enhancing credit policy, managing non-performing loans, managerial skills, and resource shortages. The

analysis of the impact of these factors on the Z''-score value is missing in this paper.

A comparison between private commercial banks and state-owned commercial banks found that there is a huge difference in Z''-Score value between them, and state-owned banks outperform private commercial banks in terms of financial soundness (Parvin and Rahman, 2016). A t-test has been done to identify the result. Z''-Score will be different from bank to bank and from year to year, as Z''-Score depends on about seven different variables. Seven variables from different banks in different years cannot occur at the same time. The author chose only six commercial banks out of forty-eight. Only 12.5% of commercial bank data has been considered for this study.

Research was done about the usefulness of the Altman Z''-Score model in determining the level of financial distress of Bangladesh Industrial Finance Company (BIFC), and People's Leasing and Financial Services (PLFS). It was found that the Altman Z''-Score model is usable to forecast financial distress (Azim and Sharif, 2020). PLFSL is now in the liquidation process among the 34 NBFIs in Bangladesh. In Bangladesh, only PLFSL is in the liquidation stage. One single set of data cannot provide a concrete decision about the relationship between liquidation and the Z''-Score for NBFI in Bangladesh. The authors showed the mean of current assets, total assets, current liabilities, total liabilities, retained earnings, and book value of two companies. This does not play any significant role in the article's decision-making process.

Full-length research on the financial health of 27 leasing companies in India was done by Z''-Score analysis, and it was found that about 48% of leasing companies fall into the grey and distress zones and 52% fall into the safe zone (Jaisheela, 2015). The study recommended reviewing companies' policies for the improvement of their financial health without specifying which policies should be revised.

Based on research of sixty-nine non-financial firms from the Stock-Exchange of Karachi from 2012-2017, it is found that Altman Z-Score and size of the firm have shown a positive relationship to the financial performance indicators

(ROA and ROE), whereas leverage is inversely related to financial performance (Mushafiq et al., 2021). The Z-Score-Scoreken as a credit risk indicator in this research.

A study was done on thirty-two commercial banks in Indonesia to identify the relationship between non-performing loans as the dependent variable, return on assets (ROA) as an independent variable, loan-to-deposit ratio as an independent variable, and cost-to-income ratio as an independent variable. The study found that cost-to-income ratio and non-performing loans have a negative and large impact on return on assets, whereas the loan-to-deposit ratio has a positive and considerable impact (Dewi and Badjra, 2020). To obtain the regression coefficient the author used a multiple linear regression analysis model; later on, he did an autocorrelation test, a heteroscedasticity test, and other relevant tests to verify the model.

As per the study of 84 listed non-financial companies on the Kuala Lumpur, Malaysia, Stock Exchange, it was found that 52 companies are at high risk and 32 are considered low risk (Hiong et al., 2021). The experiment is done through Altman's Z-score model. Applying this model, one can identify the strengths and weaknesses of a company, which will help investors make the right decision. Though what factors are involved in the strength or weakness of a company are not shown in this research, more in-depth impact factor analysis can provide more insight for investors to observe the company's health.

After studying numerous relevant published papers, it was observed that most of the studies tried to show the current financial health condition of different financial organizations in different countries. But the impact of different financial ratios on Z''-Score is still unknown. After calculating the Z''-Score, this study will help determine the impact of different financial ratios on the calculated Z''-Score. As a result, financial organizations can take steps to improve their financial health by improving the impactful financial ratio's value.

The Altman Z-Score is a well-known distress prediction model (Altman and Danovi, 2013). This model was formulated in 1968. 33 healthy and 33 bankrupt

American manufacturing enterprises made up the model's initial application. The model was accurate enough to be 95% accurate. The Z-Score model had five indicators (Altman, 1968). During the following year, this model was further developed into a new Z''-Score model (Altman, 1995) with four indicators. The updated Altman Z''-Score Model can be used by manufacturing firms operating in underdeveloped nations as well as non-manufacturing sectors. Based on the score, there are three classification areas: 'safe', 'grey' and 'distress'.

In most cases, Return on Assets (ROA) and Return on Equity (ROE) are used to measure profitability or financial performance. Return on equity is inversely correlated with non-performing loans, deposit ratios, and cost-to-income ratios, whereas return on equity is positively correlated with loan ratios. (Imtiaz et al., 2019). In another study, it was also found that Z''-Score is positively related to a company's performance (Jahan and Kabir, 2019).

The pooled Ordinary Least Squares (OLS) regression model is a simple regression model, as this model disregards the space and time dimensions of the pooled data. Due to its simplicity, the pooled regression model may misrepresent the relationship between dependent and independent variables. Panel data that combines time series of cross-sectional observations provides more efficient data that is more informative, more variable, less collinear with other variables, and more degrees of freedom. (Gujarati, 2004, p. 637). The fixed effect model introduced more complexity and precision than the OLS model. Regarding the fixed effect model for panel data analysis, there are various presumptions. The intercept of each individual is a time variant in the fixed effect model. In a fixed-effect model, it is assumed that the regressors' coefficients are constant throughout time and between individuals. On the other hand, the random effect model differs in many ways from the fixed effect model. The error component in the random effect model shows how each individual intercept deviates from the mean value, and the intercept constant denotes the mean value of all the cross-sectional intercepts (Gujarati, 2004, p. 648).

2.2 Research Objectives

The goal of this study was to determine the financial health and effects of various financial metrics on various NBFIs in Bangladesh. This study also tried to find the impact of financial parameters like Income Ratio (CIR), Loan Ratio (LR), Deposit Ratio (DR), and Non-performing Loan Ratio (NPL) on the financial health of NBFIs.

2.3 Research Problems and Justification

According to some recent unrest events involving NBFIs in Bangladesh, it is crucial to know the financial health condition of NBFIs for stakeholders. It is also important to find out the correlation between financial parameters and financial health conditions. Improvement of these factors will lead to a sustainable health condition for NBFIs. It might be that some NBFIs are not concentrating on important financial rations, which can lead them into difficult situations. From the different literature reviews, it is observed that proper data analysis is missing before providing improvement statements. So, this paper will help to provide a concrete financial condition improvement scope through rigorous data analysis by different regression models.

2.4 Hypothesis

Non-performing Loans (NPL), Deposit Ratios (DR), and Cost-to-income Ratios (CIR) are inversely related to NBFI's financial health distress score (Z''-Score), while the Loan Ratio (LR) is positively related to financial health distress score (Z''-Score).

Here is the explanation of the hypothesis:

Independent variables: NPL, DR, CIR, and LR

Dependent variable: financial health distress score (Z''-Score)

Relationship: Inverse relationship between NPL, DR, and CIR and Z''-Score; positive relationship between LR and Z''-Score.

The inverse relationship means that as the value of NPL, DR, or CIR increases, the value of Z''-Score decreases. The positive relationship means that as the

value of LR increases, the value of Z''-Score increases. We are also considering that the financial health of most of the NBFIs in Bangladesh is in distressed condition.

3. Research Methodology

3.1 Data and Sample

Required data for this paper have been collected from secondary data sources. Data for this paper has been collected from published and audited annual reports of different NBFIs in Bangladesh. Annual reports are audited and publicly available, so the data set is authentic and reliable. All information is collected from open source, and there is no ethical violation in this paper.

Data has been taken from different NBFIs in Bangladesh. Due to the unavailability of required annual reports and required data, 13 NBFIs have been excluded from the data set. Data have been taken for a five-year span from 2015 to 2019. This is the most recent data, as most of the companies do not publish annual reports for 2020.

The values of current asset, current liability, total asset, total liability, retained earnings, earnings before interest and taxes, market value of equity, total deposit, total operating income, total operating expenses, unclassified loan, classified loan, and total loan have been manually collected from 105 annual audited reports of 21 NBFIs in Bangladesh from 2015 to 2019.

Microsoft Excel Spreadsheet Software has been used for determining the Z''-Score from the previously defined data. For regression analysis, software for statistics and data science, STATA (Version-14), has been used.

3.2 Analysis Method

To calculate the value of the Z''-Score four ratios have been taken as per the model. Later on, four different financial ratios have been taken as independent variables, and the calculated Z''-Score has been taken as a dependent variable.

3.2.1 Calculation of the Z''-Score

Altman's Z''-Score model will help to categorize financial institutions into 'safe zone, 'grey zone' and 'distress zone' according to their financial health condition. Z''-Score calculated by working capital, retained earnings, earnings before interest and taxes (EBTI), book value, total assets, and total liabilities. Different four ratios are the main components used to calculate the Z''-Score.

For non-manufactures, the Altman Z''-Score Model is:

$$Z'' = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$$

X_1, X_2, X_3, X_4 variables defining and zone distribution are given in table 01:

Table 1: Variable Definition and Zone Interpretation

Variables	
X_1 = Working capital/total asset	
X_2 = Retained Earnings/Total Assets	
X_3 = Earnings before Interest and Taxes (EBTI)/Total Assets	
X_4 = Market Value of Equity/Total Liabilities	
Zone Defining According to Altman's Z''-Score Model	
Zone	**Z''-Score**
Safe Zone	Z''-Score>2.6
Grey Zone	1.1<Z''-Score<2.6
Distress Zone	Z''-Score<1.1

Source: Altman, Danovi and Falini (2013)

All the four ratios X1 (working capital/total assets), X2 (retained earnings/total assets), X3 (earnings before interest and taxes (EBTI)/total assets), and X4 (market value of equity/total liabilities) are necessary to calculate the Z''-Score value. A higher Z''-Score leads to a better financial health condition for a company. A lower Z''-Score leads to a financially distressed company. A short description of different variables and ratios can be found in Table-2:

Table-2: Short Description of Different Variables and Ratios to Determine Z''-Score

Variable Name	Description
Working capital	Working capital is the result of subtracting current assets from current liabilities. It is a measure of liquidity of a company.
Total Assets	The total asset is the sum of the short-term and long-term assets of a company.
Total Liabilities	Liability is an obligation that must eventually be paid, and it is a claim on assets.
Retained Earnings	Retained earnings are the amount carried forward into the coming years from net earnings.
Earnings before interest and taxes	Earnings before Interest and Taxes (EBTI) shows the operating profit or operating earnings of a financial organization. It is calculated from the balance sheet as earnings before tax and the provision.
Market Value of Equity of Book Value	This is the total market value of shareholders' equity.
X_1 = Working capital/total asset	The working capital and total assets ratios are symbols of a bank's liquidity and ability to meet creditors short-term obligations.
X_2 = Retained earnings/total assets	Accumulated Retained Earnings to Total Assets (TA) is the ratio that denotes the reinvestment capacity that can be explained by this ratio. A positive ratio indicates the company's financial solvency.
X_3 = Operating earnings/total assets	By using this ratio, the efficiency of using the company's total assets can be measured. This ratio indicates the capacity of the firm to generate a satisfactory level of earnings to pay off its fixed obligations, like interest.
X_4 = Market value of equity/total liabilities	This ratio indicated the condition of the market value of the bank's stock in comparison to its total liabilities. The higher the ratio, the higher the market price of the firm's share is.

3.2.2 Statical Model

There are lots of factors or ratios to define the different statuses of a financial organization. Randomly, four financial ratios have been taken as independent variables for the regression analysis. The four ratios are the cost-to-Income Ratio (CIR), Deposit Ratio (DR), Non-performing Loan (NPL), and Loan Ratio (LR). A short description of different financial ratios considered independent variables can be found in Table-3:

Table 3: Short Description of Financial Ratios considered Independent Variables

Ratios Name	Description
Cost-to-Income Ratio (CIR)	This is the ratio of total operating costs to total operating income of a firm at a certain year. It measures the operating efficiency of a bank.
Deposit Ratio (DR)	The ratio of the total deposit to the total asset is the deposit ratio. The profitability of a firm can be impacted if it fails to transform its deposits into loans efficiently.
Non-performing Loan (NPL)	NPL can be derived from the ratio of the total classified loan amount to the total loan amount. If a loan does not generate income for a certain period, then that loan will be called a classified loan.
Loan Ratio (LR)	The loan ratio can be calculated by dividing the total loan amount by the total asset. A loan generates income for a financial organization. More loans in the asset portfolio are expected to generate more income for the firm.

The regression model to test the hypothesis has been chosen and is given below:

$$Z''\text{-}Score = \beta_0 + \beta_1\, CIR + \beta_2 DR + \beta_3 NPL + \beta_4 LR + \varepsilon$$

Considered Z''-Score as a dependent variable and CIR (cost-to-income ratio), DR (deposit ratio), NPL (non-performing loan), and LR (loan ratio) as independent variables. Here 'β_0', 'β_1', 'β_2', 'β_3' and 'β_4' are coefficients to be estimated, and 'ε' is the error component.

3.2.3 Regression Models, Diagnostic, and Robustness Test

An Ordinary Least Squares (OLS) regression model has been run, considering Z''-Score as the dependent variable and CIR, DR, NPL, and LR as the independent variables. For panel data sets, better results cannot be expected from the OLS regression model as the OLS model cannot differentiate the data set values for different companies for different years. For better results, a fixed effect regression model is applied for panel data regression analysis.

The Generalized Least Squares (GLS) random effect regression model was applied for regression analysis along with the fixed effect model. Later on, the

Hausman Specification Test is done to find the best-suited model between the fixed effect model and the random effect model.

Macro panels with extensive time series typically experience issues with cross-sectional dependence and serial correlation. For a microdata set with a few years of data, this is not much of a problem (Baltagi, 2005, p. 199). The data set is for 21 NBFIs over a period of 5 years. This data set is a microdata set. General diagnostic tests for cross-sectional dependence in panel data were also performed.

To obtain heteroskedasticity-robust standard errors, the Huber-White robust standard error model has been run.

A Breusch-Pagan Lagrange Multiplier (LM) test has been run for the random effect model to determine the best-fitted model between random effect regression and simple OLS regression.

4. Result Analysis

4.1 Estimation of Z''-Score and Financial Health

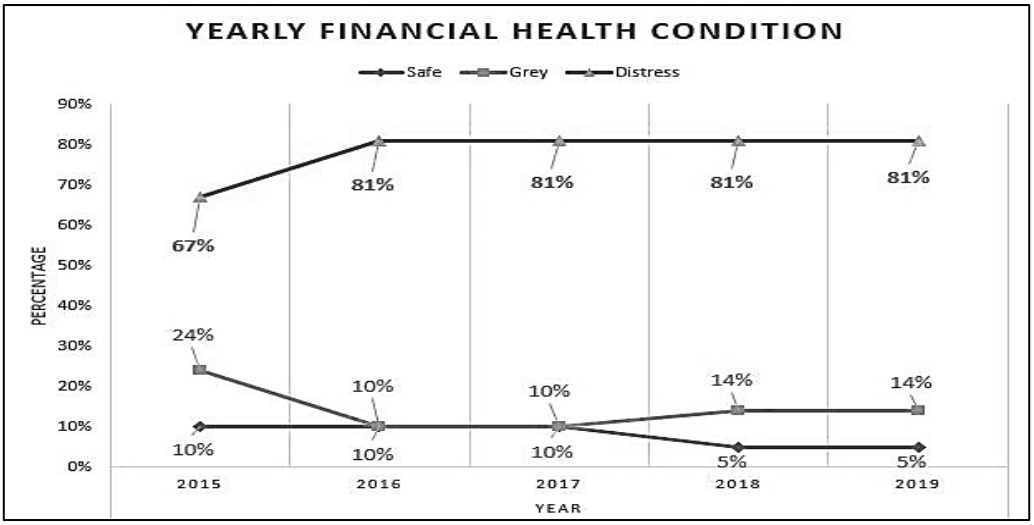
The collected data has been used for determining the Z''-Score for 21 NBFIs of Bangladesh during the years 2015 to 2019 by the Altman Z''-Score Model. After the calculation, it is found that most of the companies are in a financially distressed condition according to the Altman Z''-Score Model. In the year 2015, only 10% of NBFIs were in the 'safe' zone, 24% were in the 'grey' zone and 67% were in the financially distressed zone. In the years 2016 and 2017, only 10% of NBFIs were in the 'safe' zone, 10% were in the 'grey' zone and 81% were in the financially distressed zone. The percentage of NBFIs in a distressed zone has increased since 2015. In the years 2018 and 2019, only 5% of NBFIs were in the 'safe' zone, 14% were in the 'grey' zone and 81% were in the financially distressed zone. Table-formatted result data can be found in Table-4 and graphical analysis can be found in Figure-1:

Table 4: Bangladeshi NBFI Performance Analysis Yearly by Number of Institutions

Zone Type	Year									
	2015		2016		2017		2018		2019	
	No.	%	No.	%	No.	%	No.	%	No.	%
Safe	2	10%	2	10%	2	10%	1	5%	1	5%
Grey	5	24%	2	10%	2	10%	3	14%	3	14%
Distress	14	67%	17	81%	17	81%	17	81%	17	81%
Total	21	100%	21	100%	21	100%	21	100%	21	100%

Source: Constructed by the Author Based on Data from the Annual Reports of Sample Companies

Figure 1: Graphical Performance Analysis of Bangladeshi NBFIs Yearly by Number of Institutions



It is observed that the financial condition of NBFIs is not good at all. It will be very difficult to protect against financial shocks for most in the NBFIs in Bangladesh. After the year 2015, financial conditions have fallen, and financial distress is constant for 81% of NBFIs.

4.2 Regression Analysis

According to the correlation matrix (Table-5), there is no significant correlation between the dependent variable (Z''-Score) and the independent variables (CIR, DR, NPL, and LR). The correlation between DR and Z''-Score is 0.59, but it is considerable.

Table 5: Correlation Matrix between Dependent Variables and Independent Variables

Variables	Z	CIR	DR	NPL	LR
Z''-Score	1				
CIR	-0.0531	1			
DR	-0.5914	0.1238	1		
NPL	-0.3789	0.0427	-0.1018	1	
LR	-0.2105	-0.4263	0.1351	-0.0163	1

A graphic representation of the histogram analysis of all the variables can be found in Figure-2. It is observed that LR and CIR are mostly concentrated at a single point, whereas Z''-Score, NPL, and DR are distributed along the whole axis.

From the Table-6, we can see the mean value, standard deviation, minimum value, and maximum value of Z''-score, the Cost-to-income Ratio (CIR), Deposit Ratio (DR), Non-performing Loan Ratio (NPL), and Loan Ratio (LR). It is observed that the cost-to-income ratio has the highest standard deviation among all five variables. The minimum value of the cost-to-income ratio is -272.0132, and the maximum value is 343.609. The standard deviation for the Z''-Score is 2.49712, with a minimum value of -6.892535 and a maximum value of 14.64688. Detail is in Table-6.

Figure 2: Density Histogram of Different Variables

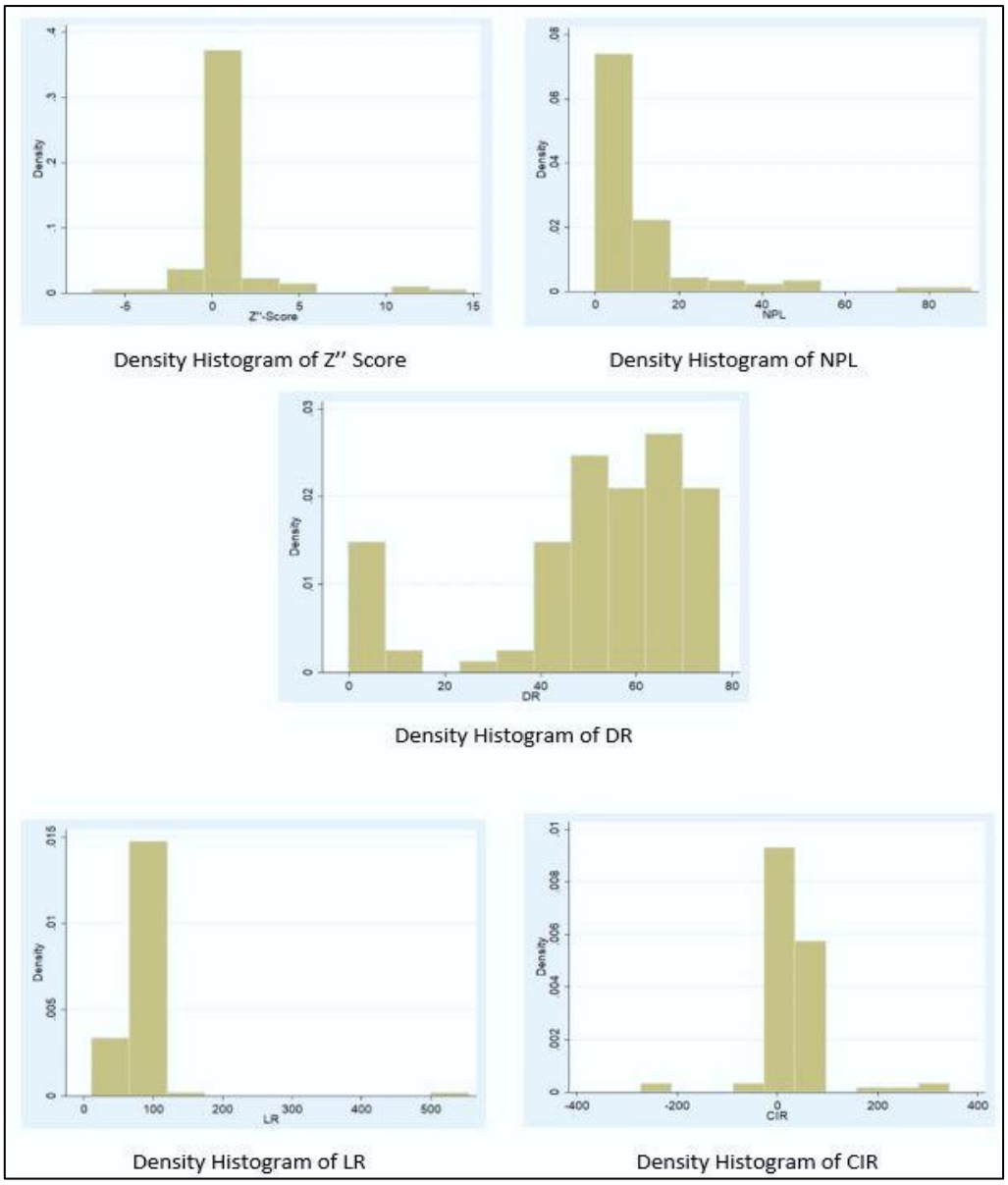


Table 6: Summary of Considered Variables

Variable	Number of Obs.	Mean Value	Standard Deviation	Minimum Value	Maximum Value
Z''-Score	105	0.8710803	2.49712	-6.892535	14.64688
CIR	105	33.89917	64.49843	-272.0132	343.609
DR	105	51.06828	21.96885	0	77.39772
NPL	105	10.70025	14.60343	0	90.30875
LR	105	79.47931	48.79453	11.74533	555.6018

The test results of Ordinary Least Square (OLS) can be found in Table-7.

Table 7: OLS Regression Model Analysis Result

Variables	Coefficient	Standard Error	t stat (t)	P value (P>|t|)
CIR	-0.0007315	.002896	-0.25	0.801
DR	-0.0698958	.0077956	-8.97	0.000
NPL	-0.0757577	.0113896	-6.65	0.000
LR	-0.0073024	.0038277	-1.91	0.059
Constant	5.856352	.5192345	11.28	0.000
	SS	Df	MS	Number of Observations = 105
Model	364.848499	4	91.2121247	
Residual	283.654852	100	2.83654852	
Total	648.503351	104	6.23560914	
F (4,100) = 32.16		Prob > F = 0.0000		
R-squared = 0.5626		Adj. R-squared = 0.5451		

As per the OLS regression model analysis, it is observed that all the independent variables are negatively related to the Z''-Score. DR and NPL are providing significant value at a 5% level, whereas CIR and LR are not significant in this model.

The data set used for this study is a combination of cross-sectional data and time-series. So, the data set is a panel data set. In STATA, the data set is defined as a panel data set, and it is found that the data set is strongly balanced. Details in Table-8.

Table 8: Panel Data Status

Panel Variable	Company (strongly balanced)
Time Variable	Year, 2015-2019

Findings of the fixed effect regression model are given below in Table 9:

Table 9: Fixed Effect Regression Model Result

Dependent Variable	**Z''-Score**	**Coefficient**	**Std. Error**	**P>|t|**
Independent Variables	CIR	0.0006765	0.0022393	0.763
	DR	-0.0346336	0.0143332	0.018
	NPL	-0.0572119	0.0110577	0.000
	LR	-0.0017127	0.0030753	0.579
Prob > F = 0.0000; number of obs. = 105, number of groups = 21				

In the model, Z''-Score is negatively related to Deposit Ratio (DR), non-Performing Loan (NPL) and Loan Ratio (LR) and positively related to Cost-to-Income Ratio (CIR). But the relation of the Z''-Score with CIR and LR is insignificant as the probability is greater than 5%. The relation between DR and NPL and the Z''-Score is significant at 5%. Z''-Score is negatively related to deposit ratio and non-performing loans.

The findings of the random effect model can be found in Table-10.

Table 10: GLS Random Effect Regression Model Result

Dependent Variable	Z''-Score	Coefficient	Std. Error	P>|Z|
Independent Variables	CIR	-0.0002326	0.0022253	0.917
	DR	-0.0566766	0.0102259	0.000
	NPL	-0.0657647	0.0103367	0.000
	LR	-0.0034239	0.0030484	0.261
Prob > chi2 = 0.0000; Number of obs. = 105, Number of groups = 21				

In the model, Z''-Score is negatively related to Cost-to-income ratio (CIR), Deposit Ratio (DR), Non-performing Loan (NPL), and Loan Ratio (LR). But the relation of the Z''-Score with CIR and LR is insignificant as the probability is greater than 5%. The relationship between DR and NPL and the Z''-Score is significant at 5%. The Z''-Score is negatively related to deposit ratios and non-performing loans.

Later on, the Hausman Specification Test is done to find the best-suited model. The detailed result of the Hausman Specification Test is given below in Table-11.

Table 11: Hausman Specification Test Result

	Coefficients		Difference (b-B)	Sqrt (diag (V_b-V_B)) S.E.
	Fixed (b)	Random (B)		
CIR	.0006765	-.0002326	.0009091	.0002497
DR	-.0346336	-.0566766	.022043	.0100436
NPL	-.0572119	-.0657647	.0085528	.0039277
LR	-.0017127	-.0034239	.0017112	.0004055
Chi2(4) = 2.36		Null Hypothesis: Random Effect Model is appropriate; Alt. Hypothesis: Fixed Effect Model is appropriate		
Prob>chi2=0.6701				

The Hausman Specification Test accepts the null hypothesis as long as the probability is greater than 5%. The Hausman Specification Test recommends that the random effect regression model is best suited for the regression analysis with this panel data set. The cross-sectional dependence test has been done.

The result of cross-sectional dependence can be found in Table-12.

Table 12: Test Results of Cross-sectional Dependence

Pesaran's test of cross-sectional independence = 0.287	Null Hypothesis: There is no cross-sectional dependence;
Pr = 0.7741	Alt. Hypothesis: There is cross-sectional dependence.

The probability is more than 5%, so the null hypothesis is accepted. There is no cross-sectional dependence in the panel data set.

According to the result of the Huber-White robust standard error model, it is found that Cost-to-income Ratio (CIR) and Loan Ratio (LR) are negatively related to Z''-Score but these variables are not significant. Deposit Ratio (DR) and Non-performing Loan (NPL) are also negatively related to Z''-Score and they are also significant at the 5% level. There is a similarity between this robust variance estimation result and the random effect model result. The detailed results can be found in Table-13.

Table 13: Robust Variance Estimation

Dependent Variable	**Z''-Score**	**Coefficient**	**Robust Std Err.**	**P>|Z|**
Independent Variables	CIR	-0.0002326	0.0017976	0.897
	DR	-0.0566766	0.0245096	0.021
	NPL	-0.0657647	0.0125835	0.000
	LR	-0.0034239	0.0030406	0.260
Prob > chi2 = 0.0000				
Number of obs. = 105, number of groups = 21.				

The null hypothesis for the Breusch-Pagan Lagrange Multiplier (LM) test is that there is no significant difference in units (no panel effect on the data set). From the finding, it is observed that the test result rejects the null hypothesis as the probability is less than 5%. It proves that the random effect model is more appropriate than simple OLS regression. Detailed results can be found in Table-14.

Table 14: Breusch-Pagan Lagrange Multiplier (LM) Test

	Var	Sd = sqrt (VAR)
Z''-Score	6.235609	2.49712
E	1.349315	1.1616
U	1.383659	1.176291
Chibar2 (01) = 45.27	Null Hypothesis: There is no significant difference in units (no panel effect); Alt. Hypothesis: There is a significant difference in units (panel effect).	
Prob > chibar2 = 0.0000		

5. Discussion of the Results

According to the data analysis, most of the NBFIs are in distressed condition. It might be difficult for them to protect themselves if any financial shock happens in the near future. A higher Z''-Score means higher financial stability.

The data set used for this study is a strongly balanced panel data set, so an acceptable model for regression analysis is a fixed effect model or random effect model rather than OLS regression model. As per the Hausman test, it is observed that the random effect model is more appropriate for this analysis than the fixed effect model. As per the result of the random effect model regression analysis, it is found that all four independent variables (CIR, DR, NPL, and LR) are negatively related to the Z''-Score. Though CIR and LR are not significant, a negative coefficient suggests a reduction in the cost-to-income ratio, and the loan ratio might improve the financial condition. As per the histogram chart (Figure-2), it is observed that CIR and LR are mostly concentrated at a point where Z''-Score is diversified. This might be a reason for its insignificant value. Whereas NPL and DR show diversification at the histogram (Figure-2) and also provide significant value.

A non-performing loan is negatively related to a bank's profitability (Dewi, 2020). As per the analysis, it is also showing that higher NPL and higher DR are negatively related to the financial distress condition.

6. Conclusion

6.1 Conclusion and Recommendation

This study attempted to find the financial health conditions of different NBFIs in Bangladesh and the impact of different financial parameters on their financial health. It has been found that most of the NBFIs are financially distressed. 67% of NBFIs from the selected data were in a financially distressed zone in 2015. In 2016, 2017, 2018, and 2019, it increased to 81%. This is alarming for the financial sector. It will be very difficult to protect against financial shocks for most of the NBFIs in Bangladesh. This study also tried to find the impact of financial parameters on Z''-Score. It is observed that, as per the model, the Cost-to-income Ratio (CIR) and Loan Ratio (LR) have no significant impact on financial health. Whereas Deposit Ratio (DR) and Non-performing Loan Ratio (NPL) are negatively related to Z''-Score. Where the non-performing loan is the most impactful parameter for the Z''-Score. A deposit is the liability of a financial company. If a financial organization cannot efficiently convert its deposit amount to loan amount, then that deposit will be a burden, and financial distress may occur for that company. For financial institutions, one of the main income sources is the loan's interest. If a loan fails to make interest, then the company will face a financial crisis. A non-performing loan is not making interest for the company, and as a result, it is in a distressed condition. This is in compliance with the relationship between the non-performing loan and financial organizations' profitability. So, it is strongly recommended that financial organizations focus mostly on reducing non-performing loans and mobilizing deposits efficiently.

Through this research analysis, financial organizations can perform better by observing and controlling the different important financial ratios. This study makes contribution by expanding the application of Altman's Z''-Score model regarding NBFIs in Bangladesh. NBFIs in Bangladesh may benefit from using the Z''-Score model to evaluate their financial standing, according to the study's findings. The research's offers fresh perspectives on the factors that influence the financial stability of NBFIs in Bangladesh. These results may help Bangladeshi NBFIs strengthen their financial situation. They can also be helpful

for regulators and decision-makers to create regulations that support the NBFIs' financial stability.

6.2 Research Limitations

Data from all 34 NBFIs over a longer period of time can produce a more accurate result. Increasing different financial variables will help to determine the relationship of the Z''-Score with other financial variables. Altman's Z''-Score is for the non-manufacturing industry of developing countries. If the Z''-Score model can be modified only for the financial organization, then a better result can be expected.

6.3 Study Scope

The same model can be run for the commercial banks of Bangladesh and other countries, whether it follow the same recommendations or not.

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Appendices

Appendix Table 1: Calculation of Z''-Score and Zone Distribution

No	Company Name	Year	X1 = Working Capital / Total Asset	X2 = Retained Earning / Total Asset	X3 = EBTI / Total Asset	X4 = Book Value / Total Liability	Z''-Score = 6.56 X1 + 3.26 X2 + 6.72 X3 + 1.05 X4	Zone
1	IDLC Finance Limited	2019	0.0247	0.0231	0.0208	0.1086	0.4916	Distress
		2018	(0.0068)	0.0241	0.0231	0.1171	0.3120	Distress
		2017	0.0005	0.0258	0.0285	0.1288	0.4141	Distress
		2016	0.0232	0.0295	0.0337	0.1104	0.5907	Distress
		2015	(0.2103)	0.0235	0.0358	0.1036	(0.9534)	Distress
2	MIDAS Financing Ltd	2019	0.0090	0.0116	0.0120	0.1618	0.3474	Distress
		2018	0.0138	0.0032	0.0027	0.1376	0.2639	Distress
		2017	0.0279	0.0125	0.0219	0.1362	0.5142	Distress
		2016	(0.4180)	(0.0121)	0.0338	0.1207	(2.4277)	Distress
		2015	0.1192	(0.0723)	0.0051	0.1515	0.7403	Distress
3	United Finance Limited	2019	(0.0375)	0.0091	0.0177	0.1712	0.0826	Distress
		2018	(0.0170)	0.0079	0.0197	0.1489	0.2024	Distress
		2017	0.0413	0.0086	0.0171	0.1444	0.5650	Distress
		2016	0.0256	0.0124	0.0226	0.1654	0.5339	Distress
		2015	0.0082	0.0122	0.0270	1.1618	1.4949	Gray
4	Bangladesh Infrastructure Finance Fund Limited	2019	0.3127	0.0285	0.0563	2.2049	4.8377	Safe
		2018	0.2927	0.0224	0.0613	3.4166	5.9920	Safe
		2017	0.6483	0.0252	0.0590	7.1247	12.2127	Safe
		2016	0.7165	0.0265	0.0592	9.0115	14.6469	Safe
		2015	0.7003	0.0340	0.0720	5.8302	11.3106	Safe
5	Delta Brac Housing Finance Corporation	2019	0.0484	0.0084	0.0239	0.1086	0.6198	Distress
		2018	(0.4092)	0.0075	0.0261	0.0961	(2.3836)	Distress
		2017	(0.0687)	0.0076	0.0251	0.0868	(0.1665)	Distress
		2016	(0.0449)	0.0048	0.0147	0.0838	(0.0921)	Distress
		2015	(0.0354)	0.0101	0.0353	0.0975	0.1407	Distress
6	Lanka Bangla Finance Limited	2019	0.0159	0.0267	0.0108	0.1448	0.4160	Distress
		2018	0.0506	0.0285	0.0101	0.1263	0.6253	Distress
		2017	0.0122	0.0313	0.0179	0.1024	0.4097	Distress
		2016	0.0702	0.0382	0.0192	0.1199	0.8401	Distress
		2015	0.0413	0.0463	0.0234	0.1394	0.7260	Distress

No	Company Name	Year	X1 = Working Capital / Total Asset	X2 = Retained Earning / Total Asset	X3 = EBTI / Total Asset	X4 = Book Value / Total Liability	Z''-Score = 6.56 X1 + 3.26 X2 + 6.72 X3 + 1.05 X4	Zone
7	IPDC Finance Limited	2019	0.0171	0.0104	0.0184	0.0948	0.3688	Distress
		2018	0.0167	0.0107	0.0222	0.0802	0.3785	Distress
		2017	0.0038	0.0139	0.0171	0.0860	0.2754	Distress
		2016	0.0022	0.0255	0.0222	0.1401	0.3941	Distress
		2015	0.0835	0.0714	0.0544	0.4321	1.5992	Gray
8	Infrastructure Development Company Ltd.	2019	0.2836	0.0204	0.0442	0.1012	2.3299	Gray
		2018	0.2813	0.0097	0.0346	0.0901	2.2040	Gray
		2017	0.4350	0.0104	0.0370	0.0895	3.2299	Safe
		2016	0.4556	0.0133	0.0378	0.0890	3.3796	Safe
		2015	0.5646	0.0223	0.0425	0.0916	4.1580	Safe
9	International Leasing and Financial Services Limited	2019	(0.5088)	(0.6236)	(0.1701)	(0.3606)	(6.8925)	Distress
		2018	(0.2929)	0.0034	0.0106	0.0647	(1.7708)	Distress
		2017	0.0139	0.0062	0.0138	0.0631	0.2705	Distress
		2016	0.0101	0.0003	0.0117	0.0681	0.2178	Distress
		2015	0.0066	0.0043	0.0172	0.1071	0.2855	Distress
No	Company Name	Year	X1 = Working Capital / Total Asset	X2 = Retained Earning / Total Asset	X3 = EBTI / Total Asset	X4 = Book Value / Total Liability	Z''-Score = 6.56 X1 + 3.26 X2 + 6.72 X3 + 1.05 X4	Zone
10	National Housing Finance and Investments Limited	2019	(0.0768)	0.0114	0.0216	0.1157	(0.2003)	Distress
		2018	0.0486	0.0116	0.0245	0.0924	0.6182	Distress
		2017	0.0228	0.0139	0.0293	0.1176	0.5155	Distress
		2016	0.0500	0.0174	0.0385	0.1542	0.8047	Distress
		2015	0.1182	0.0225	0.0453	0.2171	1.3812	Gray
11	First Finance Limited	2019	(0.0065)	(0.0545)	(0.0229)	0.1118	(0.2575)	Distress
		2018	(0.2727)	(0.0580)	(0.0354)	0.0835	(2.1281)	Distress
		2017	0.0052	(0.0204)	(0.0141)	0.1194	(0.0015)	Distress
		2016	0.0037	0.0062	0.0130	0.1793	0.3199	Distress
		2015	0.0215	0.0022	0.0175	0.1641	0.4380	Distress
12	Bangladesh Finance Limited	2019	0.0401	0.0218	0.0195	0.1969	0.6720	Distress
		2018	0.0625	0.0204	0.0185	0.1630	0.7718	Distress
		2017	0.0590	0.0152	0.0283	0.1372	0.7709	Distress
		2016	0.0069	0.0109	0.0245	0.1293	0.3811	Distress
		2015	0.0087	0.0082	0.0181	0.1182	0.3291	Distress

No	Company Name	Year	X1 = Working Capital / Total Asset	X2 = Retained Earning / Total Asset	X3 = EBTI / Total Asset	X4 = Book Value / Total Liability	Z''-Score = 6.56 X1 + 3.26 X2 + 6.72 X3 + 1.05 X4	Zone
13	National Finance Limited	2019	0.0622	0.0059	0.0056	0.2700	0.7483	Distress
		2018	0.0359	0.0103	0.0328	0.2125	0.7126	Distress
		2017	0.0766	0.0090	0.0317	0.1950	0.9497	Distress
		2016	0.0975	0.0083	0.0421	0.2279	1.1888	Gray
		2015	0.0426	0.0145	0.0456	0.2131	0.8569	Distress
		Year	X1 = Working Capital / Total Asset	X2 = Retained Earning / Total Asset	X3 = EBTI / Total Asset	X4 = Book Value / Total Liability	Z''-Score = 6.56 X1 + 3.26 X2 + 6.72 X3 + 1.05 X4	Zone
14	Prime Finance & Investment Ltd.	2019	0.0603	(0.1151)	0.0031	0.3425	0.4008	Distress
		2018	0.0038	(0.1073)	(0.0069)	0.2952	(0.0618)	Distress
		2017	(0.0280)	(0.0904)	(0.0231)	0.2233	(0.3989)	Distress
		2016	(0.0887)	(0.0578)	(0.0356)	0.2344	(0.7632)	Distress
		2015	(0.1853)	(0.0222)	(0.0225)	0.2475	(1.1792)	Distress
15	Premier Leasing & Finance Ltd.	2019	0.0111	0.0051	0.0041	0.1427	0.2666	Distress
		2018	0.1140	0.0076	0.0103	0.1384	0.9873	Distress
		2017	0.0100	0.0133	0.0148	0.1052	0.3188	Distress
		2016	0.0466	(0.0750)	(0.0188)	0.0169	(0.0475)	Distress
		2015	0.0524	0.0006	0.0065	0.1062	0.5003	Distress
16	Fas Finance & Investment Ltd.	2019	(0.4641)	(0.0750)	(0.0188)	0.0169	(3.3979)	Distress
		2018	0.0054	0.0006	0.0065	0.1062	0.1921	Distress
		2017	0.0032	0.0109	0.0131	0.1157	0.2658	Distress
		2016	(0.1455)	0.0086	0.0138	0.1152	(0.7128)	Distress
		2015	0.0117	0.0113	0.0113	0.1411	0.3374	Distress
17	Islamic Finance and Investment Limited	2019	0.0830	0.0091	0.0226	0.1335	0.8663	Distress
		2018	0.0837	0.0116	0.0227	0.1329	0.8790	Distress
		2017	0.0787	0.0128	0.0158	0.1440	0.8149	Distress
		2016	0.0633	0.0170	0.0325	0.1673	0.8650	Distress
		2015	0.0620	0.0172	0.0317	0.2067	0.8929	Distress
18	Bay Leasing & Investment Ltd.	2019	0.0572	0.0115	0.0166	0.2340	0.7703	Distress
		2018	0.0378	0.0110	0.0202	0.1982	0.6271	Distress
		2017	0.0124	0.0094	0.0166	0.2143	0.4485	Distress
		2016	0.0049	0.0093	0.0157	0.2812	0.4630	Distress
		2015	0.0069	0.0074	0.0194	0.5199	0.7461	Distress

No	Company Name	Year	X1 = Working Capital / Total Asset	X2 = Retained Earning / Total Asset	X3 = EBTI / Total Asset	X4 = Book Value / Total Liability	Z''-Score = 6.56 X1 + 3.26 X2 + 6.72 X3 + 1.05 X4	Zone
19	Uttara Finance and Investments Limited	2019	0.0888	0.0220	0.0457	0.2275	1.1998	Gray
		2018	0.1862	0.0170	0.0582	0.2006	1.8785	Gray
		2017	0.1405	0.0076	0.0486	0.1924	1.4751	Gray
		2016	(0.0216)	0.0064	0.0449	0.2323	0.4248	Distress
		2015	0.0857	0.0051	0.0492	0.2072	1.1272	Gray
20	Phoenix Finance & Investments Limited	2019	0.0074	0.0103	0.0179	0.1208	0.3296	Distress
		2018	0.0029	0.0084	0.0267	0.1053	0.3364	Distress
		2017	0.0245	0.0080	0.0268	0.0903	0.4614	Distress
		2016	0.0040	0.0102	0.0279	0.1173	0.3706	Distress
		2015	0.0030	0.0124	0.0340	0.1440	0.4394	Distress
21	GSP Finance Company (Bangladesh) Limited	2019	0.0933	0.0156	0.0569	0.4276	1.4934	Gray
		2018	0.0542	0.0247	0.0582	0.4303	1.2791	Gray
		2017	0.0706	0.0249	0.0596	0.3517	1.3139	Gray
		2016	0.0592	0.0286	0.0672	0.4475	1.4032	Gray
		2015	0.0623	0.0266	0.0517	0.3818	1.2440	Gray

Appendix Table 2: Ratios for Regression Analysis

No	Company Name	Year	Cost to Income Ratio (CIR) = Total Operating Expenses / Total Operating Income	Deposit Ratio (DR) = Total Deposit / Total Asset	Non-performing Loan (NPL) = Classified Loan / Total Loan	Loan Ratio (LR) = Total Loan/Total Asset
1	IDLC Finance Limited	2019	41.77674	69.33732	3.065832	79.7598
		2018	40.66033	70.15772	2.201108	78.34972
		2017	40.28452	8.675407	2.765667	76.30373
		2016	37.86656	9.271492	2.975133	79.91057
		2015	35.18843	66.54761	3.058105	75.04345
2	MIDAS Financing Ltd	2019	57.88946	56.43618	9.923025	86.05983
		2018	63.32734	62.58768	12.48665	86.20838
		2017	35.33007	66.52413	9.921254	86.34885
		2016	45.35316	65.12633	11.9663	84.87592
		2015	66.51112	52.23181	25.59685	79.72301
3	United Finance Limited	2019	57.08496	56.77945	4.252186	65.7084
		2018	49.19892	63.01584	2.955807	74.53468
		2017	52.47815	65.19108	2.979427	70.83021
		2016	47.67616	63.14832	3.793098	66.76146
		2015	41.94584	61.58078	5.051112	61.62059
4	Bangladesh Infrastructure Finance Fund Limited	2019	7.566658	1.460188	1.3841	54.75436
		2018	7.771857	0	0.030194	56.31332
		2017	7.623678	0	0	41.51324
		2016	6.499816	0	0	31.88819
		2015	2.252156	0	0	31.1661
5	Delta Brac Housing Finance Corporation	2019	26.9746	73.231	0.452841	75.1045
		2018	24.81783	75.33824	0.302799	76.25822
		2017	24.7089	75.46216	0.272246	77.39592
		2016	22.9038	74.01053	0.362695	77.11869
		2015	19.38716	69.2234	0.299765	81.95997

No	Company Name	Year	Cost to Income Ratio (CIR) = Total Operating Expenses / Total Operating Income	Deposit Ratio (DR) = Total Deposit / Total Asset	Non-performing Loan (NPL) = Classified Loan / Total Loan	Loan Ratio (LR) = Total Loan/Total Asset
6	Lanka Bangla Finance Limited	2019	54.32589	59.2247	5.58536	76.61199
		2018	57.50609	66.22916	3.603455	79.07035
		2017	49.86395	66.04056	3.067761	79.12522
		2016	51.34529	69.67503	3.524438	81.13012
		2015	46.0066	67.68198	3.718005	80.73335
7	IPDC Finance Limited	2019	45.31171	71.98734	1.568752	78.76417
		2018	40.09617	73.38193	2.137944	87.75339
		2017	45.99012	75.71306	0.620507	87.72686
		2016	40.38369	76.09173	0.705873	86.28533
		2015	30.28152	55.40945	1.979215	78.22195
8	Infrastructure Development Company Ltd.	2019	11.82188	0	4.544729	75.70653
		2018	9.763201	0	7.149121	73.81235
		2017	7.629727	0	10.91493	54.85238
		2016	7.035799	0	9.450185	56.16562
		2015	6.004138	0	1.580238	57.60081
9	International Leasing and Financial Services Limited	2019	-2.53318	61.31492	90.30875	86.39427
		2018	31.17944	64.29108	4.557169	82.42145
		2017	28.12259	66.47785	4.71053	80.20741
		2016	27.544	61.73073	4.689468	83.76165
		2015	23.37425	60.39115	7.349593	85.6075
10	National Housing Finance and Investments Limited	2019	33.22451	72.61933	5.211315	73.98628
		2018	24.91497	76.97017	4.253851	58.92976
		2017	24.28244	72.18971	5.121168	63.38679
		2016	21.91031	69.20294	4.947131	73.13867
		2015	18.18037	62.91703	5.611517	82.84994

No	Company Name	Year	Cost to Income Ratio (CIR) = Total Operating Expenses / Total Operating Income	Deposit Ratio (DR) = Total Deposit / Total Asset	Non-performing Loan (NPL) = Classified Loan / Total Loan	Loan Ratio (LR) = Total Loan/Total Asset
11	First Finance Limited	2019	343.609	59.54075	36.57573	87.09391
		2018	-218.703	61.62298	47.60484	78.91118
		2017	311.7597	53.26793	32.17633	80.6087
		2016	73.73764	53.6455	35.46291	88.57602
		2015	51.65045	61.31549	40.41139	82.51505
12	Bangladesh Finance Limited	2019	46.01312	51.4909	4.844363	76.58438
		2018	45.68559	51.1757	4.417213	72.81193
		2017	32.06057	52.75703	6.084469	72.51518
		2016	32.03172	50.10112	7.831066	77.20537
		2015	29.66595	60.04692	4.508147	82.05384
13	National Finance Limited	2019	78.85822	42.3576	23.46368	77.04406
		2018	27.4441	45.42232	16.18839	81.86461
		2017	24.75123	51.34889	14.86646	76.91778
		2016	19.63322	54.0794	13.70512	76.73028
		2015	19.33014	57.71689	5.902596	79.76772
14	Prime Finance & Investment Ltd.	2019	84.26146	43.35607	15.94392	58.96183
		2018	166.8422	47.35392	17.11602	60.45414
		2017	-272.013	52.05151	1.40123	555.6018
		2016	-75.3059	47.66942	12.03522	68.44423
		2015	220.6261	54.28268	10.20238	70.20306
15	Premier Leasing & Finance Ltd.	2019	63.09886	49.20154	29.61247	74.02669
		2018	40.78715	50.7553	25.62668	74.76639
		2017	28.56303	54.49144	9.761074	75.25783
		2016	31.92655	55.2979	9.279364	86.60871
		2015	18.32519	55.63345	9.042567	78.0991

No	Company Name	Year	Cost to Income Ratio (CIR) = Operating Cost / Operating Income	Deposit Ratio (DR) = Total Deposit / Total Asset	Non-performing Loan (NPL) = Classified Loan / Total Loan	Loan Ratio (LR) = Total Loan/Total Asset
16	Fas Finance & Investment Ltd.	2019	-51.9052	44.14917	73.1508	88.44544
		2018	52.75854	44.60922	15.21047	81.76462
		2017	35.79451	47.89543	11.67228	76.46599
		2016	32.37182	48.06667	9.990056	80.89735
		2015	20.35433	53.09333	7.29651	84.99734
17	Islamic Finance and Investment Limited	2019	38.75708	76.42299	4.569785	72.21073
		2018	35.00071	77.39772	3.808713	69.97571
		2017	50.08629	73.48174	5.751972	68.90188
		2016	42.59747	66.82511	4.514562	76.00537
		2015	38.434	65.6991	10.34335	64.45107
18	Bay Leasing & Investment Ltd.	2019	28.84624	7.700514	52.22568	122.955
		2018	22.5358	5.915262	50.7761	11.74533
		2017	25.93642	41.70598	8.39624	64.41456
		2016	27.39259	40.37126	8.703734	65.3214
		2015	23.75333	37.70197	6.434678	64.89846
19	Uttara Finance and Investments Limited	2019	13.74657	44.54417	6.697348	72.61467
		2018	8.987579	43.69824	10.63256	81.40755
		2017	11.89315	40.73218	6.422603	73.29624
		2016	14.43953	50.86483	7.926786	71.27357
		2015	40.49135	46.52876	8.240841	68.72027
20	Phoenix Finance & Investments Limited	2019	45.92379	66.3036	7.059362	90.98335
		2018	30.00815	68.69488	5.771769	90.18214
		2017	27.52271	64.86102	4.941475	91.74537
		2016	31.67249	67.38864	3.75773	88.30006
		2015	30.99259	69.86028	2.792457	85.01253
21	GSP Finance Company (Bangladesh) Limited	2019	11.91704	29.73227	18.91358	76.70764
		2018	10.71582	32.4651	8.146315	76.67337
		2017	9.950646	41.93219	8.536979	81.01766
		2016	10.43393	45.35582	7.292264	75.45524
		2015	16.72038	47.3133	6.478739	75.10812

Data collected manually from annual reports

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Effect of Intellectual Capital on the Financial Performance of Indian Public Sector Banks

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Abstract

The current article assesses the influence of intellectual capital (I.C) on the financial performance (F.P) of Indian public sector banks (IPSBs). The information was collected from annual reports and CMIE of 12 PSBs for the period 2010 to 2022. For assessing the F.P of IPSBs, a simple panel least square analysis is conducted. Return on assets (ROA), Return on sale (ROS), and return on equity (ROE) are applied as dependent variables. The intellectual capital (I.C) components including structural capital (S.C), relational capital (R.C), human capital (H.C), and capital employed (C.E), have been used as independent variables along with two controlling factors financial leverage and size. The empirical outcomes of the research indicate that C.E, and S.C have a positive significant association with ROA, ROE, and ROS whereas R.C and H.C have a positive insignificant association with ROA, ROE, and ROS. The MVAIC positively insignificant correlates with ROA, ROE, and ROS. The research indicates that decision-makers should manage I.C and its constituents with care because they are a significant source of organizational value. It is essential to keep in mind that excessive investment in I.C results in decreased firms' efficiency and wasteful use of resources, as well as decreased profitability.

Keywords: Modified Value-added Intellectual Capital Coefficient, Indian Public Sector Banks, ROA, ROS, ROE, Intellectual Capital.
JEL Classification: C1, J24

1. Introduction

As a consequence of the worldwide shift from manufacturing-based to knowledge-driven economies, resources related to information and knowledge will become preeminent at the organization level, as well as for the competitiveness of nations and the generation of wealth in such nations (Kramar & Steane, 2012; Lin & Edvinsson, 2008). Intellectual Capital (I.C) is well-defined as ownership of an organization's innovations, the ability and knowledge of its personnel, the organization's experience, and its relationships with

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stakeholders, all of which lead to goodwill and create value (Xu & Wang, 2019). The discussion of I.C is advanced by the increased interest shown by businesses in expanding their investments not just in physical resources but also in non-physical assets, often known as I.C (Tran & Vo, 2020). I.C becomes the lever for organizations and businesses to maintain sustainable corporate performances and competitive advantage (Marr & Chatzkel, 2004; Poh et al.,2018). Non-physical resources, such as I.C, are just as important to today's economies as financial and physical capital (North & Kumta, 2018). According to stakeholder theory, "managing the stakeholders" is important in the twenty-first century. It focuses on the complex interrelationships that exist between an organization's stakeholders, including its suppliers, customers, investors, employees, society, and other stakeholders. A company ought to provide value for all parties involved, not just shareholders. Relational capital, one of the key elements of I.C, is concerned with how an organization manages its relationships with its stakeholders (Freeman et al., 2010). Because of advancement and dynamic changes in the business era, numerous organizations consider that I.C becomes a vital element in evaluating and measuring the performances in the business fields. Various organizations expected that the firms' performances have been directly impacted by the efficiency of I.C. Among knowledge-intensive business fields, the banking sector is foremost in developing a country's economy by assisting financial transactions and banks directly interacting with customers. The banking sector accumulates surplus funds, make them available for investment and provides finance to business firms, and assists other sectors to manage their activities proficiently and adequately. The performance of different sectors is based on the services given by the banking industry so it is crucial to investigate to what degree banks are proficient in making use of intellectual resources.

Over the course of the past years, the environment around the financial service sector, mainly those operating in the banking sector, has become increasingly vibrant and competitive. Banks provide essential services for fostering economic development and serve as intermediaries (Chen Goh, 2005). For banks to achieve sustainable F.P, competition at various levels compels them to reposition themselves in the marketplace. The banking industry is included among knowledge-based industries (Mondal & Ghosh, 2012). Consequently, the banking

sector has a direct or indirect influence on the tangible assets of all sectors. Numerous researchers Celenza & Rossi (2014); Chen Goh (2005); Inkinen (2015); Nimtrakoon, (2015); Xu & Wang (2019) have agreed that I.C. is a crucial key operator and important strategic resource for the accomplishments of banks, without denying the existence of other significant factors.

India has tie-up with several neighbouring countries and has strong trade associations with them. To close the gap with other SAARC nations, India increased its investment in a variety of infrastructure and development initiatives. India required an additional Rs 50 trillion in 2022 for the sustainable development of its infrastructure. In the beginning, developed nations began utilizing I.C, and it quickly became the focus of the banking industry. I.C measurement had also evolved in other industries, such as the manufacturing industry, the construction industry, and the pharmaceutical industry in developed nations, which regulate business sector competitiveness and development (Poh et al., 2018). The element of I.C and its influence on numerous industries became the gap to recognizing research in developing nations. This vacuum motivates academic researchers to investigate I.C and its function in the banking sector. India evolved as a nation with extraordinary economic development and prosperity. India's gross domestic product (GDP) is greater and more stable than that of its South Asian neighbour's Afghanistan, Sri Lanka, Bangladesh, Nepal, Maldives, Bhutan, and Pakistan. Since 2010, India's GDP has grown by an annual average of 6.6%. During the fiscal year 2020-21, total assets in the banking sector increased to 2.52 trillion US dollars, with assets of PSBs reaching 1.52 trillion US dollars. Due to the expanding function of the financial sector, it is necessary to analyze banks' productivity and performance, as well as how they evaluate and manage their I.C. Moreover, Firer and Mitchell Williams (2003) found that the banking industry held more intellectual property than other industries.

However, this research sheds new insight into the field of I.C and its effect on the F.P of Indian public sector institutions. Previous studies have evaluated the effects of I.C on the F.P of banks using the VAIC model, but our study is unique in that we utilized the MVAIC model to evaluate the effect of I.C on F.P. The research employed simple panel least square estimation. Using the panel data of

12 PSBs in India for the period 2010 to 2022. The results demonstrated that only C.E and S.C has a substantial positive association with ROA, ROE, and ROS. In addition, MVAIC has a positive insignificant related to I.C.

2. Literature Review

A literature review facilitates a critical analysis of published documents pertaining to a research topic. It aids in acquiring in-depth knowledge about a particular subject and comprehending the contributions made by various researchers over time. The previous findings aid in determining the scope of future research and clarify the research conducted to date in a particular field of study. Thus, it serves as a solid foundation for an investigation into the selected topic. The literature review has been divided according to study-relevant variables. In this study, a literature review has been divided into two sections: Theoretical background and I.C and its elements, and I.C and its impact on firms' performance.

2.1 Theoretical Background and I.C and its Elements

The legitimacy hypothesis contends that companies constantly make an effort to ensure that their actions respect society norms and boundaries (Deegan et al., 2002). This legitimacy paradigm places a strong emphasis on how businesses engage with society. The aforementioned point of view contends that an organization must be aware of social community norms since they are an integral element of the organization. According to Ghozali and Chariri (2007), the fundamental concept of legitimacy is a contractual relationship that exists between an organization and the society in which it functions and consumes resources. I.C is a multifaceted concept that includes the firm's relational, structural, capital-employed, and human resources. According to a theory known as resource-based theory, resources are crucial in assisting organizations' growth and competitiveness. According to Grant (1996), the most crucial strategic asset for companies seeking to increase their market share and revenue is I.C. Therefore, it is reasonable to assume that I.C., both overall and for every element, has a favourable effect on a firm's success.

There is no one definition of I.C that is universally recognized. Researchers have defined and categorized the relatively innovative idea of I.C in a variety of different ways. I.C is frequently referred to as non-physical, knowledge-based resources that generate value for enterprises and assist those firms in gaining and retaining a competitive edge (Bontis, 1998; Roos et al., 1997; Sveiby, 1997). The difference between a firm's market and its book value can also be considered in terms of the company's I.C (Maditions et al., 2011). According to Sullivan (2000) I.C is defined as the information a corporation possesses that has the potential to be turned into a concrete profit. A company's ability to acquire or keep an ongoing competitive edge is referred to as I.C (Wang et al., 2014; Youndt & Snell, 2014). Though there are a variety of conceptual frameworks available, two to four components of I.C are generally agreed upon by scholars. These components are relational capital (R.C), structural capital (S.C), human capital (H.C), and capital employed (C.E). Especially Bontis, (1998) and Ruckdeschel (1998) has divided I.C into three different categories: H.C, customer capital, and S.C. I.C was variously classified by a few articles as belonging to the H.C, S.C, and R.C categories (Kujansivu & Lonnqvist, 2007; Sveiby, 1997). The value-added intellectual coefficient model (VAIC) that Public (1998) created is generally applied both in academic settings and in professional settings (Barathi Kamath, 2007; Le et al., 2022; Mohapatra et al., 2019; Mondal & Ghosh, 2012; Xu & Li, 2019). The method VAIC is considered by adding the three constituents of efficiency known as C.E, H.C, and S.C. The VAIC model does have certain drawbacks, such as the fact that it neglects firm R.C and innovation capital (Smriti & Das, 2018). Several research has revised the conventional VAIC model by incorporating an additional element of I.C. referred to as relational capital (Bayraktaroglu et al., 2019; Kapoor & Saihjpal, 2022; Nazari & Herremans, 2007; Nimtrakoon, 2015).

H.C is linked with employees' knowledge, capabilities, skills, expertise, experience, and their ability to give constructive knowledge to the firms further can be implemented to achieve the firm's target and to enhance the productivity of companies (Cabrita & Bontis, 2008; Edvinsson, 1997; Henry, 2013; Ruckdeschel, 1998; Subramaniam & Youndt, 2005). When employees change

their jobs from one organization to another the experience gained by them is also transferred (Stewart, 1997; Henry, 2013; Cohen et al., 2014).

S.C comprises of organizational structure and organizational culture. Values created from the efficient use of technology and information come under organizational culture. Whereas formal techniques applied to organize the firm are related to the organizational structure (Sullivan, 2000). Moreover, Goh (2003) bifurcates structural capital into two sets. The first set consists of intellectual property and databases like trademarks, copyright, and patents. The second set consists of infrastructure resources that are associated with the firm working operations.

The term "capital employed" (C.E) refers to the amount of value that can be produced by an organization by investing one monetary unit either in financial or in physical capital (Xu & Wang, 2019). The capacity of a company to generate value is directly proportional to its C.E, which consists of both its physical and financial capital (Tran & Vo, 2020). R.C comprise of firm's association with its marketing channels, suppliers, customers, and stakeholders (Ferenhof et al., 2015; Inkinen, 2015; Subramaniam & Youndt, 2005).

2.2 Intellectual Capital and its Effects on Firms' Performance

Several researches have been performed in a wide variety of countries to investigate the effects of important aspects of I.C and how they have an impact on the F.P of businesses (Bayraktaroglu et al., 2019; Buallay et al., 2020; Haris et al., 2019; Joshi et al., 2010; Poh et al., 2018; Tiwari & Vidyarthi, 2018). According to the Isanzu (2015) study on Tanzania banks, I.C has a positive association with CEE and HCE, but a negative association with SCE. The profitability and I.C of insurers in Ghana discovered a substantial positive correlation between the two variables (Asare et al., 2017). The research performed by (Anifowose et al., 2018) on Nigerian firms revealed a positive correlation between corporate book value derived from economic value added and I.C. The Australian research conducted by Pulic (2000) demonstrates the significance of I.C. Corporate success and organizational I.C have a significant

correlation. Banks with greater I.C investments are profitable and have superior financial performance.

From 2007 to 2019, Le et al. (2022) analysed thirty commercial banks in Vietnam. The study examined whether I.C could enhance the allocation efficiency, technical efficiency, and pure technical efficiency of institutions. This study also suggests that banks should utilize their competencies and intangible assets to generate more value and wealth for the organization. Salehi et al. (2023) studied 35 firms listed on the Iraq stock exchange. The research discovered negative association between I.C and social capital, as well as financial statement fraud and money laundering.

Chu et al. (2011) carried out research on Hong Kong companies between the years 2005 and 2008. According to the findings of the research, among the four components of I.C, SCE and CEE play an important factor role in forecasting the F.P of businesses, whereas HCE indicates a negative correlation. A huge data of 5749 US commercial banks from the years 2005 to 2012 was employed by (Meles et al., 2016). According to its findings, the H.C have a greater influence on financial performance than other sub-components. Over the years of 2012–2018, Nassar, (2020) performed research on 34 Palestinian companies. The results also show that when compared to S.C and C.E, H.C has the most effective element of I.C.

According to Weqar et al. (2020), the efficiency of I.C considerably raises both the productivity and profitability of Indian banks in the context of the banking industry. Overall, the most important element of I.C for enhancing the effectiveness and productivity of the Indian banking sector is H.C. R.C has a minimal contribution to the banks' F.P, while S.C and C.E are essential for increasing profitability. The effect of several I.C aspects on the operational and F.P of Jordanian banks was examined by Taha et al. (2022). The findings demonstrate that H.C has no effect on F.P. R.C and S.C have a favourable impact on F.P, and all I.C aspects have a positive impact on operational success. According to Tripathy et al. (2015), physical capital positively affects firms' Return on Assets (ROA), proving that it has unquestionably remained a key contributor to the success of Indian businesses.

Nawaz and Haniffa (2017) found a correlation between I.C and profitability using data from 68 Islamic Financial Institutions (IFIs) located in 18 different countries. The findings indicate, in part, that both HCE and CEE have a sizeable and favourably impactful influence on ROA. Another study conducted by Nawaz (2019) analyses 47 Islamic banks from a variety of nations throughout the time-period 2005 to 2010 and noticed H.C had a strong positive effect on market value both before and after the financial crisis. According to Ousama et al. (2020), I.C does have a significant positive influence on the performance of Islamic banks however, this effect is significantly minor compared to the effect seen in previous researches. In addition, the effects of HCE and CEE are beneficial to IB performance, whereas the effect of SCE is negligible. During the years 2011–2013, this study on IB was carried out in the nations that make up the GCC.

According to the results of Sardo and Serrasqueiro (2017), H.C, R.C, and S.C all have a positive effect on the F.P of Portuguese SMEs hotels. According to the findings of Oppong et al. (2019) both intellectual capital and physical capital have a favourable correlation with H.C and ATO in the Ghanaian insurance business. The research performed by Chowdhary et al. (2018) on the textile industry in Bangladesh and discovered that while C.E is favourably associated with financial performance, H.C continues to be insignificant in the industry.

In nutshell, research using the MVIC and VAIC techniques had produced conflicting results in various industries around the world. The inconsistent evidence does not support a compelling conclusion about the relationship between the firm's financial success and I.C. This study provides a better knowledge of the impact of I.C. in the Indian public sector banks by evaluating the effect of I.C. on F.P.

Objectives of the Study

- To investigate which element of intellectual capital (C.E, H.C, S.C, and R.C) has the biggest influence on financial performance.
- To study the effect of total intellectual capital (MVAIC) on financial performance

- To determine which element of intellectual capital is most important for improving profitability.

3. Methodology

3.1 Data Collection

The key aim of this research is to examine the effect of I.C on the financial performance IPSBs. The information on IPSBs were gathered via their annual financial statements and Prowessiq the information system (Centre for Monitoring Indian Economy). From 2010 to 2022, data relating to twelve currently working IPSBs was compiled.

3.2 Research Design

In order to examining the influence of I.C on the F.P of IPSBs a simple panel least square analysis has been carried out. This study employs MVAIC to evaluate the influence of I.C on F.P. Numerous academicians from different countries, including (Aybars & Oner, 2022; Bayraktaroglu et al., 2019; Tiwari & Vidyarthi, 2018; Xu & Li, 2019) employ MVAIC and panel regression. The various approximations serve to represent Structural Capital Efficiency (SCE), Human Capital Efficiency (HCE), Relational Capital Efficiency (RCE), and Capital Employed Efficiency (CEE). All the information about variables is arranged in panel data form. Afterwards descriptive stats and matrix of variable correlation are computed to get to know the nature and relationship among variables. The stationarity of the data series for various factors has been investigated in the second stage using different unit root tests LLC (Levin et al., 2002), ADF (Maddala & Wu, 1999) and Phillips-Perron (PP) (Choi, 2001). In beginning, these are performed at a level. Since data series for different factors were not stationary at level. Following this these are examined at first difference. Since all the factors are found to be constant at first difference. Therefore, all factors' data are converted to the first difference. Panel data estimate is performed afterward. Three dependent variables are present (ROA, ROE, and ROS). For each dependent variable, a model is developed. In the beginning, the influence of the four distinct elements of I.C (S.C, R.C, C.E, and H.C) on each variable that is dependent is investigated. Additionally, the cumulative effect is investigated

using MVAIC. Furthermore, the study employed two control factors, namely leverage and size.

The following are the equations of the models

Model 1. $ROA = \alpha + \beta_0 + \beta_1(SCE)_{it} + \beta_2(RCE)_{it} + \beta_3(CEE)_{it} + \beta_4(HCE)_{it} + \beta_5(LEV)_{it} + \beta_6(SIZE)_{it} + e_{it}$
Model 2. $ROE = \alpha + \beta_0 + \beta_1(SCE)_{it} + \beta_2 (RCE)_{it} + \beta_3 (CEE)_{it} + \beta_4 (HCE)_{it} + \beta_5(LEV)_{it} + \beta_6(SIZE)_{it} + e_{it}$
Model 3. $ROS = \alpha + \beta_0 + \beta_1 (SCE)_{it} + \beta_2 (RCE)_{it} + \beta_3 (CEE)_{it} + \beta_4 (HCE)_{it} + \beta_5(LEV)_{it} + \beta_6(SIZE)_{it} + e_{it}$
Model 4. $ROA = \alpha + \beta_0 + \beta_1 (MVAIC)_{it} + \beta_2 (LEV)_{it} + \beta_3 (SIZE)_{it} + e_{it}$
Model 5. $ROE = \alpha + \beta_0 + \beta_1 (MVAIC)_{it} + \beta_2 (LEV)_{it} + \beta_3 (SIZE)_{it} + e_{it}$
Model 6. $ROS = \alpha + \beta_0 + \beta_1 (MVAIC)_{it} + \beta_2 (LEV)_{it} + \beta_3 (SIZE)_{it} + e_{it}$

3.3 Measurement of Variables

Table:1 Variable Description

S.No	Variables	Sign	Description of variables	Citations
Independent Variables				
1.	Capital employed Efficiency	CEE	The ratio of value-added divided by CE (VA/CE) CE = Equity + Long term borrowings Value-added = Operating profit + employees' cost + Depreciation + Amortization	Pulic (1998,2000, 2004)
2.	Human Capital Efficiency	HCE	The ratio of value-added divided by HC (VA/HC) HC = Total employee expenditure	
3.	Structural capital efficiency	SCE	The ratio of structural capital divided by VA (SC/VA) SC = Value-added - Human capital	
4	Relational capital efficiency	RCE	The ratio of relational capital divided by value-added (RC/VA) RC = The amount invested in marketing, selling, and advertisement expenses	Nazari and Herremans, 2007; Buallay and Madbouly,2019; Weqar and Khan,2020; Tran and Vo, 2020; Oner and Aybars, 2022; Vidyarthi, 2018; Xu and Wang, 2019
5.	Modified value-added intellectual coefficient	MVAIC	It is the sum of all four elements of I.C (CEE+HEC+SCE+RCE)	
Dependent Variables				
6.	Return on assets	ROA	It is the ratio of net income divided by total assets	Xu and Wang, 2019; Buallay and Madbouly,2019; Xu and Liu, 2020; Poh et al, 2018
7.	Return on equity	ROE	It is the ratio of profit available to equity shareholders divided by shareholders' fund	
8	Return on sales	ROS	EBIT/ Net Sales EBIT = Earnings before interest and tax	
Control variables				
9.	Financial Leverage	Lev	It is the ratio of total outside liabilities divided by total assets	Xu and Wang, 2019; Buallay and Madbouly,2019; Oner and Aybars, 2022; Kapoor and Saihjpal, 2022; Weqar and Khan,2020
10.	Total assets	Size	It is the log total assets	

Source: Self compiled by the authors

4. Results and Discussions

Table 2: Summary of Descriptive Statistic

Variables	ROA	ROE	ROS	HC	CE	SC	RC	MVAIC	LEV	SIZE
Mean	0.099	0.983	-11.915	6.131	0.556	0.814	0.803	8.306	15.887	12.896
Std. Dev	0.824	17.395	13.379	1.873	0.551	0.094	1.656	2.420	2.607	0.932
Skewness	-1.598	-2.539	-1.473	0.134	10.825	-4.500	9.742	5.011	0.145	0.489
Kurtosis	5.848	13.467	5.700	2.878	128.972	31.874	109.224	45.334	5.548	3.139
Jarque-Bera	119.214	879.851	103.850	0.563	106195.8	5945.996	75811.38	12302.36	42.773	6.344
Probability	0.000	0.000	0.000	0.754	0.000	0.000	0.000	0.000	0.000	0.041
Sum	15.530	153.420	-1858.820	956.546	86.879	127.069	125.295	1295.791	2478.520	2011.873
Sum Sq. Dev	105.294	46903.78	27746.65	544.087	47.108	1.385	425.366	907.804	1053.457	134.669
Observations	156	156	156	156	156	156	156	156	156	156

Source: Self-compiled with E-views 12

Table-2 is a presentation of the descriptive statistics for all that were considered in this study. The value created by H.C is relatively high, H.C has demonstrated the maximum mean value. Chowdhury et al. (2018); Vergauwen et al. (2007) have previously reached the same conclusion. The unified mean of H.C, R.C, and S.C is 7.748, which is substantially greater than the unified mean of C.E (0.556). According to prior research, firms generate more value through I.C than through financial and physical assets (Mehralian et al., 2012; Vergauwen et al., 2007). Moreover, the mean values obtained for leverage and size are 15.887 and 12.896, respectively.

Table 3: Correlation Matrix

Variables	ROA	ROE	ROS	CEE	HCE	RCE	SCE	MVAIC	LEV	SIZE
ROA	1.000									
ROE	0.948	1.000								
ROS	0.942	0.895	1.000							
CEE	0.133	0.131	0.156	1.000						
HCE	0.447	0.445	0.554	-0.079	1.000					
RCE	-0.291	-0.311	-0.270	-0.028	-0.106	1.000				
SCE	0.438	0.478	0.497	-0.522	0.779	-0.175	1.000			
MVAIC	0.193	0.180	0.299	0.125	0.713	0.588	0.403	1.000		
LEV	-0.269	-0.293	-0.143	-0.096	0.163	0.095	0.042	0.171	1.000	
SIZE	0.134	0.125	-0.008	-0.177	-0.077	-0.170	0.066	-0.214	-0.085	1.000

Source: Self-compiled with E-views12

The multiple correlation analyses are depicted in Table 3, and the outcomes revealed that the dependent variables ROE, ROS, and ROA are positively correlated with the S.C, C.E, H.C, and MVAIC, and negatively correlated with RC. CE demonstrates a negative correlation with the following I.C components: H.C (-0.079), R.C (-0.028), and S.C (-0.522). H.C depicts a negative correlation with C.E (-0.079), R.C (-0.106), and positive with S.C (0.779). C.E (-0.0323), H.C (-0.106), and S.C (-0.175) are negatively correlated with R.C. Nevertheless, S.C is positively associated with H.C (0.779).

Using the unit root test, we examine the stationarity of the data series for all 12 IPSBs over a period of thirteen years, using five independent variables, three dependent variables, and two control variables.

Table 4: Unit Root

Variables	ROA	ROE	ROS	HCE	CEE	SCE	RCE	MVAIC	LEV	SIZE
					LLC					
Without	-12.794	-13.730	-10.749	-14.927	-13.631	-14.371	-19.103	-23.072	-14.130	-10.178
C&T	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
With C	-4.242	-1.961	1.162	-8.103	-2.188	-8.505	-15.138	-21.876	-7.279	-3.592
	(0.000)	(0.024)	(0.005)	(0.000)	(0.014)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
With	-2.191	1.230	4.431	-7.009	1.542	-7.345	-14.581	-17.172	-6.418	-4.500
C&T	(0.012)	(0.008)	(0.007)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
					ADF					
Without	146.565	150.467	125.089	161.538	145.867	165.511	163.828	177.486	148.336	120.940
C&T	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
With C	85.894	85.631	65.751	90.224	80.572	101.417	104.349	114.936	80.729	60.884
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
With	63.056	55.279	43.276	71.074	48.465	76.459	81.554	83.092	52.949	59.202
C&T	(0.000)	(0.003)	(0.009)	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
					PP					
Without	234.915	233.349	236.825	237.145	232.349	225.305	233.500	234.234	232.870	209.796
C&T	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
With C	242.137	226.689	224.051	195.690	252.368	220.734	241.989	190.066	206.973	192.821
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
With	206.760	201.807	208.652	206.166	206.004	199.302	195.784	186.226	171.722	178.427
C&T	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Source: Self-compiled with E-views12

*(P value <0.01), ** (P value <0.05), ***(P value <0.1)

The outcomes of panel unit root tests at first difference are shown in Table-4. Various unit root tests have been performed with and without constant and trend variables. The significance value of these unit tests is less than the significance level (0.001), they are summarised in Table-4, along with the statistics for each variable. It indicates that the unit root does not exist and all data series are stable at first difference.

Table 5: Panel Least Square Estimation Using ROA, ROE, ROS (Models 1-3)

Variables	ROA (Model-1)		ROE (Model-2)		ROS (Model-3)	
	Coefficient	T-statistics	Coefficient	T-statistics	Coefficient	T-statistics
HC	0.017	0.319 (0.750)	-1.344	-1.163 (0.246)	0.473	0.606 (0.545)
CE	0.788*	7.852 (0.000)	16.169*	7.545 (0.000)	11.802*	8.143 (0.000)
SC	6.051*	6.107 (0.000)	139.528*	6.603 (0.000)	91.552*	6.406 (0.000)
RC	-0.021	-1.174 (0.242)	-0.463	-1.209 (0.228)	-0.284	-1.098 (0.273)
LEV	-0.032	-1.382 (0.169)	-2.804*	-5.533 (0.000)	-0.372	-1.085 (0.279)
SIZE	0.212	1.613 (0.109)	5.577***	-1.983 (0.064)	3.211***	1.688 (0.093)
C	-0.022	-0.505 (0.613)	-1.778	-1.863 (0.064)	-0.478	-0.741 (0.459)
R-squared	0.577		0.663		0.599	
Adjusted R-squared	0.558		0.648		0.582	
Durbin-Watson stat	2.460		2.746		2.123	
F-statistic	31.153 (0.000)		45.056 (0.000)		34.213 (0.000)	

*(P value <0.01), ** (P value <0.05), ***(P value <0.1)

Source: Self-compiled with E-views12

Using panel least square, Table-5 illustrates the relationship between the bank's F.P and I.C. The dependent variables in this case are ROS, ROE, and ROS. The six explanatory variables are C.E, H.C, R.C, S.C, Leverage, and Size. Leverage and size are the controlling variables.

At the 1% level of significance, it is determined that C.E, and S.C are statistically significant in the first model in which ROA serves as the dependent variable (Anifowose et al., 2018; Kim & Tran, 2023; D. B. Tran & Vo, 2018). The corresponding R^2 value, as well as the adjusted R^2 value, comes in at 0.577 and 0.558 respectively. It indicates that a variety of explanatory variables are capable of adequately explaining 57.7% of the variance in the ROE. In order to test for autocorrelation in the model, the Durbin-Watson method is utilised. Because the value of Durbin-Watson is 2.460, there is neither an autocorrelation nor a serial correlation issue that warrants significant concern. The value of the F-stat. in the current model is 31.153, and the p-value associated with it is less than 0.01, indicates that model is a good fit.

In the second and third model in which ROE and ROS are the dependent variable, C.E, and S.C are significant at the 1% level. Here also only C.E and S.C is positively related to ROE and ROS. Only 66.3% of the variability can be described by Model-2, according to the R^2 value. Just like in the second model, approximately 59.9% variance of the dependent variable is properly explained by different explanatory variables in the Model-3. The value of the Durbin-Watson ratio near to 2 in the both models. Therefore, neither an issue of autocorrelation nor a problem with serial correlation can be seen in the current models. The ROE and ROS model have overall good fitness, as indicated by a high significant ANOVA value (45.056 and 34.213) with a P value that is less than 0.01.

According to Table-5, the Coeff. of C.E and S.C are favorable and substantially significant in all the models, indicating that C.E and S.C are one of the most crucial variables that determines the F.P of public sector banks in India. As a result, C.E and S.C are the significant components that determines a bank's overall F.P. Nevertheless, findings of study consistent with the research results (Chu et al., 2011; Nawaz & Haniffa, 2017; Ozkan et al., 2017; D. B. Tran & Vo, 2018), which indicated that C.E and S.C impacts either explicitly or implicitly to bank efficiency.

Table 6: Panel Least Square Estimation Using ROA, ROE, ROS (Models 4-6)

Variables	ROA (Model-4)		ROE (Model-5)		ROS (Model-6)	
	Coefficient	T-statistics	Coefficient	T-statistics	Coefficient	T-statistics
MAVIC	0.017	0.833 (0.406)	0.085	0.195 (0.845)	0.336	1.071 (0.285)
LEV	-0.165*	-6.373 (0.000)	-5.510*	-10.318 (0.000)	-2.407*	-6.231 (0.000)
SIZE	0.352**	2.026 (0.044)	8.583**	2.403 (0.017)	5.327**	2.061 (0.041)
C	-0.102	-1.745 (0.083)	-3.357	-2.787 (0.006)	-1.700	-1.951 (0.053)
R-squared	0.236		0.435		0.231	
Adjusted R-squared	0.220		0.423		0.215	
Durbin-Watson stat	2.751		2.688		2.492	
F-statistic	14.455 (0.000)		36.061 (0.000)		14.087 (0.000)	
*(P value <0.01), **(P value <0.05), *** (P value <0.1)						
Source: Self-compiled with E-views12						

The combined effect of I.C and two control variables on the three dependent variables (ROA, ROE, and ROS) is presented in Table-6. For the purpose to evaluate the effect that MVAIC has on financial performance in terms of ROA, ROE, and ROS, three distinct multiple regression models have been constructed (Models 4, 5, and 6). The combined intellectual capital (MVAIC) shows positive insignificant impact on ROA, ROE, and ROS. In other words, MVAIC has no effect on the financial condition of banks. The leverage, which is a control variable, represents the negative significant influence on ROA, ROE, and ROS. Whereas Size shows positive significant association with ROA, ROE, and ROS. According to the coefficient of determination (R^2), the model 4 is only able to explain 23.6% of the variability, 43.5 % in Model-5, and 23.1% in Model-6. The corresponding Durbin-Watson ratio in all three model is near to 2, which shows that there is no issue with serial correlation in the model. The entire model is a good fit because the F-stat. value is 14.455 in Model-4, 36.061 in Model-5, and 14.087 in Model-6 and the corresponding p-value is less than 0.01.

5. Conclusion, implication, limitation, and future research

This current research analysed the effect of I.C on the F.P of Indian public sector banks operating in India over thirteen year (2010-2022). In order to study the effect that I.C has on F. P. the simple panel least square estimation method is utilised. This study identifies the various components of I.C (H.C, C.E, S.C and R.C). Later, these components of I.C are employed as independent variables to examine their influence on the F.P of Indian PSBs. The three financial ratios of ROA, ROE, and ROS were applied as dependent parameters while financial leverage and size have been utilised as control variables to illustrate the F.P of PSBs in India. After collecting information for each variable across thirteen years and twelve PSBs, the information was arranged in a balanced panel format. In the initial phase, unit root test is conducted at the level and first difference. At first difference, the information of all factors is found to be stable. Therefore, the data series for all variables are transformed into the first difference. Later, a basic panel least square estimation utilising three dependent variables (ROA, ROE, and ROS) is performed.

The empirical outcomes of the research indicate that C.E and S.C have a significant positive association with ROA, ROE, and ROS. The statistical relationship between C.E,S.C and F.P indicators may be the most convincing evidence that C.E. and S.C. are the essential components of I.C (Chowdhury et al., 2018; Firer & Mitchell Williams, 2003, 2003; Ginesti et al., 2018; Mehralian et al., 2012; D. B. Tran & Vo, 2018). The results demonstrate that MVIAC is not correlated with F.P indicators. This demonstrates that, even in knowledge-based businesses, an organization's performance is still measured in terms of its physical assets. This goes without a doubt against the claim made by many academics that knowledge-driven corporations need the I.C. more in order to acquire an edge over competitors (Marr & Chatzkel, 2004).

This study has a number of implications. The findings suggest that the Indian public sector banks keep functioning on conventional means, including monetary and physical capital as well as organizational structure, regulations, and procedure. In order to improve their financial position in the cutthroat and knowledge-based market, bank management should concentrate on how to use and manage the C.E and S.C resources effectively. Although the relationship of H.C and R.C with the F.P indicators is insignificant. Therefore, it is necessary to reconsider the importance of investing in I.C. For improving H.C and financial efficiency viewpoint continuous training and development should be given to employees for enhancing their competencies. However, policymakers can allocate additional benefits; increase wages, profit sharing, and equity incentives to increase employee motivation. The research pointed out that decision-makers should check administrative and selling expenses and employee expenses which can also create financial wealth.

From the viewpoint of S.C, for the smooth functioning of operations and improvement, corporate efficiency policymakers should continuously keep an eye on relevant policies, strategies, and procedures. Managers should also keep in mind and recognize the importance of knowledge-based infrastructure, innovation capital, social environment, and administrative processes available within the organization. It is important to understand that too much investment in

I.C, resulting in lower corporate efficiency and resources can be engaged and not profitable to an organization.

The study expresses that decision-makers should meticulously handle I.C and its elements because these are important sources of financial value creation and corporate performance. In addition, for improving financial efficiency, the organization should not overinvest in I.C. For achieving continuous and credible success in this knowledge-based and tough business era, the company resources must be non-substitutable and inimitable, rare, and valuable. With the start of the information base era, now organizations are utilizing and more prone to intangible resources and resources like I.C in their working operations.

The researcher identifies a few study limitations. Only public sector banks had been selected for the analysis of the banks' financial performance and I.C however, there are many more various types of banks in India that should also be considered. Second, for measurement the F.P of the banking sector few variables are selected, further research can include more dependent and control variables. Third, the research includes only one sector which is the banking sector, researchers may take into consideration other sectors and analysed the effect of I.C. Finally, future studies can use primary data to figure out how I.C affects a firm's financial success.

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