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Contents

Bank Parikrama
Volume XLVII, Nos. 1 & 2, March & June, 2022 (pp. 5-17)

Ethics in Banking

- Sadiq Ahmed*

A. Overview and Introduction

It is a great honor and privilege to address this august gathering on a subject that is very close to my heart. I did not ever meet Mr. Nurul Matin. But the subject matter emanates a close bonding with his thoughts and ideals.

This audience is not new to me. The Bangladesh Bank including its affiliate institutions like the BIBM, which is the host of this evening's event, is arguably amongst the strongest institutions we have in Bangladesh. I had the privilege of interacting with many of you in my capacity as independent Director of the Bangladesh Bank (BB) Board from 2010-2016. In particular, I recall my interactions with three distinguished officers. The Honorable BB governor Fazle Kabir, who was a fellow Board member representing the Ministry of Finance, Deputy Governor Ahmad Jamal, who served as the secretary of the Board, and the Director General of BIBM Dr. Akhtaruzzaman who was the Executive Director of Economic Research.

Despite some shortcomings emerging from the work of a few bad apples, I can testify that the BB is staffed with possibly the most qualified and committed professionals in any public institution in Bangladesh and with high ethical standards. All these augur well for further strengthening of this fine institution.

I am the 20th speaker in this annual lecture series. This presents both an advantage and a handicap. The advantage is that I was able to learn from the research and wisdom of past speakers. The handicap is that I was struggling to see what I can add to the richness of what was already said before. To my mind, I can perhaps add some value by talking about contemporary ethical challenges facing Bangladesh banking today and the way forward. So, I will not reflect on

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*Sadiq Ahmed, Ph.D. is the Vice Chairman, Policy Research Institute (PRI) of Bangladesh. The lecture was presented in the 20th Nurul Matin Memorial Lecturer on Ethics in Banking on 28 February 2022 at BIBM Auditorium. The views expressed in this lecture are the speaker's own.

the philosophical and historical context of ethics in banking that was often the focal point of past lectures, and instead talk about the contemporary ethical issues prevailing in the banking industry in Bangladesh today.

At this juncture, one might wonder since ethics is important for all business and personal dealings, why single out banking? The short answer is unlike other business, the very foundation of banking business is based on trust. When a license is given to a bank or a non-bank financial institution to mobilize deposits, the Bangladesh Bank and the government are essentially certifying that they have confidence and trust that the enterprise will safeguard the citizen's money it has mobilized through deposits. When this trust is broken or even weakened, the stability of the banking system will suffer. So, essentially, ethics is a core element of the banking business.

As I said, this subject is close to me heart. As evidence I cite the twelve pieces of articles that I published in the leading Bangladesh English Daily Newspapers between 2010 and 2021. The references are attached to the written version of the lecture. Indeed, my presentation today captures the essence of my evolving thought process on the subject.

B. Bangladesh Banking Sector has Progressed Well

It is very important to note at the very outset that the banking sector in Bangladesh has progressed well since independence. Following the initial debacles and governance challenges in managing a publicly owned banking system, the banking sector witnessed great progress following a series of reforms starting in 1998. These reforms deregulated the banking industry and sharply strengthened the supervision and implementation of prudential norms.

The reforms greatly improved the quantity and quality of banking services in Bangladesh, thereby contributing handsomely to the Bangladesh development progress[1]. The progress is most advanced in urban areas that is now well served by a vibrant and competitive banking sector owing to the emergence of many

[1] A detailed review of key banking reforms and their impact is available in Sadiq Ahmed "The Imperative for Banking Reforms in Bangladesh" BIBM, Bank Parikrama, Volume XLIV and XLV, September 2019-June 2020 (pp 86-113).

private banks. The quality of banking service has vastly increased, reflected in easy access to banking, availability of many banking products and the emergence of digital banking that has lowered transaction costs.

The rural areas are increasingly coming under the spread of commercial banking, supplemented by the large growth of microfinance institutions. A growing number of unbanked rural population is being serviced through mobile financial services.

C. Banking Ethics has also Improved by Historical Standards

There are several dimensions of ethics in banking. The most important aspect is banking governance. Prior to the reform program initiated in 1998, banking sector governance was very weak. Even as late as 1997, the banking sector was dominated by corrupt and inefficient public banks, accounting for 67% of total deposits and 63% of total loans. Many of the loans of these banks were non-performing owing to weak discipline and inefficient management Loan and interest recovery culture was lax. In summary, banking ethics was weak. Thus, in 1998, some 41 percent of the total loan portfolio of the banking sector was officially classified as Non-Performing Loans (NPL). This was mostly due to the infected portfolio of the public banks that dominated the banking sector. For example, 40% of the loan portfolio of State-owned Commercial Banks (SCBs) and 67% of the portfolio of the state-owned Development Finance Institutions (DFIs) were classified as NPLs. The DFIs were essentially bankrupt and survived through financial support from the Treasury. The financial health of the state-owned commercial banks was also weak and required frequent equity support from the Treasury to stay afloat.

The reforms of the post 1998 period largely restored much of the banking sector governance and ethics. As a result of deregulation, reforms in the management of public banks and implementation of prudential norms, the overall health of the banking sector improved considerably. By 2011, the private banks became the dominant players in banking sector causing the public bank's market share for deposits and loans to fall to a mere 20%. Combined with strengthened prudential norms and reforms in public banks, the total NPL came down sharply

to 6% (Table-1). The portfolio of public banks also improved considerably contributing to this progress.

Table 1: Trend in Non-Performing Loan as Percent of Total Loans 1997-2011

Bank type	1997	1998	1999	2000	2002	2008	2011
SCBs	37	40	46	39	34	25	11
DFIs	66	67	65	63	56	26	25
PCBs	31	33	27	22	16	4	3
FCBs[2]	4	4	4	3	3	2	3
Total	37	41	41	35	28	11	6

Source: Bangladesh Bank Annual Report 2003, 2005, 2015

Another dimension of this strengthened governance is the increase in capital adequacy norm of the banking sector. Overall capital adequacy grew from 7.5% in 1997 to 11.4% in 2011. This was an important dimension of progress in strengthening the safety of the banking sector.

Along with better governance, another improvement in banking ethics happened in access to banking services. A combination of supportive policies from the Bangladesh Bank and the Ministry of Finance contributed to this. These include the spread of microfinance institutions, spread of rural commercial banking, special credit programs for small enterprises, and the spread of mobile financial services. Here I would like to caution that the equitable access agenda is still substantially unfinished.

D. Yet Events have Shown the Fragility of the Progress in Banking Ethics

The banking sector has continued to do well in several dimensions after 2011. Financial deepening has increased further reflected in the rising GDP shares of total deposits and credits. Interest rates have come down in both nominal and real terms, and access to banking has continued to increase. There is no doubt that these factors have played a major development role in spurring GDP growth, investment, and exports. So, there is much to celebrate.

[2] The observed deterioration of NPLs in foreign banks reflects the effects of two poorly performing banks: the Islamic Commercial Bank owned by the Malaysians and the National Bank of Pakistan. Their share of the deposit base is negligible and do not pose a major stability threat.

The area I feel less comfortable is concerning the slide in banking ethics. The most powerful indicator of this is the resurgence of the incidence of non-performing loans. The rise in NPLs has happened in both public and private banks, although NPL incidence continues to be mostly concentrated in public banks. The incidence of total NPLs doubled between 2011 and 2019, surging from 6% in 2011 to 12% in 2019 (Table-2). The NPL incidence in state- owned commercial banks increased from 11% to 32%; in private banks it increased from 3% to 7%.

Table 2: Trend in Non-Performing Loan as Percent of Total Loans 1997-2019

Bank type	2011	2012	2013	2014	2015	2016	2017	2018	2019
SCBs	11	24	20	22	22	25	27	28	32
DFIs	25	27	27	33	23	26	23	22	18
PCBs	3	5	5	5	5	5	5	6	7
FCBs	3	4	6	7	8	10	7	7	6
Total	6	10	9	10	9	9	9	10	12

Source: Bangladesh Bank Annual Report 2017-18 and Bangladesh Bank Website

At this point, one might want to pause and ask why is a rising NPL a reflection of poor banking ethics? Surely, in a market economy, enterprises do fail due to market conditions from fall in demand, rise in commodity prices, political turmoil like hartals, and natural disasters including COVID. It is true that adverse market conditions can cause temporary payment problems in enterprises. Some blip in NPLs can happen, as for example during the first year of the COVID incidence. But persistent and rising NPLs over a prolonged period is a clear indicator of serious governance problems facing the banking sector.

Another indicator is the NPL incidence by groups of banks. BB data clearly show this. Historically, public banks have shown high and growing incidence of NPLs while private banks have shown much lower incidence. Within private banks, well-managed banks show much lower NPL than poorly managed and weak governance-infected private banks. Perhaps, the best illustration of this point is the NPL incidence of private foreign banks. These banks are largely free from domestic governance problems and political interventions. These banks are supervised by international head-offices. Management is selected and rewarded

based on performance. Overall, banking ethics environment in these banks is highly positive. Therefore, it is hardly surprising that they have shown very low and stable NPLs in the 2-3% range. They also have substantially larger capital adequacy ratio.

The governance environment and ethics problem are most challenging for SCBs and DFIs. These public financial institutions are basically government run and carry huge political mandates that are not financially and economically viable. The most notable example of such lending operations is the financing of poorly performing state-owned enterprises. Furthermore, in many cases loans are provided to private sector based on connections rather than economic and financial viability. It is not surprising that most DFIs have now gone bankrupt and have ceased to operate. Corrupt practices are also more dominant in public banks. Most prominent examples of such corrupt practices are the infamous Sonali Bank fraud between 2010-2012 involving the Hallmark group and the Basic Bank fraud between 2009-2013.

In 2003, I did a piece of research along with two World Bank colleagues to review the progress with banking in South Asia[3]. A major conclusion of that report was that in countries with poor governance environment as in South Asia, government ownership of banks is bound to create serious ethical problems leading to very weak portfolios. This is because even with sound regulations and strong supervisory norms, in practice it is near impossible to rein in state-owned banks that are patronized by politically powerful forces.

Domestic private banks typically face a better governance environment than state-owned banks. So, overall banking ethics is better but varies considerably by banks. The bank board quality is uneven, insider lending transactions are prevalent and banking norms can be bypassed through political connections since many private banks are owned by political leaders. The rising NPLs in domestic private banks is the result of the uneven application of banking ethics and sound banking practices among different banks.

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[3] A. Sadiq, Uy, Marilou, & S. Ramachandran. "South Asia banking and finance: Growth with festering problems." South Asia Region Internal Discussion Paper IDP-186, The World Bank: Washington, D.C.

There has been a slight downward trend in the incidence of NPLS since 2018. But this is not based on any meaningful reform and therefore does not reflect an improvement in the financial health of the banking sector or improved banking sector ethics. Most unfortunately, the government has chosen not to face the challenge of the worsening loan portfolio of the banking sector by introducing sustainable reforms but has opted for cosmetic actions to hide the magnitude of the real problem. The actions to address the NPLs has mainly involved relaxation of the loan classification norms, restructuring of large loans, and extensive loan write offs. These policies have lowered somewhat the stock of NPLs but the fundamental problems that cause NPLs – the bad loan decisions and the strengthening of loan recoveries – remain virtually untouched. So, while the stock of NPLs is being lowered cosmetically, the flow of new bad loans keeps growing. This flow problem has been further aggravated by the onset of COVID-19.

E. Social Cost of NPLs

The social cost of NPLs is best understood by looking at their magnitude. The value of NPLs surged from Taka 226 billion in 2011 to Taka 961 billion in 2020. One particularly damaging element of the cosmetic approach to lowering the stock of NPLs is the issue of loan write offs. While this might appear to be the right thing to do to keep the banking sectors books clean since these loans would never be recovered, it is not obvious that the government has paid enough attention to the social cost of this policy. Data for the past 11 years shows that the amount of annual loan write offs has grown progressively owing to rising NPLs (Table-3). The loan write-offs continued to be dominated by public sector banks well until 2017. Since 2018, private banks account for a higher share of total loan write offs reflecting the growing portfolio problems of private banks.

Table 3: Volume of Loan Write-offs by Type of Banks (Tk. in Billion)

Type of Bank	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20
State Owned Commercial Banks	70.5	82.4	72.9	107.2	154.8	210.3	220.4	224.2	226.2	232.2	179.4
Specialized Banks	31.8	32.0	24.5	32.6	34.2	5.6	5.6	5.6	5.6	5.8	3.8
Total Public Banks	102.3	114.4	97.4	139.8	189	215.9	226	229.8	231.8	238	183.2
Private Commercial Banks	69.6	77.1	64.9	109.7	127.7	155.5	189.4	216.7	246.5	294.3	239.4
Foreign Commercial Banks	2.1	2.4	2.6	3.7	4.4	5.1	7.2	8.6	10.7	12.3	10.1
Overall Banking Sector	174.0	193.9	164.9	253.3	321.1	376.5	423.2	455.3	489.0	544.6	432.7

Source: Bangladesh Bank Annual Reports

The social cost of loan write offs is substantial, but these costs differ between public and private banks. For public banks, the social cost of loan write offs is huge as it amounts to either a diversion of taxpayer revenues or loss of revenues for the Treasury from public banks. Fundamentally, the loan write offs of public bank is simply a reflection of the shifting of the burden of bad loans to the Treasury, which then finances the loan write offs from taxpayer resources or by foregoing income transfers from public banks. These divert resources from high-priority spending like health, education, and social protection to the borrowers of these funds from the public banks.

This critical point is highlighted in Table 4, which tells a very sad story. Annual public bank loan write offs have substantially exceeded the total spending on health in all years from FY2010 to FY2020. In most years they have also exceeded the amount spent on social protection (excluding civil service pension). The social cost of public bank loan write offs is obviously very high. These resources could have been well used to improve the health outcome of the Bangladeshi population and to reduce poverty through income transfers to the poor and vulnerable. Instead, the money went primarily to the pockets of the rich and powerful borrowers from public sector banks who took the money and never paid back interest or principal or both. This practice is highly unethical and socially harmful and must be stopped.

Table 4: Social Cost of Public Bank Loan Write-offs (Tk. in Billion)

Items	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20
Public Bank Write off	102.3	114.4	97.4	139.8	189.0	215.9	226.0	229.8	231.8	238.0	183.2
Health Expenditure	63	72	77	85	91	100	128	151	173	183	172
Public Bank Loan Write off (% of Total Health Expenditure)	163	159	127	164	207	216	176	152	134	130	107
Social Protection Spending (Excluding Civil Service Pension)	89.6	88.5	104.6	118.5	117.4	124.8	170.6	213.1	197.4	256	257.4
Public Bank Loan Write off (% of Social Protection Spending)	114	129	93	118	161	173	132	108	117	93	71

Source: Ministry of Finance Monthly Fiscal Reports

The social cost of private bank loan write off is less devastating but also harmful. High NPLs and associated loan write offs tend to increase the cost of financial intermediation that invariably puts pressure on interest rates as banks try to recoup income through higher lending rates and lower deposit rates. They also hurt the quality of banking services through cutbacks in administrative costs.

F. Improving Ethics in Banking: Addressing the Cancer of NPLs

As I noted earlier in my lecture, it is no accident that private foreign banks have the best loan portfolio because lending decisions are primarily based on client quality considerations. On the other hand, public banks have the worst quality portfolio while a growing number of weak and poorly managed private banks have also been experiencing growing portfolio problem. A common element for these banks is bad lending decisions owing to poor governance. The only sustainable way to scale back loan write offs is to stem the tide of bad loan decisions through sharp improvements in banking governance where lending decisions are guided by project quality and not political or business connections.

Loan recovery process similarly should be guided by sound business norms and not connections.

How does one bring about this massive improvement in banking governance? Let me first talk about the persistent use of some of the cosmetic solutions in practice today and then move on to the long-term and sustained solution to the NPL problem. I would like to alert the audience that I am only talking about addressing the NPL problem and not talking about ethical issues related to spread of low-cost banking to the rural areas and small borrowers who continue to face serious access problems. There are also other banking reform issues related to new bank licensing, interest rate management, loan concentration etc., which are not covered in this lecture.

a) **Portfolio Reclassification:** The softening of NPL definition as has happened in recent months is not a recommended option. This bandage type solution to a serious cancer problem is neither helpful nor sustainable. Bangladesh Bank is commended for moving forward with internationally recommended norms of loan portfolio classification and measurement of capital adequacy ratios. They must maintain this discipline and resist political pressure to soften the application of prudential norms. The long-term interests of Bangladesh are best served by staying on track with the application of internationally approved prudential norms for the supervision of the banking sector and certifying its health.

b) **Loan Restructuring:** In a market economy some loan restructuring is inevitable. The Bangladesh Bank developed a large loan restructuring policy (LLRP) in January 2015, aimed at reducing these transaction costs and facilitate an orderly restructuring process for large loans of enterprises that are under temporary financial stress. This is a facility available to all business irrespective of their political affiliation and based only on the merits of the business case. The LLRP was developed with scrutiny by the BB Board and drew on the good practice examples from Asian countries. Attention was given to ensuring that only a genuine business enterprise with evidence-based restructuring proposal duly certified by a

pre-qualified accounting firm is eligible. The LLRP requires that individual banks must own and approve the restructuring proposal based on strictly business considerations, but it also provides prudential limits on the generosity of the restructuring terms. This means a bank, especially state-owned commercial bank, cannot just decide to forego its earnings based on political pressures. The LLRP was never intended to bail out persistently poor-performing enterprises or to reward them with lower loan terms for bad behavior. So, this is not an instrument for managing NPLs and should not be provided to known loan defaulters.

c) **Addressing the Governance Problems in Public Banks:** As noted earlier, the evidence is clear that in an environment of country-wide governance challenges, as in Bangladesh and elsewhere in South Asian countries, government ownership of banks is inconsistent with ensuring good ethics in public banks. The first best option is to privatize most public banks while keeping one bank, such as the Sonali Bank, to primarily support Treasury functions. A second-best option is to convert state commercial banks into narrow banks that allows them to take deposits and invest only in T-bills. No lending is allowed, which eliminates the NPL and associated corruption problems at source.

In the current political environment, none of the first two options appear feasible. We then go to the third-best option of improving the management of these banks and requiring them to earn a genuine rather than book- keeping profit. This entails several reforms. First, the banks must be managed by an independent board as in private banks without intervention from the government. The bank management must be professional in nature and certified by the Bangladesh Bank in terms of the fit and proper guidelines applied to the certification of the private bank board. Second, public banks must be fully supervised by the Bangladesh Bank and required to comply with all the prudential norms within a specified timeline. Third, the Treasury must impose a hard budget constraint on these banks so that no Treasury transfers are possible to keep them afloat. They must become financially viable and profitable within a

specified timeline. Fourth, bank management must be held accountable by the government for performance including monitoring of NPLs, capital adequacy, and profitability.

d) **Addressing the Governance Problems in Private Banks:** Weak private banks must be given a timeline to perform and fully meet all prudential norms, failing which they become candidates for mergers.

e) **Strengthening Loan Recovery and NPL Workouts:** The legal framework for loan recovery must be strengthened by focusing on provisions for easier and faster loan recovery. Punitive measures for loan default must be tightened to deter individuals and bank staff abetting such behavior. A proper workout of the stock of NPLs for each bank must be adopted based on international good practice experience[4]. Technical assistance can be sought from the IMF or the World Bank in this task.

f) **Strengthening the Supervision Role of Bangladesh Bank:** The Bangladesh Bank as the main banking oversight agency must adopt a swift program to stem the tide of the flow of bad loans through much stronger supervision and disciplinary actions against the management of poorly functioning bank. Due diligence on poorly functioning banks must be strengthened including review of board effectiveness, quality of bank management, quality of lending decisions, and the effectiveness of loan recovery process. Frequent loan write offs and a softening of loan classification must be avoided. The Finance Ministry must not get involved in cosmetic NPL solutions or provide political cover to powerful loan defaulters. Instead, it should strengthen the hands of the Bangladesh Bank by giving them stronger autonomy including the application of full prudential norms for public banks and full pursuit of all legal options against loan defaulters without fear of adverse political repercussions.

[4] The principles of an NPL workout are suggested in Karlis Bauze "A holistic approach to NPL resolution." Finsac World Bank Presentation to the Finsac NPL Conference, Austria May 15-16, 2018

G. Concluding Remarks

The banking sector has played a key role in helping accelerate private investment, export, and GDP growth in Bangladesh. This progress must be preserved and further strengthened as Bangladesh seeks to achieve Upper Middle-Income status by FY2031. The dark clouds looming from a slide in banking governance that is reflected in growing NPLs must be tackled swiftly and firmly through sustainable solutions and not through cosmetic interventions. Strong partnership between the Ministry of Finance and the Bangladesh Bank is essential. I have identified some of the issues and challenges in banking industry ethics that need to be addressed. I have also offered some practical solutions. Having worked closely with both the Bangladesh Bank and the Ministry of Finance in recent years, I have no doubt they will rise to the occasion and do the right things.

In the end it is very important to note that despite considerable progress, we still have lots of poor and needy people in Bangladesh. It is highly immoral and unethical to let a few greedy politically connected ultra-rich people to siphon off depositors' money and then the gap is filled with taxpayer money, thereby depriving critical services to the poor.

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The New Role of Monetary Policy in Promoting Developmental Central Banking: The Bangladesh Experience

- Atiur Rahman*

M A M Kazemi- A Polymath

I feel a deep honor, also a profound sadness to be invited for this lecture. I wish I never had to give this lecture. I cannot accept the fact that I – more importantly – we as a nation cannot seek Mr. Kazemi's (I always called him as Kazem Bhai) advice today when we need him so badly.

Kazemi Bhai was so many things to so many people. I know that for me, he was more than an advisor, more than a fellow central banker, more than a guide, more than a friend, more than a source of wisdom. He was always more than we understood him to be and gave us more than we could fully appreciate. As I look back and go through my memories of Kazemi Bhai, I cannot and I also do not want to define what he was to me, what he was to all of us. He was always beyond simple publicity or definition. Now he is also beyond our reach. But I earnestly hope he would always remain our inspiration, remain alive in our memories. I thank the current Governor Mr. Fazle Kabir to initiate the memorial lecture, and that too on Monetary Policy in which Kazemi Bhai was an intellectual giant. I also invite the next Governor to carry forward the memories and the inspirations of Kazemi Bhai in promoting the unique brand of developmental Bangladesh Bank while remaining focused on the conventional wisdom on central banking as practiced elsewhere. Indeed, we must walk on both legs.

I have been missing Kazemi Bhai especially in recent months as the clouds over the world have darkened. The world economy and the global geopolitics

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have not been this complex in many decades. The pandemic, the disruptions in the supply chain, the persistent uncertainties and fallout from the war in Ukraine, the commodity price shocks, the worldwide increase in inflation, all in one, are in motion to make the global financial system so different than what we used to know. When it comes to economic management, as the policymakers across the world are finding out: the water is going to be choppy for some time, the waves are going to be big and many.

More than ever, policymakers at this current juncture need a steady focus, a clear vision, an aspirational conviction, and most importantly, a quiet integrity, let me repeat, quiet integrity, the kind of integrity that Kazemi Bhai always lived his life by, without ever preaching publicly. Conviction and integrity must anchor the difficult choices facing us, whether it involves making exchange rate more flexible to reduce market pressures or tightening monetary policy to tame the broad-based inflationary pressure or further improving supervision so that growth touches the lives of many and not only of a few, lights hope for all. In this difficult time, we need to make difficult choices, many of them will not, may not be, in fact cannot be popular. As the current or any ex-Governor can attest, good central banking is a lonely job – central bankers, like good drivers, rarely get any credit for all the accidents they avoided during their tenure. So, loneliness is a part of the job description of a central banker. Kazemi Bhai understood that loneliness better than anybody else. However, he never regretted for this reality of his professional life. He knew his bounds. But he also appreciated public debate and encouraged us to speak out. Thus, as late as on May 17, 2020, barely a few weeks before his final departure from this world he sent me a text saying, "Much appreciate your mindfulness of need for candor in public statements/ comments. Continuing engagement with BB confines my candor to bounds of in-house policy discussions and notes, with no room for any public comment." But in private, he was very candid. He was equally conversant with fiscal and monetary policies. He could easily analyze them in light of the global context. To give you another example, Kazemi Bhai wrote me an email on 29th April 2020 explaining in detail how to respond to the challenges of the pandemic which was still unfolding. In his prophetic statements he shared with me pragmatic policy directions with a hope that I brought the same in public domain, which I did. To

quote him, "Major pickup in government's revenue earnings will be unlikely in FY21 from the post lockdown gradual resumption of normal pace of economic activities, the higher fiscal expenditure outlays needed in FY21 will have to be financed mainly with borrowings. For this, large scale recourse to domestic borrowing by issuance of treasury bonds and bills will be inadvisable; as that will cause private sector credit needs to be crowded out more than ever before, with banks opting for the safe lucrative returns from risk free treasury securities far more than opting for uncertain returns from riskier private sector lending at capped single digit interest rates.

The best immediate option for FY 21 fiscal financing would be the substantial volumes of concessionary emergency assistance on offer from IMF, WB, and other official multilateral institutions for coping with fallouts from COVID-19 pandemic. These concessionary assistances should be accessed to the fullest available extent; it is understood that Bangladesh no longer being a low-income economy parts of these assistances will be at somewhat higher than the lowest cost, but those higher costs would still be below the costs of non-concessionary borrowings from global financial markets. To get the most out of the multilateral official assistance sources at the lowest possible costs the government will need to remain amenable to their suggestions for (preferably gradual) phasing out of all administratively imposed rigidities in Taka interest rates and exchange rates… It is important to bear in mind that administratively imposed rigidities in interest rate and exchange rate implacably obstruct fostering of financial market development crucial for successfully mobilizing the massive volumes of domestic and external investments needed for attainment of our ambitious aspirations of graduation to upper middle-income economy status by 2031 and to advanced economy status by 2041." I have deliberately quoted him so extensively as these ideas can be of significant interest in setting the tone for today's lecture which is coincidently given in his memory.

Innovations in Monetary Policy in the Context of Developmental Central Banking

Let me share few observations on how Kazemi bhai and I tried to introduce innovations in monetary policy during my stint as a Governor. As you know,

monetary policy is as much art as science. Kazemi Bhai was both a scientist and an artist, in his field, the best Bangladesh has ever known. In that sense I was lucky to get him by my side for a long spell of about seven years as we were both striving for institutionalizing change management in our central bank. No doubt, we redesignated him as a Change Management Adviser to the Governor. I must thank my successor for continuing this position and I am sure he too must have been immensely benefited from Kazemi Bhai's prudent advice.

Kazemi Bhai believed that if well designed the central banks can make wide-ranging effects on the real economy and society through effective implementation of monetary policies. This depends on how wisely a central bank defines its policy space and interacts with major stakeholders, mostly banks, to motivate and act as desired. Fortunately, Bangladesh Bank focused on utilizing its mandates, objectives, targets, and instruments for effective transmission of its monetary policy decisions for desired economic growth with moderate inflation. We also prioritized financial inclusion. The focus on financial inclusion served several purposes: it improved monetary transmission, broadened economic base, most importantly it brought the questions of ethics, equity, and environment into central policy focus, well before it became part of the mainstream global central banking trend. Compared to other countries, Bangladesh started this approach earlier. As we all know, monetary transmission in both developing and advanced economies are often incomplete. Hence, in line with the philosophy of developmental central banking, we tried to innovate market-based but somewhat activist policy design.

The strategy pursued by BB has been to allow moderate monetary growth in proportionate to real output growth expectations alongside guidance for lenders in channeling the financial inclusivity into output initiatives in all economic sectors. This strategy of pragmatic monetary policy of BB contrasts sharply with post GFC large scale QEs in advanced countries in shoring up flagging global growth. Bangladesh Bank articulated its monetary policy objectives of prioritizing inclusive growth without compromising its core mission of price stability. It has been following the monetary targeting strategy by seeking to control growth of broad money (M2) at a rate it deems consistent with its objectives of output growth and price stability. As done by most central banks,

Bangladesh Bank allows M2 being broadly determined by reserve money (RM) through money multiplier and by setting an operational target for RM accordingly. To reach its RM target BB controls liquidity in the market on a day-to-day basis using conventional instruments.

To encourage inclusive growth, a blended approach of moral suasion as along with targeted credits for farm, nonfarm MSMEs for rural and urban communities to shore up domestic supply of output and enhance demand through increased employment income has been used. The trade-offs between supply and demand sides have been neatly balanced. In addition, BB has been pursuing targeted refinance lines for providing incentives to the banks to give more credit to priority areas like agriculture, livestock, SMEs, green enterprises etc. Enforcing differential ceilings on loan growth, maximum loan size, debt equity ratios for some sectors for macro-prudential reasons. The final objective is to meet the target of sustainability and inclusivity. The emphasis on agriculture and green energy can be linked to increasing supply to reduce inflation, given the large share of food and energy in the consumption basket. Bangladesh Bank also upgraded financial sector infrastructure covering wide-ranging digitization for improving transmission channel. The core goal has been to combine short-term business fluctuation management with long-term sustainability agenda. Simultaneously Bangladesh Bank has been making attempts at ingraining socially and environmentally responsible financial ethos reflecting local context and as well as global challenges. The main motivation has been to enable the bottom of the pyramid through financing sustainable entrepreneurial innovations. These ideas of central banking were certainly ahead of the curve. But fortunately, the global financial and climate crises have been pushing many experts on central banking to think out of box and go for multiple targets beyond inflation targeting even though it was never less important than others. After more than a decade of Bangladesh Bank's courageous move to go beyond single target and materialize financial inclusion, it was heartening to hear Professor Barry Eichengreen of University of California, Berkeley in the same vein. According to him, "Monetary policy has implications for issues beyond inflation and payments, including climate change and inequality…The best way forward for central bankers is to use monetary policy to target inflation, while directing their regulatory powers at

other pressing concerns." ('New Model Central Banks', Project Syndicate, February 9, 2021). This shift in paradigm on monetary policy leads us to focus more on the emerging concept of developmental central banking where Bangladesh Bank stands on a higher ground. In short, our innovations in monetary policy should not be viewed in isolation but within the broader context of the work agenda of a developmental central banking.

Why Developmental Central Banking?

Inclusive development has emerged as a global policy priority. While fiscal policy has a dominant role in addressing inequality, the central banks in many countries have broadened their objectives and have deployed several innovative monetary policy tools over time to ensure equitable allocation and distribution of sectoral credit. Although it is widely accepted that the key objective of any central bank should be to achieve price stability, the global financial crisis and most recently, the COVID-19 pandemic have highlighted a wider and complementary role of the central banks in safeguarding the economy against domestic and external shocks.

Central banks primarily contribute to inclusive development by maintaining low and stable inflation and ensuring stability in the financial sector. They also promote inclusive growth by safeguarding customers' interests and ensuring a prudent regulation for the financial sector. As a policymaker, investor (of foreign exchange reserves), issuer (of currency), and regulator (of the financial sector), a central bank can make its monetary policy more effective in addressing inequality while not jeopardizing its core responsibilities. Historically, central banks have pursued multiple developmental goals and tools. Examples are the central banks of Argentina, Bangladesh, China, and India which have used a broad array of tools to manage their economies for developmental purposes.

As mentioned earlier, Central banks can play a broader role to help countries meet key challenges, such as generating productive employment, allocate investment to productivity enhancing activities and tackle the challenges of climate change. The central bank can work effectively with other key institutions, such as development banks, specialized financial institutions and a variety of government ministries and private actors while, at the same time, ensuring that it is not

overwhelmed with tasks better undertaken elsewhere. Developmental central banking works better with a stronger coordination between the central bank and government. In many developing and emerging economies, central banks have begun to place renewed emphasis on the promotion of economic development and structural transformation, looking beyond narrow mandates for macroeconomic stability. For example, the governor of the Reserve Bank of India recently concluded that financial inclusion has empowered monetary policy by strengthening its ability to stabilize inflation and reap welfare gains for the society. And Bangladesh Bank, as already indicated, has been a pioneering central bank in promoting innovative features of financial inclusion with noticeable impacts on both financial stability and broadening the access to finance to the unserved and underserved. And fast adoption of digital technology has provided an edge to Bangladesh in making mobile financial services and agent banking services available to the doorsteps of the disadvantaged.

How Central Banking can Make Banking Better

Governments require the credit flow to create fiscal space to strengthen relief, recovery, and reform. For that, we need to enable spending on nationally produced goods and services. This can have positive impact on containing inflation through the route of supply side. If we direct the money to the many, that is an effective way to generate internal demand within a country. It enables investment in productive capacities and creates more jobs. This is another area where we can inject money to enhance social protection to cover the newly poor and vulnerable, and to ensure excess liquidity does not create inflationary pressure.

We still, certainly, have inflationary pressure in many developing countries, including Bangladesh. The Ukraine-Russia war has made the situation even more complicated as prices are going to go up. These increases will have a significant effect on the inflationary situation in many developing countries.

Given these challenges, we need to talk about a more realistic monetary policy that addresses more than the single target of inflation. But it cannot remain oblivious to it either as inflation hurts more the poor. Hence the need for opting for mor innovative monetary policy without creating any financial imbalance.

Bangladesh has done quite well in making the balanced transition to restraining inflation and encouraging inclusive growth. How?

The Bangladesh Experience

Bangladesh has promoted inclusive finance for more than a decade, in the wake of the global financial crisis. We made financial services accessible to one and all, leveraging digital solutions to ensure reliable low-cost services.

As already pointed out, we gave attention to underserved segments, such us agriculture or micro and small and medium enterprises, and prioritized women entrepreneurs. Private banks have been particularly motivated to finance SMEs and prioritized women entrepreneurs on the strength of incentives from the Bangladeshi Central Bank.

Environmentally benign green output processes have been promoted to ensure sustainable development in Bangladesh. Our idea was to test the ground to change the real economy for people living at the bottom of the social pyramid. The driving force has been a focus on socially responsible finance for more inclusion, which Bangladesh made the core of its central banking activity. The outcome has been strong macroeconomic performance as a foundation, a strong financial sector, which allowed increases to the reserves, controlled inflation, and accelerated investment creating fiscal space.

A balancing act between innovation and maintaining continuity has been key. It was not easy, but we encouraged innovation and open discussion with government departments and different stakeholders, including the banks. The stakeholders' response was very positive. They came forward with innovative ideas about how to make services more user-friendly and we saw changes in people's mindsets. The bankers started to go beyond compliance culture. They went, at a grass-roots level, to help the many.

Bangladesh's financial system has been highlighted as a model of sustainable economic development. The country has been a role model for financial inclusion and sustainable economic development for its financial inclusion campaign. A credit guarantee scheme from the Bangladesh Central Bank was taken up, providing extra support for SME finance in the country. The central

bank also provides liquidity support to the banks through low-cost refinancing facilities to motivate them to give SMEs including women entrepreneurs more loans. The entrepreneurial farmers are also getting such loans.

School banking in Bangladesh has been another fantastic innovation. Between March 2020 and March 2021, the number of these accounts increased from 2.2 million to 2.6 million, which was an 18% increase. At the same time the amount deposited increased by 37%. All of which means many young people are becoming familiar with banking, and money, at an earlier stage so they are better equipped to create more resilient futures for themselves.

Digitization has been key to promote access to finance and reach the many. Immediately after the global financial crisis, the Central Bank of Bangladesh took initiative to pursue integrated supervision systems, encouraging other banks to go digital. During the pandemic, this digitization worked very well. Know your customer processes have been linked to a national database of the Election Commission using national IDs. Digital financial services like online banking, mobile financial service, and agent banking are greatly benefitting from this digital data base. Between 2015 and 2020, access to finance was significantly and positively impacted by the central bank's drive for digitalization.

Bangladesh banks' green drive has been another very interesting innovation. Green financing funds and Bangladesh Central Bank policy will, I believe, reinforce longer-term climate-friendly initiatives. The Bangladesh government is developing this strategic investment framework, called the Mujib Climate Prosperity Plan, to mobilize finance through international cooperation for renewable energy and climate resilience initiatives. The government has earmarked about 8% of its budget for these green initiatives and the central bank has provided further support. The central bank of Bangladesh has also developed a farsighted Sustainable Finance Policy to guide the banks and other financial institutions to support more green initiatives through directed green financing.

The Role of Central Banks around the World

Beyond Bangladesh, climate change, pandemics and the destruction of nature are common global threats. They should unite us in working towards a common solution for a 'cleaner, greener and safer' world.

Central banks and banking, in general, should target climate-friendly development. Let me now summarize some learnings that may be useful for all the central banks and the banks all around the world in the light of the Bangladesh experience:

01) **One size does not fit all**. We need to take national and contextual needs into account while pushing for regulatory innovation.

02) **Specific groups and areas can be targeted to promote financial inclusion**, such as share-croppers or women entrepreneurs.

03) **There is a need to focus on more than just controlling inflation**. We need to focus instead on the broader economy and changing the mindsets of bankers and other stakeholders, and this will yield huge results. How? Some ideas:

- A broader expertise and innovation approach, using new tools such as green technology or digital financial services.
- Developmental targeting, enhanced transparency, and accountability of the developmental approach.
- Coordination with the broader policy framework, and an understanding of the policy thrust of government. Central banks and Ministries of Finance must coordinate their activities and work together.
- Directing credit to productive sectors instead of speculative uses.

There is a need for a trade-off between developmental central banking and financial and economic stability. We need to take more money out of the traditional fields of investment and put it to work at a grass-roots level. I think that is what central banks should do.

Towards Hope, Confidence, and Pragmatism in an Uncertain World

Towards hope, confidence, and pragmatism in an uncertain world No doubt, the current global situation remains highly vulnerable. The tightening of monetary policy throughout the world with several consequences including shift of foreign investment from developing countries may not be avoidable. And this calls for remaining both. Continue traditional monetary policy as close to market imperatives and at the same time investing in the real economy to augment more supplies of goods and services. Let's don't jump. Let's not be adventurous. Let's touch the ground and remain focused on what has been working better for our economy. If need be, we should also be ready to change our course in the middle of the journey depending on the level of the crisis. However, collaboration and partnership between stakeholders should remain our key strategy. This has worked well in the past. This will work better as well in the future.

Let me share with you some parting thoughts. As I was thinking this evening about this lecture, I asked myself what would Kazemi Bhai tell us today in private in his quiet, gentle but powerfully polite voice as he always did when Bangladesh faced any challenging global context. I am sure he would always start his advice with hope, optimism, confidence, and his characteristic pragmatism. He would always remind us progress comes in small incremental steps. He would also remind us that right choices are often initially painful. He would also give us the courage to not be distracted by the noises of the vested interest groups. He always reminded me how the power of market-based solutions can and should be harnessed, while being mindful of when and where the market may not adequately address equity, ethics and inclusion. As we navigate the ongoing complex global environment, we must remember that guidance from Kazemi Bhai to increase foreign exchange flexibility to address the balance of payments pressures. I commend the current Governor for emphasizing that flexibility, which should make it easier for the incoming Governor to move in that direction. I should also convey what Kazemi Bhai always reminded me in private: foreign exchange flexibility requires interest rate flexibility. For modern monetary policy for a country like Bangladesh that is undergoing rapid structural changes, both foreign exchange and interest rate flexibility are necessary ingredients for all

market development. Kazemi Bhai always reminded me to upgrade data collection and dissemination for policy formulation.

Let us all show our respect to the memory of Muhammad Allah Malik Kazemi by discussing and designing policies that can touch the lives of all Bangladeshis. Only then we can keep his memories alive and we can also honor the lives of all who sacrificed their lives for Bangladesh over the last 51 years.

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Dynamics of Inflation, Money Supply and Economic Growth in Bangladesh: A Multivariate Analysis

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Abstract

Using the ARDL model, this study analyses the dynamics of money supply, price level and real GDP during the period FY1979-2018. The study's empirical findings reveal that the money supply, price level and real GDP have a long run equilibrium relationship. The result implies that in Bangladesh money supply has a positive impact on price level and real GDP affects negatively on price level in long run. But the Error Correction Model (ECM) reveals that in short run only money supply has a negative impact on the price level. Based on findings, the paper suggests that an expansionary and growth supported monetary policy should be continued to make loan attractive for productive purposes with a view to raising production and investment which will ultimately contribute economic growth.

Keywords: Money Supply, Price Level, Inflation, Economic Growth, Cointegration, Error Correction Model, Causality, Bangladesh.
JEL Classification: C32, E23, E31, O51, O53

1. Introduction

Higher and sustainable economic growth and lower inflation are the main objectives of a developing economy. Bangladesh also emphasizes on sustaining higher growth with lower inflation while formulating monetary policy. Various economists, policy makers and experts show arguments on economic stability, particularly that low rate of inflation (below the threshold level) has a positive relationship with economic growth. Higher inflation (above the threshold level) creates negative effects on the smooth functioning of the economy. It brings more burdens on the cost of living which severely affects particularly life of poor people. The Inflationary pressures hamper investment due to the increase in cost of production which negatively affects GDP growth.

The study's main goal is to examine empirically the causal linkages between money supply, price level and output in Bangladesh for the period of FY1979-FY2018. This study specifically attempts to find a long run relationship

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among these variables and their short run dynamics. However, in Bangladesh, the relationship between inflation and money growth as well as the impact of inflation on economic growth or vice versa has received little attention. To the best of our knowledge, a little empirical research has been conducted in the country on the causal relationship between inflation, money supply growth and economic growth.

The structure of this study is displayed in the following manner. After introduction, Section-2 shows conceptual and theoretical framework. In Section- 3, a review of literature is discussed. Stylized facts on money supply, price level and GDP in Bangladesh are depicted in Section-4. Data and methodology are shown in Section-5. Empirical results are discussed in Section-6. Conclusion and policy recommendations are explained in the final section.

2. Conceptual and Theoretical Framework

A number of theories—Classical, Neoclassical, Keynesian, Neo-Keynesian and Monetarist—are linked to money, price and output relationship. The Classical and Neoclassical monetary theory based on equation of exchange formulated by Irving Fisher which states that "other things remaining unchanged, as the quantity of money in circulation increases, the price level also increases in direct proportion and the value of money decreases and vice versa". This means that the amount of money plays the key factor in determining the price level or the value of money. If quantity of money is changed, it will cause a change in the price level exactly in the same proportion. The equation of exchange formulated by Fisher states that money supply as defined by quantity of money (M) multiplied velocity of money (V) equal to the value of goods and services (T) as defined by number of goods and services (Q) multiplied by their average prices (P). Symbolically it can usually be written as MV = T or MV = PQ.

Under the framework of aggregate demand and supply, both Keynesian and Neo-Keynesian theories postulate that there is a direct relationship between inflation and output growth in the short run. Changes in expectations, labour force, prices of other factors of production, fiscal and/or monetary policy are the driving forces in this process. Keynesian economists believe that output will change in the same proportion as the quantity of money with no change in prices

as long as there is unemployment and that at full employment, price will change in the same proportion as the quantity of money does.

Monetarists emphasize money growth to determine inflation and believe that an excessive money supply in inherently inflationary. The quantity theory of money sets the cornerstone of monetarism by stating that the value of money is determined by quantity of money. They also argue that high growth of supply of money results in huge inflation. Money growth that exceeds economic output growth ends in inflation, because in this situation more goods and services are demanded than their supply. For the purpose of controlling inflation growth of money supply needs to grow below the output growth.

This argument guides the way to manage monetary policy. Some monetarists view that the money supply should be kept within a tolerable range in order to keep inflation under control. So, most monetarists opine that though an expansionary monetary policy can boost production to an overwhelming economy in near term, but the impact of such expansionary money supply is very gloomy in the long run.

Other monetarists opine that increasing the money supply does not affect on real output, spending and employment. According to most monetarists any kind of non-inflationary policy may lead to a continual decline in money supply. Therefore, the monetarists think that instead of government continual attempts of changing economic policies regarding expenditure and taxes, a better attempt to adopt anti-inflationary policies for moving the economy towards full employment.

The quantity theory of money states that the amount of money multiplied by its velocity (the speed at which money changes hands) is equal to the nominal expenditures (the number of goods and services multiplied by their average prices). Since this equation is an accounting identity, it is not controversial. Monetarist theory states that the velocity is generally stable meaning that nominal income is mostly a function of money supply. Fluctuations in nominal income reveal changes in real economic activities (the number of goods and services sold) and inflation (the average price paid for them). The monetarist views that an increase in money supply will lead to higher prices or wages in the long run

without any effect on real production or employment. However, in the short run, the increase in money supply will have a momentary impact on real production and employment as adjustment of prices and wages takes time.

Keynes reformulated money's quantity theory that happened a shift of monetary theories from prices to output. He also combined theories of money and value and connected theories of interest to money. He differed with the old quantity theory of money which states a direct and proportional link between changes in quantity of money and prices. He revealed that an indirect and non-proportional relationship between changes in quantity of money and prices and that a change in supply of money has an impact only on the absolute price level, but not on the relative prices. He thinks production varies with the change in quantity of money in the same proportion so long as there exists unemployment and, in such case, prices will be changed. However, changes in prices will be proportional to quantity of money when the economy remains at full employment. He believes that changes in output and quantity of money will be in the same proportional until the economy remains at full employment and hence price level will not be changed.

3. Literature Review

There is a common phenomenon in empirical literature to relate inflation with output growth negatively. There are some situations, known as stagflation implies inflation shoots up when production is declining or stable. There is also no situation where an economy reaches directly to high inflation, however, follows a temporary way that leads to increase inflation and ultimately falls. A short run relationship between changes in output and price level is evident but no long run relationship between them. To keep inflation at steady level, output must be consistent to natural rate (Jhingan, 2005). The study followed quantity theory of money as formulated by Keynes as it provides theoretical knowledge to determine the linkages between money, output and price level.

Moroney (2002) developed a long run version of quantity theory regarding the growth in money, real GDP and price level and found that cross sectional inflation is strongly explainable byaverage growth rate of broad money. He argued that countries facing high growths in money and price level had estimated

coefficients of money supply noticeably closer to 1 which is clearly consistent with quantity theory. In comparison, countries with low growths in money and price level had the estimated coefficient of money growth, only 0.69. Therefore, quantity theory does not provide an entire explanation of inflation. Thus, the quantity theory of money is regarded as a reliable model for most countries, except those facing lower money growths. Ireland (1994) revealed that the impact of inflation on growth is low, but the impact of growth on money is large.

Grauwe and Polan (2005) used a sample of about 160 countries with a period of 30 years in determination of relationship between growth in GDP, money and price level and found a strong positive and less proportional long run relationship between inflation and money supply on output growth. They viewed that a strong relationship between inflation and money growth is evident due to the existence of high inflationary countries.

Mehra (1989) studied an empirical analysis on quantity theory of money. The most important aspect of the quantity theory of money is that in the long run, the changes in price levels depend mainly on the change in money beyond the change in output. This relationship is connected to the idea of cointegration developed by Granger (1968), in which it is shown that price levels are cointegrated with money, output and nominal interest rate. These variables form an equation of price on the basis of equation of exchange. Moreover, this cointegrating nature in data is relevant to the result of Granger Causality Test that reveals causality emerges from money supply and output to prices.

Su et al. (2016) examined relationship between the growth in money supply and price level in China using causality test. The results reveal that growth of money supply affects inflation both positively and negatively in some sub periods and inflation has also similar effects on money growth in China. If money growth does not offset output growth, only reduction of money supply cannot contain inflation. It is noticeable that in maintaining stability in price level and economic growth, a stable growth in money supply is needed in China.

Qayyum (2006) studied linkage between growths in money supply and price level using a correlation analysis. He shows that there is a positive relationship between growths in money supply and price level. Firstly, money growth affects

real output growth and secondly, it affects inflation in Pakistan. His view is reliable with the view of monetarists that excessive money growth results in the rise in inflation. The study recommends a tight monetary policy for controlling inflation in Pakistan. While formulating monetary policy, it should be considered the development of real as well as financial sectors.

Awomuse and Alimi (2012) found that a long-run unidirectional causal relationship comes from money supply to inflation and the relationship supports the view of monetarists. A causal relationship strictly from inflation to interest rate is not found according to Fisher's hypothesis, however, an inverse casual relationship is found between them. Using Wald test in examination of restrictions imposed on money and output, they finally reached the confirmation of the proposition of quantity theory of money which states inflation is a monetary phenomenon.

Emerson (2006) applied Johansen method to establish a long run relationship among price level, money supply, real output and nominal rate of interest. The result from Likelihood ratio test show that within the framework of the study, the restrictions imposed by quantity theory of money cannot be rejected easily for the whole sample period. But, while considering sub-periods, he found mixed results regarding the quantity theory of money, specially in recent decades.

However, it is very essential to understand the linkages between price level, money, and real output. While theoretical knowledge gives us existing relationship between these variables, empirical studies, in this regard, still provides us diverse results in terms of impact, methodology and country perspectives.

4. Stylized Facts on Money Growth, Inflation and GDP Growth in Bangladesh

Inflation is viewed as strictly a monetary phenomenon and it happens when money growth is higher than output growth in an economy. It shows traditional monetary connection from issuance of high-powered or reserve money to inflation if monetary authority issues money in excess of demand for cash in a given level of price. Excess demand in goods market which induces the level of

price upward because the people tend to avoid their cash holding. Then the monetary authority plays its role on balancing money growth and inflation through effective coordination for monetary expansion.

Historical data show that Bangladesh has been experiencing a high GDP growth after liberation with significant fluctuations. From FY1975 to FY1980, the average growth (arithmetic mean of annual GDP growth rates as calculated by the authors) of GDP was 5.60 percent. From FY1980 to FY1989, the average growth of GDP stood lower at 3.43 percent due to some turmoil in political and agricultural production caused by devastating floods. In the decade of 1990's, the average growth of GDP increased to 4.87 percent and stood at 5.80 and 6.60 percent in the decades of 2000 and 2010 respectively. From the beginning of current century, the economy of Bangladesh recorded above 6 percent of GDP growth from FY2011 which surpassed 7.0 percent from FY2016, high in a decade, and higher than neighbour Asian countries' average, turning Bangladesh into one of the three best growth achievers in Asia. The GDP growth in FY2016 reached to 7.1 percent, supported by both domestic and external demand. Bangladesh has achieved a GDP growth of 7.86 percent in FY2018. On the supply side, this robust growth was mainly propelled by industry and service sectors activities.

The increase in money supply reflecting either credit demand for private or public sectors is regarded as the main cause of inflation. But an output growth has an offsetting effect on the level of price. The money supply—both narrow and broad money—grew sharply in Bangladesh over the years. After liberation (during FY1975-80) Money supply growth followed fluctuating trend and stood at the range of minimum 1.21 to 28.87 percent. During FY1980-89, growth of money supply accelerated more and shot up at the range of 14.32 to 42.18 percent averaging (arithmetic mean of annual growth rates of M2 as calculated by the authors) at 21.66 percent. On the other hand, money supply eased significantly and ranged from 8.24 to 16.88 percent in the decade of FY1990 to FY1999. But, in FY2000-09 decade, money supply went up again, spanned from 13.13 to 19.30 percent while it stood at the range of 9.24 to 22.44 percent in the current decade.

In the current decade monetary policy of Bangladesh remains cautious. However, it is inclusive, growth supportive and investment friendly too for the sake of achieving desired output growth and keeping inflation at a tolerable level. In this regard, Bangladesh Bank designed its monetary and credit policies and programmes to keep inflation at a level of 5.5 percent and achieve economic growth of 8.2 percent for FY2020 as targets of National Budget. Broad money (M2) growth stood at 9.24 percent at the end of June, 2018.

Trends in Bangladesh's CPI inflation followed a very fluctuating tendency from FY1975 to FY1979. In 1980's, inflation went up in double digit level and stood higher at 18.46 percent in FY1980. The next 1990-decade, inflation eased somewhat ranged from near 4.00 to below 9.00 percent. In 2000 decade, it started increasing and recorded near double digit level due to global food and fuel prices hike. Yearly average inflation has tended to declining from the beginning of the current decade. The annual average inflation reached at 5.79 percent in FY2018. The growths in real output, CPI and money supply in Bangladesh from FY2001 to FY2018 are shown in Table-1.

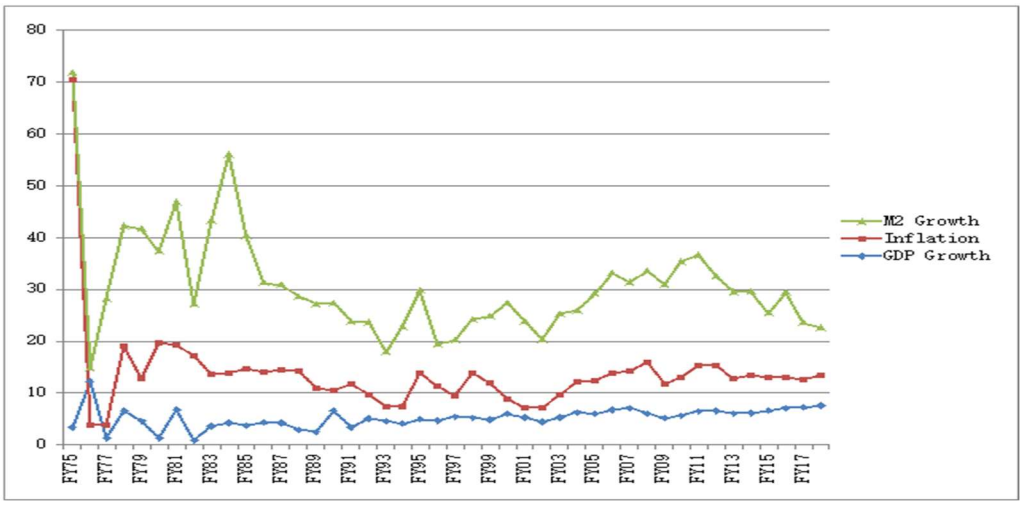
Table 1: Some Selected Macroeconomic Aggregates (% Change)

Year	GDP Growth	Inflation	M2 Growth
FY2001	5.27	1.94	16.60
FY2002	4.42	2.79	13.13
FY2003	5.26	4.38	15.59
FY2004	6.27	5.83	13.80
FY2005	5.96	6.48	16.75
FY2006	6.70	7.16	19.30
FY2007	7.10	7.20	17.06
FY2008	6.00	9.94	17.63
FY2009	5.10	6.66	19.17
FY2010	5.60	7.31	22.44
FY2011	6.46	8.80	21.34
FY2012	6.52	8.69	17.39
FY2013	6.01	6.78	16.71
FY2014	6.12	7.35	16.09
FY2015	6.60	6.40	12.42
FY2016	7.10	5.92	16.35
FY2017	7.20	5.44	10.88
FY2018	7.86	5.78	9.24

Source: Annual Report, Bangladesh, Various Issues, and Statistical Yearbook, Bangladesh Bureau of Statistics, Various Issues.

From, Table-1, we find that three variables—GDP growth, inflation and M2 growth— have gone in the same direction. High M2 growth rates induce monetization in the economy heavily and thus in turn triggers high inflation. But inflation was hovering over in a single digit in the last two decades but rose somewhat to 9.94, 8.80 and 8.69 percent in FY2008, FY2011 and FY2012, respectively.

Figure 1: Trend of Real GDP Growth, Money Supply Growth and Inflation



The trend in real GDP growth, money supply growth and inflation from FY1975 to FY2018 is shown in Figure-1. It is found that real GDP growths were rather low from FY1975 to the end of 1980s with significant volatility. At the beginning of the 1990's, GDP growth grew continued with some less volatility and gained momentum with 6 percent growth from FY2006 and onward. The Bangladesh economy was about untouched at the global economic slowdown in 2008 and 2009 with GDP growth of 6.00 and 5.10 percent, respectively. This growth continued its upward trend starting from 2011 with above 6 percent and reached at 7.86 in FY2018, and was driven primarily and largely by industry and service sectors. The figure also shows theoretical controversy—a divergent co-movement is evident between money growth and inflation. Inflation also responds to the money growth with a time lag at different paces. However, roughly a noticeable relationship is witnessed between money growth and

inflation from 1980's and continued till current period of time with few exceptional cases.

5. Data and Methodology

5.1 Types and Sources of Data

Secondary data are used in this paper. Data are collected from Bangladesh Bank and Bangladesh Bureau of Statistics. Data set includes consumer price index, money supply (M2) and Real Gross Domestic Product (RGDP). Data frequency is annual and covered the period from FY1979 to FY2018.

Consumer Price Index (CPI): CPI is constructed from a set of prices of goods and services that the households consume regularly. There are different base years of CPI data. However, for econometric purpose, the authors adjusted all CPI data in the FY2005-06 base year.

Money Supply (M2): M2 is the broader definition of money supply. It includes currency outside banks basically the currency held by public and deposits including demand and time deposits.

Real Gross Domestic Product (RGDP): GDP is the total value of goods and services produced or served in an economy for a year. While GDP is measured at current prices, RGDP is the measure of GDP adjusted for price changes. However, for econometric purpose, the authors adjusted all RGDP data in the FY2005-06 base year.

5.2 Model Specification

To find out the relationship among price level, money supply and output, we first specify the quantity theory of money introduced by Fisher (1911) which can be written as:

$$MV=PQ \text{ --- } (1)$$

where, M, V, P and Q stand for money supply, velocity of money price level and output, respectively.

We can rewrite the quantity theory of money in logarithmic form in the following way:

$$\log M + \log V = \log P + \log Q \text{ --- } (2)$$

Rearranging Equation (2), inflation equation can be derived as follows:

$$log\ P = log\ M + log\ V - log\ Q \text{ --- (3)}$$

Assuming the V is constant, substituting P, M and Q in Equation (3) by variables *CPI*, *M2* and *RGDP,* respectively, and using $log = L$ for simplicity, we can specify a regression equation as follows:

$$LCPI_t = \alpha + \beta_1 LM2_t + \beta_2 LRGDP_t + \varepsilon_t \text{ --- (4)}$$

where, α is a constant term, β_1 and β_2 are coefficients of *M2* and *RGDP variables,* respectively, t is time. ε is error term and we assume it is white noise. We expect the signs of β_1 and β_2 are positive and negative, respectively.

As our aim is to find a long-run linkage among price level, money supply and GDP, it is wise to see first long-run causality among the above variables. We can get signal on the direction of long run causality among variables through Granger causality tests on levels (Morley, 2006). But to find the long-run relationship, we will accept the results from ARDL method as final.

Before running any regression-model using time series data, it is worthwhile to find unit root in data. Practically it is very difficult to choose a suitable unit root test. According to Enders (1995), tests of Augmented Dickey-Fuller (1981) and Phillips-Perron (1988) can be regarded as safe choice. If these tests give the same results, we are then very confident about unit root in data. Dickey-Fuller (DF) test find probable serial correlation among the error terms while Augmented Dickey-Fuller (ADF) test adjust DF test by adding lagged difference terms of regressand. Phillips-Perron (PP) test applies nonparametric statistical methods to find serial correlation in error terms without adding lagged difference terms (Gujrati, 2003). Kwiatkowski, Phillips, Schmidt and Sin or KPSS test is complement to ADF and PP. KPSS test follows a null hypothesis of stationary time series data against alternative hypothesis of a unit root (Kwiatkowski et al., 1992). We will use above three-unit root tests for all variables. If we find that all variables have unit root at levels, but stationary at first differences, we then conclude variables are integrated of order one i.e. *I(1)*. If all variables have the characteristic of *I(1)*, we then use cointegration method to find a long-run relationship among variables.

5.3 ARDL Model

In cointegration technique all variables have to be integrated in the same order. However, in ARDL method variables need to be either purely *I(0)* or purely *I(1)* or combination of both (Pesaran et al., 2001). There are some advantages of ARDL method compared to cointegration techniques introduced by Engle & Granger (1987) and Johansen & Juselius (1990). In ARDL method each variable can take any number of lags while in cointegration technique all variables must take same number of lags. Another benefit of ARDL method is that it gives us unbiased estimates and valid *t*-statistic of long run model even if some regressors are endogenous (Harris & Sollis, 2003). Finally, ARDL method can correct bias of small sample (Pesaran & Shin, 1999).

The ARDL bound testing approach is developed on the basis of Ordinary Least Square (OLS) estimation of a conditional unrestricted Error Correction Model (ECM). We can specify our Equation (1) according to this approach as follows:

$$\Delta LCPI_t = b_0 + b_1 LCPI_{t-1} + b_2 M2_{t-1} + b_3 LRGDP_{t-1} + \sum_{i=1}^{p} e_i \Delta LCPI_{t-i} + \sum_{i=0}^{p} f_i \Delta LM2_{t-i} + \sum_{i=0}^{p} g_i \Delta LRGDP_{t-i} + u_t \quad \ldots (5)$$

where, b_0 is an intercept; b_1, b_2 and b_3 are the long run coefficients; L is a logarithm operator; Δ is first difference operator; p is maximum number of lags; and u_t is white noise error term.

In the first stage of ARDL bound testing approach, we need to estimate Equation (5) through OLS method. Then we perform Wald test or *F*-test for joint significance of coefficients of lagged level variables of the model, where the null hypothesis is:

$$H_o : b_1 = b_2 = b_3 = 0$$

against alternative hypothesis of:

$$H_1: b_1 \neq b_2 \neq b_3 \neq 0.$$

Pesaran et al. (2001) developed two sets of critical values for *F*-test. One set i.e. lower critical bound assumes that all regressors are *I(0)*. Another set i.e. upper critical bound assumes that all regressors are *I(1)*. Therefore, when we get estimated *F*-statistic greater than upper critical values, we then decide that there is a long run relationship among the variables. If the estimate *F*-statistic is below the lower critical values, then we cannot reject the null hypothesis of no cointegration. Finally, if estimated *F*-statistic falls between bounds, then we cannot draw inference without knowing the order of integration of the underlying regressors.

In the second stage, we need to estimate long run relationship. If we get a cointegration relationship in the first stage, then we specify ARDL (m, n, q) long run model for LCPI in the following way:

$$LCPI_t = c_1 + \sum_{i=1}^{m} e_{1i} LCPI_{t-i} + \sum_{i=0}^{n} f_{1i} LM2_{t-i} + \sum_{i=0}^{q} g_{1i} LRGDP_{t-i} + u_{1t} \quad \ldots (6)$$

where, *m, n* and *q* are optimal number of lags of the variables.

In the last stage, we will derive ARDL model for short run dynamics by constructing an error correction model (ECM) of the following form:

$$\Delta LCPI_t = c_2 + \sum_{i=1}^{p} e_{2i} \Delta LCPI_{t-i} + \sum_{i=0}^{p} f_{2i} \Delta LM2_{t-i} + \sum_{i=0}^{p} g_{2i} \Delta LRGDP_{t-i} + k\, ECM_{t-1} + u_{2t} \quad \ldots (7)$$

where *ECM+-1 t-1*is the error correction term and is defined as:

$$ECM_t = LCPI_t - c_1 - \sum_{i=1}^{m} e_{1i} LCPI_{t-i} - \sum_{i=0}^{n} f_{1i} LM2_{t-i} - \sum_{i=0}^{q} g_{1i} LRGDP_{t-i} \quad \ldots (8)$$

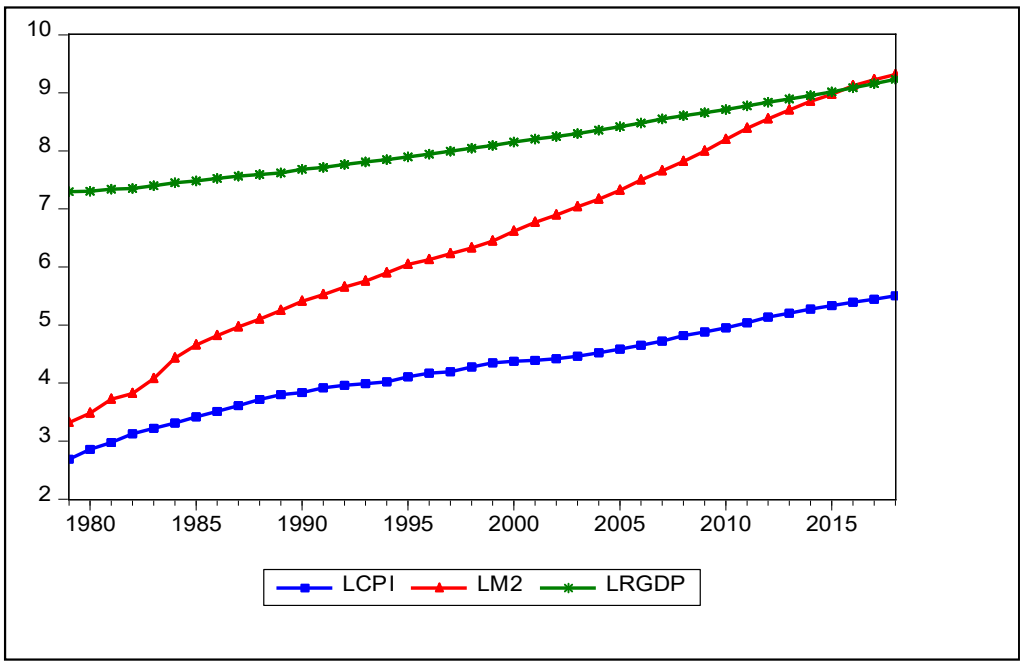
All the coefficients–e_2, f_2 and g_2–in the equation (7) show short rum dynamics of model's convergence to equilibrium and the term, k shows speed of adjustment.

6. Empirical Findings

6.1 Graphical Presentation of Data

Before going to any econometric analysis, it is very helpful to present time series data graphically to find features of data in different aspects such as trend, structural break, stationarity, etc. A graphical presentation of variables used in our econometric model is given in Figure-2. We see from Figure-2 that three variables—*LCPI*, *LM2* and *LRGDP* have upward and deterministic trend. None of the variables has a structural break.

Figure 2: Trends in LCPI, LM2 and LRGDP



6.2 Grainger Causality Test

The results of Granger causality tests for lags 1 through 3 for the variables—*LCPI, LM2* and *LRGDP* are shown in Table-1 in the Appendix-2. Results show that pairwise causality comes from *LM2* to *LCPI* and from *LRGDP* to *LCPI* significantly at all lags. Moreover, these causal relationships at different lags are unidirectional. Therefore, we conclude that causality comes basically from *LM2* to *LCPI* and from *LRGDP* to *LCPI*.

6.3 Unit Root Test for Stationarity

Three-unit root tests – ADF, PP and KPSS – were applied on variables—*LCPI*, *LM2* and *LRGDP* at their levels and first differences both with intercept and with intercept and trend term. Unit root tests are shown in Table-2 in Appendix-2. The ADF test result shows that *LCPI* is stationary at level at 5% level of significance, but *LM2* and *LRGDP* are found stationary at first difference at 5% level of significance. From PP test we find three variables are non-stationary at first difference at 5% level of significance. However, the KPSS test shows that *LCPI* and *LM2* are stationary at 5% level of significance and *LRGDP*is non-stationary at first difference at 5% level of significance. Therefore, we can decide that *LPCI*is*I(0)* and *LM2* and *LRGDP* are *I(1)* as per similar results appeared at least two different tests of unit root.

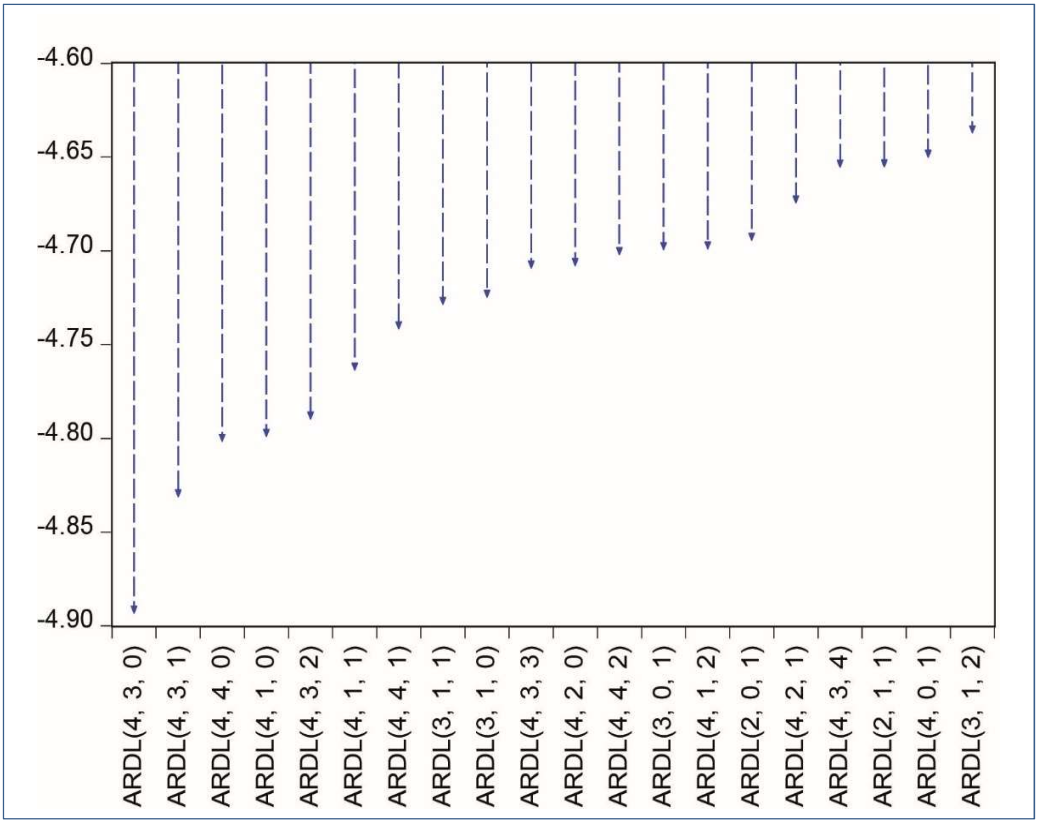
6.4 ARDL Bound Test

We applied bounds test to find a long run relationship between variables. Table-3 in Appendix-2 shows results of bounds test. From Table-3 we find that estimated *F*-statistic is 12.24, which is higher than all bound values at different levels of significance. Test result suggests us to reject null hypothesis of no relationship. Hence, we conclude that a long run relationship between variables *LCPI*, *LM2* and *LRGDP* exists.

6.5 Model Selection Criteria

To select optimal lag length, we choose Schwarz Information Criterion (SIC). We find our best model among top 20 models is ARDL (4, 3, 0) through applying SIC. Figure-3 shows lag order selection for variables through SIC.

Figure 3: Schwarz Criteria (Top 20 Models)



6.6. Long-run Relationship

Table-4 in the Appendix-2 shows long-run relationship between variables. From the result of estimation of LCPI equation, we find that LM2 has a positive and significant effect on LCPI while LRGDP has negative and significant effect on LCPI. The coefficient of LM2 is 0.48 which indicates if M2 increases by 1%, CPI increases by 0.48%. On the other hand, the coefficient of LRGDP is -0.18 which indicates if LRGDP increases by 1%, CPI decreases by 0.18%.

6.7 Short-run Dynamics

As we got a long run relationship between variables, we applied ECM to find short run dynamics of the variables. Result of ECM of the ARDL model (4, 3, 0) is shown in Table-5 in the Appendix-2. From Table-5, we see that LM2 has a short-run significant effect on LCPI, butin the opposite direction. On the other

hand, LRGDP has no short run impact on LCPI. The negative short run effect of money supply on price level indicates that an increase in money supply is not only increasing aggregate demand directly, but also increasing aggregate supply indirectly which in turn affects the price level negatively. But the sign and value of coefficient of Error Correction Term (ECT) is very important. We found that the sign of ECT is negative which confirms the expected convergence process in the long run dynamics of LCPI, LM2 and LRGDP. The value of coefficient of ECT(t-1) is 0.55 and statistically significant at 1% level which indicates that 55%of the previous year's disequilibria are corrected in the current year. Once a shock happens, it takes nearly 2 years to adjust broad money (M2) and real GDP to restore long run relation with the price variable. It is considered as a good speed of adjustment in the relationship process following a shock.

6.8 Diagnostic Tests

We have checked the robustness of ECM by most important diagnostics tests—normality, autocorrelation, heteroscedasticity, model specification error and stability tests. The results of diagnostics tests are shown in Table-6 in the Appendix-2. The normality behavior of the estimated residuals is confirmed by the Jarque-Bera statistic. Breusch-Godfrey serial autocorrelation (LM) test confirms that our ARDL model is free from serial autocorrelation. Breusch-Pagan-Godfrey test confirm that residuals ae homoscedastic. Ramsey regression specification error test (RESET) confirms correct functional form of equation. The estimated coefficients might not be stable. So, Pesaran and Pasaran (1997) recommended assessment of the stability of parameters in the estimated equation. Accordingly, we applied Cumulative Sum of Recursive Residuals (CUSUM) and CUSUM of squares tests. The CUSUM and CUSUM of squares statistics are plotted in the figures in appendix-1. The plotted CUSUM and CUSUM of squares statistics fall inside the critical bands of 5% confidence intervals of parameter stability which indicate the stability in the estimated coefficients of ECM over the sample period. Moreover, the adjusted R^2 (0.83) shows that the estimated equation is fitted well.

7. Conclusion and Policy Recommendations

The aim of this study is to find relationship among price level, money supply and real GDP. To find this relationship empirically, we used yearly data on consumer price index, broad money and real GDP for the period from FY1979 to

FY2018 using a bound testing approach to cointegration within ARDL framework. The empirical results show that variables are cointegrated, and broad money and real GDP have significant effect on price level in the long-run. However, money supply is positively related with price level which indicates that money has inflationary impact in the long-run. In contrast, real GDP is negatively related to the price level indicating that inflationary pressures come down with the increase of output. In the short run, only money supply has a significant effect on price level and real GDP has no impact. But, in the short run money supply is related negatively to price level which hints that the increase in money supply, no doubts, increases aggregate demand by spending a portion of money on consumption as well as utilizing other portion of money in productive sectors. Therefore, the net effect of money supply on the level of price is negative in the short run. This can be perceived from the recent trends in money supply, inflation and real GDP growth in Bangladesh which shows that Bangladesh's real GDP growth is much higher than inflation and inflation is remained at tolerable level. The reason behind this is the positive contribution of money supply to output growth in the short run. Moreover, Biswas, Masuduzzaman & Siddiqe (2016) reveal that inflation and GDP growth move positively for any level of inflation below the threshold i.e.6.25 percent. In an earlier study, Younus (2012) also finds another threshold level of inflation within 7-8 percent. In FY2018 money supply in Bangladesh increased by 9.24 percent and average inflation rate stood at5.78in FY2018 while output growth reached to 7.86 percent which supports that money supply contributes more to output growth than inflation.

But we can conclude on the basis of the results of this paper that in the long run money supply contributes to price level positively whereas in the short run it is the opposite case. Moreover, real GDP contributes to price level negatively in the long run while it has no effect on the price level in the short run. Based on the above findings, the study recommends the following policies:

Firstly, expansionary and growth supported monetary policy is advised to make loans attractive for productive purposes. This may be helpful of increasing of raising production and investment in the real economy that will ultimately affect economic growth. Credit to SMEs on both short and long terms is identified

as a good opportunity for investment in the real sector (Ogunmuyiwa & Francis, 2010). So financial institutions not only make short term funds available to the real sector, but also make funds accessible to this sector as and when needed. Thirdly, the findings of the study reveal that money supply is inflationary in the long run. In order to limit its harmful effect, it is needed to design fiscal policy so that credit goes to the real sector (industry and agriculture) to boost national development. This will not only boost supply of output but also reduce general price level. On the other hand, inflation should be kept at a minimum or tolerable level while formulating and implementing monetary policy.

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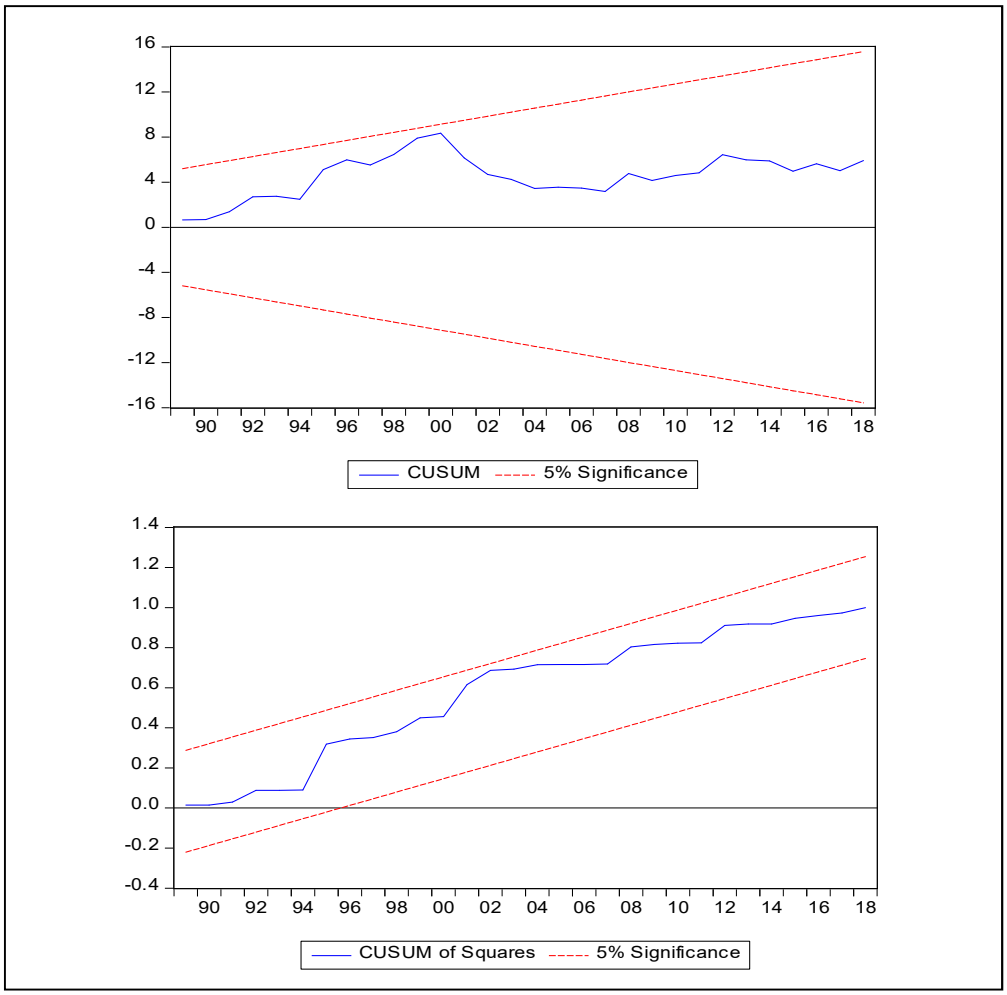
Appendices

Appendix 1



Appendix 2

Table 1: Pairwise Granger Causality Tests

Test Hypothesis	F-statistics in Lags		
	1	2	3
LM2 does not Granger Cause *LCPI*	27.73 (0.00)	12.28 (0.00)	9.35 (0.00)
LCPI does not Granger Cause *LM2*	3.31 (0.08)	2.56 (0.09)	1.88 (0.15)
LRGDP does not Granger Cause *LCPI*	17.94 (0.00)	5.51 (0.01)	4.51 (0.01)
LCPI does not Granger Cause *LRGDP*	1.49 (0.23)	0.91 (0.41)	1.93 (0.14)
LRGDP does not Granger Cause *LM2*	7.89 (0.01)	2.99 (0.06)	2.02 (0.12)
LM2 does not Granger Cause *LRGDP*	0.63 (0.43)	1.26 (0.30)	0.88 (0.46)
Observations	40	40	40
Note: Figures in the parenthesis are *p*-values used to decide on causality at the 5% significance level.			

Table 2: Unit Root Tests

Variables	In levels		In first difference		Order of integration
	With intercept	With intercept and trend	With intercept	With intercept and trend	
Augmented Dickey-Fuller test statistic					
LCPI	-1.95 (0.31)	-4.21 (0.02)	-	-	I(0)
LM2	-1.02 (0.74)	-3.23 (0.09)	-3.41(0.02)	-3.96 (0.02)	I(1)
LRGDP	-7.28 (1.00)	-0.66 (0.97)	-1.02 (0.74)	-7.49 (0.00)	I(1)
Phillips-Peron test statistic					
LCPI	-2.37 (0.17)	-3.09 (0.12)	-3.31 (0.02)	-3.82 (0.03)	I(1)
LM2	-1.93 (0.32)	-2.59 (0.29)	-3.62 (0.01)	-3.99(0.02)	I(1)
LRGDP	11.75 (1.00)	-0.60 (0.97)	-3.84 (0.01)	-14.16 (0.00)	I(1)
Kwaitkowski-Phillips-Schmidt-Shin test statistic					
LCPI	0.78[0.46]	0.12[0.15]	-	-	I(0)
LM2	0.78[0.46]	0.09[0.15]	-	-	I(0)
LRGDP	0.78[0.46]	0.21[0.14]	0.87[0.46]	0.17[0.15]	I(1)
Note: Figures in the parentheses are p-values used to decide on unit roots at the 5% level of significance. Figures in the brackets are the critical values at the 5% level of significance.					

Table 3: Bound Tests

F statistic	No. of regressors	No. of observations	Level of significance	Critical value bounds	
				I(0)	I(1)
12.24	2	40	10%	2.84	3.59
			5%	3.44	4.26
			1%	4.77	5.86
Note: F statistic is bold when level of significance is 1%.					

Table 4: Long Run Coefficients of ARDL Model

Dependent variable: *LCPI*				
Criterion	Model	Regressors		
		Constant	LM2	LRGDP
SIC	ARDL (4,3,0)	2.70*** (5.58)	0.48*** (15.96)	-0.18** (-2.08)
Note: Figures in the parenthesis are *t*-values. ** and *** indicate the coefficients are significant at 5% and 1% levels.				

Table 5: Short Run Dynamics

Dependent variable: Δ *LCPI*		
Regressors	Coefficients	t-values
Δ *LCPI(t-1)*	0.36***	3.29
Δ *LCPI(t-2)*	0.10	1.02
Δ *LCPI(t-3)*	0.31***	3.94
Δ *LM2*	-0.14**	2.73
Δ *LM2(t-1)*	-0.01	-0.11
Δ *LM2(t-2)*	-0.24***	-3.50
ECT(t-1)	-0.55***	-7.33
Note: Figures in the parenthesis are *t*-values. ** and *** indicate the coefficients are significant at 5% and 1% levels."Δ" stands for difference operator. "ECT" stands for error correction term.		

Table 6: Diagnostic Tests

Test for	Test Statistic	Probabilities	Conclusion
1. Normality (JB test)	1.39	0.50	Residuals are normally distributed.
2. Breusch-Godfrey Serial Correlation (LM Test)	0.98	0.39	No Autocorrelation
3. Heteroscedasticity (Breusch-Pagan-Godfrey)	0.65	0.75	No heteroskedasticity
4. Ramsey RESET Test	0.00	0.96	No specification error
5. Goodness of Fit (adjusted R^2)	0.82		Well fitted of data

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Economic Uncertainty, Money-Demand Stability and Monetary Policy in the United Kingdom

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Abstract

The multi-faceted relationships that exist among money, real output, prices, interest rates and exchange rates lead to the proposition that a stable money-demand function underpins the causal relationship between money growth and inflation at the steady state irrespective of the exchange rate regime which makes the money stock endogenous or exogenous. Accordingly, the perception remains that the relationship between money growth and inflation breaks down when the money-demand function becomes unstable for many reasons including changes in economic uncertainties under different policy regimes. The recent literature on money demand includes economic policy uncertainty or inflation uncertainty or both when the economy remains exposed to shocks, policy uncertainty, inflation uncertainty, and any monetary-financial innovations. The inclusion of these variables removes the model mis-specification error that exists in an otherwise conventional money-demand function. An expanded money-demand function then demonstrates its inherent stability and usefulness to monetary policy analysis. Using quarterly data for the United Kingdom over the period from 1998Q1 to 2021Q1, this paper estimates an open-economy narrow money-demand function that includes economic policy uncertainty and inflation uncertainty as additional determinants of money demand. The model is estimated within the Autoregressive Distributed Lag (ARDL) and non-linear ARDL (NARDL) approaches to cointegration and error-correction. The overall results show that such an expanded narrow money-demand function in the United Kingdom was well-behaved over the study period irrespective of whether the model was estimated by the ARDL or the NARDL technique.

Keywords: Economic Policy Uncertainty, Inflation Uncertainty, Money-demand Instability, Monetary Policy, ARDL, NARDL, the United Kingdom
JEL Classification: C22, E41, E52

1. Introduction

Following the successful introduction of inflation targeting in New Zealand in the early 1990s, the United Kingdom discarded monetary targeting or a variant

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of it and then adopted inflation targeting to achieve price stability.[1] On the grounds that the money-demand function became unstable in a deregulated financial environment of the 1980s, the United Kingdom switched from a monetary aggregate to a short-term policy interest rate as the instrument of monetary policy. This switch effectively downgraded the role of money in the conduct of monetary policy in the United Kingdom.[2] While the interest rate-based inflation-targeting strategy is considered an improvement over other strategies of monetary policy in the sense that it stabilizes output and prices simultaneously in a low-inflation environment (Siklos & Weymark, 2009), the deployment of the interest rate raises money-growth volatility which in turn raises inflation volatility (Hossain, 2015a, 2015b). Inflation and inflation volatility in turn affect the real interest and exchange rates and also make them volatile.

In the monetary literature on inflation, the question therefore remains whether the money-demand function is still relevant for establishing the causal relationship between money growth and inflation. McCallum and Nelson (2011) argue that the steady state causal relationship between money growth and inflation is not at all conditional on whether the money-demand function remains stable and whether the money stock is endogenous or exogenous. They illustrate this proposition as follows. While a unit root in the error term of the money-demand function which represents a money demand shock, violates the dynamic condition of stability, a causal relationship can still exist between money supply growth and inflation, adjusted for output growth. This relationship remains robust and can indeed be validated empirically across countries and over time using data

[1] See Baumgartner and Ramaswamy (1996) for discussion on the inflation-targeting strategy in the United Kingdom since it was adopted in 1992.

[2] There is perception that the money-demand function has become unstable in many countries when they introduced financial reform measures, including a flexible exchange rate regime under perfect capital mobility. The consequent instability of the interest rate is then interpreted as the source of instability of the money-demand function to the extent that severed the relationship between money, output and prices. However, the fact that the interest rate can, and often does, have an effect on money demand does not imply that the money-demand function becomes unstable in a deregulated economic system. Friedman (1959, 1966) has clarified this point long ago. Unless the interest-rate elasticity of the demand for money is infinite, a significant coefficient of the interest rate in the money-demand function does not make any difference in the design and conduct of money-based monetary policy for price stability. These questions have been addressed in the writings of Milton Friedman. Some recent studies on money-demand include Fujiki, Hsiao and Shen (2002), Hossain (2015a, 2015b) and Mishkin (2018).

having different frequencies.[3] Thus, it looks odd that money does not appear in the formulation of monetary policy under inflation targeting although it does not deny that money supply growth and inflation are causally related (Nelson, 2008a, 2008b, 2020; Svensson, 2011).[4] The recent monetary policy strategies in some major countries such as Japan and the United States and in the European Union have shown the usefulness of money in a low inflation environment that may create a lower-bound interest rate problem as the instrument of monetary policy.

As part of rehabilitatng the role of money in the conduct of monetary policy in the low-inflation environment of the United Kingdom, this paper develops the proposition that the actual or perceived instability in the narrow money-demand function in the United Kingdom represents an exclusion of such variables as economic policy uncertainty or inflation uncertainty or both. The empirical results, obtained by both the Autoregressive Distributed Lag (ARDL) and Non-linear ARDL (NARDL) approaches to cointegration and error-correction, suggest that in addition to the effects of real income and both domestic and foreign interest rates, inflation uncertainty in particular has a significant positive effect on narrow money demand in the United Kingdom. The effect of economic policy uncertainty on narrow money demand is, however, not significant. The paper uses four complementary approaches to investigate the question of stability of the narrow money demand function in the United Kingdom. The results show that the estimated narrow money-demand function was well-behaved and stable over the study period irrespective of whether the model was estimated by the ARDL or the NARDL technique.

The remainder of the paper is organized as follows. Section 2 specifies an augmented money-demand function that includes economic policy uncertainty

[3] As the rates of money growth and inflation are stationary with well-defined means and variances, they can, and often do, maintain a causal relationship. This relationship can be investigated using a multivariate distributed lag model of inflation, money growth and economic growth. Analytically, this relationship is formulated in the form of a monetary model of inflation that is derived from the equilibrium condition of the money market (Hossain, 2015a, 2015b).

[4] The idea that inflation is a monetary phenomenon is attributed to Friedman (1968, 1972). For discussion and evidence on the money growth-inflation relationship, see De Grauwe and Polan (2005) and Lucas (1996).

and inflation uncertainty as additional determinants of money demand. Section 3 estimates the model using quarterly data for the United Kingdom over the period from 1998Q1 to 2021Q1 and interprets the results. Section 4 deploys different approaches and techniques to investigate whether the specified money-demand model remained stable in the United Kingdom over the study period. Section 5 estimates the model using non-linear ARDL approach to investigate whether economic policy uncertainty or inflation uncertainty or both had asymmetric effects on narrow money demand in the United Kingdom over the study period. Section 6 draws policy implications of the results and concludes. The paper has a data appendix which reports the data sources and any transformation of data needed for the regression analysis.

2. Specification and Estimation of A Narrow Money-demand Function for the United Kingdom

2.1 Specification of A Long-run Narrow Money-demand Model

Following the study by Hossain and Arwatchanakarn (2020) on the money-demand behaviour in New Zealand, this section specifies a narrow money-demand function for estimation using quarterly data for the United Kingdom:

$$LRNM_t = \alpha + \beta_1 LY_t + \beta_2 LDIR_t + \beta_3 LFIR_t + \beta_4 LREER_t + \beta_5 UNCTY_t + \beta_6 INFU_t + \varepsilon_t \quad \ldots\ldots\ldots (1)$$

where $LRNM_t$ is the log of real narrow money balances[5]; LY is the log of real income; $LDIR$ is the log of a representative domestic interest rate[6]; $LFIR$ is the log of a representative foreign interest rate[7]; $LREER$ is the log of the real effective exchange rate of the UK currency; UNCTY is a measure of economic policy uncertainty; INFU is a measure of inflation uncertainty; and ε is a random error term, with a mean of zero and a constant variance, which captures random shocks to money demand. In this model, the coefficient β_1 of real income is expected to carry a positive sign while the coefficients β_2 and β_3 of domestic and foreign interest rates are expected to carry a negative sign. The signs of the coefficients β_4, β_5 and β_6 of other variables remain indeterminate because they can carry a

[5] Real narrow money balances are defined as the narrow money stock, currency and demand deposits, deflated by the GDP deflator.
[6] This study uses the 3-month interbank rate to represent the domestic interest rate.
[7] This study uses the US federal funds rate (USFFR) to represent the foreign interest rate.

negative sign or a positive sign depending on the relative strength of two opposite forces of how each of these variables affect money demand. Some further comments are made below on the effects of the determinants of money demand as specified.

The effects of real income and the domestic and foreign interest rates on money demand are standard in any conventional money-demand function. Real income acts as a scale variable in a money-demand function. The coefficient of this variable carries a positive sign. The coefficient can have a value of about one or even significantly greater than one. In contrast, the domestic and foreign interest rates carry a negative sign in the money-demand function because they represent the opportunity costs of holding money relative to the holding of alternative interest-bearing financial assets. In an open-economy money-demand function, the real effective exchange rate of the domestic currency appears as an additional determinant of money demand. The coefficient of this variable bears a positive or negative sign depending on whether the appreciation of currency increases or decreases money demand. The level of the real effective exchange rate provides information on the direction of future change in the exchange rate depending on whether the exchange rate is misaligned and hence, needs adjustment through the monetary, fiscal and exchange rate channels. The expected change in the real exchange rate induces a re-allocation of wealth-holders' assets in their portfolios.

The recent monetary literature provides justification for inclusion of such variables as economic policy uncertainty and inflation uncertainty in a conventional money-demand function. However, the net effects of these variables on money demand remain indeterminate in both theory and empirics.[8] There are two opposite effects of inflation uncertainty or economic policy uncertainty or both on money demand. For example, an increase in economic policy uncertainty has a substitution effect, which lowers money demand. This is because an

[8] Choi and Oh (2003) report that in the United States, economic uncertainty has a negative impact on money demand whereas monetary uncertainty has a positive effect on money demand. Later, Bahmani-Oskooee and his co-authors have conducted research on money demand for several developed and developing countries. Their findings reveal that economic uncertainty and inflation uncertainty have effect on money demand, at least in the short run (Bahmani-Oskooee & Baek, 2017; Bahmani-Oskooee & Xi, 2011, 2014).

increase in economic policy uncertainty makes money holding risker relative to the holding of interest-bearing financial assets or real assets or both. Formally, following the portfolio choice theory of asset demand, an increase in economic policy uncertainty increases demand for low risk financial or real assets (Tobin, 1958; McCallum, 1989). In contrast, an increase in economic policy uncertainty can increase money demand because money is highly liquid relative to the holding of relatively less liquid alternative financial and real assets. As the demand for relatively liquid assets increases, they become desirable during uncertainties and emergencies. Like economic policy uncertainty, inflation uncertainty can affect money demand both positively and negatively. Both the asset and transaction theories of money demand suggest that an increase in inflation uncertainty increases money demand because of increased risk of holding any fixed-term interest-paying securities. In contrast, facing any expected loss of the purchasing power of money because of inflation uncertainty, firms and households may acquire more interest-bearing securities as a better hedge than money which does not pay interest (Darrat, Al-Mutawa, & Benkato, 1996; Garner, 1986; Slovin and Sushka, 1983).

2.2 An Error-correction Model of Narrow Money Demand for the United Kingdom

The long-run money-demand model specified above can be estimated by deploying the cointegration and error-correcting approach. The cointegration approach determines the presence of long-run equilibrium relationships among economic variables which are non-stationary or integrated of order one I(1). The existence of a cointegral money-demand relationship, for example, implies that in the long-run, any permanent change in the determinant of money demand such as real income brings a corresponding permanent change in real money balances. Another implication of such cointegral relationship is that any deviation of the actual real money balances from its long-run level due to any shock, known as the cointegration residual, is transitory and therefore, it disappears over time in response to the underlying forces which establish the cointegral relationship in the first place (Benati, Lucas, Nicolini & Weber, 2016). In contrast, when any non-stationary variables are not cointegrated, they wander around as there are no

underlying forces which would bring them together in the form of a meaningful steady-state relationship. The two non-stationary variables, for example, which establish a cointegral relationship, maintain a long-run causal relationship between them, at least in one direction. Accordingly, any increase in real income is expected to have a causal relationship with real money balances. This relationship is expected to be stable, durable and meaningful in economic sense.

Although there are several approaches to determine the presence of cointegral relationships among non-stationary variables, the ARDL approach is deployed widely in empirical studies. An advantage of the ARDL approach to estimate a long-run cointegral relationship is that it does not require pre-testing for unit root in variables which appear in a money-demand relationship (Enders, 2010; Pesaran, Shin & Smith, 2001). Within the ARDL approach, the presence of a cointegral relationship can be established by both an F-test and a t-test. With regard to the bounds F-test for determining the cointegral relationship, the critical F-statistic that is used has lower and upper bounds. Whether the lower bound or upper bound statistic is to be deployed for determining the presence of a long-run relationship depends on whether the variables in the model are stationary, non-stationary or their time-series properties are indeterminate. When all the variables in the model are non-stationary or integrated of order one, the upper bound F-statistic value becomes relevant. For example, if the estimated F-statistic value exceeds the upper bound critical value with a big margin, the null hypothesis of no cointegral relationship among the variables can be rejected at the conventional five or one percent level. In contrast, the lower bound critical value of the F-statistic becomes relevant if all the variables in the model are stationary I(0). When the variables in the model are a mixture of I(1) and I(0), the test result could be indeterminate when the estimated F-statistic value falls within the lower and upper bound critical values. As the F-statistic value of a model may vary significantly depending on some variables included or excluded, it is important that the model specified must be backed by well-developed theory, additional information on institutions, policy regimes, and other factors that should be included if needed to explain the relationship better with clarity or without ambiguity. Provided that a cointegral relationship exists and is determined by the

F-statistic, the cointegral relationship is associated with an error-correction model in which all the variables are stationary and the estimated error-correction term, with one-period lag, carries a negative sign. The statistical significance of the error-correction term with one period lag is determined by a t-statistic. The presence of a significant error-correction term reinforces the presence of a cointegral relationship.

Therefore, to distinguish the short-run effect of an argument on money demand from its long-run effect, an error-correction form of the money-demand function can be specified in the following general form:

$$\Delta LRNM_t = \alpha_0 + \alpha_1 T + \sum_{i=1}^{n1} \beta_i \Delta LRNM_{t-i} + \sum_{i=0}^{n2} \delta_i \Delta LY_{t-i} + \sum_{i=0}^{n3} \varphi_i \Delta LDIR_{t-i} + \sum_{i=0}^{n4} \gamma_i \Delta LFIR_{t-i} + \sum_{i=0}^{n5} \eta_i \Delta LREER_{t-i} + \sum_{i=0}^{n6} \lambda_i \Delta UNCTY_{t-i} + \sum_{i=0}^{n7} \mu_i \Delta INFU_{t-i} + \phi_1 LRNM_{t-1} + \phi_2 LY_{t-1} + \phi_3 LDIR_{t-1} + \phi_4 LFIR_{t-1} + \phi_5 LREER_{t-1} + \phi_6 UNCTY_{t-1} + \phi_7 INFU_{t-1} + \varepsilon_t \dots\dots\dots\dots (2)$$

where the coefficients β_i, δ_i, φ_i, γ_i, η_i, λ_i and μ_i represent the short-run effects of the determinants of money demand, the coefficients ϕ_s represent the long-run elasticities, obtained by normalizing the coefficients in the relationship, and ε is a random error term with a mean of zero and a constant variance.

3. The Estimation of the Model and the Regression Results

3.1 Data Sources and the Time-series Properties of Variables in the Regression Model

The narrow money-demand model specified in section 2 is estimated for the United Kingdom using quarterly data over the period from 1998Q1 to 2021Q1. The model is estimated by deploying the ARDL contegration and error-correction approach.[9] Unless stated otherwise, the data deployed for estimation of the model are drawn from IMF's International Financial Statistics and some statistical

[9] To complement the results obtained using the ARDL model, section 5 reports some estimates of the model by non-linear ARDL (NARDL) approach. The results obtained using both these approaches are similar and can be used to draw policy implications.

publications of the Organisation for Economic Cooperation and Development. As it remains useful to interpretation of the empirical results, the time-series properties of variables are determined by conducting both the augmented Dickey-Fuller (ADF) and the Kwiatkowski, Phillips, Schmidt and Shin (KPSS) tests. Although these tests have low power, they complement each other. Therefore, the unit-roor test results are used to draw inference on the presence of cointegral money-demand relationship.

The unit-root test results[10] suggest that the key variables in the model, such as real narrow money balances, real income and economic policy uncertainty, have a unit root in the level form but they are stationary in the first-difference form. All other variables are stationary or have a near-unit root. There is no data series for any variable with double unit root. This indicates that the log of real narrow-money balances, which is non-stationary in the level form, can establish a cointegral relationship with one or more non-stationary variables such as real income and economic policy uncertainty in the presence of one or more stationary variables such as the domestic interest rate, the foreign interest rate, inflation uncertainty and the real effective exchange rate.[11]

It was indicated earlier that the ARDL approach to cointegration and error-correction remains appropriate for estimation of the money-demand model because it allows the inclusion of both non-stationary and stationary variables for testing a long-run money-demand relationship. The inclusion of stationary variables as the determinants of real money balances is justified econometrically on the grounds that these variables help to stabilize the coefficient estimates of variables in the model by reducing, if not removing, all econometric problems such as autocorrelation, heteroskedasticity and model instability. A long run

[10] The unit-root test results and data deployed for estimation of the model may be available upon request.
[11] There is controversy whether some macroeconomic variables such as the domestic interest rate, the foreign interest rate and the real effective exchange rate can be considered non-stationary or whether they have the characteristic of a near unit-root series. The movement of each of these variables remains bounded over a longer period because of various economic and political constraints. Therefore, their means and variances do not necessarily move around over time but return to what may be called 'long-run steady-state values'. Provided that there is a cointegral relationship between say real narrow money balances and real income, the presence of stationary variables does not create problems in determining the long-run money-demand relationship that is needed for forecasting under inflation targeting.

stable money-demand relationship indeed remains useful to forecast money demand in the context of designing a money-based monetary policy for price stability.

3.2 Estimated Cointegral and Error-correction Models of Narrow Money Demand

It is suggested earlier that the narrow money-demand model for the United Kingdom is estimated using quarterly data over the period from 1998Q1 to 2021Q1. As the model is specified in a general form, the Akaike Information Criterion (AIC) is employed to choose the optimal lag-length from a maximum of four. Table 1 reports the coefficient estimates of the narrow money-demand model for the United Kingdom. The question addressed in the paper is whether the variables which appear in the narrow money-demand model maintain a cointegral relationship. An answer to this question is obtained from the bounds-test F-statistic value, which is 10.50. Since this value exceeds the upper-bound critical value of 3.28, the null hypothesis of no cointegral relationship among variables in the money-demand model is rejected at the conventional five percent level. The estimated coefficients of the key determinants of money demand are significant at the conventuional one or five percent level. Therefore, the estimated coefficients can be interpreted meaningfully using economic insights. The estimated coefficients can also be reconciled with some findings of the related studies.

Panel-A in Table-1 reports the short-run coefficient estimates of the money-demand model for the United Kingdom. It suggests that real income, the domestic interest rate and the real effective exchange rate have significant short-run effects on narrow money demand. The short run effect of the foreign interest rate on narrow money demand is, however, not significant at the conventional five percent level. Along with these variables, inflation uncertainty seems to have mild short-run effect on narrow money demand in the United Kingdom.

While the short-run coefficient estimates provide information on the short-run effects of some, if not all, of the determinants of money demand, the estimated long-run coefficients, as reported in Panel B in Table 1, provide information on whether the coefficients of most or all the determinants of money

demand remain significant over the long run. It is significant that some variables which may affect money demand in the short run may not sustain their effects over the long run. The estimated coefficients show that real income, the domestic interest rates, the foreign interest rates and inflation uncertainty have significant long-run effects on narrow money demand. The income elasticity of demand for real narrow money balances is significantly greater than one, implying that real narrow money balances have the property of a luxury asset. Inflation uncertainty has a significant effect on narrow money demand in the United Kingdom. The coefficient of economic policy uncertainty, however, does not have significant effect on narrow money demand in this country.

Panel-C in Table-1 provides information on the robustness of the cointegral relationship established among variables in the money-demand model. Within the cointegration and error-correction modelling framework, the coefficient of one-period lag Error-correction Term (ECM_{t-1}) carries a negative sign and the coefficient is significant at the conventional five percent level. This result reinforces the existence of a cointegral relationship among real narrow money balances and their long run determinants. The fact that the core determinants of narrow money demand are statistically significant and that they have meaningful economic interpretations suggest that the narrow money-demand function is well specified. The diagnostic statistics suggest that the estimated narrow money-demand model is well-behaved and has indeed high explanatory power. The Cumulative Sum (CUSUM) and Cumulative Sum of Squares (CUSUMSQ) tests of residuals (Figure-1) reveal that the estimated narrow money-demand relationship in the United Kingdom remained stable over the study period.[12]

In summing up, the empirical results reported and interpreted in this section provide such information which could be used to formulate a money-based monetary policy for price stability in the United Kingdom. Firstly, as explained earlier, the major long-run determinants of narrow money demand in this country

[12] The CUSUMSQ test results indicate some episodic instability in the narrow money-demand relationship. This problem could be the outcome of model mis-specification, arising from non-linearity in the relationship. Section-5 uses the nonlinear ARDL technique to investigate this issue.

include real income, the domestic interest rate, the foreign interest rate and inflation uncertainty. Of these variables, real income and the domestic and foreign interest rates remain the core determinants of narrow money demand. The other variables included in the model are considered 'secondary' although they remain useful to explain the money-demand behaviour in an uncertain economic and policy environment. Secondly, even in a low-inflation environment, economic policy uncertainty and inflation uncertainty, individually and jointly, can have significant effects on narrow money demand in the United Kingdom. While economic policy uncertainty does not appear significant in the narrow money-demand function, inflation uncertainty has a significant effect on money demand. This indicates that unlike a conventional money-demand model that contains only real income, the domestic interest rate and the foreign interest rate, the inclusion of additional variables in the augmented money-demand model is useful to reduce the mis-specification problem. Moreover, an augmented money-demand model can explain and forecast money demand better, especially in an uncertain economic environment. Finally, due to gradual or sharp changes in economic institutions and policy regimes, some secondary variables which appear in the augmented money-demand model can gain influence while others may lose influence. An implication is that while the conventional definition of stability of the money-demand function emphasizes the importance of only a small number of key determinants of money demand, the inclusion of secondary variables such as economic uncertainty and inflation uncertainty remains useful to explain and forecast money demand better. These additional variables capture spikes, trends and episodic movements of real narrow money balances which may originate from economic shocks and any changes in institutions and policy regimes.

Table 1: Coefficient Estimates[a] of the Narrow Money-demand Function for the United Kingdom

(ARDL model (4, 4, 2, 1, 2, 0, 1). Optimal lag-length, with maximum lag order four, is selected by the AIC)

Panel A: The s**hort run coefficient estimates of the real narrow money-demand function**						
Lag Order	0	1	2	3	4	
ΔLRNM		-0.17**	-0.14*	-0.23***		

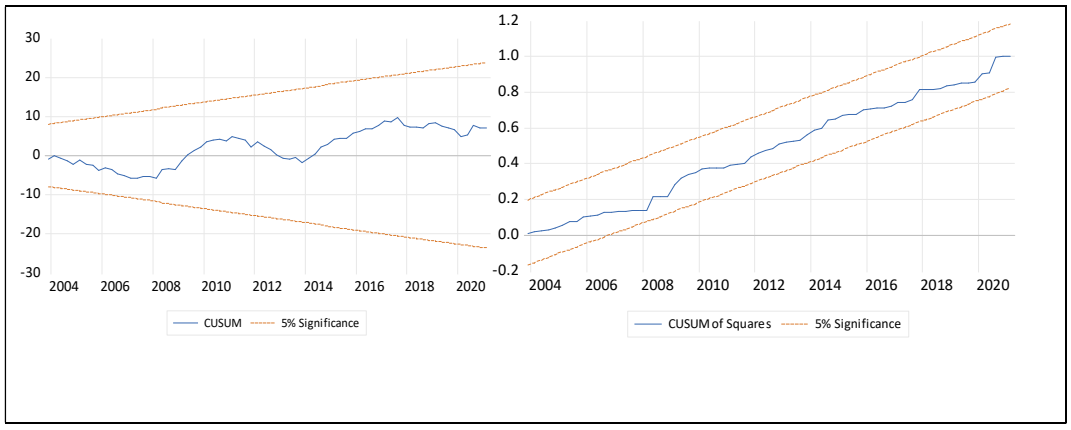
		(2.13)	(1.81)	(2.78)		
ΔLY	0.207*** (5.56)	-0.35*** (3.73)	-0.24** (2.46)	-0.27*** (3.28)		
ΔLDIR	-0.06*** (6.59)	0.03*** (3.41)				
ΔLFIR	-0.0001 (0.07)					
ΔLREER	-0.02 (0.41)	-0.17*** (3.90)				
ΔINFU	0.05* (1.67)					
Panel B: The **long run coefficient estimates of the real narrow money-demand function**						
Intercept	LY	LDIR	LFIR	LREER	UNCTY	INFU
-13.03*** (22.76)	1.46*** (35.08)	-0.09*** (13.75)	-0.008*** (3.79)	0.07 (1.39)	0.0004 (0.09)	0.19*** (3.03)
Panel C: Some **diagnostic statistics of the estimated real narrow money-demand function**						
F-statistic[b]	ECM_{t-1}	LM[c] test for autocorrelation	Adjusted R^2	CUSUM test for model stability	CUSUMSQ test for model stability	
10.50***	-0.54*** (9.62)	11.94	0.59	Inference: The model is stable	Inference: The model is stable	

Notes: (a) The numbers in parentheses are absolute t-ratios. The symbols ***, ** and * indicate that the estimated coefficient is significant at the one, five, and ten percent, respectively.

(b) The upper bound critical value for the F-statistic at the five percent level is 3.28, given the number of regressors k= 6 and intercept = restricted.

(c) The LM is the Lagrange Multiplier statistic for testing the first-order autocorrelation. It is distributed as χ^2 with two degrees of freedom. The critical value is 5.99 at the five percent level.

Figure 1: The CUSUM and CUSUMSQ Tests for Residuals as Obtained by the ARDL Approach



4. How Stable is the Narrow Money-demand Function in the United Kingdom?

The earlier section has confirmed the presence of a cointegral narrow money-demand relationship in the United Kingdom. It is suggested that a cointegral money-demand relationship remains stable over the longer run unless proved otherwise although a shorter version of a money-demand model could be unstable for many reasons relating mostly to model specification and estimation. Nevertheless, it is useful to examine the question of stability of the money-demand model for the United Kingdom on the grounds that the UK economy has undergone various institutional and policy changes.

This section investigates the question whether there was any major structural break in the money-demand relationship in the United Kingdom over the study period. The parameter values of monetary relationships may undergo changes over time in response to changes in monetary-policy regimes, exchange rate arrangements and restrictions and controls over trade and capital flows. Although the long run money-demand relationship remains stable over time (Laidler, 1993), a short-run money-demand relationship exhibits instability of one form or the other. This arises because considerable time is required for adjustment of the relationship when any disequilibrium exists between the desired and actual levels of money holding. The actual holding of money can deviate from the desired level due to shocks of both domestic and foreign origin, as well as due to changes in institutions and policy regimes (Goldfeld & Sichel, 1990). Many economists suggest that such instability in the money-demand relationship peters out once the economy completes its adjustment to shocks and institutional and policy changes. Furthermore, what matters for the design of monetary policy under a flexible exchange rate system is the long run money demand function which remains stable over time in both economic and statistical sense. A stable money-demand function is, and can be, used for forecasting money demand under a rule-based monetary policy such as monetary targeting or inflation targeting.

The remainder of this section deploys four complementary techniques to investigate different aspects of the money-demand relationship with respect to the determinants of money demand and stability of their coefficients over time.

First, a stepwise regression approach is deployed to examine the relative importance of four 'secondary' determinants of narrow money demand, namely the foreign interest rate, the real effective exchange rate, economic policy uncertainty and inflation uncertainty. Second, a recursive regression technique is used to investigate temporal changes in the coefficient values of all the determinants of money demand. Third, a least-square with breaks technique is used to investigate any structural break in the narrow money-demand relationship over the study period. Fourth, an estimated error-correction model, which is associated with the long-run money-demand relationship, is deployed to investigate the *ex-post* forecasting ability of the model. These approaches and techniques are complementary with respect to assessing the robustness of the money-demand relationship. The idea is to determine whether the money-demand relationship remains sufficiently stable so that it can be used for forecasting of money demand under any rule-based monetary policy such as monetary targeting or inflation targeting or any variant of these under a flexible exchange rate system.

4.1 Stepwise Regression Analysis

The empirical results reported in the earlier section show that in the estimated narrow money-demand model for the United Kingdom, the two significant determinants are real income and the domestic interest rate. Real income and the domestic interest rate remain the core determinants of money demand for any country. Some other determinants of money demand are included in a conventional money-demand model so that the model remains stable over time and the coefficient estimates carry the attributes of unbiasedness and consistency. Accordingly, the foreign interest rate, the real effective exchange rate, economic policy uncertainty and inflation uncertainty are added to the money-demand model for the United Kingdom. These variables can be viewed as 'secondary determinants of money demand' in the sense that they are expected to capture both the trends and episodic movements of real narrow money balances arising from macroeconomic and monetary developments and shocks of both domestic and foreign origin.

In order to determine the importance of secondary variables in the augmented money-demand function, this sub-section reports the stepwise regression results. The variables selected for the regression analysis are: the foreign interest rate, the real effective exchange rate, inflation uncertainty and economic policy uncertainty**.** The results in Table-2 show that inflation uncertainty should appear as the last in order of importance of the listed variables while the real effective exchange rate should appear first**.** Of the four variables in the list, the foreign interest rate and the real effective exchange rate are statistically significant while the other two variables are not statistically significant at the conventional five percent level. While specifying the model, it is suggested that the variables included have justifications for their inclusion and therefore, the fact that one or more of the secondary variables is not statistically significant does not justify their exclusion because this would cause mis-specification error. This indicates that the model specified is appropriate for the present purpose irrespective of whether one or more of the determinants of money demand loss or gain statistical significance**.**

Table 2: Stepwise Regression Results for Real Narrow-money Balances in the United Kingdom

Selection method: Stepwise forwards (with max lag =1) (1998Q1-2021Q1)	
Regressors	Coefficient (t-ratio) [prob.]
Always included regressors: 3	
Intercept	-11.46 (13.00) [0.00]***
LY	1.43 (26.89) [0.00]***
LDIR	-0.07 (9.67) [0.00]***
Search regressors: 4	
LREER	-0.20 (3.03) [0.00]***
LFIR	-0.008 (2.41) [0.02]**
UNCTY	0.006 (0.70) [0.48]
INFU	0.059 (0.70) [0.48]
Diagnostic statistics	
Adjusted R^2	0.98
DW statistic	1.81
Standard error of the regression	0.033

Notes: (a) The numbers in the parentheses ( ) and brackets [ ] are, respectively, absolute t-ratios and probability values.

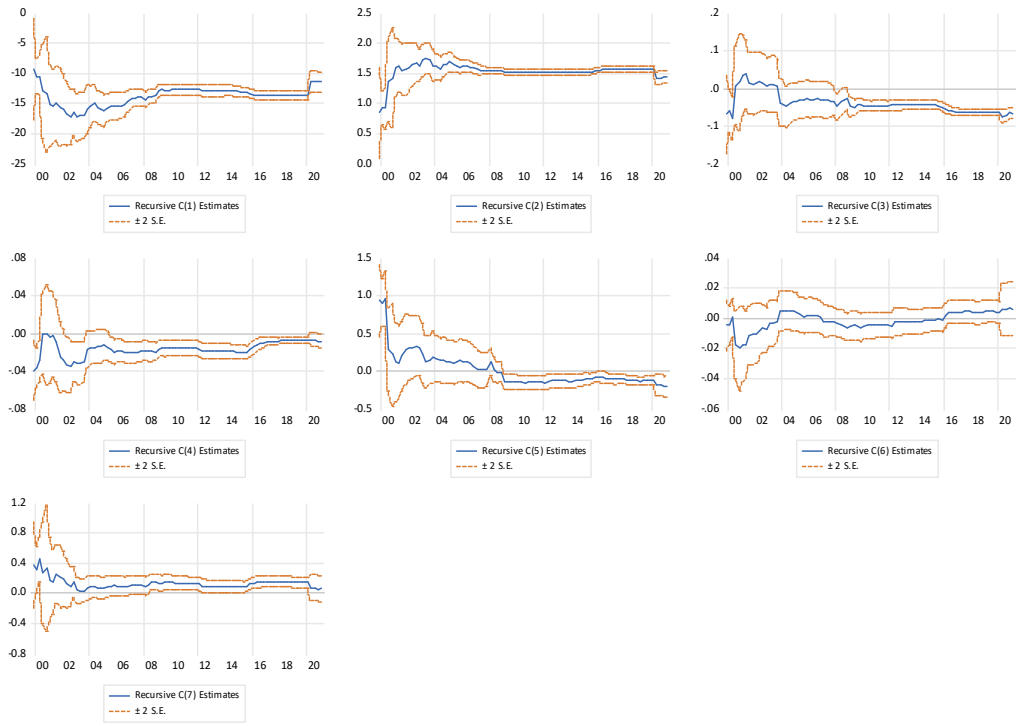
(b) The symbols ***, ** and * indicate that the estimated coefficient is significant at the one, five, and ten percent, respectively

4.2 The Recursive Regression Results

This sub-section investigates the temporal stability of the estimated coefficients of the money-demand model for the United Kingdom. Figure 2 plots the recursive coefficients of the determinants of money demand. They reveal that although the coefficients of real income and inflation uncertainty remained stable over the study period, the coefficients of other determinants exhibited temporal instability as they gained or lost significance over time.

Figure 2: The Recursive Coefficients of the Determinants of Narrow Money-demand in the United Kingdom

The coefficients are plotted as follows:
Row 1: Intercept, LY, LDIR;
Row 2: LFIR, LREER, UNCTY,
Row 3: INFU



4.3 Structural Breaks in the Money-demand Relationship

This sub-section deploys the least square with breaks technique to determine any structural breaks in the narrow money-demand relationship in the United Kingdom. Table 3 reports the regression results. They show that there were two structural breaks in the narrow money-demand relationship over the study period. These breaks were associated broadly with the Dot.Com crisis of the early 2000s and the European debt crisis of the early 2010s. The estimated models over the sub-sample periods show that the coefficient of real income remained positively and stably related with real narrow money balances. The coefficient of the domestic interest rate also maintained negative irrespective of the sub-sample period of estimation. The coefficient value seems declined in absolute sence since the early 2000s. However, due to the small sample size for each sub-sample period, the coefficient values for most variables exhibited temporal instability. Nevertheless, the estimated models behaved well and the coefficients of real income and the domestic interest rate in particular remained statistically significant.

Table 3: The Regression Results of Real Narrow Money Balances in the United Kingdom

(Obtained by the least squares with breaks technique)

Regressors	Coefficient (t-ratio) [prob.] (1998Q1-2003Q4)	Coefficient (t-ratio) [prob.] (2004Q1-2014Q1)	Coefficient (t-ratio) [prob.] (2014Q2-2021Q1)
LY	0.72 (7.30) [0.00]***	0.63 (14.75) [0.00]***	0.57 (10.37) [0.00]***
LDIR	-0.13 (2.21) [0.03]**	-0.03 (2.14) [0.03]**	-0.046 (5.36) [0.00]***
LFIR	-0.017 (0.86) [0.39]	-0.013 (1.63) [0.10]*	0.0001 (0.13) [0.89]
LREER	-0.64 (2.36) [0.02]**	-0.42 (3.79) [0.00]***	-0.23 (1.52) [0.13]
UNCTY	-0.011 (0.85) [0.39]	0.023 (1.82) [0.07]*	0.012 (0.93) [0.35]
INFU	0.397 (2.68) [0.00]***	-0.33 (3.22) [0.00]***	0.17 (1.15) [0.25]
Adjusted R^2 = 0.99 DW statistic = 1.27 S.E. of the regression = 0.024			

Notes: (a) The numbers inside the parentheses ( ) and brackets [ ] are absolute t-ratios and probability values.
(b) The symbols ***, ** and * indicate that the estimated coefficient is significant at the one, five, and ten percent, respectively.

4.4 Forecasting Analysis using an Error-correction Model of Money Demand

This sub-section investigates the forecasting ability of an estimated error-correction model for the United Kingdom. Following the forecasting literature, the specified model is estimated for a shorter sample period from 1998Q1 to 2016Q4. The estimated model then is used for *ex-post* forecasting of money demand over the period from 2017Q1 to 2021Q1. Figure 3 and Table 4 report the forecasting performance results. Figure 3 plots the actual and forecasted values of log of real narrow-money balances. The actual and forecasted values remained close over the *ex-post* forecasting period up to the early 2020. However, the actual and forecasted values exhibited sharp volatility over the COVID-19 pandemic period that is included in the expost forecasting period. Table 4 shows that the root-mean-squares errors for the forecasted period were 5.95 percent. This value was significantly higher compared with the root-mean squared errors for the estimation period. The estimated root-mean-squared errors for the estimation period was only 0.8 percent. This reveals that the money-demand behaviour during the pandemic period cannot be captured without a dummy variable. This is not done in the present excercise. Nevertheless, the Theil's inequality coefficient was close to zero. It suggests that the forecasted values of real money balances were not much different on average from their actual values.

Figure 3: The Actual (LRNM) and Forecast (LRNMF) Values of the Log of Real Narrow Money Balances

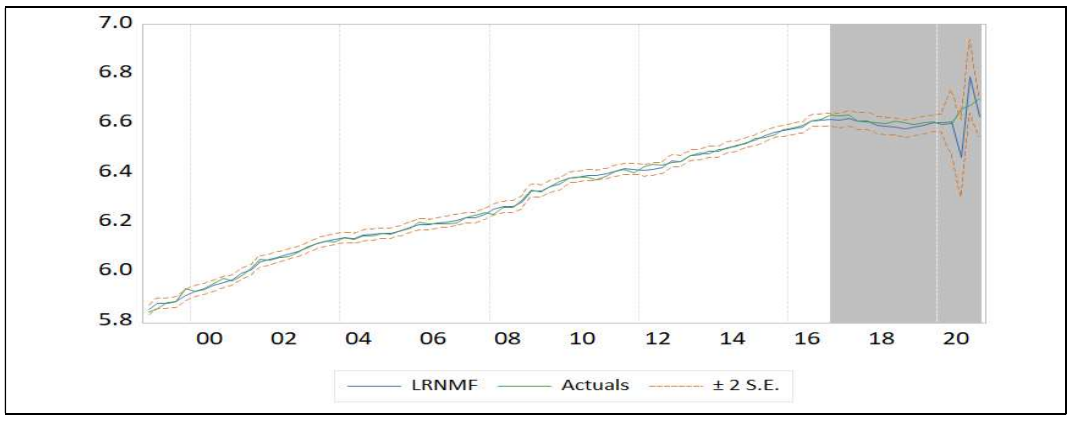


Table 4: Summary Statistics for Residuals and the Forecast Errors of the Log of Real Narrow-Money Balances

	The United Kingdom	
	Estimation Period: 1998Q1-2016Q4	Forecast Period: 2017Q1-2021Q1
Root Mean Squared Errors	0.0082	0.0595
Mean Absolute Error	0.0061	0.0319
Mean Absolute Percent Error	0.0987	0.4797
The Theil Inequality Coefficient	0.0006	0.0045

5. Do Economic Policy Uncertainty and Inflation Uncertainty have Asymmetric Effects on Narrow Money-demand in the United Kigdom?

The key finding of the estimated money-demand model for the United Kingdom is that in addition to the effects of real income, the domestic interest rate and the foreign interest rate, inflation uncertainty in particular has a long run effect on narrow money demand. In order to gain additional insight on the effects of economic policy uncertainty and inflation uncertainty on money demand, this section investigates whether economic policy uncertainty or inflation uncertainty or both have asymmetric effects on money demand. In the recent literature, it is suggested that an increase in economic policy uncertainty can affect money demand differently from the effect on money demand of a decrease in economic policy uncertainty. The presence or absence of such an asymmetric effect of economic policy uncertainty on money demand provides additional insight into the money-demand behaviour that could be useful to determine the relative effectiveness of monetary policy depending on whether economic policy uncertainty increases or decreases. Similar to the effect of economic policy uncertainty on money demand, an increase in inflation uncertainty can have an asymmetric effect on money demand. In general, inflation and inflation volatility affect money demand in a high and volatile inflation environment. This effect indeed could be more pronounced in an unstable inflationary environment where asset holders make decisions on money holding vis-à-vis financial and real assets in the portfolios. While economic policy uncertainty represents a policy paradigm in a broad context, inflation uncertainty captures a narrow phenomenon and its

effect on money demand can be investigated separately. Inflation uncertainty affects money demand directly in response to changes in the inflation risk. Nevertheless, an increase in economic policy uncertainty or inflation uncertainty or both bring changes in wealthholders' portfolio of assets, both positively and negatively.

This sub-section deploys the non-linear ARDL approach to cointegration, as proposed by Shin, Yu and Greenwood-Nimmo (2014), to investigate the question whether economic policy uncertainty or inflation uncertainty or both have asymmetric effects on narrow money demand in the United Kingdom.[13] Within the non-linear ARDL modelling approach, two variables are created for each variable that is suspected to have asymmetric effects on money demand. Economic policy uncertainty and inflation uncertainty are two such variables.[14] Accordingly, the first variable for economic policy uncertainty represents an increase in economic policy uncertainty while the second variable represents a decrease in economic policy uncertainty. Operationally, the partial sum of positive changes in the series for economic policy uncertainty is denoted by UNCTY_POS. This time-series captures only an increase in economic policy uncertainty. Similarly, the partial sum of negative changes is denoted by UNCTY_NEG. This time-series captures only a decrease in economic policy uncertainty. Replacing Economic Policy Uncertainty (UNCTY) and Inflation Uncertainty (INFU) by their POS and NEG components[15], an error-correction model of narrow money demand is specified in the following form:

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[13] Bahmani-Oskooee and Fariditavana (2015) and Bahmani-Oskooee and Maki-Nayari (2018, 2020) used the non-linear ARDL approach to investigate the asymmetric effects of economic uncertainty on money demand.

[14] The real effective exchange rate is another variable which may have asymmetric effects on money demand. This study does not include this variable for investigation of any asymmetric effect on money demand.

[15] The variables for economic policy uncertainty are defined as: $UNCTY\_POS = \sum_{j=1}^{t} \Delta UNCTY_j^{+} = \sum_{j=1}^{t} max(\Delta UNCTY_j, 0)$ and $UNCTY\_NEG = \sum_{j=1}^{t} \Delta UNCTY_j^{-} = \sum_{j=1}^{t} min(\Delta UNCTY_j, 0)$. The variables for inflation unceratainty are defined as: $INFU\_POS = \sum_{j=1}^{t} \Delta INFU_j^{+} = \sum_{j=1}^{t} max(\Delta INFU_j, 0)$ and $INFU\_NEG = \sum_{j=1}^{t} \Delta INFU_j^{-} = \sum_{j=1}^{t} min(\Delta INFU_j, 0)$

$$\Delta LRNM_t = \alpha_0 + \alpha_1 T + \sum_{i=1}^{n1} \beta_i \Delta LRNM_{t-i} + \sum_{i=0}^{n2} \delta_i \Delta LY_{t-i} + \sum_{i=0}^{n3} \varphi_i \Delta LDIR_{t-i} + \sum_{i=0}^{n4} \gamma_i \Delta LFIR_{t-i} + \sum_{i=0}^{n5} \eta_i \Delta LREER_{t-i} + \sum_{i=0}^{n6} \lambda_i \Delta UNCTY\_POS_{t-i} + \sum_{i=0}^{n7} \lambda_i \Delta UNCTY\_NEG_{t-i} + \sum_{i=0}^{n8} \mu_i \Delta INFU\_POS_{t-i} + \sum_{i=0}^{n9} \mu_i \Delta INFU\_NEG_{t-i} + \phi_1 LRNM_{t-1} + \phi_2 LY_{t-1} + \phi_3 LDIR_{t-1} + \phi_4 LFIR_{t-1} + \phi_5 LREER_{t-1} + \phi_6 UNCTY\_POS_{t-1} + \phi_7 UNCTY\_NEG_{t-1} + \phi_8 INFU\_POS_{t-1} + \phi_9 INFU\_NEG_{t-1} + \varepsilon_t \ldots\ldots (3)$$

Panel-A in Table-5 reports the estimated coefficients of the re-specified money-demand model for the United Kingdom. The results show that there is at least one significant short run coefficient for one or more of the following variables*:* (1) real income, (2) the domestic interest rate, (3) the real effective exchange rate, (4) positive economic policy uncertainty and (5) positive inflation uncertainty. While the short run coefficients of these variables, along with the negative and significant coefficient of one-period lagged error-correction term, remain important in an error-correction model, the estimated coefficients of variables in the level form provide information on whether these variables form a long run equilibrium money-demand relationship. As the estimated bounds-test F-statistic value is much higher than the critical value, the cointegral relationship among variables in the specified money-demand model is confirmed for the United Kingdom. The cointegral relationship implies that any deviation of the actual holding of money from its steady-state level would be eliminated over time because of the underlying economic and institutional forces that establish the cointegral relationship in the first place.

In the estimated long run money-demand model (Panel-B), the coefficients of real income and the domestic and foreign interest rates are significant at the conventional five percent level. However, the effects of inflation uncertainty and economic policy uncertainty seem to be weak in a relatively low-inflation environment. The estimated results show that an increase in economic policy uncertainty decreases narrow money demand although this coefficient is not significant at the conventional five percent level. Similarly, a decrease in

economic policy uncertainty has a significant negative effect on narrow money demand. This suggests that economic policy uncertainty has mild long run effect on narrow money demand. Similarly, although the coefficient of positive inflation uncertainty (INFU_POS) carries a positive sign and this coefficient is significant at the five percent level, the decrease in inflation uncertainty does not have any significant effect on narrow money demand. However, the overall results do not reject the null of long run symmetric effect of economic policy uncertainty or inflation uncertainty although the null of short run symmetric effect of inflation uncertainty on narrow money demand is rejected. The Wald-test results do not reject the null of short run symmetric effect of inflation uncertainty on narrow money demand.

Panel-C in Table-5 reports the diagnostic statistics of the estimated model. As expected, the coefficient of one-period lagged Error-Correction Term (ECM_{t-1}) carries a negative sign. The coefficient of this variable is significant at the conventional five percent level. This result reinforces the existence of a cointegral relationship among variables in the specified money-demand model. The CUSUM and CUSUMSQ tests results, as plotted in Figure-4, show that the narrow money-demand model remained stable over the study period. The results obtained by the ARDL technique are broadly similar with those obtained by the non-linear ARDL approach.

In summing up, the coefficient estimates of the narrow money-demand model by the non-linear ARDL approach show that real income and the domestic and foreign interest rates have significant long run effects on narrow money demand in the United Kingdom. However, the effects of economic policy uncertainty and inflation uncertainty on narrow money demand are weak although their inclusion in the model is justified in both theory and empirics. The CUSUM and CUSUMSQ tests results show that there was not signficant instability in the money-demand relationship over the study period.

Table 5: The Estimates of the Real Narrow Money-demand Model by the Non-linear ARDL Technique

Panel A: The Short run Coefficient Estimates having the Order of ARDL (1, 4, 2, 2, 2, 2, 0, 1, 0) as Selected by the AIC							
Lag Order	0	1	2	3	4		
Intercept	-8.778*** (8.78)						
Trend	-0.001*** (9.21)						
ΔY	0.224*** (4.57)	-0.487*** (5.21)	-0.371*** (4.05)	-0.36*** (4.29)			
ΔLDIR	-0.055*** (5.76)	0.040*** (4.27)					
ΔLFIR	0.001 (0.49)	0.004 (1.48)					
ΔLREER	-0.039 (0.90)	-0.205*** (4.52)					
ΔUNCTY_POS	0.007* (1.80)	0.008** (2.00)					
ΔINFU_POS	0.07* (1.99)						
Panel B: Long-run coefficient estimates							
LY	LDIR	LFIR	LREER	UNCTY_POS	UNCTY_NEG	INFU_POS	INFU_NEG
1.202*** (10.82)	-0.061*** (8.75)	-0.009*** (5.51)	0.038 (1.09)	-0.005 (0.79)	-0.012* (1.97)	0.18*** (4.19)	-0.011 (0.08)
Panel C: Diagnostics							
F-statistic [b]	ECM_{t-1}	LM[c] test for autocorrelation	Adj. R^2	CUSUM test for model stability	CUSUMSQ test for model stability	The Wald-L test for long-run symmetry	The Wald-S test for short-run symmetry
7.67***	-0.82*** (8.80)	13.86	0.62	Inference: The model is stable	Inference: The model is stable	For UNCTY: $\chi^2 = 1.14$ For INFU: $\chi^2 = 1.99$	For UNCTY: $\chi^2 = 4.23$** For INFU: $\chi^2 = 2.19$

Notes: (a) The numbers in the parentheses are absolute t-ratios. The symbols ***, ** and * indicate that the estimated coefficient is significant at the one, five and ten percent, respectively

(b) The upper bound critical value of the F-statistic at the five percent level is 3.68 given the number of regressors k=8 and unrestricted constant and trend.

(c) The LM is the Lagrange Multiplier statistic for the test of first-order autocorrelation. It is distributed as χ^2 with four degrees of freedom. The critical value is 9.49 at the five percent significance level.

(d) The Wald test is distributed as χ^2 with one degree of freedom. The critical value is 3.84 at the five percent significance level.

Figure 4: The CUSUM and CUSUMSQ Tests for Residuals as Obtained by the NARDL Approach

6. Summary Findings, Policy Implications and Conclusion

The contemporary literature on inflation, inflation volatility and monetary policy provides evidence in support of a causal relationship between money growth and inflation across countries and over time irrespective of whether the money stock is endogenous or exogenous under any exchange-rate regime. There is also evidence that money growth volatility creates inflation volatility, which in turn affects the real interest and real exchange rates and their volatilities spillover across the economy. Having such interrelations among money, output, prices and the interest and exchange rates, what strategy of monetary policy is appropriate for ensuring price stability depends on many factors including the effectiveness of monetary policy to achieve one or more objectives of monetary policy. Provided that the relationship between money supply growth and inflation is well-established, the question remains whether and how money can play a role in the formulation of monetary policy for price stability irrespective of whether

monetary targeting or inflation targeting or a derivative of these is adopted as the strategy of monetary policy.

This paper has emphasized the growing importance of money in the formulation of monetary policy in a low-inflationary condition that exists in many developed countries such as the United Kingdom. Accordingly, the paper has investigated the proposition that the abandonment of money under the present inflation-targeting strategy in the United Kingdom cannot be justified on the grounds that the narrow money-demand function has become unstable and remained so since the 1990s or much earlier. The paper has argued that any actual or perceived instability in the narrow money-demand function was mostly due to model mis-specification error owing to the exclusion of such determinants of money demand as economic policy uncertainty or inflation uncertainty or both. The empirical results show that real income, the domestic interest rate, the foreign interest rate and the real exchange rate have expected effects on narrow money demand. The long run effect of inflation uncertainty on money demand is negative and significant, the long run effect of a decrease in economic policy uncertainty on narrow money demand is significant. Nevertheless, both inflation uncertainty and economic policy uncertainty remain useful as determinants of money demand, both in the short and long run. The stability and forecastibility tests suggest that although the estimated money-demand model remained stable over time, it exhibited some temporal instability in the money-demand relationship since the outbreak of the COVID-19 pandemic in early 2020.

The empirical results reported in the paper have policy implications in the context of monetary policy for price stability**.** Firstly, it is already stated that the abandonment of money in the formulation of monetary policy in the United Kingdom cannot be justified on the grounds of instability in the narrow money-demand function. Whilst a stable money-demand function remains important in the formulation of monetary policy, an essential component of the money-based monetary policy is the question of stability of the long-run money-demand function. Monetary policy cannot, and should not, be designed on the basis of what is called the short-run money-demand relationship that can exhibit temporal instability for many reasons, including the problems associated with the

estimation of a mis-specified model by sophisticated techniques with high-frequency data (Laidler, 1993). Accordingly, this paper has developed the proposition that the problem of instability in the narrow money-demand function in the United Kingdom could be an exaggeration when such variables as economic policy uncertainty and inflation uncertainty are excluded from the money-demand function (Choi & Oh, 2003; Hossain, 2015a, 2015b).

Secondly, since money remains the key determinant of prices in the long run regardless of whether the money-demand function remains stable and whether the money stock is endogenous or exogenous, the question remains how to deploy money in the formulation of a rule-based monetary policy for price stability such as monetary-targeting, inflation-targeting or any derivative of these in an uncertain economic environment. While the monetary-targeting strategy necessitates the use of the 'monetary base' or a narrow monetary aggregate as the instrument of monetary policy, the inflation-targeting strategy bypasses money in the conduct of monetary policy although there is nothing wrong in using money as the instrument of monetary policy under inflation targeting irrespective of whether the inflation rate is high or low.

Thirdly, provided that money appears in the formulation of monetary policy, the importance of money demand comes to the forefront as it allows the quantification of monetary disquilibrium that affects output, prices and the interest and exchange rates. Following the results of the expanded money-demand model, the significant effect of inflation uncertainty on money demand in particular has policy implications. A significant positive effect of inflation uncertainty on money demand implies that there is need for monetary accommodative in the event of an increase in inflation uncertainty. In contrast, an increase in economic policy uncertainty indicates the need for adoption of contractionary monetary policy to avoid creating inflationary expectations. The problem arises when economic policy uncertainty and inflation uncertainty maintain complex relationships between themselves and with macroeconomic variables. This indicates that instead of off-and-on monetary accommodation in response to actual or perceived uncertaintties of one form or the other, the role of monetary policy should aim at achieving macroeconomic stability through rule-

based monetary and fiscal policies over a longer horizon. Under any best practice monetary policy, price stability remains a major component of economic stability. There is ample evidence to suggest that under a flexible exchange rate system, price stability can be achieved through a rule-based monetary policy (Fischer, 1993, 1996; Hossain, 2015a, 2015b). However, price stability alone is not sufficient to ensure growth and stability of an economy. Therefore, to complement monetary policy, a rule-based fiscal policy is recommended to ensure that indisciplined fiscal policy does not create any pressure on monetary policy for stabilisation of the economy. Monetary policy cannot, and should not, be deployed to fine-tune an economy in the midst of monetary and real shocks which can destablise the economy, mostly in the short run. Therefore, there should not be ambiguity in the role of monetary policy. It is true that there is debate on the question of which strategy of monetary policy remains appropriate under a flexible exchange rate system. Inflation targeting is a pro-active strategy of monetary policy. It is demanding in the sense that there are a number of requirements for its implementation to make it effective in stabilizing the price level. At the same time, under a money-based monetary policy such as monetary-base targeting, it is desirable that the money growth rate remains steady over a longer period to achieve price stability. Side-by-side, the interest and exchange rates are expected to remain flexible to absorb economic shocks (Friedman, 1983a,1983b; Greenspan, 2004; Payne, 2009; Nelson, 2020).

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DATA APPENDIX

Definitions of Variables and the Data Sources

This study for the United Kingdom uses quarterly data, unless specified otherwise, over the period from 1998Q1 to 2021Q1**.** The data are obtained from IMF**'**s *International Financial Statistics* and some statistical publications of the Organisation for Economic Co-operation and Development**.** The data for inflation uncertainty are estimated by the authors using AR-GARCH model of inflation. The data for economic policy uncertainty are drawn from Baker, Bloom and Davis (2016).

Definitions of Variables in the Regression Model

LRNM = natural log of real narrow money balances ln(NM/GDPD) where NM is the stock of narrow money (currency plus demand deposits) and GDPD is the GDP deflator.

LY = natural log of gross domestic product (GDP) at constant prices.

LDIR = natural log of the domestic interest rate, which is represented by the three-month interbank rate in the United Kingdom. The interest rate series is expressed in a decimal form for logarithmic transformation, so that LDIR = log(k+DIR/100) where k is a constant.

LFIR = natural log of the yield on the US federal funds rate, expressed in a decimal form for logarithmic transformation, so that LFIR = log(k + FIR/100) where k is a constant.

LREER = natural log of the real effective exchange rate of the British currency, expressed in an index form. A rise in the index value represents an appreciation of the British currency.

INFU = inflation uncertainty. A GARCH (1,1)-based conditional variance of inflation is used as a proxy for inflation uncertainty.

UNCTY = Economic policy uncertainty. Data for this variable are obtained from Baker, Bloom and Davis (2016). Available at: http://www.Policyuncertainty.com.

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Does Inflation Target Lead to More Stable Exchange Rate? Evidence from India

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Abstract

We examined whether Flexible Inflation Targeting (FIT) adopted by India has led to more stable exchange rate of Indian Rupee (INR). We divided the data into pre-FIT (2009-14) and FIT (2015-19) and examined the determinants of the exchange rate (INR-USD) using the ARDL approach. We found that relative inflation and relative index of industrial production to be important determinants of INR-USD exchange rate. Both the rate of depreciation of the INR-USD and the volatility of the exchange rate declined in the FIT period. The study has policy implications for other countries in their conduct of monetary and exchange rate policy.

Keywords: Inflation Targeting, Exchange Rate Stability, Exchange Rate Determinants, ARDL Approach, International Parity Relationship
JEL Classification: E31, F31

1. Introduction

Beginning with New Zealand in 1990, many countries have switched to inflation targeting. This includes developed as well as developing countries. Jahan (2018) lists 38 countries that have adopted either a flexible or point inflation target. In addition, ECB and Federal Reserve Bank also use inflation targets even though they are not officially inflation targeters. India moved to Flexible Inflation Targeting (FIT) framework in 2015.

The central bank of India, the Reserve Bank of India (RBI), was constituted through the RBI Act, 1934. During the initial years following independence, the main anchor for monetary policy was credit targets with a focus on credit to the priority sector which manifested through measures like selective credit control, credit authorization, and social control.[1]

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[1] "Revisiting the Choice of Nominal Anchor for India's Monetary Policy," Reserve Bank of India, https://rbi.org.in/Scripts/PublicationReportDetails.aspx?ID=746, accessed January 17, 2020.

From the mid-1980s to 1998, the RBI adopted monetary targeting framework with money stock as the target. As money demand became unstable, the RBI shifted to multiple indicators approach in April 1998 with emphasis on the interest rate channel of transmission. Under this approach, the policy was based on multiple macroeconomic variables (Bhoi et al., 2017). RBI continued with multiple indicators approach till 2015. During 2009-2014 India experienced high inflation following which India adopted FIT governed by an Agreement on Monetary Policy Framework dated February 20, 2015, between the Government of India and the RBI. In May 2016, the FIT framework was given a statutory and institutional basis through an amendment to the Reserve Bank of India (RBI) Act, 1934 which mandated setting up of the inflation target by the Government of India, in consultation with the Reserve Bank, once every five years[2]. In line with the Amendment Act, the Ministry of Finance, Government of India, notified 4 per cent Consumer Price Index (CPI) inflation as the target for RBI for the period from August 5, 2016, to March 31, 2021, with an upper tolerance limit of 6 per cent and a lower limit of 2 percent. The Government would have to notify a monetary policy failure, in the event average inflation was more than the upper tolerance level or less than the lower tolerance level of the inflation target for any three consecutive quarters. The RBI also changed its official measure of inflation from wholesale price index to consumer price index-based inflation in 2014[3].

Explaining the rationale of a 4 percent inflation target, the former Governor of RBI, Dr. Raghuram Rajan (2014), had reasoned that with 2 percent inflation differential vis-à-vis developed countries and approximately 2 percent productivity differential, the new inflation targeting framework should produce stable exchange rate[4].

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[2] "The goal(s) of Monetary Policy," Reserve Bank of India, https://www.rbi.org.in/scripts/FS_Overview.aspx?Fn=2752, accessed December 29, 2017.

[3]The Hindu, (2014). RBI adopts new CPI as key measure of inflation. *The Hindu.* April 2. https://www.thehindu.com/business/Economy/rbi-adopts-new-cpi-as-key-measure-of-inflation/article5859713.ece

[4] Rajan R. (2014). https://www.youtube.com/watch?v=ynFkdPDE3Oc, accessed on January 17, 2020.

In this paper, we explore if inflation targeting has led to exchange rate stability in India. To understand this relationship, we first examine the determinants of the exchange rate in India.

The rest of the paper is divided as follows. In the next section, we review the literature on issues related to inflation targeting and the relationship between inflation targeting and exchange rate. This is followed by sections on research methodology, results, and discussion.

2. Inflation Targeting – Review of Literature

Freedman and Laxton (2009) (in Benes et al., 2017) argue that effective inflation targeting is linked to improved welfare by reducing uncertainty, anchoring inflation expectations, and reducing the incidence and severity of boom-bust cycles. In cross-country studies, inflation was found to be negatively related to long term GDP growth (Barro, 2004; Andrés & Hernando,1999). Price stability through the IT framework has led to economic growth in many countries (Kurihara, 2013). Thus, low, and stable inflation can promote economic growth.

Mishkin (2001) in his study observed that countries that adopted inflation targeting experienced reduction in both inflation level as well as inflation expectations. Svensson (1997) also contended that IT maintains low inflation expectations which result in reduced inflationary impact of macroeconomic shocks. Also, in the process of achieving long-run price stability, the policymakers become more disciplined, accountable, and transparent. From the studies of countries adopting inflation targeting, it has been observed that these economies had low inflation levels as well as lower inflation expectations and experienced the benefits attached to the policy (Bernanke et al., 1999).

Further, the IT framework gives clarity to the central banks' goals and makes the central bank accountable for the target (Kurihara, 2010). A combination of credible policy with a strong nominal anchor can reduce the impact of supply shocks to inflation and bring macroeconomic stability (Benes et al., 2017).

The literature also acknowledges further advantages of IT as compared to other nominal anchors (Bernanke & Mishkin, 1997). Unlike exchange rate targeting, IT enables monetary policy to focus on the domestic situation and to

take actions to respond to shocks to the domestic economy. Also, it has an added advantage that the public can easily understand. Additionally, the possibility of slipping into time inconsistency trap is reduced as the central bank is bound to an explicit preannounced numerical target (Jha, 2008).

Calvo and Mishkin (2003) commented that the emerging market economies face weak institutional credibility in the international market which affects their capital inflows. This condition makes them vulnerable to financial crises and suggests that a rule-based monetary policy like IT is suitable for such economies.

Researchers also have warned about the negative impact IT can have on the economy. The inflation trends in the developed and transition economies with IT framework show lower inflation conditions however it has not shown a substantial reduction in the inflation rate. The literature also highlights that the fluctuation in the exchange rate and output in transition economies having IT is greater as compared to the developed economies (Jha, 2008).

Some authors have suggested conditional suitability of this framework for the transition economies which are in the process of financial liberalization and integration in world financial markets. As a result, these economies face some pressure while adopting IT as a core element in their monetary policy (Jha, 2008). While establishing a link between welfare and monetary policy in action, the study points out that the stable prices achieved through inflation targeting can boost economic growth which can further reduce poverty (Jha, 2008).

The literature before India adopted the IT framework suggests that an important step in implementing the IT regime is to finalize the price index number to which the IT policy should respond. A general trend is to include a CPI or a measure of core inflation which gives a better idea of inflation, avoiding fluctuations in the prices of energy products. The experts had expressed concern regarding this issue in the Indian context (Jha, 2008).

The literature also contends that any economy should consider the following points before switching to IT framework. It suggests that the international market should consider the economy credible. It also demands a sufficiently flexible exchange rate regime and central bank independence (Jha, 2008).

The commodity shock of 2006-2007 and the Global Financial Crisis and its impact on the entire world economy posed serious challenges to the IT framework. The prospects of IT in the context of the developing economies depend on how well central banks in these economies manage the transition toward the full-fledged stationary target. In addition to these advanced economies as well as developing economies face these challenges to achieve a robust IT framework: "improving central bank independence, transparency, and accountability; strengthening flexible IT without giving up low inflation as the key policy mandate, and evaluating seriously adoption of price-level targeting" (Schmidt & Carrasco, 2016). Implementing IT in developing countries including India shows its readiness to cope up with the challenges (Schmidt & Carrasco, 2016).

From the experience of Argentina in 2001 and South Africa in 2002, it has been observed that IT involves a lower economic cost despite monetary policy failures. If an alternative monetary policy framework fails for example exchange rate pegs, the output costs involved can be very large leading to huge reserve losses, high inflation, financial and banking crises, and subsequently debt defaults. As opposed to this the output cost involved in the failure to meet the inflation target is limited to higher inflation than targeted levels for a temporary time period and slower growth as interest rates are increased to bring inflation within the targeted limits (Batini & Laxton, 2006).

The countries with the absence of a strict set of preconditions make the implementation of IT in emerging economies difficult. The preconditions like the technical capacity of the central bank to implement the inflation targeting, absence of fiscal dominance, sound financial markets, and an efficient and strong institutional set up to facilitate and promote commitment to low inflation (Batini & Laxton, 2006).

To make inflation targeting successful the central bank must show its commitment to low and stable inflation through tangible actions. While demonstrating this commitment due to the aggressive response to inflation, it may result in a temporary reduction in output. This obligation on the central bank to hit the target restrictively can limit growth (Batini & Laxton, 2006).

The adoption of IT in India was criticized on the ground of lack of a proper inflation index, choice of the inflation target, the prevalence of agricultural shocks, inefficient transmission mechanism, lack of a well-developed capital market and accurate forecasting techniques making it unsuitable for the Indian economy (Mahajan et al., 2014; Gupta & Sengupta, 2016). Further, it was pointed out that the dominant role of food and fuel prices in India could make IT inefficient for the economy. Notwithstanding such criticisms, India formally adopted the IT framework in January 2015 as per the Urjit Patel committee report recommendations (RBI, 2014).

The main rationale behind adopting IT in India was not only price stability but also to bring transparency, credibility, and accountability in monetary policymaking. Agarwal and Shah (2019) analysed the relationship between the GDP growth and combined CPI in India from 2012 to 2018 found that inflation has reduced sharply without any adverse impact on growth post FIT adoption. However, the study also hints that it would be too early to judge this performance for such a short duration.

Credibility is an important aspect of IT. If not credible, high inflation expectations will make it difficult to achieve the target. "The credibility of a central bank is achieved slowly by achieving the target and not by announcements" (Mohan, 2008). "Credibility is not a free lunch of inflation targeting but is achieved through short-run losses in output and employment" (Mishkin, 2001). This statement again makes it clear that the credibility of the Central Bank will be achieved at the cost of short-run output and employment loss.

While commenting on whether India has the credibility bonus of adopting IT, the time varying Sacrifice Ratio (SR) from the early 1990s particularly in the pre-IT and the post-IT period, has been analysed. The estimation of SR gives an idea about the cumulative loss in the output because of the reduction in inflation by policymakers. Other researchers have mixed views about SR bonus in adopting IT (Debelle & Fischer, 1995; Posen, 1998; Walsh, 1995; Cukierman, 2002; Ball, 1991). Agarwal and Shah (2019) argue that SR for India since 2004 indicates that policymakers have the scope to further reduce inflation without

sacrificing output. The cross-country evaluation of IT of developing countries like Brazil, Colombia, Ghana, India, Indonesia, Mexico, Philippines, Peru, South Africa, Turkey, Thailand tells us that implementation of IT framework has been successful in reducing inflation rates and external debt (Agarwal & Shah, 2019). Going a little further the study also considered the economies which have adopted this framework long back and analysed their IT policy performance post 2008 crisis. Most of them had to face poor growth performance with the overshooting of the inflation target. So, overall, it is evident that lower inflation comes at the cost of slower growth pointing out the flip side of the policy (Agarwal & Shah, 2019).

3. Inflation Targeting and Exchange Rate

From the inflation targeting experience of Brazil it may be inferred that as compared to industrialized economies, emerging markets are more vulnerable to the effects of financial crises (Minella et al., 2003). Volatile exchange rate markets lead to frequent revisions in inflation rate expectations which might result in failure in achieving the target. From the data, it is clear that inflationary pressures arising out of exchange rate depreciation are mainly related to the magnitude of the depreciation as compared to the pass-through coefficient. Further, as exchange rate volatility is an important reason for fluctuations in inflation, it has been suggested that the design of the inflation targeting framework should consider this relationship. Through this, we can avoid the hindrance caused by the exchange rate volatility in achieving the required inflation target which may impact the credibility of the central bank. During 2001 and 2002 the percentage contribution of depreciation of the exchange rate in the inflation rate increased by around 21% in Brazil (Minella et al., 2003).

A piece of work by Stone et al. (2009) highlighted some peculiarities regarding the inflation targeting emerging economies with respect to the exchange rate. It talks about the role of the exchange rate in different phases of inflation targeting for emerging economies. Some studies have shown benefits of including the exchange rate in the reaction function but have posed a risk if used frequently. Inclusion of the exchange rate in the policy reaction function helps to mitigate the impact of risk premium shocks and cost-push shocks through

reduced interest rates and exchange rate fluctuations. Emerging economies are majorly characterized by the rigid exchange rate and frequent foreign exchange market interventions. If an effective role is given to the exchange rate, it can narrow down the tussle between the inflation objective and other considerations. Albeit limitations attached to it, transparency of the role of the exchange rate with reference to policy objectives, operational procedures, and ex-post evaluation can reduce the possibility of confusion about the inflation target (Stone et al., 2009).

Commenting on the role during the transition to inflation targeting the establishment of a systematic, consistent, and market-based role for the exchange rate is the key. As per the model simulations, if the exchange rate is given a larger weight in the interest rate reaction function or used as the operating policy target, it can induce better macroeconomic performance as compared to policy reaction function dominated by the interest rate. It also suggests that financial market development can improve implementation by reducing dependence on foreign exchange intervention and facilitates sterilization (Stone et al., 2009).

The countries which adopted IT experienced a decline in the pass-through from exchange rate changes to inflation. The researchers could not find any evidence on changes in the degree of effectiveness of the nominal exchange rate as a shock absorber. Researchers consider a floating exchange rate system a prerequisite for the smooth functioning of the inflation targeting framework (Mishkin & Savastano, 2001). This condition is based on the 'impossible trinity' where capital mobility, independent monetary policy cannot coexist with a pegged exchange rate system.

While considering this relationship between inflation targeting and floating exchange rates some analysts say that IT may increase exchange rate volatility. From a policy evaluation perspective, it is necessary to analyse the selection of exchange rate regime with inflation targeting separately. The analysis using these two approaches shows that there is no evidence that by controlling the exchange rate regime, the volatility of (nominal or real) exchange rates increased with the adoption of IT. However, out of five countries that adopted floating exchange rate system three countries experienced huge exchange rate fluctuations. From the data, it is evident that the countries with a background of chronic inflation do

consider trends in the nominal exchange rate while taking monetary policy decisions (Edwards, 2006).

In the context of emerging economies along with the IT regime, it has been said that responding beyond the limit to the exchange rate movements under IT may pose the risk of transforming the exchange rate into a nominal anchor for monetary policy which might outweigh the inflation target. To avoid this, the central banks should adopt transparent mechanisms related to the exchange rate mainly to smoothen the impact of temporary shocks and to achieve the required target. The empirical research says that the amount and frequency of foreign exchange interventions have been able to reduce the exchange rate volatility to a large extent. So, if used properly the foreign exchange interventions can play a positive role in the IT policy implementation to lessen the adverse impact of temporary exchange rate shocks on inflation and financial stability (Domac and Mendoza, 2004). By considering two approaches it has been found that the overall intervention to mitigate the volatility of the exchange rate has reduced the conditional variance for both the Mexican peso and the Turkish lira. But at the same time, if analysed separately, it shows that the reduction of volatility is achieved through sale operations. The data shows that the purchase operations do not have a statistically significant effect on the exchange rate volatility. The study also suggests that these policy interventions can only be used to correct short-term exchange rate volatility and not to resolve underlying economic problems (Domac & Mendoza, 2004).

A study on inflation targeting in South Korea, Thailand, Indonesia, and the Philippines revealed that the adoption of inflation targeting has resulted in reduced exchange rate volatility in all the four countries. The results from these Asian countries highlight that this policy tool helps to achieve the ultimate goal of price stabilization through reduced exchange rate pass-through or variability (Prasertnukul et al., 2010).

A study by Fraga et al. (2003) focussed particularly on emerging market economies found that emerging economies that have implemented the IT framework have experienced higher fluctuations in output, inflation, interest rates, and exchange rates than developed countries.

In their study, Soe and Kakinaka (2018), primarily focus on the role of the IT framework as a part of monetary policy in determining Exchange Market Pressure (EMP) in developing countries. Through this study, the impact of IT on the fluctuations in exchange rate depreciation and international reserves changes has been studied. The empirical analysis has put forth some interesting results as follows: Under an IT regime changes in international reserves majorly bring down the fluctuations in the EMP. Additionally, the policy commitment to an IT regime improves the credibility of the monetary policy stance and this in a way helps to lessen the speculative behaviour of the market participants and this suggests that upon adoption of the IT regime the central bank may not necessarily be required to intervene in the foreign exchange market thereby keeping international reserves stable. By segregating the countries into low – and middle –income countries the researchers found that IT policy has been successful in managing EMP fluctuations and changes in international reserves in the middle income countries but failed to find this relationship among low-income countries. So, the benefits of IT policy are limited to middle-income countries.

While there are research studies that have examined the impact of exchange rate on inflation in India, to the best of our knowledge, studies have not specifically focussed on the impact of FIT on exchange rate volatility. This study aims to fill this gap. The main objective of this study is to examine if inflation targeting has led to more stable exchange rate in India. To do this, we first examine the factors that determine the exchange rate.

4. Methodology

Celebrated purchasing power parity theory suggests that exchange rate change should be equal to the inflation differential between the domestic economy and trading partners (Levi, 2004). If a country has relatively higher inflation, its currency is expected to depreciate over time. Uncovered interest rate parity says that if a country has a relatively higher nominal interest rate, its currency will tend to depreciate by the amount of interest rate differential vis-à-vis trading partners (Levi, 2004). Thus, these two theories suggest inflation differential and interest rate differential are important determinants of the exchange rate.

Asset-based approach to determinants of exchange rate suggests that relative differential between domestic and foreign, prices, real income, and money supply are factors determining exchange rates (Levi, 2004):

$$ER_t = \alpha_0 + \alpha_1(m_t - m_t^*) + \alpha_1(i_t - i_t^*) + \alpha_2(y_t - y_t^*) + \varepsilon_t \quad \text{----(1)}$$

Where, ER_t is the natural log of the exchange rate at time t, m_t is the log of domestic money supply, m_t* is the log of money supply in trading partners, i_t is the log of domestic interest, i_t* is the log of interest in trading partners, y_t is the log of domestic output, y_t*is the log of output in trading partners.

For our purpose, we consider the USD-INR exchange rate. The exchange rate is expressed as Indian Rupee (INR) per US$. Most of India's trade with other countries happen to be in US$. For example, in 2014, more than 80% of India's trade was invoiced in US$ (RBI, 2014). The RBI's focus in terms of foreign exchange intervention is also the USD-INR exchange rate. Hence, we considered the USD-INR exchange rate for our analysis.

According to the asset-based approach model:

- If the money supply in India rises faster than that in the US, INR will depreciate (US$ will appreciate).
- If India's output growth is greater than that of the US output growth, INR will appreciate (US$ will depreciate).
- If India's interest rate differential with the US rises, INR will depreciate (US$ will appreciate).

We use monthly data and hence the output data used in the study is the Index of Industrial Production (IIP) as a proxy for output. For money supply we used broad money (M3 for India[5], M2 for the USA[6]), interest rate used is the federal funds rate for the USA and the call money rate for India.

[5] M3 = M1 + Time deposits with the banking system (It includes Net bank credit to the Government + Bank credit to the commercial sector + Net foreign exchange assets of the banking sector + Government's currency liabilities to the public - Net non- monetary liabilities of the banking sector

[6] M2 = M1 + savings deposits+ small denomination time deposits + balances in retail money market mutual funds.

We consider the exchange rate situation post the sub-prime crisis period. We divide this into two periods 2009-14 (pre-FIT) and 2015-2019 (FIT). The choice of the periods is guided by the following considerations. Indian rupee stabilised in 2009 after sharp volatility during the sub-prime crisis. The years 2009-14 witnessed high inflation, and as mentioned earlier, India adopted the FIT framework in 2015.

We also used the consumer price index instead of the money supply in Equation (1) to examine the impact of inflation on the exchange rate as follows:

$$ER_t = \alpha_0 + \alpha_1(p_t - p_t^*) + \alpha_1(i_t - i_t^*) + \alpha_2(y_t - y_t^*) + \varepsilon_t \quad \text{-------(2)}$$

Here, p_t is the domestic consumer price index (CPI) and p_t^* is CPI of trading partner (USA).

To examine the impact of FIT on exchange rate volatility we modify the above equations as follows:

$$lnCV_t = \alpha_0 + \alpha_1(m_t - m) + \alpha_1(i_t - i_t^*) + \alpha_2(y_t - y_t^*) + \beta_i x_t + \gamma\, dum + \varepsilon_t \quad \text{-------(3)}$$

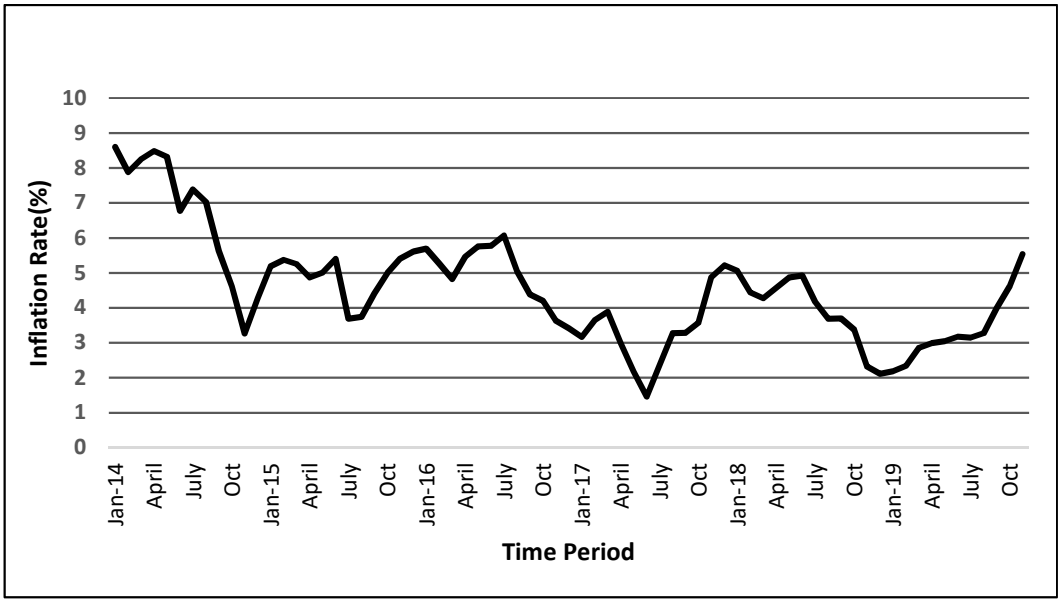
$$lnCV_t = \alpha_0 + \alpha_1(p_t - p_t^*) + \alpha_1(i_t - i_t^*) + \alpha_2(y_t - y_t^*) + \beta_i x_t + \gamma\, dum + \varepsilon_t \quad \text{-------(4)}$$

Where, x_t is foreign exchange intervention by the central bank. We took the natural log of sum of the purchases and sales of foreign currency by the central bank for x_t. The variable *dum* is a dummy that takes the value of 1 for the period 2015-19, 0 otherwise. We should expect negative value for the coefficient of dummy if FIT is successful. We also considered EPU Index for India of Baker et al. (2016) (available at http://www.policyuncertainty.com/) as an explanatory variable. In the EPU index, several other factors are considered not just inflation. It is based on the count of news articles that contain words that capture EPU. We should also expect lower Economic Policy Uncertainty (EPU) under FIT if it is successful. We modified Equations (3) and (4) to include the natural log of EPU as an additional variable.

5. Results and Discussion

Description, measurement, data sources used in the study are available in Appendix-1 and descriptive statistics are presented in Appendix-2. Since the time India adopted FIT, the RBI has been largely successful in meeting the inflation target of 4%+/-2% (Figure-1).

Figure 1. India's CPI Inflation



Source: Computed by authors based on CPI data from the Ministry of Statistics and Programme Implementation, Government of India.

In Table-1, we present the trend of the exchange rate of the INR-USD exchange rate. As can be seen during the FIT period the rupee depreciation has been more moderate when compared to the pre-FIT period (2009-14). The rupee depreciated by approximately 12 paise[7] per rupee per month during the FIT period as opposed to 26 paise during the pre-FIT period. However, it is also true that rupee continued its depreciation tendency against USD despite inflation targeting, albeit at a slower rate.

[7] One INR=100 paise.

Table 1. Trend of INR-USD Exchange Rate

Trend Equation for 2009-14	Trend Equation for 2015-2019
y = 42.851 + 0.2592t (45.77) (13.30) R^2= 0.7339	y = 63.421 + 0.1192t (167.79) (10.91) R^2= 0.5289

Source: RBI Database for the exchange rates. Monthly average exchange rates and trends estimated by authors.
Note: Figures in parentheses are t-values for coefficients.

In Table-2, we present the standard deviation and coefficient of variation (in %) of daily exchange rates during the two sample periods. This piece of evidence suggests that in the FIT period variability (both SD and CV) in the exchange rate was lower, indicating the success of FIT in bringing greater stability to the INR-USD exchange rate. The average CV was 0.97% (excluding the Aug.2013 outlier it was 0.93%) during the pre-FIT period, whereas it was 0.57% during the FIT period.

Table 2: Variability of INR-USD Exchange Rate

SD for 2009-14	CV for 2009-14 (in %)	SD for 2015-19	CV for 2015-2019 (in %)
0.5128	0.97	0.3841	0.57

Source: Computed by authors based on data obtained from the RBI database for the exchange rates.

Model Estimations

To begin with, we carried out augmented Dickey-Fuller tests for checking stationarity of the variables.

Table 3: Augmented Dickey-Fuller Test Results

Variable	Test Statistic	p-value
er	-0.546	0.8828
D.er	-8.803*	0.0000
cv	-9.031	0.0000
rm	-3.252**	0.0171
rcpi	-2.508	0.1135
D.rcpi	-9.487*	0.0000
rint	0.204	0.9725
D. rint	-10.072*	0.0000

Variable	Test Statistic	p-value
riip	-5.062*	0.0000
inter	-4.367*	0.0003
epu	-4.303*	0.0004

Notes: 1. Pre-fix D. indicates first difference of the variable.
2. and ** indicate significance at 1% and 5% levels, respectively.
3. All variables are in log form.

We also applied the Phillips-Perron test for stationarity. Results confirmed the ADF test results. We then estimated the Equation (1) mentioned in methodology. Since some variables are I (0) and some are I (1) and none of them is I (2) we decided to use the ARDL model. The lag lengths were selected based on FPE and AIC criteria. These criteria suggested 4 lags. ARDL results suggested the use of ARDL (2,4,3,0). Bounds test for cointegration indicated the presence of cointegration among variables. Hence, we used the Error Correction Model (ECM). The results are presented in Table-4. The coefficient of the Error Correction Term (ECT) was negative and significant which indicated that there is convergence to the long run equilibrium. About 13.76 percent of deviation from long term equilibrium is corrected in one period.

Durbin-Watson and LM test showed that there is no autocorrelation. White's test indicated no heteroskedasticity. Cameron & Trivedi's decomposition of IM-test skewness and kurtosis test results were satisfactory. JB test for normality indicated that residues are normally distributed. The model stability test (Cusum test) also concluded that the model is stable.

Let us now turn to long-term relationships (Table 4). There is long-term association between CPI and exchange rate. A 1 percent rise in relative CPI leads to the depreciation of INR by 1.15 percent. This confirms the PPP theory that currencies of countries with relatively higher inflation are likely to depreciate in the long-run by the amount of inflation differential. The coefficient of interest rate is not significant. The reason for this could be that nominal interest rates did not adjust according to inflation due to rigidities in the market. Otherwise, as per uncovered interest rate parity theory, higher nominal interest rates should have led to the depreciation of the INR or the coefficient should have been positive. The correlation between CPI and interest rate was 0.35 at levels and -0.0046 in first difference suggesting that interest rate did not move in tandem with inflation.

The rise in relative IIP will result in an appreciation of INR. This association is in line with the theory. The short run results are similar to the long run results. Lagged interest rate differential turned out to be significant. This means that in the short run, a rise in the relative interest rate will lead to the appreciation of the rupee. This could be because the rise in interest rate will attract capital inflows.

Table 4: Results of Regression (with CPI as An Explanatory Variable)

Dependent Variable er (n=127)		
Long-run		
Variable	**Coefficient**	**t-values**
Constant	1.1455*	4.44
lnrcpi (L1)	1.1552*	10.98
lnrint |(L1)	-0.0045	-0.36
lnriip (L1)	-3.0778**	-2.17
Short-run		
er (LD)	0.2649*	3.16
lnrcpi (D1)	0.1242	0.69
lnrcpi (LD)	0.1904	0.98
lnrcpi (L2D)	0.3565 **	2.00
lnrcpi (L3D)	-0.3575**	-1.98
lnrint (D1)	0.0153	1.45
lnrint (LD)	-0.0217 **	-2.03
lnint(L2D)	-0.0144	-1.41
lnriip(D1)	-0.4235**	-2.37
ECT_{t-1}	-0.1376*	-4.33
Adj.R^2	0.2763	
(*) significant at 1% level, (**) significant at 5% level		
Test	**Statistic**	**p-value**
Durbin-Watson d	1.9616	-
Breusch-Godfrey LM test (chi sq)	0.330	0.5654
White's test for homoskedasticity	101.10	0.1992
Cameron & Trivedi's decomposition of IM-test- skewness – Chi Sq	17.70	0.1250
Cameron & Trivedi's decomposition of IM-test- kurtosis – Chi Sq	0.14	0.7060
Jarque-Bera normality test (Chi Sq)	2.617	0.2703

We now consider the model with money supply as an explanatory variable instead of CPI. Lag length for ARDL was selected based on FPE and AIC criteria.

These criteria suggested 2 lags. ARDL results suggested the use of ARDL (2,0,2,1). Bounds test for cointegration indicated the presence of cointegration among variables. Hence, we used the Error Correction Model (ECM). The results are presented in Table-5. The coefficient of the ECT term is negative and significant which indicates that there is convergence to the long-run equilibrium. There is 9.29 percent correction in one period to the deviations from long run equilibrium.

Durbin-Watson and LM tests showed that there is no autocorrelation. White's test indicated no heteroskedasticity. Cameron & Trivedi's decomposition of IM-test Skewness and Kurtosis test results were satisfactory. JB test for normality indicates that residues were normally distributed. The model stability test (Cusum test) also concluded that the model is stable.

Since only the money supply is the new variable, we will interpret results with respect to this variable. The long run coefficient of the money supply is significant thereby implying that a rise in money supply leads to depreciation of the exchange rate. Obviously, the route through which it influences is inflation. The larger the increase in money supply, the higher inflation, and consequently greater the depreciation of the home currency. Short run results are similar to the long run results. In the short run also rise in the money supply causes INR to depreciate.

Table 5: Results of Regression (with Money Supply as An Explanatory Variable)

Dependent variable er (n=127)		
Long-run		
Variable	**Coefficient**	**t-values**
Constant	1.7578*	4.48
rm (L1)	1.3631*	6.85
rint |(L1)	-0.0252	-1.28
riip (L1)	-8.0715*	-2.85
Short-run		
er (LD)	0.2588	3.10
rm (D1)	0.1267*	4.52
rint (D1)	0.0166	1.51
rint (LD)	-0.0300*	-2.84

Dependent variable er (n=127)		
Short-run		
Variable	**Coefficient**	**t-values**
riip(D1)	-0.4196*	-2.60
ECT_{t-1}	-0.0929*	-3.61
Adj.R^2	0.2165	
(*) significant at 1% level, (**) significant at 5% level		
Test	**Statistic**	**p-value**
Durbin-Watson d	1.9616	-
Breusch-Godfrey LM test (chi sq)	0.330	0.5654
White's test for homoskedasticity - Chi sq	101.10	0.1992
Cameron & Trivedi's decomposition of IM-test- skewness – Chi Sq	17.70	0.1250
Cameron & Trivedi's decomposition of IM-test- kurtosis – Chi Sq	0.14	0.7060
Jarque-Bera normality test (Chi Sq)	2.617	0.2703

As can be seen from Table 6, the growth of the money supply was lower during 2015-19 and the inflation rate has also come down following the adoption of the FIT framework. Given the long run positive association of money supply and inflation with the exchange rate, the rate of depreciation was also lower during the FIT period when compared to the pre-FIT period. Thus, inflation targeting has lowered the rate of depreciation of the rupee.

Table 6: Growth Rate of Money Supply and CPI (% Per Month)

Variable	2009-14	2015-2019
M3	1.12	0.72
CPI	0.76	0.39

Volatility of Exchange Rate

To examine whether the volatility of the exchange rate has declined and the reasons thereof we estimated the regression model outlined in the methodology section with the log of the CV of daily exchange rates as the dependent variable.

The results are available in Table-7. All the post-estimation diagnostic tests including a stability test (Cusum) showed that the fitted model is appropriate. The coefficient of ECT_{t-1} term is negative and significant indicating long term

convergence of the model. In the long run as well as short run, none of the variables except the dummy variable is significant. The coefficient of the dummy variable is negative and significant implying that during the FIT period the volatility has been lower.

Table 7: Results of Regression (with Money Supply)

Dependent variable cv (n=113)		
Long-run		
Variable	**Coefficient**	**t-values**
Constant	-1.7480	-0.25
rcpi (L1)	-0.8357	-1.09
rint |(L1)	-0.0506	-0.66
riip (L1)	0.8722	0.13
Short-run		
rcpi (D1)	-0.8012	-1.10
rint (D1)	-0.0485	-0.66
riip(D1)	0.8362	0.13
dum	-0.5637**	-2.28
inter	0.0205	0.29
ECT_{t-1}	-0.9587*	-9.99
Adj.R^2	0.4674	
(*) significant at 1% level, (**) significant at 5% level		
Test	**Statistic**	**p-value**
Durbin-Watson d	1.9361	
Breusch-Godfrey LM test (chi sq)	0.158	0.6913
White's test for homoskedasticity - Chi sq	28.82	0.3194
Cameron & Trivedi's decomposition of IM-test- skewness – Chi Sq	8.60	0.1971
Cameron & Trivedi's decomposition of IM-test- kurtosis – Chi Sq	3.64	0.0563
Jarque-Bera normality test (Chi Sq)	2.879	0.2371

When we repeated the exercise by replacing the CPI with money supply the results are similar to that of the model with CPI (for the sake of brevity we have not reported here but is available on request).

When we included the EPU index as an explanatory variable, the coefficient of dummy turned out to be non-significant, coefficient of 'epu' was found to be significant (Table-8). EPU was lower during the FIT period when compared to pre-FIT period. The correlation between dummy and 'epu' was 0.6883 implying

that during the FIT period EPU was lower. The FIT could have contributed to the reduction of policy uncertainty.

Table 8: Results of Regression (with EPU)

Dependent variable cv (n=113)		
Long-run		
Variable	**Coefficient**	**t-values**
Constant	-3.6190	-0.53
rcpi (L1)	-0.7886	-1.15
rint |(L1)	-0.0741	-1.07
riip (L1)	0.2536	0.967
Short-run		
rcpi (D1)	-0.8169	-1.16
rint (D1)	-0.0767	-1.07
riip(D1)	0.2627	0.04
epu	0.4812**	2.79
dum	-0.3334	-1.32
inter	0.0453	0.66
ECT_{t-1}	-1.0359*	-10.67
Adj.R^2	0.4994	
(*) significant at 1% level, (**) significant at 5% level		
Test	**Statistic**	**p-value**
Durbin-Watson d	1.8950	
Breusch-Godfrey LM test (chi sq)	1.191	0.2751
White's test for homoskedasticity - Chi sq	46.08	0.0809
Cameron & Trivedi's decomposition of IM-test- skewness – Chi Sq	7.58	0.3714
Cameron & Trivedi's decomposition of IM-test- kurtosis – Chi Sq	6.02	0.014
Jarque-Bera normality test (Chi Sq)	3.219	0.1999

6. Conclusion, Limitations, and Policy Implications

In conclusion, the FIT has resulted in slower depreciation of the rupee and lower variability in the daily exchange rate. However, the depreciation tendency of rupee persists. As and when India revises its inflation target to a point target and at a level lower than 4 percent the rupee should show even more stability than what has been witnessed so far. The reason for depreciation to persist in the FIT

period could be that there is still an inflation differential vis-à-vis the US. While inflation has remained within the target set, our target rate itself is higher than the US inflation target. Further, in the US, actual inflation has generally been less than 2 percent during 2015-19. Another reason could be that the anticipated productivity gains as mentioned by Dr. Rajan, ex-governor of RBI, did not happen during the FIT period. This will need further investigation.

The findings of this study could be useful for policymakers of other developing economies that are suffering from persistently high inflation and consequently depreciating currencies. They may consider moving towards an inflation targeting framework to avoid high inflation. When countries wish to adopt an inflation targeting framework, they may consider the success of the FIT framework of India in keeping inflation under check and consequently keeping the exchange rate also more stable.

The study has limitations. We have considered a few factors that influence the exchange rate. There could be other factors such as productivity that may also influence the exchange rate. We have only considered the INR-USD exchange rate. Future studies may also consider the exchange rate vis-à-vis other major currencies and trading partners. We only have five years of data under the FIT framework since it was implemented in 2015. Longer data set would lend more credibility to the analyses.

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Appendices

Appendix 1: Variables, Measurement, and Source of Data

Variable	Description/ Measurement	Source of data
Er	monthly average of INR-US$ exchange rate,	Computed by authors using daily INR-US$ exchange rate database available on RBI website
Cv	coefficient of variation of daily exchange rate during a month	Computed by authors using INR-US$ daily exchange rate database on RBI website
Rm	ratio of India's money stock to USA money stock	Calculated by authors using Federal Reserve Economic Data, RBI database and OECD database
rcpi	is ratio of India's CPI to the US CPI	Calculated by authors using RBI database, OECD Data and Federal Reserve Economic Data
Rint	the ratio of India's interest rate (call money rate) to that of US interest rate (Federal funds rate),	RBI and Federal Reserve Economic Data
riip	ratio of India's Index of industrial production to the US industrial production	Central Statistics Office Data and Federal Reserve Economic Data
inter	Foreign exchange intervention by RBI	RBI website
dum	Dummy variable takes value '0' from 2009-14 and 1 from 2015 to 2020.	-
epu	Economic Policy Uncertainty index	http://www.policyuncertainty.com/

Notes: All variables are except dum are in natural logarithms. Frequency of all variables is month.

Appendix 2: Descriptive Statistics

Period: 2009-2019					
Variable	**No. of obs.**	**Mean**	**Std. Dev.**	**Min**	**Max**
er	132	4.0658	0.1572	3.7925	4.2991
cv	132	-0.4634	0.6590	-1.7493	1.3339
rm	132	-4.7922	0.1695	-5.1964	-4.5426
rcpi	132	-0.9609	0.1673	-1.3236	-0.7168
rint	132	3.1449	1.2639	0.8507	4.8604
riip	131	1.0187	0.0159	0.9831	1.0581
inter	114	8.4466	1.1166	5.1648	10.6206
epu	132	4.5329	0.4745	3.4930	5.6479
Period: 2009-2014					
Variable	**No. of obs.**	**Mean**	**Std. Dev.**	**Min**	**Max**
er	72	3.9501	0.1193	3.7925	4.1550
cv	72	-0.2376	0.6312	-1.3439	1.3339
rm	72	-4.9169	0.1260	-5.1964	-4.7318
rcpi	72	-1.0850	0.1256	-1.3236	-0.8925
rint	72	3.9606	0.6148	2.7331	4.8604
riip	72	1.0078	0.0100	0.9831	1.0420
inter	55	7.9638	1.3180	5.1648	10.2777
epu	72	4.8259	0.3478	4.1916	5.6479
Period: 2014-2019					
Variable	**No. of obs.**	**Mean**	**Std. Dev.**	**Min**	**Max**
er	60	4.2047	0.0425	4.1277	4.2991
cv	60	-0.7343	0.5898	-1.7493	0.4581
rm	60	-4.6426	0.0543	-4.7344	-4.5426
rcpi	60	-0.8119851	0.0426	-0.8881	-0.7168
rint	60	2.1661	1.1426	0.8507	4.2723
riip	59	1.0321	0.0108	1.0056	1.0581
inter	59	8.8966	0.6203	6.9726	10.6206
epu	60	4.1813	0.3518	3.4930	4.9717

Notes: 1. All variables are in natural logarithms.
2. Frequency of all variables is month.

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Are Job Satisfaction and Employee Commitment Beneficial to Organization? A new look of organizational performance

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Abstract

The main intent of the paper is to explore the impact of job satisfaction and employee commitment on the organizational performance by integrating the mediating impact of employee commitment from the perspective of the banking sector in Bangladesh. In this regard, the study conducted a survey with structured questionnaire among bank employees and end up the survey with a final sample size of 308 respondents of which 126 were from public sector banks and 182 were from private sector banks. Structural Equation Modeling (SEM) is applied to evaluate the hypotheses of the study. The findings showed that job satisfaction is directly and significantly influence the organizational performance. The study also showed that job satisfaction significantly influences employee commitment. The findings also demonstrated that employee commitment has no mediating effect between job satisfaction and organizational performance. The evidence from this study is likely to assist the bank management of Bangladesh in realizing the importance of job satisfaction in enhancing the performance of banking services, which may provide input for decisions regarding the persistently recognized role of job satisfaction in the bank's employees. The present study incorporates two vital aspects of human resources: job satisfaction and employee commitment, to judge the impact of these factors on organizational performance directly and indirectly. Therefore, this research will shed light on the relationship between job satisfaction and organizational performance specially in the banking industry of Bangladesh.

Keywords: Job Satisfaction, Employee Commitment, Organizational Performance
JEL Classification: M12

1. Introduction

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The definition of organizational performance is the advancement of an organization through significant and high yield development (Singh, Darwish, & Potocnik, 2016). Organizations are constantly looking for new ways to improve their effectiveness and get a competitive edge in the market (Chen, 2005). As a result, it needs more attention. Performance was described by Mandy (2009) as the result of adopting an efficient management process from the perspective of the management process. Performance, according to Greenberg (2011), is a collection of financial and non-financial measures. Similar to this, Hilman and Abubakar (2017) place emphasis on the financial metrics linked to growth in sales, investment, and profit. The factors that affect organizational performance have been the subject of several research. Researchers of different disciplines already studied on leadership styles, human resource practices and intellectual capital. Some others emphasized on the total quality management, organizational capabilities, even there are research on information technology and innovation, among others, from a variety of disciplines, like human resource and operations management, marketing, information systems, and international business (Farouk, Elanain, Obeidat, & Al-Nahyan, 2015; Lo & Fu, 2016; Wang, Cao, & Ye, 2016).

Wood, 1999), and human resource management should be reflected as a basic requirement to improve organizational performance (Wood, 1999). Human resource management is an inevitable function in any organization that integrates every member of the organization that leads to organizational performance and success (Bhattacharya, Gibson, & Doty, 2005). A few more examples can be shown in the respect of organizational performance such as Mathieu and Zajac (1990) proved that a committed workforce resulted in increased performance and increased sales (Barba et al., 1999). In any organization, the commitment of the employees is a critical factor for successful performance. This is because human resources are the hallmark of the performance of any organization (Obicci, 2014). Zheng (2010) described employee commitment as simply an employee's attitude to the organization. Thus, Steers (1977) proved that employee commitment was directly related to company turnover. To make this statement more vigorous, Arthur (1994) and Hafiz (2017) concluded that an organization's performance would be enhanced by a high level of employees' commitment. Therefore, in his

study Tumwesigye (2010) opined that employee commitment has gained important attention due to the dependency of the organization on its committed employees who can create competitive advantage and serve excellent performance for the organization.

The present study incorporates two vital aspects of human resources: job satisfaction and employee commitment, to judge the impact of these factors on organizational performance. Armstrong and Baron (2002) regarded organizational performance as a strategic concern and a unique technique to provide stable performance to an organization by augmenting the performance of employees through team spirit and individual contributions. Vasconcelos (2011) went on to say that management resolutions can sometimes elicit angry feelings, frustration, grievance, and distrust among employees, which can have a negative impact on overall organizational performance. As a result, it may be considered that job satisfaction and employee commitment are two robust factors for improving organizational performance, and this study incorporated these constructs to define organizational performance from the perspective of the banking industry in Bangladesh.

Although several studies have been conducted in many countries, recent trends have discovered that there is a paucity of studies in this area that have shown an indirect relationship between job satisfaction and organizational performance in various perspectives. Another motivational force for conducting this study is the lack of sufficient empirical evidence in Bangladesh. Hence, the study has been focused on job satisfaction and employee commitment and their impact on organizational performance. Recently, Dalkrani and Dimitriadis (2018) statistically proved that job satisfaction is inherently interwoven with organizational commitment. Reversely, Risal (2018), through regression analysis, explains the negative relationship between job satisfaction and employee commitment. These findings have obviously encouraged us to revisit the relationship from the perspective of banking services. This study's integration of the "Balanced Score Card (BSC)" method, which combines financial and non-financial dimensions of organizational performance in accordance with Kaplan and Norton, is another important strength (1992).

Greater competition, according to Khan et al. (2010a), forced local Bangladeshi businesses to play a significant role in terms of production effectiveness, product quality, and customer retention. Organizations must employ non-financial indicators and multi-dimensional performance measuring strategies like BSC in order to account for these issues. According to Karathanos & Karathanos (2005), BSC is a well-liked tool that many companies use to evaluate their performance across a number of organizational facets. According to Hussein, Mazen, and Thierry (2012), the BSC was developed to help firms stop relying solely on financial performance indicators to gauge their performance. They identified four viewpoints as the factors influencing future total organizational performance since it concentrated on the fact that supervisors must employ both financial and operational indicators, as follows:

- What do customers think of us, from their perspective?
- Perspective on internal processes: What must we excel at?
- In terms of finances, how do we appear to our stakeholders?
- Can we keep becoming better and adding value from a learning and growth perspective?

The objective of this study is, therefore, to examine the impact of job satisfaction on organizational performance by integrating the mediating impact of employee commitment through structural equation modeling in the perspective of banking services.

The study organizes the paper into several sections: Section 2 studied the literature on job satisfaction, employee commitment, and organizational performance and their relationships, including the theoretical context and hypothesis construction for the study. Section 3 highlighted on the methodology of the research. Section 4 offered the results of the study. Section 5 presents the discussion of the study findings. Sections 6 and 7 articulate the research implications and few limitations of the study. Finally, Section 8 wrap up the whole study.

2. Literature Review

2.1 Job Satisfaction

Since it is measured as a fundamental issue in enhancing an organization's performance and competitiveness, job satisfaction is a crucial factor to consider. Workplace behaviors including organizational citizenship, absenteeism, and turnover can all be predicted by factors such as job satisfaction, which is a significant determinant of how people feel about their positions. Understanding the factors that contribute to job satisfaction is essential to raising employee happiness (Okpara, Squillace, & Erondu, 2005). Due to its impact on employee loyalty to a business, job satisfaction has become a persistent and important research issue. Job satisfaction is a major concern for all types of organizations in developed and underdeveloped countries (Rehman et al., 2013). It is regarded as a person's evaluation of his or her job and work environment. Further, it is connected with employees' positive or negative feelings of their jobs and it could be intrinsic and/or extrinsic characteristics of the jobs (Bashir & Ramay, 2008).

2.2 Employee Commitment

Meyer and Herscovitch (2001) recommend that commitment is the power that integrates an individual into a path of action attached to one or more targets. Meyer and Allen (1990) stated that employee commitment is a psychological state that describes the employee's affiliation with the organization. It has some effects on the decision to continue participation in the organization. Furthermore, Allen and Meyer (1990) proposed that employee commitment is composed of three constructs, namely affective, continuance, and normative commitment. Affective commitment states to the condition where the employee of the organization has an emotional promise with their organization. Continuance commitment denotes to a context where an employee feels losing more by parting than will gain. The impairment can be in any kind, such as status, income, attachments, or social loss. Normative commitment shows a sense of compulsion to the organization, and this sense of compulsion can stem from moral and ethical deliberations. Thus, an individual wants to stay in the organization for some reasons. The approach to organizational commitment that is most frequently used in the literature views commitment as an affective attachment to the organization, whereby the person who is highly devoted identifies with, participates in, and

enjoys belonging to the organization. This viewpoint, which claims that affective commitment is maybe the greatest representative for organizational commitment, is strongly backed by Kanter (1968) and Buchanan (1974). In addition, Porter et al. (1974) identified four important aspects of employee commitment. Here is a list of them.

- wants to stay connected to the organization.
- it states the organization's morals and objectives.
- ready to exert effort
- commitment to keep on working for an organization

Thus, we selected 4 items of affective commitment for representing the employee commitment (Bentein et al., 2005).

2.3. Organizational Performance

Since organizational performance is a requirement for determining how well the firm is performing over time, evaluating business performance is one of the most important management tasks. Numerous businesses are using a variety of strategies for performance assessment in organizational settings as a result of realizing the importance of ongoing performance evaluation (Fernandes et al., 2006). Organizations assessed performance solely on the basis of financial criteria between 1850 and 1975, which has been criticized because it promotes a transient viewpoint, ignores strategic focus, is unable to support data about quality, responsiveness, and flexibility, thus encouraging a positive viewpoint, and does not show what customers expect or the caliber of competitors' performance.

The four components of BSC have been utilized as a foundation for assessing organizational performance because of how comprehensive it is for analyzing performance and how frequently it is applied to strategic management issues. The BSC offers managers a wide-ranging framework for changing the business entity's strategy in accordance with a logical set of performance standards (Kaplan and Norton, 1992). The use of BSC for measuring organizational performance was also endorsed by Yasin et al. (2004) due to its financial and non-financial qualities covering a wide variety of realistic performance metrics.

The performance of the banking services is evaluated in this study using four BSC aspects namely financial, customer, internal process and learning and growth perspective.

2.4 Job Satisfaction and Organizational Performance

Khan, Nawaz, Aleem, and Hamed (2012) examined job satisfaction of personnel and performance and found that job satisfaction delivers invaluable input for superior performance to organizations.Umar (2015) vividlyspecified that job satisfaction significantly affects organizational performance. In this context, Robbins (2001) articulated that satisfied employees were precondition for increasing productivity, quality and customer service. Nancarrow (2007) disclosed that job satisfaction creates sense of obligation and increases autonomy and thus better performance is ensured through better working environment. Recently, some researchers have identified a positive correlation between job satisfaction and organizational performance that is cementing this relationship (Danica, 2018, Latif et al., 2015).

2.5 Job Satisfaction and Employee Commitment

Through empirical evidence, Menon (2015) proves that higher level of job satisfaction can increase employee commitment. Nancarrow (2007) revealed that higher level of job satisfaction created an obligation to provide superior service. Mullins (2005) described that job satisfaction is usually linked with motivation and it is also associated with a personal feeling of achievement. As a result, the current study has given credence to the notion that job satisfaction may have some relationship to employee commitment. In recent times, Edward, Kasekende, and Gladies (2017) empirically evidenced that there was a positive relationship between job satisfaction and employee commitment (= 0.59, p 0.01). Furthermore, Qureshi et al. (2019) found that all three types of commitment (affective, normative, and continuance) have a positive impact on job satisfaction, indicating a reverse relationship.

2.6 Employee Commitment and Organizational Performance

It is well-known that an employee who is pleased with his job would perform well and normally be committed to his job and consequently committed to his

organization. Thus, it is very essential for employers to identify the reasons that may affect job satisfaction of their employees as subsequently it would affect the organizational performance (Awang et al., 2010). Committed employees are the most essential assets of the organization, and they lead to unique significances in terms of effectiveness, organizational productivity and performance both in the individual and organizational level (Fiorita et al., 2007). Several previous investigations (Mathieu & Zajac, 1990; Meyer & Allen, 1991; Mowday, 1998) established that commitment is connected to valuable outcomes for employees, such as enhanced morale, reduced stress, and improved productivity. Lately, several scholars have endorsed that committed employees are always considered the greatest asset for any kind of organization, and organizations will have to play a major role in overall profitability and efficiency for their business (Hurter, 2008; Hsein, 2009). A recent study done by Abilash and Siju (2021) revealed that employee commitment towards work by teleworking can enhance the work credit for any employee which subsequently increase organizational performance. Aziz et al., (2021) also identified the positive relationship between employee commitment and the university performance. An interesting finding revealed by Aktar (2022) showed that continuance commitment has positively influence the job performance of financial institutions however, negatively influence the non-financial institutions in Bangladesh.

2.7 Mediating Role of Employee Commitment

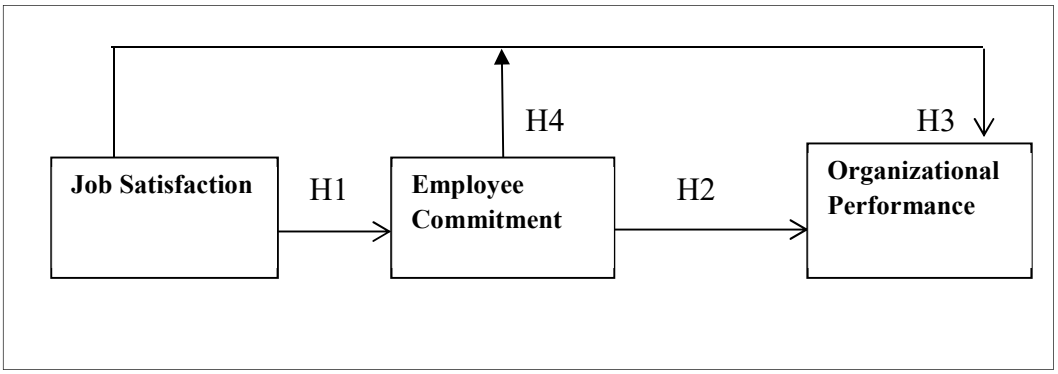
He et al. (2011) familiarized employee commitment as a mediating variable in the construct of service climate and customer satisfaction. Furthermore, Osman, Alam and Saha (2016) incorporated employee commitment as a mediating variable in the construct of service climate and service quality and empirically confirmed that employee commitment is partially mediating. Recently, Ennis, Gong, and Okpozo (2018) integrated employees' affective and normative commitment as a mediating variable between transformational leadership and turnover intention. Employee commitment was discovered to be the intermediary between transformational leadership and turnover intention. Various other studies have investigated that increased job satisfaction not only results in increased employee commitment but also leads to increased job

performance (Fu & Deshpande, 2014). To the best of our knowledge, no such study has been conducted to find out the mediating effect of employee commitment on the relationship between job satisfaction and organizational performance in the banking sector of Bangladesh.

2.8 Theoretical Framework

Social Exchange Theory underpins the relation of employee behavior and performance with working condition and job satisfaction of employees (Birtch, Chiang, & Van Esch, 2016). This theory confirms the idea that job satisfaction affects an employee's behavior and performance when they are happy with their jobs in an organization (Yee, Guo, & Yeung, 2015). The exchange of benefits and goods of equal value between two parties is described by a social exchange theory (Ko, Hur, & Smith-Walter, 2013). This study found that employees are more devoted to their individual firms if they are happy with their jobs. Employees in this study are anticipated to trade relationships in this manner. The conceptual basis for this investigation was developed in large part thanks to this idea. In addition, a variety of theories, such as the equity theory, self-efficacy theory, and need theory, link job satisfaction to motivation (Landy, 1989). The conceptual framework for this is developed on the basis of literature, which is supported by the abovementioned theories.

Figure-1: Conceptual Framework of Organizational Performance.



2.8.1 Research Hypotheses

Based on the extensive literature review, a conceptual model has been developed to explore the relationship between job satisfaction, employee commitment, and organizational performance. On the basis of such evidence, the following hypotheses are developed:

H1: There is a positive relationship between Job satisfaction and employee commitment.

H2: Employee commitment has positive relationship with organizational performance.

H3: There is a positive relationship between Job satisfaction and organizational performance and

H4: Employee commitment mediates between job satisfaction and organizational performance.

3. Method

3.1 Sample and Procedure

To collect data, a survey was conducted through a structured questionnaire. The questionnaires were purposively distributed among 400 bank employees of commercial banks in Bangladesh. Respondents were constituted from different groups of commercial banks, including state-owned banks, private banks, specialized banks, and foreign banks operating in Bangladesh. Out of 400 questionnaires, a total of 308 were received, and 10 questionnaires were found to have missing values. The missing values from 10 questionnaires were analyzed and settled and finally a total of 308 questionnaires were used for analysis. Before filling the questionnaires, the researchers explained about the purpose of the questionnaire among the respondents so that they could properly fill it. Besides, written instructions were clearly given in the questionnaire to ensure its accurate filling. The researchers personally administered the filling up process of the questionnaire during the training sessions at BIBM among the banks' executives in the rank of senior officer and above. Endorsement from previous studies specified that this technique produced higher response rates (Tay, 2008).

3.2 Instrument

The study was mainly based on the primary data. In this regard, a structured survey questionnaire was employed among private and public commercial banks to gather required data from the respondents. The questionnaire focused both on the demographic traits of respondents and different statements associated with job satisfaction, employee commitment, and organizational performance. A 5-point Likert Scale was used for measuring the responses starts with "strongly disagree" to "strongly agree". In this research, organizational performance is measured through dimensions of a balanced scorecard that contain various perspectives like financial, customer, internal process, and learning & growth indicated by Kaplan and Norton (1992). The financial perspective measured by 4 items earlier used by Chan (2004) and Kaplan and Norton (1992). The customer focus also measured by 4 items considering Chan (2004), Fuentes-Fuentes (2004), Kanji (2002), and Kaplan and Norton (1996). The internal process which measured by 4 items was used from the study of Chan (2004); Fuentes-Fuentes (2002); Kaplan and Norton (1996). The learning and growth variable also measured by 4 items and followed the study of Chan (2004); Fuentes-Fuentes (2002); Kanji (2002). Job satisfaction measured by 8 indicators was adapted from Schnake (1983), with an alpha coefficient of 0.84. To end with, employee commitment (four indicators) was adapted from Bentein et al. (2005) with an alpha coefficient of 0.82.

4. Results

4.1 Respondents' Demographic Characteristics

Among the 308 respondents, 77.6% (239) were male and 22.4% (69) were female. According to the position, 23.7% (24) was senior VP, 23.1% (71) was principal officer, 17.5% (54) was senior officer, 7.8% (24) was senior AVP, 10.4% (32) was AVP, and 13.3% (41) was officer. In this study, 40.9% (126) of respondents worked for public banks, while 59.1% (182) worked for private banks.Table1 shows the descriptive statistics. It showed the highest mean associated with customers, which means respondents' perception of this factor is high compared to other factors. The assessment of normality was conducted through the value of skewness and kurtosis, which must confirm the range of –

1.0 to +1.0 and –2 to +2.0, respectively, to confirm normality (George & Mallery, 2010). Table 1 confirmed the normality and listed the following:

Table-1: Descriptive Statistics

Variables	N	Min	Max	Mean	Standard Deviation	Skewness	Kurtosis
Job Satisfaction	308	1.38	5	2.916	0.8897	0.105	- 1.073
Employee Commitment	308	1	5	3.340	0.9989	-0.636	- 0.120
Finance	308	1	5	3.256	0.9513	- 0.415	- 0.618
Customer	308	1.25	5	3.341	0.9911	- 0.528	- 0.732
Internal Process	308	1	5	3.095	0.9359	0.008	- 0.957
Learning & Growth	308	1	5	3.149	0.9620	- 0.271	- 0.899

4.2 Reliability, Validity and Uni-dimensionality

The paper used Cronbach's alpha for measuring the reliability of all the constructs. Hair et al. (2010) suggested that the minimum value of Cronbach's Alpha should be 0.70, however, value of 0.60 can be accepted in case of exploratory research. Therefore, the paper considered Cronbach's Alpha value of 0.60 or above as the true reflection of inner consistency (Table 2). The AVE (average variance extracted) was used for assessing the construct validity in order to determine the convergent validity. Fornell and Larcker (1981) recommended that reliable variables should equal to and more than 50 percent explained variance (AVE). In this study, all latent variables extracted more than 50 percent AVE thus validity is confirmed (see Table 2). In order to reach an uni-dimensionality, factor loading less than 0.60 needs to be removed. Uni-dimensionality must be ensured prior modeling their inter-relationship. The factor loading for an item should be 0.60 or higher for already proven scales (Awang, 2012). In this endeavor, factor loadings are fluctuated from 0.61 to 0.89 which are certainly representing uni-dimensionality (Table 2). Finally, to confirm the hypotheses, path analysis was conducted through SEM. The composite reliability is one more measure of convergent validity. It confirms that the level to which a number of items consistently identify the hidden construct. As suggested by Hair et al., (2010), the recommended value should be 0.70 or bigger. Hence, the current study meets the composite reliability as all the values ranged from 0.90 to 0.98.

Table 2: Reliability, Validity, and Uni-dimensionality Assessment

Construct	Factor Loadings	Cronbach's Alpha	CR	AVE
Job satisfaction		0.89	0.90	0.52
• JS1	0.75			
• JS2	0.74			
• JS3	0.70			
• JS4	0.75			
• JS5	0.75			
• JS6	0.61			
• JS7	0.75			
• JS8	0.71			
Employee commitment		0.84	0.93	0.57
• EC1	0.66			
• EC2	0.74			
• EC3	0.79			
• EC4	0.79			
Finance		0.86	0.96	0.64
• FIN1	0.69			
• FIN2	0.85			
• FIN3	0.81			
• FIN4	0.83			
Customer		0.89	0.98	0.68
• CUS1	0.82			
• CUS2	0.73			
• CUS3	0.87			
• CUS4	0.87			
Internal process		0.86	0.97	0.62
• INP1	0.79			
• INP2	0.81			
• INP3	0.77			
• INP4	0.77			
Learning & Growth		0.89	0.98	0.68
• LG1	0.78			
• LG2	0.84			
• LG3	0.77			
• LG4	0.89			

4.3 Discriminant Validity

In respect of reaching discriminant validity, several researchers recommend a threshold value of correlation between two constructs should be 0.85 (Clark & Watson, 1995; and Kline, 2011), even though others suggest a value of 0.90 (Gold, Malhotra, & Segars, 2001 and Teo, Srivastava, & Jiang, 2008) is satisfactory for dodging multi-collinearity. In this study, correlation value of 0.90 was determined to reach the discriminant validity. The discriminant validity is achieved for the reason that correlation value between two constructs is below the recommended cut-off points (Table 3).

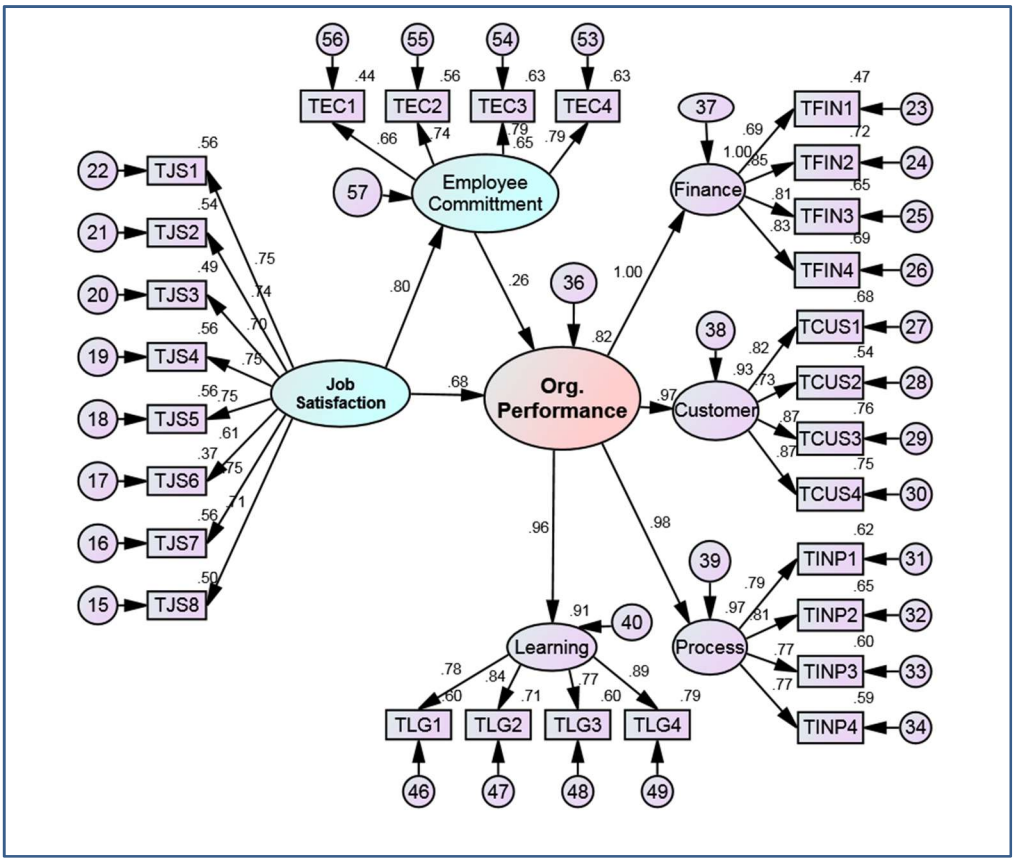
Table 3: **Correlations from AMOS Output**

Constructs	JS	EC	Performance
JS	1		
EC	0.803	1	
Performance	0.892	0.808	1

4.4 Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis is recognized as an outstanding factor analysis instrument. It has the inherent power to confirm a construct's existence, and its indicators are stable with respect to the researcher’s theorizing of the nature of that hypothesis. Prior to conducting the CFA for all variables, it is important to attain the uni-dimensionality, validity, and reliability (Awang, 2012). In this endeavor, the uni-dimensionality, validity of the factor, and the reliability have been confirmed (Table 2). Figure 2 shows the structural fit model by executing the CFA.

Figure 2: Structural Model of Organizational Performance



4.5 Goodness of Fit

This study confirmed a good fit of the model (Table-3). The ratio of Chisq/df was 2.584 which was below than the recommended value of 5.0 as suggested by Hair et al. (2010) and Holmes-Smith (2006). The incremental fit indexes achieved the required level as the values of CFI and TLI were greater than 0.90. With regard to the absolute fit index, the value of RMSEA was 0.047 which is below the suggested value of 0.08. Together with these indexes, it is confirmed that the research model was a proper fit. Among all the indexes, minimum one index from

individual class should ensure the model fit as suggested by Hair et al. (2010) and Holmes-Smith et al. (2006). Hence, the study achieved the goodness of fit as all the indexes fulfilled the required level.

Table 3: The Assessment of Fitness of Final Fit Model

Name of Category	Index	Acceptable Level	Comments
1. Absolute fit	RMSEA = 0.047	RMSEA < 0.08	Achieved the criteria
2. Incremental fit	CFI = 0.902	CFI > 0.90	Level of criteria is achieved
	TLI = 0.911	TLI > 0.90	Minimum level is achieved
3. Parsimonious fit	Chisq/df = 2.584	< 5.0	Fulfill required level

4.6 Status of Hypothesis Testing

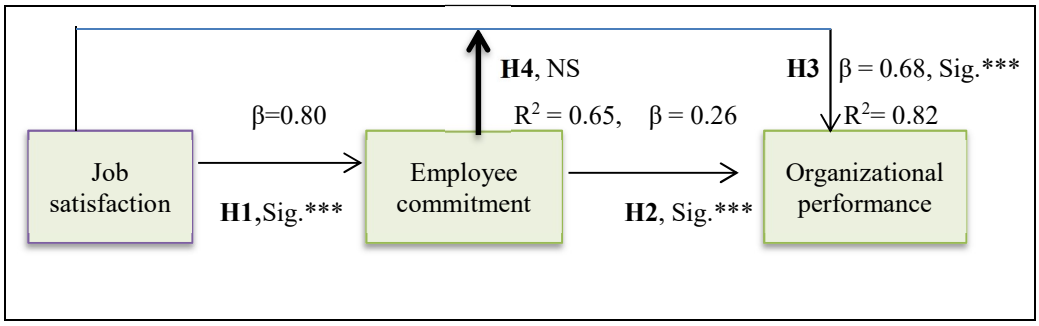
To fulfill the objectives of the study, a total of four hypothesizes were examined (Table-4). The significance level of direct and indirect path analysis shows in Figure-3. The study also tested the mediation effect of employee commitment between job satisfaction and organizational performance. According to Hair et al. (2010, p.773), full mediation is occurring when direct path is not significant however indirect paths are significant. On the other hand, if both the paths are significant then no mediation is occurring.

Table 4: Results of Hypothesis

Hypothesis	Standardized beta Estimate	P value	Results
H1: There is a positive relationship between Job satisfaction and employee commitment	0.80	***	Significant
H2: Employee commitment has positive relationship with organizational performance	0.26	***	Significant
H3: There is a positive relationship between Job satisfaction and organizational performance	0.68	***	Significant
H4: Employee commitment mediates between job satisfaction and organizational performance	Direct path is significant (β=0.68) and indirect paths are also significant.		Not mediating

Note: *** = Significant at < p 0.001 level.

Figure 3: Evaluated Model of Organizational Performance



Note: direct impact: ——————
mediating impact: ▬▬▬▬

** = Significant at < p 0.01 level,*** = Significant at < p 0.001 level, and NS = not significant

In accordance with Table-4, hypothesis *H1, H2,* and *H3* are found statistically significant at p value less than 0.001. The study also revealed that hypothesis *H4* is not statistically significant as both direct and indirect paths are statistically significant. In respect of Figure-3, the study denoted $R^2 = 0.65$ means that job satisfaction explained 65 percent variation in employee commitment thus job satisfaction proved itself as a good predictor of employee commitment. Furthermore, the study disclosed again $R^2 = 0.82$ means that job satisfaction and employee commitment explained 82 percent variation in organizational performance. Consequently, it can be determined that job satisfaction and employee commitment are regarded as the strongest predictors of organizational performance.

5. Discussion

The main intent of the paper is to explore the impact of job satisfaction on organizational performance. Besides, based on the previous literature, the study also expected that employee commitment is supposed to mediate the association between job satisfaction and organizational performance, which is tested through structural equation modeling in the banking sector. According to Table-4, there is a significant positive relationship between job satisfaction and employee commitment. Thus, hypothesis H1 is reinforced by the study. It certainly indicates that job satisfaction is the precise predictor of employee commitment in the

banking industry of Bangladesh. This finding is consistent with several researchers (Kasekende & Gladies, 2017; Mullins, 2005). Figure-3 depicts that job satisfaction significantly explains employee commitment due to its beta value of 0.80 and p value of 0.001.

Referring to Table-4, the study demonstrated a significant relationship between employee commitment and organizational performance. Thus, hypothesis H2 is secured by the study. It means that employee commitment is a significant predictor of organizational performance. Therefore, effort must be exerted towards generating and sustaining employee commitment because this is the latent force of the organization for strengthening performance. This finding is exactly the same as that of Awang et al., 2010; Fiorita et al., 2007).

Table-4 also reveals that job satisfaction is highly influencing organizational performance. As a result, hypothesis H3 is supported. This finding specifies that organizational performance is virtually influenced by the job satisfaction. Thus, every organization should focus on job satisfaction and continuously need to detect and remove the unfavorable elements of job satisfaction in the working process. This finding is steady with (Latif et al., 2015; Danica, 2018; Umar, 2015; Taslim, 2014).

As illustrated by Table-4, the study discloses that employee commitment does not mediate between job satisfaction and organizational performance. Thus, hypothesis H4 is not supported. Finally, Figure-3 shows that job satisfaction explains 80% of the variation in employee commitment, and employee commitment explains 82% of the variation in organizational performance, both of which are significant at the p 0.001 level. These findings strongly suggest that job satisfaction and employee commitment are important factors in explaining banking performance, and these factors clearly have a positive image for representing bank's performance.

6. Implications

The study has important implications for both academic research as well as human resource management practices in the banking industry of Bangladesh. In the context of academic research, the study proves that job satisfaction and

employee commitment are two ideal factors for enhancing bank's performance. In terms of theoretical contribution, the study clearly demonstrates that employee commitment has no mediating effect between job satisfaction and organizational performance. This outcome may further supplement the existing literature to some extent. Regarding the practical point of view, the findings of the study may assist the board of directors, senior management, policy makers, and other stakeholders related to the policy implementation level in banking industry of Bangladesh to ensure proper job satisfaction and employee commitment to produce superior performance in banks.

7. Limitations

The study collected data by applying purposive sampling technique from different commercial banks in Bangladesh using structured questionnaire. Hence, the paper used cross-sectional data for analysis and the results cannot be generalized for all the industries. Also, the participants were the executives of banks in different levels only, and deliberately the non-executive employees were excluded. Therefore, even in the banking industry the results cannot be generalized. Finally, there is some possibilities of measurement errors. Moreover, the research highly relied upon on the perceptions of the respondents which may not reflect the true scenario for all the banks. This could have prompted some perceptual inflation of self-assessment scores.

8. Conclusion

The study reveals that job satisfaction significantly influences employee commitment and organizational performance. Thus, it uniquely exposed itself as a valuable factor for determining employee commitment and organization performance. This study evidences that hypotheses H1, H2, and H3 are statistically significant. Then again, employee commitment fails to verify its mediating influence between job satisfaction and organizational performance. The realistic reason is that job satisfaction, as an independent variable, significantly and directly influences employee commitment and organization performance (please refer to Table-4). So, there is no scope for mediating employee commitment. This unique finding ensures once more that job satisfaction is quite a valuable aspect for keeping employee commitment and

confirming organizational performance without any transmission of the effect of job satisfaction to organizational performance. Through the visualization of the evaluated model in Figure 3, the study reveals that job satisfaction and employee commitment are two influential factors which are exclusively responsible for determining organizational performance.

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Impact of Microfinance on Women Economic Empowerment with Moderating Effect of Demographic Variables

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Abstract

Empowering women economically enabled women decision maker and strong in income and asset ownership. This study mainly focused on microfinance impact on economic empowerment of women considering demographic variable as moderator. The data were collected from 346 female microfinance clients by using questionnaire. Multiple regression, Structural equation modeling and paired sampled t-test data analysis techniques were used in the study. Result of Multiple linear Regression supported, credit amount, education, age, marital status, number of training have significant impact on economic empowerment of women. Result of Paired sampled t-test showed microfinance service has significant impact on women's economic empowerment of women economically. Moreover, the structural equation modeling result showed age of women has moderating role on the impact of micro finance service on women economic empowerment. However, education, and number of households did not have moderating effect on microfinance and women economic empowerment relationship.

Keywords: Microfinance, Women Economic Empowerment, Impact
JEL Classification: G21

1. Introduction

Women economic empowerment is women capacity to participate in a variety of development issues and scale-up activities from growth and development processes (Addai, 2017). Economic empowerment increases women's non-financial resource and financial success. Moreover, economic empowerment is good opportunity for market information and skill development (Khadre, 2015). Women's economic participation is the basis for women's rights and for women's empowerment in their families and in society. Women economic empowerment is creating equitable societies (Gendernet, 2011).

Microfinance is effective instrument to solve women's problem by providing credit, saving and training service. Women status and participation in controlling over resources and economic activities is very low in Ethiopia (Misrak, 2012; Haimanot, 2007). Zelalem and Chalchissa (2014) study clearly revealed that

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microfinance provides savings service, credit, insurance service, money transfer to clients that do not have opportunity for access to commercial banks. Microfinance is an important economic development catalysis designed to benefit women and low-income people. Microfinance plays a major role in alleviating poverty through job creation, employment, and entrepreneurship. Women's participation in microfinance programs will give them more freedom, more freedom and improved skills, self-confidence and better self-confidence (Khan, 2016; Addai, 2017). Similarly, Khandare (2015) study identified women opportunities in decision making and independent income increased and their economic participation in the community showed dramatic improvement.

There are controversies on impact of microfinance institutions on women economic empowerment. Odell (2010) findings identified the difficultly of microfinance intervention impact generalization considering heterogeneity of the service. Study conducted by Stewart et al. (2010) in Africa showed that Microfinance impact on income of microfinance clients was insignificant. Similarly, Rathiranee et al. (2015) study revealed that, there is a weak but positive impact on empowerment of women due to microfinance service provision in Sri Lanka. Mohamed et al. (2016); Khan, 2016; Addai (2017) study clearly indicated that there is positive result of microfinance institution intervention on women economic empowerment in Bangladesh and Ghana, respectively. Similarly, Misrak (2012) and Loomba (2017) confirmed the significance impact of microfinance.

Top published studies linking microfinance institutions to women's economic empowerment. The shadowy study focused on microfinance into its role in women's economic empowerment, poverty alleviation, and microfinance's impact on national economic development. The idea of microfinance, especially in Ethiopia, is still in its infancy and needs further investigation. In addition, the researcher noted that major studies in Ethiopia in this regard focused exclusively on the economic benefits of rural women, but the study did not address the specific problem of urban women's economic empowerment where loans are used for income-generating activities. For the above reasons, this study focused on

microfinance service impact on the economic benefits of women considering demographic variables as moderator.

2. Microfinance Impact on Women Economic Empowerment

Microfinance institutions are considered as a community-based strategy to provide finance service for very poor and disadvantage section of the society in order to improve the life of microfinance clients (SEEP, 2006). Microfinance sector has also been considered a key resource in supporting community in their transition towards peace and development. Doyle (1998) states that microfinance supports the development and expansion of enterprises by providing financial services to the domestic economy.

Contextual Control and Licensing Proclamation no. 626/2009 describes the provision of financial services, including microfinance loans, savings, drawing, money transfer services and other related services. This definition of microfinance business is not limited to microfinance institutions. In this article, Microfinance provides access to financial services for low-income individuals and regular financial institutions, as well as for other micro and small enterprises. Microfinance is not limited to lending activities but also to other financial services such as savings, transfers, insurance and others.

Microfinance industry empowers women economically by giving working capital and allowing them to get an independent monthly income to their families. Women economic empowerment improved self-esteem of microfinance women clients (Kusum, 2015). According to Mudakappa (2014), a number of Women are beneficiaries of microfinance institutions in different countries. Microfinance provides financial service to start new business and expand the existing one. The service of Microfinance gives women better confidence and helped them to be more active in participating in the household and community affairs.

Microfinance institution service empowers women by accelerating employment rate, improving productivity of labor and increasing wages rate (UN, 2011). The impact of microfinance can be checked by looking income variation, employment creation, and sustained consumption. The services of a microfinance institution are directly measured by literacy rates and changes in housing, fertility

rate. According to Khandker (1999), changes in income and employment among microfinance participants may affect their life at large.

Microfinance helped the poor to protect from risk, diversify business and increase sources of income which is considered as essential path out of poverty (Littlefield et al., 2013). For many researchers, income has played a major role in consumption, political formation, and other security perspectives. When income levels increase the supply of nutritious food, their access to services and children's education is positively impacted. Microfinance institutions also provide services to protect the poor. For example, a microfinance institution is working on a savings program to get money when there is a need for funds for crisis times and purposes. Therefore, efficient microfinance program could also reduce the rate of unemployment and diversified sources of earnings.

According to Temesgen (2017) findings, microfinance provides short-term financial services for low-income and non-standard banking services. The study found that it had a significant impact on the living standards of the poor and that it was generally helping to alleviate poverty among their families. Microfinance Institution in Ethiopia is providing financial services to empower women in their lives with dignity and self-confidence. According to Kibret and Ermias (2018), microfinance institutions focused on satisfaction of customer and their preferences to be successful in this competitive business environment. Women will involve in microfinance program if there is better service delivery practice.

Conceptual Framework of the Study

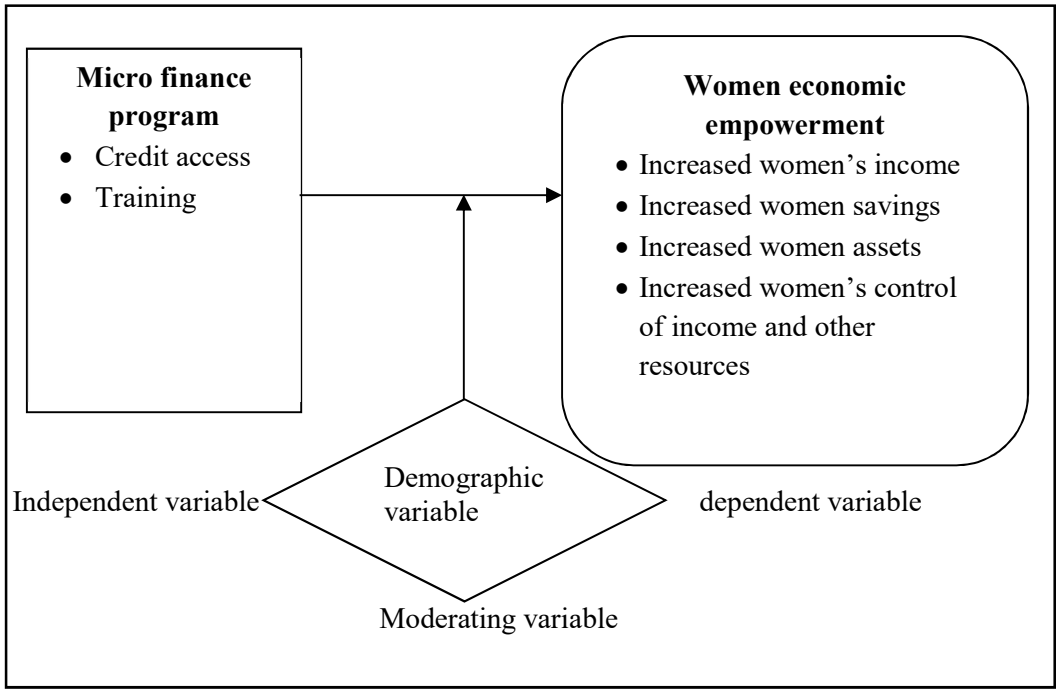
Conceptual framework for this study is developed based on the evidence available in literature. More than thirty articles and papers reviewed to develop this conceptual framework. Based on literature review, the researcher has developed conceptual framework to show the relationship between independent variables, micro finance service, dependent variable women economic empowerment and moderating variables demographic variables.

Impact assessment is important to know the service of microfinance. According to SEEP (2000) study, microfinance service improves poverty level

and financial security, ensuring better customer service and commitment, and overseeing the responsibilities of other external stakeholders.

The model below shows that micro finance service and moderating variables (age, marital status, and education, number of house hold) leads to economic development of women. According to Addai (2017) study, microfinance service has positive impact on economic position of women but the relationship is mainly dependent on marital status, age and educational level (demographic variables) of the women clients. Similarly, Rehman et al. (2015) study revealed that education and age have profound impact on economic empowerment of women beneficiaries. Increased participation in economic activities raises women's incomes, savings, control of their own and family income, and other household resources which are basis for women economic empowerment (Dawit, 2014; Abdul, 2014; Rehman et al., 2015).

Figure 1: Conceptual Framework of the Study



3. Methodology

3.1. Research Design

In this study, Explanatory research design employed. The study used cross-sectional data; all relevant information is collected only once. Mixed approach used to examine microfinance impact on economic empowerment of women. According to Creswell (2014) book, all methods have their own limitations, Triangulating data sources, mixing qualitative and quantitative data together, is important characteristics of mixed approach.

3.2. Data Source and Collection Instruments

The primary and secondary source of information used in the study. Although the study is based on primary and secondary data, the study focuses primarily on primary data, as microfinance is the primary source of information. Secondary Source of data was Amhara Credit and Savings Institution Reports and Documents.

3.3. Sampling Technique and Sample Size

Multistage sampling techniques were employed in this study. Knowledge and experience of the researcher were used for selecting the study area. According to United Nations Secretariat Statistics Division 2003 handbook, 10 percent is adequate for purposely choosing places for study but 30 percent used for this study. Secondly, in order to evenly distribute the sample in all geographical area; the existing administrative division were taken as a base for allocation of sample size. The Amhara Credit and Savings Institution database has used to determine the number of customers in each city, and the respondents have been determined at proportional rate. Finally, the responses recorded in the study were drawn using simple random sampling technique.

The total population of this study is 9,157 female clients. Using the formula developed by Yamane (1967), the researcher was able to determine the sample size from the total population.

$$n = \frac{N}{1 + N(e)^2}$$

Where,

N=number of populations; n=number of samples; 95% confidence level.

The formula gives 384, and then a sample size of 384 women was selected for the study.

3.4. Validity and Reliability

According to Creswell (2014), validity test is a measure of what one intends to measure. Prior to the final decision of questionnaire, pilot study were conducted. Data collection tools, relevance, queries are solved by the researchers to make the data collection instrument more relevant and reliable. Respondents' concerns were corrected and questionnaires were filtered. In addition, the verification of the questionnaire has been thoroughly investigated by experts.

Instruments reliability measures the consistency of the instruments. Creswell (2014) looks at the reliability of the device as a function of the consistency of the instruments. Based on this, in Debre Berhan, Dessie and Woldia towns, a sample of 30 respondents were tested and reliability test was shown to be 0.85 for the instruments. Typically, an alpha value of 0.80 or more would be considered a good indicator of reliability, while others 0.7 and above would be acceptable.

3.5. Data Analysis

Regression

Multiple linear regression analysis conducted to find out the five-variable age, marital status, education level; the amount of credit and the amount of training have impact on women economic empowerment or not.

Paired t-test

In this study, a paired t-test can be used to compare income, asset, and savings before and after the credit program.

Structural Equation Modeling for Moderation

Moderation effects are used to identify the variables that increase or decrease the relationship with in independent and dependent variables. Moderator models are used to examine an independent variable, microfinance service influences by

demographic variables (age, educational level, number of household) on a dependent variable (economic empowerment). Laha and Kuri (2014) recommended in their study that the methodology focus is not only on the relationship between microfinance and women empowerment, but also on the positive aspects of age and education on the relationship should be considered.

Currently, due to the increasing importance of moderating effects; the use of structural equation modeling has become vital in numerous management areas. Structural equation modeling is named as second-generation data analysis method (Hoyle, 2012). In this study structural equation modeling used to examine the moderating effect of demographic variables on the relationship between independent variable and dependent variable.

4. Result and Discussion

In order to achieve economic development, different strategies are undertaken in Ethiopia and microfinance is one among different interventions. Microfinance important contribution towards economic empowerment is that it helps to combat poverty and empower women economically. This section is intended to provide an in-depth explanation how much microfinance impacts the economic lives of women considering the demographic variable.

The result of multiple regressions revealed that age; level of education; marital status number of training; amount of credit were significant variables on women economic empowerment in the study areas.

Table 1: Regression Result

Coefficients[a]					
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	4.663	1.306		3.570	0.000
Age of Respondent	1.416	0.217	0.303	6.511	0.000
Marital Status	1.974	0.704	0.127	2.806	0.005
Level of Education	1.328	0.244	0.247	5.452	0.000
Credit Amount	0.762	0.144	0.246	5.282	0.000
Number of Training	1.411	0.281	0.233	5.015	0.000

This study found that age and women's economic empowerment were positively associated i.e. economic empowerment increase with the increases in age. According to Dawit (2014) explanation for the positive relationship was that when women got more knowledge and exposure on different matters, as women age increased to older age. The experience they got helps them to better understand decision making role on their life, family matters and in the community, which leads them towards economic empowerment. The result of the study is in line with previous researchers. For example, a study by Rehman et al. (2015) shows that age has a significant impact on women's empowerment. In addition, Ringkvist (2013) in a Burma field study shows that age has a positive effect on women's economic potential.

The marital situation mentioned above has a profound effect on women's economic empowerment. This finding is in line with the findings of Addai (2017): married women supported by her husband and her children. The consequences of education have been identified by the use of microfinance funds in credit and training services and the economic benefits. Women's education is directly linked to wealth control. In addition, women's education is a key factor in women's economic empowerment, contraception, and more employment opportunities. Education is one of the keys to becoming a full-fledged in the process of women's empowerment and development (Parveen, 2005; Addai, 2017).

Credit amount has a huge impact on economic development of women. Relationship between loans and economic empowerment Women is positive; in high credit amount are more likely to report high-income. The finding of this study is similar with Khan and Noreen (2012) indicated that significant impact on the economic benefits of microfinance and its use in women economic empowerment. The macro-finance training is very important and brings women's economic benefits; they are more likely to develop their business skills and attitudes (Parveen and Leonhäuser, 2004; Dincer, 2014; Charles, 2016).

Paired sampled t-test used to compare the mean difference of income, saving, asset before and after credit program. Paired sampled t-test was conducted to examine the impact of microfinance on women's asset after credit and before credit program, there was significant effect on asset, t (345) = 16.444, p=00. It

can be observed from Table-2 below that the mean asset difference after credit and before credit program is significant and microfinance program has positive impact on women asset ownership in the house hold. The result of the study is similar with Temba (2016), in a study conducted in Tanzania showed that microfinance has able to managed to help women to avoid poverty and empower themselves economically by increasing their asset ownership when compared to before joining micro fiancé program.

Table 2: Paired Sample Test Results

Paired Samples Test								
	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Asset after Credit - Asset Before Credit	3.72254	4.21088	0.22638	3.27729	4.16780	16.444	345	0.000
Income after Credit - Income before Credit	3.23121	2.53068	0.13605	2.96362	3.49881	23.750	345	0.000
Saving after Credit - Saving before Credit	2.90751	2.76890	0.14886	2.61473	3.20030	19.532	345	0.000

As clearly shown in table above, there is significant mean difference in income after and before credit program t (345) = 23.750, p=00. Based on the result by pair t-test statistics shown, there is significant mean difference after women get credit from micro finance and before credit program. Gangadhar and Malyadri (2015) and Wanjiku and Njiru (2016) study also supports the result of this study.

Paired sampled t-test was made to examine the impact of microfinance on women saving amount after credit and before credit program, there was significant effect on saving amount, t (345) = 19.532, p=00. Before joining micro finance most women did not save and few women save but the saving amount were small. The main reason for not saving is lack of additional income and lack of awareness about business and microfinance service. After credit program all

most all of women clients put their money in saving accounts maintained with microfinance institutions and commercial banks.

Structural equation modeling was used to examine the moderating effect that demographic variables may have upon that relationship between microfinance service and women economic empowerment. The following tables of AMOS result revealed that age of women has moderation role on microfinance and women economic empowerment relationship.

Table 3: Structural Equation Modeling Result Age as Moderator

			Estimate	S.E.	C.R.	P	Label
Economic Empowerment	<---	Microfinance	0.666	0.099	6.726	***	significant
Economic Empowerment	<---	Age	0.771	0.148	5.202	***	significant
Economic Empowerment	<---	agexmf	0.523	0.242	2.159	0.031	significant

Note: Model fit CMIN/DF=.277; GFI=1.0; CFI=1.0; RMSEA=0.001

Based on the above table, Moderating effect of age on relationship micro finance service and women economic empowerment is significant. Therefore, age can moderate the effect of microfinance on economic empowerment of women. Age moderates the relationship between microfinance and women economic empowerment in such a way that relationship is stronger where the women's age increased and the relationship is weakened where the women is lower. The study is similar to previous researchers. A study by Adadai (2017) in Ghana shows that there was a statistically strong positive relationship between microfinance and economic empowerment of women, but this relationship is based on the age of women.

Table 4: Structural Equation Result Education as Moderator

			Estimate	S.E.	C.R.	P	Label
Economic Empowerment	<---	Microfinance	0.670	0.106	6.332	***	Significant
Economic Empowerment	<---	Education	0.339	0.182	1.861	0.063	Insignificant
Economic Empowerment	<---	eduxmf	0.156	0.264	0.590	0.555	Insignificant

Note: model fit CMIN/DF=0.143; GFI=0.998; CFI=1, RMSEA=0.001

Based on the Table-4 above education did not have moderation effect on relationship microfinance and women economic empowerment. The study is similar to previous researchers. Laha and Kuri (2014) study identified the importance of paying attention to other women economic empowerment attributes such as marital status, age, and educational level of women which have significant impact on relationship between microfinance and women economic empowerment. Unlike to this study, Kabee (2005) investigation in south Asia showed that the service of microfinance has important effect to women economic empowerment but microfinance does not automatically empower women economically. Other development interventions such as education moderate microfinance contribution on women economic development.

Table 5: Structural Equation Result Number of Household as Moderator

			Estimate	S.E.	C.R.	P	Label
Economic Empowerment	<---	Microfinance	0.648	0.109	5.945	***	significant
Economic Empowerment	<---	Education	0.744	0.179	4.162	***	significant
Economic Empowerment	<---	numxmf	-0.123	0.328	-0.374	0.709	insignificant

Note: Model fit CMIN/DF=1.769; GFI=0.997; CFI=0.993; RMSEA=0.049

In the above table, it has been found in AMOS result that number of households did not have has moderation effect in microfinance and women economic empowerment relationship. Therefore, the effect of number of households on increasing or decreasing the effect of microfinance service the economic empowerment of women is insignificant.

5. Conclusion and Recommendations

This study was mainly focus on the impact of microfinance on women economic empowerment considering demographic variables as moderator. The finding confirms that age, marital status, education level, number of training, and loan amount all contribute to the economic empowerment of women in the study area. The structural equation modeling result revealed that age has moderation effect on the relationship between microfinance service and women economic empowerment. However, education, and number of household did not have

moderating effect on the relationship between microfinance and women economic empowerment.

To know the use or non-use of microfinance on women asset, income, saving, pair t-test was employed. The result of study clearly showed that the difference in income, asset, and saving amount is significant. Services provided by microfinance plays a vital role and improve women income, asset and saving amount of women. Different researchers also show the importance microfinance on women asset ownership improvement, income increment, saving amount improvement, and effective decision making. In the microfinance program, women's economic potential is enhanced by economic development, participation in income-generating activities, self-confidence, social and political awareness, organizational skills and activities.

Opinions of respondents showed that the loan offered is too small to start a business. There for Amhara credit and saving institution should adjust the amount of credit provided to women clines. Moreover, the majority of microfinance client's dissatisfied with high interest rate. Therefore, the institutions need to revise its interest policy so as to attract more women clients.

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COVID-19 Pandemic: Challenges and Opportunities for Islamic Banking Industry of Bangladesh

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Abstract

Bangladesh Islamic banking sector continued to show rapid expansion in terms of growth of assets, deposits, investments, and number of account holders. It plays a significant role in mobilizing deposits and financing different sectors of the economy towards inclusive growth. The outbreak of COVID-19 has impacted Islamic banking sector adversely in case of functioning as financial intermediary like conventional banking sector. By using its innovative inclusive financial tools, Islamic banking sector has potentials to mitigate impacts this epidemic and maintain its development roles in the national economy. The main objective of the study is to discuss the challenges and opportunities of the epidemic for the Islamic banking industry of Bangladesh. For achieving the objectives of the study, both primary and secondary data have been used. The draft paper was presented in a webinar and it has been finalized after accommodating recommendations and observations of the webinar seminar. It is opined that Muslims may consider COVID-19 as a test for mankind and the true believers will be rewarded if they react accordingly. Believing in Allah, we have to try our level best overcome the economic meltdown for the pandemic. We should not be panicked and frustrated, we must hope for Allah's mercy. Maintaining ethical standards in every sphere of our life including banking operations is important. Normal that was at pre-COVID era will never come back in the mind, behavior and thinking of individuals and business entities. We have to prepare ourselves

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to accept the new-normal business environment. Based on the prediction of different authorities, it is assumed that economy in the post-COVID will be very vibrant and aggressive. As IB is based on divine guidance of Allah (SWT), it must be superior to the man-made system. However, we the Muslims have to take the challenge to prove superiority and risk resilient of this system to others. If the system fails in combating COVID-19, it is not a fault of the system rather it is a failure of the individuals working behind the system. The banks which are *Shariah*-compliant in operational level, in true sense, will be leader at the post-COVID situation, In Sha Alllah.

Keywords: COVID-19, Islamic Banking, Challenges and Opportunities
JEL Classification: E51, E52, G21,

1. Introduction

The novel corona virus disease popularly known as COVID-19 started in the city of Wuhan, Hubei province, China in late December 2019. Later, it has spread rapidly to more than 200 countries (IOM, 2020) and territories of the world. The World Health Organization (WHO) declared COVID-19 as a global pandemic on March 11, 2020. As on June 26, 2020, there have been more than 9454 thousands confirmed cases of COVID-19, including 483 thousands deaths (https://covid19.who.int). On the day, total confirmed cases in Bangladesh are 130 thousands with 1661 deaths (https://www.iedcr.gov.bd). The global economy has fallen into tremendous crisis triggered by the worldwide massive spread of COVID-19 pandemic. Leading economists have dubbed the global crisis as the greatest challenge after the Second World War. The adverse impacts of the pandemic have hit every sphere in lives of the planet-economy, health, education, transport and other sectors. In the absence of a vaccine or effective treatment and in a response to minimize the effects of COVID-19, near all governments of the world have enforced lockdown, border shutdowns, travel restrictions and quarantine sparking fears of an impending economic crisis and recession. Bangladesh, as the eighth largest populous country of the world, has also experienced unprecedented adverse effects of COVID-19 in all major sectors of the economy- finance, health education, etc. Bangladesh's banking sector comprising interest based conventional banking and interest free Islamic banking has faced severe challenges in maintaining its smooth operations and keeping its vital role in financial intermediary via promoting saving-investment process towards higher inclusive growth and employment. In current paper, we would

focus on Bangladesh Islamic banking sector's challenges and policy directions for mitigating adverse impacts of COVID-19 Pandemic.

Bangladesh Islamic banking sector continued to show rapid expansion in terms of growth of assets, deposits, investments, and number of account holders. Now, the share of Islamic banking sector can be reckoned close to 25 percent of the entire banking sector (BB, 2019) and it plays a significant role in mobilizing deposits and financing different sectors of the economy towards inclusive growth. The outbreak of COVID-19 has impacted Islamic banking sector adversely in case of functioning as financial intermediary like conventional banking sector. By using its innovative inclusive financial tools, Islamic banking sector has potentials to mitigate impacts this epidemic and maintain its development roles in the national economy. Given this, first we would analyze impacts of COVID-19 on global economy and its ramifications on Bangladesh economy. Later, we would investigate into potential impacts of COVID-19 pandemic on Bangladesh's Islamic banking sector. We would also provide policy options for meeting challenges of COVID-19 faced by Islamic banks as well as explore the opportunities.

1.1 Objectives

The pandemic of COVID-19 impacted on every dimension of human life. Consequently, banking industry including Islamic banking has been affected in different ways either positively or negatively. The main objective of the study is to discuss the challenges and opportunities of the epidemic for the Islamic banking industry of Bangladesh. The specific objectives are:

i) to review policy initiatives for Islamic banking industry of Bangladesh;
ii) to identify challenges facing by the industry; and
iii) to identify probable opportunities combating COVID-19 epidemic.

1.2 Methodology

For achieving the objectives of the study, both primary and secondary data have been used. Primary data have been collected through an unstructured questionnaire administered to Islamic banks and central bank. However, data of only three full-fledged Islamic banks and five conventional banks having Islamic

banking branches/windows have been compiled in the study. Besides, some professionals and experts have been interviewed over phone for getting insights of the banks. Moreover, a FGD (Focus Group Discussion) attended by some banders was arranged. As regard to secondary data, different publications of Bangladesh Bank (BB), concerned Islamic banks, Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI), Islamic Financial Services Organization (IFSB), International Monetary Fund (IMF), World Health Organization (WHO) and Institute of Epidemiology, Disease Control and Research (IEDCR) of Bangladesh have been consulted. More on that, circulars and guidelines of BB and policy initiatives of concerned banks have been studied. This is a descriptive study, and data have been presented in tabular form. The draft paper was presented in a webinar and it has been finalized after accommodating recommendations and observations of the webinar seminar.

2. COVID-19 and Overall Economy

This section would focus on adverse impacts on global economy and its ramifications on Bangladesh Economy.

2.1 World Economy

Following outbreak of the pandemic, the global economy is projected to contract sharply by 4.9 percent in 2020, much worse than during the 2008–09 financial crisis (Table-2.1). Due to worldwide massive stimulus package, the global economy is projected to grow by 5.4 percent in 2021 if economic activity normalizes. World trade is projected to decline by 11.9 percent in 2020 and increase by 8.0 percent in 2021. Trade of advance economies, and emerging market and developing economies may go down by 13.4 percent and 9.4 percent in 2020 respectively. Trade of advance economies and emerging market and developing economies are forecasted to rise by 7.2 percent and 9.4 percent in 2021, respectively.

Table 2.1: Overview of the World Economic Outlook Projections

Particulars	2019	2020P	2021P
Economic Growth			
World Output	2.9	-4.9	5.4
Advance Economies	1.7	-8.0	4.8
United States	2.3	-8.0	4.5
Euro Area	1.2	-10.5	6.0
Emerging Market and Developing Economies	**3.7**	**-3.0**	**5.9**
Middle East and Central Asia	1.2	-4.7	3.3
World Trade Volume (goods and services)	0.9	-11.9	8.0
Advance Economies	1.5	-13.4	7.2
Emerging Market and Developing Economies	**-0.8**	**-9.4**	**9.4**

Source: World Economic Outlook, IMF, June 2020 (P=Projection)

According to International Labor Organization (ILO), there will be a reduction of global jobs equivalent to about 195 million full-time workers (https://www.ilo.org). The United Nations Conference on Trade and Development (UNCTAD) is forecasting that the global flow in Foreign Direct Investment (FDI) will shrink by 5 to 15 percent in 2020 (https://unctad.org). In addition, it is forecasted that due to the global lockdowns and the historic slump in oil prices, global remittance is likely to reduce by 20 percent[1].

2.2 Bangladesh Economy

The economy of Bangladesh has performed well attaining near 7 percent annual economic growth during the past decade before the corona virus outbreak. According to data of IMF, Bangladesh attained 8.2 percent growth during FY19[2]. Following corona virus outbreak, the government has adopted many precautionary measures to contain the spread of the virus. The government declared a national holiday prompting the closure of government and private offices, factories as well as restrictions on public transport and individual movement. Localized outbreaks have led to the imposition of stricter lockdowns

[1] National Budget Speech, 2020-21, Government of Bangladesh
[2] IMF Country Report No. 20/187, June 2020

in major parts of the country. As results, public and private business units have experienced unprecedented loss in economic output.

Domestic economic activity is projected to decline as policies to limit the spread of COVID-19 are implemented and the national shutdown mandated by the government aims to keep people indoors. The large share of workers in the informal sector and in daily paid work indicates that a substantial part of the labor force is highly vulnerable to the COVID-19 shock. Growth is projected to decline to 3.8 percent in 2020 which is 4.4 percent lower than that of FY19, the largest one-year decline in the last three decades. Exports and Imports are predicted to go down by 17.9 percent and 8.8 percent in 2020, respectively. Remittances are forecasted to grow only 1.4 percent in 2020 relative to 9.6 percent in 2019.

Since the beginning of the COVID-19 pandemic, the government has undertaken various steps to combat its fallout under a comprehensive plan[3]. The comprehensive plan includes four main strategies. Firstly, it will discourage luxury expenditures and prioritize government spending that creates job. Due to sound macro-fiscal operation, Debt-to-GDP ratio is still as low as 34 percent. This provides a cushion against any negative macroeconomic implication on the eve of increasing public spending to overcome the crisis. Secondly, the strategy is to create loan facilities through commercial banks at subsidized interest rate for the affected industries and businesses so that they can revive their economic activities and maintain competitiveness home and abroad. The third strategy is to expand the coverage of the government's social safety net programs to protect the extreme poor and low paid workers of informal sector from the sudden loss of their source of earning due to pandemic. Finally, the fourth strategy lies in increasing money supply to the economy while making a delicate balance between increased money supply and possible inflationary pressure.

[3] National Budget Speech, 2020-21, Government of Bangladesh

Table 2.2: Impacts of COVID-19 on Key Economic Indicators

Particulars	FY17	FY18	FY19	FY20^{P}	FY21^{P}
Real GDP	7.3	7.9	8.2	3.8	5.7
CPI inflation, annual average	5.4	5.8	5.5	5.7	5.6
Current Account balance (Percent of GDP)	-0.5	-3.5	-1.7	-2.2	-3.5
Exports of Goods	1.7	6.7	10.1	-17.9	-0.8
Imports of Goods	9	25.2	1.8	-8.8	4.8
Remittances	-14.5	17.3	9.6	1.4	-7.1
Gross official reserves (in millions of USD)	33,471	32,838	32,762	30,652	26,778
In months of Goods and services	6.4	6	5.9	5.6	4.8
Budget Deficit (Percent of GDP)	-3.3	-4.6	-5.3	-6.3	-6.1
Public sector total debt Budget Deficit (Percent of GDP)	33.4	34.6	35.9	39.1	40.7
Of which External sector Debt	13.7	14.9	14.9	16	1.58

Source: Country Report on Bangladesh, IMF, June 2020
Note: P=Projected

In light of the comprehensive plan and strategies described above, the government has declared a number of stimulus packages to support the emergency healthcare services, protect jobs and achieve smooth economic recovery. The economic recovery packages declared so far has totaled BDT 1031.17 billion equivalent to 3.7 percent of GDP, which is the largest in the South Asia region.

3. Islamic Banking Industry and COVID -19 Pandemic

3.1 Islamic Banking Industry of Bangladesh

Bangladesh established its first Islamic bank 'Islami Bank Bangladesh Limited' in 1983 which is the first Islamic bank in South-East Asia. At present, Bangladesh's Islamic banking sector with assets of USD 30 billion dominates among different components of Islamic finance and it recorded robust growth during the last three decades[4]. Bangladesh accounts for 1.9 percent share of global Islamic banking assets securing 8th position[5].

[4] Financial Stability Report 2018, Bangladesh Bank
[5] Islamic Financial Services Industry Stability Report 2019, IFSB

Bangladesh Islamic banking sector conducts its operations following Bank Company Act 1991 (amended in 2013) and other relevant acts/regulations as the conventional banking sector. Though there is no separate Act for Islamic banks, some clauses have been incorporated in Bank Company Act for smooth functioning of Islamic banks. In addition, Islamic banks follow Bangladesh Bank's Guidelines, 2009[6] in conducting its operations. As Central Bank, Bangladesh Bank issues licenses for Islamic banks under certain terms and conditions, monitors operations of Islamic banks and conducts on-site and off-sight inspection in Islamic banks regularly. According to Bangladesh Bank's Guidelines, 2009, each Islamic bank has established *Shariah* Advisory Board/Committee to look after *Shariah* compliance issues. Furthermore, BB Guidelines on Internal Control & Compliance in Banks 2016[7] incorporated a separate section on *Shariah* audit. There is a *Shariah* non-Compliance Risk Rating approach in the guidelines. *Shariah* Board for Islamic Banks of Bangladesh (CSBIB) has been established by Islamic banks and other conventional banks having Islamic banking operations in order to offer advisory services on *Shariah* compliance and impart training on Islamic finance.

At the end of December 2019, Bangladesh's 8 full-fledged Islamic banks have been operating with 1380 branches out of total 10578 branches of the whole banking industry. In addition, 19 Islamic banking branches of 9 conventional commercial banks and 88 Islamic banking windows of 8 conventional commercial banks are also providing Islamic financial services in Bangladesh. Besides, three more conventional banks got permission of BB to be converted into full-fledged Islamic banks. Furthermore, some other conventional banks got approval for launching Islamic financial services through their branches/windows. Market share of Islamic Banks' deposit and Investments stood at near 25 percent of entire banking industry. Appendix-I summarizes information of Islamic banking industry of Bangladesh for first quarter of 2020. Market share of Islamic banks relative to banking Industry is shown in Table-3.1.

[6] BRPD Circular No. 15/2009, dated: November 09, 2009
[7] BRPD Circular No. 03/2016, dated: March 08, 2016

Table 3.1: Share of Islamic Banking Industry at the End of December 2019

Aspects	Entire Banking Industry	Islamic Banking Industry	Share of Islamic Banking Industry
Total Deposits (BDT in Millions)	11369796	2802278	24.65%
Total Investments (BDT in Millions)	10587073	2627520	24.82%
Remittances (BDT in Millions)	414091	146325	35.34%
Number of Bank	59	8	13.56%
Total Number of Bank Branches	10578	1380	13.05%
Number of Account Holders	106,595,211	19,406,416	18.21%

Source: Quarterly Report on Developments of Islamic Banks and SBS, Bangladesh Bank, December 2019

The Islamic banking sector is also showing better financial performance compared to conventional banks in terms of financial performance indicators such as Return on Assets (ROA), Return on Equity (ROE), Investment-Deposit Ratio (IDR), Capital Adequacy Ratio (CAR) and classified investment ratio (Table-3.2).

Table 3.2: Comparative Financial Performance of Islamic Banks in 2019

Ratios	Islamic Banking Industry	Entire Banking Industry
Return on Asset (ROA)	0.6	0.5
Return on Earnings (ROE)	11.4	7.4
Net Profit Margin	2.9	2.1
Investment (Advance)-Deposit Ratio	94.3	77.3
Classified Investment (Credit) to Investment	4.7	9.3
Classified Investment (Credit) to Capital	71.7	92.7
Capital to Risk Weighted Assets Ratio (CRAR)	12.4	11.6

Source: Financial Stability Report, Bangladesh Bank (2019)

3.2 COVID-19 and Regulatory Initiatives for Banking Industry of Bangladesh

Bangladesh Bank has eased monetary policy and has undertaken several other steps to contain the negative fallout from the COVID-19 outbreak. Major steps include (i) reduction of the repo rate in two steps by 75 basis points (bps) to 5.25 percent and the Cash Reserve Requirement (CRR) by 150 bps to 3.5 percent

on a daily basis and to 4 percent on a bi-weekly average basis; (ii) BB raised the Advance/Investment-Deposit Ratio (ADR/IDR) by 2.0 percentage points, increasing ADR to 87 percent for the conventional banks, and IDR to 92 percent for the *Shariah*-based banks; (iii) private and public banks were instructed to provide a minimum level of banking services during the national shutdown to facilitate financial transactions for clients; and (iv) relaxation of foreign exchange regulations for trade and some specific non-trade transactions.

Gradual recovery from the COVID-19 pandemic is projected to start in the second quarter of FY21. Despite signs of disruptions in the domestic food supply chain, overall inflation is projected to remain broadly unchanged, owing partly to a bumper harvest in the agriculture sector. As Bangladesh has sufficient food reserves created from domestic agro-sector and has also foreign exchange reserves of above USD 32 billion to maintain adequate coverage at around 6 months of imports, Bangladesh hopes to withstand the large uncertainties relating to the duration of the pandemic and its impact on major sectors.

3.2.1 COVID-19 and a Summary of BB Directives

To revive economic activity of the country, to ensure continuation of job of the workers and to maintain the competitiveness of the entrepreneurs in the backdrop of possible economic impact of COVID-19 pandemic, Bangladesh Bank (BB) has issued various instructions for compliance by banks. A summary of related circulars/circular letters are furnished below:

3.2.1.1 Financial Stimulus Package Payment of Salary/Wages of the Export Oriented Industries[8]

Government has formed a fund of Tk. 5,000 crore (from Budget) as financial stimulus for payment of 3 months (April, May & June of 2020) wage & salary of workers of the active export oriented industrial concerns. Bangladesh Bank will not charge any profit/interest on the commercial banks for this fund. On the other hand, banks will realize one time service charge at 2 percent from the client.

[8] BRPD Circular 7 dated 02.04.2020 and BRPD Circular Letter 15 & 21 dated 11.04.2020 & 27.04.2020 respectively and FE Circular Letter 19 dated 03.05.2020.

Working Capital for the COVID-19 affected Industrial & Service Sector Clients[9]

Government has formed a fund of Tk. 30,000 crore to reduce the burden of profit/rent against working capital investment/loan from the COVID-19 affected industrial and service sector business enterprises (other than CMSME clients) by way of providing profit/interest subsidy. Under this package, bank will sanction special Working Capital (WC) limit [30% of existing WC limit (for existing client) and 30% of Estimated WC limit (for the clients who did not avail WC limit earlier)]. Rate of return against the WC will be 9 percent (Client: 4.50% + Govt. Subsidy: 4.50%).

Working Capital Refinancing Scheme for Industrial & Service Sector Business Enterprises (other than CMSME)[10]

Bangladesh Bank has formed a refinance scheme (Revolving) of Tk. 15,000 crore to provide refinancing facility to the bank to the extent of 50 percent of their investment/loan disbursement under the above-mentioned special WC limit. Rate of return of this fund is 4 percent to be charged by Bangladesh Bank on quarterly basis. Validity of the scheme is 3 years.

Special Loan/Investment Facility- SME[11]

Government has formed a fund of Tk. 20,000 crore to reduce the burden of profit/rent against working capital investment/loan from the COVID-19 affected Cottage, Micro, Small and Medium Enterprise (CMSME) clients by way of providing profit/interest subsidy. Rate of return will be 9 percent (Client: 4% + Govt. Subsidy: 5%). Validity of the package is 3 years for the banks and a single client will avail the facility for only one year (nonrenewable).

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[9] BRPD Circular 8 dated 12.04.2020, BRPD Circular Letter 22, 25, 30, 33 dated 03.05.20, 10.05.20, 11.06.2020 & 25.06.2020 respectively.
[10] BRPD Circular 10 dated 23.04.2020.
[11] SMESPD Circular 1 dated 13.04.2020 & Circular Letter 1,3 & 5 dated 30.04.2020 , 12.05.2020 & 22.06.2020 respectively.

Working Capital Refinancing Scheme for Cottage, Micro, Small and Medium Enterprise (CMSME) Clients[12]

Bangladesh Bank has formed a refinance scheme (revolving) of Tk. 10,000 crore to provide refinancing facility to the bank to the extent of 50 percent of their investment/loan disbursement under the above-mentioned special WC limit. Rate of return of this fund is 4 percent to be charged by Bangladesh Bank on quarterly basis. Validity of the scheme is 3 years.

Agricultural Loan/Investment on Additional Items at Concessional Rate in the Crop Sector[13]

As per existing Agricultural and Rural Credit Policy & Programme for 2019-20, banks are allowed to make investment/loan at concessional rate of return of 4 percent against import substitute crops (lentils, seed oil, spices & corn). This package will be effective from 01.04.2020 to 30.06.2021. Bank will make investment at 4 percent and claim for reimbursement of loss of investment return at 5 percent from BB against the adjusted deals.

3.2.1.2 Refinance Scheme

Pre-shipment Credit Refinance Scheme for the Export Oriented Industries[14]

Bangladesh Bank has formed a pre-shipment credit refinancing scheme fund of Tk. 5000 crore. Validity of the scheme is 3 years (revolving). Bank can avail the facility from BB at 3 percent and can invest at 6 percent (present rate of return is 7%).

Refinance Scheme for Agricultural Sector[15]

Bangladesh Bank has formed working capital refinance scheme of Tk. 5,000 crore for the agricultural/agro based sector (other than crops and including horticulture, fisheries, poultry, dairy firm, livestock) and for the entrepreneurs who purchase the agricultural product from the farmers and sell directly to the

[12] SMESPD Circular 2 dated 26.04.2020 & Circular Letter 2, dated 07.05.2020.
[13] ACD Circular 2 dated 27.04.2020.
[14] BRPD Circular 9, dated 13.04.2020 & SFD Circular 1, dated 22.04.2020.
[15] ACD Circular 1, dated 13.04.2020

market. Bangladesh Bank will provide fund at 1 percent and the bank will provide loan/investment at 4 percent and tenor of investment is 18 months.

Refinance Scheme for Low Income Professionals, Farmers and Marginal/Small Business Enterprises[16]

Bangladesh Bank has formed a refinance scheme (revolving) of Tk. 3,000 crore to support economic activity of low-income professionals, farmers and marginal/small business enterprises. Validity of the scheme is 3 years. Tenor of the investment/loan is 24 months including grace period (maximum 1 year). BB will provide the facility to commercial banks at 1 percent, commercial banks will provide the facility to MFI at 3.5 percent and MFI will provide the facility to their clients at 9 percent.

Reduction of RR of existing 3 Refinancing Schemes (Term & WC Investment) under SMESPD[17]

A few amendments applicable for existing "Small Enterprise Refinance Scheme", "Refinance Scheme for Setting up Agro Based Product Processing Industries in Rural Areas", & "Refinance Scheme for New Entrepreneurs in Cottage, Micro and Small Enterprise Sector" to support CMSME vide SMESPD Circular 2 dated 05.09.2019. Volume of the Schemes has been increased to Tk. 1500 crore, Tk. 1400 crore and Tk. 100 crore, respectively.

3.2.1.3 Foreign Exchange Policy Guidelines

Relaxation in Different FEX Trade Transactions – Time Extension Facility[18]

Authorized Dealers (AD) may allow exporters to extend the tenure up to 60 days, as additional time for realization of export proceeds and submission of bill of entry up to 180 days for usance period of back to back LCs and EDF loans.

Broadening Area of Bullet Repayment for Imports under Supplier's/ Buyer's Credit[19]

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[16] FID Circular 1, dated 20.04.2020
[17] SMESPD Circular letter 2 dated 07.05.2020
[18] FE Circular 13 & 19 dated 19.03.2020 and 12.04.2020.
[19] FE Circular letter 11 dated 12.04.2020.

To facilitate importers in minimizing COVID-19 pandemic related disruptions, it has been decided that bullet repayment will be permissible for other usance imports under supplier's/buyer's credit (instead of earlier specified import transactions).

Extension of Usance Period[20]

The ADs are allowed to extend the usance periods up to a maximum of 360 days to import industrial raw material, agricultural implements and chemical fertilizers and up to maximum of 180 days to import of life saving drugs depending on the actual needs of their concerned clients.

Reduction of Rate of Return of Bangladesh Bank EDF[21]

To facilitate export trade due to COVID-19 related disruptions, Rate of Return (RR) on EDF loans/investment to ADs will be charged by Bangladesh Bank at 1.00 percent per annum (earlier it was six-month USD LIBOR + 0.50%), while ADs will charge profit to manufacturer-exporters at 2.00 percent per annum.

Reducing LC Margin Requirement[22]

LC margin can be obtained maximum of 5 percent against import of opening LC of baby food to ensure price stabilization of the same in the market and to prevent probable supply crisis.

Increasing limit of foreign remittance[23]

Expatriate Bangladeshis can get 2 percent incentives without showing any paper on remittance up to BDT 5 Lac/USD 5000 (earlier USD 1,500) and for more than USD 5,000 papers need to be submitted by the beneficiary within 2 months (earlier 15 days).

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[20] FE Circular 16 & 17 dated 23.03.2020 & 24.03.2020 Respectively & FE Circular Letter 18 dated 26.04.20

[21] FE Circular 18 dated 07.04.2020

[22] BRPD Circular Letter: 12 dated 04.04.2020

[23] FE Circular Letter 20 dated 12.05.2020.

3.2.1.4 Policy Relaxation

Classification (CL) status of a borrower shall not be shown worse up to 30.09.2020 than it was as on 01.01.2020. However, improvement in CL status can be updated. During this period, no penal interest/additional fee (whichever the name is) cannot be charged[24]. More on that, payment of credit card bill to be paid on 15.03.2020 or onwards can be delayed up to 31.05.2020 without paying any additional charge/fee/penal interest/late payment fee[25].

Bangladesh Bank (Monetary Policy Department) has re-fixed the Cash Reserve Requirement (CRR) at 4.0 percent (earlier it was 5.50%) on bi-weekly average basis with a provision of minimum 3.5 percent (earlier it was 5%) on daily basis effective from April 15, 2020[26]. Besides, towards implementation of various financial stimulus packages declared by the Government, interest rate of BB REPO has been reduced from 5.75 percent to 5.25 percent per annum[27]. Furthermore, investment-deposit ratio (IDR)[28] of Islamic banks has been increased from 90 percent to 92 percent with effect from 15.04.2020 [For conventional bank, it has increased from 85% to 87%].

Submission of all regulatory statements related to BRPD, DOS & other departments of BB have been allowed up to 10th day of reopening of normal business activity of the banks[29]. Moreover, submission of audited financial statements of the banks has been allowed up to 30.06.2020[30].

Bank should transfer interest/profit earned/to be earned during 01 April 2020 to 31 May 2020 on the outstanding loan/investment of a client on 31.03.2020 to

[24] BRPD Circular no. 04 & 13 dated 19.03.2020 & 15.06.2020 respectively
[25] BRPD Circular Letter: 11 dated 04.04.2020
[26] MPD Circular 03 dated 09.04.2020.
[27] MPD Circular 04 dated 09.04.2020.
[28] DOS Circular 2 dated 12.04.2020.
[29] BRPD Circular letter 16 dated 11.04.2020 & DOS Circular Letter 12 dated 12.04.2020
[30] DOS Circular Letter 15 dated 27.04.2020.

non –interest/profit bearing blocked account and cannot transfer the amount into income account[31].

3.2.1.5 Other Policy Initiatives of BB

Bangladesh Bank has issued various circulars time to time regarding conduction of banking operation in limited scale for different locations and Govt. declared general holidays[32]. In addition, each bank will form a 'Central Quick Response Team' at head office comprising of Senior Executives & Zone level to take necessary decisions at the earliest in this changed situation[33]. All meeting of the Board of Directors/ Executive Committee/ Audit Committee/Risk Management Committee will be held virtually/through video conference[34]. On the eve of withdrawing lock down and gradual start of full phage banking operation, each bank will have to follow 13 instructions issued by DGHS under Ministry of Health[35].

Banks with capital adequacy ratio (CAR) (in relation to RWA) of 12.50 percent or above will be permitted to declare up to 30% dividend (of which cash dividend may be up to 15%); banks with CAR between (11.25-12.50) percent may declare dividend up to 15 percent (of which maximum cash dividend may be 7.5%); banks with CAR below 11.25 percent may declare dividend up to 10 percent (of which maximum cash dividend may be 5%). Cash dividend can be distributed before September 30, 2020 in favor of individual (local and foreign) investors[36].

The Govt. declared financial incentive[37] (to be given by concerned banks) for the officials and staffs working at bank-premises during the general holidays for COVID-19 pandemic valid upto 28.05.2020. Then the banker will receive

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[31] BRPD Circular 11 dated 03.05.2020 and BRPD Circular Letter 23 dated 04.05.20 & BRPD Circular 12 dated 10.06.2020.
[32] DOS Circular letter 13, 14, 18 & 20 dated 16.04.2020 and 23.04.2020 & 15.06.2020 respectively.
[33] BRPD Circular 05 dated 22.03.2020.
[34] BRPD Circular letter 9 & 26 dated 23.03.2020 & 17.05.2020.
[35] BRPD Circular letter 28 dated 17.05.2020.
[36] DOS Circular 3 dated 11.05.2020 & DOS Circular Letter no. 19 dated 07.06.2020.
[37] BRPD Circular Letter 17, 18 & 27, dated 12.04.2020; 15.04.2020 & 17.05.2020 respectively.

conveyance expenses for working during Government declared general holidays. Besides, special health insurance facility has been declared for the COVID-19 affected bank-employees/family of deceased employees.

Bangladesh Bank has launched special collateralized 360 days Repo. Participating banks can avail 85 percent of face value of Treasury bill and 95 percent of face value of Treasury bond. Interest rate will be fixed in the auction and base rate for auction will be the existing Repo rate (5.25%). This fund can only be used in implementing the financial stimulus package[38]. No late payment fee/additional charge can be imposed in case the depositors' failure to deposit monthly installment (for the month of April & May, 2020) of any deposit scheme[39]. The depositors have to deposit the overdue installment of April and May within June 20, 2020.

Government has decided to provide onetime cash assistance of Tk. 2500 directly to the mobile account of selected 50 lac distressed family from all over the Bangladesh through mobile financial services (MFS)[40]. Banks are advised to ensure expenses of the allocated fund from CSR in health sector and to provide essential medical equipment for the COVID-19 positive people and safety equipment for all the people related to providing health service[41].

3.3 COVID-19 Pandemic and Initiatives Taken by International Organizations for Banks

The Accounting Board (AAB) of the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) has issued a statement "Accounting Implications of the Impact of COVID-19 Pandemic". Moreover, AAOIFI Governance and Ethics Board (AGEB) has issued a separate statement titled "Application of AAOIFI governance, ethics and auditing standards in view of the impact of COVID-19 pandemic". In line with this, the Islamic Financial Services Board (IFSB) has given a statement on the situation related to the COVID-19 on

[38] DMD Circular 02 dated 13.05.2020
[39] BRPD Circular letter: 29 dated 01.06.2020.
[40] PSD Circular 04 dated 13.05.20.
[41] SFD Circular Letter 3, dated 16.06.20.

March 10, 2020[42]. The COVID-19 pandemic raises the prospect of a deep recession. Borrowers and businesses face job losses, slowed sales, and declining profits as the virus continues to spread around the world. Banking customers are likely to start seeking financial relief, and Bangladesh Bank is encouraging banks to help them. To cushion the economic blow, the authorities have deployed not only monetary and fiscal policies but also prudential regulation and supervision and other financial policies.

In many jurisdictions, governments and regulators have announced various types of payment moratoriums, deferments and suspensions. Some of them extended the contractual period of the transaction, without increasing the profit/return on the transaction whereas sometimes they suspended the payments for the time being, without increasing the contractual period of the transaction, and the total profit on the transaction remains the same. It is also found that they modified the contractual terms and conditions whereby the contractual period of the transaction is increased with increase in the profit/return (where acceptable in line with Shariah principles and rules). However, it is important to note that it may not be considered fair and equitable for participatory stakeholders, including unrestricted investment accountholders, if the institution suspends amortization of the deferred profit for the period of moratorium or recognizes an upfront loss.

In case of *Murabaha* and other deferred payment sales, the original transaction shall not be derecognized however; payment moratorium without increase in profit/return for established receivables (*Dains*) is permissible. It is not permissible to extend the date of payment of debt in exchange of additional payments in case of rescheduling, irrespective of whether the debtor is solvent or insolvent. Accordingly, there is no intrinsic right of increase in profit in such situation.

IFIs may offer payment moratorium without increase in rental for *Ijarah MBT* with increase in *Ijarah* term. Accordingly, the unrecognized *Ijarah* revenue shall be amortized on a systematic basis (in line with the relevant standard), and related depreciation shall be charged, over the extended *Ijarah* term. This will

[42] Subsequently, IFSB issued another statement addressing the implications of COVID-19 on aspects of Islamic banking and Islamic capital markets on July 08, 2020.

ensure just and equitable return to the participatory stakeholders. Besides, IFIS may also offer payment moratorium without increase in rental for *Ijarah MBT* and without increase in *Ijarah* term. More on that, they extend payment moratorium with increase in rental for *Ijarah* MBT with change in *Ijarah* term where clients are capable.

In all other transactions, whereby the payment moratorium is allowed (subject to mutual consent of parties and fulfillment of *Shariah* principles and rules, as confirmed by SSC of the institution), with or without additional returns/profits, the accounting treatment shall be in line with the requirement of relevant Standard.

Settlement of a transaction with execution of a new transaction can take different forms, whereby the first transaction is settled/completed earlier than the contractual settlement/completion date and a new transaction is executed which is a similar transaction e.g. a *Murabaha* or *Tawarruq* transaction being replaced with a new *Murabaha* or *Tawarruq* transaction, respectively with different terms and conditions – duly fulfilling the requirements of *Shariah* principles and rules, and meeting the de-recognition criterial as per relevant standard. Alternatively, altogether a different transaction e.g. a *Murabaha* transaction can be replaced with an *Ijarah MBT* transaction duly fulfilling the requirements of *Shariah* principles and rules.

Governments or regulators may offer *Qard Hasan* (interest-free loan) and zero-return Repos to the IFIs. Unlike conventional financial institutions, IFIs are not subject to credit risk on all their financing and investing transactions, and rather due to the specific nature of the transactions, several products (wholly, or at a given stage of the transaction) are subject to operational, market and equity-investment risks. In line with the requirements of FAS 30, an institution should ensure that the carrying value of non-monetary assets, including inventory, is not higher than the recoverable amount of such assets. Due to prevalent uncertainty, almost all asset classes may be affected, requiring extensive testing for potential impairment.

The Bank for International Settlements (BIS) recommended the local regulators to support the supply of credit to the economy by lighten capital and

other regulatory requirements and/or result in a less stringent supervisory stance. They also recommended to be flexible in loan classification criteria for prudential and accounting purposes to be complemented with sufficient disclosure on the criteria banks use to assess creditworthiness. The recommendation for banks to make full use of capital and liquidity buffers should go hand in hand with restrictions on dividends and bonuses and clarity concerning the process for rebuilding them and to follow the application of expected loss provisioning rules, combined with sensible transitional arrangements, may constitute a balanced approach to mitigating the unintended effects of the new accounting standards.

As community spread of the coronavirus (COVID-19) proliferates, alternatives to in-person banking and physical exchanges are looking more and more attractive. The World Health Organization (WHO) has advised people to use contactless payment and avoid handling banknotes as much as possible. That's because the coronavirus may continue to live on banknotes for days, accelerating spread of the disease. Of course, it's not just paper money that's increasingly being viewed and treated as a potential coronavirus carrier. Banks, consumers, and governments are weighing the risks of in-person banking, and opting for digital channels when they have the choice.

4. COVID-19 and Islamic Banks: Observations and Findings

4.1 COVID-19 and Steps Taken by Islamic Banks of Bangladesh

In response to the regulatory initiatives, both local and international, Islamic banking industry has taken some actions for tackling COVID-19 pandemic. As per direction of BB and others govt. agencies, and considering local environment, like conventional banks, Islamic banks have provided limited banking services during declared general holidays. The IFIs are rationing duties of officials for ensuring normal banking services. They allowed and requested customers for doing banking through nearby branches in the locked down areas. Banks are also extending 24/7 services from hotline customer care center on queries of customers along with broadening alternative delivery services for the customers. Some banks have reduced/waived charges/fees for different online services during COVID-19 period.

Under this pandemic, banks have tried their level best for ensuring timely receipt of remittance by the beneficiaries. Banks are also widening limits/ceilings for withdrawal and other facilities. In line with this, they are ensuring availabilities of cash and real time services at Automated Teller Machine (ATM) and Cash Recycler Machine (CRM). Sometimes banks are arranging off premises services for equated monthly installment (EMI) and other small deposits. Most of the banks are now arranging online meetings (Investment Committee, Management Committee, Executive Committee, Board etc.). Some banks are conducting webinar training/seminar for their officials and stakeholders. Generally, IFIs are providing personal protective equipment (PPE) and other protective instruments for the front desk and some other officials. Ensuring health safety for employees, sanitizing office premises and incoming customers, appointing doctors for offering tele medicine and other consultant services, arranging health support services for the affected employees/families, assisting suspected employees in getting testing & other lab facilities from selected medical center/hospitals and arranging ambulance services/oxygen cylinders for acute level patients are some mentionable initiatives taking by banks in the crisis. Banks are distributing health instruments/sanitization facilities/equipment to general people/ poor segments of the society as well. Moreover, they are providing cash and in kind assistance to the families of affected employees. Declaring health insurance for COVID affected employees together with payment of incentives to the officials attending physically in the offices are worthy of note.

Banks are providing financial assistance to agent banking outlets for continuing services. Furthermore, few banks have enhanced card limit for the employees. Installing disinfected machines at the office premises entry points, checking temperature of incoming people through thermal scanner, arranging hand washing outside the office premises for customers, arranging transport for the officials (disinfected) to avoid public transport and emergency communication media have been set up to support business operation are done by some banks in this epidemic situation.

4.2 *Shariah*-issues for Islamic Banks regarding Regulatory Initiatives

4.2.1 Extension of Repayment Period for Installment (Credit)

Islamic banks of Bangladesh are to extend the repayment time of huge number of customers` dues as per regulators' instructions. Conventional banks can extend maturity date of credit outstanding for clients affected from COVID. They can charge/realize additional interest against extended time. However, Islamic banks cannot charge any profit or re-fix their sale value of *Murabaha* goods against extending time for repayment of investments. This causes income mismatch of banks working in the same financial environment. It is noted that more than 70 percent investments are made by Islamic banks of Bangladesh under *Bai*-mechanism (Trading). Therefore, Islamic banking industry is facing problem in extending repayment time to the customers as per regulatory requirements.

4.2.2 No Separate Guidelines for Islamic Banks in Availing Stimulus Package

Stimulus package declared by the Govt. and guidelines issued from the Bangladesh Bank (BB) have not considered *Shariah* compliance in investment operations of Islamic Banks. A circular states 4.50 percent interest subsidy (for instance) which contradicts the principles of *Shariah* based banks. Because, Islamic banks add mark-up profit with cost of the goods at the time of execution of *Murabaha* deals which shown as clients' liability accordingly. But BRPD circular 8 dated April 12, 2020 clause 6(*kha*) states that interest subsidy, to be received from BB, shall not be shown in the liabilities of the clients. Though the entire profit charged be added to the liabilities if the same is not paid in time. Besides, the circular instructed the banks to claim the interest/profit (subsidy) quarterly (March, June, September & December) from Bangladesh Bank after realizing the client's potion of interest/profit. If the clients fail to pay the interest in time as per rule mentioned in the circular then the subsidy will not be given and the same will be charged on the clients as liability. These practices are not consistent with the *Shariah* principles of *Bai*-mode of financing. It is noted that conventional banks realize only interest amount quarterly to continue facilities against working capital finance while Islamic Banks realize principal plus profit (sale price) gradually or once within the due date. Islamic banks provide working capital facilities deal-wise against actual buying/selling or

financing need which is disbursed for specific period within the validity of the limit. Conventional banks allow single deal facility against Cash Credit (CC) pledge/hypothecation or Over Draft (OD) which are operationally different with Islamic mode of finance.

In this case, the Islamic banks may be given alternative option to charge full amount of mark up (say 9%) on the investment which will be shown as liability of the clients and rebate will be allowed equal to subsidized amount (if received) at the time of adjustment of the investment deal as per rule.

4.2.3 Availing Refinance Scheme

BB declared various refinancing facilities e.g. 50 percent in case of large investment & CMSME sector and 100 percent for other sectors. The modus operandi of availing refinance facilities is fully conventional and interest based. Under normal circumstances, Islamic banks can not avail such facilities due to *Shariah* issues such as, there is no *Shariah* permissible alternative for Islamic banks (like *Mudarabah*, *Wakalah* etc.) to avail refinance fund from Bangladesh Bank. Besides, the Islamic banks have to repay the dues with additional charge (interest/profit) on maturity weather the fund is realized by the banks from the customers or not. Even in some cases, 2 percent interest will be charged on the banks which is not consistent with the *Shariah* principles.

There can be separate guidelines for *Shariah* based banks modifying the contradicting/*Shariah* non-compliant issues. Some Islamic banks have already raised such issues before BB which can be addressed. However, *Shariah* Supervisory Committee (SSC) of some Islamic banks has temporarily consented to avail refinance considering urgency of present situations.

4.2.4 Blocking Interest and Waiver Thereof

Bangladesh Bank vide BRPD circular No. 11 dated May 03, 2020 advised banks for blocking all interest charged/accrued for April-May 2020 and not to realize the same from the clients. Later on vide BRPD circular No. 12 dated June 10, 2020 BB provided detailed guidelines for waiver of profit, realizing the un-waived amount from the clients and transferring the same to income of the bank. The modus operandi of profit waiver mostly does not match with the practice

of Islamic banks. More importantly, Islamic banks face problem in distributing profit to the *Mudarabah* depositors for these particular months who follows monthly basis Income Sharing Ratio (ISR) method for distributing profit.

4.2.5 Implementing Single Digit Profit of Investment and Penalty Interest Rate

Bangladesh Bank vide BRPD circular No. 03 dated February 24, 2020 fixed rate of return at 9 percent on all unclassified investment effective from April 01, 2020. Islamic banks cannot change the rate in *Murabahah* deals before maturity or adjustment by the clients. However, Islamic banks may, at their own discretion, offer any amount of rebate on the dues of customers at the time of recovery. Besides, the circular mentions 'penalty interest rate' which contradicts the *Shariah* principles. Besides, Islamic *Muamalat* encourages differential pricing based on the nature of the product, client and contract.

4.3 Challenges and Opportunities for the IB Industry in Bangladesh

4.3.1 Health Hazard of Bank Employees

Novel corona virus disease (COVID)-19 is very contagious and most of the countries have been affected. After COVID-19 positive cases being confirmed in Bangladesh, Govt. has declared lockdown all over the country along with general holidays. In this situation, most of the professionals were forced to stay home. However, doctors and other health workers have started fighting with the disease whereas bankers have started struggling for preventing meltdown of our economy. As Bangladesh economy is highly dependent on banking sector, bankers do not stay inactive even in the pandemic. Nonetheless, they do not get sufficient PPE for discharging their duties. Moreover, most of the private commercial banks do not declared specific COVID allowances for affected and/or deceased officials like doctors in the public hospitals. Bankers reported that, by this time, many employees have been affected by COVID-19 and some of them have already died. Corona virus reminded us the Islamic principle of cleanliness in daily life. As most the employees of Islamic banks are pious, they will be more careful about etiquette and cleanliness together with trusting in Allah's plan.

4.3.2 Salary Reduction of the Bank Employee and Lay-Off

In line with conventional banks, Islamic financial institutions are extending supports and cooperation for other business organ of the economy. They are providing financial assistance for working capital requirement including payment of wages and salaries of the business enterprises. However, owners and top-managements of the banking sector are planning for their cost reduction and lessening of salary/financial benefits of the employees has become the most targeted one to some banks. Senior managements argue that, as a member of the bank-family, everybody has to sacrifice in the crisis moment therefore; all of the employees should accept the cost deduction initiative. On the other hand, some of the employees argue that they are agents of the bank-authority and therefore, they would not bear the ownership related risk as per the *Shariah* principle. It is inconsistent that bank will cut-off financial benefits of the employees whereas Govt. employees are getting additional financial benefits (allowance) due to COVID. More on that, BB has instructed all banks to motivate their employees serving in the COVID-19 pandemic. Therefore, it is expected that no employee of an Islamic banks has to lose job because of the epidemic.

4.3.3 Obstacle in Regular Banking Operations

Due to COVID-19 pandemic, regular banking activities have been hampered severely. Proper appraisal of client and business, availability of information and its smooth flow, file processing and documentation of banking activities, sharing and discussion meeting etc. are not in regular manner. Evil persons, both employees and customers, may take this chance for materializing their bad intents. It is expected that the integrity/morality of the employees and customers of Islamic banks would be higher than that of average people of the society because of the system/environment. However, the bank would not get such competitive advantages if there was any deficient in pre-COVID stage in this respect.

4.3.4 Operating Expenses for Safety and Employee Allowances

Although revenues have been decreased but operating expenses of the banks have been increased. Because, a major part of the operating expenses is fixed,

which could not be skipped be the bank. Besides, about 6 percent of the total operating expenses have been incurred for health safety and COVID allowance (Appendix-II). This additional cost without additional revenue will adversely impact profit of the bank. However, banks with sufficient retained earnings may be in comfort zone for offering dividend among the shareholders. It is also noted that some other costs (e.g., cost for arranging physical meeting) have been reduced drastically. COVID teaches us to be cautious for maintaining sufficient internal capital (retained earnings) spontaneously instead of maintaining minimum capital as required by the regulators.

4.3.5 Status of Deposit

In the pandemic situation, overall economy has been adversely affected therefore, income level of the average people could be decreased, whereas withdrawal could be more and new deposit could be lesser. Moreover, disbursement would be increased due to stimulus package and lesser recovery of existing credit. Nonetheless, some of the Islamic banks are in deposit surplus position whereas some other banks are expecting more deposits. Therefore, overall market position of the deposit is satisfactory. In addition to this, deposit of Islamic banks may increase in the upcoming days due to positive change in the mindset of the general people as regard to religious prohibition of *Riba*.

4.3.6 Share of Profit for Livelihood of Depositors

Islamic banks collect most of the deposits under *Mudarabah* principles where depositors share profit or loss from investment of the deposited money whereas conventional banks collect deposit by making commitment of fixed return (interest). There are some regulatory directions for assisting borrowers/investment clients affected in the pandemic. However, a least attention has been given for depositors of Islamic banks. With the deferment of earnings or waiving thereof, investment income of the Islamic banks will be reduced and consequently, banks will not be able to pay profit to the depositors as per their expectation. Nonetheless, there are a large number of depositors whose livelihood depends on the earning from the deposit. Subsequently, Islamic banks may have to face displaced commercial risk. The problem became more acute for the months of April-May 2020 for the banks following Income Sharing Ratio (ISR)

method of profit calculation. Having profit equalization reserve (PER) and investment risk reserve (IRR) fund may act as cushion for Islamic banks in this epidemic. On the other side of the coin, it can be said that Islamic banks are much more comfortable in managing the cost of fund as compared to the conventional counterpart because of *Mudarabah* principle. COVID-19 reminds Islamic banks to aware the *Mudarabah* depositors about any pandemic situation where they may not be able to earn profit on deposit that will help manage the displaced commercial risk.

4.3.7 Recovery of Dues, Extending New Investment and Maintaining Asset Quality

As a result of COVID-19 pandemic, most of the business organizations have been adversely affected. Some of them are not capable to pay the existing debt and some of them are not creditworthy based on financial criteria for availing new fund. Furthermore, some solvent clients are taking advantages of general relaxation guided by the regulator. It is observed from the Appendix-III that most of the investments of Islamic banks are under trading mode and Islamic banks could not charge any extra for extended time. However, asset quality in the book will not be deteriorated because of regulatory easing. In this COVID-19 pandemic, an ideal Islamic bank have not to be much worried because every single fund disbursed by the bank had been converted in real asset, no fund had been diverted, transparency had been ensured in all respect, there was no adjustment of old deal by new one, and there was no hidden classified assets. Moreover, they had able to select ethical customer, there were partnership relationship with some customers and strong monitoring and supervision were there. However, they should properly address the going concern threat of the customers.

4.3.8 Selecting Priority Sectors for Investment

Islamic banking is derived and operated by divine regulations. *Maqasid-as-Shariah* have to be achieved through *Muamlat* in Islamic banking. Prioritization

of investment project and client based on need hierarchy[43] is expected to be followed by an Islamic bank. If it is not being ensured by the banking community, they will be suffered in this pandemic. Agriculture, health, CMSME etc. should get priority in the Islamic banking. Prevention of environmental degradation and ensuring ecological balance is a teaching of Islam. If banking industry follow this principle in their invest decisions, it is expected that Almighty Allah will protect human being from pandemic. Sometimes, it is being said that COVID-19 affected mankind adversely but others favorably.

4.3.9 Remittance Mobilization

Share of Islamic banks in remittance mobilization is about 35 percent. Because of COVID-19 pandemic, remittance flow in the upcoming days may reduce drastically if the pandemic continues for a longer period. As Islamic banking channel is highly recognized by the remitters, efforts should be continued for mobilizing remittance in the upcoming new-normal days. Even in this COVID-19 pandemic, share of IBs in remittance mobilization has been increased due to their services. Furthermore, it is uttered that there will be a positive change in the faith of human being. Therefore, there is a possibility of getting competitive advantages by the IFIs.

4.3.10 Implementation of Stimulus Packages

In the present context, Islamic banks are operating under dual system where conventional banks are dominating. Therefore, most of the packages have been designed considering interest-bearing concept. Nevertheless, Islamic banking sector should raise the issue collectively before the regulators for necessary amendment of the directive issued by the regulator. Furthermore, having some stimulus package in IFIs is a feature of Islamic economics. A fund for *Qard-e-Hasan*, *Zakah* and cash *Waqf* may be able to assist Islamic banks for supporting their customers who deserved it. The CSR (Corporate Social Responsibilities) is also inbuilt in Islamic finance which is utilized for the poor people. Giving

[43] (i) Basic Necessities (Daruriyyat): Food, clothing, shelter, etc.; (ii) Complementary Needs (Hajiyyat): Higher Education, Comfortable home, etc.; and (iii) Embellishment (Tahsiniyyat): Luxury Car, Jewelry, etc.

instructions to link charitable activities with the business, the Prophet (peace be upon him) said "mix some charity with trade". [44]

4.3.11 Governance, Supervision and Monitoring

On account of COVID-19, there is a great change in governance system of banks. There is no physical Board of Directors' or its committees' meetings on regular basis. There is no visit of high official in different regions of the banking network. Most of the meetings are being conducted through webinar. Off-site surveillance and monitoring is also getting importance in this pandemic. Most of the Islamic banks are not conducting on-site internal audit (IA) or *Shariah* audit. The banks who have already introduced audit-software, they are availing advantages of efficient and cost-effective internal/*Shariah* audit. The banks having strong management information system (MIS) are getting benefits of online supervision. This is an opportunity for the banking community to be familiar with virtual supervision and monitoring of the business activities.

4.3.12 Training and Development

Nature and approach of training has been changed due to COVID-19 pandemic. Bangladesh Institute of Bank Management (BIBM), and concerned Islamic banks are now offering webinar training programs for the bankers. In the virtual class room approach, training and development cost has been reduced radically. On the other hand, trainees are able to take part in the training alongside their desk work. Besides, travelling cost and time have also been saved because of online training. Now-a-days, trainers, trainees and concerned institutions are comfortable with ICT-based training. Along with others, International Monetary Fund (IMF) projected that the economy of the advanced and emerging economic countries will be boosted-up in 2021. Islamic banking sector should be prepared enough to cope with the new-normal business environment. All executives should be well-versed in FinTech and new products/services. Though, some of the banks have postponed all types of local and foreign training for reducing cost. However, it would be advisable that expenditure for training and development is not an expense rather it is a great investment for the coming days for combating with new-normal circumstances.

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[44] Jami at Tirmidhi, Book on Business, Hadith No. 1208

4.3.13 Use of ICT and Its Threat

For maintaining physical distance as safety measure, day-to-day banking operations, supervision and monitoring, surveillance, audit and follow-up etc. have dependent on ICT. For these purposes, it has become necessary to relax access in the system and allow remote operations and consequently, ICT risk has become a great threat for banks. As such type of pandemic is not predicted earlier, all banks are not equally ready to protect ICT risk. On the contrary, there is no way to be lagged behind in the name of preparation. Therefore, banking community should address the issue with top priority which is also highlighted by Habib (2020).

4.3.14 Conversion of Bank Who Got Approval Recently

Some conventional banks of our economy got permission of the central bank for full conversion into Islamic banks. They have started their preparation however; none of the banks has become able to complete the procedure due to COVID-19. Some of them have applied BB for time extension for their conversion. Nonetheless, there is no scope to be inactive or delay the conversion process rather they would set the target to grasp the new-normal opportunities. Same strategy may be followed by the conventional banks got new permission for Islamic branches/windows. It is deserved that existing Islamic banks will extend their whole-hearted support to the newly licensed banks which will increase market share of the industry bargaining power against their counterpart.

5. Conclusion

The novel corona virus disease (COVID-19) spread all over the world at this moment. Along with health, it has severely affected global economy, irrespective of advanced, developing and under developed economy. From worldly viewpoint it is believed that nature reacts if there is any substantial disparity in ecosystem created by mankind. On the other hand, Muslims do believe that everything is planned by Allah (SWT). Sometimes He tests the believers for giving a great reward, signals as warning the mankind, gives a smaller pain for forgiveness of sins, or punishes for wrong doing in this life as part of the hereafter. In the Holly Quran, Almighty Allah says,

"And We will surely test you with something of fear and hunger, and a loss of wealth and lives, and fruits, but give good tidings to the patient" (Surah Al-Baqarah: 2/155).

"And We will surely let them taste the nearer punishment short of the greater punishment that perhaps they will repent." (Surah As-Sajdah: 32/21).

"Corruption has appeared throughout the land and sea by [reason of] what the hands of people have earned so He may let them taste part of [the consequence of] what they have done that perhaps they will return [to righteousness]" (Surah Ar-Rum: 30/41).

"Then why, when Our punishment came to them, did they not humble themselves? But their hearts become hardened, and Satan made attractive to them that which they were doing" (Surah Al-An'am: 6/43).

"…And We sent to no city a prophet except that We seized its people with poverty and hardship that they might humble themselves (to Allah)…And if only the people of the cities had believed and feared Allah, We would have opened upon them blessings from the heaven and the earth" (Surah Al-A'raf: 7/94&96).

"…And never give up hope of Allah's mercy. Certainly no one despairs of Allah's mercy, except the people who disbelieve" (Sura Yousuf: 12/87).

Consider the lesion of the above verses, Muslims may consider COVID-19 as a test for mankind and the true believers will be rewarded if they react accordingly. Believing in Allah, we have to try our level best overcome the economic meltdown for the pandemic. We should not be panicked and frustrated, we must hope for Allah's mercy. Maintaining ethical standards in every sphere of our life including banking operations is important.

Normal that was at pre-COVID era will never come back in the mind, behavior and thinking of individuals and business entities. We have to prepare ourselves to accept the new-normal business environment. Corona virus is fueling the movement towards digital banking. Banks should anticipate this shift towards digital banking and taking relevant measures. To alleviate banking customers' fears with digital transactions, bank may provide real-time guidance. It is very possible that customers no longer have to pay a potentially stress for a physical visit of a branch to complete any transaction, either in asset or liability side.

Based on the prediction of different authorities, it is assumed that economy in the post-COVID will be very vibrant and aggressive. They will win in the race who will take prudent and timely decisions. Re-shaping and re-designing banking

products and process, widening and safeguarding ICT infrastructure, retaining and equipping human resources, maintaining and intimating customer relationship, and most importantly be patience might be crucial in this regard. Extensive research for developing new product to respond COVID-19 pandemic is inevitable.

As IB is based on divine guidance of Allah (SWT), it must be superior to the man-made system. However, we the Muslims have to take the challenge to prove superiority and risk resilient of this system to others. If the system fails in combating COVID-19, it is not a fault of the system rather it is a failure of the individuals working behind the system. The banks which are *Shariah*-compliant in operational level, in true sense, will be leader at the post-COVID situation, In Sha Alllah. Moreover, a great change may be observed in belief and practice of individuals after the pandemic which might be a great opportunity for Islamic banking industry of Bangladesh and globe as well. Islamic banks cannot be silent spectators in this critical time of the nation rather this is the best time to stand by the COVID affected people.

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Appendices

Appendix-I: Islamic Banking Activities in Bangladesh, January -March 2020

(Taka in Million)

	March 2020#	December 2019#	March 2019#	Changes		% Changes	
	Quarter	Quarter	Quarter	Quarterly	Annual	Quarterly	Annual
Total Deposits* (Outstanding)	2846113.83	2802278.03	2421188.01	43835.81	424925.83	1.56	17.55
a) Full-fledged Islamic Banks	2673407.48	2637564.36	2273818.49	35843.11	399588.99	1.36	17.57
b) Conventional banks having Islamic banking branches	88488.19	87375.92	82209.38	1112.27	6278.81	1.27	7.64
c) Islamic banking windows	84218.16	77337.74	65160.14	6880.42	19058.03	8.90	18.69
Total Investments* (Outstanding)	2673089.42	2627519.94	2372792.00	45569.48	300297.42	1.73	10.74
a) Full-fledged Islamic Banks	2544223.51	2498847.08	2247931.66	45376.43	296291.85	1.82	11.16
b) Conventional banks having Islamic banking branches	73642.96	74938.57	70914.28	-1295.61	2728.68	-1.73	5.67
c) Islamic banking windows	55222.95	53734.29	53946.06	1488.66	1276.89	2.77	0.00
Investment/Deposit Ratio	0.94	0.94	0.98	0.00	-0.04	0.17	-4.16
a) Full-fledged Islamic Banks	0.95	0.95	0.99	0.00	-0.04	0.18	-3.74
b) Conventional banks having Islamic banking branches	0.83	0.86	0.86	-0.03	-0.03	-3.23	-3.52
c) Islamic banking windows	0.66	0.69	0.83	-0.03	-0.17	-5.04	-20.86
Total Remittances	100593.19	146324.97	83377.46	-45731.77	17215.74	-31.25	20.65
a) Full-fledged Islamic Banks	100083.91	145649.97	82907.30	-45566.07	17176.61	-31.28	20.72
b) Conventional banks having Islamic banking branches	321.00	476.12	377.06	-155.12	-56.06	-32.58	-14.87
c) Islamic banking windows	188.28	198.87	93.10	-10.59	95.18	-5.32	102.24
Total Branches	1428	1380	1252	48	176	3.48	14.06
a) Full-fledged Islamic Banks	1274	1273	1198				
b) Conventional banks having Islamic banking branches	19	19	19				
c) Islamic banking windows	135	88	35				
Total Manpower	36372	35906	34128	466	2244	1.30	6.58
a) Full-fledged Islamic Banks	35530	35145	33540	385	1990	1.10	5.93
b) Conventional banks having Islamic banking branches	361	351	387	10	-26	2.85	-6.72
c) Islamic banking windows	481	410	201	71	280	17.32	139.30

Source: Bangladesh Bank
Note: * Excluding Inter-Bank Items # Provisional

Appendix-II: Status of Islamic Banking Industry in COVID-19 Pandemic

Based on provisional data & perception				
Particulars	Status as on March 31, 2020 as % that of 2019	Status as on June 25, 2020 as % that of 2019	Status as on June 25, 2020 as % of 1% Target of 2020	Comment
Total Amount of Deposits	114%	107%	91%	Some new deposits have been collected but not as per target.
Total Profit Paid to Depositors	112%	85%	73%	Because of *Mudarabah* principle, lesser amount of profit has been considering income.
Total No. of Deposit A/c	112%	110%	95%	Some new a/c have been opened but not as per target.
Total Amount of Investments	111%	103%	96%	Due to stimulus package, some new investment have been disbursed.
Total Amount of Investment Income	108%	85%	68%	Due to BB guidelines, business depression, *Murabaha* principle, income has been decreased.
Total No. of Investment A/c	103%	95%	95%	Existing customer availed some additional facilities but not new.
Total Amount of Remittance	117%	82%	74%	A large no. of wage-earners have returned back in Bangladesh some other lost jobs.
Total Operating Income including commission, charges etc.	97%	71%	64%	Both funded and non-funded income have been decreased.
Total Operating Expenses	110%	93%	85%	As most of the expenses are fixed in nature and additional allowances for COVID-19.
Total Amount of Operating Profit	97%	60%	52%	More decrease in income as compare to expenses.

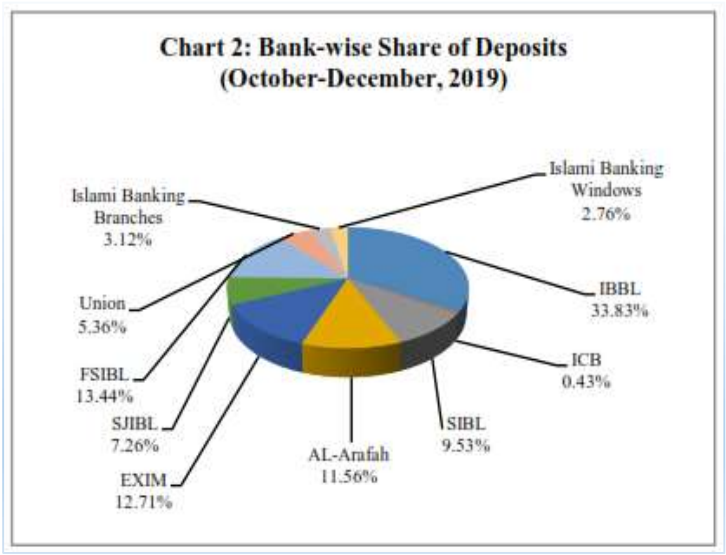
Based on provisional data & perception				
Particulars	Status as on Dec. 31, 2019	Status as on March 31, 2020	Status as on June 25, 2020	Comment
Investment-Deposit Ratio	88.44%	89.35%	90.06%	Because of BB relaxation.
Classified Investments	Unchanged			Because of BB instructions.
Total COVID-19 Allowance Paid to Employees and Expenses Incurred for Safety Measures as % of operating expenses	N/A	N/A	6%	Due of BB instructions for COVID-19 allowances and other safety measures
No. of new branches Opened as % of approved No. of Branches	N/A	N/A	0%	Generally, new branches opening start from the 2nd quarter

Source: Survey data

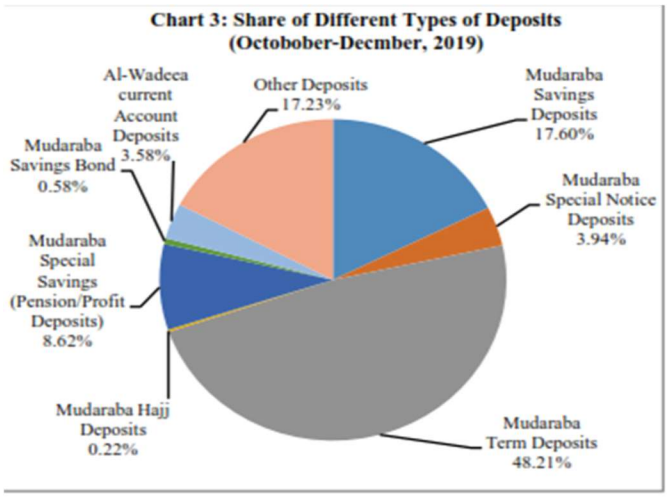
Appendix-III

Status of Shariah-Based Contract

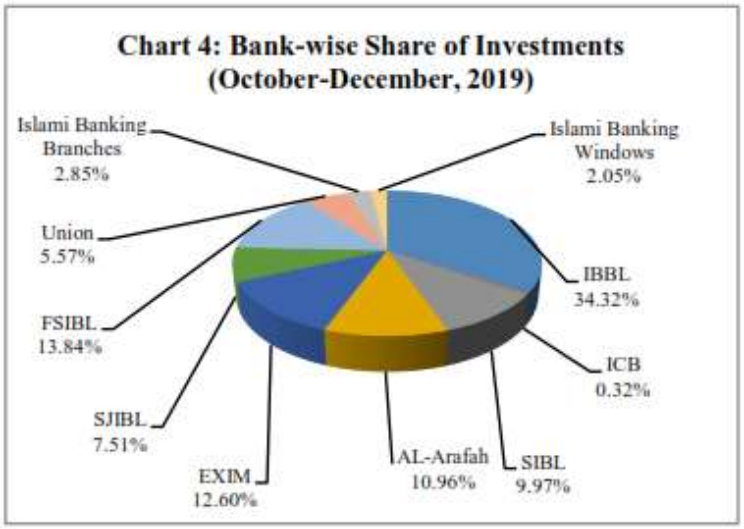
Bank-wise Deposit



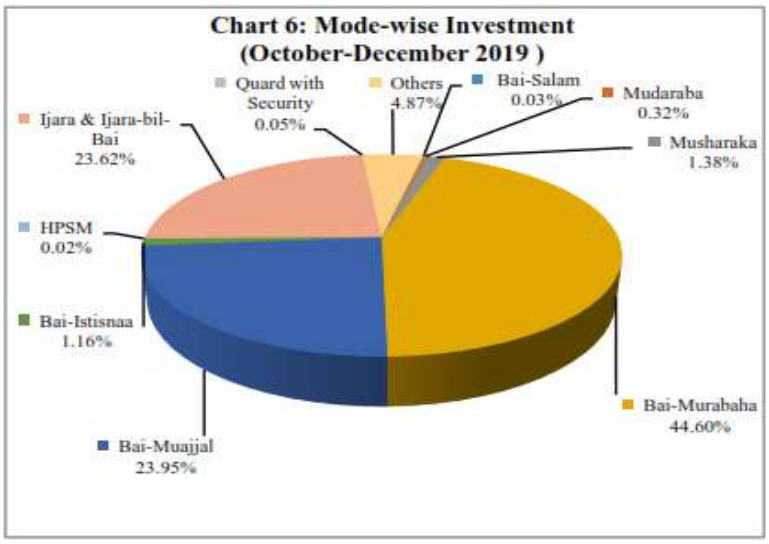
Mode-wise Deposit



Bank-wise Investment



Mode-wise Investment



Source: Quarterly Report on Developments of Islamic Banks, BB, December 2019

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JEL Classification/ Code: At least One (01)

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2. Literature Review
3. Objectives and Hypotheses
4. Methodological Issues Involved
5. Findings and Analysis
6. Policy Implications
7. Conclusion

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Acknowledgement (If Required)

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