

Transmission Mechanism of Monetary Policy: The Effect on Bank Competition

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Registration No: 150 (Session: 2015-2016)

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DECLARATION

I do hereby declare that this Ph.D. dissertation is based on my original work except quotations and citations which have been duly acknowledged. I also declare that it has not been previously or currently submitted for any other degree at any other institutions.


22.1.26
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LETTER OF TRANSMITTAL

January 22, 2026

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Subject: Submission of Thesis paper for the degree of Ph.D. titled “Transmission Mechanism of Monetary Policy: The Effect on Bank Competition”.

Dear Ma’am,

Please find the enclosed Thesis Paper titled “Transmission Mechanism of Monetary Policy: The Effect on Bank Competition” as the final requirement for the degree of Doctor of Philosophy under the University of Dhaka, Dhaka, Bangladesh.

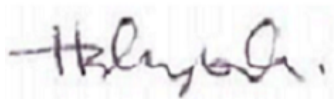
May I further state that I am at your disposal for any further correction or guidance.

Sincerely yours,


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CERTIFICATE

This is to certify that the dissertation titled “Transmission Mechanism of Monetary Policy: The Effect on Bank Competition” has been prepared by Sultana Shahida Abedin, under my supervision. This dissertation is the independent work of the researcher. I believe, this work fulfils the requirements of Ph.D. thesis. Therefore, I recommend that Sultana Shahida Abedin to be awarded the degree of Doctor of Philosophy.



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Executive Summary

The changes in monetary policy affects the channel of bank lending directly as by the change of interest rate banks are given the signal of lowering the flow of loanable funds to the prospective borrowers if the interest rate is set higher by the policy makers. Some recent studies have confirmed that in the economy where banks are competitive with each other, the lending channel has comparatively minor adversity by the interest rate change.

The primary objective of this study is to find out the effect of the change of monetary policy on banks when they are competitive among themselves. To obtain this objective, the measures of bank competition would be calculated and then they would be tested via empirical model to find out the effect interest rate change on banks when they are in a competitive situation. Finally, there will be comparative analysis between Western and Eastern regions' banks.

In this study, 10 countries were selected, a mix of developed and developing, to see whether the banks are competitive or monopolistic and finally how the demand for loanable funds gets affected by the monetary policy change. To measure the competition Panzar- Rosse H statistics were calculated and the bank level data are collected from Bankscope. To analyze the impression of competition on bank lending channel the empirical model of Ehrmann et al (2003) was adopted, which is been followed by many other studies as well. As the data covered the global financial crisis era, to check whether the banks' competition could have the same impact on bank loan supply through and afterwards the catastrophe, the samples were divided into two groups – during and after the crisis, and the model was tested again.

Interestingly the countries where there is monopolistic competition show less sensitivity compared to those which have no competition among themselves for interest rate change. It was observed that, during global financial crisis, bank competition cannot perform strongly to

combat the policy rate changes by ensuring their loanable funds' demand to be fulfilled smoothly and banks of eastern region needed more time to heal even after the crisis period.

The study overall proves that the monetary transmission mechanism gets weaker when the banks are competitive in a country and suggests the policy makers to come up with some alternatives to preserve the true intention of Monetary Policy Change.

Table of Contents

Chapter 1: Introduction	1-15
1.0 Background of the Study	2-12
1.1 Objectives of the Study	13
1.2 Significance of the Study	13
1.3 Limitations of the Study	14
1.4 Structure of the Study	15
Chapter 2: Literature Review and Context of the Study	16-54
2.0 Introduction	17
2.1 Theoretical Framework	18
2.2 Literature Review	32
2.2.1 Bank Competition	34
2.2.2 Bank Competition and Bank Lending Channel	40
2.3 Research Gap	45
2.4 Context of the Study: Banking Industry in the Selected Countries	46
2.5 Conclusion	54
Chapter 3: Methodology	55-66
3.0 Introduction	56
3.1 Research Design	56
3.2 Data Collection	57
3.3 Data Analysis	58
3.3.1 Revenue Equation	61
3.3.2 Empirical Model	62

3.3.3 Expected Relationship of Variables with Loan Growth	64
3.4 Conclusion	66
Chapter 4: Data Analysis and Findings	67-85
4.0 Introduction	68
4.1 Descriptive Statistics	68
4.2 Major Findings	72
4.2.1 Measuring the bank competition	72
4.2.2 Results of the Empirical Model	73
4.3.2 Other Findings	81
4.3.2.1 Financial Crisis and Its Impact on Banking Competition	81
4.3.2.2 Robustness Check	83
4.4 Conclusion	85
Chapter 5: Recommendation and Conclusion	86-92
5.0 Introduction	87
5.1 Recommendations	88
5.2 Future Research Directions	90
5.3 Conclusion	91
References	93-97

List of Tables

Table 3.1 : List of Countries	56
Table 3.2 : Variable Names and Expected Relationship with Loan Growth	65
Table 4.1 : Descriptive Statistics of Eastern Region	69
Table 4.2 : Descriptive Statistics of Western Region	71
Table 4.3: Bank Competition Measures	72
Table 4.4: Estimation Results of Loan Growth Equation for Western Region	76
Table 4.5: Estimation Results of Loan Growth Equation for Eastern Region	77
Table 4.6: Estimated Results of During and After the Crisis	81
Table 4.7: Robustness Check – Alternative Measure of Competition	84

List of Figures

Figure 1.1: Classification of Monetary Mechanism Channels	11
Figure 2.1: Effect of Interest Rate Change	23
Figure 2.2: Flowchart of Expansionary Policy	26

Chapter 1: Introduction

1.0 Background of the Study

An effective and proper Monetary Policy in any economic system is desirable not only by Bankers or Businessmen, but also by general people. It is also required to stabilise the economic condition in a country. To claim for a good sustainable Monetary Policy, one has to consider few things. A healthy Monetary Policy will ensure sufficient supply of cash in the country along with keeping the interest rate feasible and making enough job opportunities to address unemployment. To ensure such desirable situation, Central Bank in a country plays vital role for ensuring a rational system. It is understood that without proper distribution of money, sustainable growth cannot be achieved in the society. Thereafter, Monetary Policy may be defined as or synonymous of Economic Policy. The purpose of this policy is to manage the growth of economy by managing supply of money in the country in accordance with the requirement of the size of the market.

Because of obligation and market size, now a days, plenty of numbers of Banks are available in countries to conduct business and meet up people's requirement. These Banks are in great competition with each other for capturing clients and making profit bigger than the previous years. This competitive culture of Banks has a significant effect on the introduction of various changes in the Monetary Policy. Researcher from various corners, Regulators of different countries along with different policy makers, writers in different economies also hold the view that Monetary Policy cannot ignore the practices of Banks doing individual business and thus, such Policy gets written or dominated by taking into consideration of such competitiveness.

Market power also plays an important role towards the business of respective Banks. It is agreed by the researcher and policy makers that Banks get appropriate incentive through respective market power which also guide them for careful behaviour towards the customers and economy. Since many years, it has been argued that change in Monetary Policy may not have noteworthy consequences on the economy where Banks are in high competition with each other. It has been the belief that such competitiveness in banking industries may have less impact of the change introduced by Monetary Policy. However, this view is under severe challenges by various scholars, researcher in recent years. This has also been challenged under several studies both theoretical and empirical in nature which has opened a new area for discussion.

As said earlier, market power plays an important role to the sensitivity of lending through Banks. Therefore, High market power allows Banks to cast charges in accordance to their necessity, thus, grabbing a great amount of profit from the market. This is significant and these banks are sensitive to change of interest as they want to conduct safe business and such practice also gives investors a safe channel for investments. While we speak about the competitiveness of Banks with each other, if, the Banks are in practice of fair competition, they might have less adverse effect by Monetary Policy change.

The aim of a healthy economy of a country is to make people's lives better by steadying and keeping the inflation low. By introducing various methods and measures, countries try to control the inflation to keep it as low as possible. In this regard, Central Banks of different countries play vital role. It might be a bit negative to observe that in a market-oriented economy, the direct control of Central Bank over inflation may lose its monopolistic power.

It has to introduce few mechanisms to try to control such inflation e.g., managing the rate of interests etc. Sometimes, without going for a stable and permanent solution, some Central Banks use temporary way out e.g., using growth of money or rate of exchange as a mechanism etc.

The simple definition of Monetary Policy may be termed as it is such a policy which controls the inflation for the betterment of the society along with keeping the rate of interest reasonable and reachable. It also confirms less unemployment in the Country. Central Bank in Country has to inscribe such policy for economic growth and avoidance of any disaster or surprise. It can be defined from another perspective i.e.; monetary policy standardizes and control the supply of money into the economy and also controls how much money should be available in any economy.

Under a broader definition, monetary policy can be defined as a system run by some collective principles/segments in an economy. These principles are the main component of such policy which any Central Bank in an economy use to try to control and shape up. This method of controlling by way of shaping up such tools are not negative rather; the Central Bank use its control mechanism for everyone's comfort. Though, when a policy is introduced in an economy, some may argue negatively while some argues in favour of the policy. The main point here is to bring a rational and stable position in the economy where every sector of a society can survives. Typically, Central Banks use monetary policy for various purposes e.g., making the interest rate reasonable for all corners, controlling the inclusions and supply of money in the society from known/unknown sources, changing reserve requirement of Bank etc. To execute a good monetary policy, Central Banks of different countries often introduce various strategies for the purpose of promoting a healthy growth in the economy. So, based on the above discussion, we may summarize some key points regarding Monetary Policy as below:

1. Monetary Policy is a set of rules, the purpose of which are to check and keep it under control for the supply of money in an economy and by this way, to achieve a healthy economic growth for any particular country;
2. Revision of rate of interest along with change in the requirements of bank reserve are to be treated the two most important strategies of Monetary Policy;
3. Classifications of monetary policy may be of various types. But the most types of classification may be termed as Expansionary Monetary Policy or Contractionary Monetary Policy;
4. Some mechanisms are available which can be used as specific techniques of Monetary Policy that control the economy in a country. These techniques or tools are very important for execution by Central Bank because of making a balance between the total demands and spending in an evolving economy. We may state these tools as follows:
 - Open market operation.
 - Altering the bank rate.
 - Fluctuating the cash reserve ratio.
 - Taking the responsibility of selective credit controls.

It is mentionable here at this point those strategies of monetary policy may also get influenced by some other factors like statistics of economics etc.

There are other mechanisms which are used by central bank. For example, central bank may buy government bonds and sell the same to strengthen its financial control on the economy along with confirming income of the government which in return help them to get appropriate back up from the executive body i.e., Government. In the present world with the booming of business among the countries, foreign money e.g., dollars etc. have become so powerful that it has become mandatory to address the exchange rate of foreign money. By addressing such

exchange rate, Central Bank tries to ensure the balance between foreign money and local currency. Additionally, it also fixes up the required reserves that has to be kept by Banks which also helps them to control the money market so that depositors' investment be kept safely with Banks.

Types of Monetary Policy

The Central Bank of any country is obliged to execute an effective Monetary Policy for the betterment of the economy. A good and goal oriented monetary policy may be expected by every corner of the society for which, Central Bank has to be rational and result oriented. As stated earlier this policy may be divided (upon commonly accepted) into 2 types e.g., Expansionary Monetary Policy and Contractionary Monetary Policy.

Expansionary Monetary Policy

In simple term, the definition of Expansionary Monetary Policy is very synonymous with its heading. The main area of focus of this policy is to make expansion of supply of money in the society. In other order, it is that kind of monetary policy which take every initiative by which supply of money is get increased in the economy. Thus, people have money in their hand for spending in different categories. Because of this nature, specialist also calls this policy in another name, which is termed as 'Easy Monetary Policy'.

This type of monetary policy works interestingly by keeping the interest rate lower in the market and economy. When interest rate gets low, people start to have money in their hand. In this way, the availability of money in the economy is also get increased making the supply of money sufficient. We can also term it as market liquidity gets increased. This is important

with regard to the increment of economic activity in the society. Generally, where the market liquidity gets higher, the same attracts and encourages more economical activity in the society by different segments e.g., businessmen, general people, officials etc.

There are some steps which a Central Bank may (based on the circumstances of individual economy) take for example:

- a. By making decrease in the rate of interest rate like Repurchase Rate, Reverse Repo, MSF, Bank Rate etc.
- b. By making decrease in the Reserve Ratios like Cash Reserve Ratio (CRR) and Statutory Liquidity Ratio (SLR)
- c. To make sure that ample of liquid is available in the market/economy, this type of monetary policy suggests/allows for buying governmental securities in a large quantity which can be termed as a part of practising OMO i.e., Open Market Operations.

So, we have seen how Expansionary Monetary Policy tries to work in an economy by keeping a lower rate of interests and also by buying government security to make sure ample of flow of money in the economy.

Contractionary Monetary Policy

Contractionary Monetary Policy is just opposite of one the main aims of expansionary monetary policy. Wherein the former monetary policy ensures sufficient supply of money in the economy, contractionary monetary policy is basically aims on the contraction (decreasing) the flow of liquid fund in the market. In other words, it may be defined as Tight Monetary Policy.

Contractionary monetary policy significantly increases the key rate of interests in the economy. When the interest rate is increased, market liquidity gets reduced. This means the supply of money gets decreased which has an inverse impact on the economy. Economic activities in the society get limited which in turn, affect production and consumption behaviour of general people. Such less activity may have an undesirable impact on the growth of overall economy.

Based on the nature of individual economy and requirement, Central Bank of any country take some measures to implement Contractionary Monetary Police. Some of these are:

- a. This policy ensures increase in the rate of interest (policy rate) like Repo, Reverse Repo, MSF, Bank Rate etc.
- b. It sets effective steps to make sure that Reserve Ratios get increased like Cash Reserve Ratio (CRR) and Statutory Liquidity Ratio (SLR).

So, this policy ensures that there is less liquidity in the economy. To make this happen, contractionary monetary policy works in such method, so that government securities can be sold from market which is an inevitable part of Open Market Operations (OMO). By this method, the policy enables to take out cash from the market making liquidity available in a limited size.

It is observed that Contractionary Monetary Policy works in the opposite of Expansionary Monetary Policy. It works in such a way for which the interest rate gets increased and by this way, this policy ensures less availability of currency in the market. This limitation of liquidity not only create less opportunity in production, but also change behaviour of people for example, in terms of consumption of products and services also get affected significantly.

Monetary Policy vs. Fiscal Policy

Monetary Policy is endorsed by a central bank to endure a level economy and ensuring lower unemployment rate, guards the worth of the money, and preserve economic evolution. So, depending on the market condition, the policy makers try their best to evaluate the demand and supply of money from a periodic basis and change the policy rates according to the necessity. Manipulation of interest rates or reserve requirements, or participating actively in open market operations are some common measures taken by a central bank to effect borrowing, spending, and savings rates.

On the other hand, Fiscal Policy is a supplementary tool used by governments and not central banks. This policy ensures the use of government earnings and expenditure to influence the fiscal activities. While the Central Reserve can stimulus the flow of fund in the economy, the Government's Treasury Department can generate new money and impose new tax policies. It increases the supply of money, directly or indirectly, into the economy to upsurge spending and spur growth through business and household activities. By changing the composition of taxation and selecting sectors of government spending can influence the macroeconomic variables, including –

- Aggregate demand and sources of economic activities
- Saving and investment both for business and households
- Distribution of earnings or revising the income level
- Allocation of resources equally for short term and long term.

So, the major distinction between monetary and fiscal policy is that the latter is often taken control of by a designated government department to deal with imposing and collecting taxes on earnings from different sectors of the country and the spending of that money for various segments of the government; while on the contrary, monetary policy focuses on the interest

rate change to ensure the balance of flow in the market and often administered by the Central bank of a country.

Monetary policy employs different techniques which would be used by central bankers to maintain a nation's economy stable while restraining inflation and unemployment. Expansionary monetary policy stimulates an ebbing economy and contractionary monetary policy is adopted to slow down an inflationary economy. A country's monetary policy is often synchronized with its fiscal policy and both policies are adopted to ensure the economic performance of the country.

Monetary Transmission Mechanism

Monetary transmission mechanism is the consequence of changing the policy from the existing one which affects the overall economy through multiple channels. To implement such decision, the authority may use different tools such as- change in interest rates, money supply of change in reserve requirements. Bank lending activities are directly affected by such mechanism.

Channels of Transmission Mechanism

The channels of monetary transmission mechanism can be divided into - Neo classical and Non-neo classical points of views.

Under neo classical theory there is no asymmetric information and due to this reason, the financial market is perfect. So, with the change in monetary policy, there will be a direct consequence on channels based on consumption, international trade and lastly investment. On the other hand, non-neo classical theory describes under information asymmetry and imperfection in the market when the monetary policy is reformed, there will be effect on i) banks' lending and capital channels, under monetary policy tightening, there would be less

loan disbursement due to higher lending rates; and on ii) firms' balance sheet; for example, it will be obligatory by the firms to pay higher interest while contractionary monetary policy is imposed.

The following flowchart glimpse the categories of both classical and non – neo classical channels of monetary policy transmission mechanism. These are elaborately described in the literature review section.

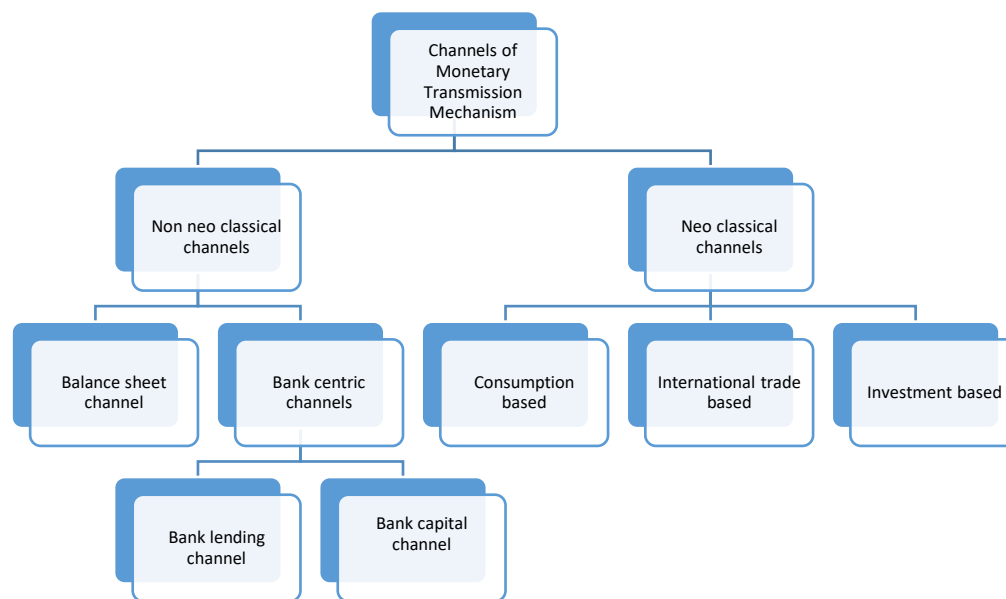


Figure 1.1: Classification of Monetary Mechanism Channels

Competition of Banks and the Monetary Policy Transmission Mechanism

The policy taken to ensure the supply of monetary fund to incline by reducing the market interest charges is known as expansionary monetary policy. This policy is introduced to rise the aggregate demand of loanable fund in the market and to create various investment opportunities. Thus eventually, the expansionary monetary policy boosts aggregate output of an economy ensuring favorable condition for both firms and households

Alternatively, under the tight monetary policy, as the central bank rises the interest rate, demand for loanable fund drops, making a shrink in the investment opportunities and

ultimately triggering the slowdown of an economy that eventually declines the aggregate output.

When contractionary monetary policy is adopted, the bank lending channel gets directly affected this policy and has no other option but to reduce the loan supply. To control the excess money flow in the market the authority imposes some restrictions through the contractionary monetary and it is necessary to maintain the sustainability of the economic condition. But the toll is often paid by the financial institutions, which, main source of income is the earnings from interest. Although increase interest means higher income, but the demand of loan gets soared due to the higher interest charges. From the demand side, the people who have no collateral or cannot cope with the higher charges if they take the loan, will automatically wiped out from the loan market. Banks with low capital or lower establishment would find it difficult to run their business.

On the other hand, in the financial industry where financial institutions have a higher degree of competition, may seem to be more prepared to face any challenges rising from economic or political conditions. Developed countries also have financial freedom which plays a vital role for their banking industries to stand still in any type of adverse situation. Developed or developing, the countries which have a stronger competition among banks would face the adversity of monetary tightening more efficiently compared to the banks of those countries where there is less competition among the banks.

In recent studies is been found that the intensity of banks competing with each other can impact the monetary policy' efficacy if their level of competition is higher.

1.1 Objectives of the Study

The general objective of the study is to see the effect of transmission mechanism of monetary policy on bank lending channel when there is competition among banks for both Eastern and Western region.

To obtain the objective, the specific tasks that are to be performed in the research are-

- To calculate the banking competition in each of the selected countries of Eastern and Western regions and define the type of competition they have.
- To identify the effect of banking competition on the bank lending channel by using the measure of bank competition in the empirical model along with macroeconomic and bank specific variables.
- To make the comparative analysis of the effect of monetary policy changes on competitive banks for both the regions.

1.2 Significance of the Study

The increased competition among banks has lessen the information asymmetries about the borrowers and had made banks to face the monetary policy change from a different perspective. According to Disyatat (2011), a passably capitalised environment of financial institutions can constantly fulfil the demand side of loanable funds if it desires to, as under fiat money standard and liberalized financial system, there is no exogenous restraint on the supply of credit except through governing capital necessities.

When there is an incline in banking competition in an economy, it may have any of the two impacts- the monetary transmission mechanism becomes weaker or the competition does have no significant effect on the mechanism.

There are notable researches to find out banking competition but to address the effect of this competition on monetary policy mechanism which can ultimately make the policy makers think for alternatives of controlling the supply and demand of money in the market are still to be explored. Specially in the eastern countries, if the banks can buffer the lending channel via different sources of funding, it might diminish the true essence of monetary policy change.

The developing countries for which there have been massive changes in the banking sector for the last two decades specially for increased number of state-owned banks converted as private banks, the entrance of foreign banks and also the specialised groups (investment banks, mutual fund etc) competing with them, could be a good sample to study along with the banks of developed economies. The comparison on these different economies could also show the bank competition effect per different nature of governments.

In the study, answer of the question- what happens to the power monetary policy in bank lending channel while banks are in a competitive situation- would be founded by doing a quantitative analysis on bank level data and related macro variables. Specifically, ten countries from Western and Eastern region are selected using convention sampling method and among these economies the strength of banks' competition would be measured while monetary policy is changes adversely.

1.3 Limitations of the Study

Although the research is based on one of the contemporary issues and the findings match with recent researches, there are some limitations which should be mentioned-

- The financial industry consists of both banking and non-banking financial institutions. Nevertheless, in the research, only the banks to were considered to represent the overall financial industry of each country.

- Five countries from each region were selected to make the comparative analysis. However, inclusion of more countries could make the research even more meaningful.
- The study period is from 2001-2015, which could not be updated due to the unavailability of Bankscope dataset. As the data were quite large a volume, it would be difficult to collect from individual sources in such consequences

1.4 Structure of the Study

In Chapter 2, important literatures on bank competition and monetary policy transmission mechanism are reviewed. The second section of the chapter covers the information about the economies of the ten countries to give a clear idea about the similarities and differences of those economies. Chapter 3 the methodology of designing the research, collection of data and the tools used to analyse the data and discussion of empirical model are presented elaborately. The fourth chapter – Data Analysis and Findings contains the results of empirical model and in this chapter their analysis regarding the estimated results are broadly discussed. Finally, in Chapter 5 the recommendations are given in light of the findings of data analysis along with the overall conclusion, that summarises of the analysis and lastly, some suggestions to policy makers are proposed.

Chapter 2: Literature Review and Context of Study

2.0 Introduction

Reviewing the previous studies and seeing whether the researchers adopt any specific stream or do debate with others, is an important part of doing any new research. Literature review glimpse the views of different studies and the ways of their experiments. This helps to generate new ideas and also to find gaps of researches that ultimately gives birth of fresh branches of studies to be made in future.

In this section, two broader parts of literatures, first on 'Bank Competition' and second on 'Bank Competition and the Bank Lending Channel' will be discussed briefly, also the last part covers the information about the economies of the countries the research is conducted on. but before moving to those parts, some fundamental concepts about monetary policy mechanism are needed to be explained.

Monetary transmission can be classified into - neo classical and non-neo classical channels. Neoclassical channels are on the assumption that- financial markets are flawless which is defined as 'perfect financial market' and non-neoclassical channels hold the opposite view, that the financial market has more or less matters of imperfections, usually from which the credit view is initiated.

It is assumed that as a policy instrument, the monetary authority contains straight control and supervision on lending rates which are of short-term in nature. An influential characteristic that is notable from many of the transmission mechanism policy is that compared to the nominal interest rate, the real interest rate has especially stronger effect on the values of other asset and also on the pattern of spending in the transmission channels. Which means, while there is a modification in monetary policy rates, all the market inputs will get affected by such a change. Apart from that, the absolute anticipated route of interest rates, it does not change just the current price, but also effects asset prices and consumptions and thus the

spending behaviour of the buyers. Both factors give elevation to a focal responsibility to prospects in the consequences of the actions of monetary policy, because these approaches can persuade both the anticipated progression of nominal rate of return and the vision of future inflation and consequently affecting real rate of interest. So, the variation in lending rate affects nominal and real rates as well as indicates the expected inflation. Certainly, Woodford (2003) hints that dealing the expectations of the marketers with expert hands is the primary accountability of authority who takes care of monetary policy.

2.1 Theoretical Framework

Neoclassical Channels

During the mid-20th century, the channels of monetary policy transmission were introduced for the first time. They focused on the fundamental representations of investment, consumption, and global trade performance. Jorgenson (1963) and Tobin's (1969) investment models, Brumberg and Modigliani (1954) lifecycle/permanent income models of consumption, and the universal IS/LM-type models of Mundell (1963) and Fleming (1962) are mentioned as the neo classical investment models, income based and international trade models. Among the stated models, the first one is meticulously related Tobin's q channel because it relies on the rate of return directly functioning over the operational cost of capital. For consumption, the channels work as the price change in wealth affecting the decision of purchasing and thus the counter of replacement effects occurs; and for trade, the exchange rate affects the business decision directly.

Investment-Based Channels

Interest-Rate Channels: Direct interest rate channel is the utmost well-established channel of monetary transmission that have been entrenched in the models considering macroeconomic factors. This ultimately alarm the power of lending rates which change the cost of capital anticipation thus has effect on the expenditure of doing business and domestic affairs, for example, home loans and buyer durables projects. So, investment on both short term and long-term perspective directly gets affected from the change in interest rate. From the prevailing neoclassical models of making investment establish the fact that the client's assumption of borrowing cost is a focal component of the demand for capital, whether it is for investment goods, residential housing or consumer durables. User cost of capital can be formulated as follows-

$$u_c = p_c [(1 - \tau)i - \pi_c^e + \delta]$$

where, u_c is user cost of capital that depend on price of new capital, nominal rate of return, tax rate and expected rate of price changes on assets along with the depreciation rate. The relative price of new capital is denoted as p_c , i is the nominal interest rate, the expected rate of price appreciation of the capital asset is shown by π_c^e , and δ is the rate of depreciation. As we can see from the equation, the interest rate is determined by adjusting the nominal interest rate with the marginal tax rate τ .

If π^e is the expected inflation rate, the above formula can be rewritten by decomposing the nominal interest rate to real interest rate that is - after-tax real interest rate, $(1-\tau)i - \pi^e$, and by calculating the expected real rate of appreciation of the capital asset as $\pi_c^e - \pi^e$,

$$u_c = p_c [\{(1 - \tau)i - \pi^e\} - \{\pi_c^e - \pi^e\} + \delta]$$

For the stated model, various components have shown notable impact while connecting their relationship with the monetary policy transmission. As we can see, the user- cost channel, u_c depends on the rate of return after conducting the expenditure. Allocation in the capital resources includes various spending in planning for assets, their procurement and installation. While thinking of investing in long term assets both organizations and individuals need to have a clear assessment of the upcoming rise of cost of investment in case the interest rate changes. Both households and businesses need to think of prolonged span when contemplating the instabilities in interest earnings their assessment of investment opportunities. Consequently, real rate of interest and decision for expanding expenditure on the real assets depend a lot on the expected tenure of these assets, which is evidently for long term. The monetary policy instrument focuses on changing the short-term interest rate, but has a long-term implication on the investment side. From the above discussion it is clear that there is a connection between money market rates and long-term rates. So, for monetary transmission mechanism, the link of these short term and long-term rate of interests are very important to define the term structure hypothesis.

It is well understood that there is a direct and clear connection available between the rates of interests for both short term and long term. Because of this linkage and having a change in monetary policy, where there is a rise on the rate of interest for short term credit facilities, the same have incremental impact on the rate of interest for long-term credit facility. This has a direct impact on the decline in demand for the capital asset as it becomes expensive to get credit facilities for capital investment. Thus, due to incremental rate of interest for the long-term credit facility, people find less interest to borrow to use the fund for expansion of business or to fulfil any household requirement which have a negative impact in terms of growth for making expenditure for long term investment by borrowing. Consequently, the

total amount which had been spent onto such long-term credit facility get decreased in the later years in comparison to previous terms.

The famous framework of James Tobin (1969) on the decision of investment both for firms and households can also be taken into account. Named after Tobin, the proportion of market value of firms to the proxy of cost of borrowing for any type of investment in business is known as Tobin's q and is been used still by various researches.

Tobin's $q = \text{market value of firm} / \text{substitute cost of capital}$

A higher q signifies that the firm has a higher market price compared to the additional cost of borrowing for capital. Which means the resources for new plant and equipment will be less costly compared to the current market price of firms. So, firms can raise capital by issuing stock and get more appreciated price for those shares compared to the expenditure on the resources and equipment they tend to buy. Thus, due to the advantage of issuing a small percentage of stock to buy huge amount of investment goods, investment spending will rise up. Firms will enjoy investment opportunities only because their share values are appreciated in the market and they can manage the investment funds easily from the market. The identical modification is employed for household expenditure to make any investment from individual perspective.

In case of expansionary monetary policy which loses the interest term and interest rates fall, there will be an ascendent compression on demand for stocks and stock prices increase, that ultimately causes the spending on investment to incline and there is an upward pressure on the aggregate demand for loanable funds.

Consumption-Based Channels

Effects of Wealth: Brumberg and Modigliani (1954) introduces the wealth effect which was later improved by Ando and Modigliani (1963). The theory explains that payments on consumption is determined by anyone's acquired assets during his life time which is a combination of capital from shares, real assets, or additional resources. The cost of borrowing is reduced under the expansionary monetary policy which makes the demand for loans to go up. The consumers may get encouraged to purchase assets such home, land and common stock. So, the demand of these assets will increase and their prices will be driven up. Due to the upsurge in accumulated wealth, there will be visible evidence of acceleration of domestic consumption and an upward pressure on aggregate demand side. When borrowing is cheaper, people tend to invest this money to resources that they can utilize for a long span of time. The demand for purchasing assets inclines making their prices to up. Asset price movements thus affect the standard lifecycle of wealth, and considered as an influential factor in the monetary transmission mechanism.

The following diagram is taken from the website of European Central Bank where the effect of interest rate change affects asset prices, labour cost, exchange rate; ultimately triggering the domestic market price also the import prices of goods and services.

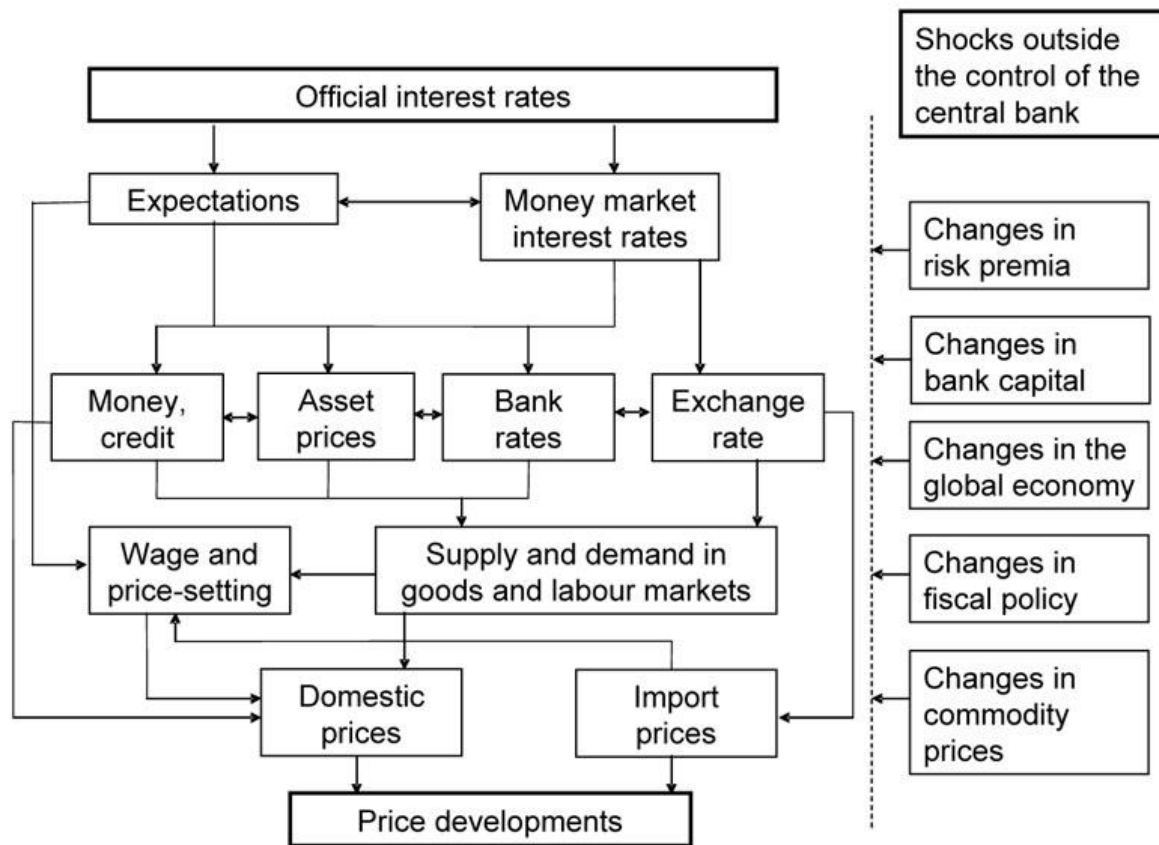


Figure 2.1: Effect of Interest Rate Change

(Source: Website of European Central bank)

Channels Based on International Trade

Exchange Rate: In the time of reducing rate of capital by the central bank of a country, the benefit on national resources declines contrasted to overseas properties. Consequently, the depreciation of local currency results in cheaper prices of inland goods compared to the foreign goods and services. So, the demand for the goods increases in foreign marketplace and ultimately makes the net export of the country to increase. The aggregate demand for loanable funds increases. There are two factors which should be taken into consideration. First, we need to focus how sensitive the exchange rate is compared to the interest rate

movements: the higher the sensitivity of the exchange rate on interest rate movements, the greater the effect would be.

On the other hand, smaller, more open economies may have greater effects compared to a larger and conservative economies through this channel.

So, it can be undoubtedly said that, the exchange rate channel portrays a vital part in the economic effect of monetary policy changes. Countries with more interest sensitive exchange rates would be greatly affected by the monetary policy change, smaller economies would be more prone to such movements.

Non-neoclassical Channels

When there is an evolution of channels due to the market imperfections rather than those connected with nominal earnings and strictness in values of assets, that will be called non-neoclassical transmission mechanisms. There could be some possible reasons for occurring the channels. First, due to the existence of imperfections in private markets for example – insiders have better information than others, known as asymmetric information; second, there are several segmentations in market that lead to barriers to a competent financial market operation and lastly direct or indirect interference of the government to control the markets. In the credit markets, the non-neoclassical transmission mechanisms may create market imperfections in any of the stated ways-

- i) Government interventions by changing the supply in credit markets,
- ii) Through lending and bank capita, known as bank-based channels,
- iii) Affecting both firms and household, termed as balances sheet channels.

Government Interventions in Credit Markets through Credit Supply

Authorities frequently inhibit through the permitted operations of loan markets with an intention to complete specific objective induced by policymakers, for example-reorganization or advancing specific categories of investment. In Bangladesh, the non-banking financial institutions are encouraged to do the financing in SMEs by the central bank. There was an interest rate ceiling of 9% on loanable funds starting from April 2020. On the other hand, in the United States, to encourage the home ownership, government interference has been remarkable in financing housing to the individuals.

Greater short-term rates tend to make long term returns which used to be considerably larger in percentage previously compared to the deposit rates' upper limit. So it will encourage the people who deposit their money in banks with saving purpose to take out their savings from depository institutions in order to invest them securities with higher yields. The banks lose deposits due to this change in interest rate which is known as 'disintermediation'. Mortgage institutions face the constrain of lending and therefore there will be a severe fall in mortgage credit and in the activities of housing constructions.

Bank-based Channels

Bank as a financial institution is obliged with a vital role to play in the transmission mechanism of monetary policy as they are one of the prominent intermediaries to supply loanable funds from savers to borrowers. Bank based channels can be divided into either traditional or capital-based channel. In the following paragraphs these channels are described with the help of previous researches and different views of the scholars.

Corresponding with the traditional bank lending channel, the asymmetric information is considered to be a key for banks to manage existing and new customers. In the financial system, the role of banks is critical, they can solve the asymmetric information problems in loan markets. There are a specific group of debtors who may not be able to enter the credit markets except they take loans from banks. In case there is no ideal alternatives of retail bank deposits to collect ample amount of funds, the operation of bank lending channel may operate under either with a positive or negative demand of loanable funds making the economy to expand or shrink correspondently. Expansionary monetary policy, that loosens the required reserve amount by central banks, due to the increases of bank reserves and deposits, will make the availability of bank loans to go up. As several debtors rely on bank loans for funding their business and personal accomplishments, they will seek bank loans more under this monetary policy change and overall investment and consumer spending would be increased.

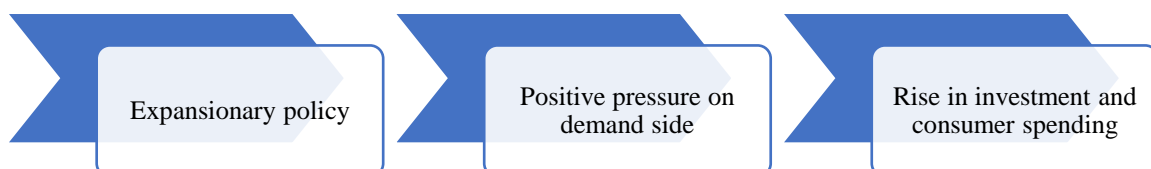


Figure 2.2: Flowchart of Expansionary Policy

On the contrary, some researches have shown doubt on this direct connection of bank advancing channel with the financial policy change. The study results of Lown and Morgan (2002) suggest that bank lending may have a great consequential influence in economic variabilities, but this channel of bank lending affected by monetary policy changes may be of ignorant portion. According to Iacoviello and Minetti (2008) – if countries have more dependency on bank loans for their mortgage finances, visibility of the presence of lending decision of banks with regard to the policy rate change for households would be remarkable.

According to bank capital channel, the condition of balance sheets of banks and other financial intermediaries may also determine their intention of lending. Financial institutions having a heavier weight on deposits and allocation of assets may think of shrinking their loanable funds in case of monetary tightening compared to others. If asset prices depreciate, the banks' loan portfolios will face losses. So, bank capital channel would affect the supply of loanable funds. Then again, debtors less ability or willingness to pay back their debts will deteriorate credit quality may also bring down the worth of the institution's resources. When there are shortages in the asset side of any banking institution, that impacts the capital side as well. There is clear evidence of such case during the recent financial catastrophes. These shortages of capital are to set back by pulling the rope of bank lending, making the bank loans more expensive to its demanders. During the depreciation of asset prices, while assets are devalued, only way to stabilise the capital to asset ratio by making the loanable funds more costly, in other words, by shrinking the bank loan amount.

This activity will directly hit the borrowers who are bank-dependent for any kind of loan, as they will no longer be able to get loans and so they will have no other option but to curtail their spending and thus the aggregate demand of loanable funds will decline.

On the other hand, when monetary tightening is withdrawn and the expansionary policy is adopted, the effect hits directly to the balance sheet of any financial institution. There are two ways how this policy can lead to enhance bank balance sheets. Foremost, when the money market rate is declined, making the short-term loans available in a cheaper price, the tentative borrowers can easily get loans and also repay them in time.

Thus, the interest margin is improved and banks tend to earn more profit on their lending. when the short-term interest rates are reduced, banks have smaller size of non-performing loans and the interest earnings can be deployed to invest in both short term and long-term assets. By the passage of time balance sheet of the financial institutions are boosted up.

Secondly, in the time of expansionary monetary policy, there will be appreciation of asset prices. Thus, there will be an upward change in bank capital. Bankers will be encouraged to make loans available to borrowers in a less expensive cost, ensuring the demand side of loanable funds to move rightward. Thus bank capital channel is affected by this monetary policy as it ensures the enhancements bank capital and lending, and consequently aggregate demand of loanable funds increases and ensures borrowers both bank dependent or borrowers with other options to seek loans from banks for their business and household spending.

Channel of Bank Balance Sheet

Market imperfection means the information is not identical to all participants in the market. Information gap is known as asymmetric information problems which can make the credit markets more vulnerable and riskier. The asymmetry in information creates a deficiency of effectiveness in the value and quantity of goods and services provided, as economic information can be resembled through the prices quoted on its products, ineffective price signals give birth to adverse selection. If a person's net worth falls, there will be an increase chance of selecting wrong projects, inducing the adverse selection problem. Due to adverse selection and information gap, credit markets face the problem of moral hazard, which means facing hazards of selecting wrong projects unknowing the true facts which were not disclosed by the party having all of the information.

In the bank balance sheet channel, this information asymmetry creates a dilemma of selecting the right projects to invest in. When the prospective borrower's net worth is lower, this indicates his collateral would not be sufficient to cover the loan. Borrowers with an intention to earn more profit will indulge into high-risk investment making the probability of selecting wrong projects. Due to this problem, risk-taking intention would fast capture by many investors, worsening the situation moral hazard. Consequently, banks and other credit institutions will demand higher risk premium or cut the amount of lending to show their reluctance to grant loans, so cost of lending will be decreased and aggregate demand would fall.

Policy change by the authority can also influence the bank balance sheet over cash flow, the distinction between cash receipt and cash spending. We know under contractionary monetary policy, that accelerates rate of interest will trigger companies' cost of borrowing to escalate, thus, resulting the cash flow to decline. When the firms have limited internal funds of cash flows, they must seek for external sources for fulfilling the demand of funds.

With the existence of asymmetric information problem, sometimes borrowing money from external sources can be very costly for firms. This cost is known as external finance premium. This unpleasant rise in cost of capital would result in restricting the investment and borrowing activities in the market, thus there will be less economic activities.

The money market interest rate portrays distinctive role in transmission mechanism, as the expenditures of interest on short-term debt normally exhibit distinguished impact on firms' cash flow. How firm's balance sheet gets affected by the change in monetary policy could be observed in the forms of several directions. As we know, asset prices will decline in the monetary policy tightening regime, specifically the value of equity would drop drastically. The pressure will be directly on the reduction of the net value of a company. Hence, in time

of this type of policy, the adverse selection would rise and moral hazard problems would get worse. Consequently, giving loans and advances will decline, expenses will rise and there will be a fall of aggregate demand.

The Channel of Bank Lending

The economic activities can be affected by the monetary policy over numerous channels like-

- i) The channels of interest rates or interest rate channel,
- ii) The exchange rate channel that focuses on the proportion of exchange of domestic and foreign currency,
- iii) Other asset price channels, which takes birth from the changes in bank lending rate and affects all assets in an economy.
- iv) The credit channels, that the borrowers would get into dilemma when there cost of capital of borrowing does not comply with their perception.

Due to information gap, it is not possible by the entities providing loans if they are not a perfect substitute of financial institution. The bank lending channel arises from the imperfection of financial market and be reliant on the lack of perfect replaceability among loans provided by banks and debt supplied by private sectors. As quoted by Bernanke and Blinder (1988), the bank lending channel draws attention to the extraordinary participation of banks and their distinctive role playing in the financial systems of an economy, which of course doesn't match the traditional interest channel and there is a strong connection among deposits in banks and supply of loanable funds in the market.

From the channel of bank lending, contractionary measures of policy are taken to balance the reserves and, thus, affects the amount of funds supplied by savers to banks, which institutes the loanable flow of resources. Banks are then left with no other option but to lessen their loan portfolio, for which they show resistances in approving loan without any guarantee to make a replacement of the shortage in loanable funds. However, Disyatat (2011) argues the prominence on policy-tempted changes in deposits is erroneous. If anything, the process actually works on the other way round with loans driving deposits. It is claimed that the theory of the money multiplier is inconsistent and vague in terms of analysing the underlying forces of bank lending. In the aggregate, the accessibility of deposits is not a restraint on lending. In a fiat money standard and independent financial system, there is no exogenous restriction on the loan supply except through governing capital obligations. A sufficiently capitalized banking system can constantly satisfy the demand for credit if it wishes to.

In their study, Bernanke (2007) and Disyatat (2011) have proposed a substitute mechanism for the bank lending channel. Rather than working through any induced changes in deposits, this works through the impact of monetary policy on banks' external finance premium as established by their recognized balance sheet concentration. The fundamental theoretical concept is that the bank's balance sheet in terms of leverage and excellence of asset will decrease due to a restrictive monetary policy as well as in consideration of associated risk. Cantero-Saiz et al., (2014) correctly said- that will result in the incline in banks' premium of external financing, endangering them to a higher charge of resources, which are then carried on to the lending.

Therefore, the mechanism of the bank lending channel on the monetary policy change can be summarized as follows: a monetary policy contraction can persuade a reduction in the quantity of loanable funds through deposits and/or a rise in premium of banks' external

financing; that puts an immense pressure on banks' decision to approve the desired loan to the commercial demanders and consumers.

2.2 Literature Review

Several papers have made an effort to research the presence and the operational actions of the bank lending channel. Formerly, the original work of Bernanke and Blinder (1988) was followed broadly for such an investigation. These researches were based on aggregate data which lack proper identification problem. Due to the incapability to determine whether the experimental changes in lending performance after a tight monetary policy are persuaded by bank loan supply or motivated by loan demand, these researches became less acceptable by the passage of time. So, most researches have devoted bank-level data supporting Kashyap and Stein (1995) to explore the effects of bank-specific features and monetary policy variations on the supply of credit.

The bank-specific characteristics or their balance sheet strengths influence the aftermath of lending to the changes in monetary policy. That's why models specifying bank-level data manage to deliver comparatively more detailed and accurate estimations. In the presence of separate bank lending channel, larger banks with enormous capitalization or with high liquidity, would squeeze their financing bucket less than small, low capitalized and banks with limited liquidity. In the study of Kashyap and Stein (1995) and Kishan and Opiela (2000, 2006) it is shown that small-sized banks lack to generate or access alternative sources of funds. Due to less buffering ability to fulfil the demand for loan by their clients, these banks are more influenced by monetary tightening compared to large banks. So, these types of banks will definitely show severe reaction on the monetary policy change compared to larger banks.

Similar proof is seen for banks with lower liquidity and/ or if they are weakly capitalized (Altunbas et al., 2002; Ehrmann et al., 2003; Gambacorta, 2005; Kishan and Opiela, 2006; Cetorelli and Goldberg, 2008; Juurikkala et al., 2011). It is because of the facts that banks enjoying higher liquidity will be able to counterbalance the influence of monetary tightening by liquidating some of their short-term assets like- cash and securities, thus the demand of loanable funds would be managed somehow without declining all the applications. Again, banks with strong capital base can easily seek for unsecured financing from the market, this frequent access to marketplaces can be used as shield to defend their loan portfolios (Altunbas, et al., 2009). Not only size, liquidity and capital; but also bank ownership has found to have impact on the lending channel of monetary policy transmission by some studies. In his research, while studying the Indian banks, Bhaumik et al. (2011) states that newly formed private banks have better power to combat contractionary monetary policy compared to than foreign banks and old private banks in India. On the other hand, Wu et al. (2011) argue that -due to the existence of internal capital markets for foreign banks, contractionary monetary policy taken the in-host countries should affect them less adversely.

Deregulation, financial innovation and worldwide financial crisis have made the bank lending channel to change drastically. Several studies have searched for the impact of the new factors, such as modifications in banks' business models and market funding patterns, on the bank lending channel. Altunbas et al. (2009) concluded that the altering role of banks from 'originate and hold' to 'originate, repackage and sell' decreases the effectiveness of the bank lending channel of monetary policy. Correspondingly, Gambacorta and Marques-Ibanez (2011) showed proof that banks with higher access to the securitization market are more capable of buffering their lending activity to deal with monetary policy changes.

Perera et al. (2014) claims that banks having more acquaintance to off-balance sheet functions when monetary policy changes, are better capable to shield their loan supply counter to such a change, hence establishing a defence mechanism on monetary transmission. Lastly, to connect financial distress to the monetary policy change, investigators introduced the ‘risk factor’ on the effect of financial crisis on the lending channel into the monetary transmission mechanism. Altunbas et al. (2009) stated that, banks with lower risk, having smoother access to uninsured funds from the market, can better safeguard their lending from monetary tightening. Falling in the same line, Cantero-Saiz et al. (2014) finds countries where banks are to be paid high risk premiums would show severe vulnerability to monetary policy contractions.

2.2.1 Bank Competition

Competition is defined differently by various authors. Alain Bienayme (1998) said competition is “a confrontation of companies each of which seeks to increase its market share.” Kraft(1999) defines competition is “ a set of actions that are undertaken in order to achieve the objectives of a firm at expense of others.”

As we know the deviation of competition is classified as either - Structural or non- structural.

Two scholars namely, Mason (1939), Bain (1956) are the primary introducer of the SCP (The structure conduct performance) paradigm. This describes the presentation of firm in the form of the structural properties of the market in which they manage their operations.

To conduct financial activity in the country, it is very important that there should be a stable relation and connection in between 2 segments e.g., requirement for loan by the borrowers and supply of savings. Banks acting as financial intermediaries, playing a crucial role to bridge between the two i.e., requirement of loans and flow of savings, their activity influences the growth of any economy. Savings have been turned/converted into productive capital by the borrowers and thus returning with a higher value make the aggregate economy to look for a larger version of itself from year to year. It is commonly known that fair and competitive competition among the banks would lead a steady growth in the economy as such competition would further make progress in the intermediation process. This is very significant because the borrower will be able to get loans at a lower interest from Banks where such Banks will also make available a better yield on deposits given by their respective clients. Such an outcome is very beneficial for an economy as it persuades a continuous growth on both parts e.g., investment and savings.

Banking competition occurs mainly for two reasons. First one is due to the diversity of banking products and we call it 'market competition'. On the other hand, with the structural changes in the financial and banking environment which is known as 'non market competition', makes banks to be competitive among each other.

According to various scholars e.g., Cameron, 1967; Goldsmith, 1969; McKinnon, 1973; Shaw, 1973, from the point of view of economics, it is acknowledged commonly that a theoretical outcome is that for the growth and sustainability of any economy, financial development is fundamental and foremost priority. It also advocates for the requirement of a strong build economical basis for the financial industry which is fundamental for the purpose of economic development. Consequently, this will ensure required connection that will assure necessary

movement/flow from financial condition for the desired growth of economy. Numerous empirical inputs as well as theoretical one has been founded on this belief.

There are several studies available which have scrutinized how much competition among financial institutions can have impact on the growth of economy in a country. For doing it, such studies have used information of aggregate region which have been used for a number of sampled countries. The work which has considered the presence of connectivity between 2 segments i.e., structure of bank and performance of macrocosmic, is also categorized by the quintets of models known as partial equilibrium models, and general equilibrium models. Relationship between the lender and borrower is the primary concern of the first model. It does not pay attention on any general impact in the economy which may arise in running business by different banks in a financial industry by presuming structure of banking industry. Both the elements i.e., deposit by depositors in the bank and bank structure's influence in a country's economy are duly considered by the other quintet (the 2nd), except in doing the analysis, it does not consider many features of the relationship between banks and debtors.

It is not an ideal condition for any economy wherein lending business by various financial institutions are going through some irrational competition. According to Pagano (1993), such irrational competition has an adverse effect in the economy. This is because such imperfect atmosphere restricts borrowers' (both individual and institutional) easy access to having credit facilities or advances. And thus, economic growth of a country is greatly hampered and delayed.

Researchers like Mayer (1988, 1990), Petersen and Rajan (1995) have expressed a different view. According to them under the domain of a monopolistic supremacy, lending activities by various financial institutions rise to a great number because of the reason of getting inspiration by the banks. This also led to the path of ease access of having loans by different borrowers.

If there is a growth on savings and investment, the economy is surely to boost up and bloom at a higher rate. Some scholars e.g. Carbo Valverde, Humphrey and Rodriguez Fernandez (2003); Cetorelli and Gambera, 2001 (pp. 620–621) also acknowledge such outcome. It similarly supports the reason of paying a distinct consideration by governments and international associations to encourage a competitive atmosphere in the financial industry.

There has been significant availability of competitiveness present among the financial institutions in the banking industry which effects on financial services' productivity, financial products' quality, and degree of innovation of different products and tools in the market.

Researchers namely, Cetorelli and Gambera (2001) used an extensive study on the data for different banks from different countries. Through their research, it was the aim to know how structure of market in financial industry (for a given size of economy/market) has experimental significance for the growth of the economy. Their study shows that if bank concentration is present in the financial segment, such concentration regulates general decrease on availability of loans which reduces the economic growth in the country, affecting entirely all the firms and segments comprehensively.

To see relationship between bank stability and degree of bank competition, John H. Boyd and Gianni De Nicoló(2005) argued on different literatures whether it is practically possible by banks to act differently when the interest rate change. Their findings suggest that a positive relationship between the number of bank competitors and risk seeking is fragile.

Claessens (2004,2009) finds that the bank competition can have direct influence on household and businesses of banking products that will ultimately affect the aggregate economic growth and sustainability. To measure competitive conditions in 11 European banking systems over 1997 to 2008, Hong Liu, Phil Molyneux and John O.S. Wilson (2011) took a diversity of structural and non-structural measures (including the Lerner index, Rosse-Panzar H- statistic and Profits-Persistence parameters). Their study says that competition trials be susceptible to deliver conflicting results and the measures are statistically not related. They also found that, unless from the ROE preservation parameter and loan-loss requirements, banking sector risk (Z-score, loan-loss provisions, variation in ROE and ROA) is also not linked to the several measures of competition.

Using the Panzar–Rosse methodology, Simpasu (2011) studies the nature of competitive circumstances in the Tanzanian banking sector between 2004 and 2008. His study finds that the projected competitive indicator, the H-statistic obtained from a non-scaled total income measure signifies that bank in Tanzania function under monopolistic competition.

Poshakwale and Qian (2011) evaluate the influence of strengthened competition and effectiveness in commercial banking on the Egyptian economy. Their outcome implies that over time, the banking sector of Egypt has become more competitive. The findings also exhibit a positive relationship between competition and economic growth in the short run. However, they could not provide any proof of a long run relationship between banking competition and economic growth. Economic growth is, however, influenced by a plethora of variables other than banking competition.

Thorsten Beck, Olivier De Jonghez, Glenn Schepens (July18,2011) used Lerner index for a pool of developed and developing countries to see the extent of bank competition and stability through different countries. Their sampling period was 1994 to 2009. They found a

positive and significant relationship between market power and bank soundness. They argue that, countries where there are severer restrictions on new initiatives and activities, more similar market structures, larger deposit insurance and where the system of credit information allotment is more efficient, an upward competition will have a larger influence on banks' risk-taking motivations.

María Pía Olivero a, Yuan Li b, Bang Nam Jeon (2011)– used two indexes-1. five firm concentration ratio CR5 and 2. herfindhal-hirschman index (HHI) to measure the extent of consolidation. They say- A stronger banking sector consolidation makes the bank lending channel of monetary policy weak. The findings are robust to the complementary procedures of consolidation and monetary policy- different specification on bank size, levels of aggregation and subsets of countries. According to their study, while monetary contraction takes place, foreign banks reduce their loan less than the domestic private banks. And this is not due to the different size, capitalization, size and efficiency; It's because the existence of internal capital market of foreign banks.

Wolf Wagner (2011) introduced a model where competition occurs from deteriorating switching cost for businesspersons. They have exhibited that when banks have restraint over their risk-taking, the firmness effect of lending market competition may be inverted. This is due to the reason that banks have an ideal amount of risk they want to accommodate and thus want to compensate the impact of safer debtors on their balance sheet by taking higher risk.

Fosu (2013) investigates the magnitude of banking competition in African sub regional markets. The study applies a dynamic version of the Panzar–Rosse model that is implemented, contiguous with the static model to evaluate the overall limit of banking competition in each sub regional banking market over the period 2002 to 2009. The findings propose that African banks generally show monopolistic competitive behavior.

Using bank-level panel data for 29 African countries, Amidu, M. (2022) exercised two step estimation procedure to see the consequences of cross-border banking and institutional quality for bank competition in Africa. The results indicate that cross-border banking improves bank competition in African countries with strong governance structures and organized excellence.

Yuan, Gu, Yuan, Lu and Ni(2022) selected the balanced panel data of 4,631 non-failure banks of USA over the period of 2002 to 2017 to see the impact of bank competition on stability. Lerner Index was used as a measure of bank competition and their study suggests that bank competition mainly affects stability through franchise value, the cost of borrowing and operating behavior.

With a sample of 465 Chinese commercial banks over the period of 2007–2020, Xinyu, Yan and Jiali (2023) estimated the panel regression and used 2SLS method to see the monetary policy uncertainty and banks' risk taking. Their findings suggest that the banks which show higher competition with other banks are engaged in more risk taking while there is monetary policy uncertainty.

2.2.2 Bank Competition and the Bank Lending Channel

Competition among Banks regarding doing business in the industry mainly considers how such Banks behave towards their customers specially, how the management of the Bank conducts the business. Thus, such competition among Banks can effectively improve the channels of bank lending by involving an effective monetary. It has been evident in a good number of studies which show that competition among banks is good for the economy and also for the general people. It is because if the competition among banks is high, generally, the rate of interest for various banking products becomes lower and this encourages and give

an opportunity for a foundation for having smoother entry to various funding by financial institutions. (Beck et al., 2004; Cetorelli and Strahan, 2006).

But there is also negative side available for such competition among banks. Due to having such competition, different Banks tend to minimize duration of lending affairs which may have a negative impact by damaging effectiveness of operation of the banks. (Pruteanu-Podpiera et al. 2008). Such competition also may encourage to have strategies full of various risks by different Banks; this happens because value of the authorization gets reduced (Hellmann et al., 2000; Repullo, 2004).

It is important to have an analysis on the effectiveness and efficiency of Monetary Policy. To do such, a few things need to be considered e.g., concentration of banking system, measurement of competition among banks and the conditions/circumstances prevailing among such banks. These have been discussed by Kashyap and Stein (1997). Furthermore, other scholar e.g., Lensink and Sterken (2002) have emphasized for the detection through further works in future whether such competition among banks in any economy cast a significant impact in framing an effective monetary transmission mechanism.

It is interesting to find out here is that the number of academic analyses done regarding the concern are not sufficient and adequate. Here, we can mention Freixas and Rochet (1997). They tried to have an examination how rates between banks (interbank rates) have influences on the rates on lending as well as deposit by using the Monti-Klein model in an oligopolistic banking market. The finding of the study is interesting. The study says that there is less effectivity of the rates between banks (interbank rates) on the lending/loan/credit facility rate under such an atmosphere where the competition among banks are high. It also conveys that under such circumstances, in case, there is deviation made by central bank in policy rate;

under such circumstances, high competition among banks will result with a less effect on monetary policy.

Other scholars like Stiglitz and Greenwald (2003) have used a mean-variance method in a more competitive and constraint banking atmosphere/system for analysing the effectivity of monetary policy in such system. They have found that under a competitive atmosphere among banks, the inclining rate of interest on lending through banks is less strong/weaker while comparing with a more limited atmosphere. However, such studies have been criticized by scholars Alencar and Nakane (2004). The main reason for criticizing the studies is they have considered a limited equilibrium study only. So, the said scholars have made an alternative option and have used a dynamic general equilibrium model for examining the effect of monetary policy in such an atmosphere and condition where there is availability competition perfect and monopolistic in nature which ensures that an economy is more vulnerable for any alternations made in the rate of interests where there is existence of an improved competition among banks.

Scholars Adams and Amel (2005) have conducted an experimental analysis by using data from the US to find and examine how transmission of monetary policy gets influenced by the competition among banks (measured by the Herfindahl index). They have concluded to the conclusion that markets become more concentrated and the impression of channels of bank lending becomes weaker.

Nevertheless, some researchers e.g., Claessens and Laeven, (2004) have expressed that the degree of competition is not certainly evaluated by Herfindahl Index. For the purpose of measurement of the level of competition among banks, scholars like Gunji et al. (2009) and Oliever et al. (2011a) both have used H-statistic obtained with Rosse–Panzar model for analysing relationship between banks' channel of lending. It is their observation that channel

of bank lending gets decreased because of the present of bank competition. Opposite views has been expressed by several other scholars. For example, Fungacova et al. (2014) and Leroy (2014) have expressed and conveyed their finding that if there is competition among banks available in an economy, such improved/effective competition certainly increase efficiency of monetary policy transmission through the channel of bank lending. For their study, a good number of financial institutions/banks have been considered from the countries of Euro area, and for measuring the competition among banks, they have considered an index namely, the Lerner index.

Scholars like María Pía Olivero a, Yuan Li b, Bang Nam Jeon (2011) 560–571), using Panzer Rose index for the measurement of bank competition and then to see the effect, used the loan growth model under Generalised methods of moments (GMM). They have concluded that monopolistic competition is available in the banking industry in countries of Latin America and Aisa. Largely, the stronger is the competition, the weaker is the transmission of monetary policy throughout the channel of bank lending.

To see whether the entrance of foreign banks will make any conflict, due to the change in the rate of interest, in channel of bank lending, scholars namely, Ji Wu, Alina C. Luca, Bang Nam Jeon (2011) used Pooled OLS and System GMM. The said scholars have taken a good number of banks e.g., around 1200 from around 35 developing countries from different economies e.g., Asia, Latin America, Europe (both Central and Eastern). According to them, due to the alternations or changes made in the monetary policy, domestic/national bank react contrarily to such changes made, verifying the presence of a channel of bank lending and by having used various categories of ownership. It is their finding that foreign banks under any host countries are less vulnerable in an economy where contractionary monetary policy is present. This is because in such economical condition, foreign banks increase the rate of interest making decreasing the instances of loans in comparison to other local private banks.

Adam B. Ashcraft (2001), in his publication, used a data for a period of 1976-1999 of all US banks to establish that affiliated bank's growth in loan is less delicate to variations made in the rate of federal funds in comparison to the unaffiliated banks under the domain of contractionary monetary policy. These comparatively unconstrained banks are better able to ease insured deposit spending by issuing uninsured debt. His study advocates that- the banks which are a part of multi-bank holding companies are significantly greater than their actual size designates, especially when it comes to demonstrate their aptitude to smooth policy-induced variations in insured deposits, as their internal capital can be used when ever needed to.

A small bank has to deal with dense increasing marginal costs when it thinks of issuing uninsured debt, on the other hand, external fund raising is not expensive for a large holding company and channel this fund to its subsidiaries. Moreover, it is an obligation for a parent company to support its subsidiaries in times of trouble, these types of banks have no fear of financial constraints during normal times. As unrestricted banks are unable to decline lending response of restrained banks, banks' channel of lending could perform a critical role to truly explore how monetary policy works does.

Using the bank level data of 23 advanced economies, Kim et al. (2020) applied integrated panel VAR model to examine the connection between bank competition and monetary policy. Their findings align with the idea that transmission mechanism gets stronger in a competitive banking system. On the other hand, for the US economy, to examine how bank competition affects the transmission mechanism of monetary policy, several works are done. Segev and Schaffer (2020) used the banking sector data of USA over a period of 1994-2008 and found distinction in the development of credit across regions in the United States.

Moudud (2020) originated the findings that bank competition and bank performance are inter related. According to the author, smaller banks show less effectiveness compared to large banks in competitive markets. The across bank size competition heterogeneously impacts the competence of taking risk and bank stability. Especially, in times of economic crisis, it is found that banks which are smaller in size are as effective as bigger sized banks but having risked shared; and in highly concentrated markets, small banks show stability during crisis but these same banks are less stable in competitive environments. Finally the association amongst competition performance and risk is non-linear.

Using the data of U.S. commercial banks from 1994 to 2017, Wang , Whited, Wu and Xiao(2022) estimated a dynamic banking model in which monetary policy changes the funding ability of imperfectly competitive banks. Their study verifies the fact that banks optimize the pass-through of these costs to borrowers and depositors, when to deal with the capital and reserve requirements.

In a very recent study Rakshit and Bardhan (2023) using two step system GMM inspect how competition in the Indian banking affects the transmission of monetary policy through bank lending channel. Their findings suggest that a higher degree of market power weakens the monetary policy transmission mechanism for the entire banking industry and across ownerships.

2.3 Research Gap

From the above discussion it is clear to get into a convinced conclusive point of the effect of competition among banks on the channel of bank lending., there are few or no satisfactory experimental outcomes. This must be enlightened to the separate experiments and separate

means to measure the competition among banks, and moreover, the absence of agreement on the mechanism of this effect should also be properly addressed.

Through lowering the informational asymmetries, swelling the market share of large banks or strengthening the sensitivity of loans rates to monetary changes, increased competition may strengthen or weaken the bank lending channel. Consequently, we have seen an increment and penetration of a good number of foreign banks in recent years developing markets indicating that the channel of bank lending as the monetary transmission mechanism has become weaker. Factors like (i) autonomous of liquidity of bank, (ii) capitalization, (iii) risk in providing credit; (iv) size, efficiency etc., (v) the effects from demand side etc. have led the foreign or non-local banks to react less adversely compared to domestic banks which may have fewer alternatives to fulfil the demand of loanable funds during monetary tightening. To ensure their sustainability in the always changing era of business and technology there is fewer or no alternatives left in banking sector but to compete with each other. That makes banks strong enough to face constraints imposed by the authority.

Surprisingly most researches on this issue is done on the banks of Developed countries and few attention are given on the developing countries where there have been massive reformation in the banking industry. In this study, considering the banks of both region and doing the analysis would be an exceptional contribution to this field of research.

2.4 Context of the Study: Banking Industry in the Selected Countries

It is a basic that any Central Bank or Reserve Bank is the regulatory authority for introducing and controlling the Monetary Policy in any country. Like, the Monetary Policy of Australia is governed by its Reserve Bank. Monetary policy fixes the rate of interest in any market for taking loans or credit facilities by individuals and institutional entities from different financial

institutions. This is shortly called the 'cash rate'. This cash rate is significant in the banking/financing industry. Because of the cash rate, the economy is get shaped up as it largely affects the lending scenario in a country by various borrowers from different types of lenders. Inflation rate also depends on this cash rate.

As monetary policy has a significant importance in the economy, the same has to be determined and articulated in a decent way so that it becomes a powerful policy for the overall prosperity of the country. Alternatively, it can be said that the Reserve Bank of Australia has an immense duty to formulate such monetary policy so that there is a stable condition in its financial business, employment category and its currency gets stronger. It has also responsibility that the monetary policy should also ensures the prosperity of the country and contribute to a great extent for the betterment of its people. For achieving the above targets, the Reserve Bank of Australia has set monetary policy in such a manner so that inflation rate of the economy shall be within 2-3 per cent. By confirming ample job opportunity, the Banks has also been trying to keep the rate of inflow stable and low. By taking such initiatives, the economic growth of the country is being confirmed.

The Bank of England is the Central Bank of the United Kingdom. The aim of the monetary policy of it is to keep the rate of inflation as low as possible. To do this, the monetary policy is depicted in such a way so that the rate of interest for borrowing from different financial institutions by different persons, institutions do not get higher. This is the policy that the Bank of England has been trying to adopt since 2009 (where a deep financial crisis was seen). Therefore, the aim of the UK monetary policy is to keep the inflation rate low as well as keeping the unemployment rate low. If the employment rate goes higher, the same will have a positive impact in the economy. In the UK, the Monetary Policy Committee (MPC) sets the monetary policy for the country. They are trying to keep the inflation rate below or around 2%. The MPC works independently but they try to achieve the target of Government in terms

of financial matter e.g., inflation rate etc. generally, a base rate is fixed by the Bank of England. While this base rate is changed, it has an overall impact everywhere e.g., rate of interest for mortgage, loan, deposits etc.

MPC works by taking into consideration different elements of economy to set up a stable and workable monetary policy e.g., loan nature of clients, total size of the market (approximate), prices of products of loan e.g., car, house etc., growth in the economy, rate of exchange, creation of employment opportunity etc. Thus, considering a number of variables, the Bank of England sets the rate of interest in the market. If it is seen that there is probability of having a higher inflation along with higher rate of growth, it will set a higher rate of interest. But if it projects of having a lower rate of inflation along with less growth in the economy, it will set the rate of interest lower.

One of the largest economies in the world is the economy of France. The financial industry includes various financial intuitions both private and state owned. The Central Bank of France is called the Banque de France. As like other countries, monetary policy of the country is nurtured by the central bank. France's monetary policy is interesting as it has been following the common monetary policy introduced by the European Central Bank (ECB) since 1999. If we talk about ECB's monetary policy, the primary target is to maintain a stable condition in pricing among the members of Eurozone. This has been also adapted by the central bank of France. It is noticeable that ECB fixed lower rate of interest for France's economy from 2013 to 2021 which also ensured the low rate of inflation (in the last decade to 2022, the average inflation was 1.6%). But from 2022, it gives focusses to make the rate of interest normal to address the issue of rise of inflation. The rate of interest ranges from 2.50% to 3.50%.

The rate of interest was lower in the past decade which was possible to achieve as among others, the rate of unemployment decreased in the last decreased from 2013-2022. It is the

proof that the country's labor market is getting stable. The average rate of unemployment in France was 9.1% for the decade to 2022 (just below the average of 9.2% fixed for the Eurozone). Especially in 2022, the rate was 7.3%.

Therefore, to strengthen the economy, among other factors, lower rate of inflation, making more opportunities for unemployed persons etc. are the key factors that the Banque de France considers while implementing the monetary policy in accordance with the policy of ECB and thus, trying to keep the rate of interest as low as possible thus, making the borrowing by different borrowers easier. This makes a huge impact on the lending business and economy gets a booster.

As like other economies in the west, Sweden is trying to set up its monetary policy to reflect a lower inflation rate in its economy. The Central Bank of Sweden is called Sveriges Riksbank. Specially, there are in a process to make the rate of CPIF (the consumer price index with a fixed interest rate) inflation to be within 2 percent in a year. The Riksbank is well aware of the impact of rate of inflation in the banking industry and overall growth in the economy. For this purpose, it is obliged to take such steps e.g., solving unemployment issue etc. so that, the rate of inflation keeps in a stable position making ultimately a stronger economy. At present, the rate of interest is around 3.5% in Sweden showing a stable stage for the borrowers to take credit facilities from financial institutions. The central bank in use of its financial market, and, thus, by implementing monetary policy, maintains the stability in financing business. It also allows the counterparties to get credit facilities along with depositing their money in Riksbank.

It is well understandable that for the purpose of having a sustainable and strong economy, an organized and stable financial system is required. A strong monetary policy by Riksbank will enable Sweden to achieve such an economy wherein people will have the ability for making

payment for their expenditure. This will only be possible wherein employment opportunities are available which alternatively, will help to maintain the rate of inflation low.

Bangladesh is one of the developing countries in the world. Bangladesh Bank is the Central Bank of the country. As a developing country, there are 62 Scheduled Banks, 5 Non-Scheduled Banks and 34 Non-Banking Financial Institutions under the authority of Bangladesh Bank. Bangladesh Bank regulates all these Banks and Financial Institution. Bangladesh Bank is also responsible for implementing the monetary policy in the country. At present, the inflation rate is very high in Bangladesh having around 11%. For this reason, recently, Bangladesh Bank has withdrawn the cap for lending rate of interest and now the rate ranges from 11% to 18% for Banks and NBFIs. The deposit rate is also floating from 6% to 9% for Banks and NBFIs. As the unemployment condition in Bangladesh is challenging and getting higher, it is very difficult to make any quick changes in the rate of inflation near future; which means that Bangladesh Bank has to engage and request relevant authorities to create job opportunities so that the rate of inflation gets lower which will ultimately help to make the rate of interest for lending lower. Otherwise, for a developed industry, Bangladesh may face challenges to make its economy bigger.

To control the rate of inflation, various suggestions have been raised by different corners including distinguished economist e.g., Bangladesh Bank must not supply too much support of liquidity to the problematic commercial banks; Bangladesh Bank must not print money and provide the same to the Government to support budget deficiency; and overall, the monetary policy of Bangladesh Bank must be made stronger not to introduce any policy that goes against the benefit of the same.

Reserve Bank of India is the central bank of the country. As like other good economy in Asia, the Reserve Bank of India also has the aim to keep the rate of inflation lower. For this, it aims to execute a good governed monetary policy wherein the rate of interest for lending will be

feasible and low, money supply will be controlled and there will be availability of such credit facilities.

To control monetary policy, there are several tools are used by the central bank e.g., Repo rate, Reverse RERO rate, SLR, CRR etc. It has been noticed that the rate of inflation is around 3.64% which is below the targeted rate of 4%. At present, the rate of interest is around 7.2%. The rate of unemployment is around 9.1% so far.

It is established that a good governed monetary policy wherein changes in the rate of interest is the key factor keep the inflation rate stable. But some others Some methods are suggested to control the rate of inflation by the experts. These are:

1. Introducing such a monetary policy wherein the rate of interest will be higher which will ultimately reduce the demand of loan in economy, this the rate of inflation will be reduced.
2. By controlling supply of money in the society, one can control the rate of inflation but, the growth of economy will also be lower.
3. Policies should be implemented wherein competition among Banks will be available.
4. If the appropriate authority introduces a higher rate of income tax, it will ultimately reduce the spending nature of general people and thus, it will have an impact on demand and reduce the pressure on inflation.
5. There should be a check and balance between payment made to people as wages and prices paid by them for consumption. If it can be established, then inflation can be lower.

Bank of Thailand (BOT) is the central bank of Thailand. Therefore, the monetary policy of Thailand is regulated by it. They have fixed a flexible rate of inflation in their policy framework which is not similar to many economies. They have adopted this method for the sake of making stability in prices which will ultimately make the economy developing and

growth oriented. It is worth to mention here at this point that the primary object of BOT is to focus on the medium- term stability of prices. However, the Bank of Thailand is also giving consideration on price stability for longer terms for gaining economic stability.

It is mentionable that in March, 2023, the rate of interest by the Monetary Policy Committee of BOT is increased from 1.50% to 1.75%. Though the rate of interest is much lower than many other countries, but it was the fifth consecutive time the rate got increased in Thailand.

BOT is taking several measures to tighten its financial industry so that the inflation does not get higher in the ongoing recovery of economy. At present in 2024 so far, the rate of inflation is 1.54% in Thailand. There are several steps taken by the Government of Thailand to boost up its economy e.g., boosting up the tourist sector to attract more tourist, increasing the number of wages and to create employment opportunity for the unemployed personnel in the land. BOT further concludes that with continuation of constraint in supply-side for easing purpose and with decrease in prices for energy and other commodities globally, inflation rate will further be reduced.

Central Bank of Indonesia is called the Bank Indonesia which is responsible for implementing monetary policy. ITF principle is followed by the Bank Indonesia for controlling the inflation of the economy. ITF stands for Inflation Targeting Framework. This is significant because other surrounding economic factors of monetary policy are taken by keeping in mind the ITF. So, the monetary policy is regulated in such a way so that the country achieves the target. Bank Indonesia declares the ITF in public. One of the major reasons for doing so is to make the financial institutions akin to the responsibility and duty to achieve the target. It becomes their public responsibility. By making rate of interest as a monetary policy signal, and IndONIA (Indonesia Overnight Index Average), the overnight interbank rate in Indonesia as operational target, ITF is implemented. Replacing the earlier

method to fix target (base money as the target of monetary policy), ITA had been adopted in 2005 by Indonesia formally.

It was a learning for the Bank Indonesia from the global financial crisis that took place in 2008/2009. The teaching is that the central bank should have a flexible monetary policy which could address more complicated situations and hurdles. This is the idea which leads them to adopt ITF framework.

At present in 2024, the rate of interest is 6.25% wherein the rate of inflation is 2.12%. ITF is adopted and developed by Bank Indonesia to make inflation target public and for adopting a monetary policy that looks forward by addressing complex situation. There are some basic rationalities for adaptation of ITF by Indonesia which are:

1. Target of inflation will be considered as central strategy for forming monetary policy.
2. There will be integration between policies e.g., monetary policy and macroprudential policy. This is to make stronger transmission of policy which will also make macroeconomic condition stable.
3. Strengthening policies regarding rate of exchange and flow of capital and their role for the assistance of having stability of macroeconomic.
4. Strong connection building up between the Government of India and Bank Indonesia for implementing an effective monetary policy.
5. Strategy regarding policy communication has been adopted as a policy instrument.

Japan's Central Bank's is named as The Bank of Japan. It is the core responsibility of the central bank to introduce and implement monetary policy. In Japan, the central bank aims to stable its economy by way of controlling stability in price. This is very important from the economic perspective as stability in price determines the nature and quantity of economic activity in the country.

The Bank of Japan as implementer of the monetary policy influences to fix the rate of interest for the very purpose of controlling the currency and monetary segments of economy. The Bank of Japan does the stated process by using its operational instruments e.g., money market operations.

The rate of interest in Japan is 0%--0.1% as of today. The rate of inflation is 3.3%. The monetary policy should achieve the target of price stability fixed by the Bank of Japan. In this way, the economy will be contributed by achieving the price stability.

As understandable, price stability plays the key role in the economy for making decision in consumption and investment as per the Bank of Japan. If the people find it hard to consume products, they may find it hard for making investment as well. So, by making price stability target in range, an economy can be hugely developed. Based on the theory, the Bank of Japan has set the target of price stability at 2% based on the yearly change of rate in CPI (consumer price index) in 2013.

2.5 Conclusion

In this section, first, some theoretical concepts were discussed. then the previous studies on both 'bank competition' and 'Bank competition and Bank Lending Channel' were summarised along with the researchers' findings and suggestion. Then, as this study covers ten different countries, the cross-country economies were depicted to see the similarities and dissimilarities of Monetary Policy adopted by different countries.

The following sections are Methodology, Data Analysis and Findings, and lastly Recommendation and Conclusion.

Chapter 3:

Methodology

3.0 Introduction

In this chapter the research design, collection of data, the tools used to analyse the data and related software used would be discussed so that the idea of doing the research can methodologically be depicted with clear intentions.

3.1 Research Design

The research is done in two segments. First, extent of competition among the banks of 10 Eastern and Western Countries would have to be measured. In the study, a structural measure PRH index is considered to calculate the competition level of banks of 10 countries selected on a convenient sampling method.

The countries are- Australia, Bangladesh, France, India, Indonesia, Italy, Japan, Sweden, Thailand and UK. Bank level data of those countries are collected to run the test of measuring competition.

The following table depicts the countries with their associated bank numbers and number of observations under each country –

Table 3.1: List of Countries

Country Name	Number of Observations	Number of Banks
Australia	308	45
Bangladesh	153	46
France	2028	231
India	918	95
Indonesia	490	87
Italy	4488	546
Japan	6334	497
Sweden	1021	95
Thailand	297	33
UK	1156	150

Source: Bank Scope

Then considering some key macro variables and specific variables of bank characteristics the empirical model would be run to see the connection between ‘bank competition’ and ‘monetary policy change’ on the banking industries of Eastern and Western Countries.

So, most of the data are collected from secondary sources and established empirical model is used to test the results.

3 .2 Data Collection

The bank level balance sheet and income statement data is collected from Bankscope, a well-known data set that preserves the bank’ data of most of the countries. Using the bank specific data ensures to hold one of the main propositions of the bank lending channel, which is- the response of financial institutions to monetary policy change should be diverse conditional on their discrete characteristics that proxy for banks’ financial strengths and /or constraints of their balance sheets (Olivero 2011). Specifically, using bank-level data, can help to recognise the effects of the supply-side bank lending channel as against those of the demand-side interest rate channel. It also ensures the feasibility test for any systematic variances in the impact of competition in banking on monetary policy transmission across banks with diverse degrees of financial constraints. As Specialized banks (such as mergers) do not facilitate the regular banking activities, their data are not considered in the sample. All data are collected in real values of USD, from year 2001 to 2015. The macro variables’ information is acquired from the International Financial Statistics which is a well know data set based on various IMF data collections.

3.3 Data Analysis

The monetary policy transmission is observed for banks' lending through bank lending activity, so while the activity of bank lending is spontaneous, we say it has less effect of the policy change compared to when the lending activity is hindered due to such change. Therefore, in this study, loan size is taken as a measure of dependent variable and to do the annual percentage change in bank's loan which is reserved in almost every research conducted for monetary policy transmission through lending channels.

Following the studies of Olivero et al.(2011a), Olivero et al.(2011b), Amidu and Wolfe (2013) the percentage change in short term rate of interest is considered as the monetary policy indicator. Treasury Bill rate are considered as the proxy of monetary policy indicator for most of the countries, and for those countries where Treasury Bill rates were not available, short term money market rate was used. As countries use tools for their monetary policies which may not be similar for all countries, questions may be arisen about the concern of feasibility of using different tools. Following Olivero et al. (2011 a & b), the Treasury Bill rates are found to be a good indicator to capture a change in monetary policy.

Three bank specific variables - size, capitalization and liquidity. To measure financial strength of any financial institution 'size' is considered as the indicator of strength or financial stability. Most studies argue that larger banks can easily switch to alternative sources of funding to meet the loanable demand, so they can isolate the loanable funds from monetary policy tightening, see for example Gunji et al (2009) and Amidu and Wolife(2013). To measure size, the natural log of banks' summation of asset is taken. Liquidity is calculated as the proportion of liquid assets to totals assets, again mentioning the financial strength while banks have a higher liquidity ratio. Banks with a smooth liquidity ratio would react

less adversely in case of no favourable monetary policy change. These banks can safeguard their loanable funds in case of tightening policy simply by liquidating some of its assets.

Last but not the least, bank capitalization, which is calculated by dividing equity to total asset, also is a measure of financial strength. When banks have managed the internal fundings ensuring a higher equity capital ratio, finding external funding would be cheaper as these types of banks have lower risk premiums. Thus, these banks are in better position to meet the demand of loanable fund in the time of contractionary monetary policy compared to those banking institutions which preserve a lower proportion of equity to capital ratio.

In order to have a hold on the fluctuations in demands of loanable funds and to distinct the effect of policy change on the part of supplying of the loanable funds the growth of real GDP, which is measured as the yearly percentage change in real gross domestic product of a country, is considered as a macro variable in the empirical model. Inflation, which also captures the business cycle dynamics is taken to see the impact of demand for loanable funds in case of monetary policy change.

To measure the competition –FE assuming a static equilibrium framework was used.

And for the empirical model two step system GMM dynamic panel is used. Stata 14.1 software was used to run the models.

In panel data where longitudinal observations exist for the same subject, fixed effects signify the subject-specific means. Under such analysis, the term fixed effects estimator which is synonymously a known as the within estimator, is used to mention an estimator for the coefficients in the regression model together with that one time-invariant intercept for individual variable. When the model parameters are fixed or of non-random measures, the statistical Fixed Effect Model is used. In a fixed effects model each cluster average is a

group-specific fixed quantity. Such models support in controlling for omitted variable bias due to unseen heterogeneity when this heterogeneity is persistent over time. This heterogeneity can be wiped out from the variables through differencing, for example by deducting the group-level mean value over time, or by calculating a first difference which will eliminate any time invariant measure of the model.

About individual specific effect, there could be any of the following two assumptions may be taken: the random effects assumption and the fixed effects assumption. Under the random effects, it is assumed that the individual-specific effects are uncorrelated with the independent variables. On the other hand, the fixed effect assumes that the individual-specific effects are correlated with the explanatory variables. In case of the assumption of the random effects holds, the random effects estimator is more effective than the fixed effects estimator. However, if this assumption does not hold, the estimator of random effects is not reliable. To see which model is more appropriate for a specific panel data set, the Durbin–Wu–Hausman test is needed to run. According to the results of such test, researcher decides whether to used fixed effect or random effect model. After the Hausman results the bank level competition of each country were estimated by running the fixed effect model.

Arellano and Bond (1991) developed the dynamic panel estimator. Arellano and Bover (1995) and Blundell and Bond (1998) are considered the best for situations for panels with small time periods and large cross sections; the dependent variables depend on the its past values and independent variables are not purely exogenous (correlated with previous and possibly present estimation of the errors); and there are existence of time invariant individual fixed effects and heteroscedasticity and autocorrelation within individuals but not across the variables. The estimation of Arellano-Bond transforms all regressors by differencing and then uses the generalized methods of moments (GMM). This is known as difference GMM. On the other hand, under the system GMM estimation, the standard set of equation in first-difference

with a suitable lagged level known as instruments is combined with an additional set of equation in levels with feasibly first lagged differences as the instruments.

3.3.1 Revenue Equation

The Panzer and Rose H (PRH) statistics is calculated connecting factor price input and bank outputs. H statistics is the summation of coefficients of input price factors in respect of bank earnings. The measure of PRH (or H) statistics can reside from 0 to 1, which calculates the extent of bank's competition. The greater value indicates more level of competition and H=1 means banks are in perfect competitive condition. Thus, the level of competition is measured from the profitability equation is as follows-

$$\ln(r_{i,t}) = \delta_{0,i} + \sum_{j=1}^3 \delta_j \ln(w_{j,i,t}) + \theta X_{i,t} + \varepsilon_{i,t}$$

$r_{i,t}$ = sum of returns of firm i at year t

$w_{j,i,t}$ = values of factor inputs , j= 1,2,3

$X_{i,t}$ = vector of exogenous control variables

$\varepsilon_{i,t}$ is the random disturbance term

H statistics as stated earlier, $H = \sum_{j=1}^3 \delta_j$

Using the firm level panel data, the regression model used as-

$$\ln(r_{i,t}) = \delta_{0,i} + \sum_{j=1}^J \delta_j \ln(w_{j,i,t}) + \theta X_{i,t} + \eta_{i,t}$$

$r_{i,t}$ is the measure of revenue ,is defined as- total interest income ;

There are three factor inputs (J=3)

$w_{1,i,t}$ = interest expenses /total deposit and money market funding

$w_{2,i,t}$ = personnel expenses / total assets

$w_{3,i,t}$ = operating and other expenses / total assets ;

$X_{i,t}$ is the vector of exogenous control variables, where

$X_{1,i,t}$ = equity / total assets

$X_{2,i,t}$ = net loans / total assets

$X_{3,i,t}$ = ln(total assets)

$\eta_{i,t}$ is the random disturbance term.

H-statistics is defined as,

$$H = \sum_{j=1}^J \delta_j$$

Under monopoly, H is equal to zero (H=0).

Under monopolistic competition, H is within the range of zero to one (0<H<1), is the measure of power of competition, where higher value means a greater intensity of competition.

And under perfect competition, H = 1.

3.3.2 Empirical Model

There are several models introduced and used by researchers and scholars to see the influence of bank competition on the policy change by the monetary authority. From those models, some preferred to highlight structural competition measures whereas, others focused on non-structural measures. In the study, to see the impact of banking competition in different economies, the researcher has followed the model which was introduced by Ehrmann et al. (2003). Altunbas et al., 2009; Bhaumik et al., 2011; Zulhibri, 2013; Perera et al., 2014, Yang 2016 are some of the researchers among many who have followed this Empirical model for their studies on the channel of bank lending. To relate banks' lending facilities to the changes by monetary authority, the following equation is used in the study-

$$\Delta \ln Loan_{it} = \alpha \Delta \ln Loan_{i,t-1} + \beta MP_{t-1} + \gamma COMP + \theta MP_{t-1} * COMP + \sum_j \delta_j X_{j,t-1} + \sum_j \lambda_j Z_{ij,t-1} + \mu_i + v_{it}$$

Where i symbolise the bank, j is for the country in which bank i operates and t represents the time.

The dependant variable percentage change in loan is denoted as $\Delta \ln Loan_{it}$ which means deviations in lending activity in bank i in a nation at time t .

MP is the change in short term rate of interest or T-bill rate to represent the variation in monetary policy.

GDP growth rate, CPI, along with the bank characteristic variables- size, liquidity and capitalization are denoted by two vector indicators X and Z . the specification of these variables are listed below-

- $i=1,2,\dots,N$ (number of observations), $t= 1,2,\dots,T$ (number of years) .
- $\Delta \ln Loan_{it}$ is the percentage change of loan (loan growth) of bank i at time t .
- MP is the change in monetary policy indicator, that is proxied by the short term interest rate (Ashcraft (2006) and Adams and Amel (2011)).
- To capture the macroeconomic factors X_j is used as a vector of control variables- GDP growth and CPI.

Z_j is the vector of characteristics of banking institutions' variables, namely -size, capitalization and liquidity.

- To proxy liquidity, capitalization and size, respectively the ratios of bank's liquid assets to total assets, equity capitals to total assets and the log of total assets will be used.
- COMP denotes 'bank competition' measured by the calculated PRH statistics
- MP*COMP is the measure to evaluate the marginal outcome of bank competition on loan growth of monetary policy changes. If we have a θ that is positive and significant, we may conclude that with an increased bank competition the effect on monetary policy weakens on the bank lending channel.

3.3.3 Expected Relationship of Variables with Loan Growth

The empirical model is used to see the consequence on monetary policy change on the banking industries where banks have different levels of competitions. Loan Growth is the dependent variable and the independent variables are broadly defined as macro variables and bank specific variables.

The connection between loan growth and monetary policy indicator is anticipated to be inverse, which means, when the interest rate is increased, there will be negative effect on banks' loan growth. So, higher interest rates would cause a fall on banks' availability of loanable funds.

Banking market structure which are identified by the bank specific variables- size, capital and liquidity can be proven to make policy transmission strong or weak through bank lending mechanism. A positive value of the coefficient of these variables would fade the well-established connection between monetary policy indicator and banks' lending movements.

On the other hand, if any or all coefficients have negative values, that would indicate that the indicator of monetary policy change has a strong bond with the lending decisions of financial institutions. The macro variable GDP which is calculated as the inflation adjusted real GDP is anticipated to have a positive connection with loan growth as in a favourable economic condition, it is more likely to have an upward shift in demand for loanable funds. The measure CPI may also have either positive or negative relationship with loan growth indicating its relationship with the dependent variable.

To see the effect of competition of banks on monetary policy transmission, MP*COMP is calculated. If we have a positive and significant coefficient of the stated term, which is denoted as θ , that will suggest that with increase competition the effect of monetary policy changes decreases on the positive changes on bank loan.

The following table sums up the list of variables, their meanings and the source of their collection:

Table 3.2: Variable Names and Expected Relationship with Loan Growth

Sl	Variables	Definition	Expected Relationship	Source
1	Loan Growth	Annual percentage change in banks' loan	NA	Bank scope
2	Panzar- Rosse H Statistics	The sum of coefficients of input price factors in respect of bank revenue.	Positive/negative	Calculation
3	Monetary Policy Indicator	Percentage change in short term interest rate(T-bill or money market rate) on an Annual Basis	Negative	Bank scope
4	Size	Natural log of Total Assets	Positive/negative	Bank scope
5	Liquidity	Liquid Assets to Total Assets	Positive /negative	Bank scope
6	Capitalization	Equity Capitals to Total Assets	Positive /negative	Bank scope
7	MPx COMP	The multiplication of Monetary policy Indictor and the measure of Competition	Positive /negative	Calculation
8	GDP Growth	Inflation adjusted Growth Rate for Real GDP	Positive	International Financial Statistics.
9	CPI	Consumer Price Index	Positive	International Financial Statistics.

3.4 Conclusion

In this section the methods of collecting the data, description of the variables and the models adopted are discussed broadly. By means of the bank level data and macroeconomic variables, the empirical model would be run to test the relationship between bank competition and monetary policy change. To avoid heteroscedasticity and autocorrelation, Arellano-Bond's system GMM is used. In the next chapter, the results of the regression equations will be explained and discussed in details.

Chapter 4:

Data Analysis and Findings

4.0 Introduction

In this part of the report, the results of empirical model would be described in order to see whether the objective of the study are met or not. To do so, in the first section, descriptive statistics of the data are presented and then by analysing the data the major findings will be discussed. Finally, there will be robustness check to prove the validity of the analysis.

4.1 Descriptive Statistics

Table 4.1 and 4.2 present the country wise descriptive statistics for both eastern and western economies. From table 4.1 we can see, each of the variables do show same pattern in values with little ups or downs for eastern countries. Loan growth which is the dependent variable of empirical model has highest mean in Japan which also has the lowest minimum value and highest number of banks. The second position is taken by Indonesia for loan growth and then comes Bangladesh, India and Thailand consecutively.

The one-year lag value of loan growth (percentage change in loan) shows the same pattern of results than that of the dependent variable. For the banks specific variables, the average values are heterogenous across nations resembling diverse phases of business cycle as well as different competitive and diverse institutional situation. For Capital, Liquidity and Size which are proxied by equity to total assets, liquidity to total assets and natural log of total assets respectively; Thailand has the highest mean, indicating the banks of Thailand have the highest capital, liquidity and they are enormous in size compared to other countries' banks of the sample.

Table4.1: Descriptive Statistics of Eastern Region

Variable name	Bangladesh				India				Indonesia				Japan				Thailand			
	MIN	MAX	AVG	STD	MIN	MAX	AVG	STD	MIN	MAX	AVG	STD	MIN	MAX	AVG	STD	MIN	MAX	AVG	STD
$\Delta \ln \text{loan}$	-.388	.791	.207	.187	-3.759	4.641	.189	.431	-2.472	3.014	.211	.507	-5.202	9.700	.332	.552	-1.154	2.376	.154	.558
$\Delta \ln \text{loan}_{i,t}$	-.389	.791	.179	.229	-3.759	3.983	.169	.412	-2.473	3.014	.226	.540	-3.676	9.700	.333	.544	-1.154	2.376	.165	.560
CAP	-.920	.819	.178	.242	-.608	.786	.097	.088	-.311	.772	.136	.109	-.675	.689	.058	.041	.003	.959	.252	.249
LIQ	-9.138	93.16	16.623	16.902	7.106	.683	.096	.070	.0003	266.12 2	2.609	13.434	.762	99.581	21.778	13.068	.003	109.65	89.39	20.24
SIZE	19.305	25.722	23.924	.928	19.181	29.566	24.909	1.709	18.354	28.004	23.619	1.777	19.221	34.622	25.690	2.062	21.344	29.126	25.75 6	2.279
MP	.071	.128	.088	.022	.06	.09	.069	.013	.040	.150	.064	.022	.001	.473	.118	.148	.012	.046	.024	.009
GDP	-.071	.655	.171	.234	-.519	.495	.072	.251	-.335	.923	.162	.383	-.481	1.229	.320	.521	-.904	.777	.032	.416
INF	.060	.102	.070	.010	.036	.101	.073	.022	.042	.12	.065	.023	.046	.048	.018	.025	-.009	.053	.026	.015
N				126				926				587				8008				188

Table 4.2 depicts the descriptive statistics of the western countries. Most of the countries have higher number of banks compared to the eastern region. France has the highest mean value for loan growth and second highest in the lagged value of loan growth. In case of GDP growth and inflation, again France holds the first and second position respectively showing more fluctuations on the stated variables compared to other countries.

For bank specific variables- capital and liquidity, Sweden has the highest mean value. UK, France, Italy and Australia follow rest of the sequence for capital and liquidity. Interestingly, the banks of Sweden are more liquid compared to other countries' banks maintain a high difference from the rest of the countries. in case of bank size almost all of the countries have similar values indicating the banks of those countries have comparable bank sizes.

Table 4.2: Descriptive Statistics of Western Region

Variable name	Australia				France				Italy				Sweden				United Kingdom			
	MIN	MAX	AVG	STD	MIN	MAX	AVG	STD	MIN	MAX	AVG	STD	MIN	MAX	AVG	STD	MIN	MAX	AVG	STD
$\Delta \ln \text{loan}$	-1.51	2.306	.128	.525	-3.758	5.498	.825	.752	10.55	11.348	.507	1.692	-1.694	2.110	.083	.994	-4.164	6.70	.466	1.205
$\Delta \ln \text{loan}_{it}$	-1.51	2.306	.068	.544	-3.625	5.498	.476	.470	-10.55	11.348	.488	1.842	-1.69	211	.083	.99	-4.164	6.70	.101	.602
CAP	.002	.918	.095	.133	-.088	.954	.122	.133	.001	.840	.112	.58	.004	.58	.134	.064	-.042	.991	.129	.143
LIQ	0	.8133	.128	.149	0	99.296	19.958	20.20	.000	3821	3.172	75.068	0	27532	578.30	2813	0	99.79	34.425	27.581
SIZE	19.59	31.50	25.958	2.260	20.011	33.657	26.628	2.268	20.67	33.714	24.78	1.96	19.317	31.384	24.35	2.17	20.216	32.652	25.209	2.397
MP	.025	.067	.042	.014	.0005	.010	.006	.004	.005	04	.013	.012	0	4	1.58	1.188	.41	5.67	2.344	2.136
GDP	-.578	.904	.047	.497	.045	.815	.463	.311	-.729	1.667	.438	.962	-1.031	1.678	.002	.952	-.413	.598	.063	.363
INF	.012	.047	.026	.007	.006	.022	.014	.007	.003	.034	.019	.012	-.005	.033	.010	.012	.012	.044	.025	.009
N				397				1205				3873				722				1963

4.2 Major Findings

As it is already mentioned in the methodology section, the study will be conducting by first, calculating the bank competition of each country and then by plugging the values on the empirical model to see the relationship of competition with monetary policy change on bank lending channel, in this segment the results of major findings will be discussed.

4.2.1 Measuring the bank competition

As it is mentioned already in the methodology part, to represent the intensity of banking competition, the Panzer and Rose H- statistics will be calculated. Table 4.3 represents the results of the revenue model that was run to test bank competition of the mentioned countries. To measure the bank competition, the static fixed effect estimator was used.

Table 4.3: Bank Competition Measures

Country Name	N _{obs}	N _{bank}	H-statistics	P value	s.e.
Australia	308	45	.2951	.001	.1067
Bangladesh	153	46	.8059923	.000	.0814421
France	2028	231	.5738	.000	.06921
India	918	95	.158	.001	.0444
Indonesia	490	87	.6493	.000	.0495
Italy	4488	546	.511010	.000	.0459678
Japan	6334	497	.3721	.000	.1042
Sweden	1021	95	.5598085	.000	.0652497
Thailand	297	33	.1184975	.578	.2106132
UK	1156	150	.285174	.000	.0714525

The values of PRH statistics of all of the countries are positive and less than zero, indicating the banks of Eastern and Western countries seem to be monopolistically competitive. Whether developed or developing, banks do compete with commercial, state owned or foreign banks and that environment of the competition is monopolistic.

From the results it is observed that developing countries tend to be more competitive in their banking sector compared to the countries which are developed. Gelo's and Rold's (2004); Yuan, (2006); Yildirim and Phillipatos,(2007); Bikker and Spierdijk,(2008); Bikker et al., (2009); M.P. Olivero ,(2011) had similar findings in their studies. Their research claims that

banking competition is high in developing countries, and sometime, they are higher than some developed countries. According to IMF, the countries which are in top 10 as the largest economy; France, Italy, UK, are in the chart. As we can see in the rank of highly monopolistically competitive countries, among the western countries France has a measure of competition of .5738 which is the highest among the countries mentioned in the list and it is lower than some of the countries of eastern region.

So, this study finds that the banks in developing countries have a severe degree of monopolistic competition compared to the banks of developed countries; which is again a great opportunity for emerging economies to handle the strict monetary policy by making it less adverse to the bank lending channels. As the financial institutions of developing countries face many restrictions and direct interference by their central banks, more competition among banks means the banks are more likely to be prepared to face any challenges forced by their authority who takes decision regarding the monetary policy changes.

4.2.2 Results of the Empirical Model

For testing the of the impact of bank competition on bank lending channel of monetary transmission the system GMM estimator is used, where Panzer and Rose statistics is the indicator of competition among banks. To see the endogenous relationship with loan growth, variables that are taken as instruments determining bank characteristics are- bank size, liquidity and capitalization.

The following tables -Table 4.4 and 4.5 represent the results and analytical tests of Western and Eastern countries consecutively.

Loan growth rate is the dependent variable. MP is the monetary policy variable proxied by the shifts in lending rates from year to year. GDP is the indicator of annual growth rate of gross domestic product. CPI is the consumer price index resembles is the annual inflation rate. Size, liquidity and equity are the bank specific variables. The variable 'SIZE' is calculated by taking the natural logarithm of total assets. LIQ is calculated by taking the ratio of liquid assets to total assets. To find the third bank specific variable 'CAP', the ratios of equity to total assets of each bank are considered. The P values are given as the statistics of Sargan and AR (2) tests.

As shown on the following two tables, the p values of Sargan test supports the complete authenticity of the instruments as the values denote that the overidentifying restrictions cannot be rejected for any regression. From the P values of AR (2), we can see that the assumption of second order autocorrelation in the model's idiosyncratic residuals is rejected, indicating the accurate specification of the empirical model.

From column 3 of table 4.4, we can see that the coefficients on the lagged $\Delta \ln Loan_{i,t}$ are positive and statistically significant which states that the past behaviour of loan has an impact on the present loan behaviour, again qualifying the implementation of a dynamic model.

Column 4 presents the coefficients of monetary policy indicator proxied by the short-term money market rate. As we can see, the coefficients are statistically significant and have negative values. So, it makes evidence of negative relationship with loan growth, in other words- banks' loan growth declines when the lending rate inclines.

As expected, the coefficients of GDP are positive and significant. So, with positive changes in GDP will have positive impact on loan growth. The demand for Loanable Fund theory states- the countries with a better economic condition will have a higher demand for loanable funds. The second macroeconomic factor CPI is also significant and positive for most of the countries, demonstrating the fact that there will be a positive pressure on the demand side of loanable funds while there is a positive change in the inflation rate.

Table 4.4: Estimation Results of Loan Growth Equation for Western Region

Variable Name	N_{OBS}	N_{BANKS}	ΔLn <i>Loan</i> $_{i,T-1}$	MP	GDP	CPI	MP*COMP	SIZE	LIQ	CAP	Sargan	AR(2)
Aus	222	46	.6486*** (.1792)	-34.80*** (10.56)	.1387 (.2075)	91.04*** (6.355)	.4255* (.3271)	-.444*** (.1222)	1.0343*** (.3207)	.4367 (.5633)	.333	.141
France	452	237	.3981 (.3620)		.732*** (.2886)		2.392*** (.5432)	-1.803*** (.7342)	.0495* (.0258)	-2.96 (1.90)	.116	.15
Italy	2268	493	.4864*** (.0056)	-91.189*** (24.331)	.9473*** (.0228)	-4.9239 (5.8631)	1.1527*** (.1334)	-1.3721*** (.0291)	-.0003 (.0007)	1.0802 (1.9775)	.71034	.39
Sweden	109	37	.5817 (.4125)	-1.377*** (.3526)	.9055* (.4943)		7.384*** (1.6359)	-.0696 (.1548)	.0003*** (.0008)	1.1567 (.4155)	.3199	.82
UK	1281	176	.4643*** (.0948)	-.4266*** (.1052)	.2250*** (.1093)	20.6931*** (9.9547)	.8221*** (.1622)	1.9698*** (.26201)	.0028 (.0048)	5.0879* (1.9261)	.59026	.25

Note: To measure the Regressions, Blundell and Bond (1988) two step system GMM for dynamic panel data model is used. The dependent variable is the loan growth rate, MP is the monetary policy rate proxied by short term money market or T-bill rates, GDP and CPI are the macroeconomic variables which are calculated as annual growth rate of the natural logarithm of real GDP and annual inflation rate respectively. MPxCOMP is the measure to see the magnitude of competition. Size, Liq and Cap are the bank specific variables. Sargan and AR (2) statistics are presented in p values. 1%, 5% and 10% level of significance are represented as ***, ** and * respectively. The values of standard deviation are stated in () parenthesis.

Table 4.5: Estimation Results of Loan Growth Equation for Eastern Region

Variable Name	N_{OBS}	N_{BANKS}	$\Delta \ln$ <i>Loan</i> $_{i,T-1}$	MP	GDP	CPI	MP*COMP	SIZE	LIQ	CAP	Sargan	AR (2)
Bangladesh	90	30	.32450** (.11840)	-.558* (.1012)	.6174886 (.6034)	13.7622* (22.359)	1.1511* (1.61487)	-1.305*** (.24016)	.015291 (.01371)	.5167* (1.338)	.000	0.116
India	640	81	.3923 (.3152)	-.5810*** (.1111)	.4766*** (.2051)	3.4631** (1.578)	-23.6025*** (4.3543)	- .31134*** (.14056)	1.5130 (1.3449)	.93751* (.5285)	.000	.000
Indonesia	355	55	.2500* (.09114)	48.8502*** (11.00)	-.8325*** (.089454)	-3.5379** (1.822469)	1.5487** (.8459)	.17254** (.05731)	.01713 (.01055)	.7828 (1.2175)	.4	.35
Japan	2741	586	.2687*** (.04059)	-.6947*** (.03257)	1.4330*** (.05532)	39.1054*** (4.5445)	.01537** (.0078)	-.6987** (.08629)	.02763* (.0162)	1.027** (.4961)	.424	.179
Thailand	54	18	-.06040 (.18227)	.2714*** (.128508)	-.6590* (.2465)	42.9046** (13.3147)	.89043*** (.19175)	.81483** (.26075)	.00022*** (.00004)	-.08651 (.53095)	0.516	0.532

Note: See Table 4.4

competitive banking economies suggests that with increased competition, bank show less adversity on monetary policy tightening.

Bank size, capital and liquidity are the three significant variables which measure the strength of the balance sheet of any bank. Their coefficients measure the strength of these variables on loan growth. From the results, it is seen that banks of different sizes react differently on loan growth. As we can see, the coefficients for the size of the banking firm are negative for most of the estimates. Which is goes in line with the findings with Altunbas et al (2009), Olivero et al.(2011a).

According to the previous studies Altunbas (2009),A Perera (2014) -the coefficients when inverse in relation with the loan growth, would signal the function of size of banks as a sign of information asymmetry happens to be reasonably insignificant. In accordance with the principle that banks with substantial liquidity can cushion their portfolio of granting loans in contradiction of monetary contraction merely by drawing down currency and securities, so banks do not have to compromise the lending actions. From the results we can say that to measure the impact of liquidity, the coefficients are positive and significant. Banks with more liquidity may have less sensitivity to contractionary monetary policy.

Then again, the third bank specific variable 'capital' proxied by the ratio of equity to total asset, indicates higher the value of the ratio the more capitalized the banks are. The assumption is highly capitalized banks may show less reaction to monetary policy tightening. Adams and Amel(2005),Gunji et al.(2009),Olivero et al. (2011a,2011b), Amidu and Wolfe (2013) and H.H. Khan et al.(2016) show that financially restrained banks cannot switch to complementary sources of finances while there is a monetary policy tightening. Therefore, these banks have to reduce their supply of loanable funds compared to those banks which are less financially constrained.

So, depending on the market share of banks which are less liquid or less capitalised; countries may have different reactions on loan growth relying on the size, liquidity or capital of banks.

A significant coefficient of these variables indicate loan growth has a positive impact while bank competition is higher on monetary policy change for big, more liquid and more capitalised banks, as they will have lower effect and may find other options to meet the demand of loanable funds compared to smaller, less liquid and less capitalised banks.

Unsurprisingly, coefficient of GDP growth is positive and statistically significant; implying the fact that bank loan growth is higher in emerging economy where the three is inclining demand for loanable funds in both private and public sectors.

To observe whether the connection between banking competition and the intensity of monetary policy transmission contrasts around areas- Eastern and Western countries are selected and the data are presented on tables 4.4 and 4.5. The majority of the coefficients stated in Table 4.4, specifically those on monetary policy and the interaction term are statistically significant for the data of Western countries. Though, the coefficient of the variables on the interaction term for Asian region has shown mixed results that is to be interpreted from different perspectives. In Asia, for some of the countries the coefficient on the interaction term is positive and statistically significant whereas others show insignificant values. so the results show an interesting innovation that, though countries of Asian region are very competitive in their banking sector, they cannot use this as a strength while facing the adversity of monetary policy change. The direct and indirect interreference of monetary authority, more fluctuation in the economic condition and some other economic factors are still to be corrected for the emerging countries that will make their banking sector more efficient and independent to face various challenges.

It can be stated that higher competition in the banking industry results the monetary policy transmission mechanism to get weaker for the Western countries, though yielding assorted results for countries of Asian region, where competition in the banking industry appears to show a less effective role in the transmission mechanism of monetary policy and this finding matches with results of M.P. Olivero et al (2011).

There could be various potential explanations for the varied results in the sample of Asian countries. The cross-country deviation in the intensity of competition in banking sector seems to be significant in eastern countries contrasted to that of the western region. Countries of the eastern region of my sample use a variety of monetary policy instruments. The central banks of those countries have some variety of monetary policy targets for which in some cases it's not the interest rate target that gets most of the attention by the authorities deciding the monetary policy change.

Highlights of Major findings are-

- Banking competition has noticeable significance in both western and eastern economy.
- The banks of eastern countries are more competitive compared to that of western countries.
- With an increased competition, the power of monetary policy change gets weaker, more in western countries where there is more financial freedom and less interference of central banks.

4.3.2 Other Findings

4.3.2.1 Financial Crisis and Its Impact on Banking Competition

As the time period of this analysis includes the global financial crisis period, in this section, whether the monetary policy mechanism got influenced during and/ or after the crisis would be tested.

To cope with the financial crisis, during the stress period different countries took different measures. Switching to fixed rate tenders, central banks' direct intervention in stock and bond market, targeting loan markets with longer maturities are some of the examples Kilponen et al. (2012).

On the other hand, obviously the eastern region's banks got more or less affected by this crisis compared to the banks of western region. To see how effective the bank competition measure was in the years of financial crisis (2007-2010) and the after period of crisis, the data is divided into two-time frames, e.g. – During Crisis 2007-2010 and After Crisis 2011-2014 for both of the regions.

To run the test Fixed Effect model is used and outcomes are tabulated as follows-

Table 4.6: Estimated Results of During and After the Crisis

Variables	Western Region		Eastern Region	
	During Crisis	After Crisis	During Crisis	After Crisis
$\Delta \ln \text{loan}_{it}$	-.863 ^{***} (.1218)	-.827 ^{**} (.262)	.017 (.283)	-.091 [*] (.113)
CAP	-.484 ^{**} (.220)	-.078 (.062)	.899 ^{**} (.373)	.344 (.351)
LIQ	-.007 ^{**} (.0002)	.001 ^{**} (.000)	.016 [*] (.009)	.010 (.008)
SIZE	-1.842 ^{***} (.1159)	-.202 (.256)	-.715 ^{***} (.058)	-1.247 ^{***} (.089)
MP	-.659 [*] (.1198)	-.333 ^{**} (.132)	-2.951 (.605)	.354 ^{***} (.091)
GDP	.2579 ^{**} (.100)	.903 ^{***} (.186)	.739 ^{**} (.335)	.758 ^{***} (.154)
CPI	-31.64 ^{***} (2.512)	47.769 ^{***} (7.180)	13.449 ^{***} (2.340)	11.609 ^{**} (4.101)
MPxCOMP	1.41 (.1322)	.638 ^{**} (.205)	.136 (.030)	.081 ^{***} (.015)

Note: Estimated results of two sub periods. Panel estimation with bank fixed effect. Dependent variable is the loan growth rate. Robust standard errors are in parenthesis. ***, **, * denote significance levels of 1%, 5% and 10% respectively.

Since 2007 the central banks of western and eastern countries were responding to growing financial market stress by repetitively escalating on the set of conventional and unconventional policy equipment. Banks were given many instructions to deal with the crisis in order to sustain in the adverse situation. Disbursement of loan approvals were shirked, business expansions were not the prime concern by the economist, rather staying stable was the key issue. But obviously, not the western and eastern region got the same level of impact neither did their speed of recovery was same when the crisis was over.

As shown on table 4.6, loan growth was negative during and after the crisis period for both of regions indicating the adverse effect during the crisis and a shock after the catastrophe. Secondly, the interaction terms of monetary-policy for capitalization, liquidity and size are significant and negative for western region in case of both of the periods. So, the observation is that those well-capitalized, highly liquid and smaller banks were better able to buffer their lending activity against the monetary policy change affecting the availability of funds before the crisis.

These results establish an indication for the bank lending channel before the crisis, based on the use of these bank-specific characteristics to measure the impact of monetary policy change. In case of the eastern region, banks whether more liquid or less, highly capitalized or not, big or small could not show significance in their efficiency indicating poor bank governance and stability. The results also prove that the channel was not effective during the crisis period.

The monetary variables are negative for both the regions showing the existence of lending channel. But their significance level is low during the crisis period, indicating that - although monetary policy was effective before the crisis period, it has no impact during the era of financial crisis. Interestingly, the interaction term of MPxCOMP which measures the effect of

bank competition on monetary transmission mechanism was insignificant during the crisis period for both western and eastern region. So, this indicates, the measure of bank competition is ineffective during the financial crisis.

This result matches with a discovery of Bech et al. (2012) who created on a dataset of 24 developed countries with data starting from 1960, concluded that during financial crisis monetary policy is least effective. The study also confirms that monetary policy during an economic recession in the absence of such financial crisis would show more effectiveness compared to an economic downturn while connected with a global financial crisis.

Highlights of Other findings are-

- During the financial crisis the effect of monetary policy mechanism is diminished as results show insignificant coefficients during the crisis period.
- The banks of eastern countries took more time to come back from the shock of financial crisis compared to the banks of western countries' banks.

4.3.2.2 Robustness Check

To test the robustness of the findings, the CR3 is considered as an alternative measure of bank competition. The concentration ratio CR3 which measures the market concentration captured by the largest three banks of a country. It is calculated by the market share of three giant banks in compare to the total market share of the banking industry. Higher concentration means the three banks have captured most of the market share so they are in monopoly. So, higher concentration ratio indicates lower market competition.

Table 4.7: Robustness Check- Alternative Measure of Competition

Variable	Western Region	Eastern Region
$\Delta \ln \text{loan}_{it}$.4927 ^{***} (.0056)	.2510 ^{**} (.0982)
CAP	1.7896 ^{**} (.8420)	.4291 (.2828)
LIQ	.0002 (.0002)	.0138 (.0068) ^{**}
SIZE	-1.344 ^{***} (.0220)	-.7068 ^{***} (.0068)
MP	.4990 ^{***} (.0295)	.3985 ^{***} (.1131)
GDP	.9982 ^{**} (.0232)	.9892 ^{***} (.1097)
CPI	-20.565 ^{**} (4.4073)	13.7376 (2.007)
MPxCR3	1.0648 ^{**} (.0447)	.0307 [*] (.0077)
AR(2)	.35	.375
Sargan	.40	.529
Number of observations	4154	3959

A positive and significant coefficient on the interaction term of monetary policy and banking concentration, indicating the fact that banking competition while decreased, that strengthens the transmission mechanism of monetary policy through the bank lending channel. So, the countries where majority of the market share is taken by a specific group of banks, in this study, for example, three largest banks; the monetary transmission will be stronger as the banking competition would be less. The coefficients of other variables are significant mostly below 5% level, indicating the fact that the banks' loan growth is dependent on the economic condition and bank specific variables.

Interestingly, for both of the regions while considering the whole sample from each region, the variable 'size' shows an inverse relation with loan growth. It means smaller banks perform better in case of monetary policy tightening. This falls in line with Olivero (2011) who found the cushioning effect on banks relationship on monetary policy transmission work through small size banks.

4.4 Conclusion

Data analysis and findings is the part of the report that explains the quantitative results on the data taken and measured to accomplish the objectives of the research. In this study, the findings suggest that monetary policy transmission mechanism gets affected by the banking competition in both western and eastern economies. Obviously, the extent differs according to their placement in economies - developed or developing. But the relationship of 'higher banking competition' and 'diminishing power of monetary policy change' is established.

Chapter 5:

Recommendations and Conclusion

5.0 Introduction

Competition among banks fixes up the criteria for providing credit facilities through channel of bank lending to different customers by respective banks. The finding has been examined in this study and the banks of different countries from 2 regions e.g., eastern regions and western regions are considered in this respect. To conduct the test, information of a large numbers of banks were gathered. These banks are from 10 different countries wherein in this study the effort adopted was to run the analysis that different strategies of monetary policy for running credit facilities of various banks are largely depending on how severe the competitions are present among such banks.

After scrutinizing and due analysis, it is found in this study that competition among banks with regard to providing credit facilities through channels of bank lending to the borrowers have a great impact to formulate the content/structure of monetary policy. Wherein competition in the market among banks is extensive in nature, the monetary policy transmission through channel of bank lending of credit facilities to borrower has a lesser impact on such competitive atmosphere. It can interestingly be seen through further analysis that where banks have less market power, such banks or market are much dominated or have much impact by any change in the monetary policy, especially at the time of financial crisis. So, after the above discussion, it can be said that wherein a monetary policy will be effective or not hugely depends upon the severity of competition among the banks in a particular country or regions.

5.1 Recommendations

The objectives of the study were- i) to calculate the banking competition of each of the selected countries of both of the regions and define the type of competition they have; ii) to identify the effect of banking competition on the bank lending channel and iii) comparing the results to see the effect of policy change on bank lending channel of the selected countries of Eastern and Western region.

To achieve the first objective, bank-level balance sheet and income statement data have been used, for assessing the competition level of cross countries on both regions. The results confirm that both for western and eastern region, banks are monopolistically competitive.

The loan growth equation model is adopted using two step system GMM second step and explanatory variables are comprised with the PRH statistics' result along with its connectedness with indicator of monetary policy. To do the analysis static panel models were used.

Focusing specifically on the bank lending channel, there is clear proof that banking competition is in reverse relationship to the efficiency of monetary policy. Banks of lower liquidity, smaller in size and inadequate capitalization have adverse effect of monetary policy change as they can't buffer the lending activities while the government imposes higher interest charges on loans. The rationality of these key results is secured based on robustness checks.

Interestingly, the banking sectors in both eastern and western countries are categorized in a similar manner i.e., having competition in monopolistic manner. It is also seen that the nature of competition among banks generally extinct among the countries of Eastern region comparing with the Western countries. But while comes to the reaction to monetary policy

tightening, we can see the western banks have more efficiency to get less affected in compare to the banks of eastern countries.

It is understood that competition among different banks in different economies has a positive impact for various banks to run the lending business. However, the outcomes of the sample used in this study proves and that there is a reverse relationship i.e., a negative impact on the effectiveness of monetary policy among banks in its lending business can also be borne by such competition.

In a nutshell if the study would recommend-

- After calculating the ‘bank competition’ measure, it was found that banks of both Eastern and Western Region are monopolistically competitive. This competition can help banks to buffer any type of restrictions on lending channel.
- When there are restrictions on the supply side of loanable funds via imposing higher interest rate by the monetary authority, banks can still meet the demand of loanable funds if the banking competition is high. So, banks should be more effective to keep healthier competition among themselves.
- Both the Eastern and Western regions show similar pattern of banking competition. Therefore, for banks, entering into either emerging or developed economies, would not be as challenging as it seems to be. Inclusion of financial institutions in any economy would need the prospective banks to be more capitally strong, large in size and ensuring enough amount of liquidity.

- The true essence of Monetary Policy Change is to control any type of irregularities of the money supply in the market. If banks can avoid the uncertainty of interest rate change while they are highly competitive, then the impose of high interest by monetary authority would not be effective to attain its goal. Under the view of policy perception, the findings exhibit a persuasive need for a rigorous supervision of progresses with regards to the competitive nature among banks along with structure of the market of countries for both developed and developing.

5.2 Future Research Directions

Although the study covered a wide range of data, according to the limitations stated in chapter 1, the following suggestions are given for future research.

- This study contains banking institutions to represent the entire financial industries. So, inclusion of non-banking financial institutions along with banks would make the outcomes more representable.
- From both regions, ten countries were taken. So, including more countries data will make future researches more acceptable.
- Increasing the study period that covers the data of recent time will be suggested for future researches.

5.3 Conclusion

In this research a great emphasis is given to establish an association between mechanism of monetary policy transmission (its effectiveness) and measuring banking competition extensively, with a precise attention on the channel of bank lending both emerging and developed economies. By doing so, the study provides more choices to the preceding works which have given importance to a narrower and non-flexible manner to measure such competition i.e. only given importance on the effects of market concentration. Such influence for concentrating for a broader perspective has been obtained through specifications in precise manner. This is particularly applicable for the banking sector wherein ambiguous connection is found between competition and concentration which is vague in nature. This finding of banking industry is different from other industries as well.

If we talk about the business of banking industry in the atmosphere of emerging market condition in recent time, we shall see there is significant progresses have been made there. Improved financial incorporation and internationalization, increment of the incidents of acquisitions/mergers which pointedly have an upward number with regards to consolidation and thus, exertions of privatization, improvement of foreign banks' financial performance thus stabilizing its existence, elimination of entry blocks, and extensive reformative measures taken to restructure of banks and its financing have remarkably made the banking industry more compact and equipped for any challenges from the market. All these forces of improvements have directly influenced the structure of competitiveness in financial/banking industry.

It is clearly understood that the reason for adaptation of 'Monetary Policy Change' is to make sure the economic stability of any country. The authority induces monetary tightening when it is needed to control the excess flow of money in the market that can lead to higher defaults

and an outburst of inflation. In contrast, under the domain of expansionary monetary policy, supply of loanable funds is increased by lowering the interest rate to create more opportunities in the market. To maintain either of the policies, instructions are being given to such financial institutions to alter rate of lending accordingly. In case of high competition among banks, they may buffer change of the effectiveness of monetary policy change and bypass any constrain by managing the loan funds to maintain their customer relation and profitability. This will definitely hamper the virtue of monetary policy transmission mechanism. If this is the case, then the authority have to think of taking actions in other feasible ways as higher competition would diminish the power of monetary policy change. Thus, the results of this research expose essential requirement of having appropriate step by regulators which is a mandatory necessity to make a balance on undesirable results of additional upsurges in the competition among banks and thus, having an impact on the efficiency of the transmission mechanism of monetary policy for different banks worldwide.

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