Redefining roles of Central Bank

Case study of Bank of Mongolia

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Abstract

In the last two decades, the monetary policy development and implementation in advanced economies are very much connected to the process of integration to the financial market. Banking sector experienced intense securitization of assets process, which evolutioned to the paradoxical situation when new credits were collateralized by the securities for already issued loans, which deteriorated the quality of the loans. This mechanism was behind the greatest financial crises in the modern history that obliged central banks and governments to see the financial, economic and fiscal stability and integration in the new perspective. In connection to that, central banks in all countries had to restructure their model of functioning, and acquire preventive measures for financial fluctuations. In other words, central banking is experiencing revolutionary time of invention of new tools and mechanisms for a better function in the globalised world.
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Introduction

It has been almost a decade since the bankruptcy of one of the largest American banks - Lehman Brothers Holdings Inc., one of the broadest and deepest financial recessions, comparable to Great Depression of 30s. It is hard to believe that it as a local crisis in the subprime mortgage credit market in the US that spread to the entire global financial system and threatened the collapse of many countries' banking systems. During 2008, the capitalization of world stock market lost $32 trillion and voided $2.8 trillion of loan losses. The net capital inflow to emerging market economies fell down by 5 times reaching the amount of $130 in 2008 (Federal Reserve, FOMC statement, 2010). The impact of the crisis was tremendous on production and international trade, particularly in advanced economies with steady production and volume decline. The existing tools of monetary policy were clearly not preventing destabilization, hence the doubt arises about the effectiveness of traditional models of regulation. Central banks were given stress time as the response should have been prompt and efficient.

Financial crises cannot be called a rare phenomenon, 208 currency crises, 124 banking crises, 80 sovereign debt crises and 52 complex crises (IMF, 2008) combining several of their types occurred in world between the period from 1970 to 2007. The current financial crisis has distinctive features in the causes and manifestations, as well as its origin and distribution in the financial market. One of the key reasons for the crisis is the global imbalances of savings and expenditure that was caused by over-demand in advanced economies for assets. Further, the imbalance was facilitated by mild monetary policy and low interest rates. Furthermore, the globalization of financial markets increased the contagion and inability to quarantine the healthy financial markets mainly due to deregulated financial product market. Additionally, information asymmetry played enormous role in the emergence of the crisis as initially the non-transparency of mortgage-backed securities and ratings for them were not credible and authentic. Finally, procyclicality of regulation is blamed for the inefficient regulation of the financial system.

The scope of the crisis was huge which made the anti-crisis measures to be in enormous proportions as well where macroeconomic policies would be integrated to the financial regulation policies. Governments and central banks are busy creating new economic policy principles, in particular, the proposals on the transition to the principles of macro-prudential regulation aimed at ensuring the stability of financial system.
Research Methodology
The main purpose of this research paper is to identify new roles of central banking that was caused by global financial crisis. The global financial crisis allowed authorities to identify the holes in the system as well as predict the sequence of events with precise alignment of cases. The crisis assured the economists that more integrated and well-communicated system is needed in order to prevent the collapse of the market. Furthermore, as the research paper is going to focus on precise country’s case, Mongolia, the overview of how developed countries crisis transitioned to developing country’s crisis is going to be analysed. One interesting fact in the Mongolian crisis is that, the whole world started with financial crisis that led to collapse of economy, currency crisis and global recession. However, the crisis in Mongolia started from the real economy crisis that had chained effect to the financial sector.

Aim of the thesis
The main objective of the paper is to explain and analyse the responsibility and role of central bank in the implementation of the monetary policy within the framework of public policy, and its reaction to the global financial crisis that occurred in 2008 that was one of the deepest and widespread financial catastrophe in the modern history. The financial crisis obliged central banks to implement new immediate tools to stabilize the market, and then overview their previous policies to understand and prevent future failures. The research paper will also overview the complicated mechanism of monetary policy and its interaction to other economic and fiscal activities.

Furthermore, the thesis will observe the global tendency of the financial crisis and response from central bank, mainly the area of developed countries that the crisis initially started. The fact that advanced economies were not able not only to foresee the crisis coming but also had poor reaction to counter the crisis shows that current economic, financial and fiscal policies lack the supervision and certainty in their mechanism. Additionally, the fact that one country’s collapse dragged rest of the world’s financial well being is another fruit for thought. The globalisation of financial market is indeed having beneficial outcomes reaching the main goal of financial tools – receiving profits, but at the same time the fact of interconnectedness drags other more or less not affected economies and financial market behind, in other words infecting healthy ones, gives
authorities responsibility to come up with mechanism that can benefit and prevent crises at the same time.

The case study chosen is Mongolian crisis, a country which is known to have developing economy that has relatively small market and its connectedness to other world economies is not relatively significant. But still being negatively affected by the crisis is the fact that globalisation did reach Mongolian economy, so national authorities should consider to restructure. The choice of developing country that is far away from the interaction and still suffering the same crisis is the main logic behind choosing this particular country. The pre-crisis time, crisis time with authorities response, and its effect afterwards is going to be overviewed to analyse the resemblance with global trends.

**Research question**

The research paper is going to examine three main objectives. First, research paper is going to explore the theoretical background of the monetary policy in order to draw the general role of the central banks functions before the crisis, or in other words classical theory of central banking. Second, paper will study how did response of the central banks differ from the traditional theoretical guidelines that were established. Third, the analysis whether the global trend of central bank response of advanced economies is same as the response of developing, relatively small Mongolian economy, with its small financial market and its changing role during the crisis.

The main tool of the research paper is going to be hypothesis that will guide the whole research paper:

- “Global financial crisis redefined the role of central banks”.

The main objective to answer the hypothesis question is to identify new roles central banks had to pursue in order to save the economy during the financial crisis. The review and analysis is going to be done both on the global scale and to the specific country. The response from central banks will provide basis for legislative policy changes that happened during the crisis, the efficiency of the new legislation implementation, and preventive measures that were taken afterwards recovery.
Methodology

The research paper is going to be a qualitative study that will mainly use secondary data for its research. The structure of the research paper is going to use the top-down approach which starts with the overview of general theory and explanation, followed by the specific analysis in the field the theory was explained. Academic books for the support of literature review, various study papers and reports of international organizations are going to be the main resource of the research paper. They will help with presenting different cases, stories and opinions connected to macroeconomic circumstances and crisis after effects. In addition to this, internet sources were useful in finding the newest ideas among economists and their view on the position of central bank and their responsibility for financial, economic and fiscal stability policies. Monetary policy still have its doubts in the field, hence various outstanding economists have their own definition of good monetary policy implementation that works best. In this connection considering different opinions on the “goodness” or “badness” of current monetary policy will help to visualize and construct own opinion about the issue.

First, the literature review is going to explore the historical transformation of monetary policy until the pre-crisis time, in order to understand its evolution. The history experienced quite big crisis as well which shaped the before 2008 crisis monetary policy, hence it is very logical to overview step by step the main functions of the central banks. This part also will determine the common objectives of central bank throughout the history, as well as generalize each era of the timeframe with common characteristics that the monetary policy was focused on. Second, the research paper is overviewing theory of the monetary policy that is implemented in the modern world. The classical monetary policy overview would be followed by the non-traditional emergence of monetary policy as a result for the response of financial crisis. Third, research paper will thoroughly look into the crisis in Mongolia, by examining the pre-crisis state of economy, fiscal and monetary policies and overview the effect on the market during the crisis. While determining new roles of central bank as a consequence of the economic-financial-fiscal crisis in Mongolia, the global trend response of central banks, in other words new roles of central bank in global trend, is going to be applied to the Mongolian case. The paper will be then followed by concluding the main aspects of the literature review and main findings during the analysis part. Finally, the research paper will bring up recommendations to the whole issue and provide thoughts on improving and preventing the further crises.
Central bank’s historical introduction

This section is going to look into the historical development of central banking as an institution, its general tools used and what challenges formed the pre-crisis central banking system.

*I think I learned as much from studying the history of central banking as I have from knowing the theory of central banking, and I advise all of you who want to be central bankers to actually read the history books*

*(Fischer, 2013)*

Throughout the history the central bank’s functioning can be generalized to 3 main objectives:

i. To maintain price stability with gold standard, pegged exchange rate or an inflation target
ii. To maintain financial stability and stimulate the economic activity
iii. To support the state’s financing needs at times of crisis and constrain abuse of power in normal times

Modern central bank’s functions had some noticeable transition from its origins due to economic and financial environment. Unlike one-sided mathematical orientation, it broadens the temporal and cultural definition of the laws of development. Significance of this can be seen in the last 20-25 years when academics at that time argued that central banks decision can be substituted by formulas and mechanisms. One research (Banfi et al, 2013), on monetary tool changes accentuated that inflation targeting simplifies and makes primitive monetary policy. In worst case, central bank can agree on the inflation rate with the government.

The research of Goodhart (2010) identified three main epochs of central banking development throughout the history: Victorian era, the decades of government control and triumph of the markets (Table 1). The time between these epochs were usually times when central banks were trying to identify their roles, for example, the era after triumph of the market is the subprime mortgage crisis that resulted in global financial crisis.
Goodhart (2010) distinguished Victorian; decades of government control and the triumph of the markets epochs as three main highlights of central bank history (Table 1). The times that central bank’s role was in transition, like current modern world, are typically when central banks are on the search to find their role. Another economist (Shirakawa, 2010) defines two important designations of the global financial crisis: sustainable growth path for the economy and preventive measures to avoid future crises.

Table 1. Central banking throughout the years (Goodhart, 2010)

<table>
<thead>
<tr>
<th>PERIOD</th>
<th>NAME OF PERIOD</th>
<th>CENTRAL BANK ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1840-1914</td>
<td>Victorian era</td>
<td>• Establishing financial stability</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Central bank rules usually observed rules of the thumb</td>
</tr>
<tr>
<td>1930-1960</td>
<td>The decades of government control</td>
<td>• Advice on economic policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Administration of the system of controls</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Management of markets</td>
</tr>
<tr>
<td>1980-2007</td>
<td>The triumph of the markets</td>
<td>• Inflation targeting, as a system, becomes emphatic</td>
</tr>
</tbody>
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The history of central bank narrows down to the current description of the activities they do: supporting central banks sustainable economic growth and implementing price and financial stability policies.
Central bank in pre-crisis era

This section is going to elaborate the pre-crisis environment of monetary policy, how banks operated in the normal times.

The security of the value of the currency in terms of low domestic inflation or stability of exchange rates would cover the monetary stability, while smooth and efficient allocation of resources will help to function the financial system. Smooth and effective functioning of the financial market allows the private sector to make optimal consumption and investment decisions, an act that is fundamental for the long-run development of the economy. The main functions of the central bank in the pre-crisis time were (1) issuance of money, (2) conduct of monetary policy, (3) payment systems facilitation, (4) lender of last resort, and (5) banking supervision (Mishkin F.S, 2001). The key functions are going to be overviewed broadly in the following chapters.

Issuance of money
Central bank in most countries is the banknote issuer, and the modern banknote is being printed with countersignatures of the governor or the chairperson of the country’s central bank and the finance minister (or the treasury secretary in the United States and the Chancellor of the Exchequer in the United Kingdom). The countersignatures reflect the fact that the banknotes issued by the central bank has the backing of the sovereign.

The banknotes have now evolved together with the technological advancement and now money can be issued through electronic means. For example, central bank is liable to commercial bank for the government securities hence they electronically credit the commercial banks account held at central bank without printing banknotes. Of course, that money can be converted into banknotes from central bank when needed. In either case, the process will be called as money creation process as it enters the market and circulates in the economy (Bank of Mongolia, 2015). The money creation process multiplies the initial amount of money issued by the central bank, which results in a much larger amount. The final amount of money that comes out of the money creation process constitutes money supply.
The Money Creation Process and Its Influences on Economic Activity and Price Levels

It would be no surprise that money creation process does have an impact on economy and its activity. Once issued money is on commercial banks’ balance sheet the bank will actively seek to lend out that money to profit, as it is one of the core functions of the commercial bank. Idle money is not beneficial because there is expense for storage, interest that is paid to depositors and opportunity cost if money has been used. The more money is issued the more commercial banks give out loans, the more money is in the system the more is commercial banking competition making loan interest rates lower.

Inflation
The lower costs of borrowing and less stringent borrowing terms enable borrowers to engage in more economic activity. Firms can borrow more money to buy raw materials, build new factories, hire employees, and generally engage in production. Individuals can borrow more money to buy houses, cars, or other gadgets, which will, in turn, prompt more production and investments by firms. As firms and individuals use the money to bid up resources, products and services are going to experience increase in price. Indeed, if the central bank keeps on printing and issuing new money, money will be worth less and less in terms of goods and services that can be purchased. A situation in which there is a continuous and sustained, as opposed to a one-time, rise in the general level of prices is called inflation (Blinder, 1999).

Hyperinflation
At the extreme, if the central bank keeps issuing a lot of money, money can very rapidly diminish in value, such that the problem of hyperinflation ensues (Blinder, 1999). With hyperinflation, the value of money can fall so fast, even minute-by-minute, that it is not a good store of value. People in a country with hyperinflation would rather use the money to buy goods and services right away once they get the money. With hyperinflation, people are not able to make optimal investment decisions since they cannot reasonably predict investment costs and revenues even in the short term.

Recession
In contrast, if too little amount of money is introduced into the system, economic activity could very well slow down or even fall, tipping the economy into a recession (Blinder, 1999). With a
scarcity of money to lend out, banks will charge higher interest rates and impose more stringent terms on their loans. Firms will find it hard to borrow to buy raw materials, invest in new factories, hire employees, or expand their production. Individuals will find it hard to borrow money to finance their purchases of goods and services, which also affects the firms that provide those goods and services. Indeed, as money in the system becomes scarcer, and demand for goods and services falls, firms might have to cut their prices. As firms are unable make profits, they might have to also cut down on their number of workers, which would further reduce aggregate demand in the economy.

Deflation
At the extreme, if money is in fact scarce, economic activity could fall so much so that a large number of firms will fail, resulting in high unemployment. Surviving firms, meanwhile, might be forced to keep cutting prices to attract customers. The number of the firms’ customers, meanwhile, could keep dwindling as more people lose their jobs. The situation where the general price level continuously falls is known as deflation (Blinder, 1999).

Since the amount of money that the central bank introduces into an economy can seriously affect economic conditions, it is very important that the amount of money the central bank issues into the economy is appropriate for economic conditions. The central bank might also need to regulate the money creation process and money conditions in the economy through other means.

The regulation of money conditions: the conduct of monetary policy
Central banks have the power over the setting of reserve requirements hence they are in charge of regulating the flow and amount of money in the economy. As discussed before, when central bank conducts monetary policy in the inflation targeted regime households are livelier to engage in the market. Whereas, insufficient money supply will stagnate the market idling households and firms. Hence, making sure there is right amount of money available at the right cost to households and firms is something that the central bank has always aspired to as the regulator of money.

Money Supply versus Reserve Requirements versus Policy Interest Rate
Modern central banks regulation of money have become sophisticated and indirect. Since the relationship between the level of base money and the total level of the money supply in the
economy could be very unstable, most modern central banks no longer attempt to set a target for the money supply in the economy. Furthermore, central banks tend to refrain from frequent adjustments of reserve requirements, the percentage of deposits that banks must keep. For example, if the reserve requirement is raised to slow down the economic activity with no excess reserves then commercial banks would probably ask their loans back to meet new requirements. The process of taking the loan back would be pricey both in mercantile and psychological levels disrupting economic activity.

So for smoother regulation central banks use *policy interest rate* and *financial market operations*. A policy interest rate is a short-term interest rate that a central bank chooses to directly influence, which gives a signal to the public as to what it sees in terms of future economic conditions and future price levels. By raising the policy interest rate, the central bank signals to the public that it wants to tone down the acceleration of economic activity and tame the rise in the general price level. By lowering the policy interest rate, the central bank signals to the public that it wants economic activity to pick up and that it wants to allow a rise in the general price level. By keeping the policy interest rate at a particular level, the central bank signals to the public that money conditions in the economy are appropriate for a favorable outlook of economic activity and the general price level. Financial market operations, on the other hand, help ensure that the policy interest rate stays at or near the level that the central bank wants to keep.

*The Use of Policy Interest Rate and Financial Market Operations to Regulate Monetary Conditions in the Economy*

Policy interest rates can be increased by central banks if they think that money conditions are too loose. The raise will also increase the opportunity cost of money making lenders more discrete, especially with modern day system the information would be available in real-time, hence lenders adjust their lending behavior right away, raising the cost of their loans. On the other hand, if there is excess of money supply central bank will take into action like selling government bonds, draining money from financial system. On contrary, if money supply is too tight central bank lowers the policy rate the opportunity cost of money will be lower and lenders will be more willing to lend. Central bank actually can buy government bonds in the financial market the central bank will effectively insert money to the system.


**Payment systems oversight and provision**

Commercial banks hold accounts at the central bank for various operations, like clearing. This practice is quite logical as central bank is no longer profit driven organization and commercial bank no longer sees them as competitors, as well as central bank is the most secure for commercial bank accounts. When commercial banks transacted among themselves, it became easier for them to settle with each other via their accounts held at the central bank. Accordingly, the central bank acted a banker to commercial banks by taking in deposits and clearing funds for them.

At present, instead of simply clearing funds for commercial banks, the modern central bank now often takes on a more active role in national payment systems. With regard to payments systems, the modern central bank often actively participates as (1) a regulator that ensures smooth functioning of the country’s payment systems, and (2) a service provider of national payment systems.

**Payment Systems Oversight**

As a payment systems regulator, the central bank sets rules and guidelines regarding payment systems. The central bank’s main aims in setting rules are to (1) reduce the probability of a payment systems failure, (2) improve efficiency in payment systems, and (3) ensure fairness and equity in the use of payment systems.

Payment system failures can cause ripple effects through the financial system and the economy, as participants might rely on payments to meet their own liquidity obligations. In extreme cases, liquidity shortages resulting from payment system failures could cause financial panics and bank runs. Consequently, failures in payment systems have the potential to disrupt economic activity and cause financial instability. It thus is in the central bank’s interest to reduce the probability of such failures, which could lead to instability in both the financial system and the economy.

Apart from reducing systemic risks, the central bank also regulates the payment system for efficiency reasons. New technology often brings improved efficiency. In many cases, however, the private sector might not have the incentive to move to newer technology, as it often requires major investments. To help prod the private sector along, the mantle often falls on the public sector, particularly the central bank, to issue guidelines and regulations to help coordinate players in the private sector to move to the new technology on an appropriate timeline. Efficient
payment systems are also integral to efficient monetary policy operations. Efficient payment systems can help the central bank inject and absorb liquidity more quickly. Likewise, efficient payment systems will allow commercial banks to efficiently manage their reserves. Commercial banks can borrow and lend more quickly as needed. Consequently, to ensure maximum efficiency in monetary operations it is also in the interest of the central bank, as the conductor of monetary policy, to get involved in designing and regulating payment systems.

Furthermore, since payment systems are often a public good with positive externalities, the central bank might want to set rules that ensure equity and fairness in the economy. The infrastructure of a payment system network often has economies of scale and requires large investments that can only be made by the public sector or large players in the private sector. When the private sector is the one making the necessary investments, it might be beneficial that smaller players also be able to access the network at a price that is affordable to them, yet fair to those large players that made the investments.

*(Payment Systems Provision)*

The modern central bank is often the key service provider for the large-value fund transfer system in the economy. For interbank fund transfer payments, it is often most efficient for commercial banks to use a single integrated central system, rather than relying on different, fragmented systems. Such a single integrated central system, however, is a public good. Without public intervention, commercial banks that initially invested in such an infrastructure are unlikely to allow other commercial banks to join in, or free ride, the network. To get around this problem, most central banks often become key service providers of wholesale payments themselves. For small-value fund transfer payments, however, central banks often get involved as a service provider only with certain types of instruments, notably check clearing. Central banks would be unlikely to be involved with credit card clearing, however, since private sector service providers already provide extensive services in this area.

*(Lender of last resort)*

It is natural for commercial bank in trouble to ask for help to the central bank for help. Prior to the recent global financial crisis, however, the modern central bank often played down this function for fear of the so-called moral hazard problem.
Moral Hazard

In a banking context, the moral hazard problem (Martin A, 2005) suggests that if banks know that they can always seek assistance from the central bank, they will be more reckless in their behavior. The theory suggests that commercial banks might lend to risky projects thinking there is security pillow in face of central bank. To discipline central bank requires to find solutions by other means or just not help at all unless it will not jeopardize the whole financial system.

In the wake of the recent global financial crisis and the subsequent euro crisis that threatened to destabilize the global economy, however, many central banks had to again embrace the lender-of-last-resort function in a very significant manner (Martin A, 2005). Major central banks, including the Federal Reserve, the ECB, and the Bank of England, all became lenders of last resort to prevent the crises from destabilizing the financial system and the economy even more severely than it already had.

Forms of Lender-of-Last-Resort Function

Theoretically, the central bank can assume the lender-of-last-resort function in three main forms (Blinder, 1999). First, it can lend liquidity to individual banks. Second, it can lend liquidity to the market, rather than to specific individual financial institutions. Third, it can inject risk capital into troubled banks, which effectively also implies a takeover of the banks by the government.

In the first form of the lender-of-last-resort function, the central bank could provide short-term loans, possibly against collateral such as government securities, directly to a troubled bank so that it could meet its short-term obligations first. Once the troubled bank has met its short-term obligations, it could return to normal functioning and would be expected to repay the borrowed funds to the central bank. The fact that the bank could return to normal functioning after meeting its short-term obligations suggest that the bank was merely facing a liquidity problem rather than a solvency problem. In the second form of the lender-of-last-resort function, the central bank could lend out liquidity to the market, rather than to specific individual financial institutions, to reduce liquidity shortages that occur across the financial system in times of extreme stress. Examples from the global financial crisis of 2007–2010 include the Federal Reserve’s Primary Dealer Credit Facility, which was set up to ease up liquidity conditions in the repo market as well as the Federal Reserve’s Commercial Paper Funding Facility, which was created to ease liquidity...
conditions in commercial paper market. In both cases, the Federal Reserve was willing to lend to nonbank financial institutions as well as nonfinancial firms, which were in many cases against illiquid collateral to help alleviate liquidity shortages in these markets.

With extra liquidity from the central bank, financial institutions or firms are able to meet their short-term obligations better. The lending can also help bring down the general level of short-term interest rates or prevent them from rising further. If short-term interest rates are low, financial institutions will be more willing to lend and borrow both among themselves and with other customers, which will help ease general tightness in liquidity and allow economic activity to continue.

The third form of the lender-of-last-resort function applies to cases in which the bank is unlikely to be able to return to normal functioning even after meeting its short-term obligations. In such cases, the central bank might need to inject risk capital into the bank and take over the management of that bank. Through injecting capital, the central bank would take ownership of the bank and would work to find a suitable resolution to the problem.

**Bank supervisor**

The role and burden of the lender of last resort is upon the shoulders of central bank hence it is in their interest to regularly assess the health of commercial banks, evaluating the worthiness and willingness to pay for such help. The regular assessment of central banks on commercial banks gradually evolved into banking supervision, under which the central bank not only has a formal duty to inspect the soundness of commercial banks’ operations but also to issue regulations that will ensure such soundness. Bank supervisors have quite diverse number of tasks (Blinder, 1999) such as (1) licensing of new banks, (2) examination and monitoring of banks’ operations, (3) setting regulatory requirements for banks, (4) enforcement of regulations to ensure corrective action, and (5) providing resolution for troubled financial institutions when necessary. The aim of these tasks is to reduce risk with respect to individual financial institutions as well as to the system as a whole.

**Licensing of New Banks**

Licensing by central banks ensures new banks for establishing sound framework. The process goes as following (Bank of Mongolia, 2010): new commercial bank top management have to submit an application to the central bank. As profit driven organization, the business plan of the
bank will be thoroughly examined and assessed for the profitability and how quick that profit will come. Management as well as BOD will be also examined to see assess their appropriateness.

Central bank has an opportunity to reduce systemic risks and innovation/competition encouraged by shaping the financial landscape under its jurisdiction. If central bank thinks that existing competition among commercial banks are healthy and sufficient and allow more entrant to increase the competition, there is a risk that market players will resort riskier activities to achieve adequate return because of excessive competition. In contrast, if central bank evaluate the market to be insufficient to lighten the competition they can issue licenses for new players and provide more competitive financial service.

Examination and Monitoring of Commercial Banks’ Operations

Examination and monitoring is the basis of supervisory process of central banks to ensure the compliance of commercial banks to rules and regulatory requirements. Modern bank examination consists of on-site supervision and off-site monitoring. The on-site supervision is when central bank staff is sent physically to the commercial banks entity for inspection. Off-site monitoring is done between on-site examinations and consists of central bank monitoring and analyzing the performance of examined bank using data from on-site examination to regulate the safety and soundness of the banks condition and performance.

Setting Regulatory Requirements for Commercial Banks

In order to operate in a safe and sound manner of commercial banks central bank set up rules and sound manners. These regulations range from organizational governance and risk management practices to capital and reserve adequacy. The main tools to do so is to set capital and reserve requirements. Capital requirement is the minimum capital that each bank needs to have to buffer against unexpected losses while reserve requirement is the minimum reserves that each bank needs to hold against deposits to meet liquidity demand,

Enforcement of Laws and Regulations to Ensure Compliance

If commercial banks are found to be not in compliance with central bank laws and regulation the later has the full power to take measures because it has enforcement power over the former and uses the power to ensure that banks pursue corrective actions and prevent risky situations. Milder
measures include moral persuasion, whereby the central bank has discussions with the management of a commercial bank to persuade it to alter its gray area actions. More drastic measures that the central bank might use to ensure compliance with laws and regulations can include removal of directors or managers of banks for negligence or misconduct and installation of a temporary administration, as well as a recommendation of a forced sale or liquidation of the bank.

*Resolutions for Troubled Financial Institutions*

Despite central banks have tools to rule and regulate commercial banks there is still the possibility for the trouble, for example the commercial bank was very successful in hiding shady troubles or sudden market turbulence. Therefore, central banks have prepared actions for these kind of situations as well. First, closing of the bank and asset liquidation (Blinder, 1999) to repay the banks’ liabilities. Second, conservatorship meaning taking the administration of the bank into their hands temporarily. Third, purchase and assumption of third party healthy bank to buy bankrupted banks assets with partial or full liabilities as well. Last, nationalization where the government takes over the bankrupted bank with all the assets and liabilities.
Central banking during and after crisis

This section is going to focus on how did monetary authorities responded to global financial crisis. The crisis originated in the US, so majority of the examples would be abut how Federal Reserve reacted to the crisis, as well as another big financial area – Eurozone. The main aspect of the literature is from Mishkin’s paper “Central banking after crisis” as he is one of the main economists that research the changing roles of central banking.

“Food Stamp recipients didn’t cause the financial crisis, recklessness on Wall Street did”.

Barack Obama

The above-mentioned theory is general aspect of central banking. What would be discussed next is how did scope of activities changed of central banking after the crisis. Mishkin’s analysis of the crisis and central banking identified 6 key facts learned from the crisis:

Financial disruptions making the macro-economy highly nonlinear

The financial disruption by Mishkin (2012) is basically an information asymmetry in financial market that deteriorates value of capital for productive investment opportunities. Financial disruptions are inherently nonlinear because they involve an adverse feedback loop in which the decline in asset values leads to a contraction in economic activity, which then leads to a further decline in asset values, a further contraction of economic activity, and so on (Mishkin, 2012). This creates a moral hazard problem and mitigates the adverse selection as the asset price decreases leading to devaluation of collateral. The general idea of collateral helps for the risk aversion, because borrower has more incentive to not take unbearable risks and lose the collateral, hence the moral hazard problem reduces by itself. But that was not the case with subprime mortgage crisis. High demand on real estate declined its price, i.e. asset value, that caused the collateral to fall as well, leading to worsened scenario for adverse selection and moral hazard and contraction of economic activity. The economic activity contraction leads for further reduction of asset values that dropped the value of collateral, which in response contracted the economic activity further, and caused additional decline in asset value – vicious cycle. The crisis showed how nonlinear the financial and macro-economy could be, as with seized up financial system both credit and liquidity spreads increased dramatically (Mishkin, 2012). Hence it made
the economic activity contraction highly non-linear as well. We can see the proof by the decrease of real GDP not only in US with annual rate of -1.3% in 4th quarter 2008 (reference), but also with the rest of the world that fell by -6.4% in same timeframe (reference).

*Disruptions to the financial sector have a very negative impact on economic activity for a long period of time*

Economic theory has a V-shaped recovery model after recessions by Reinhart and Reinhart (2010), however the deleveraging process takes a long time (Mishkin, 2012). The observation of recovery after previous global financial crises, like post-World War II era (after 1945), Great Depression (after 1929-1939) or oil shock (1973), the real GDP growth rates had median decline of 1% during the decade after each episode. It is exactly a decade since the most recent financial crisis, the median decline of GDP per capita growth (World Bank, nd) from 2008 to 2016 is 1.063, remaining below to the 2007 level. Mishkin states on this – “we now recognize that the cumulative output losses from financial crises are massive, and the recent crisis is clearly no exception”.

*Price and output stability do not ensure financial stability*

Achieving price and output stability is a common view of theoretical academic world and practical central bank on financial stability. Numerous studies showed that monetary policy that establishes optimal inflation and output are going to stabilize prices for asset. Policy-makers were satisfied about financial disruption risks because central banks were quite successful in inflation stabilization and decreased the volatility of business cycle fluctuations. But it might have even promoted the risk, because low volatility lured potential investors as economic system seemed relatively risk-free. That lead to decrease to low levels the credit risk premiums and underwriting standards for loans. It also might have connection why some market participants (rating agencies) used shady tools to back-up their loaned backed securities. Some recent theoretical research even suggests that benign economic environments may promote excessive risk-taking and may actually make the financial system more fragile (Gambacorta (2009) (find this work for reference). To conclude, we can practically say that there are benefits in price and output stability, but policy implementing only these goals is not enough for good economic outcomes.

*Low interest rates can encourage excessive risk-taking.*
It is very logical that low interest rate will lead to excessive risk taking and fluctuate financial instability. Before the peak of the crisis, Professor of Economics at Stanford University John B. Tailor conducted research in 2007 “Housing and monetary policy” where basically predicted the soon burst of housing bubble (Taylor, 2007). He found that low interest rate of 2002 to 2005 deviated appropriate practice and also that subprime mortgages have very poor credit assessments, one of the main reasons of the financial collapse.

There are basically two reasons why excessive risk taking is influenced by low interest rates. First, in order to have higher yield financial institutions are going to increase their actions, i.e. risk taking, because the more is the risk more compensation is going to return. Second, low interest rates increase net interest margins an increase the value of financial firms (Mishkin, 2012) that allows financial institutions to reinforce their leverage hence taking more risks. Furthermore, low interest rate five high incentives to lending because they increase collateral value. Probably due to some lessons learned from history, IMF has warned (Elliott, 2017) that prolonged cheap borrowing costs would hit earnings and force financial institutions to change business models.

One of the study (Delisa & Kouretas, 2011) researched the correlation of interest rate level and bank’s risk taking. The paper actually used 18000 annual reports in euro area banks with timeframe of 2001-2008 and revealed strong empirical evidence of negative correlation between two variables. Another study (Adrian & Shin, 2009) examined the role of financial intermediaries in monetary economics and find out that when federal funds rates are decreased term spreads increase leaving net interest margin for financial intermediaries. The more financial institution is profitable the higher is an asset growth, the higher is an asset growth which is shift of credit supply, the higher is GDP growth.

*The zero lower bound constraint on policy interest rates binds more often than expected.*

Conventional expansionary monetary policy suggests that even in deep crisis the policy interest rate will not go to zero lower bound level to stimulate the economy, so conventional monetary policy have no to little effect, hence Mishkin (2012) suggests following nonconventional policies:

- Lowering long-term interest rate
- Lowering risk and term premiums by purchasing securities
- Lowering the value of domestic currency, which would increase foreign demand for domestic production

Federal Reserve is keeping their policy rate at the zero lower bound since 2008 to late 2015 (FRBSF, 2016) which means they were not stimulating the economy to grow. At this time Fed used unconventional monetary policies like huge asset purchasing and communication to shape expectations which will be talked more broadly hereinafter. This suggests that zero lower bound problem is more frequent and not short-lived as it was previously expected. Furthermore, it can be observed that contractionary shocks from financial disruptions are more serious and lead zero lower bound to occur more, and have much greater influence on central banks as anticipated ex-ante crisis time.

Financial Crises Often Lead to Fiscal Crises

Massive bailouts of financial institutions, fiscal stimulus packages, and the sharp economic contractions (Mishkin, 2012) led to acute budget deficit universally in all affected countries. The vivid example of crisis influence is PIGS (Portugal, Italy, Greece and Spain) countries from Eurozone that were not able to refinance their government debt neither to bailout their own indebted banks. The main reason why PIGS problem had important attention from EU was that it put under threat not only euro currency, but also the existence of European Union because default on their sovereign debt meant leaving Eurozone.
Central bank’s response to the crisis

The crisis itself was a great stimulus for central banks to realize the loops in the monetary policy and identify factors that were done for some time but accumulated lead to crisis. It is important to state that conditions that made “mistakes” should not be substituted with new models and mechanisms, but rather enhance the quality of it. For example, even after crisis central banks should still focus on flexible inflation targeting on long run because it is an important tool for stabilizing monetary policy. What should be done is to reconsider the content and identify the main loops in that tool. Mishkin (2012) suggests 4 areas to conduct extensive changes.

The interaction of monetary and financial stability policies

It is believed that monetary and financial stability policies are separate, but as we discussed in previous part price and output stability cannot ensure financial stability, or how low interest rates encourage risk taking and financial disruptions interfere stable economic activity. All these facts give food for thought about monetary and financial policy correlation, and to do so identifying origins of financial instability is crucial.

Asset bubble is behind the subprime mortgage crisis, but it became a crisis because of its interaction with financial sector which resulted in credit-driven bubble. The changes in financial sector rapidly increased expectations about economic prospects, which led to credit boom and that, increased the demand and prices for some assets (Mishkin, 2012). Asset value increase encourages further lending increasing the demand, which also increases their price (Mishkin, 2012), and so on until it creates the bubble which is bound to burst someday. The collapse makes the process in reverse where loans become bad, lenders no longer willing to supply the credit; demand for assets diminishes together with asset price. All these results in erosion of balance sheets at financial institutions, which constraints credit and investment market even more. Hence, it poses a macroeconomic risk as lack of credit supply deject microenvironment like businesses and household spending.

Furthermore, there is another type of bubble which is called irrational exuberance bubble which basically means that there is a high optimistic expectation about economic activity but financial institutions are far less influencing the bubble. The great example for that can be the dot.com
bubble where bank lending was not linked to rising equity values so in the end when the bubble did burst the balance sheet of banks where not deteriorated.

These two type bubbles can have logical thought that central banks should focus more when credit-driven bubbles are emerging in the market, restraining and intervening to the market.

The identification of the bubble is another story, but credit-driven bubbles have few distinctions. Lenders weaken their underwriting standards, the risk premia become very low and credit extensions increase inorganically (Mishkin, 2012) can be just some examples of it. Furthermore, asset bubbles do not damage the economy on the large scale, while credit-driven bubbles do lead to highly nonlinear phenomenon as was explained above. In addition, if the central bank implements policies to stimulate the economy but it fairly do so, it might be a good sign to introduce policies restraining excessive risk taking because it is probably the credit-driven bubble. The logical chain of events start with low interest, that we explained previously, that leads to excessive risk taking, the natural next action is that credits are extended excessively as well and here credit bubbles are developed resulting in market failure. Central banks here use prudential regulatory measures to constrain credit bubbles and the well-functioning one contains adequate disclosure and capital requirements, liquidity requirements, prompt corrective action, careful monitoring of an institution’s risk-management procedures, close supervision of financial institutions to enforce compliance with regulations, and sufficient resources and accountability for supervisors (Mishkin, 2012). These tools will secure individual firms (micro-prudential supervision) in the market., while increase of capital requirements, lower ceilings on loan-to-value ratios, higher haircut requirements for repo or Pigouvian-tax will interfere the interaction of asset bubbles and credit supply (macro-prudential supervision). But implementation of macro-prudential supervision might face an obstacle in face of financial institutions that can have higher possibility to lobby politicians, because credit bubble timeframe is the most profitable for them. Although, the expectation that macro-prudential policy will respond to high-risk taking with higher interest rate will make credit market not-profitable. This expectation of increase of risk taking leading to rise of interest rate will not happen as it was initially intended. However, this action would be detrimental for central banks as it will create confusion as the policy focuses on financial stability and neglecting inflation target.
Another side effect of central bank intervention to financial stability is when it’s not needed. What central banks should focus on is to identify whether credit bubble is emerging. High credit growth, increasing leverage, low risk spreads, surging asset prices and surveys to assess if credit underwriting standards are being eased (Mishkin, 2012) are tools that can help central banks to indicate the credit bubble. Basel II that is going to take into force in 31 March 2019 made changes to previous Accords focusing a lot on monitoring credit market conditions.

To conclude, the obsolete approach that monetary and financial stability policies are separate units are no longer true. In order for policies to function properly price stability, output stability and financial stability should be targeted simultaneously and central banks should take on systemic regulator role.

**Nonconventional monetary policy**

The recent global financial crisis has confronted central banks with a number of questions beyond the scope of many conventional accounts of the theory of monetary policy; in this regard the reaction of central banks was implementing unconventional tools. In order to discuss the unconventional policy implementation some clarification might help for further discussion.

Pre-crisis monetary policy mainly used conventional tools like open market operations, discount rate and reserve requirements (Garrat, 2010). For example, open market operations focused on overnight interest rates in the interbank money market which in its turn made guideline for the supply of central bank money. Risk-wise for central bank’s balance sheet the liquidity-providing operations took place in the form of reverse transactions against a menu of eligible collateral (Smaghi, 2009), or in other words, in regular economic state central banks didn’t give credit for individual firms nor state, and didn’t buy government bonds and corporate debts. Being in control of key interest rates central bank is effectively managing the liquidity on the market and pursues its main objective of price stability (Smaghi, 2009).

But disruptions in the market that simultaneously affect macro environment and fiscal stability make conventional tools ineffective. In abnormal times central banks switch to unconventional monetary tools basically because of two reasons. First, with conventional tools the nominal interest rate is zero lower bound area but still no effective outcome comes from it hence additional monetary stimulus is reached by unconventional tools like (i) guiding medium to long-
term interest rate expectations, (ii) changing the composition of the central bank’s balance sheet, and (iii) expanding the size of the central bank’s balance sheet (Smaghi, 2009). Second, the lesson from the mortgage crisis showed that unconventional tools should have been used even before lowering the policy rates. In the peak of the crisis, spread between the three month EURIBOR and the overnight interest rate EONIA (Smaghi, 2009) jumped to 156 basis points from 10 drying up the market liquidity and the cloud of uncertainty hung over the market. The economists think that unconventional monetary policies will lead to hyperinflation, USD collapse, intense increase in long-term interest rates and commodity prices with expanded central bank balance sheets. But after crisis state can disapprove with real statics of too low inflation in advanced economies, decrease of long term interest rate and commodity prices like gold falling by 25% in 2015 (Roubini, 2015).

The paper is going to discuss four forms of nonconventional monetary policy and simultaneously analyze the impact of them during the crisis and its influence (Mishkin, 2012): 1) liquidity provision in which central banks expand lending to both banks and other financial institutions; 2) asset purchases of both government securities and private assets to lower borrowing costs for households; 3) quantitative easing, in which central banks greatly expand their balance sheets; and 4) management of expectations, which involves central banks committing to keeping their policy rate at very low levels for a long period of time.

*Liquidity provision*

Liquidity provision was the first reaction from central banks to help some financial institutions. In order to explain the process the example of Federal Reserve is going to be overviewed. The beginning of the crisis, which is around mid-august 2007 Federal Reserve, decreased the discount rate from 100 basis points to 50, above the federal funds rate target. Discount rate in a nutshell is minimum interest rate set by the US Fed for lending other banks (Investopedia, nd). March 2008, Fed continued to lower the discount rate and made it 25 basis point, which allowed banks to lend at much lower rate, but unfortunately, the reaction from banks was not as expected. Borrowing from discount account would assume that the bank has a problem and is desperate for funds. So Fed tried to act according to that assumption as well and created Term Auction Facility (TAF) to stimulate the borrowing through competitive auctions. TAF was more used than discount rate probably because, first, the rate banks borrowed were usually lower than discount
rate, and second, the competitive environment ceased the desperation vibe. TAF auction started with amount of $20billion, but with time and worsened conditions of the crisis the amount escalated drastically to $400billion. At the same time, in another continent European Central Bank was implementing exactly the same with an amount of €400million. Central banks then started to lend outside their traditional banking institutions and started to cooperate with investment banks to stimulate sales of MBSs and other asset-backed securities. For example, Federal Reserve assisted JPMorgan to purchase Bearn Stears and AIG to prevent the failure. The expansion of the balance sheet of central bank is quite impressive; during the period from 2007 to 2009, it reached the number of $1 trillion. Beside TAF Fed created other programs to assist and facilitate the results like Term Securities Lending Facility, Primary Dealer Credit Facility, Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility, Money Market Investor Funding Facility, Commercial Paper Funding Facility, and Term Asset-Backed Securities Loan Facility.

The evaluation of these programs has some ambiguous perspectives, as some believe this high-cost facility did not help. For example, Taylor and Williams (2009) have conducted research about unusual jump of spreads and how it raised the cost of borrowing and interfered with monetary policy. The result of their paper showed that the main factor explaining the spread jump between Libor rate and OIS rate was counterparty risk. Furthermore, they also found out that TAF is not affecting liquidity, expectations of future overnight rates nor counterparty risk at all hence it is not affecting spreads either.

On the other hand, some researchers argue that financial market might have not been affected by the lending itself, but rather the announcement of programs and used changes of spreads rather than levels for the dependent variable in the analysis. Other research (McAndrews, et al, 2008) found out that credit spreads were decreased significantly with announcements of TAF and other facilities, while other research supported an argument that TAF influenced positively to decrease interest rates. Another similar research (Ait-Sahalia, et al, 2010) found out that liquidity provision lowered interbank risk premiums helping for the stabilization of financial markets during the crisis.
“Large scale asset purchase” by Mishkin or “Credit easing” by Ben Bernanke (former Chairman of Federal Reserve) is practice in which central banks purchase private sector assets with a view to adding liquidity to a troubled market and so easing the flow of credit and lending in the economy (Financial Times, n/d). On the one hand, credit easing resembles quantitative easing because it expands the central bank’s balance sheet. On the other hand, pure quantitative easing system mainly focuses on the central bank’s reserves. In contrast to that, Fed’s focus was the composition of the loans and securities it holds and how it affects the credit conditions of microenvironment. In November 2008 Federal Reserve purchased $1.25 trillion of mortgage-backed securities (MBS) through Government Sponsored Entities Purchase Program and they are going to be backed by Fannie Mae, Freddie Mac and Ginnie Mae (Federal Reserve, 2008). The main aim of the program was to decrease the interest rate on individual mortgages to stimulate the housing market once again and was called QE1 (quantitative easing 1) as it rapidly expanded Fed’s balance sheet. In November 2010, time with still shook economy Fed announced purchasing a further $600 billion of longer-term Treasury securities by the end of the second quarter of 2011, a pace of about $75 billion per month (Federal Reserve, FOMC statement, 2010). The purchasing is logical subsequent of QE1 so it was named QE2 and the main goal at this moment was to influence micro-environment (households and individual firms) and stimulate them by decreasing the long-term interest rates. A year later Fed once again tried to do QE2 by purchasing $667 long-term Treasuries but at this moment it was trying to sell equal amount of short-term Treasuries. QE3 was followed in 2012 December and purchased $85 billion per month MBSs (instead of initial planning of $40 billion per month) and NASDAQ confirmed its effectiveness stimulating the relieve of commercial housing market debt risk (reference).

There were several researches on the effectiveness of the program on the market, one of them (Gagnon & et al, 2011) found out that long term U.S Treasury bond rates were decreased by 91 basis points, while MBS by 113 basis points and agency securities by 156 basis points enhancing the liquidity of the market dramatically.

As every coin has two sides, there are some drawbacks of large scale asset purchasing. First, the purchase of long-term securities fluctuated the price of securities exposing central bank for
interest risk alongside the credit risk (MBS) that will eventually lead to capital erosion in the central bank’s balance sheet. This in turn will lead to public and political criticism and put independence of monetary policy under risk. Not only that, because of existence of private securities (MBS) central bank intervened to the fiscal policy as well as political playground, which again puts independence under risk. The whole situation can be interpreted as central bank engaging in reckless fiscal policy of monetizing debt and flustering inflation expectations fraught with inability to control inflation in the future.

*Quantitative easing*

Actions from central bank like liquidity provision and asset purchase expanded the balance sheet of Federal Reserve drastically from $800 billion before to approximately $3 trillion as of November 2012, and the newest report shows $4 trillion billion on the balance sheet of Fed as of March 2018 (Federal Reserve, 2018). This process of expansion on the balance sheet is called quantitative easing because it leads to enormous rise in the monetary base, and theoretically it will lead to increase of money supply hence inflation. This is the reason why some economists are skeptical about the efficacy of pure quantitative easing and there are 3 reasons for that. First, the expansion in the balance sheet and monetary base had no effect for the cash supply because it is recorded into holdings of excessive reserve. It means that even though central banks do provide additional funds to commercial banks it cannot force them to lend to the market more precisely individuals and firms. Second, the federal fund rate already fell to zero hitting zero lower bound making it impossible to lower short-term interest rates any further and not being able to stimulate the economy as central banks usually do. The economy with already stagnated economy and no effective stimulation experiences currency depreciation and it especially negatively affects economies with trade imbalances, for example the case of Mongolia where domestic currency depreciation together with huge trade imbalance made another wave of crisis in 2014. Third, there is an illusion that banks will excessively lend because their monetary base increased and they can just use the asset from excess reserves. This is the case when Bank of Japan when they implemented the quantitative easing after the stock and real estate bubble burst, but not only helped to recover but worsened it by turning inflation into negative number.

Although there are some drawbacks in the quantitative easing as ineffective tool for economy stimulation, there are 2 reasons why the tool is worth the usage. In case of US, Federal Reserve
fixing policies were not directed at expanding the balance sheet but focused on credit easing. As Chairman Bernanke remarked those credit markets that were seized up because of crisis had an opportunity to unfreeze by Fed funds and improve the functioning of the market, allocating resources for a better use and stimulating the economic activity. Furthermore, lowering the interest rate of some of assets that relates to securities will increase the demand for them hence stimulating the spending on the market. The last remark can be seen in the US, where MBS securities purchase by Fed led to 100 basis point decrease in the interest rate, which in turn decreased mortgage rates and increasing the demand for residential housing.

Management of expectations

Management of expectations is a nonconventional monetary tool that manipulates the expectations of the policy’s future interest rates. There is a same concept in contractual theory which is called signalling which is basically when one party delivers information about himself to another party. The concept itself was originated from theory of information asymmetry when due to lack of information the parties are not equally informed and the economic transaction is not fairly conducted. So in general signalling will help to decrease the information asymmetry. In the case of financial crisis, signalling can be used to manipulate the future expectations of interest rates, for example Federal Reserve indicated in their announcement to lower interest rates that they would be low for “extended period”. The announcement would help to decrease long-term rates through mechanism called expectations hypothesis of the term structure. The hypothesis basically mean that long-term interest rates will equal an average of the short-term interest rates that markets expect to occur over the life of the long-term bond (Mishkin, 2012). In other words, if the funds rate will commit to keep at zero rates for extended period, the Fed can decrease the market expectation of future short-term rates which in turn decline long-term interest rates.

There are two types of commitments to future policy actions: conditional and unconditional. The commitment to keep the federal funds rate at zero for an extended period starting in 2008 was conditional because it mentioned that the decision was predicated on a weak economy going forward. If economic circumstances changed, the FOMC was indicating that it might abandon the commitment. On the other hand, if Fed had mentioned in the announcement that they are going to keep the rates at zero for extended period that would have become unconditional
commitment. Unconditional commitment is considered to be stronger as it has certainty that commitment is not going to be abandoned so it will have impact on long-term interest rates. Unfortunately, it has the disadvantage that even if circumstances change so that it would be better to abandon the commitment, the central bank may feel it cannot go back on its word and do so. There is a great example for such unconditional commitment that happened during 2003-2006 period in US. Federal Reserve was worried that very low interest rate will deflate the economy so at FOMC meeting they states that: ” In these circumstances, the Committee believes that policy accommodation can be maintained for a considerable period” (Mishkin, 2012) but at the next meeting, around half-year later, they changed their position and stated that: “policy accommodation can be removed at a pace that is likely to be measured”. Every meeting after that the Fed raised the federal funds rate target by exactly ¼ percentage points at every single meeting. The public interpreted the FOMC statement as unconditional commitment, hence Fed may have doubted to deviate from ¼ percentage point moves at every meeting. In retrospect, this constraint may have led to monetary policy that was too easy for too long, with inflation subsequently rising to well above desirable levels, and, as discussed earlier, it may have led to excessive risk-taking through the risk-taking channel of monetary policy.

Another important aspect is to be specific about the conditions. Woodford (2012) argues that when there is a zero bound lower problem in the picture then the policy commitment should be conditional on a target criterion that makes monetary policy history dependent in a particular way. The expectation of easier policy will mitigate the effect of the zero interest rate to be high when zero-lower-bound constraint emerges. Woodford (2012) also suggests having target criterion start at the rate when zero-lower-bound first emerged and consider nominal GDP path, which grows at the inflation target rate multiplied by the growth rate of potential GDP. Unfortunately, there are still some challenges for central banks to implement conditional commitment based on nominal GDP path. Firstly, the information delivery to public and market participants is complicated because inflation target is easier to explain than target path. Secondly, when the threshold of inflation rate is temporarily passed as initially intended, central banks need to persuade the public that they are not weakening their commitment to long-run inflation target. Thirdly, the nominal GDP path requires central banks to foresee the growth potential of GDP rate, the number which is very uncertain in the first place. This problem happened in 70s in USA,
when Federal Reserve neglected the inflation rate when estimating the output gap resulting in inflation.

The challenges of implementing the policy are quite serious but in current environment managing expectations at the zero-lower bound is the one certain effective monetary tool for disposal. It is especially relevant to the post crisis time as both biggest economies US and Europe are struggling, especially at the year of 2012. US had a serious fiscal cliff while Eurozone was on the verge of breakup. Large-scale asset purchases are very important for the expectation management. The announcement alone is very weak and cheap policy commitment that is not credible. But together with central bank purchase the message to the public becomes different and credible, because central bank is taking risk on its shoulders.

**Risk management and gradualism**

The standard theory of central banking assumes that the economy is linear, but from the lessons from crisis that was overviewed above the assumption that the economy is non-linear surfaced. With a quadratic objective function, the optimal policy is therefore certainty equivalent: it can be characterized by a linear time-invariant response to each shock, and the magnitude of these responses does not depend on the variances or on any other aspect of the probability distribution of the shocks (Mishkin, 2012). Here comes the concept of gradualism – a policy of gradual reform rather than sudden change or revolution (Dictionary, nd). In other words, when financial participants of the market and price-setters are far-sighted the changing committed policies happen mainly by inertia.

The time before the crisis for the monetary policy was relatively smooth. Great example is Fed’s stable federal fund rates that were usually on $\frac{1}{4}$ or $\frac{1}{2}$ percentage point and extreme events were relatively rare. The monetary policy before crisis can be seen using Taylor-style rules. Taylor rule is a reduced form approximation of the responsiveness of nominal interest rate set by central banks to changes in inflation, output or other economic conditions. For each 1% increase in inflation central banks tends to increase the nominal interest rate by more than one percentage point. In other words, the response of policy rates are based on inflation and output gaps. These studies have generally found that the fit of the regression equation is improved by including a lagged interest rate that reflects the smoothness of the typical adjustment pattern (Mishkin, 2012).
The nonlinearity from financial disruptions suggests for policy-makers to adjust their policies to respond to uncertainty with preferred implementation of tail risks. This will help to lower the probability of severe detrimental outcomes. Mishkin (2012) suggests to economists and policy-makers to learn from the financial frictions and nonlinearities in the economy to create rational risk management approach of monetary policy where the main goal is that policy itself will act to financial disruptions (adverse feedback loop). Therefore, the first reaction of monetary policy is to decrease the policy rates so that the financial disruption will not grow bigger than it already is, the tool is the adverse feedback loop that was described above. A feedback loop is a term commonly used in economics to refer to a situation where part of the output of a situation is used for new input. But if the financial market is not responding well to that change, then credit market will deteriorate and the conditions will worsen which damages the credit market even more. With the adverse feedback loop make it easier for markets to collect information that facilitates the price discovery, thus hastening the return of normal market functioning (Mishkin, 2012).

To stabilize and make the market function normal the monetary policy should be timely, decisive and flexible. Firstly, *timely action* is essential when core macroeconomic objectives of central bank are under serious risk for instability, because slow reaction will lead to further and more deep deterioration of the market as well as more costly to restore. In normal times the monetary policy responds to usual conventional economic data like production, employment and inflation. But when there is a disruption in the financial market that pre-emptive policy should focus on indicators like market liquidity, credit spreads, and other measures that help to identify macroeconomic risks. Ideally, the pre-emptive policy should counteract the negative interruption on the financial market.

Furthermore, policy-makers should be prepared for *decisive actions* when financial disruptions occur. If the circumstances in the economy worsen and hold severe adverse outcomes central banks can ensure participants by easing the further stance of policy. Additionally, central banks can state that the assessment does not imply any deterioration but it is a proper risk management action that counters risk adverse outcomes.

Finally, *policy flexibility* is a must when financial market disruptions occur. This flexibility might be evident from the decisive easing of policy that is intended to forestall the contractionary
effects of the disruption and provide insurance against the downside risks to the macro-economy (Mishkin, 2012). However, sometimes-disrupted financial markets can organically recover itself with first reactions, hence central banks should always check credit spreads and other incoming data so in case if the market will not drag tail risk take back some of the safety pillows it implemented. This kind of risk management approach is going to eradicate the linear-quadratic framework of optimal monetary policy, and stay with pre-emptive wide changing monetary policy. The mentioned characteristic is the used conventional monetary policy by Federal Reserve during the crisis. A month after the disruptions started in August 2007 Federal Reserve decreased its fund rate target by 0.5 percentage point, although the economy at that exact time had positive momentum with strong GDP numbers. This can be interpreted as that Fed was not reacting to current conditions but rather expectations that disruption might bring. When crisis started to take into force after Lehman Brothers collapse Fed continued its policy that reached zero lower bound in the end.

As, again, everything has 2 sides, this pre-emptive aggressive actions have a risk that its focused too much on stabilizing economic activity rather than price stability. If this would be the market participant’s perception then pre-emptive actions will direct the market to think that intervention will lead to high inflation. Hence, in order for the risk management policy to be effective, strong nominal anchor should be defined providing additional rational for a flexible inflation targeting framework. Mishkin (2008) also states that strong nominal anchor can be especially valuable in periods of financial market stress, because to prevent and adverse feedback loop prompt and decisive policy action me be required.

**Fiscal dominance and monetary policy**

One of the big observations that subprime mortgage crisis showed is that financial crises are often followed by fiscal crisis. Two differentiate the two: financial crisis is a broad variety of situations in which some financial assets suddenly lose a large part of their nominal value; fiscal crisis is an inability of state to bridge deficit between expenditures and its tax revenue and usually characterized by financial, economic, technical dimension on the one hand and political and social dimensions on the other.

In normal times, central banks (in most cases in developed countries) pursue long-run budget balance so that government debt to GDP ratio would be at tenable level. But post crisis data
shows huge increase in government debt mainly because of huge spending it did to stimulate the economy or because of bailouts that financial sectors experienced (e.g. PIGS countries). The logical conclusion to this is that government would no longer be willing to pay for their spending with future taxes, but rather issue monetary liabilities or default on the government debt. The situation when budget deficit is out of the hand is called fiscal dominance mainly because central banks are no longer able to keep the inflation under control as a monetary policy tool. The various experiences of collapse in previous years, e.g. Argentina in 2002, shows that default results in currency depreciation and high inflation. This happens even to currency unions because default results in exclusion from the union and newly created domestic currency will experience huge inflation. The example for this event is Greece and its default that resulted in total chaos and EU’s determination to help was mainly because Greece put danger on Eurozone’s existence.

Fiscal dominance will still be present even if the default does not take place, and high inflation will still be there although central banks are strongly committed to inflation target. The inflation will still have monetary feature as it increases the high-powered money, a situation that know as “unpleasant monetarist arithmetic” which was first introduced by Sargent and Wallace (Mishkin, 2012). Even tight monetary policy would be ineffective to counter high inflation when fiscal dominance is present because at some point central banks would be forced to monetize the debt. If the debt would not be monetized the interest of government debt will acutely increase which leads to decline in economic activity. Undeniably, with no monetization fiscal dominance will lead to government default on its debt which would be followed by financial disruptions and again further economic recession. With lesser from two evils principle between extreme economic and financial recession and surge of inflation central bank will likely chose the latter, purchasing the government debt and monetizing it. The example of this kind of events happened in Eurozone when sovereign government debt was purchased and eventually monetized by ECB on secondary market (Outright Monetary Transactions), in return sovereign countries were obliged to follow European Stability Mechanism. The mechanism is set to reduce inflation in those countries and in case opposite course of action apply; it will put not only those countries in deep recession but would send the Eurozone over the cliff.

To conclude, the real life examples showed how assertive is fiscal dominance regardless how much central banks try to commit for inflation target and what is needed for them is long-term
fiscal sustainability. With sustainable fiscal policy central banks would not be able to maintain inflation low and stable.

**Conclusion**

It can confidently be concluded that the subprime mortgage crisis changed the central banking forever. Conventional monetary policy is a necessity that will keep the economy relatively stable in normal times, but in abnormal times central banks should rethink their approach for policy conduct. First, central banks should strongly lean against credit-driven bubbles, acquire ability to identify it and act accordingly. In that interaction of monetary and macro-prudential policies will help a lot. Second, in times of crisis flexibility is key to act quick so non-conventional monetary policy would be at hand, especially management of expectations. During the crisis everything is uncertain and market participants are at panic, hence when authorities are confident and have certain plan it will certainly calm down the chaos. Unfortunately, the communication and delivery of exact content is difficult as speculations or misunderstanding of a statement might occur. Third, in crisis times the economy is certainly acting in non-linear ways hence it is widely encouraged for central banks to focus on risk management pre-emptively and quickly in post crisis. Fourth, fiscal dominance puts in danger advanced economies as it is quite strong phenomenon overriding core commitment of central banks inflation targeting. Hence all the changes that were made by the crisis probably identified the loopholes in financial market and teaching a great lesson for central banks around the world.
EMPIRICAL ANALYSIS

Pre-crisis economic developments

This section is going to briefly overview the pre-crisis tendencies of Mongolian economy, its fiscal and monetary policy in order to navigate the response of Central bank during and after the crisis.

Mongolian economy had a rough start as a new sovereign country after disintegration of USSR, and hard transition from centrally planned economy to open market and multi-party governance. In 1993 the inflation rate reached 283.4% (World Data Atlas, 2017) slumping the economic activity drastically. But unlike the subprime mortgage crisis which is an external factor, the 90s crisis was fully internal and resulted by poor structural reforms which included activities like state owned companies privatized, price liberalization, and market based institution establishments. During this time Mongolian government tried to implement policies that will focus on stabilization of macroeconomic conditions and figuring out how to structure the market based economic policies. Fortunately, the fruits of the effort started to emerge in mid 90s where macroeconomic policies were efficient in increasing real economic growth averagely to 6%, the foreign debt had a stable decrease and fiscal deficit was balanced and even experienced surplus increasing international reserves, increase in FDIs and tenable inflation rates.

Mongolia is a landlocked country that has 2 biggest economies as a neighbor (Russia and China). Because of its isolated and locked geographical position the international trade, more specifically logistics, are 4 times more expensive than other east Asian countries, but having 2 biggest economies as a neighbor has an advantage of being trading partners. Furthermore, natural resources (6000 known mineral deposits of 80 different minerals) that Mongolia possesses open doors for efficient export. Before the global financial crisis, Mongolian economy experienced comfortable 9% annual growth rate, where income per capita increased to USD1290 (from USD721). Total GDP increased from USD1.8 billion (2004) to USD 5.2 billion (2008) mainly due to commodity price increase, such as copper and gold that are main exporting products (Graph 1). The favourable trade conditions of mineral products increased the reliance of the real economy on them, for example copper and gold consist 57% of the total export (Bank of
Mongolia, 2007). This is an important piece of information because this high dependency on natural resource fund affected the economy extremely negative during the crisis.

Graph 1: Prices of major commodity exports

Sources: (IMF, Mongolia, 2010)

Fiscal policy

Budget revenue of Mongolia as of 2008 averagely consisted from income taxes (40%), taxes on domestic goods and services (30%) and since 2006 “windfall” taxes became notable generator (20%), more than half of which was from the commodities. During the four years prior to 2008 crisis fiscal performance was doing well as export and prices for the commodities were booming, which increased the fiscal revenue. With more budgets at hand government expenditure steadily increased as well reaching 40% from the GDP ratio in the year of 2008. Unfortunately for the later years, state budget minus mining revenue balance steadily declined from -5.8% in 2004 to -15.3% in 2008 (graph 4).
The composition of the government spending since 2004 till the crisis time have changed a lot (Graph 2a), where social related indexes have grown, e.g. wages, salary, social benefits and social investments (almost tripled in percentage from 2004). The nominal numbers shows that government investment increased by 8 times, allowing to address urgent needs of the country to develop and upgrade the infrastructure. That investment was mainly concentrated on big infrastructure projects like countryside highways, upgrade of current power generating system and buying machinery for agricultural sector. Unfortunately, the monitoring and program evaluation process was not efficient and needs further improvement, as corruption and quality of projects were under question.

Graph 2a: Government expenditure structure: In current prices

Source: (IMF, Mongolia, 2010)
Graph 2b: Government expenditure between 2004 and 2008: In current prices

Source: (IMF, Mongolia, 2010)

Graph 2c: Real growth of Government expenditures: In percentage

Sources: (IMF, Mongolia, 2010)
Nominally government expenditure rose from 4 to 9 during four years (Graph 2b), while in real terms and same timeframe it grew averagely by 31% (Graph 2c). Social assistance and investment received good support and grew averagely by 56% and 59% respectively. Additionally, the pro-cyclical spending policy allowed the increase of wages and salaries by MNT0.4 trillion, procurement by MNT0.3 trillion and the social welfare subsidies by MNT0.5 trillion. All these together represent 70% of the total government expenditure. The country’s external debt consistently was better off each year dropping from 87% of GDP in 2003 to 33% in 2008, while the government balance was mostly positive, except 2008 (Graph 3).

Graph 3: Government budget balance

Sources: (IMF, Mongolia, 2010)

Monetary policy and inflation

Inflation is one of the main concerns of the Mongolian economy; the average rate was 11% between 2004 and 2007 (World Data Atlas, 2017). Theoretically the inflation rate is not high, and central banks should be able to tolerate inflations around 10% fluctuations, but practically the economy itself received inflationary pressures. The fluctuations occur from time to time, e.g. it reached 33.7% in August 2008, but later decreased for a bit. Although the main objective of the Bank of Mongolia is to keep inflation rates stable, the monetary policy that they implement is
pro-cyclical. Due to commodity market prosperity the money supply grew a lot, increasing over 35% annually during pre-crisis period (Bank of Mongolia, 2007). The tools used for money supply increase was purchase of foreign currencies and international reserve reached unprecedented level of USD1.1 billion. The extreme growth of money supply decreased the interest rates down, but compared to international level it was still a high number (Graph 4); for example the nominal interest rate decreased by 12.4% by the end of 2007. However, the decrease in the loan interest rate is not the decrease of risk premium, but an increase of inflation. Deposits on the other hand were stable at 15% mark and yielded positive returns in the pre-crisis era.

Graph 4: Interest rates, money supply growth and CPI inflation

Sources: (IMF, Mongolia, 2010)

Generally, Mongolian financial market is mainly consisted of commercial banks, and relative small market share of non-banking financial institutions and insurance companies. Central bank’s integration to the global financial market is very minimal and its operation are relatively very traditional.
Bank of Mongolia’s response to the crisis

This section is going to overview how did Bank of Mongolia responded to the crises, which tools it used and the impact of it to the economy and market.

As discussed in previous chapter, the subprime mortgage crisis which is financial crisis by its nature, did come to Mongolian economy and brought up recession. The start of the crisis happened in the US with a collapse of asset bubble bursting with excessive risk taking which led to financial sector crash. The crisis itself originates in the financial sector which later on dives into economy. In case of Mongolia, the process started in an opposite way, where the stagnation of trade partners and global drop of price changes on commodities deteriorated the export numbers, which negatively influenced the reserve, banking sector and currency state. In other words, the real economy crisis emerged first which led to financial and currency crises in Mongolian case. In order to overview the consequence of the crisis and response from the monetary authority the crisis is going to be divided into economic, financial and currency crises.

Economic crisis

*Mining based economy*

Mongolia experienced big external shock in late 2008 and throughout 2009 with the collapse of mineral resource prices on the global scale and the fall of worldwide export demand. The most important strategic source of the country was copper, which fell by as much as 65% from US$8,700 per ton in April 2008 to US$3,000 per ton in March 2009 (World Bank, 2010). Other types of mineral resources like coal, zinc, and crude oil prices fell down significantly as well. The one that withstood the crisis was gold; its price had little deterioration compared to others probably because of the relation to the money and being safe haven investment (Figure 1.1).

The collapse of the global price decline for commodities was worsened by the external demand shock, the consequence of contraction of economic activities of major trading partners of Mongolia. For instance, China’s industrial production growth, which absorbs about 70% of Mongolia’s exports, slowed from about 16% year-on-year in mid-2008 to 5% in the first quarter of 2009 (World Data Atlas, 2017) and the year-on-year data of Chinese demand showed 50% drop in 2009 (Figure 1.2). The same figure shows us that the internal production was
experiencing the downturn as well, and the demand for Mongolian production was aligned with total decline of import to China.

The mining industry collapse and global crisis, as an external shocker, demonstrates how structural and economic policies of Mongolia and strategic economic planning of the government is weak and unplanned. At the very beginning of no response from central bank and government the result of the shock expanded the fiscal and current account deficits. The national currency weakened tremendously were it weakened 35% against USD in just a few month since the start of crisis (XE Corporation, nd) hence reserves were dedicated to support national currency (reference?). The next step of crisis was transferred to financial sector and banks started to overheat with uncertainty. Although central banks did tried some efficient tools to recover banking sector one of the biggest banks couldn’t resist the pressure and collapsed. The collapse of the bank resulted to even more uncertainty in commercial banks hence the market participants started to withdraw their money from the banks resulting in deposits falling rapidly.
The research paper concludes that the crisis in Mongolia, unlike rest of the world, started from the real economy. The collapse of the main export component affected negatively the economy itself, the national currency and financial sector.

**FDI and remittances**

The pre-crisis time showed the economic prosperity in the Mongolian economy, as a developing country the image of growth in economy and finance attracted investors throughout the world. Between 2004 and 2008, FDI inflow have increased drastically from USD 129 million (GDP of 5.8%) to USD 683 million (GDP of 13%). The main receiver of the majority of the FDIs was mining sector, especially big strategic mineral birth places of copper, gold and coal which again confirm the previous chapter about economy concentration on mining sector. The other part of the FDI was going to service sectors.

FDI inflows decreased by half (Table 6.2.) during the recession and did not recover by the year later. The mining sector slowed down the economic growth and decline in entrepreneurs’ sales turnover, the capacity of borrowers to repay their loans deteriorated and thus credit risk increased. The amounts added to non-performing loans of banks eroded the banking sector profitability. For instance, as of 2009, non-performing loans increased by MNT 75.1 billion in the construction sector, MNT 60.2 billion in the manufacturing sector, MNT 41.5 billion in trading, and MNT 35.3 billion in the mining sector. To make things worse, the very same problem occurred in the 2014 crisis were commodity prices fell again and China refused to buy coal for a time, the financial crisis covered the market again by the very same mistake.
Regarding the remittances, Mongolians started to migrate in large numbers (the informal count is around 100,000 citizens) for a better wages, usually to more developed countries. With globalization process going in the current world the tendency increased even more. The majority of outward migrants send money back to their families, but unfortunately, the estimation of those remittances is not possible as there are lots of unofficial migrant’s data as well as the amount of how much they send. The rough estimation was done by World Bank (2008) where it concluded that Mongolia received around USD 200 million (GDP 3%) in remittances from migrants at that reported year. One of the weaknesses of monetary policy of Mongolia is that it doesn’t have a mechanism to estimate the foreign remittance amount that come every year. During the economic prosperity, outward migrant workers did send significant amount of money to their families that lead to increase in the supply of foreign currencies in the country encouraging MNT to appreciate. When the crisis started, the remittances did stop significantly as well and led to decrease of foreign currency supply. With the same negative logic, the deficit of foreign currency pressured national currency to depreciate.
Financial crisis

Fiscal imbalance

Due to the high reliance on commodity reserves and slow response to it from authorities, the fiscal balance of the country deteriorated significantly. The moderate surplus of reserves in prior years couldn’t stand the shock it received from the crisis. Even more, during the mining boom government decided to ease non-mining sector and eased the fiscal burdens on them, which made the dependence on the mining sector even more. In addition, central bank pegged the national currency to the dollar, which directly influenced the tax revenue. The non-mining fiscal deficit doubled since 2006 and was at 15.3% in 2008 (Figure 1.3).

Inefficient resource allocation of government from mining boom funds added further pressure for fiscal balance; the government did not know what to do with the „excess” money and started to give it out to the public. Social benefits and other one-time projects took place and during the boom years, it became universalized. One of the most important but at the same time debated (even until now in 2018) social benefit program is Child Money Program (CMP) disbursing MNT 140 billion per year which is equivalent to 5.6% of fiscal spending in 2008. The social transfers became very common in the pre-crisis era, mostly because of the elections. Money disbursement promises and its actual allocation is very common scene during both parliamentary and presidential elections. Mining money consists third of the program’s fund which means that those poor population that are dependent on social safety net are also dependent on the international commodity price fluctuations. Another drawback of the CMP was that their target was not well-planned and even children that did not need the money benefited from it. The overall money supply surplus government increased their spending on wages, salaries and government expense significantly (Figure 1.4.).
One of the main challenges of successful government spending is to ensure that the investment would transition into productive capital asset. The ICOR ratio of Mongolian investment shows a concern of low allocative and operational efficiency. World Bank (2010) estimated that the average ICOR ratio between 2002-2008 was 4, which is considered a normal outcome for developing countries but the mining sector was included to it hence non-mining ICOR ratio would most likely reach 5.4 for the same period which surpasses the threshold of 4.5. In comparative analysis the ratio number is much higher than other central Asian countries (Figure 5.4.a)
The current account balance swung from surplus to deficit because of the mining collapse the research paper overviewed previously. As a consequence the current account balance moved from surplus of 6.7 percent of GDP in 2007 to 14% deficit in 2008 (World Bank, 2010).

Banking sector

The external shock exposed how weak was the banking sector in Mongolia, which was overly stimulated during the mining prosperity years. During the crisis, the inflation rate reached 33.7% in August 2008 (Bank of Mongolia, 2008) which is the highest inflation in the East Asian region in 2008. Together with the loose monetary policy, it led to a credit collapse, where information about nonperforming loans and low credit quality was exposed. Usually the credit portfolio consisted of lending from construction and real estate industries, moreover added by the fact that they were usually individual creditors stirring the risks of bank’s loan portfolio. Figure 1.10 shows that from 2008 the top 50 borrowers by loan sizes consisted from 20% to 30% of the total lending.
High inflation was followed by negative real interest rates on MNT deposits which stimulated the market participants to shift from national currency deposits to foreign currency ones (Figure 1.11).

During this time, asset quality dropped and non-performing loans share rose to 13.7% by July 2009 from 2.7% in May 2008 (Honma, 2015). The ratio reached its spike in November 2009
reaching 25%. This is one of the reasons why fourth and sixth largest banks in Mongolia were put into conservatorship status by central bank. To increase the trust of the market participants and general public central bank issued deposit guarantee blankets in November 2008 (Bank of Mongolia, 2008). Unfortunately, the blanket was delivered to the public in a vague picture and stirred uncertainty about which type of deposit is covered, as a result the real interest rates on MNT decreased to negative. With mutual discussion of central bank and government, the later received approval to issue bond in MNT100 billion in order to save Zoos and Anod banks from collapse. However, initial plan was not met and BoM sold only MNT33 billion bonds (Business Mongolia, 2010). The money raised was used for the policy implementation on securing the savings and current accounts by the central bank. Finally, on 24 November 2009 authorities officially declared the merging Zoos and Anod bank good activities to the newly established State Bank. State Bank is a commercial bank that is owned by the government entities, 25% by the Ministry of Finance and 75% by Deposit Insurance Corporation of Mongolia (State Bank, 2018).

Another problem in the banking sector is the thick connection of banks to each other. Figure X shows that every single bank is connected to another on the market, and many of the connections are thick. There is a cross-ownership links among banks as well as between banks and big corporations. This linkage results in significant loans to be borrowed by related banks and companies, and having common borrowers in the same system. An increase in classified loans, a default of the banks’ single largest borrower, or a significant downgrade of performing loans to substandard would significantly erode the capital buffer of the banking system (IMF, 2018).
We can see the financial market stagnation in 2009 through the activity of the stock exchange market. As we have already mentioned the global financial crisis came to Mongolian economy a bit later, hence 2009 data is the affected timeframe. The economic stagnation resulted in the decrease of stock purchases by two times, the value of which decreased more than four times (Graph x).

Liquidity provision

Liquidity pressures in the banking system intensified in the first quarter of 2009 with the shortage reaching 42 billion MNT. The BoM substantially increased available liquidity in the interbank market to 376.9 billion MNT at the end of 2009. The reaction of BoM was quite quick as the Bank introduced an Emergency Lending Facility at the end of 2008 to make loans to banks that were facing a temporary liquidity shortage. Under this facility, the BoM extended loans totalling MTN 304.2 billion in end December 2009. A total of MNT 124.3 billion loans were

<table>
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<tr>
<th>Timeframe</th>
<th>Stock amount (pcs)</th>
<th>Stock value (MNT)</th>
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<tbody>
<tr>
<td>2008 Q2</td>
<td>97 052 180</td>
<td>43 079 314 336.00</td>
</tr>
<tr>
<td>2009 Q2</td>
<td>49 895 363</td>
<td>10 294 174 856.00</td>
</tr>
</tbody>
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Graph X. Source: (Financial Regulatory Committee, Security market review, 2015 Q2, 2018)
paid and the outstanding amount stands at MNT179.9 billion. In the same timeframe, the balance sheet of central bank can be seen to rapidly increase from USD1.5 billion in 2008 to USD2.5 billion in 2009 (Bank of Mongolia, 2009). Generally, we can see how the Emergency Lending Facility expanded the balance sheet of Central bank. The Emergency Lending Facility operated until 2013 and was stopped, as central bank deemed the mechanism no longer applicable for the market.

Furthermore, in order to assist interbank market development, decrease interest rate spreads and increase returns on asset, a number of changes were made on 25 March 2009 to the reserve requirement regulation. Banks were required to hold a minimum of 50 percent of the reserve requirement on a daily base (compliance is on an averaged basis), and interbank deposits were excluded from the reservable base. The policy rate had been cut by 1.25 percentage points in May and June 2009, to 11.5 percent. The policy rate increased in real term due to the rapidly decreasing inflation rate. Urging banks to increase lending, the BoM not only cut its policy rate but also tried to fix the quantities of the CBBs in circulation.

Government debt monetization

In the end of 2009, Central Bank agreed to purchase government bonds by signing an agreement on „Budget deficit financing securities” with 3 settlements (Bank of Mongolia, 2018):

- 60 billion MNT with annual rate of 5%
- 55 billion MNT with annual rate of 7.50%
- 55 billion MNT with annual rate of 10%

The main aim of the purchase was to balance the budget deficit. The monetarization of government debt that was discussed previously overviewed the risks of how does fiscal dominance gets over the monetary policy as central bank authorities do not have any other way to get things better. Nevertheless, the main aspect of the fiscal dominance was that the budget deficit would be out of control, which is not particularly the case in Mongolian crisis. The only one who did purchase the government bonds was central bank, and the private sector had zero transaction that year for bonds purchases (Financial Regulatory Committee, Annual Report, 2010). Graph X shows to activity that goes through stock exchange broker and government
bonds were purchased zero times in 2009 (the government bonds purchase of central bank goes through another channel which has direct application program with Ministry of Finance).

**Exchange of Securities value (in billion MNT)**

![Graph showing exchange of securities value from 2000 to 2010.]


**Stand By Arrangement**

On 18 March 2009, Mongolian government requested Stand-By Arrangement to IMF and was approved later on. The main content of the program aimed to smooth adjustment of trade shock, restore health to the country’s fiscal finances, allow for exchange rate flexibility in line with market conditions, address weaknesses in the banking system, and protect the most vulnerable from the burden of the needed adjustment (IMF, Request for Stand-By Arrangement, 2018). The authorities made prior actions and passed the amendment on the budget which will be compatible to the fiscal targets in the Stand-By Arrangement. Additional to the 300% percent quota from IMF, Asian Development Bank, World Bank and Japan together agreed to provide $160 million for next 2 years. Most definitely, the main conditions are to meet programmed fiscal adjustment, restoring stability to the financial system, improving the system of social transfers, and institutionalizing medium-term fiscal responsibility. IMF (2011) confirmed in their report the
effective results of the program especially how banking sector was efficiently restructured and two commercial banks were placed under conservatorship in smooth and well-planned way. Furthermore, Bank of Mongolia permitted regulatory forbearance. Although the commercial banking sector is experiencing weak underwriting practices and inefficient governance system in banks, the enforcement of regulatory requirements from central bank lacks strictness. Compliance-based supervision continues as the norm, but the BOM is planning to switch smoothly to risk-based and forward-looking supervision. In this regard, the BOM has incorporated market and operational risks in the calculation of capital adequacy ratios.

Currency crisis

It is very important to single out of the indicators of financial instability cause – non-credible exchange rate mechanism – the crisis itself exposed the mechanism to have a flaw. The capital outflow and sudden stop of FDI currency inflows influenced the instability in the market that BoM had to intervene with stabilizing tools - net international reserves (NIR). The tool was set by international standards that had to be above the minimum acceptable level. An artificial demand created by the public’s inconsistent and wrong expectations of the currency exchange rate and uncertainties of intergovernmental donor financing schedules, made safeguarding national currency exchange rate impossible and left the BOM with no choice but to fix the exchange rate. On the other hand, the drastic depreciation of MNT’s exchange rate in an economy with foreign currency shortages and one third of the banking sector loans provided in foreign currency, created an environment that could have interrupted the supply of needed imports, increased the inflation and stagnated the economy, which would have eventually led to a currency crisis and even provoked banking sector instability. Since MNT’s real exchange rate was not able to set itself in an economy where an “artificial demand” was predominant for many years, import rationing was conducted to promptly stabilize short-term market instabilities. An agreement was reached with the IMF, to balance supply and demand in the inter-bank market without delaying international settlements of national importance and without creating a shortage in strategically important import products until the Stand-By Agreement program started from the 1 April 2009.

As in many countries with developing financial markets and specific structural characteristics of the economy, Mongolia has the exchange rate of MNT to the US dollar is an important "nominal
anchor” for maintaining macroeconomic stability. In other words, among all possible intermediate monetary indicators, the MNT rate is the most controlled and predictable benchmark for achieving the ultimate goals of monetary policy – stabilities of price and the financial system. In general, it is considered that one of the following three indicators can be chosen as the conductors of monetary policy: the exchange rate, the money supply and the interest rate. It is impossible to target all three of these indicators simultaneously. The fixation of the exchange rate in this case does not allow the central bank to operate with an interest rate. In addition, according to the Mundell-Flemming model, when moving to a system of floating exchange rates in conditions of high mobility of international capital flows, the effectiveness of fiscal policy as a macroeconomic regulator is significantly reduced. At the same time, monetary policy becomes the most effective instrument of influence on the level of output and employment in the economy. With an increase of GDP monetization, the deepening and sophistication of financial markets, the development of the capital market and the elimination of structural distortions in the transitional economy, the demand for money becomes unstable, and the interest rate begins to act as the main reference point for participants in economic activity. Fixing the exchange rate in this case does not allow the central bank to operate with an interest rate. Bank of Mongolia is based on the principle of evolutionary modification of the monetary policy regime, de facto pursues exchange rate policy in the peg to the US dollar, although a basket of currencies consisting of the US dollar and the euro serves as a de jure operational benchmark. There are serious reasons for that as 2009 was the period when excessive MNT volatility might have led to the destabilization of the financial sector. A standard use of the currency basket provides for the synchronization of the movement of the exchange rate of MNT to the US dollar and euro with the movement of the cross-rate of the dollar to the euro. Such a policy allows central banks to gradually abandon the unilateral fixation of the exchange rate against the US dollar, to give the course flexibility and smooth switch to other monetary benchmarks (primarily the interest rate on the interbank market).

Furthermore, in order to prevent the domestic currency crisis BoM increased their policy rate to 14%, which theoretically mean that their objective, aside from price stability and inflation rate drop, was to decrease the money supply of foreign currency on the market and increase the demand for domestic currency. BoM started to conduct foreign currency auctions twice a week, which successfully revived the national currency and stability to the foreign exchange market.
Furthermore, to stimulate commercial banks to new deposits and increase central bank’s return on MNT assets in the money market the 12-week Central Bank bonds rate was increased to 20%.

With demand for local currency falling in late 2008 and early 2009, substantial reserve losses were incurred in support of the currency. Currency flight during the crisis period was further aggravated by the Bank of Mongolia’s (BoM) attempt to hold on to its de facto currency peg to the U.S. dollar. This was in contrast to other major commodity exporters that let their currencies freely depreciate as a first defence mechanism against falling international commodity prices. In the process, the BoM lost US$500 million of international reserves between July 2008 and February 2009. The currency depreciated anyway, by about 38 percent between the end of October and the middle of March 2009 (Figures 1.7 and 1.8).
Changes in organizational structure of BoM

This section focuses on the organizational changes of BoM, because the organizational chart has changed dramatically from pre-crisis time.

There are major differences in the organizational chart from the beginning of 2000 (Appendix 1, 2) compared to 2015 and 2016 chart (Appendix 3,4). The paper focused only on those important aspects of the organizational chart that carry strategical value. For example, the IT operations were since the beginning of the function of the CB but it was just a small additional unit for the settlement centre, whereas now the IT department carry one of the most important tasks which is payment system and its safety. The findings are going to be divided into New Departments and Committees.

New Departments.

Risk Management Unit

As the name of the department speaks for itself, the department is responsible risk management and the main activities are:

- Formulate financial and operational risk rules, guidelines and handbooks;
- Formulate foreign exchange reserves short to medium term asset allocation framework and benchmarks;
- Propose risk controls and monitor their implementation;
- Prepare reports on foreign exchange reserves management;
- Research opportunities to improve Bank of Mongolia’s risk management;
- Determine collateral framework for central bank lending operations;
- Determine collateral framework for repo operations;
- Coordinate Bank of Mongolia’s operational risk management framework;
- Oversee adequacy of Bank of Mongolia’s Business continuity and disaster management planning.
Considering the fact that the department was not existent before the crisis era, all the activities are in pre-emptive mode coming up with possible stress situations, having guidelines for them and monitoring to detect those stress situations.

*Markets Department*

Market department is fundamentally responsible for implementation of monetary policy, managing foreign exchange and internal market operations. The department consists of (1) international markets division, (2) domestic market division and (3) treasury fund. When managing the foreign exchange reserve management international market division is responsible for delivering prompt transaction through safe channel. Only in the case of the fulfilment of previous action the division can increase the exchange benefit, conduct foreign market research, and visualize activities in short-, medium- and long-terms. The division is also responsible for the communication with international organizations and foreign countries. The responsibility of the internal market division and treasury fund is monitoring and implementing the monetary policy, broaden the channel of foreign currency inflow, build exchange rate protection system and introduce various financial tools to the market to avoid potential internal market risks. The division is also responsible for all types’ domestic securities transactions and supervision of them on the daily basis.

*Public education and information centre*

The role of the Public Education and Information Centre is to provide the prompt and transparent delivery of Central Bank’s information to the public, as well as educate the population with financial literacy.

The research paper assumes that the department was created for better communication with public and educate citizens about the misunderstandings it had about financial stability and central bank’s reaction to it. As we have already discussed above, the expectation of the market participants does influence the course of events, especially in abnormal times. In times of chaos having authority that expresses themselves as confident decision-makers will stabilize the economy just by its statements. For example, around 2014 one of the biggest commercial banks Golomt bank was having acute internal issues between shareholders, which raised a lot of uncertainty in public and the banking sector itself. In case of Mongolia, the big commercial
banks collapse will deteriorate the economy and tangibly influence the market. Together with BoM and Golomt Bank authorities’ communication cooperation and help from the former the separation of commercial bank’s assets and liabilities proceeded smoothly. With BoM’s assertive statement that they have back of the commercial bank the public was no longer panicking and withdrawing their savings.

Committees

The information gathered for this section comes from the Law on Central Banking issued by government of Mongolia (Mongolia, 2018).

Supervisory Board

The supervisory board is responsible to debate and consult Bank of Mongolia in the regulation of BoM’s banking activities, conducted supervisory reports, and offer credit to Deposit Insurance Corporation.

Secretariat of financial stability council

The Financial Stability Council is responsible for the detection, control and reduction of systemic risks in connection with ensuring the stability of the Mongolian financial system. The council consists of BoM Governor, Financial Regulatory Commission’s Governor, parliament members responsible for budgeting and Deposit Insurance Corporation’s CEO. The main objective of the council is to share information, influence the risks that might affect stability and balance of financial system, planning pre-emptive measures and guidelines for its implementation, and refinacement of commercial banks and its conditions. This council is probably the main outcome from the financial crisis as all its activity is to prevent those events on happening again.

Monetary policy committee

Monetary policy committee consists of seven members, which include BoM governor, first deputy governor, deputy governor, and 4 members appointed for duration of 6 years by Parliament. The main objective of the committee is to draft monetary policy, to regulate the interest rate on monetary tools, and to determine reserve requirement and prudential ratios of commercial banks.
Banking supervision council

Banking supervision council is authorized to monitor the Central Bank’s delivery of truthful and transparent information to Parliament and public about internal audit operations, independent external audit reports and investment portfolio information. The Council must not have any influence on monetary policy planning decision-making. It consists of one manager and 6 members all of whom are appointed by Parliament for the duration of 6 years.

One interesting fact is that there is no documented organizational chart from 2009 report. Although the annual report does not say anything about it, the research paper is going to make following assumptions:

- The chaos was tremendous that lead to vague responsibilities of departments
- The 2009 was period when central bank realised there should be restructuring but it took them more time to do it hence the organizational structure was not there

Organizational structure discussion

The research paper thinks there is direct connection of new organizational structure to the events occurred during the crisis. First, the creation of new departments was an important transformation. One of them, risk management department, is inevitable creation as uncertainty in the economy still present, even in normal times. The role of this entity is to identify risks, come up with strategies to guard against these risks, to execute these strategies, and to motivate all members of the company to cooperate in these strategies. Forecasting and projecting possible adverse scenarios in the future would really help to prepare for the sudden or not changes in the economy. Furthermore, the process of forecast can lead to ex-ante evaluation of scenarios and prevent collapses to happen in the first place. This will enable central banks to operate more confidently and deliver the same vibe to the market participants and public.

Markets department’s overall functions were present in the pre-crisis era, but probably the integration of these market operations from one administration was the logic behind the creation of this department. The integrated operations whereas domestic or foreign markets and close monitoring of them is an important aspect of well-functioning central bank.
Concerning the Public Education and Information Centre, the research paper assumes there are two main logical reasons for its creation. First, with the creation of this department the public relation with the market participants and society became very much under control. From administrative point, having only one source of statements is better rather than asking different economists and officials in BoM who might tell slight different data, because in time of chaos it might steer even more uncertainty. Second, the population literacy in financial market and its tools is very low. Giving an opportunity for knowledge about ways to have better financial state is not only beneficial on individual level, but also on the state level. Having population that is intellectually participating in financial market will stimulate the economic and financial activity of the market.

In regards with various consulting committees and councils that emerged after the crisis in the organizational structure of central bank, this seems to be very logical as well. By having committee a lot of work can be done before the board meeting, in other words, the information would be processed before parliament members and central bank governor will meet saving lots of time, having more focus on main strategies and policies that needs to be discussed. The procession of the data requires lots of time because there needs to be research done, coming up with alternatives, long discussions and brainstorming.

**Policy change outcome**

While the initial shock came from mining sector dependence and commodity price fall, the event exposed banking sector instability and contraction of credits from commercial banks, which led to general economic activity freeze. However, the economy started to show better indicators very quickly and growth index reached 7.6% in the first quarter of 2010 (Figure 4.1). The economic recovery and steady growth in 2010 led to consumer price increase. The inflation came back to positive numbers in the end of 2009 and has been averagely hit at 8% (Figure 4.2), which was probably influenced by the food price and core inflation level increase as recovery was happening. What is needed now that inflation rate is going back to acceptable level is to not accelerate further as it reached 33.7% during the boom time.
The data of Q4 2009 (Figure 4.3) showed how expenditure restraint and revenue recovery improved fiscal balances but continuing budget consolidation is still the priority. The fiscal balance at the end of 2009 reached MNT 328 billion, whereas target full-year number was MNT 364 billion. The mining revenue decline had negative impact on the revenue intake of 2009 which was by 7.5% lower than 2008 index, but the global copper price increase made up for that. This lead to increase of grants and revenues by 66% yoy in Q1 2010 and positive base effects accelerated to help the numbers. The cut of government spending to maintain fiscal sustainability and reaching the targets of the fiscal deficit lowered total spending by 5.7% from 2008. The main cuts were capital expenditure and subsidies, that allowed to wage salary increase, force major expenditures (for example, relief actions for flood, swine flu or severe winter that kills large number of livestock). Other part of the expenditure was directly connected to the crisis response, like blanket guarantee law and help for banking sectors. Overall, MNT 8.6 billion was disbursed1 out of the government reserve fund and MNT 8 billion out of Finance Minister’s portfolio (World Bank, 2010).
Furthermore, China’s market recovery meant the recovery of commodity prices and increase of export demand that helped tremendously to adjust current account. Another aspect for the adjustment was recovery of the domestic economy and recovering imports, mainly by freights from Russia and China. As a result, current account deficit dropped to 4% of GDP in Q4 2009, when in Q1 it was 13% (Trading Economics, nd). The current account balance was mainly financed by net capital flow into the financial account added by increase of FDI that experienced upturn over some time, but not reaching the boom era level. The donor disbursement and credits for commercial banks the net borrowing increased in public and private sectors.

The nominal exchange rate was stabilized starting mid 2009 after its rapid depreciation period at the start of the crisis. The policy changes that were imposed like discarding exchange rate peg, the increase of nominal exchange rates, and narrowing trade deficit resulted in stable nominal exchange rates. The changes also helped Bank of Mongolia to restructure international reserves that received disbursements from IMF, OT prepayment loan (another bigger mining project), IFAD and JAICA; the balance reached unprecedented level of $1.1 billion in December 2009.

In general, the economic and currency crises recovered from the shock, unlike financial crisis where banking sector problems lingered. After stabilization process of deposit accounts central banks shifted their focus to the balance sheets of commercial banks. The currency anti-crisis policy measures for stabilization of exchange rate and reviving confidence into national currency contributed the deposit problem. Bank of Mongolia put the rate of CBB to 14% allowing inflation to fall and foreign currency exchange market to calm down. In September 2009 the central bank considered the market to stabilize and reduced the rate to 10% gradually; this increased the capital adequacy ratio of commercial banks, reduced credit risk fund rates and introduced a foreign exchange auction system (World Bank, 2010). The gradual reduction of policy interest rate happened in three times, the gradualism of which helped nominal interest rates for national and foreign currency deposits and credits not to fall helping deposit retention. Banks were searching for extra funds on the market to increase their liquidity problems, hence the deposit interest rates were high.

Together with fall of CPI inflation rate in 2009, nominal rates resulted in increase of costs for real economy borrowings. It was measured by ex-post real interest rate, which held back the recovery of the private sector economic activity. But inflation went up afterwards, to make ex
post real rates to go down, decreasing ex-ante borrowing costs. During the crisis period, banks credit availability dropped and instead they used resources to purchase CBBs. The overall stock of outstanding loans has remained broadly flat in nominal terms since mid-2008, up only 3 percent from 2009 Q2 through to the end of 2009 Q4 (Bank of Mongolia, 2009). The level of new loans dropped in late 2008 and early 2009 nominally, with 57% yoy Q1 2009 and relative to unpaid loans. There was some recovery to the level of new issuance later, but it was mainly in the mining sector.

After dealing with immediate threat of liquidity crisis central bank shifted their focus on the quality of banking sector balance sheet, as the weakness of it was apparent. The most serious issue was that the loans were bad quality and that majority of nonperforming loans came from private sector and it increased by 5 times compared to the same period last year. The loans with principals in arrears were not behind, and increased by 23% since December and reached MNT 139 billion in April 2009 (Bank of Mongolia, 2009). The credit quality of banking sector still remains an issue, but the profit of commercial banks changed dramatically from the loss of MNT 143.4 billion in 2009 compared to earning MNT 10.4 billion in 2010.
Conclusion

The pre-crisis period had a general view that securitization of assets and use of financial derivatives provide diversification of risks and thus constitute an element of self-regulation of the market system. As another element of it, the multiplication of money as a result of lending operations was considered. But further developments have shown that in a full-scale crisis, both mechanisms for self-regulation of the economy do not work. Moreover, hedging risks using a wide set of derivatives led to a systemic risk affecting the entire financial system.

The global financial crisis, which began in August 2007, was provoked by excessive liquidity in the US economy. This liquidity hit the stock market and the real estate market as a result of the policy of stimulating aggregate demand. The Fed leadership justified its actions by the need for preventive measures that could reduce the perceived risks of the financial sector. As a result, the attraction of borrowed resources rapidly increased the use of leverage. The research paper assumes that a high degree of leverage of the financial sector has not been fully taken into account in the development of the monetary policy in developed countries.

The beginning of the financial turmoil was an unexpected and complete stop of operations in several segments of the financial sector, in particular, the market of commercial papers and mortgage-backed securities, leading to a loss of liquidity in the interbank lending market. Later, there were serious difficulties in the market of credit default swaps (CDS), resulting in the total loss from the fall of all stock markets in the world for the year amounted, according to expert estimates, about 16 trillion dollars (reference).

In such conditions, the Federal Reserve, the ECB, and other central banks of developed countries actually supported not only the banking sector, but also the stock market, having turned from the lenders of last resort to the market makers of last resort. Thus, the leading central banks took on the responsibility for refinancing the economy, for the actions of speculators in the stock market and inflating speculative bubbles.

Eventually, central banks created additional instruments for providing liquidity to the financial sector and started to receive mortgage bonds as a collateral, although the real market value was absent on the market. By purchasing these bonds of no-value-markets as collateral, central banks put themselves under risk for security evaluation, which in fact subsidized the financial market.
Such activities are fraught with the threat of an inflationary explosion in the global economy and significant increase in the volatility of the global financial system.

The research paper also overviewed the analysis of the changes that central banks experienced due to the financial global crisis. In normal times, central banks have general responsibilities like issuing money, payment system facilitation, lender of last resort, banking supervision and conduction of monetary policy. But at abnormal times, the conduction of monetary policy should be done in different, more flexible way to stand against the market shocks. The research paper concluded that the changes can be generalized in four categories:

1. Interaction of monetary and financial stability policies
2. Nonconventional monetary policy
3. Risk management and gradualism
4. Fiscal dominance and monetary policy

These four areas of changes are seen in the case of how financial crisis influenced the scope of activities of central bank in Mongolia. The roles that Bank of Mongolia acquired during the crisis is going to be analysed as the following.

<table>
<thead>
<tr>
<th>New role of BoM</th>
<th>Description</th>
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<tbody>
<tr>
<td>Conservatorship of 2 commercial banks</td>
<td><em>Management of expectations</em></td>
</tr>
<tr>
<td></td>
<td>The research paper puts this role as a management of expectation mainly because the course of action deals with decrease of uncertainty in the market. With authority being in charge and bearing responsibility the market participants expectations led to decisions that financial sector is going to be backed up by central bank, so the withdrawal of deposits and inactivity of economy might have been worse than it was.</td>
</tr>
<tr>
<td>Deposit guarantee blankets</td>
<td><em>Risk management</em></td>
</tr>
<tr>
<td></td>
<td>The deposit guarantee blanket is a pre-emptive action taken for further collapse of banking sector.</td>
</tr>
<tr>
<td>Selling securities to finance recovery program</td>
<td><em>Nonconventional monetary policy</em></td>
</tr>
<tr>
<td></td>
<td>First, the action is not connected to the target inflation rate. Second,</td>
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</table>
it was unprecedented event for a central bank to generate revenue for the sole purpose of financing the recovery program for commercial banks.

<table>
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<tr>
<th>Emergency Lending Facility</th>
<th>Liquidity provision</th>
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<tbody>
<tr>
<td>The provision of liquidity to commercial banks was an essential part of keeping the financial market to function. This allowed increased the balance sheet of BoM by USD 1 billion in a year.</td>
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<table>
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<tr>
<th>Purchase of government bonds</th>
<th>Fiscal dominance</th>
</tr>
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<tbody>
<tr>
<td>By the definition of Mishkin (2012), fiscal dominance is when government pressures the central bank to monetize the government debt and implement actions that are against keeping the inflation rate stable. The scale of the monetisation of government debt by Bank of Mongolia is not comparable to the Argentinian or Eurozone cases, but the action itself is very much the fiscal dominance by the definition.</td>
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<tr>
<th>Organizational structure</th>
<th>Other</th>
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<tbody>
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<td>The research paper found one aspect of the crisis response to be different than the global trend is the change of the organizational structure. The paper suggests there are mainly two reasons for this. First, the modern Bank of Mongolia was established in 1991, with very difficult transition period from centrally planned economy and governance to free market. The newbie in the financial arena, BoM was on the way of stabilising its functions. Second, the crisis did guide the central bank to the direction of governance that will keep up with the global standards.</td>
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</tr>
</tbody>
</table>
**Recommendation**

Generally, the economic entities tend to take into consideration only those risks that have been faced before. Therefore, they do not behave rationally about new risks, hence the risk of a systemic crisis as a result of widespread use of hedging instruments was not correctly estimated. Furthermore, the risk is not fully eliminated, but is moved between market participants in a boomerang trajectory. Overcoming the global financial crisis requires the monetary authorities to implement new methodological approaches to the monetary policy, improve its tools, methods and mechanisms. And it is important to draw clear conclusions from the theoretical and practical mistakes made in the pre-crisis period. One should not allow excessive intertwining of the banking sector and the stock market, widespread usage of financial instruments as a bank collateral, and also reduce the ability of central banks to control the formation of liquidity.

The adoption of effective measures to prevent future global financial crises will require active international cooperation, as large as the Bretton Woods international conference. This will solve a number of problems, which until recently was not given proper attention. For example, it is necessary to ensure control over the formation of international liquidity as a result of the multiplication of reserve currencies. This, most likely, will necessitate the liquidation of bank offshore zones. Their activities not only weaken control over international liquidity, but also unfair competition in the field of taxation. It is also necessary to unify the requirements to the quality of the bank collateral and to prevent the use of securities issued under securitization of loans issued to secure new loan obligations.

*Enhancing traditional role of central bank*

Traditionally, central banks acted as the lender of last resort as tool to bring financial stability back to its normal pace. But the area and implementation of lender of last resort has evolved with the emergence of new financial instruments, and the crisis shows that LLR should be expanded in their scope of activity. Central bank authorities should implement policies that allow liquidity provision not only to commercial banks, but other financial institutions with more types of collaterals. Emergency Lending Facility that was provided by Bank of Mongolia is a great example how policy adjustments provided liquidity in stressed situations. However, LLR is sill a policy for last resort actions. Another disputable issue is the implementation of monetary policy
by central banks. The crisis showed that in most cases policies aimed at fighting against financial vulnerabilities are too vague to implement. The research paper suggests developing such monetary strategy where inflation will still be targeted, but the policy should adjust and harmonize with macro-prudential policy.

Broadening the communication and better systemic risk analysis

Central banks are responsible for monitoring identifying risks, exposing the financial vulnerabilities and communicating it within the system and public. In order to improve the communication, first of all, central banks should increase their transparency about the systemic failures that are happening in the market, and most preferably to deliver their stance and further actions with it. The statements that were done during the financial crisis were very implicit and unconditional. Although, the research paper overviewed in the literature review pros and cons of unconditional expectations, the assumption is that in times of severe uncertainty authority having proper sets of actions and delivering sense of trust is very essential to manage the crisis. The communication should be developed not only to the public and other market participants, but also on the state level, where central banks and government will create agency or department that is solely implemented for integration of two sides. Finally, the central bank should focus more on macro-prudential surveillance, where new financial products would be assessed and evaluated for financial stability disturbance as well as regulating arbitrage.

Roles in macro-prudential policy

Central banks have great capacity to regulate both micro- and macro-prudential policies. They have infrastructure and system-wide perspective to be able to run stress tests for macro-prudential policies. The traditional stress tests focus on requirement fulfilment on liquidity and capital to face when the crisis comes, but macro-prudential stress test is like preventive tool, where different scenarios are implied for interaction between banks, real economy, other financial institutions and non-financial markets. The main logic behind is that during stress test, the weakness of the organization or an institution is going to surface, giving an opportunity to prevent or prepare plans of actions against financial shock.
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Appendices

Appendix 1. Organizational chart of BoM 2002
Appendix 2. Organizational chart of BoM 2003
Appendix 3. Organizational chart of BoM 2015
Appendix 4. Organizational chart of BoM 2016