

# **Doctor of Philosophy's Dissertation**

## **Monetary Policy Rule and Its Performance: Case of Mongolia**

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## **Abstract**

This dissertation aimed to examine the monetary policy rule and its macro-economic performance in Mongolia. The Part I investigated the history of the Mongolian monetary policy in relation with its macroeconomic conditions during 1990-2016. The Part II focused on empirical studies of monetary policy rule and its transmission mechanism under the inflation targeting framework since its adoption in 2007.

The Part I mainly illustrated how the Mongolian monetary policy has struggled high and volatile inflation. The monetary policy framework has made the following major progresses to cope with inflation. As the initial step in the early 1990s, the Bank of Mongolia (BOM) was assigned to implement a monetary policy in accordance with the transformation from a centrally planned economy to a market-based economy. The BOM had adopted a monetary aggregate targeting as an instrument to manage inflation in this initial stage. As the next progress, the BOM has adopted a inflation targeting instead of a monetary aggregate targeting, and at the same time has set a policy rate as an operating target since 2007. The inflation targeting has been further graded up by applying a forward-looking framework since 2011, and the BOM also has improved its operation by establishing an interest rate corridor since 2013. While the framework has shown the progresses above, however, the Mongolian monetary policy management has faced difficulties by internal and external factors: the monetary policy has often been confronting with expansionary fiscal policy in managing inflation, and also been disturbed by exchange rate fluctuation and massive flows of foreign capital. The history of Mongolian monetary policy, in this sense, contained not only a positive side of the progresses in its framework but also a negative side of policy dilemma with internal and external factors.

The Part II evaluated empirically the Mongolian monetary policy under inflation targeting framework since 2007 from the perspectives of monetary policy rule and its transmission mechanism. The first empirical analysis employed the policy reaction function to see if the inflation targeting has been linked with a monetary policy rule emphasizing on inflation stabilization. The study contributed to the literature by examining the linkage between Mongolian monetary policy rule and inflation targeting directly and thoroughly for the first time, and also by taking into account a recent progress in the inflation targeting framework toward forward-looking mode since 2011. The main findings through the estimation outcomes of policy reaction functions were summarized as follows: First, the

Mongolian current monetary policy rule under inflation targeting is characterized as inflation-responsive rule with forward-looking manner (one quarter ahead). It might reflect the progress in inflation targeting framework toward forward-looking mode by adopting the Forecasting and Policy Analysis System since 2011. Second, the inflation-responsiveness is, however, not powerful enough to stabilize inflation in the sense that the real policy rate tends to be still pro-cyclical to inflation pressure. Third, the Mongolian monetary policy rule is also responsive to exchange rate movement, due to the “fear of floating”. The policy reaction to exchange rate is typically represented by the fact that the BOM has still kept its policy rate at higher than ten percent even under the inflation rate below the targeted rate after 2015 to prevent currency value from falling. The “fear of floating” might weaken the policy reaction to inflation and output gap. The strategic policy implication to enhance monetary autonomy in the Mongolian monetary policy would be the serious necessities to have more foreign reserves to cope with foreign capital mobility and to diversify manufacturing industries to acquire a resilience against currency depreciation in the long run.

The second empirical analysis examined the monetary policy transmission mechanism under the inflation targeting in Mongolia by applying structure vector-autoregressive model. Under the inflation targeting framework, the BOM has introduced the policy rate since July 2007, and has established the interest rate corridor since February 2013, for the purpose of improving the interest rate channel of the transmission mechanism. The study then contributed to the literature by assessing whether the interest rate corridor has really improved the policy rate transmission effects by comparing the effects between the pre-corridor and the post-corridor period. The main findings of this study were summarized as follows: First, there is a clear contrast in the responses of the lending rate and inflation rate to the policy rate shock between the pre-corridor period and the post-corridor one: in the post-corridor period the effect of policy rate is clearly transmitted to the lending rate and inflation rate through the longer responses of interbank market rate, whereas the pre-corridor period does not represent any significant interest rate transmission effects. This outcome implies that the framework of the interest rate corridor has contributed successfully to enhancing monetary policy transmission mechanism, in particular, in controlling inflation rate. Second, the responses of exchange rate and industrial production to the policy rate shock are not significant even after the adoption of the interest rate corridor. This insignificance might come from the sticky policy rate to stabilize the exchange rate, so-called a “fear of floating”.

The conclusion throughout the Part I and II is that the Mongolian monetary policy has shown steady progresses in its framework by adopting an inflation targeting and improving its operations; there have been still a serious problem, however, in its management in the sense that the “fear of floating” has prevented its policy rule from working effectively; therefore, the enrichment of foreign reserves in the short-run and the diversification of industries in the long-run should be recommended to enhance the monetary autonomy of Mongolia.

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## INTRODUCTION

Over the last two decades, Mongolia privatized most of its public enterprises and assets, created a two-tier banking system, liberalized its foreign trade and capital flows, and operated the foreign exchange market by creating basic regulations. During the economic transition period, Mongolian economy faced a number of challenges including high inflation pressure, and the monetary policy aimed to stabilize the economy and the banking sector.

After the transition period, Mongolian economic structure has changed such that the mining sector has become one of the economic driving sector during very short period. Mongolian economy has highly depended on export revenue from the mining sector: the mining exports have constantly made up about 90% of its total exports. Moreover, the giant mining project, Turquoise hill, of copper and other coal projects has made Mongolia a popular spot for foreign investors. Depending on economic situation, the Mongolian monetary policy framework and tools have also been changed. According to the law of Mongolia concerning the Bank of Mongolia (hereafter BOM), a central bank of Mongolia, the main objective of monetary policy is to ensure the stability of the national currency. At the same time, the law also states that the exchange rate policy is to follow the principles of keeping the exchange rate floating. Maintaining price stability, however, requires the BOM to intervene in the foreign exchange market in order to soften the pass-through effects of exchange rates on inflation.

The inflation rate has also been highly vulnerable from supply shocks of several consumer goods in Mongolia. The sudden shortfalls of domestic production of wheat and meat due to harsh weather or harmful disease, and the trade limits of gasoline in the main supplier countries, have created high inflationary pressure in some periods. Mongolia has been experiencing high inflation rate in the past years. The inflation rate was around 12% on average during the periods of 2010–2014. In 2015-2017, however, the inflation rate decreased below to the targeted rate. In addition, at the end of 2012, capital inflow and foreign direct investment decreased rapidly. Furthermore, the BOM faced such challenges as the sudden stops and reversals of the capital inflows due to the high balance-of-payment deficits, large nominal depreciation, inflationary pressure, significant decline of international reserves, worsening financial stability induced from asset price drops and liquidity shortage in the banking sector.

Based on the economic backgrounds above, this dissertation investigates the Mongolian monetary policy, with a focus on its history and its policy performances. The rest of this dissertation is organized as follows. Part I discusses the history of monetary policy and macroeconomic indicators during 1990-2016. Part II reviews the monetary policy rule and its transmission mechanism under the adoption of inflation targeting for 2007-2016. The empirical analysis applies the policy reaction function to see if the inflation targeting has been linked with a monetary policy rule emphasizing on inflation stabilization. The empirics also estimates the impulse responses of transmission variables including inflation rate to the structural policy rate shock by applying the structural vector-autoregressive (SVAR).

## **PART 1**

### **MONETARY POLICY HISTORY OF MONGOLIA**

#### **INTRODUCTION**

Mongolia is a land-locked country of 1.6 million square kilometers in size which locates in Central Asia between Russia and China. From the 1920s to the late 1980s, Mongolian economic system was deeply linked to the Soviet Union. Following the shift to a market-based economy in early 1990s, the Mongolian economy has been changed continuously over time, in terms of the structure of production, development of the financial sector and trade openness etc. Mongolian economic has traditionally been based on agriculture and livestock. The mining sector has also become one of the driving forces of rapid economic growth. Due to the mining sector's contribution, GDP growth reached the historically highest level of 17.3 percent in 2011.

However, the Mongolian economy has been negatively affected by several factors such as a slowdown in the Chinese economic growth, the decline in mineral commodities prices and capital outflows. Under these uncertain and volatile environments, the Mongolian economy has been facing a number of challenges such as high fiscal deficit and external imbalance, unsustainable economic growth, currency-depreciation and inflation pressures.

Considering the backgrounds above, the Part I aims to examine the historical relationship between the macroeconomic condition and monetary policy in Mongolia. The rest of the Part I is structured as follows. Chapter 1 briefly discusses the surrounding macroeconomic condition of Mongolia. Chapter 2 reviews the financial system and monetary policy during 1990-2006. Chapter 3 focuses on the macroeconomic condition and monetary policy for 2007-2016. The last Chapter concludes.

## CHAPTER 1

### SURROUNDING MACROECONOMIC CONDITIONS OF MONGOLIA

This Chapter briefly discusses the surrounding macroeconomic condition of Mongolia in the transition period in the early 1990s and in the recent decades up to 2016.

#### *1.1 Economic Condition in the Transition Period*

Mongolia is a small and open market economy which transitioned to market-based economy since 1990s. Before the economic transition process, all of the price and exchange rate were under the government control. During the transition period, Mongolia faced with the unprecedented economic challenges. The reform programs launched by the first democratic government in 1990-1992, including price and trade liberalization, the establishment of new banking and financial systems, and privatization creating the foundation for the development of a private sector-based, market-oriented economy in Mongolia. At the same time, pension and salaries were doubled, while taxes and tariffs were also doubled. Due to that reason, annual inflation rose to 154.3% in 1991 and 325.5% in 1992 (Table 1.1). In 1990, the Soviet Union occupied the dominant share of Mongolian trade and financed most of the imports. After the collapse of the Soviet Union, Mongolia experienced the dramatic import reduction (Table 1.1). Therefore, it was necessary to implement a policy for trade reforms and for diversifying international trade partners. Mongolia joined the World Trade Organization in 1997 and became a member of the Asian Development Bank, International Monetary Fund and the World Bank in 1991.

Table 1.1: Macro-Economic indicators of Mongolia, 1989-1994

	1989	1990	1991	1992	1993	1994
<b>Growth of GDP (%)</b>	4.2	-2.1	-16.2	-7.6	-1.3	2.1
<b>Inflation (%)</b>	-	-	154.3	325.5	183.0	66.3
<b>Exports (mln US\$)</b>	796	445	347	356	360	324
<b>Imports (mln US\$)</b>	1912	1024	501	400	361	222

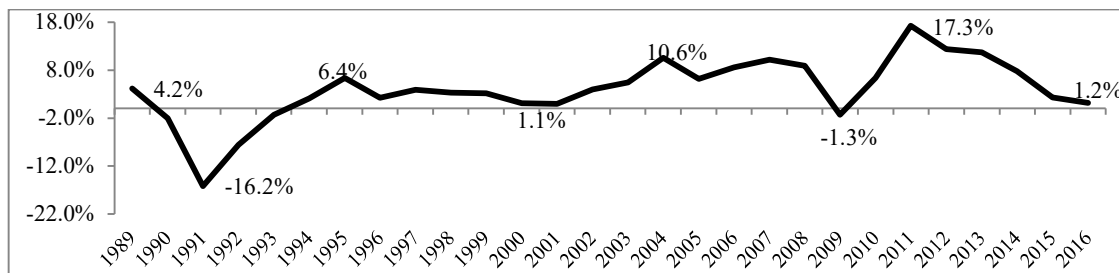
Source: Bank of Mongolia

## 1.2 Macroeconomic Conditions in Recent Decades

### Economic Growth

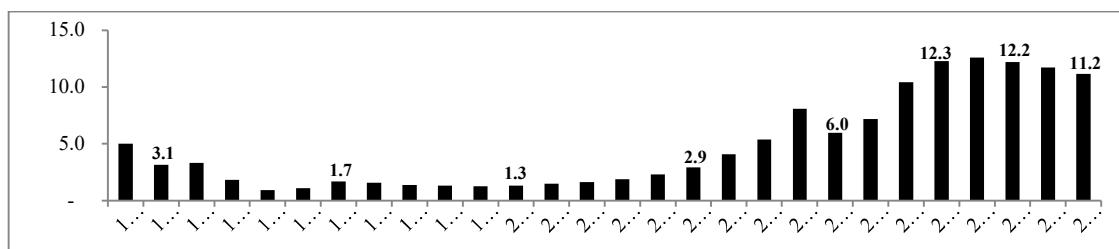
Figure 1.1 shows the trend in economic growth. From 2000 to 2013, the average economic growth of Mongolia was 7.7%. In 2009 the economic growth fell down to -1.3% due to the global economic crises. On the contrary, the peak level of economic growth was 17.3% in 2011 based on mining sector development. Since 2012, however, the economic growth decreased sharply and dropped to 1.2 % in 2016. The Gross Domestic Product (GDP) reached to 11.2 billion US dollars at the end of 2016 (Figure 1.2). The GDP per capita reached to USD 3,704 in 2016. The peak level of GDP per capita was USD 4,377 in 2012 (Figure 1.3).

Figure 1.1 Economic Growth of Mongolia (%)



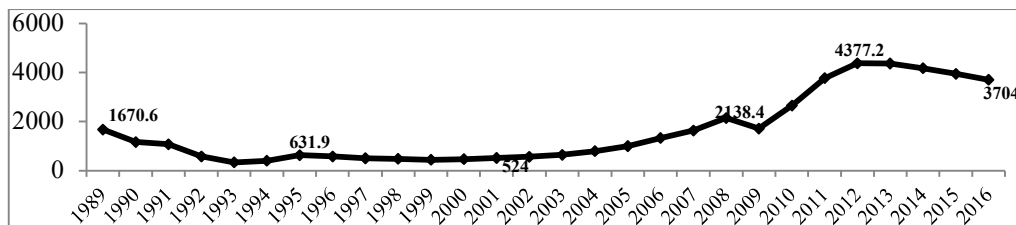
Source: NSO

Figure 1.2 Gross Domestic Products (US\$ billion)



Source: NSO

Figure 1.3 GDP per capita USD



Source: International Monetary Fund, NSO



## *Industrial Structure*

Table 1.2 shows the industrial structure. Agriculture is a traditional sector of Mongolia, which accounts for 32% of GDP in 1990, 28% in 2000 and 12.2% in 2016. The main reason for the agriculture and livestock decline is related to the geography condition, short agricultural season and harsh climate.

Mongolian mining sector, unaffected by harsh climate condition, has become one of the leading sectors in a very short period. Especially, in 2009 Mongolia explored big mining deposits, which are called “Tavantolgoi” coal mine and “Oyutolgoi” copper mine. In 2016, the mining accounted for 20.3% of the GDP.

Table 1.2 GDP Contribution by Economic Sectors (%)

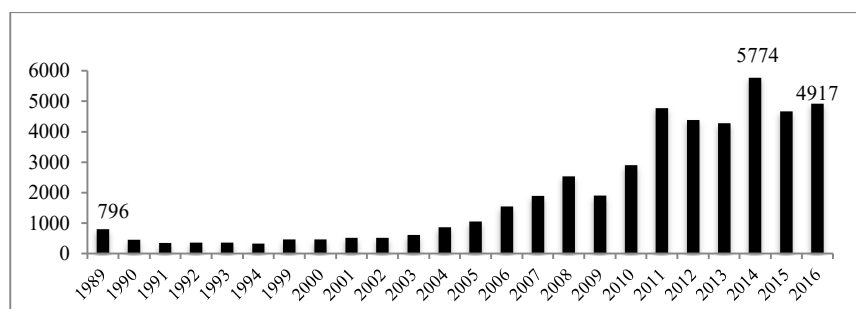
	1990	1995	2000	2005	2010	2014	2015	2016
<b>GDP growth</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
<b>Mining</b>	9	18	19	21	21.5	16.5	17.1	20.3
<b>Agriculture</b>	32	33	28	20	11.7	13.3	13.4	12.2
<b>Trade</b>	8	6	7	7	12.3	11.5	11.7	11.6
<b>Net tax on products</b>	0	2	8	10	10.2	9.3	8.2	8.3
<b>Processing</b>	7	9	5	6	6.8	8.8	7.6	6.4
<b>Transportation and storage</b>	13	4	6	8	6.9	5.0	5.0	5.2
<b>Construction+ Electricity</b>	8	6	5	6	4.9	6.2	6.3	5.6
<b>Other services</b>	16	22	22	22	23.0	27.2	28.6	28.1
<b>Other</b>	0	0	0	0	2.6	2.2	2.1	2.2

Source: National Registration and Statistical Office of Mongolia /NSO/

## *Exports*

Figure 1.4 and Table 1.3 represent the trend in export value and its industrial structure, respectively. The total export value reached 4,917 million US dollars in 2016. The export of mining made up 86% of total exports in 2016. The top export products are copper, coal and gold. The export of cashmere accounted for 5% in 2016.

Figure 1.4 Export (million USD)



Source: Bank of Mongolia

Table 1.3 Performance of Export of Goods (million USD)

	2014	2015	2016
<b>1. Minerals</b>	<b>89%</b>	<b>87%</b>	<b>86%</b>
Coal	15%	12%	20%
Copper concentrate	45%	49%	33%
Iron ore/ conc	8%	5%	5%
Crude oil	11%	8%	7%
Zinc ore/concentrate	2%	2%	3%
Non-monetary gold	7%	9%	9%
Spar, leucine, nepheline	1%	1%	1%
Molybdenum ore/conc	1%	1%	1%
<b>1. Livestock</b>	<b>6%</b>	<b>6%</b>	<b>5%</b>
Meat	0%	0%	0%
Cashmere	5%	5%	5%
Agriculture	0%	0%	5%
Leather	1%	1%	0%
<b>2. Other</b>	<b>5%</b>	<b>6%</b>	<b>9%</b>

Source: Bank of Mongolia

## Imports

Table 1.4 shows the composition of imports. The main import products of Mongolia are consumer goods, capital goods, fuel, intermediate goods and industrial materials, especially from China and Russia. The total imports reached the peak in 2011 and 2012 based on economic expansion and mining boom, but decreased afterwards. That decrease came from the decline of capital goods (machinery, equipment, supplies and vehicle, passenger cars and parts, construction materials and so on), consumer goods (foods, medical products, clothing, passenger car and parts, etc.) and industrial inputs. In 2016, the total imports reached 335 million US dollars, which decreased by 11.6% from previous year.

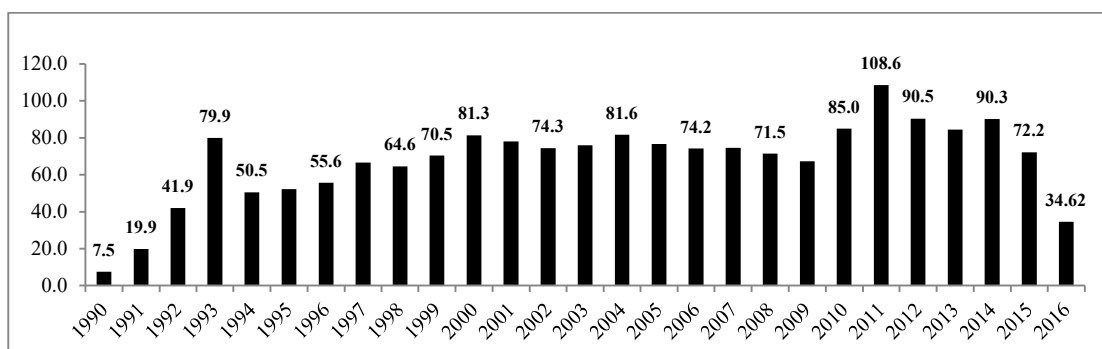
Table 1.4 Performance of Import of Goods (a percentage of total imports)

Types	2014	2015	2016
<b>Consumer goods</b>	<b>26%</b>	<b>29%</b>	<b>35%</b>
Non-durables	15%	17%	19%
<i>Food</i>	10%	12%	13%
<i>Medicinal and pharmaceutical products</i>	2%	2%	3%
<i>Other non-durables</i>	3%	3%	3%
Durables	12%	12%	15%
<i>Clothing</i>	1%	1%	2%
<i>Household electrical appliances and furniture</i>	3%	2%	3%
<i>Passenger cars and parts</i>	7%	7%	9%
<i>Other durables</i>	1%	2%	2%
<b>Capital goods</b>	<b>40%</b>	<b>38%</b>	<b>34%</b>
Machinery, equipment, supplies and vehicles	21%	20%	20%
<i>Vehicles other than passenger cars, parts</i>	5%	3%	6%
<i>Machinery, equipment and supplies</i>	16%	17%	14%
Construction materials	14%	12%	8%
Other capital goods	4%	6%	6%
<b>Intermediate goods and industrial materials</b>	<b>11%</b>	<b>14%</b>	<b>15%</b>
Food ingredients (wheat, malt etc)	1%	1%	2%
Chemical products	2%	2%	3%
Yam, fabrics, leather	0%	0%	1%
Electricity	2%	3%	4%
Metal ores and scrap	0%	0%	0%
Other industrial materials	6%	7%	7%
<b>Fuels</b>	<b>22%</b>	<b>19%</b>	<b>16%</b>
Diesels	13%	10%	8%
Gasolines A92-95	6%	6%	5%
Gasolines A80 and other fuels	3%	3%	3%

Source: Bank of Mongolia

The trade turnover expanded after the transition period from 235.8 million US dollars in 1990 to 11,123 million US dollars in 2012, which was the peak of the history. The trade turnover - GDP ratio was 7.5% in 1990, 81.3% in 2001, 90.5% in 2012 and 34% in 2016 (Figure 1.5).

Figure 1.5 Trade Turnover to GDP Ratio (%)

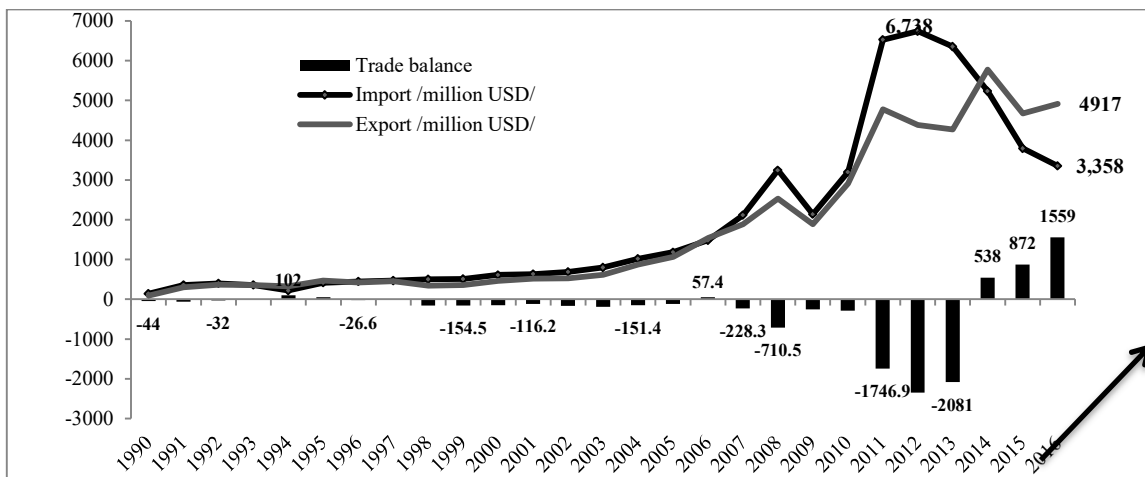


Source: Bank of Mongolia

## Trade Balance

Figure 1.6 shows the trend in trade balance. In 2016, Mongolia exported 4.91 billion US dollars and imported 3.35 billion US dollars, resulting in a trade surplus by 1.55 billion US dollars. The trade balance of Mongolia has, however, been in deficit for most of the period. Since 1990, Mongolian trade balance has recorded surplus only in the years of 1994, 1995, 2006, 2014, 2015 and 2016, whereas it has recorded deficits in all the other fiscal year. Figure 1.7 and 1.8 presents exports and imports to GDP ratio, respectively.

Figure 1.6 Trade Balance of Mongolia (million USD)



Source: Bank of Mongolia

Figure 1.7 Export to GDP Ratio

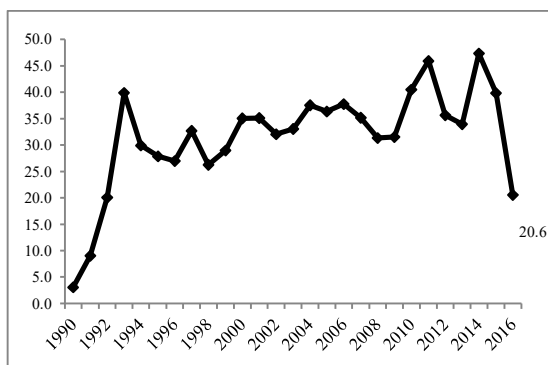
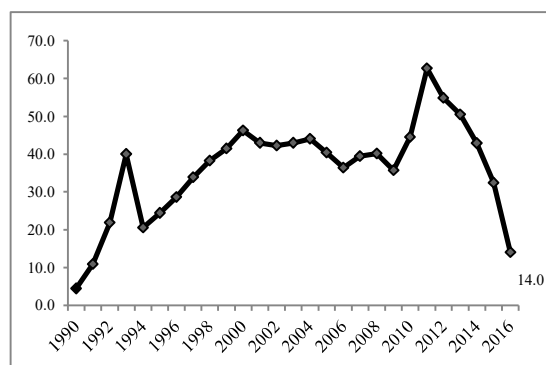


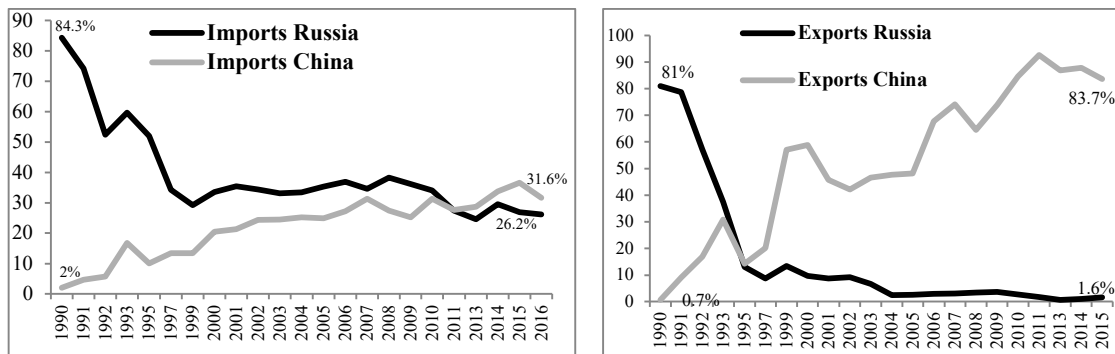
Figure 1.8 Import to GDP Ratio



Source: Bank of Mongolia

Regarding the trade partners, Mongolian economy had depended highly on Russian economy until 1990. In 1990, Russia accounted for 81.0% of total exports and 84.3% of total imports, whereas China accounted for 0.7% of total exports and 2.0% of total imports. In 2016, however, Russia accounted for 1.1% of exports and 26.2% of import, while China accounted for 79.3% of exports and 31.6% of imports (Figure 1.9 and 1.10).

Figure 1.9 Import from Major Trading Countries    Figure 1.10 Export to Major Countries (%)

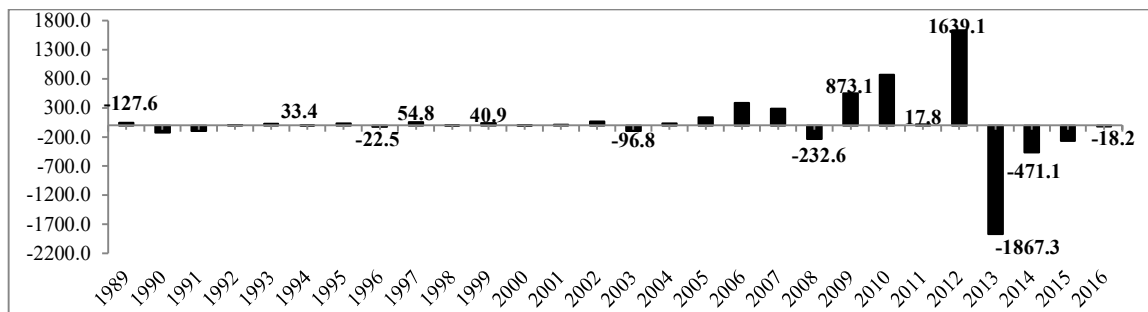


Source: Bank of Mongolia

### ***Balance of Payment***

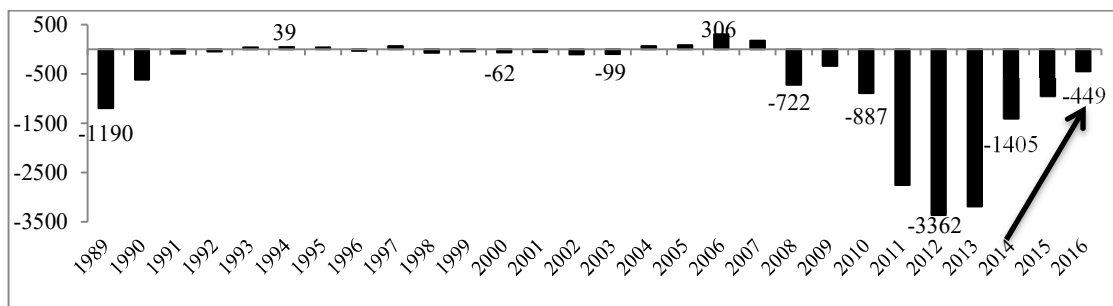
The balance of payments (BOP) is the record of all international financial transactions made by a country's residents. The BOP consists of current account, and capital and financial account. Figure 1.11 and 1.12 presents the overall balance and current account of Mongolia, respectively. Mongolia's current account has been in deficit for most of the period which amounted to 27% of GDP in 2011-2012. Since the surplus in the capital and financial accounts has compensated the deficit in current account, the overall balance has often enjoyed the surplus. Since 2013, however, although the current account deficit has been decreasing, so has the capital and financial account surplus due to declining inward foreign direct investment, resulting in deficit in the overall balance. The current account deficit reached the highest level in 2012. At the end of 2016, however, the current account deficit fell down to 449 million US dollar, which decreased by 47% compared to the 2015. After all, the deficit in the overall balances recovered to only 18.2 million US dollars in 2016. In terms of current account deficit to GDP ratio in Figure 13, it reached the highest level of 27.3% in 2012, and then narrowed to 4% in 2016.

Figure 1.11 Overall Balance of Payment (million USD)



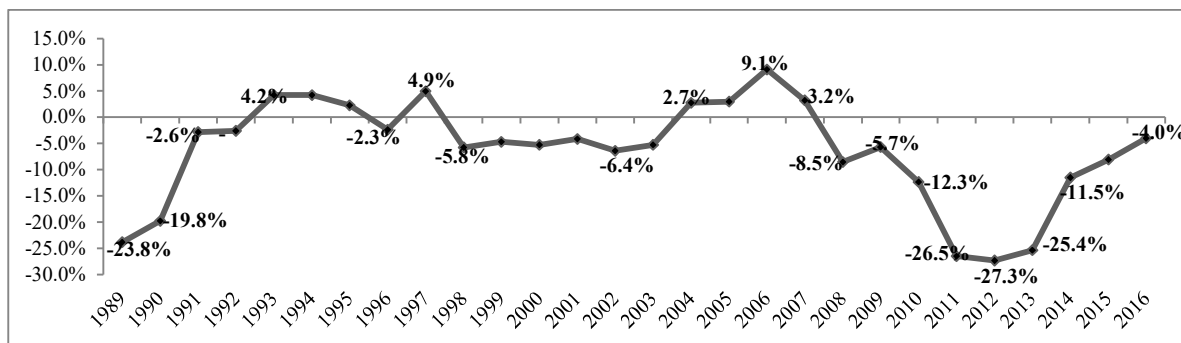
Source: Bank of Mongolia

Figure 1.12 Current Account Balance (million USD)



Source: Bank of Mongolia

Figure 1.13 Current Account to GDP Ratio



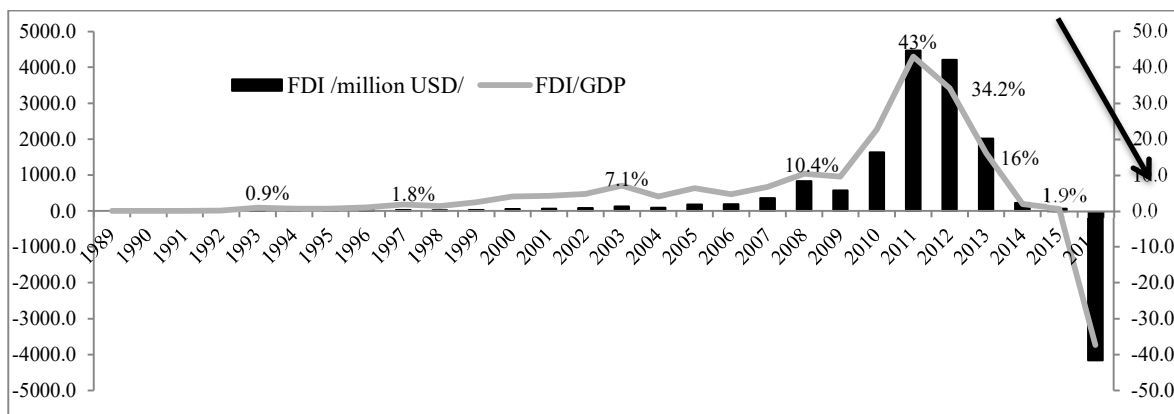
Source: Bank of Mongolia

### Foreign Direct Investment

Figure 1.4 shows the trend in FDI. It reached the peak of 4,477 million US dollars in 2011, based on big mining projects. Due to the mining resource development and the immense foreign direct investment (FDI) inflows to the mining sector, Mongolia has been one of the fastest growing countries over the past decade. Mongolia hosts the Tavan Tolgoi coal mine, which is one of the

world's largest coal deposit. The government also explored the Oyu Tolgoi copper deposit in 2009, and successfully implemented the first project with the open pit of the deposit. The second phase has been stalled, however, by the disputes between Mongolian government and Rio Tinto of Australia. Since 2012, therefore, FDI has decreased sharply due to the mining sector slowdown and global market uncertainty. At the end of the 2015, FDI fell down to only 83 million US dollars, which decreased by 85% compared to that in 2011. In 2016, FDI further dropped to negative level of -4,171 million US dollars.

Figure 1.14 Foreign Direct Investment



Source: Bank of Mongolia

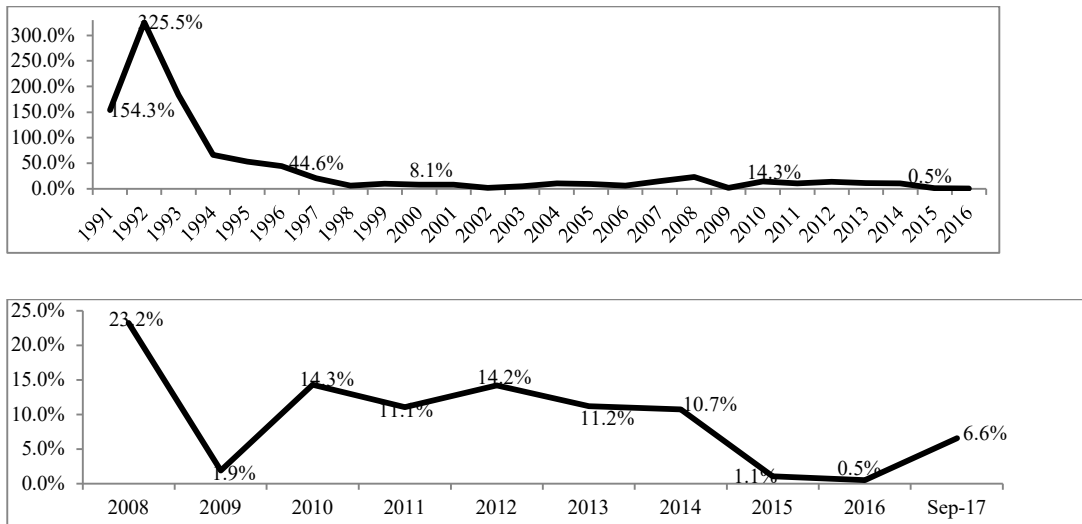
### ***Inflation***

Figure 1.15 represents the trend in inflation rate. Mongolia experienced high inflation. The inflation in Mongolia has tended to be high and volatile throughout the history, and has experienced the double-digit hike in recent years. From 2007 to 2016, there have been only three instances where the inflation rate was a single digit number. During the period from 2010 to 2014, the inflation rate recorded double-digit numbers.

The high inflation is related to the expansion in government and private consumption. These vigorous consumptions led to a demand-induced inflation. The inflation is also influenced by the supply shocks of several consumer goods in Mongolia. Trade limits of gasoline in main supplier countries and shortfalls of domestic productions of wheat and meat due to harsh weather created a supply-induced inflation in some periods. The supply-induced inflation rate, mainly made up of price growth of meat and food products, accounted for one-third of the total inflation rate in 2011

(Bank of Mongolia 2011). The Government and the BOM, therefore, implemented the “Price stabilization program”<sup>1</sup> during 2012-2014. As of the end of 2016, the inflation rate declined to 1.1%, and the BOM achieved the targeted level.

Figure 1.15 Inflation Rate (%)

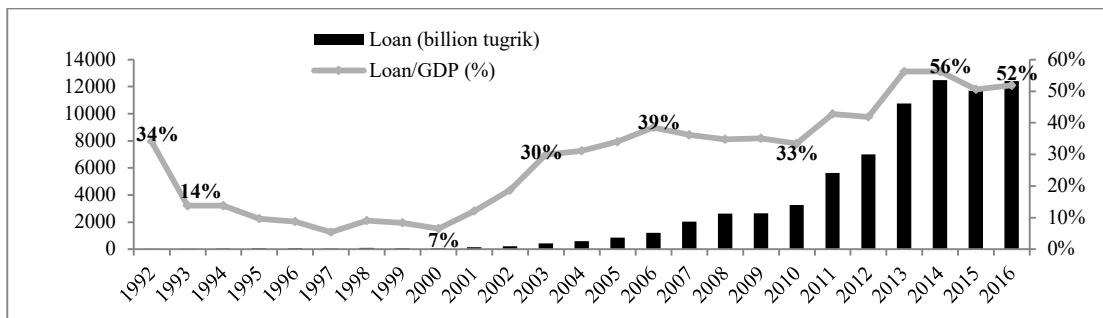


Source: Bank of Mongolia

### Total Loan and Savings

The total loan reached 12.4 trillion MNT in 2016. The loan to GDP ratio was 14% in 1993, 7% in 2000, 33% in 2010, 56% in 2014 and 52% in the 2016 (Figure 1.16).

Figure 1.16 Total Loan



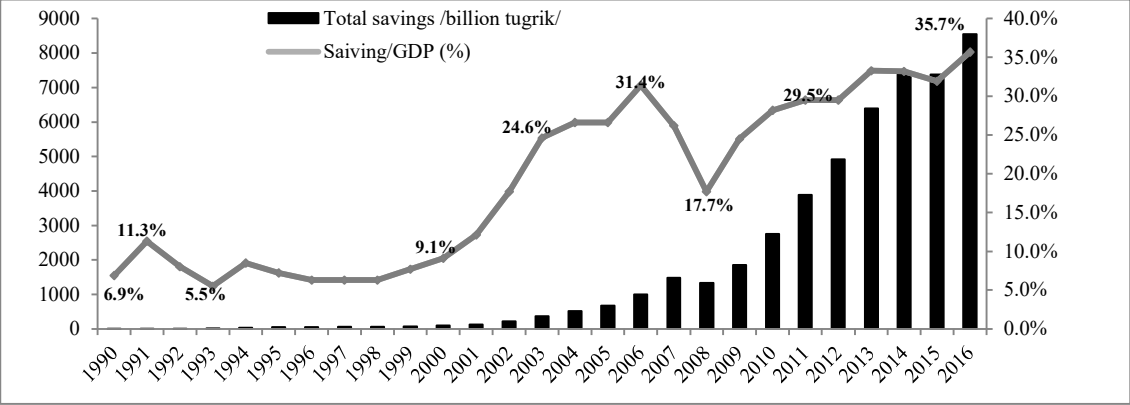
Source: Bank of Mongolia

<sup>1</sup> Under the program, BOM provides low-cost funding to corporations



The total saving reached 8.5 trillion MNT in 2016. The savings to GDP ratio was 6.9% in 1990, 9.1% in 2000, 31.4% in 2006, 29.5% in 2011 and 35.7% in 2016 (Figure 1.17).

Figure 1.17 Total Savings



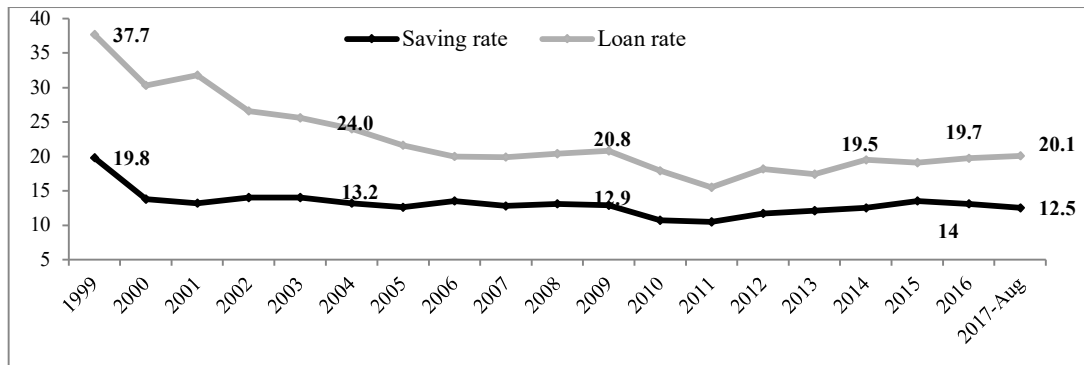
Source: Bank of Mongolia

**Interest Rates**

Figure 1.18 shows the deposit and lending interest rates. They have been very high since the transition period until today. Even though high-interest rates have declined significantly in transition countries as inflation has come down, this has not been the case yet in Mongolia<sup>2</sup>. The average loan rate was 19% and the deposit rate was 14% in 2016. Mongolian economy experienced a series of financial sector crises in 1990, 1994, 1996 and 1998-99. After the crises, the government implemented the projects and plans for strengthening the financial market and banking system. As a result, all of the state-owned banks were privatized in 2007. The competition among the banking sectors has been very intense, and thirteen commercial banks have operating although 95% of banking transactions has been made by only five leading banks. Smaller banks seem still weak with limited capacity. The high lending and deposit rates are also related to the high inflation rate.

<sup>2</sup> See more Elena Loukoianova “A Puzzle of High Interest Rates in Mongolia” 2011

Figure 1.18 Loan (lending) and Saving (deposit) Rate (%)

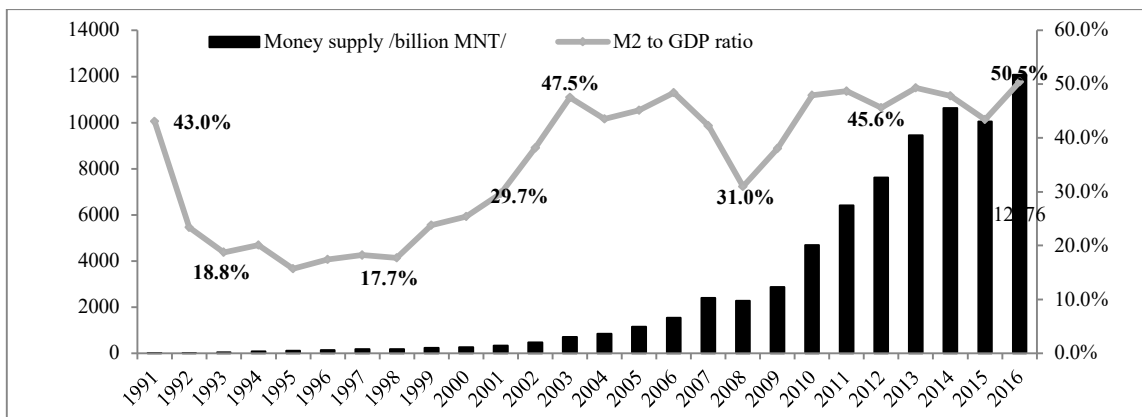


Source: Bank of Mongolia

### Money supply

In 2016, money supply reached 12 trillion MNT and money supply to GDP ratio was 50.5% (Figure 1.19).

Figure 1.19 Money Supply

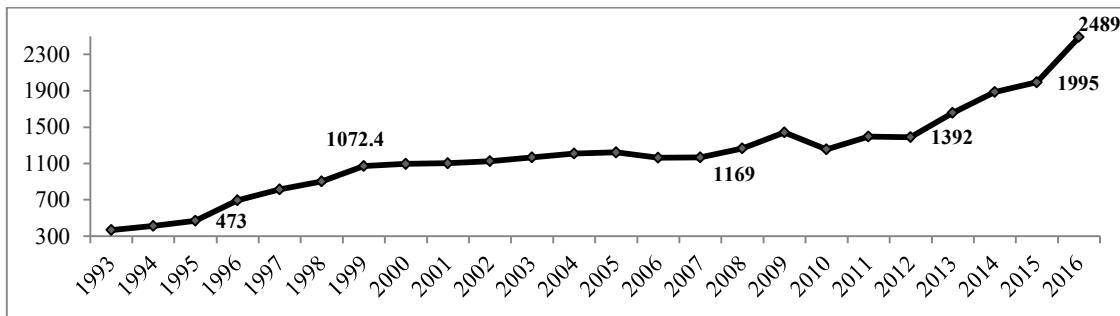


Source: Bank of Mongolia

### Exchange Rate Regime

Figure 1.20 shows the trend in exchange rate. The law of Central bank of Mongolia states that the exchange rate shall be determined according to the supply and demand dynamics in foreign exchange market. The BOM intervenes in the exchange rate market in the case of the exchange market's fluctuation and its excessive volatility.

Figure 1.20 Tugrik per USD

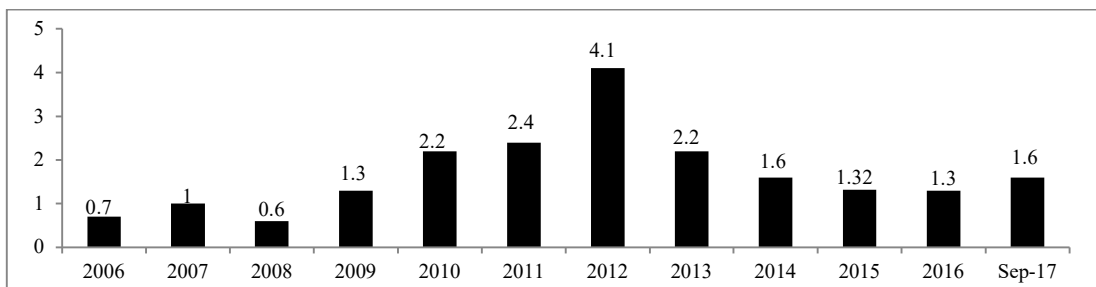


Source: Bank of Mongolia

### ***Foreign Reserves***

Figure 1.21 shows the trend in foreign reserves. In 2016, the foreign reserves reached 1.3 billion US dollars. The foreign reserves reached the peak of 4.1 billion US dollars in 2012. When the capital inflow surged, the BOM built up foreign reserves by absorbing the excess foreign exchanges in the foreign exchange market.

Figure 1.21 Foreign Reserves (billion USD)

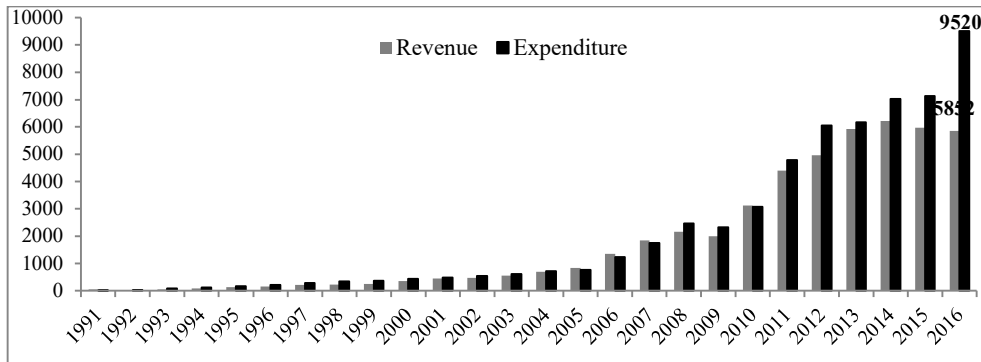


Source: Bank of Mongolia

### ***Budget Revenue and Expenditure***

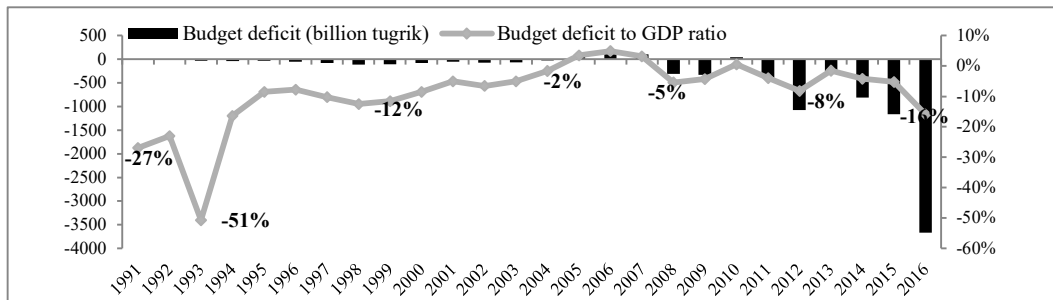
Figure 1.22 and 1.23 shows the budget scale and deficit-GDP ratio, respectively. Mongolia's total budget revenue and grants reached 5,952.8 billion MNT, while total budget expenditure and net credit amount reached 9,520.9 billion MNT in 2016. The budget deficit was equal to 15.9 percent of GDP in 2016.

Figure 1.22 Budget (billion MNT)



Source: Bank of Mongolia

Figure 1.23 Budget Deficit to GDP Ratio



Source: Ministry of Finance

### Commodity Prices

Around 90% of total exports consists of mining products. Therefore, commodity price fluctuation heavily affects Mongolian economy (Figure 1.24 and 1.25).

Figure 1.24 Copper Price USD/lb

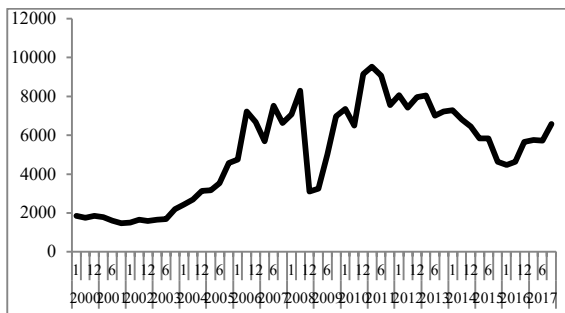
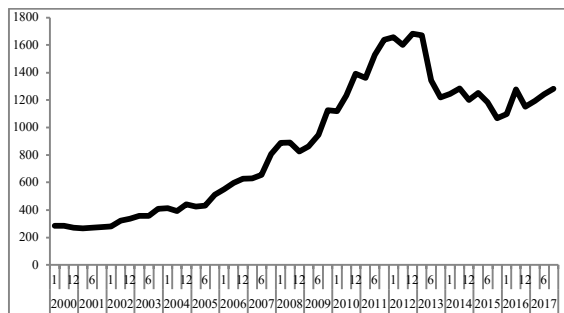


Figure 1.25 Coal Price USD/ounce



Source: Bloomberg

## **CHAPTER 2**

### **FINANCIAL SYSTEM AND MONETARY POLICY (1990-2006)**

This Chapter reviews the financial system and monetary policy during 1990-2006. When the Mongolian economic system shifted from a centrally planned economy to a market-based economy in early 1990s, a great number of political and economic reforms had been undertaken. The banking sector and monetary policy has also experienced a number of challenges during 1990-2006.

#### ***2.1 Monetary Policy in Transition***

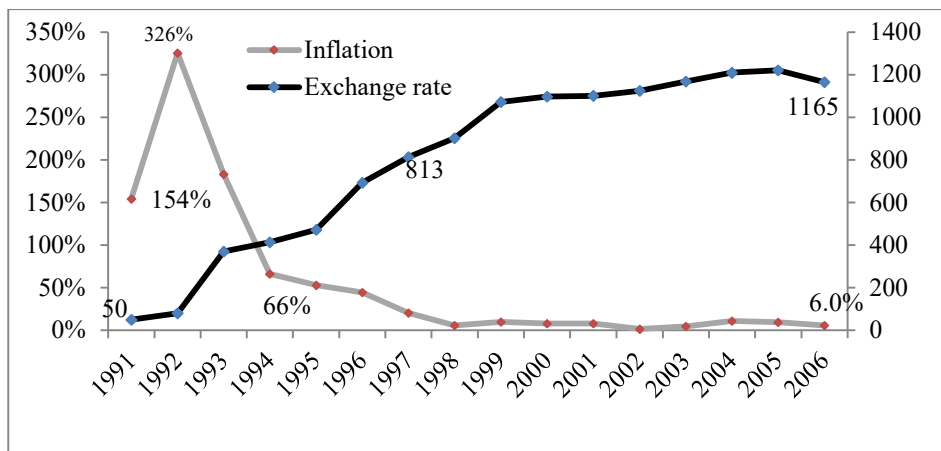
##### ***Banking Sector Reform***

Financial sector reform was a key component of Mongolia's economic transformation toward a market-based economy. The initial step in the reform centered on shifting from a mono-bank system to a two-tier banking system. This was followed by the other reform actions aimed at developing an institutional framework for indirect monetary management, fostering competition in the banking system, building a supervisory system, and establishing money and securities markets.

Before the transition period, the BOM was under the government control and monitoring the business transactions of all companies. Since 1990's, the economic transition had started and shifted to the market based economy. In 1991, Mongolia approved a new banking law and the two-tier banking system was organized. The BOM implemented monetary policy and other sixteen banks yielded commercial services. Unfortunately, commercial banks supplied loans without any control and the outstanding loans increased dramatically. Accordingly, the inflation increased to 154% in 1991, 325% in 1992 and 183% in 1993. Therefore, monetary policy was aimed to stabilize inflation through stable growth in the money supply.

In 1993, Mongolia also shifted to floating exchange rate system, and the BOM managed the exchange rate movements through intervention when the exchange rate market experienced excessive fluctuation. The annual inflation and exchange rate for 1990-2006 are shown in Figure 1.26.

Figure 1.26 Annual Inflation and Exchange Rate for 1990-2006



Source: NSO, Bank of Mongolia

The non-performing loans increased rapidly, which accounted for around 50% of total outstanding loans at the peak (Figure 1.27), and major banks were facing insolvencies. Starting from October 1992, conversely, the BOM began to use direct monetary instruments, which are imposing lending limits and reserve requirements on the commercial banks.

The BOM also used regularly the Central Bank bills since 1995. In 1995, the government and the BOM started to implement a program, which aimed at strengthening banking system such as an increase in effectiveness of monetary policy and loan management among banks with the support of international financial institutions. Then, a number of laws were approved, which were the Central Bank law, the Banking law and the law on Savings, Settlements and Bank Loan Operations. During the high inflation period, the BOM successfully conducted tight monetary policy, and the inflation rate reduced to 66.3% in 1994 and to 53% in 1995 (Figure 1.25).

### ***Minimum Interest Rate for Saving***

The minimum interest rate for saving was set and controlled by the BOM for keeping the real interest rate at a positive level and protecting the savings. After the Central bank law passed, however, interest rate control has changed to a free market interbank competition since 1996.

### ***Banking Sector Crises***

The banking sector transition in Mongolia faced a number of challenges and uncertainties. Mongolian banking system suffered from three times crises in 1994, 1996 and 1998. In 1996, the

non-performing loans rose to 50% in 1996 (Figure 1.27). Some commercial banks started to fail to provide the reserve requirements and prudential norms. Three major banks' operation was getting worse and experienced the period of illiquidity and significant losses. The BOM also decided to close some small banks.

At the end of 1997, due to the Asian economic crises, the non-performing loans increased again and reached 30% in 1998 and 51% of 1999 (Figure 1.27, and related indicators in Figure 1.28 to 1.32 and Table 1.5). During 1999, the BOM implemented some policy actions to improve banking regulation and supervision. Under the new regulations, a minimum requirement for paid-up capital was set at 1 billion tugriks<sup>3</sup>. The government also accepted the responsibility for the directed loans. Then non-performing loans declined and reached the constant level. After that period, Mongolian banking system had been stabilized and authorities had been paying more attention to strengthen the banking sector. In 1996, around 87% of total performing loans were up to 1 year, and the remaining 12.5% was from 1 to 5 years (Table 1.6).

Figure 1.27 Non-Performing Loan %

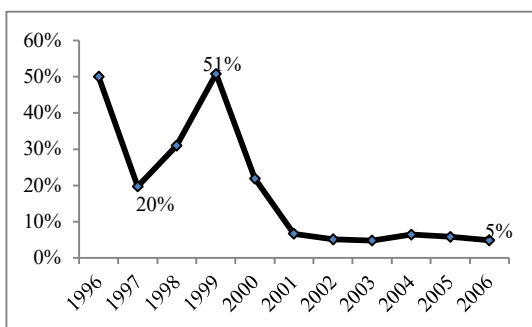


Figure 1.28 Total Loan (billion MNT)

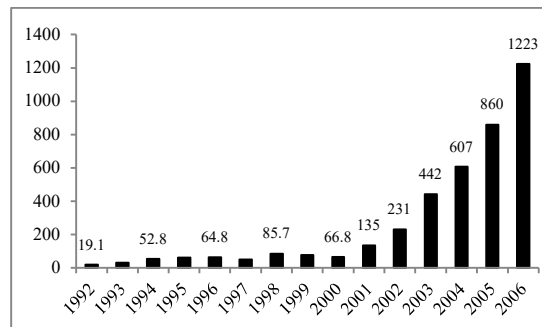


Figure 1.29 Deposit/GDP Ratio

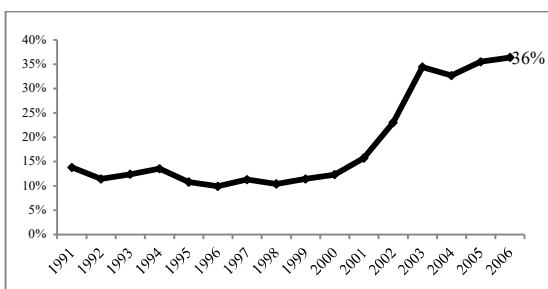
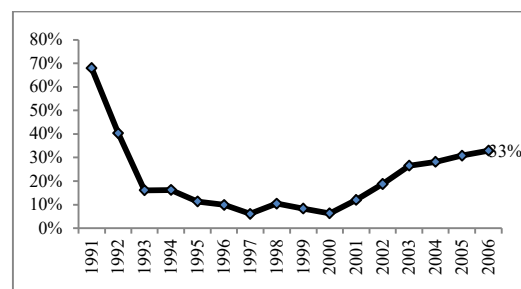


Figure 1.30 Loan/GDP Ratio



<sup>3</sup> Masaru Honma (2015) Banking sector Transition in Mongolia since 1990

Figure 1.31 Bank Total Asset/GDP

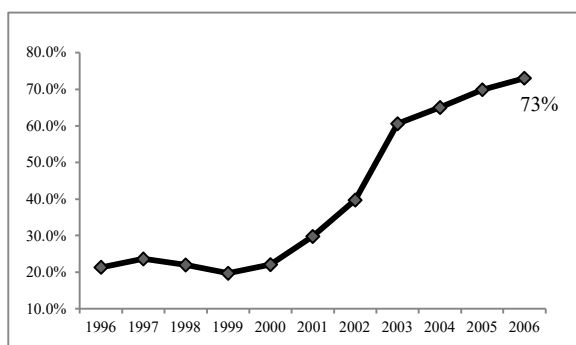
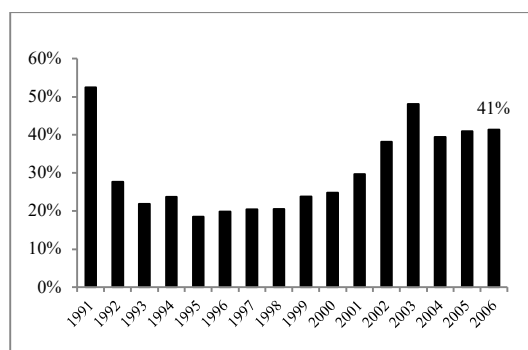


Figure 1.32 M2/GDP



Source: Bank of Mongolia

Table 1.5 Loans by Economic Sectors (%)

	1999	2000	2002	2003	2004	2005	2006
Agriculture	1.9	3.0	4.1	5.7	4.7	6.7	8.2
Electricity, gas, water supply	-	-	1.5	1.9	2.5	2.2	1.2
Construction	3.2	5.0	6.2	7.5	8.6	8.9	9.1
Mining and quarrying	22.1	21.1	15.4	8.4	8.6	9.0	7.5
Manufacturing	23.6	26.2	24.2	20.1	18.7	16.2	12.8
Wholesale and retail trade	-	-	30.8	34.0	34.6	33.2	31.5
Toursims, restaurants, catering	-	-	1.7	1.8	2.0	2.1	1.8
Transportation, storage, communications	0.9	6.9	2.9	3.0	2.8	4.3	4.3
Real estate, leasing	1.1	1.0	1.1	2.2	2.6	2.4	3.0
Health, education	0.3	0.3	0.6	0.5	1.0	0.7	1.0
Financial intermediation	0.4	2.3	0.5	1.0	0.9	1.0	1.2
Other	-	-	11.0	13.8	13.1	13.2	18.5
Total	-	-	100	100	100	100	100

Source: Bank of Mongolia



Table 1.6 Banking System Balance Sheet Structure-Performing Loans

	1996	1997	1998	1999	2000	2001	2002	2004
<b>Performing loans (MNT million)</b>	100%	100%	100%	100%	100%	100%	100%	100%
<b>Up to 1 year</b>	86.8	88.7	92.1	94.4	93.5	91.4	91.0	78.5
<b>From 1 to 5 years</b>	12.5	11.2	7.9	5.6	5.7	5.1	5.8	16.8
<b>5 and above years</b>	0.7	0.0	0.0	0.0	0.8	3.5	3.2	4.7

Source: Bank of Mongolia

### ***Strengthening of Central Bank's Functions***

The BOM retained 21 branches in key regional centers. The Banking Law provides the framework for the development of a fully functioning central bank capable of managing money and credit using indirect instruments, namely, leaving the allocation of resources to markets.

Steps were initiated to develop indirect monetary management, including the introduction of reserve requirements and the liberalization of interest rates in August 1991. Under the latter action, commercial banks were permitted to determine their lending and deposit rates freely, thus laying a basis for the active use of interest rate policy by the central bank.

Foreign reserve management functions were formally assumed by the BOM after April 1993, and reserve assets and liabilities were held by State Bank International (which was renamed as Trade and Development Bank), except for those balances related to its commercial banking operations, which had been transferred to the Central Bank. An interbank payments clearing and settlement system was introduced. The BOM had also begun to exercise its supervisory and regulatory functions. Banks established prior to May 1991 when the Banking Law were relicensed, and those that did not meet the Law's capital adequacy requirements, were combined with other banks. The BOM had developed regulations and supplementary legislation following the Banking Law covering such matters as leasing, debt recovery and accounting standards.

Some preliminary prudential regulations, notably on capital adequacy, were issued in 1992, and a system of on- and off-site inspection was established. Subsequently, prudential regulations

were extended and strengthened. However, resource limitations, poor record keeping and internal controls at the commercial banks limited the effectiveness of supervision. When breaches of regulations were uncovered, the BOM was often unable or unwilling to impose sanctions or to force bank management to take corrective action.

## ***2.2 Monetary Policy Framework after Transition***

### ***Monetary Aggregate Targeting (1995-2006)***

The BOM had been using the monetary indirect instrument and trying to achieve the goal of the price stability. The monetary policy was initially focusing on the stable relationship between monetary variables and inflation. The BOM had a monetary aggregate targeting framework since the mid-1990s until 2007, with reserve money (M0=bank reserves + money outside banks) as the operational target and money supply (M2) as the intermediate target. Policy instruments were central bank bill and reserve requirement.

Related to the economic expansion since 2000s, however, the relationship among reserve money and broad money, the money multiplier, and inflation rate had become unstable (Table 1.7). Then, since 2007 the BOM has shifted to another monetary policy framework, which will be described in the later chapter.

Table 1.7 Statistics on Money Growth and Inflation

	<b>M0</b>	<b>Growth</b>	<b>M2</b>	<b>Growth</b>	<b>Inflation</b>
	Target	Actual	Target	Actual	
<b>1995</b>		28.7	38.3	32.9	53.1
<b>1996</b>		36.5	31.7	25.8	44.6
<b>1997</b>		23.1	19.8	32.5	20.5
<b>1998</b>		18.7	4.4	-1.7	6
<b>1999</b>		49.9	10.8	31.6	10
<b>2000</b>		18.6	11.2	17.6	8.1
<b>2001</b>	11.1	8.2	13.6	27.9	8
<b>2002</b>	21.5	21.9	35.8	42	1.6
<b>2003</b>	13.9	14.5	15.2	49.6	4.7
<b>2004</b>	20	17	18	20.4	11
<b>2005</b>	15	19.7	20	34.6	9.5
<b>2006</b>	15	15	25	39.6	6

Source: Bank of Mongolia

### *Undeveloped Open Market and Interest Rate Channel*

The open market operation was undeveloped. Central bank bills auction and government bills had not been introduced yet. Around 98% of loans and deposits had a maturity of fewer than 12 months in 2004. Financial transaction was usually done by banks. The short-term rate should be transmitted to long-term rate, since the expected short-term rate would determine the long-term rate. Unfortunately, this transmission was not discernible because of unavailability of the yield curve for government securities and corporate debt.

The Chapter 2 can be summarized as follows: First, during the transition period, Mongolian economy had faced a number of challenges. The price and trade policies were under the government control until 1990. After that prices had been liberalized; foreign trade policy had been reformed; and banking sector performance had been strengthened. Second, the banking sector suffered from three times crises. Even through the crises, the banking sector had been dominant in the financial sector in Mongolia. Third, after the transition period, economic policy focused on economic stabilization and banking sector performance. Fourth, commercial banks loans and deposits had usually a maturity with 1-2 years, while long-term loans and securities market had been undeveloped with the unavailability of a yield curve. Fifth, in August 1991, the BOM introduced reserve requirements at 20 percent. The reserve money worked as the operational target, and money supply worked as the intermediate target until 2007. Under the monetary aggregate targeting, the open market operation had been undeveloped, and the interbank market development had been still weak.

## **CHAPTER 3**

### **ECONOMIC CONDITION AND MONETARY POLICY CHANGES 2007-2016**

This Chapter focuses on the macroeconomic condition and monetary policy for 2007-2016. The Chapter first describes the changes in economic condition, introduces the inflation targeting framework and illustrates its implementations from 2007 to 2016.

#### ***3.1 Changes in Economic Conditions***

##### ***Banking Sector under the Global Financial Crisis (2008-2009)***

In 2008-2009 global financial crises heavily affected Mongolian economy. After the economic transition period, mining sector development has started, and copper became one of the main commodity products in Mongolia. Unfortunately, Mongolian economy has been hit hard by the global financial crisis through a sudden drop in the price of copper. In mid-2008, the copper price has fallen by 60%, thereby creating severe imbalances in both fiscal and external accounts and inflation rate reaching 34%.

The banking system was also damaged under the crisis pressure. The non-performing loans rose from 3.3% in 2007 to 17.4% in 2009 (Table 1.8). In addition, economic growth decreased sharply to -1.3%, and the government implemented the economic stabilization project with International Monetary Fund. After going through the global financial crises, total asset of the banking sector was increased and a non-performing loan was decreased to the constant level. The banking sector recovered and strengthened rapidly.

##### ***Big Mining Projects after the Crisis***

After the global financial crises, Mongolian economy expanded rapidly. In 2009, Mongolia explored those big coal and copper mining projects, which are “Oyu-tolgoi” and “Tavan-tolgoi”. Based on those projects Mongolian economy expanded rapidly and became one of the highest GDP growth countries in very short period.

##### ***GDP and FDI: the Highest Level in History***

Economic growth reached the highest level in 2011, which was 17.3%. The foreign direct investment also reached the highest level in 2011 (Figure 1.33 and 1.34).

Table 1.8 Banking Sector Indicators (%)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
<i>M2/GDP</i>	42.2	37.7	47.6	48	49	46	49	48	43	50
<i>Loans/GDP</i>	36	32.9	32.9	33	43	42	56	56	51	52
<i>Deposits/GDP</i>	26.2	32.2	42.9	28.2	29.5	29.5	33.3	33.2	31.9	35.7
<i>NPL/Total loans</i>	3.3	7.2	17.4	11.5	5.8	4.2	5.3	5.0	7.1	8.5
<i>Lending interest rate</i>	21.8	20.4	20.8	20	17	18	18	19	20	20
<i>Interest rate on deposits</i>	13.5	13.6	12.9	12	11	11	12	12	13	13
<i>Policy rate</i>		9.8	10.0	11	12.25	13.25	10.5	12	13	14

Source: Bank of Mongolia

Figure 1.33 FDI (million USD)

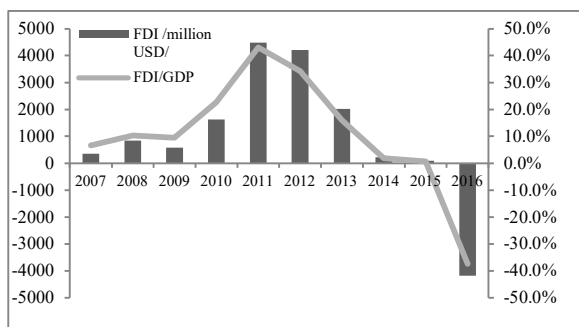
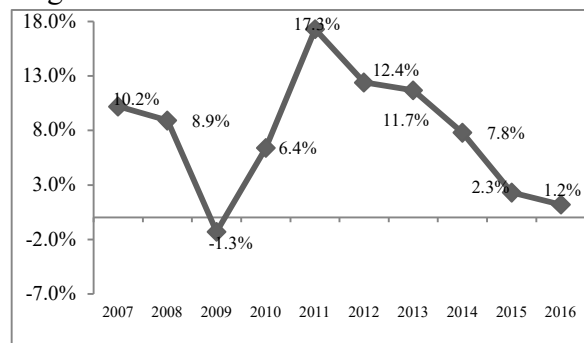


Figure 1.34 Economic Growth



Source: Bank of Mongolia, NSO

### ***Successfully Issued Government Bonds in Global Market***

The equity and bond investments had not come into Mongolian economy until 2009, because of a poor transparency and a lack of efficiency in the equity market. The non-banking sector is very small compared to the banking sector, which makes up 95 percent of the financial market in Mongolia. Since 2010, Mongolia became able to issue bonds in the international markets mainly owned and guaranteed by the government (Table 1.9).

### ***Debt***

At the end of 2016, Mongolia's outstanding external debt totaled 24.2 billion US dollars, which increased by 11% or 2.4 billion US dollars from the previous year (Table 1.10). The "Amendment of the Fiscal Stability Law" in September 2016 stated that the government debt -

GDP ratio in the present value is not to exceed the 88% in the fiscal year 2016, 85% in 2017 and 80% in 2018.

Table 1.9 Successfully Issued Bonds and Equities between in 2007-2017

	<i>Type/ name</i>	<i>Issuer</i>	<i>Issued date</i>	<i>Currency</i>	<i>Amount</i>	<i>Coupon</i>	<i>Maturity</i>	<i>Duration (years)</i>
1	<b>International bond</b>	DBM	2012/03	USD	580 million	5.8%	2017/3	5
2	<b>Sovereign bond</b>	GoM	2012/12	USD	500 million	4.1%	2018/01	5
3	<b>Sovereign bond</b>	GoM	2012/12	USD	1 billion	5.1%	2022/12	10
4	Samurai bond	DBM	2013/12	JPY	30 million	1.5%	2023/12	10
5	Dimsum bond	GoM	2015/06	CNY	1 million	7.5%	2018/06	3
6	International bond	TDB	2007/1	USD	75 million	8.6%	2010/01	3
7	International bond	TDB	2010/10	USD	175 million	8.5%	2013/10	3
8	International bond	TDB	2010/11	USD	25 million	12.5%	2015/11	5
9	International bond	TDB	2012/09	USD	300 million	8.5%	2015/09	3
10	Dimsum bond	TDB	2014/01	CNY	700 million	10.0%	2017/01	3
11	International bond	TDB	2015/05	USD	500 million	9.4%	2020/05	5
12	IPO /equity/	MMC	2010/10	USD	650 million	7.0%		
13	International bond	MMC	2012/03	USD	600 million	8.9%	2017/03	5
14	<b>Sovereign bond</b>	GoM	2017/10	USD	500 million	5.6%	2023/3	5.5

*GoM=Government of Mongolia, DBM=Development bank of Mongolia, TDB=Trade and Development bank,*

*MMC=Mongolian mining corporation*

*Source: Ministry of Finance*

Table 1.10 Debt and GDP Ratio

	<b>Total debt /USD billion/</b>	<b>Government debt/USD billion/</b>	<b>GDP /USD billion/</b>	<b>Government debt/GDP</b>	<b>Total debt/GDP</b>
2010	2.8	1.8	7.2	25%	39%
2011	9.6	1.9	10.4	18%	92%
2012	15.3	3.6	12.3	29%	124%
2013	19.0	3.7	12.6	29%	151%
2014	20.9	3.6	12.2	30%	171%
2015	21.8	3.7	11.7	32%	186%
2016	24.2	4.9	11.2	44%	216%

Source: IMF, Ministry of Finance, Bank of Mongolia

### ***Poor Securities and Bond Market Development***

Securities and bond market development is still poor in Mongolia. The banking sector is sharing 95.5% of the total financial asset, whereas securities of companies are sharing 0.5% of total assets. The Government of Mongolia also started to issue treasury bills in the domestic market since 2011.

### ***Financial System Dominated by Banking Sector***

The financial sector of Mongolia consists of the Central bank, the financial regulatory commission, commercial banks (five first tier commercial banks, eight second tier banks), securities companies, non-banking financial institutions (188), insurance companies (17) and saving and Credit Cooperatives (207). The Financial Regulatory Commission<sup>4</sup> controls activities and developments of the non-bank financial institutions, the insurance companies, securities companies and saving and loan cooperatives. Following the severe banking crisis, the government implemented measures to restructure targeting banks and to improve the BOM's ability to enforce compliance with prudential regulations. The commercial banks still account for 95.5% of total assets of the financial system. The total asset of banking sector was 3.4 trillion MNT in 2007, and reached 25 trillion MNT in 2016 (Table 1.11 and Figure 1.35).

In 2016, the banking sector assets totaled 25 trillion MNT, up by 22.2% from the previous year. The total asset comprises 46% of the total banking sector in terms of loans, 21.8% of cash and cash equivalents, 14.2% of Government bonds, 2.3% of central bank bills and 15.7% of the other types of assets (Figure 1.36). Banking sector liabilities amounted to 22.2 trillion MNT. Deposits and current account from individuals, legal entities, and state organizations accounted for 56.3% of the total liabilities, followed by liabilities to banks and financial institutions at 22.7% (Figure 1.37). Compared to 1996-2007, the maturity of loans from 1 to 5 years and 5 and above years have been increased (Table 1.12).

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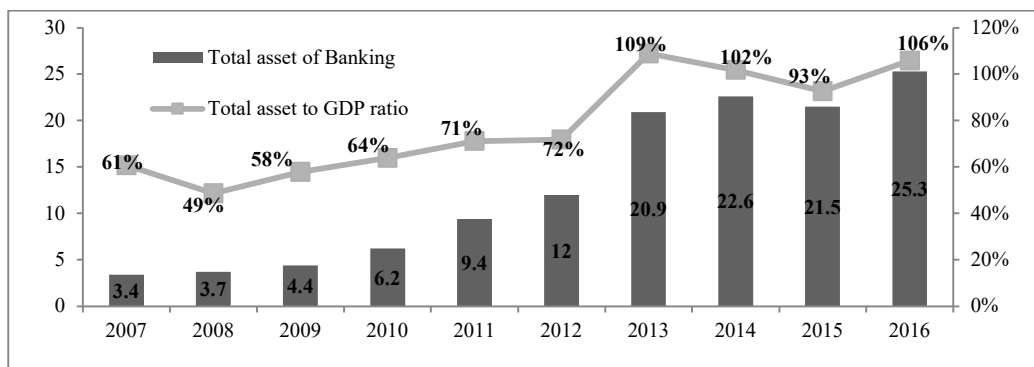
<sup>4</sup> Financial Regulatory Commission started operating in 2006

Table 1.11 Structure of Mongolian Financial Sector

	Assets		Profits		Equity	
	Amount (billion MNT)	% of	Amount	% of	Amount	% of
<b>2016</b>						
Bank	25 338	<b>95.5%</b>	176	70.1%	2 936	79.1%
Non-bank financial institutions	787	<b>3.0%</b>	59	23.5%	578	19.1%
Insurance	208	<b>0.8%</b>	11.4	4.5%	105.8	3.5%
Credit & Saving union	113	<b>0.4%</b>	3.8	1.5%	24.3	0.8%
Securities participant	91	<b>0.3%</b>	1.0	0.4%	66.8	2.2%
<b>2015</b>						
Bank	21 521	<b>95.7%</b>	218	79.9%	2 427	80.1%
Non-bank financial institutions	623	<b>2.8%</b>	46	17%	424	14%
Insurance	173	<b>0.8%</b>	7.1	2.6%	94	3.1%
Credit & Saving union	98	<b>0.4%</b>	2.2	0.8%	21	0.7%
Securities participant	68	<b>0.3%</b>	-0.7	-0.3%	62	2%
<b>2014</b>						
Bank	22582	<b>96.6%</b>	326	88.5%	2 134	81.7%
Non-bank financial institutions	508	<b>2.2%</b>	36	9.9%	332	12.7%
Insurance	153	<b>0.7%</b>	2.2	0.6%	75	2.9%
Credit & Saving union	81	<b>0.3%</b>	4.0	1.1%	19	0.7%
Securities participant	56	<b>0.2%</b>	-0.2	-0.1%	53	2.0%

Source: Bank of Mongolia

Figure 1.35 Total Asset of Banking (trillion Tugrik)



Source: Bank of Mongolia



Figure 1.36 Structure of Total Asset (%)

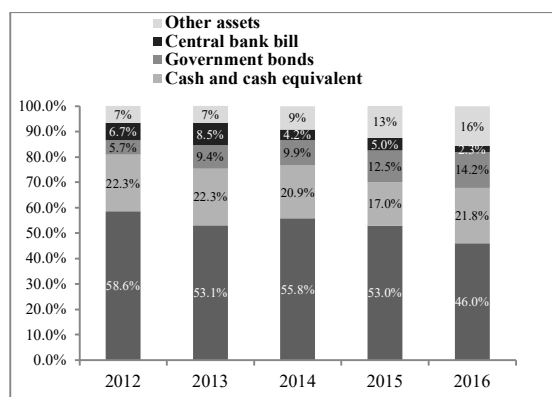
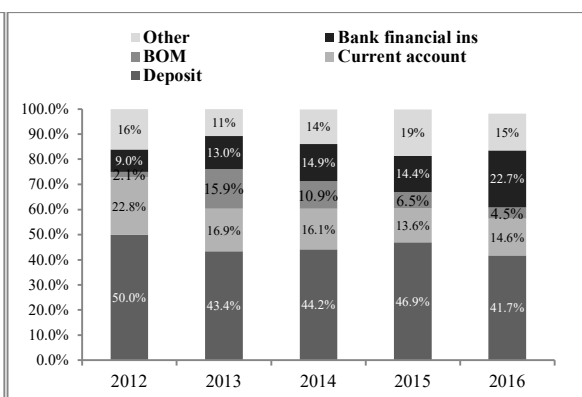


Figure 1.37 Structure of Total Liabilities (%)



Source: Bank of Mongolia

Table 1.12 Banking System Balance Sheet Structure-Performing Loans

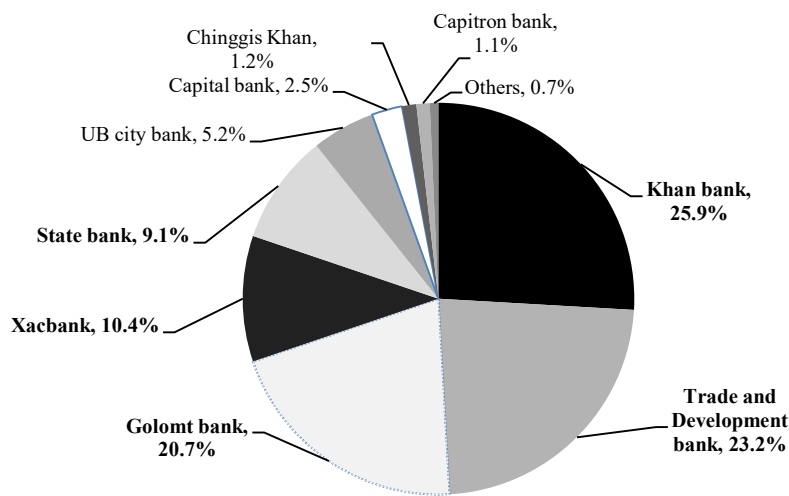
	2008	2009	2010	2011	2012	2013	2014	2015	2016
<b>Total loans</b>	100%	100%	100%	100%	100%	100%	100%	100%	100%
<b>Up to 1 year</b>	41.4%	34.3%	26.6%	19.2%	22%	20.6%	16.9%	18.8%	17%
<b>From 1 to 5 years</b>	47.6%	49.8%	56.6%	62.8%	58.5%	57.7%	59.5%	58.3%	47.5%
<b>5 and above years</b>	10.9%	16.6%	16.6%	18%	19.5%	21.7%	22.7%	22.8%	19%

Source: Bank of Mongolia

### ***Five Big Banks: 90% of Total Banking Asset***

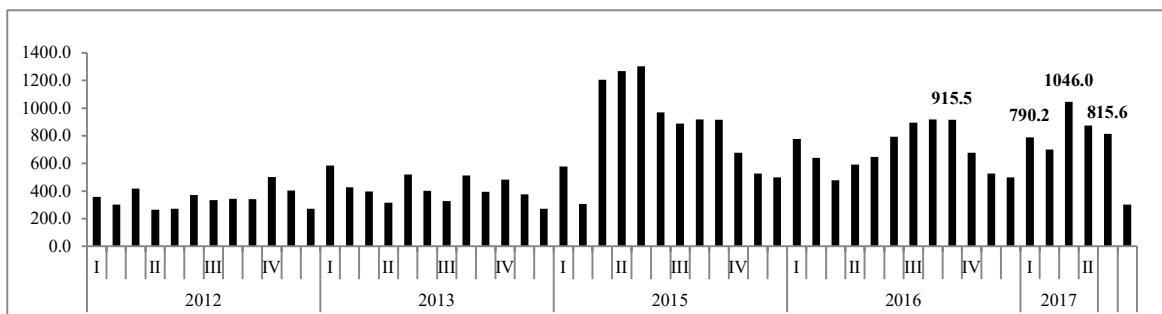
The inter-bank markets are very limited in Mongolia, even for the basic instrument of money market placement (Figure 1.39). There are 13 commercial banks that yield commercial services, and the competition among the banks are very intense. According to Figure 1.38, five largest banks are dominant in the banking sector, and accounts for 83% of banking sector assets and 89% of total depositors.

Figure 1.38 Market Share by Banks



Source: BOM

Figure 1.39 Total Volume of Interbank Market (Billion MNT)



Source: Bank of Mongolia

### 3.2 Changes in Monetary Policy

Since 2007, monetary policy environment has been changed and the BOM has introduced new monetary policy framework.

#### 3.2.1 Monetary Policy Framework: Inflation Targeting

Since 2007, the BOM started to adopt inflation targeting framework. Under this new framework, the BOM introduced the “Policy rate” in 2007. The BOM also started to conduct open market operation, and to make the central bank bill rate be equal to the monetary policy rate. The

operating target and intermediate target have changed to a weighted average interest rate of interbank, short and long term interest rates, respectively.

The BOM has also been introducing a forward looking monetary policy framework named the Forecasting and Analysis System (FPAS), which contains a forecast based policy formulation and decision making, and effective communication with the public since 2011. The desired outcome of the FPAS is to reinforce the link between the policy rate, short term market rate, long-term rate and inflation expectations.

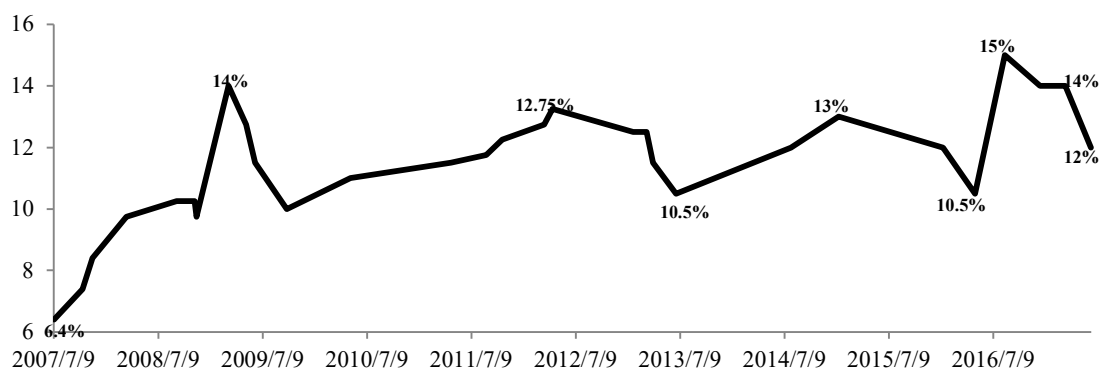
### 3.2.2 Monetary Policy Tools

The BOM is using several monetary policy tools, such as reserve requirements, policy rate, open market operation, standing facilities and foreign exchange deals.

#### *Policy Rate*

In 2007, BOM introduced the policy rate, which became a leading indicator for interbank market rates. The weighted average rate of interbank market trading is expected to be set at an approximately similar level as the BOM’s policy rate (Figure 1.40).

Figure 1.40 Policy Rate (%)



Source: BOM

#### *Open Market Operation*

The BOM also started the open market operation since 2007. The BOM issues and trades Central Bank bills with maturities of 1-52 weeks, which are the main instrument of managing the reserve of the banking system by absorbing excess liquidity from the interbank market. The

government also started to issue government treasury bills at the end of the 2012. The treasury bills maturities are 28 and 52 weeks. The government securities are becoming a benchmark of the other securities.

### ***Reserve Requirements***

The BOM imposes a minimum reserve requirement of 12% of liabilities on banks, thereby managing liquidity in the system and affecting the supply of base money.

### ***Standing Facilities***

The BOM employs two standing facilities: the overnight repo and overnight deposit. Overnight repo financing is given banks for the period from the end of a given day's transactions to the opening of transactions on the next day. The interest rate of the overnight repo is the highest rate of the central bank's interest rate corridor and is equivalent to adding 2 percentage points to the policy rate. The transaction to place overnight deposits at the BOM's account shall be the last transaction of the commercial banks on a day, whereas the transaction to return the deposits shall be the first transaction of a commercial bank on a day. The interest rate of the overnight deposit is the lowest rate of the central bank's interest rate corridor and is equivalent to minus 2 percentage point below the policy rate.

### ***Price Stabilization Program***

Since 2012, the BOM implemented the "Price stabilization program" with the government for reducing supply-induced inflation and promoting economic activity. Mongolia's inflation rate has tended to be high and volatile throughout history. Especially, supply-induced inflation rate, mainly made up of price growth of meat and food products, accounted for one third of the total inflation rate. Therefore, the BOM and the government launched the "Price Stabilization Program" in 2012, and provided a low-cost funding to corporates in the business of wholesale distribution of meat, flour, imported petroleum products, construction, coal production and other agricultural products. Under the program over 3 years, a total of 5 trillion MNT was provided to the economic sectors.

### ***3.3 Monetary Policy Implementation***

## Monetary Policy in 2007

In 2007, the BOM aimed to maintain the inflation rate at one digit. Unfortunately, depending on internal and external difficulties, inflation rate reached to 15.1% at the end of 2007 (Figure 1.41). Main reason of the inflation hike was related to i) the price hike of such products as wheat, fuel, vegetable oil and rice in the global market, and also the price hike of main trading countries, ii) the increase in domestic welfare expenditures and administration salary, and iii) the supply-lag of some products due to the seasonal influence.

Since in July 2007, monetary policy framework has changed to inflation targeting framework and has introduced the policy rate that was 6.4%. The weighted average rate of interbank market is expected to be set at the similar level at policy rate. Then in October and November, the BOM increased the policy rate totally by 2 percentage point to 8.4% (Figure 1.46). The BOM also increased the reserve requirement by 0.5 percentage point to 5.5%.

The foreign reserve amounted to 975 million US dollars, and BOM conducted the managed floating exchange rate policy. The related indicators are shown in Figure 1.41-1.50.

Figure 1.41 Inflation Rate (%)

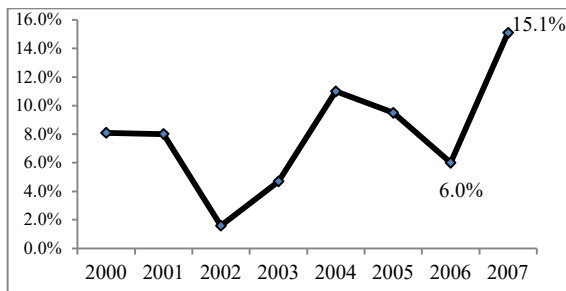


Figure 1.42 Exchange Rate (MNT per USD)

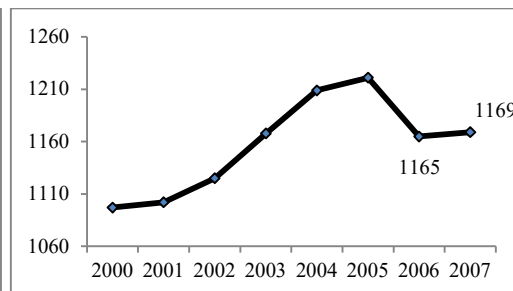


Figure 1.43 Balance of Payment

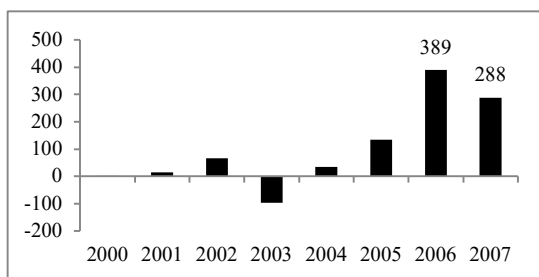


Figure 1.44 Current Account (million USD)

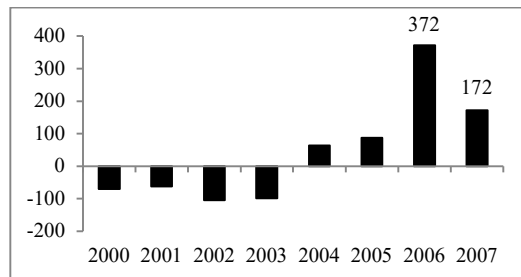


Figure 1.45 M2 Growth (%)

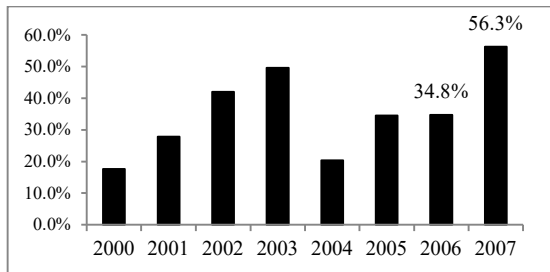


Figure 1.46 Policy Rate (%)

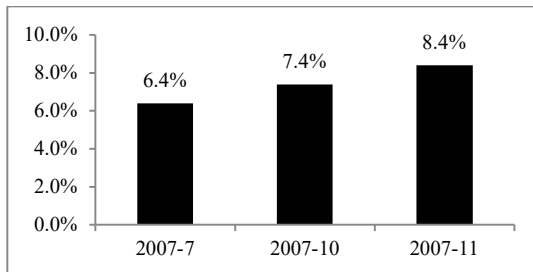


Figure 1.47 FDI (million USD)

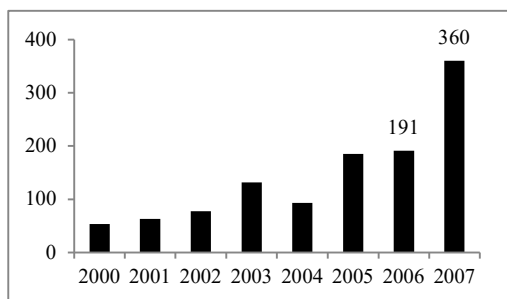


Figure 1.48 Trade Balance (million USD)

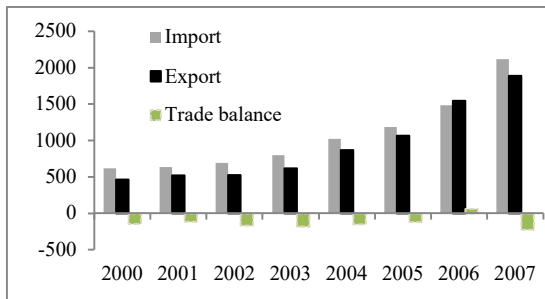


Figure 1.49 Economic Growth

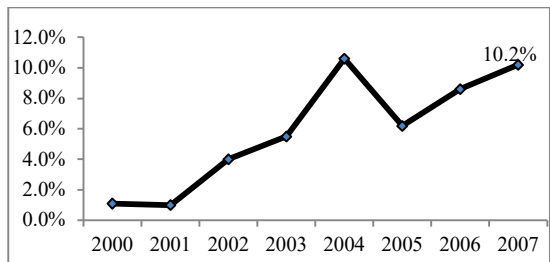
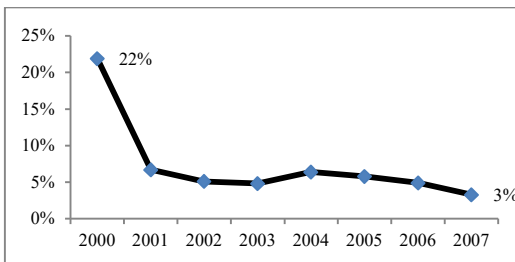


Figure 1.50 Non-performing Loan (%)



Source: Bank of Mongolia

### Monetary Policy in 2008

In 2008, monetary policy faced a lot of challenges. The economic growth reached 8.9%, whereas budget deficit accounted for 5% of GDP and current account deficit reached 1 billion US dollars that was the highest level until 2008 (Figure 1.58). The increase in government administration salary, the growth of total loan and the sudden increase in fuel and food products

created the price pressure, and the inflation rate reached 22.1% at the end of 2008 (Figure 1.51). That was 3.7 folds higher than targeted level.

Therefore, the monetary policy aimed to reduce demand-induced inflation pressure and to implement tight monetary policy. In the first quarter of 2008, the BOM increased the reserve requirement ratio by 0.5% to 5.5%, and increased the policy rate by 1.35 percentage points in March and 0.5 percentage points in September 2008 (Figure 1.56).

At the same time, due to the global financial crises, copper price declined sharply in the global market, which heavily affected the Mongolian economy. The capital inflow suddenly stopped and the Mongolian currency tugrik depreciated dramatically (Figure 1.52). Therefore, the BOM participated in the exchange rate market by intervention. Unfortunately, foreign reserves declined by 317 million US dollars equal to 50 percent (Figure 1.57) and net foreign asset of commercial banks also declined 522.1 million US dollars.

Due to the backgrounds above, banking sector was under pressure and most of the commercial banks faced insolvencies. In that situation, the monetary policy aimed towards stabilization of the banking system. The third quarter of 2008, the BOM reduced the reserve requirement by 0.5 percentage point to 5%. The BOM also cut the policy rate by 0.5 percentage points to 9.8% in December (Figure 1.56). The related indicators are shown in Figure 1.51-1.60.

Figure 1.51 Inflation Rate (%)

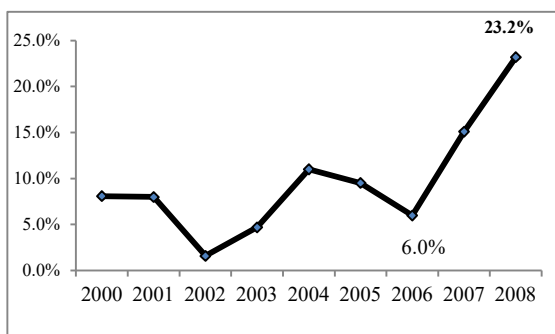


Figure 1.52 Exchange Rate (MNT per USD)

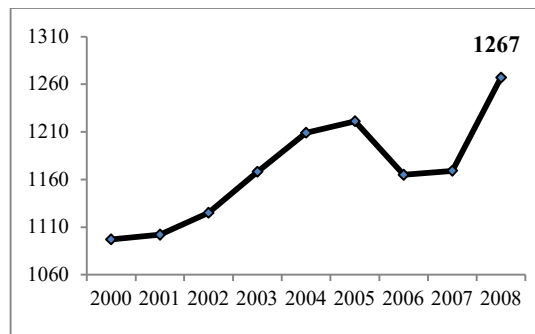


Figure 1.53 Economic Growth

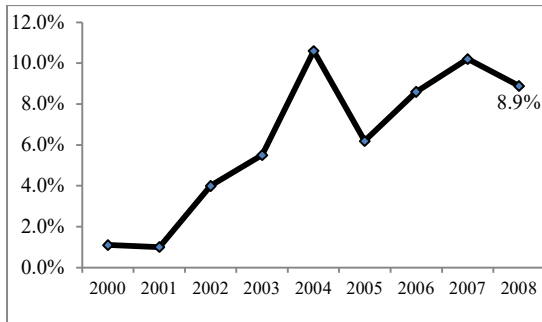


Figure 1.54 Balance of Payment (mil. USD)

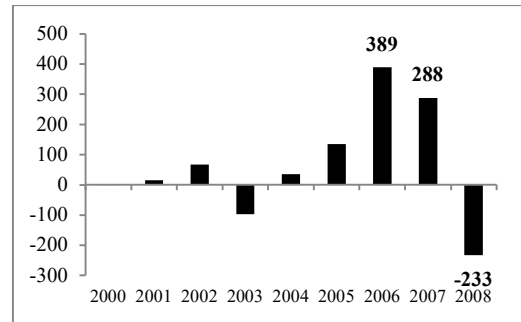


Figure 1.55 M2 Growth (%)

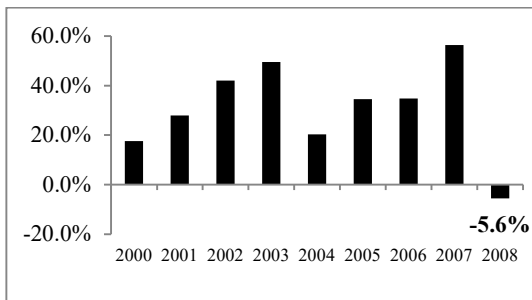


Figure 1.56 Policy Rate (%)

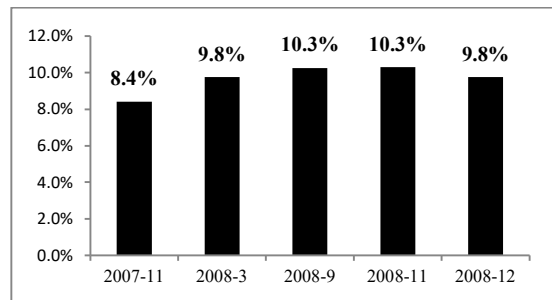


Figure 1.57 Foreign Reserve (billion USD)

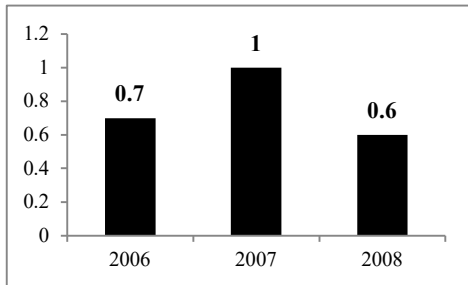


Figure 1.58 Current Account (mil. USD)

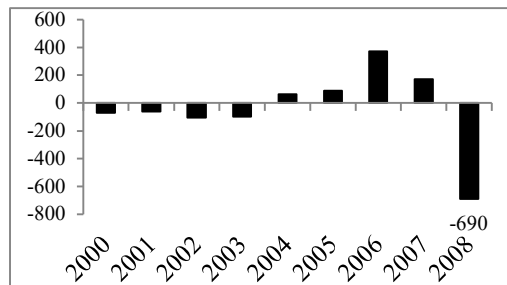


Figure 1.59 Trade Balance (million USD)

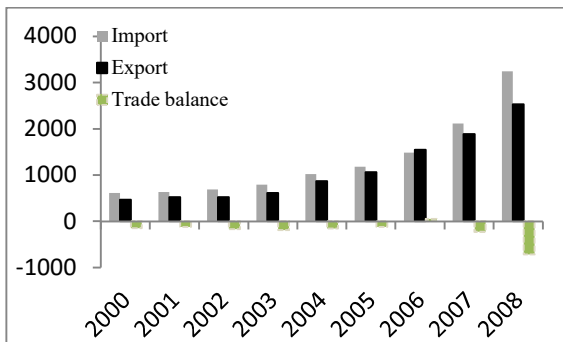
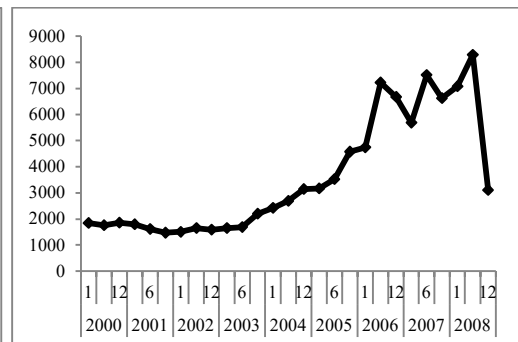


Figure 1.60 Copper Price USD/tonnes



Source: Bank of Mongolia



## Monetary Policy in 2009

In 2009, economic growth declined to -1.3% and monetary policy was conducted towards stabilization of banking sector, decreasing inflation, stabilizing the national currency and reinforcing the international reserves. In the first half of 2009, the BOM implemented tight monetary policy, and increased the policy rate by 4.25 percentage point to 14% (Figure 1.66) in order to protect national currency against high depreciation. The BOM also organized the foreign exchange auction in exchange rate market, which restored the reliability and stability in the national currency tugrik.

The BOM highlighted that tight monetary policy was a necessary step, and after that BOM was able to implement the expansionary monetary policy. The BOM lowered the policy rate totally by 4 percentage points in May, June and September (Figure 1.66) to 10%. At the end of 2009, inflation rate fell down to 1.9% (Figure 1.61)

The government and the BOM started to implement the stand-by project of International Monetary Fund since April 2009, which created the positive influence in capital inflow and economic condition. The foreign reserves increased to 1.3 billion US dollars in 2009 (Figure 1.67). The related indicators are shown in Figure 1.61-1.69.

Figure 1.61 Inflation Rate (%)

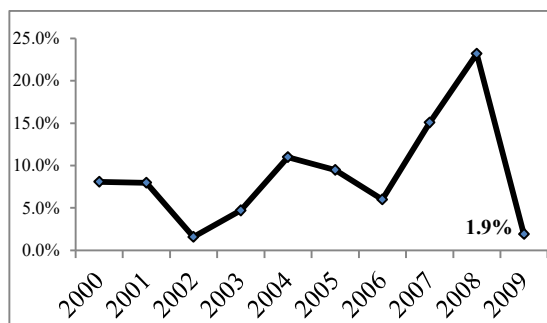


Figure 1.62 Exchange Rate (MNT per USD)

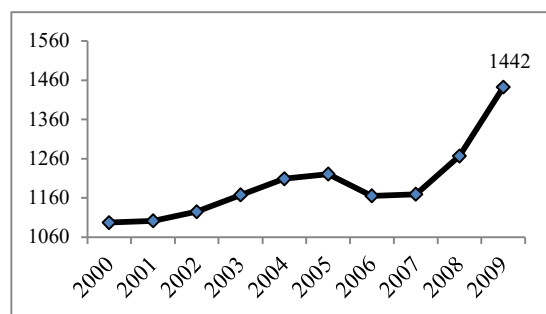


Figure 1.63 Economic Growth

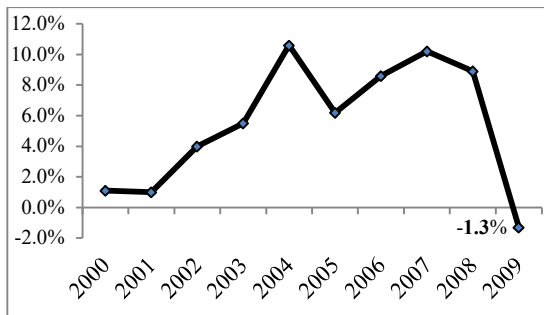


Figure 1.64 BOP (million USD)

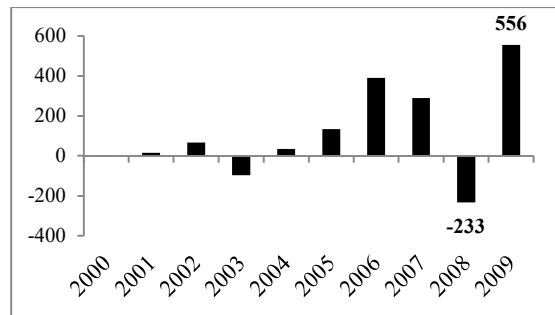


Figure 1.65 M2 Growth (%)

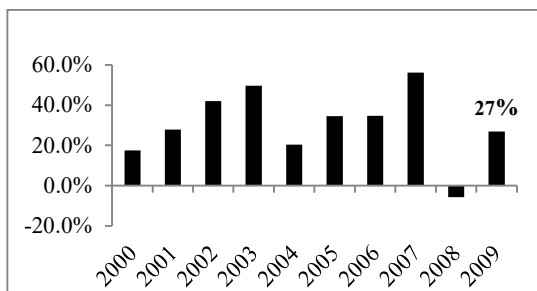


Figure 1.66 Policy Rate (%)

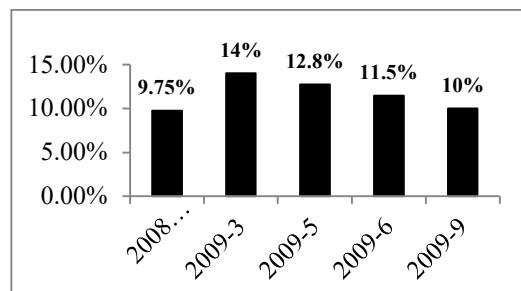


Figure 1.67 Foreign Reserve (billion USD)

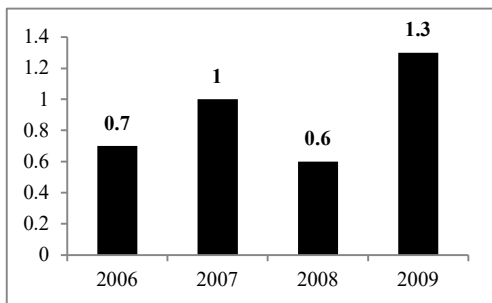


Figure 1.68 Current Account (mil. USD)

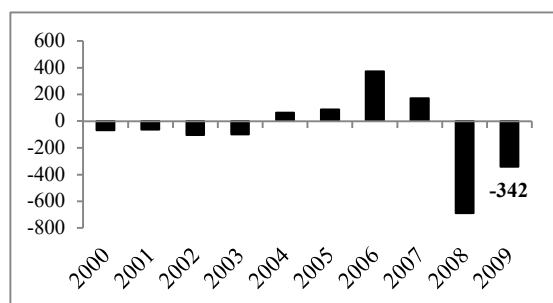
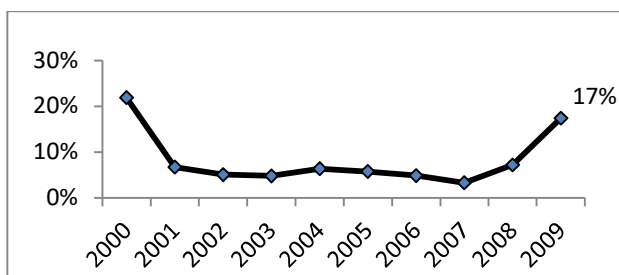


Figure 1.69 Non-performing Loan (%)



Source: Bank of Mongolia

## Monetary Policy in 2010

The government and the BOM successfully implemented the IMF project in 2010. The economic growth and money supply increased to 6.4% and 62.5%, respectively (Figure 1.72 and 1.74). In 2010, the monetary policy aimed to restore the economic growth and to stop credit crunch. In the first half of the 2010, inflation increased rapidly and reached 12.5%. Thus, the BOM increased the policy rate by 1 percentage point to 11% in May 2010. As a result, the inflation maintained to 14.3% at the end of 2010, and the price of meat accounted for 5% of total inflation. Until the end of 2010, the BOM did not change the policy rate again.

The BOM managed flexible exchange rate during 2010, and organized exchange rate intervention in the case of the exchange rate market fluctuation and excessive volatility. In 2010 the exchange rate of domestic currency MNT per USD rate appreciated by 13% compared to the 2009 (Figure 1.71). In addition, foreign exchange reserve increased by 82% to 2.2 billion US Dollars (Figure 1.76). The total asset of the banking system increased by 42% (Figure 1.79). The amount of bank deposit also increased by 47%, which indicated that credibility of banks increased. In 2010, non-performing loans decreased to 11.5% (Figure 1.78). The related indicators are shown in Figure 1.70-1.79.

Figure 1.70 Inflation Rate (%)

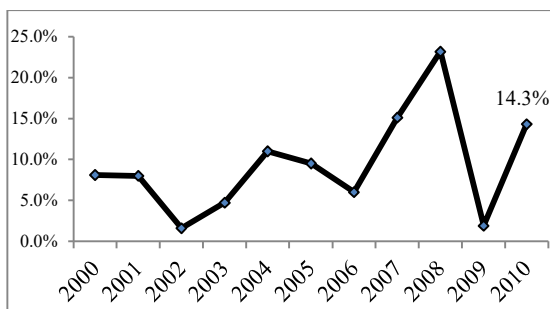


Figure 1.71 Exchange Rate (MNT per USD)

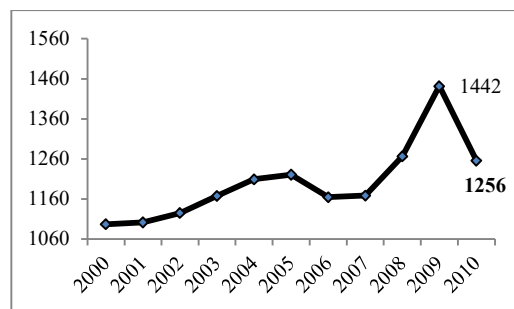


Figure 1.72 Economic Growth

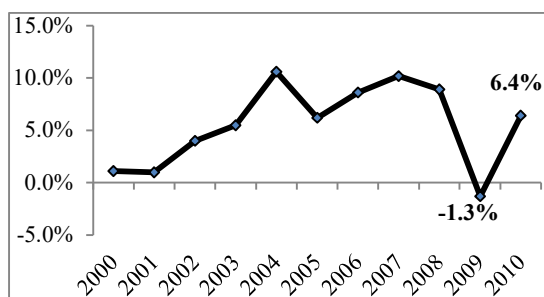


Figure 1.73 BOP (million USD)

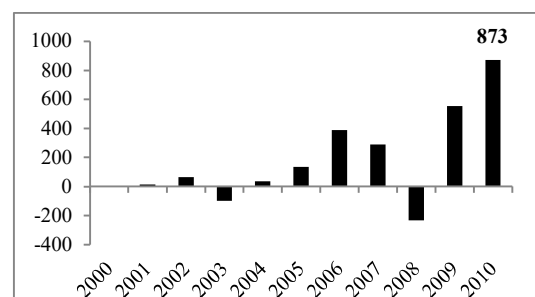


Figure 1.74 M2 Growth (%)

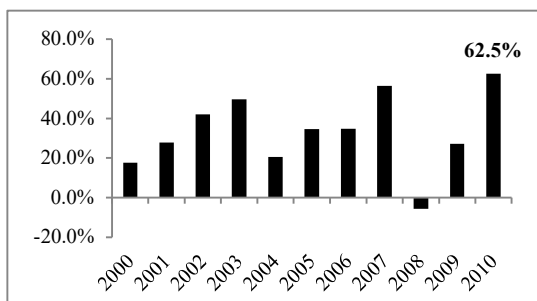


Figure 1.75 Policy Rate (%)

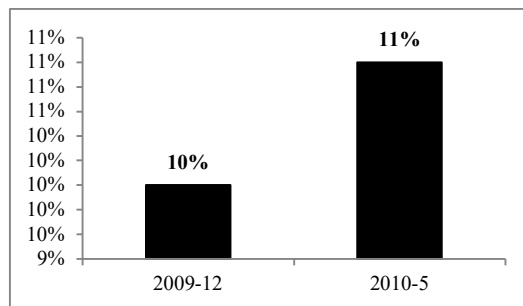


Figure 1.76 Foreign Reserve (billion USD)

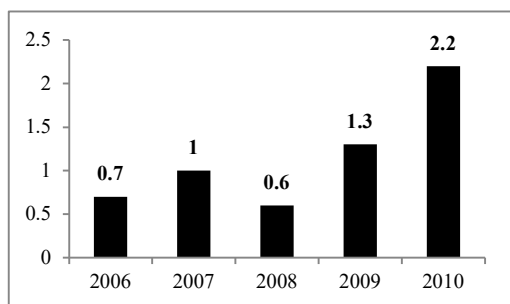


Figure 1.77 Current Account (mil. USD)

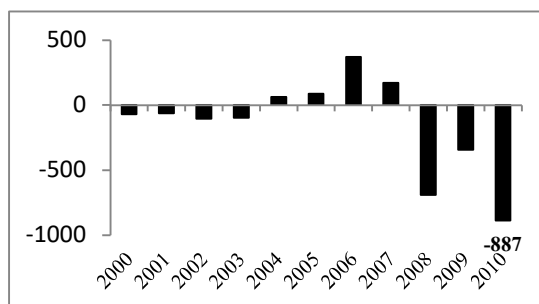


Figure 1.78 Non-performing Loan (%)

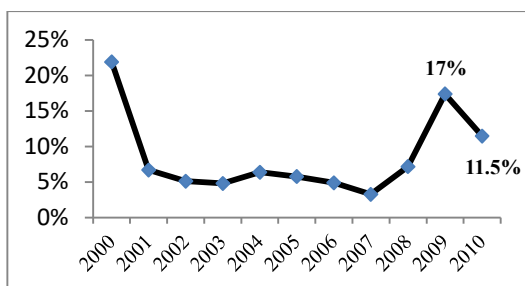
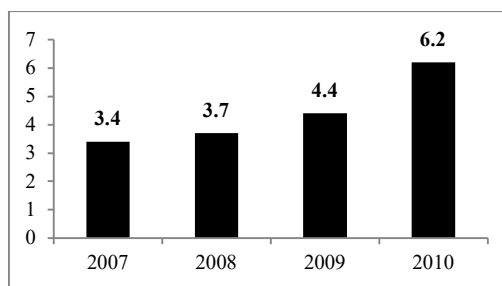


Figure 1.79 Total Banking Asset (tril. MNT)



Source: Bank of Mongolia

### Monetary Policy in 2011

The BOM aimed to reach the midterm sustainable economic growth through maintaining the inflation at one digit. In 2011, the big mining projects were in operation and Mongolian economy expanded rapidly. The GDP growth reached the 17.3%, which is the historically highest growth in

Mongolia (Figure 1.82). Macroeconomic indicators improved dramatically such that total loan increased by 52% and foreign direct investment increased by 75% (Figure 1.90).

Accordingly, total demand increased dramatically and created the price pressure (Figure 1.80). Therefore, the BOM implemented tight monetary policy and increased the policy rate by three times in total 1.25 percentage points in April, August and October (Figure 1.85) to 12.25%. The BOM also increased the required reserves twice to 11%. In 2011, BOM could not keep the inflation rate at one digit, which actually reached 11.1% at the end of the year. The price of meat accounted for 3.4% of the total inflation.

Based on mining development, foreign currency inflow increased rapidly. Unfortunately, the government implemented fiscal expansionary policy in 2011, which tended to blur the monetary policy effectiveness. The fiscal expenditure increased by 33% compared to the previous year.

The BOM continued to manage floating exchange rate regime in consistent with the macroeconomic fundamentals. Foreign exchange reserves reached 2.4 billion US dollars, which was historically highest level (Figure 1.86). The current account deficit increased sharply and reached 2.7 billion US dollars (Figure 1.87), which was equal to 30% of GDP, and trade deficit increased by 4.6 times than previous year (Figure 1.91). The related indicators are shown in Figure 1.80-1.92.

Figure 1.80 Inflation Rate (%)

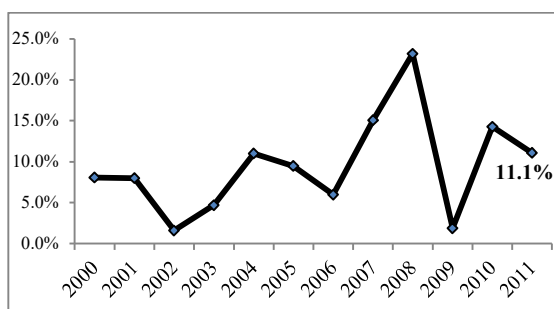


Figure 1.81 Exchange Rate (MNT per USD)

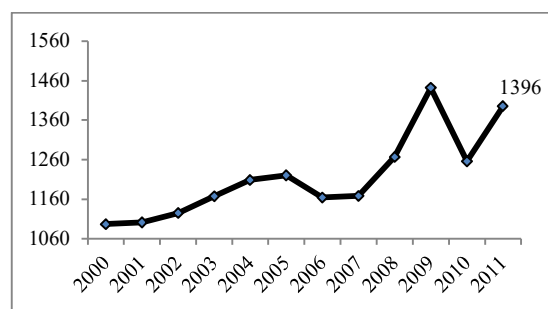


Figure 1.82 Economic Growth

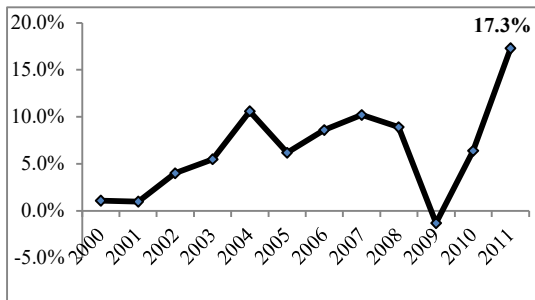


Figure 1.83 BOP (million USD)

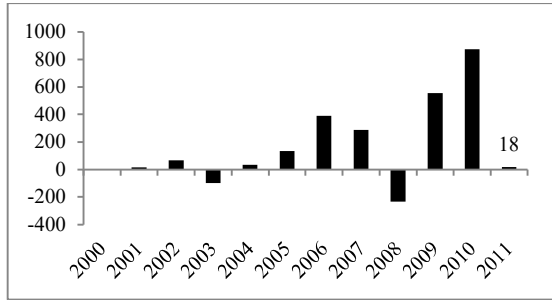


Figure 1.84 M2 Growth (%)

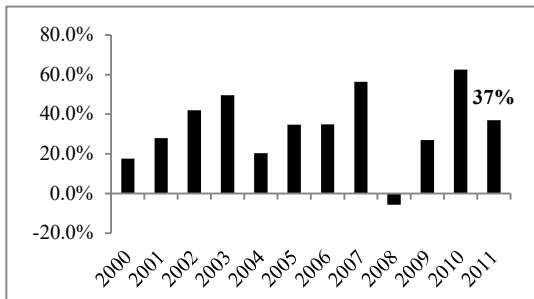


Figure 1.85 Policy Rate (%)

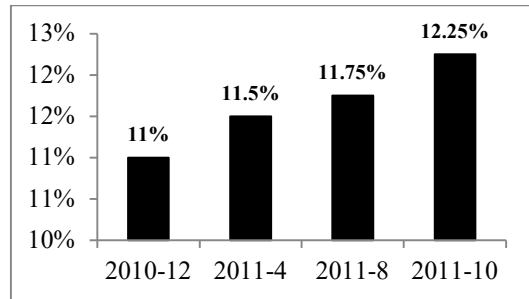


Figure 1.86 Foreign Reserve (billion USD)

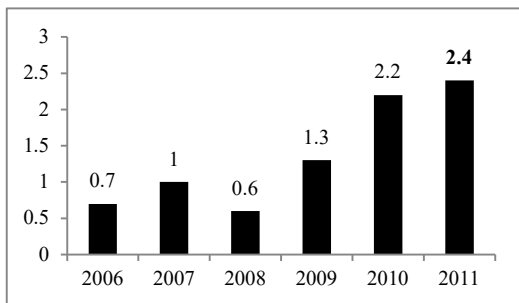


Figure 1.87 Current Account (mil. USD)

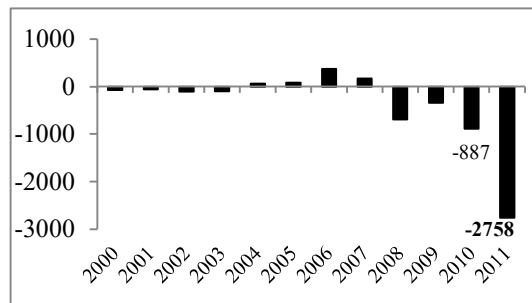


Figure 1.88 Non-performing Loan(%)

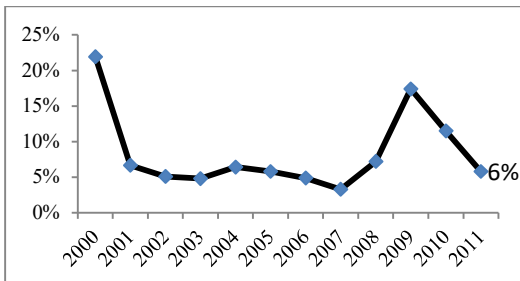


Figure 1.89 Bank Asset (tril. MNT)

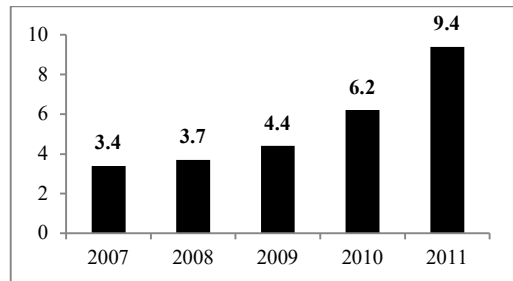


Figure 1.90 FDI (million USD)

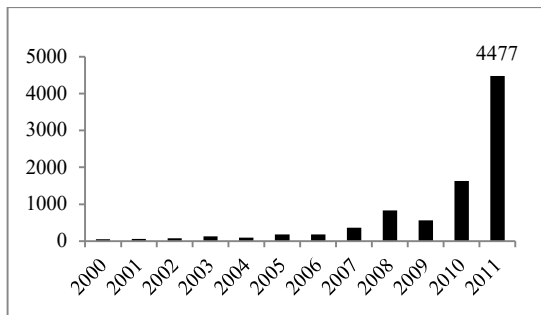


Figure 1.91 Trade Balance (mil. USD)

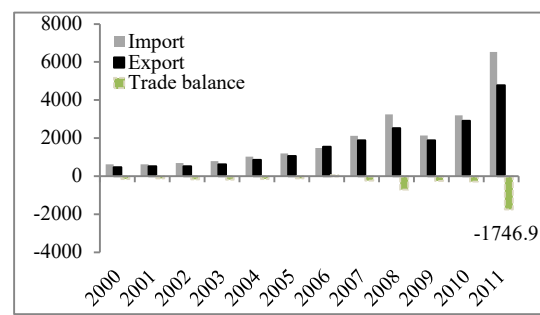
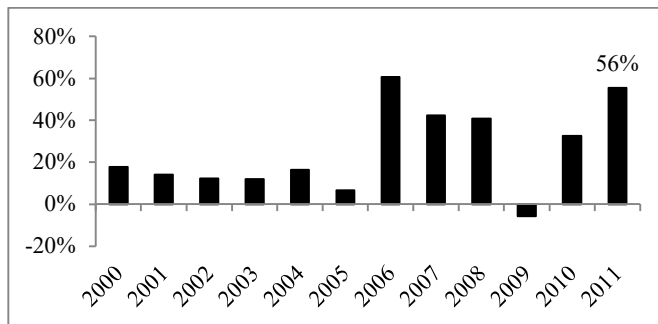


Figure 1.92 Growth of Budget Expenditure (%)



Source: Bank of Mongolia, MOF

### ***Monetary Policy in 2012***

The BOM implemented a monetary policy with the goal to bring inflation down to a single-digit and to ensure a sustainable economic growth. The 2012 was a challenging year of monetary policy with internal and external difficulties. Inflation increased rapidly due to the expansionary fiscal expenditure for 2011-2012, and cash handouts from Human Development Fund. The cash handouts of 1.9 trillion MNT that was equivalent to 10% of GDP created the demand-side pressure to inflation and huge current account deficit (Figure 1.100). Therefore, the BOM tightened monetary policy and increased the policy rate in March and April totally by 1 percentage points to 13.25% (Figure 1.97). In addition, the BOM increased the reserve ratio requirement of commercial banks by 1 percentage point to 12%.

On the other side, sudden shortfalls of some domestic productions of wheat and meat due to the harsh climate and weather, and trade limits of gasoline in supplier countries created high supply-side pressure to inflation. In 2011-2012, price growth of meat accounted for almost 30% of total inflation. Therefore, the BOM conducted the “Price stabilization program” with the

government in the second half of 2012 in order to reduce the supply-induced inflation rate. At the end of 2016, inflation reached 14.2%, which was 6.2% higher than targeted level (Figure 1.93).

In addition, the government issued first 1.5 billion US dollars sovereign bonds on international markets in December 2012, and increased the Mongolian foreign reserves to USD 4.1 billion (Figure 1.99). The BOM was maintaining floating exchange rate regime during 2012. The related indicators are shown in Figure 1.93-1.102.

Figure 1.93 Inflation Rate (%)

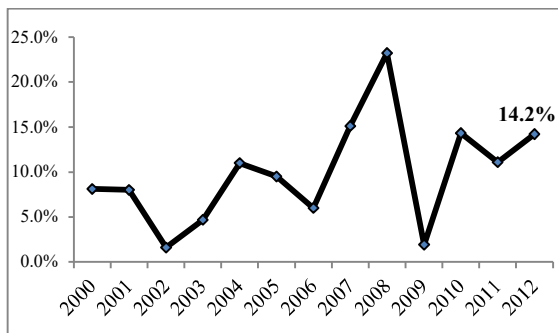


Figure 1.94 Exchange Rate (MNT per USD)

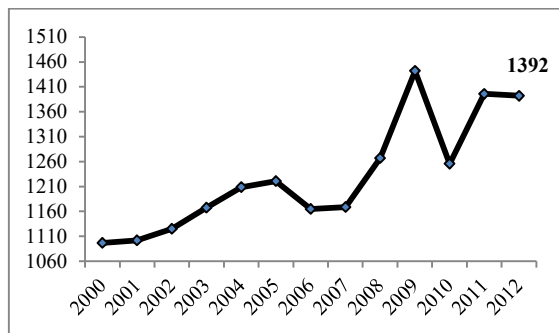


Figure 1.95 Economic Growth

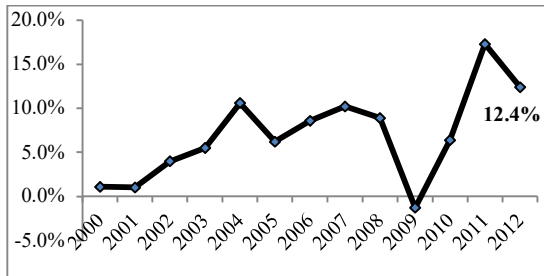


Figure 1.96 BOP (million USD)

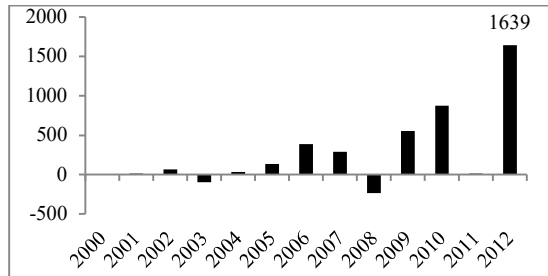


Figure 1.97 Policy Rate (%)

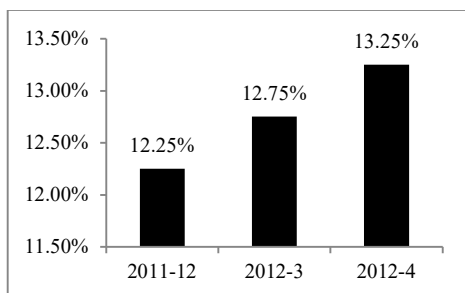


Figure 1.98 Total Banking Asset (tril. MNT)

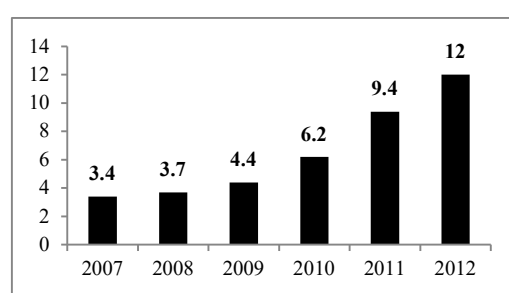




Figure 1.99 Foreign Reserve (billion USD)

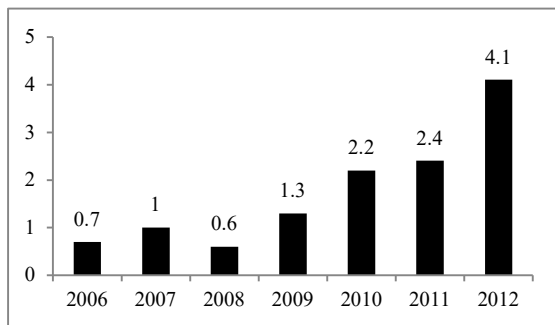


Figure 1.100 Current Account (mil. USD)

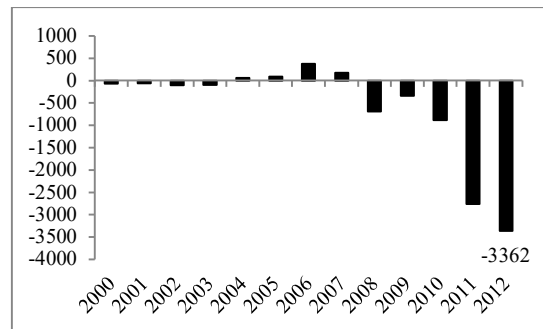


Figure 1.101 FDI (million USD)

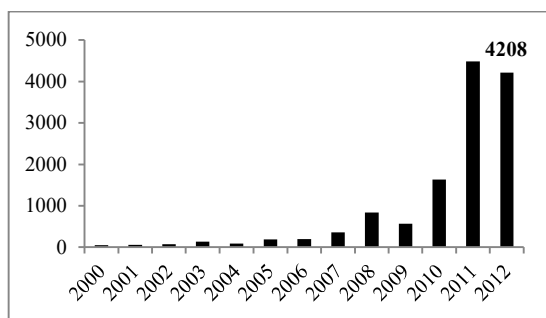
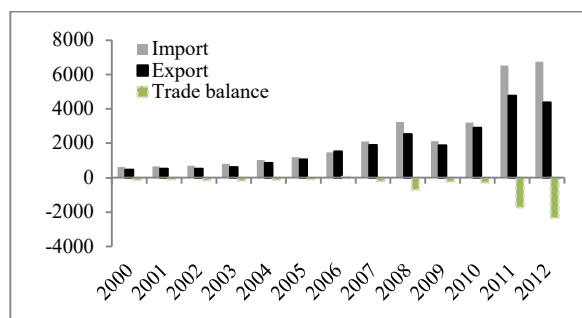


Figure 1.102 Trade Balance (mil. USD)



Source: Bank of Mongolia

### Monetary Policy in 2013

In 2013, the BOM also faced a number of challenges due to a decline in commodity prices, capital outflows and Chinese economic slowdown. During this period, monetary policy aimed to maintain macroeconomic stability, strengthening the financial sector and real sector activities. The foreign direct investment decreased by 53% from previous year. The current account deficit amounted to 3.2 billion US dollars that accounted for 25.4% of GDP (Figure 1.110). The real sector and enterprises faced the hard economic situation. The BOM, therefore, implemented the monetary injections through the private sector since November 2012. The BOM and the government injected 677 billion MNT under the “Price stabilization program”.

The BOM also cut the policy rate 3 times by 2.75 percentage point in total for promoting credit growth and economic activity (Figure 1.107). In 2013, money growth was maintained at 24.2% and GDP growth was 11.7% (Figure 1.105). In addition, the BOM improved the effectiveness of the transition mechanism of interest rate channel. In 2013, BOM introduced the

“Interest rate corridor” in order to improve interest rate channel of the monetary transmission mechanism and to reduce volatility in short-term interest rates. The corridor was launched as a new policy instrument that consists of overnight repo and overnight deposit facilities.

Due to the decline in capital and FDI inflow, national currency depreciated by 19% in 2013 (Figure 1.104). Thus the BOM continued exchange rate intervention in the foreign exchange market. The foreign reserve declined by 46% compared to the previous year and reached 2.2 billion US dollars (Figure 1.109). The related indicators are shown in Figure 1.103-1.112.

Figure 1.103 Inflation Rate (%)

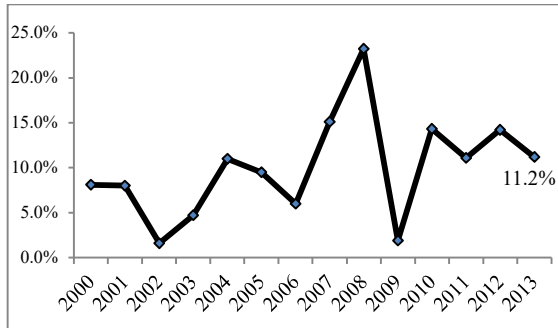


Figure 1.104 Exchange Rate (MNT per USD)

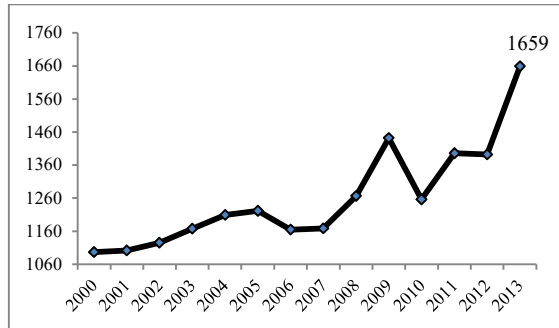


Figure 1.105 Economic Growth

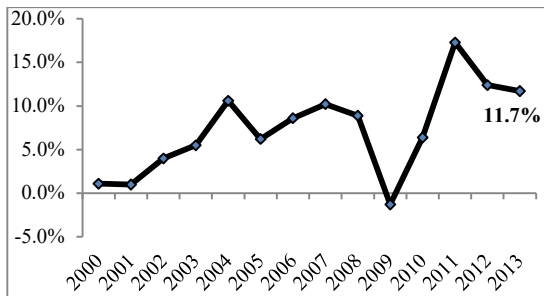


Figure 1.106 BOP (million USD)

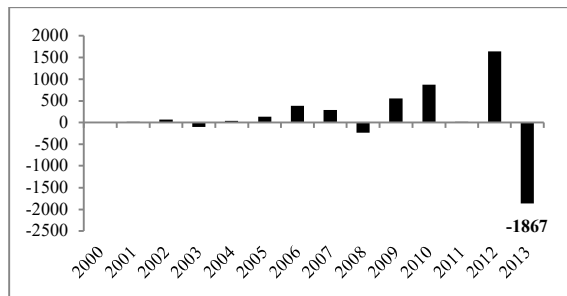


Figure 1.107 Policy Rate (%)

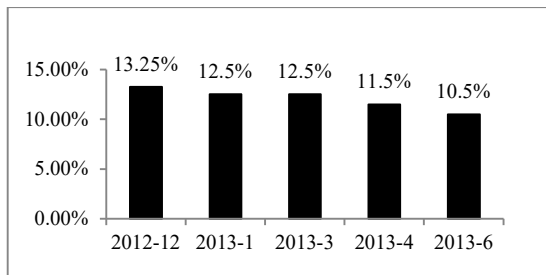


Figure 1.108 Total Banking Asset (tril. MNT)

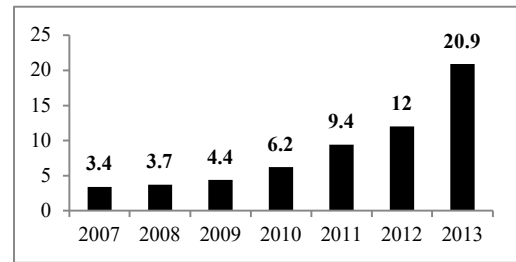


Figure 1.109 Foreign Reserve (billion USD) Figure 1.110 Current Account (mil. USD)

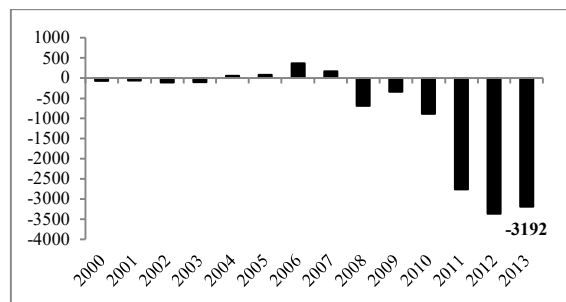
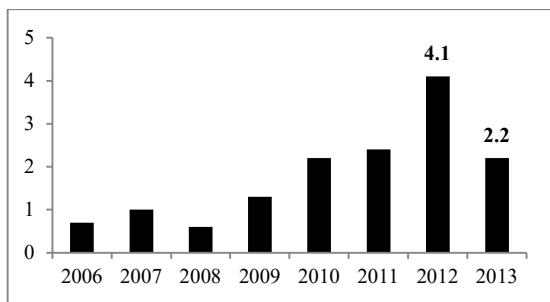


Figure 1.111 FDI (million USD)

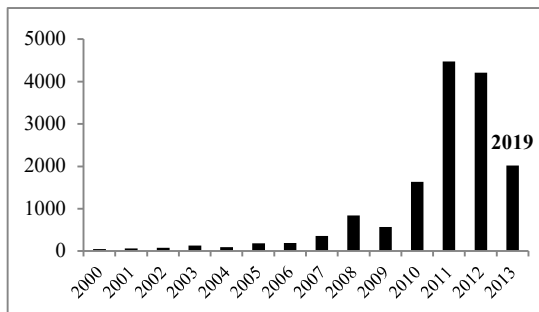
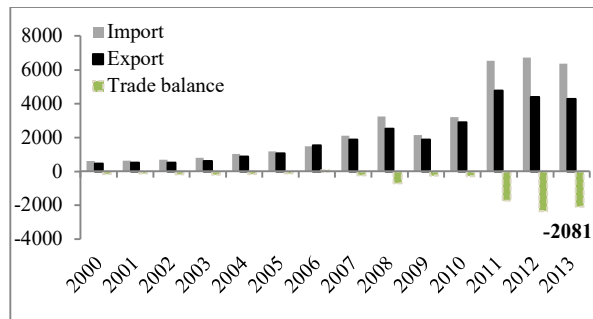


Figure 1.112 Trade Balance (mil. USD)



Source: Bank of Mongolia

### Monetary Policy in 2014

In 2014, the monetary policy still aimed to ensure the financial and macroeconomic stability. The total banking asset increased by 16%, which reached 22.6 trillion MNT, and total loan rose by 16% and reached 10 trillion MNT.

The BOM targeted the inflation rate at 8% in 2014, even though at the end of 2014 inflation reached 10.7%. The price of main mining products in the global market declined last two years, while foreign direct investment declined sharply and fell down to 231 million US dollars that was

2% of GDP in 2014 (Figure 1.121). Mongolian economic growth also declined by 3.9% to 7.8%. In 2014, the trade balance recorded the surplus in 2014, and totaled 538 million US dollars (Figure 1.122). The world economic condition was stagnant and uncertain, especially due to China's economic slowdown (Figure 1.116), which heavily affected Mongolian economy. For that reason, capital inflow into Mongolia substantially declined.

During the economic challenging period, the BOM implemented the monetary policy to stabilize the national economy by promoting real sector activities. In February 2014, the BOM unchanged the policy rate at 10.5% (Figure 1.117). However, due to continuous declining of foreign direct investment and net foreign asset, and high pressure on the balance of payments, the BOM decided to increase the interest rate by 1.5 percentage points to 12% in July 2014 (Figure 1.117). The monetary policy from 2013-2014 aimed to make the economy soft landing. The related indicators are shown in Figure 1.113-1.124.

Figure 1.113 Inflation Rate (%)

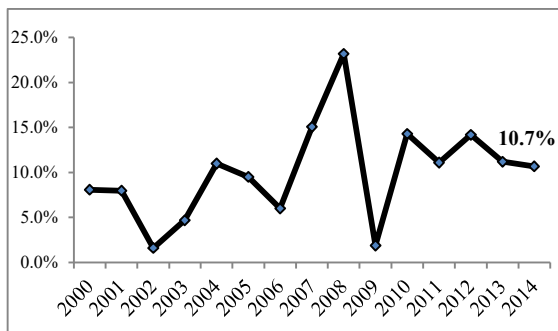


Figure 1.114 Exchange Rate (MNT per USD)

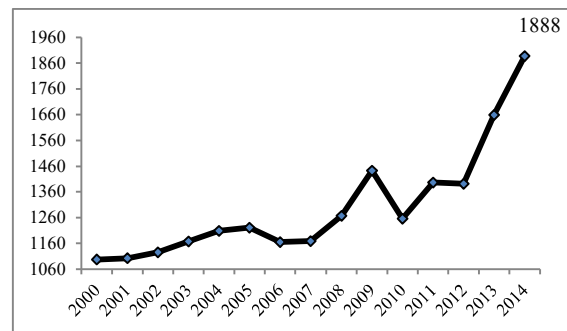


Figure 1.115 Economic Growth of Mongolia

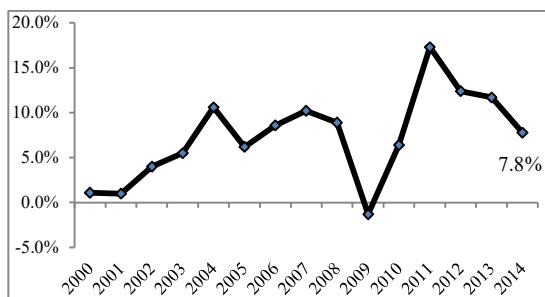


Figure 1.116 Economic Growth of China

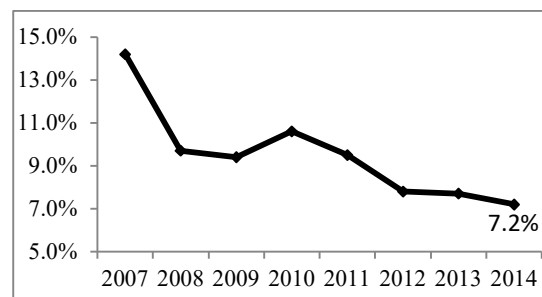


Figure 1.117 Policy Rate (%)

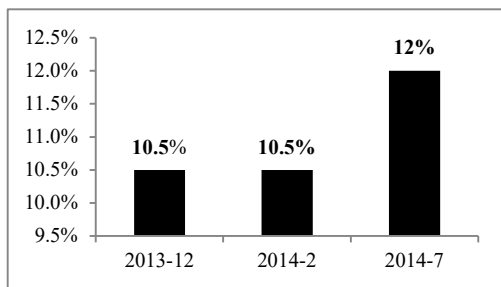


Figure 1.118 Total Banking Asset (tril. MNT)

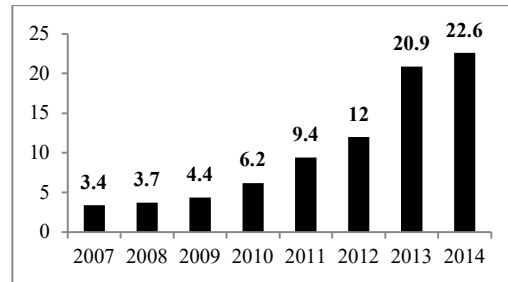


Figure 1.119 Foreign Reserve (billion USD)

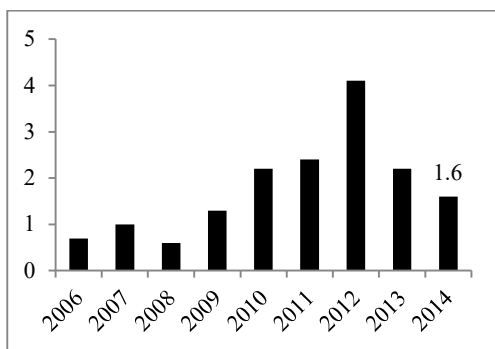


Figure 1.120 Current Account (mil. USD)

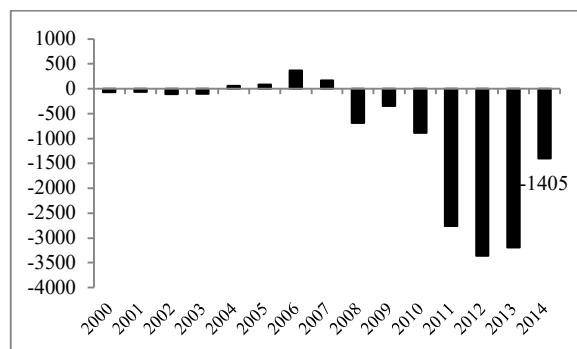


Figure 1.121 FDI (million USD)

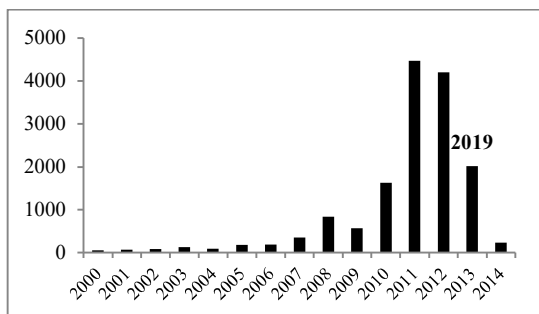


Figure 1.122 Trade Balance (mil. USD)

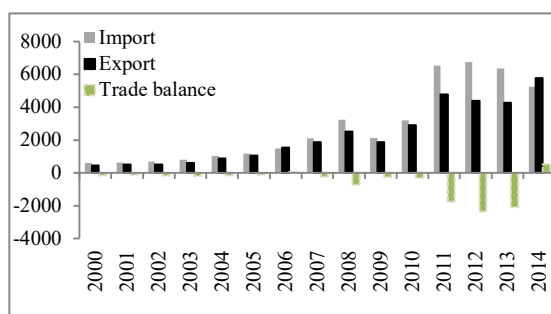


Figure 1.123 BOP (mil. USD)

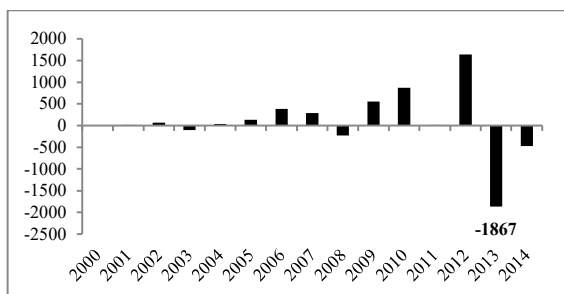
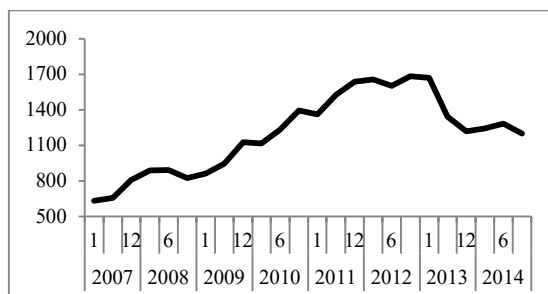


Figure 1.124 Coal Price US\$/ounce



Source: Bank of Mongolia

## Monetary Policy in 2015

In 2015, monetary policy aimed to ensure the external and internal balance of macro economy, to target the inflation rate at 7% and to improve financial stability. Mongolian economy still faced the global market uncertainties and economic slowdown. Especially, Mongolian economic structure was heavily dependent upon mineral prices of global market. In 2015, Mongolian foreign trade decreased by 25.1%. The current account deficit declined to -948 million US dollars or 4% of GDP (Figure 1.132). The foreign reserves reached 1.32 billion US dollars, and the BOM maintained flexible exchange regime (Figure 1.131).

At the end of 2015, inflation declined to 1.9% and the BOM achieved the targeted level (Figure 1.125). The main contributions were related to the decrease of supply-induced inflation, the decline of demand and shrinkage of total consumption.

The BOM increased the policy rate by 1 percentage point to 13% in January 2015 (Figure 1.129). The tight monetary policy aimed to keep the sound external balance by increasing the yield of the national currency. After that, the BOM did not change the policy rate until the end of 2015 and kept the policy rate at 13%. The related indicators are shown in Figure 1.125-1.134.

Figure 1.125 Inflation Rate (%)

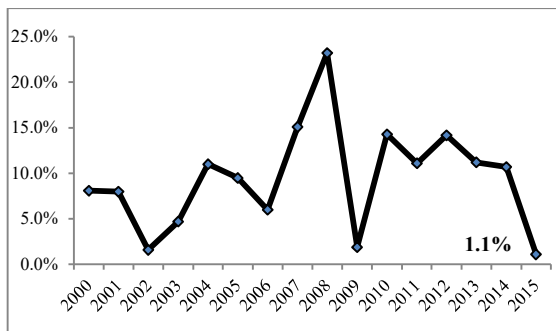


Figure 1.126 Exchange Rate (MNT per USD)

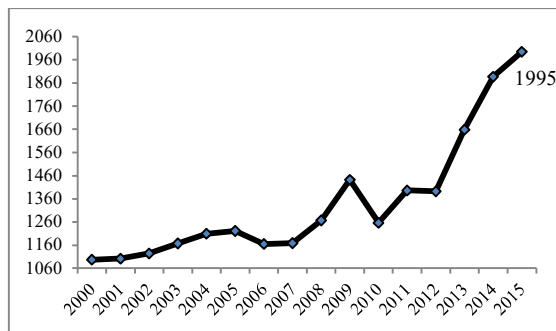


Figure 1.127 Economic Growth

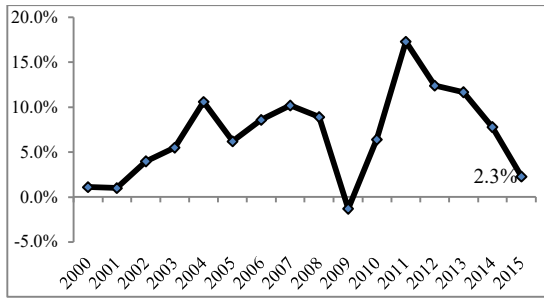


Figure 1.128 BOP (million USD)

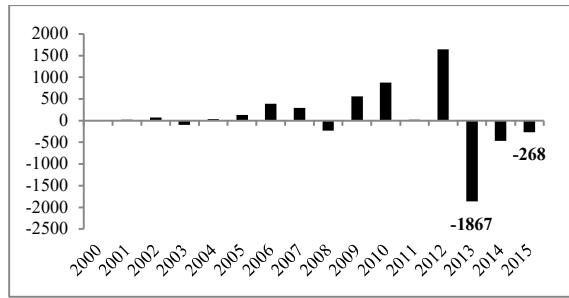


Figure 1.129 Policy Rate (%)

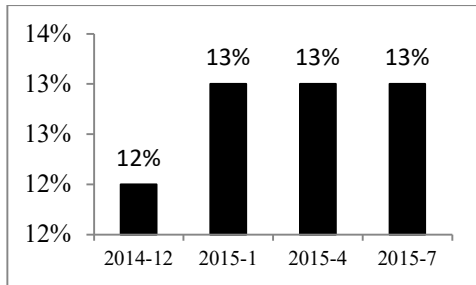


Figure 1.130 Total Banking Asset (tril. MNT)

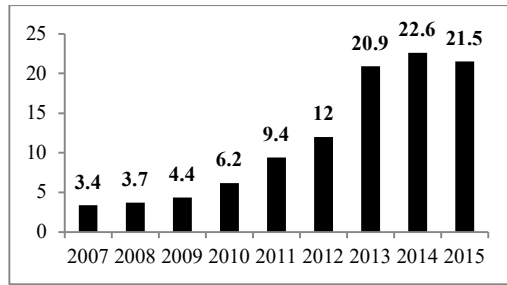


Figure 1.131 Foreign reserve (billion USD)

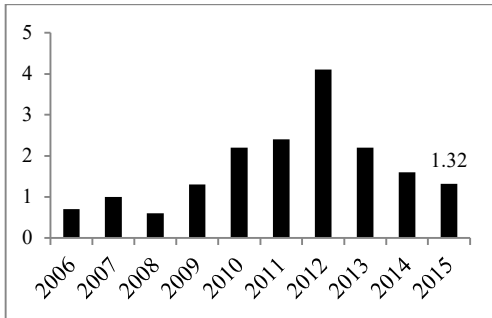


Figure 1.132 Current Account (mil. USD)

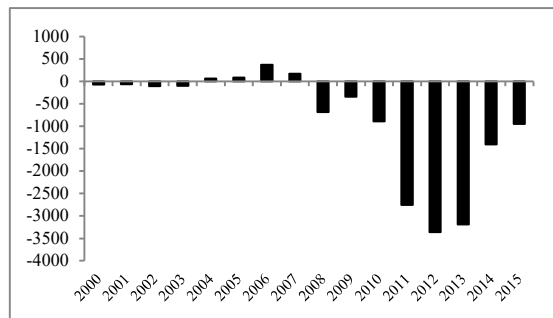


Figure 1.133 FDI (million USD)

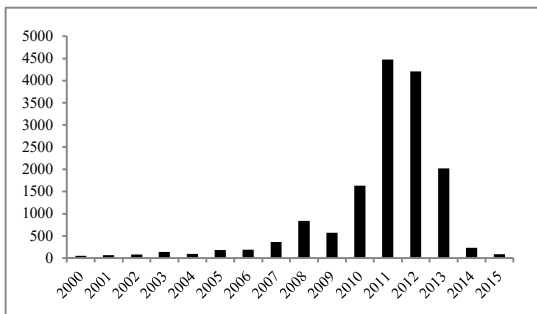
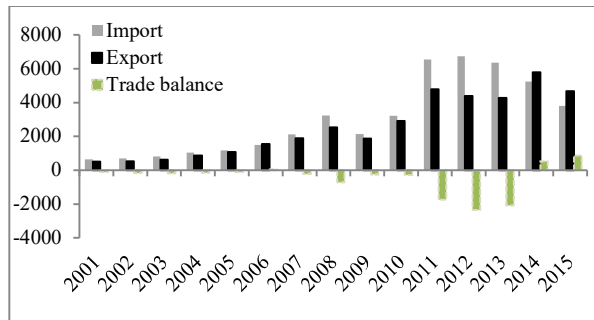


Figure 1.134 Trade Balance (mil. USD)



### Monetary Policy in 2016

In 2016, Mongolian economy faced the number of challenges such as a shortfall of foreign direct investment, a decline in economic growth and foreign debt pressure. However, inflation declined to 0.5% and the BOM achieved the inflation below the targeted level.

At the first half of the 2016, the BOM lowered the policy rate by 1 and 1.5 percentage points to 10.5% in January and May respectively (Figure 1.139). However, due to the uncertain and capital volatility environments, Mongolian domestic currency depreciated dramatically. In August 2016, therefore, the BOM raised the policy rate by 4.5 percentage points in order to stabilize the foreign exchange rate and to restore the stability of banking sector. Ministry of Finance and the BOM also reached an agreement with International Monetary Fund on the Extended Fund Facility arrangement for Mongolia. The related indicators are shown in Figure 1.135-1.144.

Figure 1.135 Inflation Rate (%)

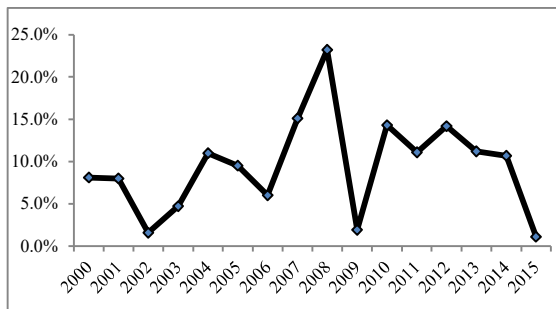


Figure 1.136 Exchange Rate (MNT per USD)

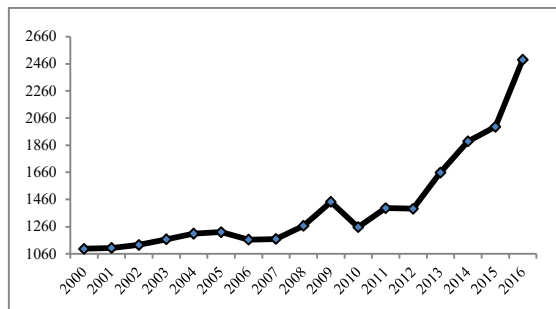


Figure 1.137 Economic Growth

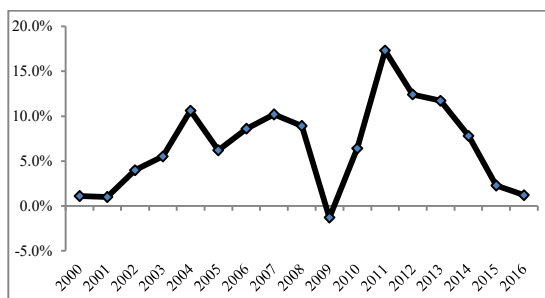


Figure 1.138 BOP (million USD)

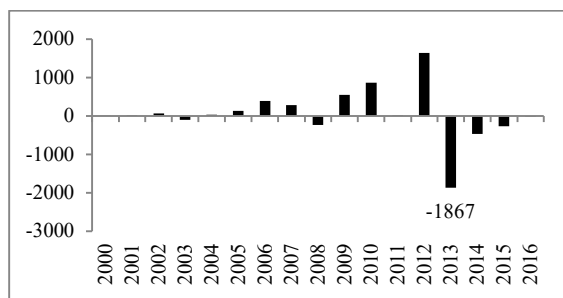




Figure 1.139 Policy Rate (%)

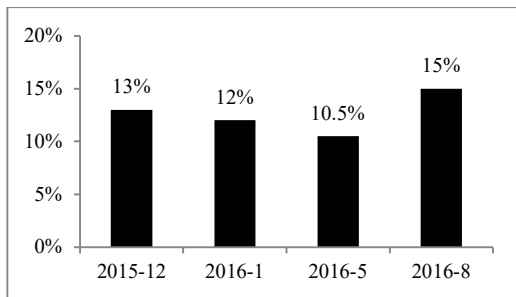


Figure 1.140 Total Banking Asset (tril. MNT)

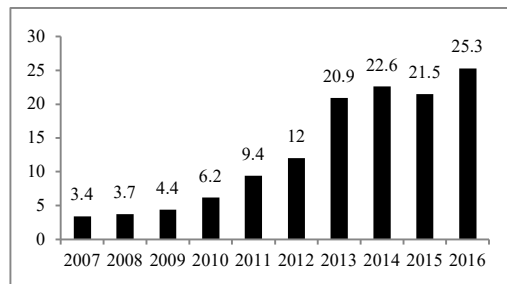


Figure 1.141 Foreign Reserve (billion USD)

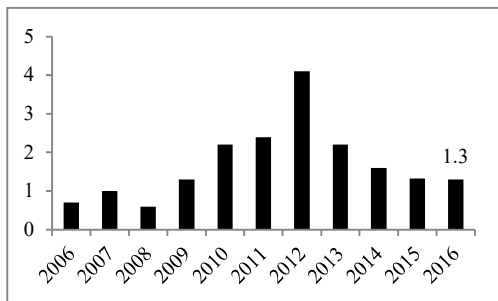


Figure 1.142 Current Account (mil. USD)

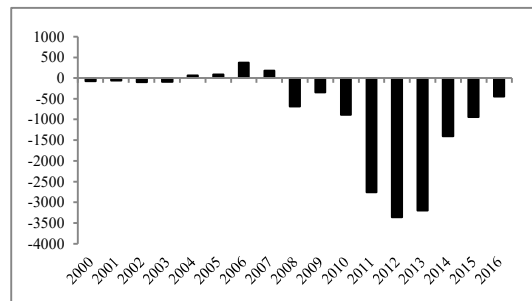


Figure 1.143 FDI (million USD)

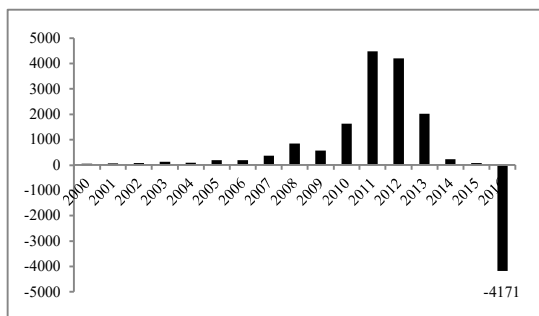
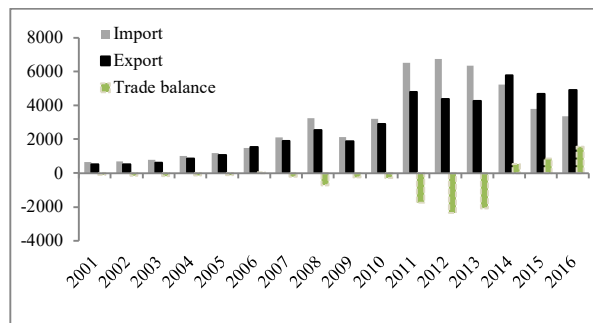


Figure 1.144 Trade Balance (mil. USD)



Source: Bank of Mongolia

## SUMMARY

The Part I reviewed the macroeconomic condition and monetary policy challenges during 1990-2016.

Chapter 1 examined the main macroeconomic indicators in Mongolian economy. The main findings are summarized as follows. First, from the early 1920s to the late 1980s, Mongolia was

closely linked to the Soviet Union, with the Mongolian political and economic systems modeled on the Soviet Union. Following the collapse of the Soviet Union, however, Mongolia began its transformation from a centrally planned economy to a market-based economy in the early 1990s. After the transition process, Mongolian economy expanded rapidly and economic structure was changed. Mongolia traditionally depended heavily on the primary sector, which mainly consisted of livestock husbandry and crop production. The agriculture share to GDP ratio was 32% in 1990, which declined to 12% in 2016. On the contrary, mining share of GDP was 9% in 1990, which increased to 20.3% in 2016. The mining has become an economic leading sector in very short period.

Second, the Mongolian economy experienced high inflation throughout history. During the economic transition period, inflation reached 325% in 1992, which was historically highest level. Then, inflation had been about 9.6% on average between 2001 and 2008. Although the inflation dropped to 2.0% in 2009, it increased again to 14.3% in 2010 and reached 12.0% on average between the periods of 2010–2014. High and double-digit inflation was related to the shock of several goods in supply side and also expansionary fiscal policy in demand side.

Third, after the economic transition process, Mongolian government paid more attention to improving the foreign trade policy. The Mongolia joined World Trade Organization in 1997 and became a member of the ADB, IMF and World bank in 1991. The trade balance of Mongolia was usually in deficit, and the trade balance of goods recorded surplus only in the years of 1994, 1995, 2006, 2014, 2015 and 2016. Since the mining has accounted for around 80-90% of the total export in Mongolia, national economy has been heavily affected by the commodity price fluctuation in global market.

Chapter 2 indicated the financial system and monetary policy challenges during 1990-2006. The major findings are summarized as follows. First, during the economic transition process a great number of economic reforms were undertaken. In 1991, Mongolia approved a new banking law and two-tier banking system was organized. Some preliminary prudential regulations, notably on capital adequacy, were issued in 1992, and the system of on- and off-site inspection was established. Mongolia also shifted to floating exchange rate regime in 1993, and foreign reserve

management functions were formally undertaken by the BOM since April 1993. The BOM issued regularly central bank bills since 1995.

Second, the banking sector experienced a number of challenges during 1990-2006. The Mongolian banking system suffered from three times crises in 1994, 1996 and 1998. During the banking sector crises, non-performing loans increased rapidly and some commercial banks failed to provide the reserve requirement and prudential norms. The Mongolian government and the BOM successfully implemented the policy, which aimed at strengthening banking system such as the increase in effectiveness of monetary policy and loan management among banks with the support of international financial institutions.

Third, the BOM had a monetary aggregate targeting framework since the mid of 1990s until 2007, with reserve money as the operational target and money supply as the intermediate target. However, due to the financial deepening process since 2000s, the relationship among reserve money and broad money, the money multiplier and inflation rate became unstable. Then, the BOM needed to shift to another monetary policy framework.

Chapter 3 indicated the economic conditions and monetary policy changes during 2007-2016. The main findings are summarized as follows. First, Mongolian economy expanded rapidly and economic growth reached the peak in history. In 2008, Mongolian economy was hit hard by the global financial crises through a sudden drop in the copper price. After the economic crises, Mongolia explored the giant mining project, Turquoise hill, of copper and other coal projects, which made Mongolia a popular spot for foreign investors. Based on the mining sector development, foreign direct investment increased rapidly and GDP growth reached 17.3 percent in 2011. At the end of 2012, however, Mongolian economic growth declined dramatically due to a decline in commodity price, capital outflows, Chinese economic slowdown and temporary stop of big mining projects of Mongolia. Foreign direct investment declined sharply too, and due to the capital inflow shortage, national currency tugrik depreciated dramatically.

Second, monetary policy framework and tools have been changed based on economic condition. Until 2006 monetary policy had targeted monetary aggregates. Since 2007, however, the monetary policy shifted to inflation targeting framework. Under this new framework, the BOM introduced the policy rate in 2007. The BOM's operating target and intermediate target also

changed to a weighted average interest rate of interbank, short and long-term interest rates. The BOM also started to conduct open market operation and to make one- week central bank bill rate be equal to the monetary policy rate. Then, the BOM has been representing a forward looking monetary policy framework named the Forecasting and Analysis System, which is a forecast based policy formulation and decision making, and effective communication with the public since 2011. In 2013, the BOM initiated the interest rate corridor, which was a critical reformation of the policy rate transmission mechanism.

Third, the BOM has been managing monetary policy in a flexible way according to economic conditions. In 2010, the Government of Mongolia and the BOM successfully implemented the IMF project and made national economy get wholly out of the crises. After the economic crises, Mongolian economy expanded rapidly due to the mining giant projects, and economic growth reached the peak level in 2011. During the highest growth years, inflation rate recorded usually double digit such that the average inflation between the periods of 2010–2014 was 12.0%. In order to reduce demand-side pressure on inflation, caused by expansionary fiscal expenditure in 2011-2012 and cash handouts from the Human Development Fund, the BOM tightened its monetary policy and increased the reserve ratio requirement of commercial banks in the first half of 2012. Furthermore, in an effort to reduce the supply-side pressure on inflation and to establish a sustainable market-based supply mechanism of main consumption goods, the BOM initiated the “Price stabilization program” (PSP) in conjunction with the Government of Mongolia in the second half of 2012. The PSP sharply reduced the supply-driven and cost-push inflation, which was a key factor behind long periods of high inflation, and brought down inflation to the target level. Since 2013, however, the BOM faced a number of challenges due to a decline in commodity price, capital outflows and Chinese economic slowdown. During this period, monetary policy aimed to maintain macroeconomic stability and to strengthen the financial sector and real sector activities. In 2013, the BOM cut the policy rate 3 times by 2.75 percentage point in total for promoting credit growth and real sector activity. The inflation was lowered below the targeted level during 2014-2016. However, due to the continuous declining of foreign direct investment and net foreign asset, and high pressure on balance of payments, the BOM has maintained the policy rate above ten percent.

Fourth, the BOM has been implementing managed-floating exchange rate regime. The BOM

intervened in the exchange rate market in the case of the exchange market's fluctuation and excessive volatility. Since 2012, foreign direct investment and capital inflow have declined sharply, which created domestic currency depreciation. Thus, the BOM usually implemented tight monetary policy to keep the sound external balance by increasing the yield of the national currency.

Focusing on the Mongolian monetary policy throughout the Part I, its framework has made the progresses to cope with inflation, including the adoption of an inflation targeting, the introduction of a policy rate as an operating target, the application of a forward-looking framework and the establishment of an interest rate corridor. In spite of these progresses, the Mongolian monetary policy management has faced difficulties by internal and external factors: the monetary policy has often been confronting with expansionary fiscal policy in managing inflation, and also been disturbed by exchange rate fluctuation and massive flows of foreign capital. The history of Mongolian monetary policy, in this sense, contained not only a positive side of the progresses in its framework, but also a negative side of policy dilemma with internal and external factors.

## PART II

### MONETARY POLICY RULE AND ITS PERFORMANCE UNDER INFLATION TARGETING IN MONGOLIA

#### INTRODUCTION

The BOM has adopted “inflation targeting”<sup>5</sup> as its monetary policy framework since 2007. The background behind introducing the inflation targeting lies in the fact that the correlation between money supply and inflation had declined, hence had come the need to reform the monetary policy strategy in the 2000s. The BOM had a monetary aggregate targeting framework until 2007 with reserve money as an operating target and with M2 as an intermediate target. Since the 2000s, however, the deviation of monetary aggregate from those targets has been enlarged due to a re-monetization process and a volatility of the money multiplier. The BOM has thus introduced the inflation targeting framework since 2007, which contains the policy mandate of announcing a targeted inflation rate to the public and of taking every possible measures to maintain inflation rate at the targeted rate. At the same time, the BOM has adopted one-week central bank bills’ rate as a policy rate since July 2007, so that the policy rate can work as an operating target to attain its targeted inflation rate. Since introducing the inflation targeting in 2007, the BOM, having experienced the challenges of high and volatile inflation, has taken several steps to make the inflation targeting system more effective: the BOM has introduced the Forecasting and Policy Analysis System (FPAS) since 2011 as a forward-looking framework, and has established an interest rate corridor to enhance the policy rate transmission mechanism since 2013 as an operational framework.

The question then arises on how we can evaluate the performance of inflation target that has been operated for one decade since its adoption in Mongolia. In general, there seems to be a consensus in academic literature and policy discussions that inflation targeting has so far been successful to stabilize inflation in advanced economies with the history of its operation since the 1990s (e.g. Mishkin and Posen, 1998; Mishkin and Schmidt-Hebbel, 2007). As far as emerging market economies including Mongolia are concerned, however, there has been rather less

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<sup>5</sup> The essence of inflation targeting framework was clearly described in Bernanke and Mishkin (1997) and Bernanke et al. (1999), for instance.

evidence to support the performance of inflation targeting due to the relatively shorter history of its operation and due to some difficulties in its management.

The difficulties that emerging market economies have faced in operating their inflation targeting might come from exchange rate fluctuations for the following senses. First, inflation targeting can work well only when monetary autonomy is secured under floating exchange rate regime with capital mobility. Emerging market economies have, however, the problem of “fear of floating”, as suggested by Calvo and Reinhart (2002). It comes from a lack of confidence in currency value, especially given that their external debts are primarily denominated in US dollars. Their efforts to avoid exchange rate volatility prevent their monetary authorities from concentrating fully on inflation targeting. Second, as Eichengreen (2002) argued, exchange rate fluctuation itself has large influence on domestic prices through the “pass-through” effect in small, open economies. It makes it difficult for monetary authorities to control inflation and to perform inflation targeting well. There is, however, a counterargument against the pass-through effect on inflation targeting. Gagnon and Ihrig (2004) argued that an inflation targeting framework reduces the pass-through effect, in the sense that domestic agents are less inclined to change prices in response to a given exchange rate shock under the strong commitment of a monetary authority to price stability.

Another possible difficulty for inflation targeting management in emerging market economies is the lack of credibility of the central bank capacity. It might come from arbitrary policy reactions accompanied with unreliable inflation forecasting by central banks as well as the economic uncertainty and volatility. As long as agents do not believe that a monetary authority will be successful in achieving inflation target, it will be difficult for inflation targeting to have any significant impact on expectations and behaviors of private sectors with respect to wage and pricing contracts. As Eichengreen (2002) emphasized, the lack of credibility would thus lessen inflation targeting performance.

Some studies, among the limited literature, have assessed inflation targeting in emerging market economies as “conditional” success. For example, Mishkin (2000, 2004) argued that the success of inflation targeting could not be solely attributed to the actions of central banks, and that supportive policies such as the absence of large fiscal deficits and rigorous regulation and supervision of financial sector were crucial to its success. Lin and Ye (2009) also noted that the

performance of inflation targeting could be affected by a country's characteristics such as the government's fiscal position, the central bank's desire to limit movements of exchange rate and its willingness to meet the preconditions of policy adoption. Ito and Hayashi (2004) presented the following two recommendations on inflation targeting management, considering the characteristics of emerging market economies: 1) emerging market countries should set an inflation with target central rate slightly higher and with a target range slightly wider than a typical advanced country; 2) small, open economies may pursue both an inflation target range and an implicit basket band in exchange rate regime, as both targets are expressed in a range (the targets work as the source of stability in expectations, while the ranges allow some flexibility).

Mongolia is not an exception in facing the aforementioned difficulties and conditional success in inflation targeting operation as one of emerging market economies. The Part II, in this context, reviews the monetary policy rule and its performance under inflation targeting framework focusing on Mongolia. This study first estimates the policy reaction function to see if the inflation targeting has been linked with a monetary policy rule emphasizing on inflation stabilization since its adoption in 2007. The study then investigates further whether the monetary policy rule would actually have its transmission effect on inflation under the inflation targeting, through tracing the impulse responses of inflation rate to monetary policy shocks in a structural vector autoregressive (SVAR) model.

The rest of Part II is structured as follows. Chapter 1 gives an overview of the monetary policy framework since the 1990s in Mongolia. Chapter 2 and 3 analyze the monetary policy rule and the monetary policy transmission mechanism in Mongolia, respectively. The last Chapter summarizes and concludes.



## **CHAPTER 1**

### **OVERVIEW OF MONETARY POLICY FRAMEWORK**

This Chapter first describes the short history of the monetary policy framework since the 1990s in Mongolia, observes the performance in Mongolian inflation targeting in connection with the policy rate stances since its adoption in 2007, and illustrates the monetary policy transmission mechanism in Mongolia.<sup>6</sup>

#### ***1.1 Development of Monetary Policy Framework since the 1990s***

The Mongolian economic system shifted from a centrally planned economy to a market-based economy in early 1990s, and a great number of political and economic reforms have been undertaken since then. In 1991, Mongolia approved a new banking law and organized the two-tier banking system: the BOM implements monetary policy as a central bank, and other banks yields commercial services. Regarding the monetary policy framework, it has the following three phases since the 1990s: monetary aggregate targeting from 1995 to 2006, transition to inflation targeting from 2007 to 2011, and inflation targeting with forward-looking framework from 2011 to the present.

In the first phase of monetary aggregate targeting for 1995-2006, the BOM set the reserve money as the operating target and M2 as the intermediate target, only through the policy instruments of operating central bank bill and reserve requirement. Since the mid-2000s, however, the relationship between reserve money and broad money, namely, the money multiplier, became unstable and the impact of money supply on inflation became ambiguous due to financial deepening, fiscal dominance and its monetization process. Hence came the necessity for the BOM to apply alternative monetary policy framework.

In the second phase from 2007, the BOM initiated inflation targeting, which contains the policy mandate of announcing the mid-term targeted inflation rate to the public and of taking every possible measures to maintain inflation rate within its targeted range. At the same time, the BOM has adopted one-week central bank bills' rate as a policy rate since July 2007, so that the policy rate can work as an operating target to attain its targeted inflation rate through its transmission

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<sup>6</sup> The description on this section is based on Bayarsaikhan et al. (2015) and the BOM website: <https://www.mongolbank.mn/eng/listmonetarypolicy.aspx?id=01>.

mechanism.<sup>7</sup> Mongolian economy was, however, hit by the wave of world financial crisis in 2009, and the BOM adopted the IMF Stand-by program in that year in order to safeguard the foreign exchange reserves and relieve immediate pressure on exchange rate. The program's terms required the BOM to target monetary aggregate by putting ceiling on net domestic assets and setting a floor for net foreign assets. In 2010, the BOM finally completed 18 months Stand-by program.

In the third phase from 2011, the BOM has been developing the Forecasting and Policy Analysis System (FPAS), for the purpose of upgrading the inflation targeting to a forward-looking framework. The system aims at forecast-based policy formation and decision making, and effective communication with the public under the inflation targeting framework. In this phase, the BOM also have improved its operational framework by establishing an interest rate corridor since February 2013. The interest rate corridor around the policy rate consists of two standing facilities: the rate of overnight repo facility as the ceiling (policy rate plus two percent points) and the rate of overnight deposit facility as the floor (policy rate minus two percent points). Setting the corridor is expected to contribute to improving interest rate channel of monetary transmission mechanism.

### ***1.2 Performance of Inflation Targeting***

This section, focusing on the second and third phases above after 2007, observes the performance of the inflation targeting by comparing the targeted inflation with the actual inflation and by associating the trend in inflation with the policy rate stances.<sup>8</sup>

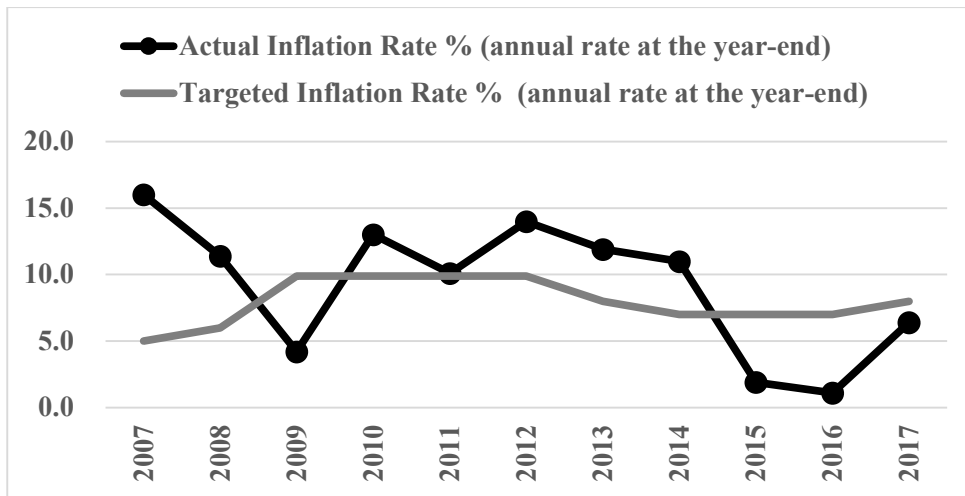
Figure 2.1 compares the actual inflation rate with the targeted rate in terms of annual rate at each year-end, in which the targeted inflation rate is updated by the BOM's Monetary Policy Guidelines for each year. Figure 2.2 illustrates the central bank's policy rate and the interest rate corridor in comparison with the interbank market rate.

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<sup>7</sup> The BOM still keeps the reserve requirement ratio as a monetary policy instrument as well as the policy rate.

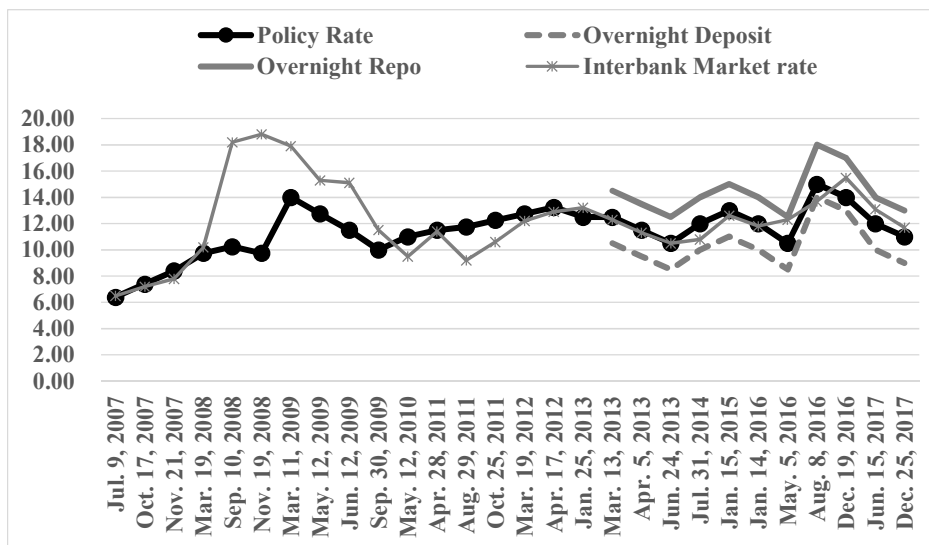
<sup>8</sup> The description in this section is based on Annual Year Report of the BOM in each year.

Figure 2.1. Actual Inflation and Targeted Inflation



Source: Author's description based on the website of the Bank of Mongolia

Figure 2.2. Policy Rate, Corridor Rates and Interbank Market Rate



Source: Author's description based on the website of the Bank of Mongolia

Soon after the adoption of the inflation targeting in 2007, Mongolian economy was hit by the wave of world financial crisis in 2009, and the BOM adopted the IMF Stand-by program in that year. At that time, the main focus of the BOM was to restore the confidence in the local currency and to stop the deposit flight out of its economy, and the BOM thus raised its policy rate from 9.75 percent to 14 percent in March 2009, although the BOM afterwards reduced its policy rate gradually to 10 percent in September in accordance with the declining inflation rate.

For the period from 2010 to 2013, Mongolian economy entered the booming stage with double-digit inflation rate, which was mostly beyond the targeted rate that pursued a single-digit level. There were the following reasons behind the fueling inflation: the price elevation of food (e.g. meat, wheat), fuel (e.g. gasoline) and public administrative goods in the supply side, the expansionary fiscal policy particularly in terms of the cash handout to the public from the specific government fund and the surge of capital inflows in the mining sector in the demand side. The BOM reacted the hike of inflation by raising its policy rate continuously to 13.25 percent until January 2013. At the same time, the BOM together with the Government initiated the “Medium-term Price Stabilization Program” containing the programs to stabilize food and fuel prices in October 2012 to decrease the supply side pressure on inflation. As a result of these policies, the inflationary pressure was calming down to some degree, thereby the BOM cutting again its policy rate consecutively from January to June in 2013 toward 10.5 percent. The interest rate corridor was also initiated from February 2013 as was stated before. As Figure 2 showed clearly, before the corridor adoption there was large deviations between the policy rate and the interbank market rate, but after its adoption, those deviations have been settled down within the corridor range.

For 2014-2015, under the background of the slowdown in the world economy including Chinese economy, the net inward foreign direct investment to Mongolia fell down significantly (in 2014 by 17 times less than its peak in 2011), thereby the balance of payment facing difficulties. To improve external balance, the BOM turned to tight monetary policy by raising its policy rate to 12 percent in July 2014 and further to 13 percent in January 2015. At the end of 2015, the inflation rate fell down to 1.9 percent as year-on-year rate, which was far below the targeted rate.

After 2016, the BOM eased its monetary policy by cutting its policy rate to 12 percent in January 2016 and further to 10.5 in May 2016, considering that the inflation rate remained below the targeted rate. The BOM, however, raised its policy rate again to 15 percent in August 2016, since during July to August the shortage of foreign reserves incurred the rapid currency depreciation, which endangered the capital flight. After avoiding a currency crisis, the BOM started to reduce its policy rate gradually and continuously from December 2016 through 2017. The inflation rates in 2016 and 2017 were still below the targeted rate at the year-end.

To sum up, in the early stage of inflation targeting for 2007-2013, the actual inflation rate tended to exceed the targeted rate in spite of tight monetary policies due to fiscal and supply-side

pressures. In the latter stage for 2015-2017, on the contrary, the inflation rate has been will-restrained under the targeted rate. The critical issue is that even under such a stagnant economic condition for that period, the BOM has still kept its policy rate at rather high level, namely, more than ten percent. As the aforementioned story told us, the constraint in the BOM monetary policy comes from the difficulty in balance of payment caused mainly by the sharp decline in inward foreign direct investment and at the same time the difficulty in the fluctuation of local currency value, so-called, “fear of floating”, which will be explained later on.

### ***1.3 Monetary Policy Transmission Mechanism***

The BOM supposes four kinds of channels of the policy rate transmission mechanism: the channels through interest rate, exchange rate, asset prices and inflation expectation.<sup>9</sup> The last two channels are not considered to be major transmissions, following the argument of Bayarsaikhan et al. (2015). The channel of asset prices depends on the development of stock market, but as a matter of fact the banking sector comprises over 95 percent of the financial sector in Mongolian economy. The channel of inflation expectation cannot also be expected due to the lack of monetary policy credibility coming from the history of high and volatile inflation. The study focuses on the channels of interest rate and exchange rate.

Regarding the interest rate channel, the effect of the policy rate shock is expected to be transmitted to the interbank market rate, to deposit and lending rate, and finally to inflation and output, consecutively. In this channel, Bayarsaikhan et al. (2015) points out the following drawbacks. First, the policy rate shock has not necessarily been transmitted to the interbank market rate in a parallel way in Mongolia as Figure 2 showed in the previous section. It is due to the underdevelopment of interbank market: the size of interbank market are marginal and most of the transactions there are settled among only five or six banks. This market structure allowed the deviation between the policy rate and the interbank market rate. After the adoption of the interest rate corridor, however, their transmission has been improved as was also indicated in Figure 2. Second, the transmission from the policy rate to the deposit and lending rate also has not always worked well due to the structure of banking sector: the fierce competition among three major banks makes it difficult to decrease their deposit rates or increase their lending rates in the fear of losing

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<sup>9</sup> The transmission mechanism is described in the BOM website:  
<https://www.mongolbank.mn/eng/listmonetarypolicy.aspx?id=0105>

their depositors and customers. Third, the subsidized loans from the BOM have blurred the policy rate transmission effect, since most of the direct financing were charged at fixed preferential rate under the contract period. The aforementioned “Medium-term Price Stabilization Program” in October 2012 contained this direct lending programs in such prioritized sectors as construction and housing.

As for the exchange rate channel, the effect of the policy rate shock is expected to be transmitted to the exchange rate, and to inflation and output through the pass-through effect of import and export prices. Bayarsaikhan et al. (2015) argued that the effectiveness of this channel depends on the central bank’s willingness to allow the fluctuation of exchange rate. In general, developing countries usually faces the problem of a “fear of floating”, as suggested by Calvo and Reinhart (2002). It comes from a lack of confidence in currency value, especially given that their external debts are primarily denominated in US dollars. Mongolian economy is not an exception, since the BOM has still kept its policy rate at more than ten percent in 2015-2016 even under the inflation rate below the target, only for the purpose of preventing Mongolian currency value from depreciating rapidly. It might lose the sensitivity of exchange rate to the policy rate shock, thereby lessening the effectiveness of the exchange rate channel.

To sum up, the interest rate channel is expected to play a major role in the policy rate transmission mechanism, in particular, after the adoption of the interest rate corridor in February 2013. As for the exchange rate channel, on the other hand, the problem of a “fear of floating” might mitigate the effect of the policy rate transmission.

## **CHAPTER 2**

### **ANALYSIS OF MONETARY POLICY RULE**

This chapter analyzes the monetary policy rule in Mongolia. The chapter first shows the related literature review with this study's contribution, and then conducts an empirical study.

#### ***2.1 Literature Review and Contribution on Monetary Policy Rule***

This section reviews previous studies on monetary policy rules under inflation targeting in emerging market economies in Asia and clarifies this paper's contribution. The discussion started with the Taylor rule (Taylor, 1993 and 1999) that argued the monetary policy of the Federal Reserve (Fed) of the United States (US) could be described by an interest rate rule based contemporaneously on the deviations of output and inflation from their targets. In practice, however, central banks in advanced nations have been targeting not necessarily past and current inflation rate but expected inflation rate. Clarida et al. (1998b) thus suggested the use of a forward-looking version of the Taylor rule, and since then the empirical studies of the forward-looking monetary policy rules have been intensified in the context with the assessment of inflation targeting adopted in advanced economies.

There are very few empirical studies of monetary policy rules under inflation targeting in emerging market economies, however, because of their relatively short-term experiences: only less than two decades have passed since their adoptions of inflation targeting. In fact, East Asian emerging market countries initiated inflation targeting after the 1997-1998 Asian currency crisis: Korea instituted it in 1998, followed by Indonesia and Thailand in 2000, and the Philippines in 2002. Later than these countries, Mongolia started inflation targeting in 2007, as mentioned before. Some of these countries have, however, been targeted as a quantitative study of inflation targeting: their monetary policy rules have been examined by monetary policy reaction functions to see if their rules under inflation targeting have really taken inflation-responsive policy stances.

Regarding the study of a group of East Asian emerging market economies, Taguchi and Kato (2011) examined the monetary policy rules of the four inflation-targeting adopters: Indonesia, Korea, the Philippines and Thailand. They found that Korea took an inflation-responsive and forward-looking policy stance while Indonesia and Thailand had inflation-responsive but backward-looking stances and the Philippines under the de facto pegged currency regime did not

follow even inflation-responsive rule. As for the study focusing on individual economies, Korean monetary policy rule under inflation targeting operation was examined by Kim and Park (2006). They found that the Bank of Korea adjusted interest rates in response to changes in inflationary pressure in a forward-looking manner as well as to current output gaps. Chinese monetary policy rule in practice was investigated by Cai and Taguchi (2015).<sup>10</sup> They showed that the policy rate response to contemporaneous inflation, though identified by a policy reaction function, was too weak to accommodate changes in inflation, and added the result that the response to exchange rate was insignificant. Thai monetary rule under inflation targeting was analyzed by Lueangwilai (2012), such that the contemporaneous responses to inflation and exchange rate movement well characterized the policy rate set by the Bank of Thailand. The study of Thai rule was updated by Taguchi and Wanasilp (2018), which demonstrated that the rule has been upgraded into forward-looking manner reflecting the progress in inflation targeting management.

The literature reviewed above could be reorganized into Table 1 as the table summarized by the following three perspectives. The first one is whether the rule is inflation-responsive and at the same time countercyclical to inflationary pressure. The inflation-responsiveness can be verified by a significant reaction of policy rate by inflation rate, and the countercyclical reaction can be measured by the elasticity of policy rate response against inflation rate, which should be bigger than unity for “real” policy-rate adjustment. The second perspective is whether the inflation-responsive rule has forward-looking or backward-looking stance. This criteria would be significant since emerging market economies, as stated in Introduction, might face the difficulties in forecasting inflation rate as Eichengreen (2002) pointed out. The third perspective is whether the policy rule contains an exchange rate-responsive reaction due to the “fear of floating”. This criteria would also be significant since emerging market economies, as stated in Introduction, might fall into the “fear of floating” as Calvo and Reinhart (2002) suggested. Table 1 includes the policy rules of advanced economies as a benchmark of comparison, by the representative work of Clarida et al. (1998b) targeting G3 (Germany, Japan, and the US), which will be explained in the next section.

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<sup>10</sup> China has not introduced the inflation targeting officially, but inflation rate has been one of the government indicators for the decision making of monetary policy.



Table 2.1. Summary of Literature on Monetary Policy Rule

Articles	Country	inflation responsive		exchange rate responsive
		countercyclical	looking mode	
Clarida et al. (1998b)	G3	yes	forward-looking	-
	Korea	no	forward-looking	-
Taguchi & Kato (2011)	Indonesia	yes	backward-looking	-
	Thailand	yes	backward-looking	-
	Philippines	no	no	-
Kim & Park (2006)	Korea	yes	forward-looking	-
Cai & Taguchi (2015)	China	no	contemporaneous	no
Lueangwilai (2012)	Thailand	yes	contemporaneous	yes
Taguchi & Wanasilp (2018)	Thailand	yes	forward-looking	yes
This study	Mongolia	no	forward-looking	yes

Sources: Author's description

Table 2.1 tells us first that the policy rules of G3 is inflation responsive with countercyclical and forward-looking manner. Among the emerging market economies, Korean and Thai rules by Kim and Park (2006) and Taguchi and Wanasilp (2018) are advanced similarly to the G3 rules, although the Thai rule is also exchange-rate responsive. China and Indonesia are behind Korea and Thailand in their policy rules, in the sense that their rules have not been forward-looking yet, and in particular Chinese rule is not even countercyclical.

Although there are several studies of the policy rules focusing on individual economies as above, there are no studies of Mongolian monetary policy rule under inflation targeting.<sup>11</sup> This study's contribution is thus to examine the linkage between Mongolian monetary policy rule and inflation targeting directly and thoroughly by applying policy reaction functions for the first time, and further to evaluate a progress in the inflation targeting framework toward forward-looking mode by dividing the sample periods. From the viewpoint of comparison with the policy rules in the other emerging market economies, the analytical concern is at what position Mongolian policy rule stands now in aforementioned three dimensions in Table 2.1, which will be clarified at the end of next section.

<sup>11</sup> Buyandelger (2015) investigated the relationship between exchange rate pass-through effect and monetary policy in Mongolia, but did not examine Mongolian monetary policy rule itself.

## ***2.2 Empirics on Monetary Policy Rule***

This section conducts the empirical analyses in order to examine the monetary policy rule under inflation targeting focusing on Mongolia. For examining it, the study estimates policy reaction functions to see if the adoption of inflation targeting has been linked with an inflation-responsive policy rule since its adoption in 2007. The study samples quarterly data from the third quarter of 2007 to the fourth quarter of 2017, and the additional estimation divides the sample into the first period from the third quarter of 2007 to the fourth quarter of 2011 and the second period from the first quarter of 2012 to the fourth quarter of 2017, considering the progress made by the BOM on the inflation targeting framework. The section first represents sample data and key variables for the estimation, followed by the estimation methodology and the estimation outcome with its interpretation.

### ***2.2.1 Sample Data and Key Variables***

The analysis here samples the quarterly data running from the third quarter of 2007 to the fourth quarter of 2017 during which the BOM has operated the inflation targeting. The source of all the data used for the estimation is the International Financial Statistics (IFS) of the International Monetary Fund (IMF).<sup>12</sup> The analytical indicators are selected as follows (see Table 2.2): “Central Bank Policy Rate” for policy interest rate (denoted by *por*); “Consumer Prices Index (2010=100)” for price index, which is transformed into its year-on-year change rate as inflation rate for the estimation ( $\pi$ ); “Industrial Production, Seasonally adjusted, Index (2010=100)” for industrial production, which is further processed into production gap (*gap*) by subtracting from the industrial production a Hodrick- Prescott-filter of that series as a proxy of potential production level; and “National Currency per US Dollar, Period Average” for exchange rate, which is expressed as its year-on-year change rate (*exr*).

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<sup>12</sup> The data are retrieved from the website: <http://www.imf.org/en/data>.

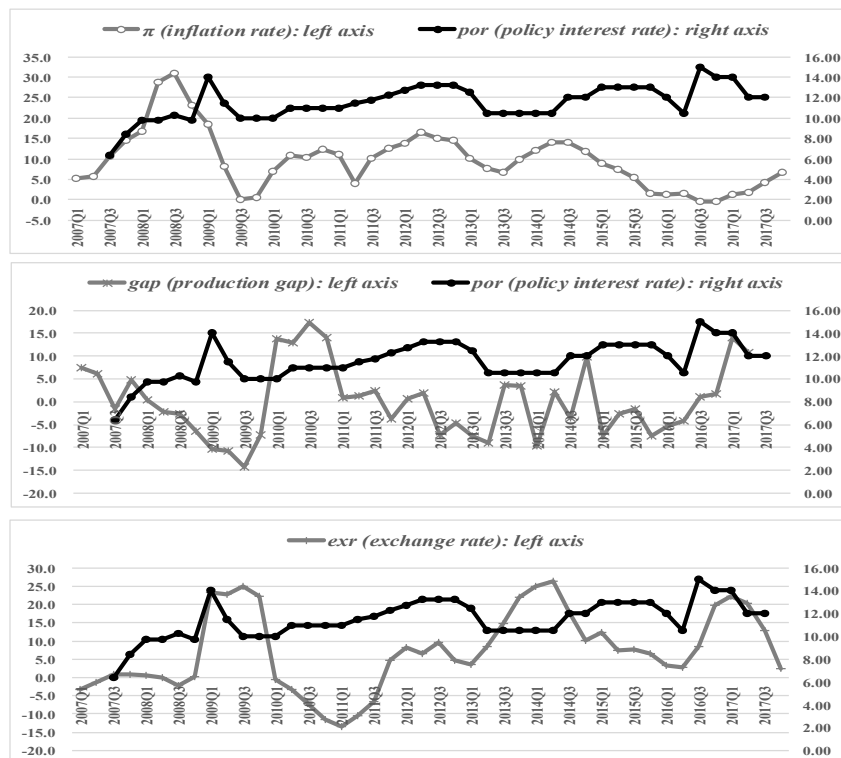
Table 2.2. List of Variables and Data Source

	variables	data source (IFS of IMF)
<i>por</i>	policy rate	retrievd from the series "Central Bank Policy Rate"
$\pi$	consumer prices	retrievd from the series "Consumer Prices Index (2010=100)"; and expressed as a year-on-year change rate (for the inflation expectations, the observed inflation data will be used, based on the assumption of rational expectations)
<i>gap</i>	gap in industrial production	retrievd from the series "Industrial Production, Seasonally adjusted, Index (2010=100)"; and expressed as a difference from Hodrick-Prescott-filter
<i>exr</i>	exchange rate	retrievd from the series "National Currency per US Dollar, Period Average"; and expressed as a year-on-year change rate

Sources: Author's description

The combination between policy interest rate and the other variables of inflation rate, production gap and exchange rate, are simply displayed in Figure 2.3. This observation itself does not tell us clear correlations and causalities in any combinations since the variables interact with each other, and so they should be statistically tested in the more sophisticated way in the later section.

Figure 2.3. Observation of Analytical Indicators



Source: IFS of IMF

Before conducting the estimation below, the study investigates the stationary property of the data for each variable, by employing the Ng-Perron unit root test<sup>13</sup> on the null hypothesis that each variable has a unit root in the test equation including “trend and intercept”. This test constructs four test statistics: modified forms of Phillips and Perron (1988) statistics (MZa, MZt), the Bhargava (1986) statistic (MSB), and the Point Optimal statistic (MPT). Table 2.3 reports the test results for the data for all the indicators, i.e., policy interest rate (*por*), inflation rate ( $\pi$ ), production gap (*gap*) and exchange rate (*exr*) for their level data. The test rejected a unit root in all the data at the conventional level of significance by higher than 95 percent, thereby their data showing stationary property. Their data are thus justified to be used for the subsequent estimation.

Table 2.3. Unit Root Test

	MZa	MZt	MSB	MPT
<i>por</i>	-42.202 ***	-4.560 ***	0.108 ***	2.332 ***
$\pi$	-26.613 ***	-3.647 ***	0.137 ***	3.426 ***
<i>gap</i>	-22.719 **	-3.306 **	0.145 **	4.389 **
<i>exr</i>	-24.853 ***	-3.487 ***	0.140 ***	3.888 ***

Note: \*\*\*, \*\* denote the rejection of null hypothesis at the 99% and 95% level of significance.  
Sources: IFS of IMF

### 2.2.2 Methodology: Policy Reaction Function

The policy reaction function is one of the useful analytical tools to describe monetary policy rules in practices managed by central banks. Its standard specification is that a central bank adjusts the nominal policy interest rate in response to the gaps between expected inflation and output, and their respective targets. It can be interpreted as a more generalized rule of the Taylor rule (see Taylor, 1993) – the simple contemporaneous policy reaction function. The estimable policy reaction functions were presented for the first time by Clarida and Gertler (1997) for the Bundesbank monetary policy, Clarida et al. (1998a) for the US monetary policy, and Clarida et al. (1998b) for monetary policies of two sets countries: the G3 (Germany, Japan, and the US) and the E3 (UK, France, and Italy). Among them, Clarida et al. (1998b) demonstrated the most comprehensive estimation of policy reaction functions. For estimating the G3 monetary policy rules, they took the forward-looking specification as the baseline and the backward-looking function as an alternative for their comparison, and they found that the G3 pursued forward-

<sup>13</sup> Ng and Perron (2001) introduced a new unit root test, which used detrended data and a lag selection procedure that improved on previous methods.

looking rules, responding to anticipated inflation as opposed to lagged inflation. As for the E3 estimation, they added such explanatory terms as German interest rate and exchange rate in their functions, to examine how the constraints of the European Monetary System that collapsed in late 1992 influenced the E3 monetary policy rules.<sup>14</sup>

This study basically applies the methodology of Clarida et al. (1998b) to estimate the policy reaction function for Mongolia during the third quarter of 2007 to the fourth quarter of 2017. The analysis employs both of forward-looking and backward-looking specifications for the estimation, and also includes the exchange rate term as one of the monetary policy determinants, in accordance with the analytical perspectives of the policy rules characterized in emerging market economies as shown in Table 2.1.

The original policy reaction function presented by Clarida et al. (1998b) is shown as the following equation (1).

$$por_t^* = \bar{r} + \beta * (E[\pi_{t+n}|\Omega_t] - \pi^*) + \gamma * (E[y_t|\Omega_t] - y_t^*) \quad (1)$$

where  $por_t^*$  is a target for nominal short-term interest rate;  $\bar{r}$  is the long-run equilibrium nominal interest rate;  $\pi_{t+n}$  is the inflation rate at the period  $t+n$ ;  $y_t$  is the real output,  $\pi^*$  and  $y_t^*$  are respective bliss points for inflation and real output;  $E$  is the expectation operator; and  $\Omega$  is the information available to the central bank at the time when it sets the interest rate.

Equation (1) can be rewritten for empirical specification by defining  $\alpha \equiv \bar{r} - \beta\pi^*$  and  $gap_t \equiv y_t - y_t^*$ , and by replacing the unobserved forecast variables with realized variables as follows.

$$por_t^* = \alpha + \beta * \pi_{t+n} + \gamma * gap_t + \varepsilon_t \quad (2)$$

where  $\varepsilon_t$  is a linear combination of the forecast errors of inflation and real output. Then the equation (2) is modified in accordance with our analytical concerns into the forward-looking specification in equation (3) and the backward-looking specification in equation (4). For the inflation expectations,  $\pi_{t+n}$ , in the forward-looking specification, the study uses the observed

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<sup>14</sup> Since Clarida et al. (1998b), there have been progresses in estimation methodologies of monetary policy rules. Caporale et al. (2018), for instance, proposed to apply an augmented nonlinear Taylor rule to monetary policy rules in emerging countries. This study does not adopt this methodology due to the time-series data constraint.

inflation data based on the assumption of rational expectations, as in the estimation of Clarida et al. (1998b). The equation (3) and (4) also include the exchange rate term,  $exr$ , as follows.

$$por_t^* = \alpha + \beta * \pi_{t+n} + \gamma * gap_t + \delta * exr_t + \varepsilon_t \quad n=1, 2 \text{ and } 3 \quad (3)$$

$$por_t^* = \alpha + \beta * \pi_{t-n} + \gamma * gap_t + \delta * exr_t + \varepsilon_t \quad n=0, 1 \text{ and } 2 \quad (4)$$

The coefficients of  $\beta$ ,  $\gamma$  and  $\delta$  are expected to be positive at the significant level.<sup>15</sup> The magnitude of  $\beta$  is also a critical yardstick: if  $\beta > 1$ , it means that the policy rate reacts to more than inflation rate, thereby the increase in real policy rate adjusting to stabilize inflation in a counter-cyclical way. With  $\beta < 1$ , on the other hand, the decline in the real rate still accommodates inflation in a pro-cyclical manner even if a central bank raises nominal policy rate. According to Clarida et al. (1998b), the  $\beta$  magnitudes of the Bundesbank, the Bank of Japan and the Federal Reserve System in USA are 1.31, 2.04, and 1.79, respectively, all of which are bigger than unity.

The equation (3) and (4) are further modified for obtaining estimable equations since the central bank tends to conduct smooth changes in its policy interest rate in their practices. By assuming that the actual rate partially adjusts to the target as  $por_t = (1 - \rho) * por_t^* + \rho * por_{t-1} + v_t$  where  $\rho$  is the degree of smoothing with  $0 < \rho < 1$  and  $v$  is the disturbance term, equations (3) and (4) can be further rewritten into equation (5) and (6) as follows.

$$por_t = (1 - \rho)\alpha + (1 - \rho)\beta * \pi_{t+n} + (1 - \rho)\gamma * gap_t + (1 - \rho)\delta * exr_t + \rho * r_{t-1} + \varepsilon_t \quad (5)$$

$$por_t = (1 - \rho)\alpha + (1 - \rho)\beta * \pi_{t-n} + (1 - \rho)\gamma * gap_t + (1 - \rho)\delta * exr_t + \rho * r_{t-1} + \varepsilon_t \quad (6)$$

For the technique to estimate the parameter vector  $[\alpha, \beta, \gamma, \delta, \rho]$ , we adopt generalized method of moments (GMM), since the equations above entail endogeneity problem in that the policy interest rate may also affect explanatory variables. The instrumental set includes one-, two- and three-quarter lagged values of inflation rate  $\pi$ , production gap  $gap$ , and exchange rate  $exr$ , in the estimation equation (5) and (6) (See Note 3 in Table 2.4 and Note 2 in Table 2.6). Since the number of the parameters to be estimated is five while the number of the instrumental variables is nine, it implies that there are four over-identifying restrictions to be tested (the degree of freedom is four).

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<sup>15</sup> The coefficient of exchange rate,  $\delta$ , is expected to be positive. The exchange rate here is expressed by national currency per US Dollar, and so the large number represents currency depreciation. In that case, the policy rate should be raised to prevent its depreciation following the “fear of float” argument.

The  $J$ -statistic finally implies that nine instrumental variables are valid in the sense that the over-identifying restrictions cannot be rejected in the models (see again Table 2.4 and 2.6).

### 2.2.3 Estimation Outcome and its Interpretation

Table 2.4 reports the estimation outcomes of policy reaction functions in two kinds of specifications: the forward-looking specification in the equation (5) and the backward-looking specification in the equation (6). Based on the estimated short-term coefficients in the equations of (5) and (6), the long-term coefficients are worked out in the equations of (3) and (4), which are displayed in the lower part of each table.

Table 2.4. Policy Reaction Functions

<i>Forward-looking</i>	$\pi_{t+1}$	$\pi_{t+2}$	$\pi_{t+3}$
$(1-\rho)^*\alpha$	0.288 (0.129)	-2.687 (-0.996)	0.545 (0.329)
$(1-\rho)^*\beta$	0.054 ** (2.278)	0.075 ** (2.458)	0.038 (1.312)
$(1-\rho)^*\gamma$	0.001 (0.100)	-0.005 (-0.228)	0.042 (1.301)
$(1-\rho)^*\delta$	-0.023 ** (-2.721)	-0.022 ** (-2.255)	-0.007 (-0.535)
$\rho$	0.934 *** (5.065)	1.177 *** (5.575)	0.930 *** (7.010)
<i>J-statistics</i>	3.546	2.588	3.846
(p-value)	(0.471)	(0.629)	(0.427)
<i>Long-term Coefficients</i>			
$\alpha$	4.428	-	7.861
$\beta$	0.831 **	-	0.560
$\gamma$	0.027	-	0.607
$\delta$	-0.368 **	-	-0.103

<i>Backward-looking</i>			
	$\pi_t$	$\pi_{t-1}$	$\pi_{t-2}$
$(1-\rho)^*\alpha$	-1.392 (-0.451)	-1.491 (-0.434)	0.669 (0.731)
$(1-\rho)^*\beta$	0.037 (1.493)	0.019 (0.866)	-0.075 ** (-2.493)
$(1-\rho)^*\gamma$	0.002 (0.134)	0.006 (0.290)	-0.023 (-0.722)
$(1-\rho)^*\delta$	-0.038 ** (-2.442)	-0.025 * (-1.887)	-0.031 *** (-4.188)
$\rho$	1.115 *** (4.246)	1.109 *** (3.922)	1.022 *** (11.414)
<i>J-statistics</i>	2.753	5.788	3.499
<i>(p-value)</i>	(0.600)	(0.216)	(0.478)
<i>Long-term Coefficients</i>			
$\alpha$	-	-	-
$\beta$	-	-	-
$\gamma$	-	-	-
$\delta$	-	-	-

Notes:

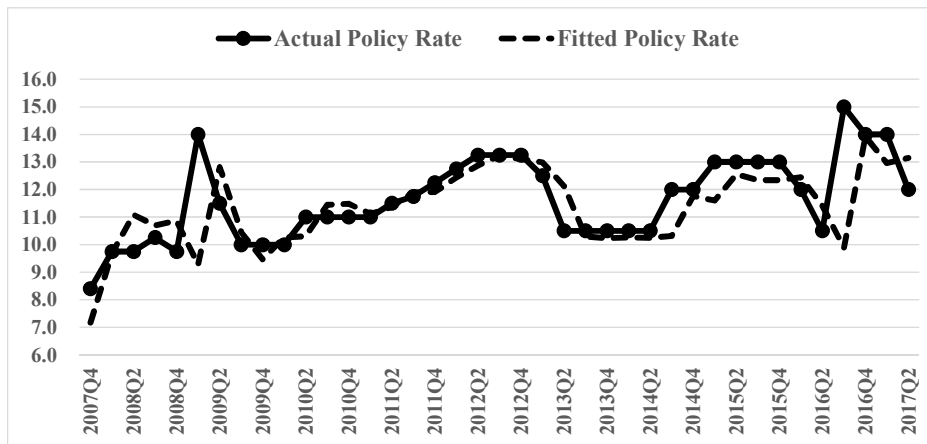
- 1) The sample period is from 2007Q3 to 2017Q4.
- 2) \*\*\*, \*\*, \* denote the rejection of null hypothesis at the 99%, 95% and 90% level of significance. The t-statistic is in parentheses.
- 3) The instrumental variables for the estimations above are three-quarter lagged explanatory variables in the equation (5) and (6): the estimation of the case of  $\pi_t$ , for instance, contains the instrumental variables of  $\pi_{t-1}$ ,  $\pi_{t-2}$ ,  $\pi_{t-3}$ ,  $gap_{t-1}$ ,  $gap_{t-2}$ ,  $gap_{t-3}$ ,  $exr_{t-1}$ ,  $exr_{t-2}$  and  $exr_{t-3}$ .
- 4) The estimations above adopt “HAC (newey-west)” as an estimation weighting matrix and “Iterate Convergence” as a weight updating.

Sources: IFS of IMF

When we focus on the long-term coefficients, it is only in the case of  $\pi_{t+1}$  that the coefficient of inflation rate is positive at the significant level of 95 percent as expected although the coefficient of production gap is insignificant and that of exchange rate is negative, contrary to the expectation; the case of  $\pi_{t+3}$  has no significant coefficients; and the other cases are excluded in the calculation of the long-term coefficients since the degree of smoothing  $\rho$  is beyond unity against the expectation. Thus the case of  $\pi_{t+1}$  (the forward-looking specification with one quarter ahead) could be tentatively a benchmark for the total sample from the third quarter of 2007 to the fourth quarter of 2017 when the BOM has operated the inflation targeting. Figure 2.4 represents the actual and fitted policy rates in this case.



Figure 2.4. Actual and Fitted Policy Rate in Case of  $\pi_{t+1}$



Source: IFS of IMF

As was described in Chapter I, however, the inflation targeting itself has made a progress by introducing the FPAS in 2011 as a forward-looking framework. Suppose that the FPAS came into effect after 2012, the sample can be divided into the first period from the third quarter of 2007 to the fourth quarter of 2011 and the second period from the first quarter of 2012 to the fourth quarter of 2017. The sample division could also be justified statistically by the Chow's breakpoint test to diagnose a breakpoint by the statistics with probabilities for the hypothesis of parameter stability over different periods. Table 2.5 identified the existence of a breakpoint in the first quarter of 2012 in the benchmark case. Thus the estimations for the different periods are justified by the breakpoint of the first quarter of 2012.

Table 2.5. Chow Breakpoint Test

	Breakpoint	Andrews-Fair Wald Stat.	Probability
<i>Benchmark Case of <math>\pi_{t+1}</math></i>	2012Q1	43.660	0.000

Sources: IFS of IMF

Table 2.6 reports again the estimation outcomes of policy reaction functions for the first and second periods on the benchmark case, and Figure 2.5 represents the actual and fitted policy rates in both estimations. The first period estimation of policy reaction function shows no significant coefficients. In the second period estimation, on the other hand, the coefficients of inflation rate

and exchange rate are significantly positive whereas that of production gap is negative<sup>16</sup>; and the magnitude of inflation coefficient,  $\beta$ , is less than unity, 0.444. All in all, among the estimated policy reaction functions, the forward-looking specification with one quarter ahead for the second period seems to be the best illustration of the current monetary policy rule in Mongolia. Regarding the robustness of estimation results above, however, it should be noted that the degree of freedom for the first and second estimations was quite limited considering the number of sample data and of estimation variables, and also that the alternative choice of instrumental variables and estimation methods such as two-stage estimation produced no significant outcomes as policy reaction functions. In this sense, the estimation results in this study are preliminary ones, and they should be updated by cumulative time-series data at a future time.

Table 2.6. Policy Reaction Functions for First and Second Periods

<i>Forward-looking <math>\pi_{t+1}</math></i>	2007Q3-2011Q4	2012Q1-2017Q4
$(1-\rho)*\alpha$	-1.714 (-0.214)	1.026 (0.606)
$(1-\rho)*\beta$	0.064 (0.889)	0.096 *** (4.266)
$(1-\rho)*\gamma$	0.011 (0.217)	-0.100 ** (-2.871)
$(1-\rho)*\delta$	0.0025 (0.069)	0.068 *** (3.773)
$\rho$	1.119 (1.677)	0.783 *** (7.132)
<i>J-statistics</i>	0.403	4.923
<i>(p-value)</i>	(0.982)	(0.295)
<i>Long-term Coefficients</i>		
$\alpha$	-	4.739
$\beta$	-	0.444 ***
$\gamma$	-	-0.465 **
$\delta$	-	0.317 ***

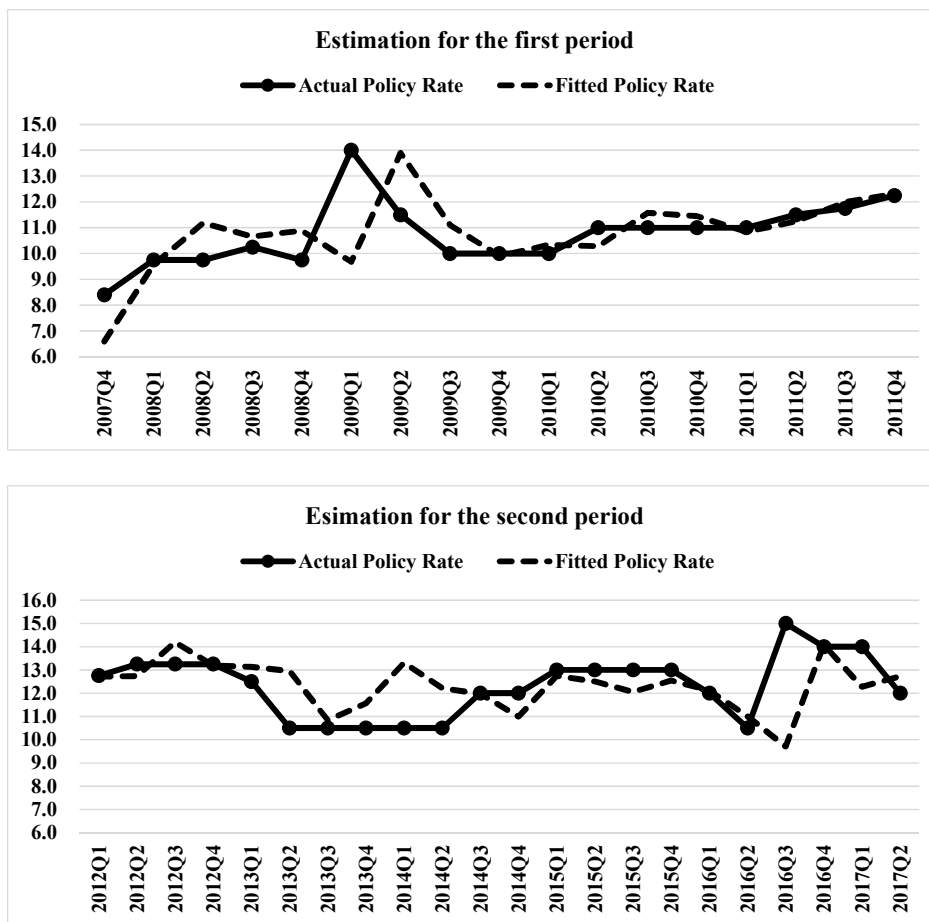
Notes:

- 1) \*\*\*, \*\* denote the rejection of null hypothesis at the 99% and 95% level of significance. The t-statistic is in parentheses.
- 2) The instrumental variables for the estimations above are three-quarter lagged explanatory variables:  $\pi_t$ ,  $\pi_{t-1}$ ,  $\pi_{t-2}$ ,  $gap_{t-1}$ ,  $gap_{t-2}$ ,  $gap_{t-3}$ ,  $exr_{t-1}$ ,  $exr_{t-2}$  and  $exr_{t-3}$ .
- 3) The estimations above adopt “HAC (newey-west)” as an estimation weighting matrix and “Iterate Convergence” as a weight updating.

Sources: IFS of IMF

<sup>16</sup> The policy rate responsiveness to production (or GDP) gap differs according to individual economies without any commonality. Even among G3 in Clarida et al. (1998b), the responsiveness is significant in Germany and Japan, but not in US. In emerging market economies, the responsiveness is significant in Korea by Kim and Park (2006), but not in Thailand by Taguchi and Wanasilp (2018).

Figure 2.5. Actual and Fitted Policy Rate in the First and Second Periods



Source: IFS of IMF

We interpret the estimation results above as follows. First, the current BOM appears to have adopted the inflation-responsive and forward-looking (one quarter ahead) monetary policy rule under its inflation targeting framework. It might reflect the progress in inflation targeting framework toward forward-looking mode by adopting the FPAS since 2011. Second, the current BOM inflation-responsiveness is, however, not powerful enough to stabilize inflation in the sense that the real policy rate tends to be still pro-cyclical to inflation pressure, as is shown in the less-than-unity magnitude of the responsiveness to inflation rate. It should also be noted, however, that the policy rate is not the only instrument but often supplemented by the reserve requirement ratio in Mongolian monetary policy. Third, the Mongolian monetary policy rule is also responsive to exchange rate movement. The policy reaction to exchange rate is typically represented by the fact that the BOM has still kept its policy rate at higher than ten percent even under the inflation rate

below the targeted rate after 2015 to prevent currency value from falling. This kind of exchange-rate reaction, so-called “fear of floating”, tends to sacrifice monetary autonomy by weakening the policy reaction to inflation and output gap. As a matter of fact, the estimation result in this study shows the less-than-unity  $\beta$  magnitude and the negative reaction to production gap.

To sum up, the Mongolian current monetary policy rule under inflation targeting is characterized as inflation-responsive rule with forward-looking manner (one quarter ahead); the inflation responsiveness is, however, weak enough to be pro-cyclical to inflation pressure; and the rule is also responsive to exchange rate due to the “fear of floating”, which weakens the policy reaction to inflation and output gap. In comparison with the policy rules in the other emerging market economies, the position of Mongolian policy rule could be confirmed in the policy rule map in Table 2.1. Mongolian rule is more advanced than China and Indonesia due to its forward-looking mode, while it is less than Korea and Thailand due to its weak responsiveness (not countercyclical reaction). In this sense, Mongolia stands in between a group of Korea and Thailand and that of China and Indonesia, in the sophistication of monetary policy rule.

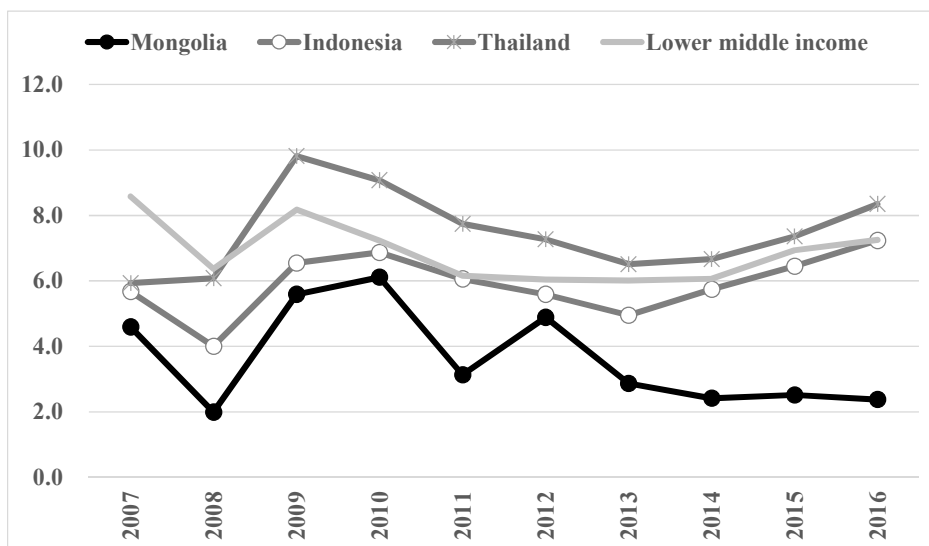
### ***2.3 Policy Suggestions***

The purpose of this section is to provide some strategic policy suggestions to improve monetary autonomy in the Mongolian monetary policy. Although emerging market economies cannot avoid the problem of “fear of floating” perfectly, some economies are keeping their monetary autonomy by allowing exchange rate fluctuations in a similar way to advanced economies. According to Taguchi and Wanasilp (2018), for instance, the Thailand policy reaction function is similar to those of advanced nations in the sense that the Thailand  $\beta$  magnitude is bigger than unity just like advanced economies. The followings are some possible suggestions for Mongolia economy to enhance its monetary autonomy by extracting some lessons from forerunners’ economies.

First, Mongolian economy should have more foreign reserves to cope with foreign capital mobility. There have been several studies to argue that the accumulation of foreign reserves has contributed to retaining monetary autonomy. Aizenman et al. (2010) provided empirical evidence, for instance, that a higher level of foreign reserves enables a country to pursue a higher level of monetary independence even under the constraint of impassible trinity. Taguchi (2011) interpreted

this contribution of foreign reserves as the anchoring role for retaining monetary autonomy in emerging market economies facing the “fear of floating.” Looking at the trend in total reserves in months of imports of Mongolia in comparison with those of Indonesia, Thailand and lower middle incomers in Figure 2.6, Mongolian foreign reserves are far less than the other economies’ ones so that the BOM should sensitively manage its policy rate against foreign capital flights. Hence comes the need to accumulate foreign reserves at least to the average level in lower middle incomers to improve monetary autonomy in Mongolia.

Figure 2.6. Total Reserves in Months of Imports



Source: World Bank Open Data

Second, from the long-term perspective, Mongolian economy should diversify manufacturing industries to maximize the advantage of currency depreciation in export side and to minimize its disadvantage in import side. Currency depreciation, as far as it does not lead to a crisis, push up exports and, this export recovery can be a growth momentum of total economy in case the export activities involve diversified industries in an economy. The depreciation is also not so harmful in import side in case an economy does not depend too much on imports under domestic production capacities enough in diversified industries. Regarding the Mongolian trading items, the exports concentrate on mining products and animal husbandry products, and the imports concentrate on machinery and consumption goods. Looking at the trade indices of Mongolia in comparison with those of Indonesia, Thailand, developing economies and the world in Table 2.7, the Mongolian trade structure shows the highest concentration on a few products by Product

Concentration Indices, and the highest diversification from the world average structure by Product Diversification Indices.<sup>17</sup> The industrial diversification may provide a resilience against currency depreciation so that the BOM care for “fear of floating” can be mitigated and its monetary autonomy can be recovered to some extent.

Table 2.7. Trade Indices

2016 Economies	Product Concentration Indices			Product Diversification Indices		
	Number of products	Exports	Imports	Number of products	Exports	Imports
Mongolia	110	0.401	0.137	214	0.842	0.449
Indonesia	245	0.128	0.065	254	0.549	0.065
Thailand	251	0.073	0.083	255	0.361	0.266
Developing Economies in Asia	260	0.099	0.108	260	0.241	0.202
Developing Economies	260	0.089	0.089	260	0.197	0.159
World	260	0.062	0.065	260	0.000	0.000

Sources: UNCTAD Stat

<sup>17</sup> The Product Concentration Indices are measured by a Herfindahl-Hirschmann Index, and the Product Diversification Indices measure the absolute deviation of the trade structure of a country from world structure. Both indices are retrieved from UNCTAD Stat and are defined in UNCTAD Handbook of Statistics 2016.

## **CHAPTER 3**

### **ANALYSIS OF MONETARY POLICY TRANSMISSION**

This Chapter analyzes the monetary policy transmission mechanism in Mongolia. The Chapter first shows the related literature review with this study's contribution, and then conducts an empirical study.

#### ***3.1 Literature Review and Contribution on Monetary Policy Transmission***

This section reviews previous studies on the monetary policy transmission mechanism and clarifies this paper's contribution. There is a vast literature that has studied the transmission mechanism targeting advanced economies such as the United States and in the euro area economies. Leeper et al. (1998) and Christiano et al. (1999), for instance, reviewed what one has learned from this extensive literature regarding the monetary transmission mechanism in the United States.

As far as developing economies such as Mongolia are concerned, however, there has been rather less evidence on the transmission mechanism due to the relatively shorter history of their policy rate operations and also due to their operational difficulties such as weak institutional capability and underdevelopment of financial market. For the studies on Central Asia, Isakova (2008) investigated the monetary transmission mechanism in Kazakhstan, the Kyrgyz Republic and Tajikistan, by using a vector-autoregressive (VAR) model. The study argued that the transmission of exchange rate pass-through on prices is the strongest channel due to the high degree of dollarization, whereas the interest rate channel to prices and output is limited due to weak financial intermediation, and suggested policy implications such as the needs to deepen local financial sectors and to develop financial intermediation. For Southeast Asia, Taguchi and Kato (2011), focusing on Indonesia, Korea, the Philippines and Thailand, examined the effects of their monetary policy shocks on prices (together with their monetary policy rules) by using a VAR model. They found that Korea took an inflation-responsive and forward-looking policy rule, in which the price response to a policy shock was confirmed, while Indonesia and Thailand conducted backward-looking rules, where the price responses were not identified.

Regarding the Mongolian case, there were several studies published in the series of the BOM research books, but most of them targeted the period before the adoption of policy rate in 2007. Luvsannyam (2004) and Doojav and Borkhuu (2004), for instance, examined the monetary

transmission mechanism for the period under the monetary aggregate targeting framework by using a VAR model, and emphasized the exchange rate channel as the most significant one in the transmission mechanism. The recent study covering the period after the adoption of the policy rate is represented by Bayarsaikhan et al. (2015). This study explored a comprehensive picture of the transmission channels of monetary policy shock to inflation and output for 2002-2015 by adopting a VAR model. Their main findings were as follows: lending rate responded to unexpected monetary policy shock in the first and second quarter after the shock; the response of exchange rate was within the quarter of the shock but it was only significant as ten percent; lending rate and bank credit to private sector could affect both inflation and output with a delay of three and five quarters, respectively. Based on the findings, the study finally suggested that monetary policy should focus on the bank lending channel as transmission mechanism in Mongolian economy.

This study contributes to the reviewed literature above on the assessment of Mongolian monetary policy transmission mechanism as follows. First, this study, by sampling the period from July 2007 to August 2017, reviews fully and exclusively the transmission mechanism of the policy rate under the adoption of the inflation targeting. The previous studies of the transmission mechanism in Mongolia did not focus on the policy-rate transmission under the inflation-targeting period, so that they could not evaluate the inflation targeting itself. Second, this study evaluates the interest rate corridor adopted since February 2013, a critical reformation of the policy rate transmission. Extending the sample period to August 2017 allows the total sample to be divided into the pre-corridor period and the post-corridor period. Comparing the responses of transmission variables to the policy rate shock between the pre-corridor and the post-corridor period makes it possible to assess whether the interest rate corridor has really improved the policy rate transmission effects. Any of studies in the aforementioned literature did not cover this critical period for assessing the interest rate corridor.

### ***3.2 Empirics on Monetary Policy Transmission***

This section conducts the empirical analyses of examining the monetary transmission effects under the inflation targeting in Mongolia for the period from June 2007 to August 2017. To be specific, the sample period is divided into the period before the establishment of interest rate corridor from June 2007 to February 2013 (the pre-corridor period) and the period after it from March 2013 to August 2017 (the post-corridor period). The study then estimates the impulse



responses of transmission variables including inflation rate to the structural policy rate shock by applying the structural vector-autoregressive (SVAR) through imposing the restriction on the model specification for both the pre-corridor and the post-corridor periods, and verifies whether the policy rate transmission mechanism has been really improved to control inflation rate after establishing the interest rate corridor by comparing the estimations for both periods. The section first clarifies theoretical assumptions, data for key variables, methodology for a SVAR model estimation, and outcomes with their interpretations.

### ***3.2.1 Theoretical assumptions and key variables for estimation***

Before conducting model estimations, theoretical assumptions should be clarified as follows. The most important assumption is about the nature of the interaction of the monetary policy shock with the other transmission variables. This study assumes that monetary policy would be exogenous and ordered at the beginning of the SVAR model. This assumption is consistent with the argument of Christiano et al. (1999) that monetary policy shocks are orthogonal to the other variables. As the policy variable, this study adopts the central bank policy rate (denoted by *por*) that the BOM has introduced since July 2007 together with the inflation targeting.

Regarding the other transmission variables, the study focuses on the interest rate channel and the exchange rate one, by considering the current transmission mechanism in Mongolia as described in Section I.3. Under the constraint of limited time-series samples, the study confines estimated variables to the following five key variables for the estimation: interbank market rate (*itr*); long-term lending rate in terms of weighted average (*ldr*); exchange rate in terms of national currency per US dollar in period average, which is expressed as its year-on-year change rate (*exr*); consumer price index, which is also transformed into its year-on-year change rate (*cpi*); and total industrial production, which is processed into its year-on-year change rate (*ind*). Although money supplies are often used for the transmission analyses, this study excludes them, since the impact of money supply on inflation has become ambiguous in Mongolia as described in Section I.1.

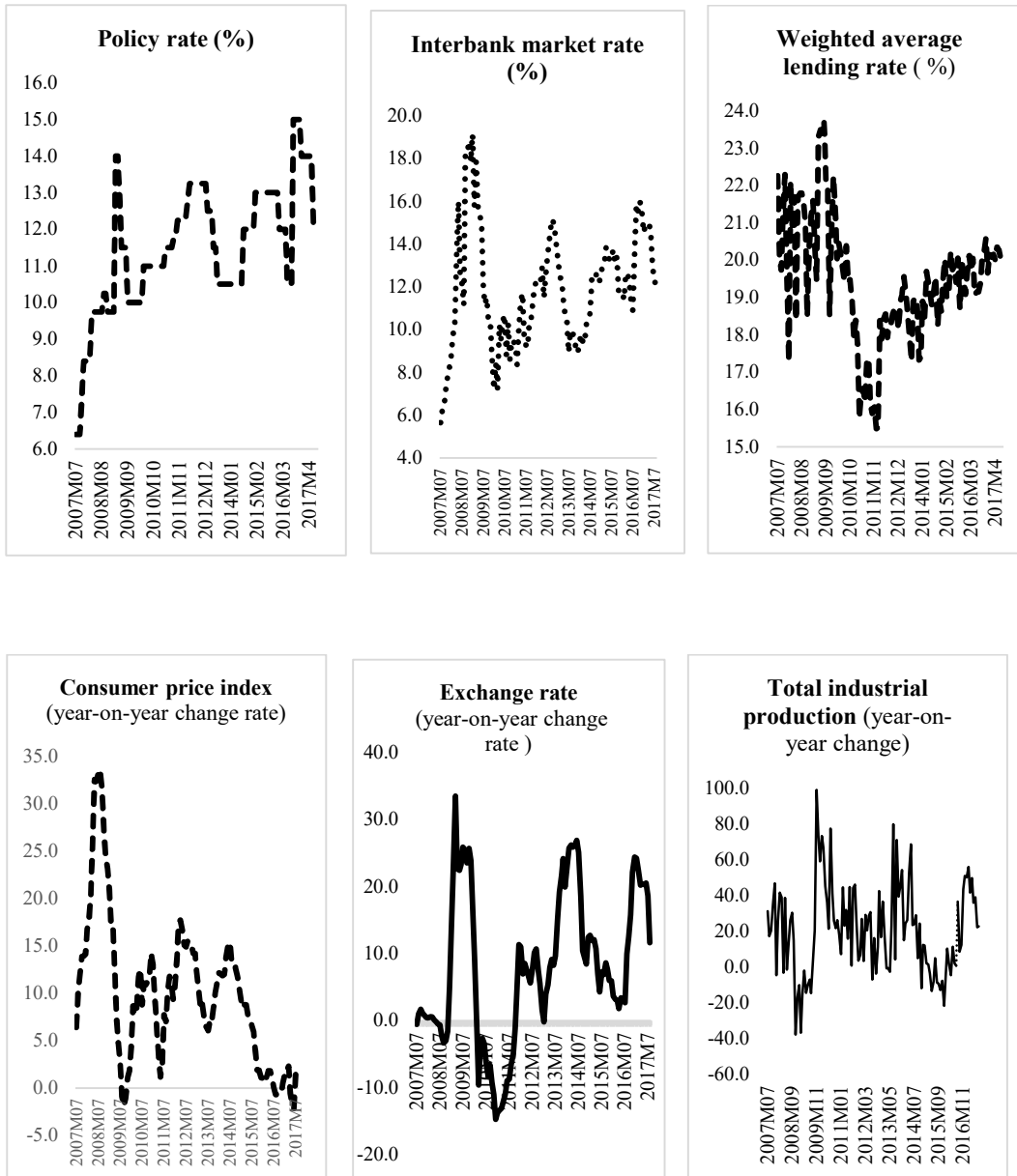
This study then assumes the recursive order in the model estimation as follows: policy rate (*por*), interbank market rate (*itr*), lending rate (*ldr*), exchange rate (*exr*), inflation rate (*cpi*) and industrial production (*ind*). The order is based on the assumption that monetary policy reactions

are transmitted first to money markets represented by interbank market rate, lending rate and exchange rate, and later to real markets shown by inflation rate and industrial production.

As for the data sources for the variables, the data of policy rate, interbank rate, long term lending rate and exchange rate are retrieved from the BOM database, while those of consumer prices and industrial production are from the database of the National Statistical Office (NSO). All the sample data for the estimation are monthly one from June 2007 to August 2017. Figure 2.7 simply displays the overview of key six variables.

From the simple observation in Figure 2.7, there appear to be some positive correlations among central bank policy rate, interbank market rate and long-term lending rate, and some negative ones between consumer price index and those interest rate variables. On the other hand, there seems to be no clear relationship among exchange rate, total industrial production and interest rate variables. To explore a monetary policy transmission, therefore, the variable interactions should be put in a statistical test by applying a breakpoint test between the pre-corridor period and the post-corridor one and by using a SVAR model in the next section.

Figure 2.7: Data of Key Variables



Sources: The database of Bank of Mongolia (BOM), National Statistical Office of Mongolia (NSO)

Before conducting the estimations below, the study investigates the stationary property of the data for each variable, by employing the augmented Dickey-Fuller (ADF) test on the null hypothesis that each variable has a unit root in the test equation including “intercept” (see Said & Dickey, 1984). Table 2.8 reports the test results for the data for all the variables, i.e., policy rate (*por*), interbank market rate (*itr*), lending rate (*ldr*), exchange rate (*exr*), inflation rate (*cpi*), industrial production (*ind*). The test rejected a unit root in all the data at the conventional level of

significance by more than 90 percent, thereby their data showing stationary property. Thus their data are justified to be used for the subsequent estimations.

Table 2.8: ADF Unit Root Test

	t-Statistic	Probability
<i>por</i>	-3.331 **	0.015
<i>itr</i>	-3.206 **	0.022
<i>ldr</i>	-4.318 ***	0.000
<i>exr</i>	-2.691 *	0.078
<i>cpi</i>	-2.792 *	0.062
<i>ind</i>	-5.988 ***	0.000

Source: Author's estimation based on the database of BOM and NSO  
 Note: \*\*\*, \*\*, \* denote rejection of null hypothesis at the 99%, 95% and 90% level of significance, respectively.

### 3.2.2 Methodology for a SVAR Model Estimation

This section conducts a SVAR model estimation to examine the transmission mechanism of monetary policy shocks in the pre-corridor period and in the post-corridor period in Mongolia. The reason why the analysis applies a SVAR model is based on the assumption that the concerned variables should be contemporaneously and dynamically interdependent. In this context, identifying and extracting a pure policy shock requires imposing some restrictions on the model system based on theoretical grounds. As a matter of fact, a SVAR model originated from monetary policy analysis where it has been used extensively to study the transmission of monetary policy shocks, which was pioneered by e.g., Bernanke (1986) and Bernanke and Blinder (1992).

The study starts to specify a reduced-form equation for the VAR estimation in the following way.

$$y_t = \mu + Vy_{t-1} + e_t \quad (7)$$

where  $y_t$  is a column vector of the endogenous variables with year  $t$ , i.e.,  $y_t = (por_t \ itr_t \ ldr_t \ exr_t \ cpi_t \ ind_t)'$  for examining monetary policy transmission effects,  $\mu$  is a constant vector;  $V$  is a coefficient matrix;  $y_{t-1}$  is a vector of the lagged endogenous variables; and  $e_t$  is a vector of the random error terms in the system. Regarding the lag interval, the lag length (-

1) is selected based on Schwarz information criterion with maximum lag being equal to (-2) under the limited number of observations on the divided samples from June 2007 to August 2017.

The total sample is divided into two periods: the one from June 2007 to February 2013 and the other from March 2013 to August 2017, based on the fact that the BOM has adopted an interest rate corridor to enhance monetary policy transmission mechanism since February 2013 as stated in the previous section. The existence of a structural change in the transmission mechanism in February 2013 could be statistically verified by Chow's breakpoint test to diagnose a breakpoint by the F-statistics with probabilities for the hypothesis of parameter stability over different periods for the bilateral combinations of concerned variables, i.e., central bank policy rate and the other five variables. Table 2.9 identified the existence of a breakpoint in February 2013 in all the combinations except the one with industrial production. The analysis thus conducts a model estimation of (7) for the different periods for June 2007 - February 2013 and for March 2013 - August 2017.

Table 2.9: Chow Breakpoint Test in February 2013

	F-Statistic	Probability
<i>por &amp; itr</i>	2.447 *	0.090
<i>por &amp; ldr</i>	10.830 ***	0.000
<i>por &amp; exr</i>	12.074 ***	0.000
<i>por &amp; cpi</i>	11.031 ***	0.000
<i>por &amp; ind</i>	0.005	0.994

Source: Author's estimation based on the database of BOM and NSO  
 Note: \*\*\*, \* denote rejection of null hypothesis at the 99% and 90% level of significance, respectively.

Based on the reduced-form VAR model estimation (7), the study examines the impulse responses of five concerned variables to the shock of central bank policy rate to elucidate its transmission mechanism. In examining the impulse response, the structural policy shock should be identified by imposing some restrictions in the SVAR model specification. In general, to identify structural shocks, there are several approaches to impose the restrictions: short-run restrictions and long-run restrictions. This study, based on the theoretical assumptions described previously, employs the restriction as one of the short-run restrictions, with the following recursive order: policy rate (*por*), interbank market rate (*itr*), lending rate (*ldr*), exchange rate (*exr*), inflation

rate (*cpi*) and industrial production (*ind*). Under the restriction, the error term of reduced-form equation (7) is linked with that of the SVAR model so that the structural policy shock can be identified.

The expected impulse responses of transmission variables to the policy rate shock are as follows: positive responses of interbank market rate (*itr*) and lending rate (*ldr*), and negative responses of exchange rate (*exr*), inflation rate (*cpi*) and industrial production (*ind*).

### 3.2.3 Estimation Outcomes and their Interpretations

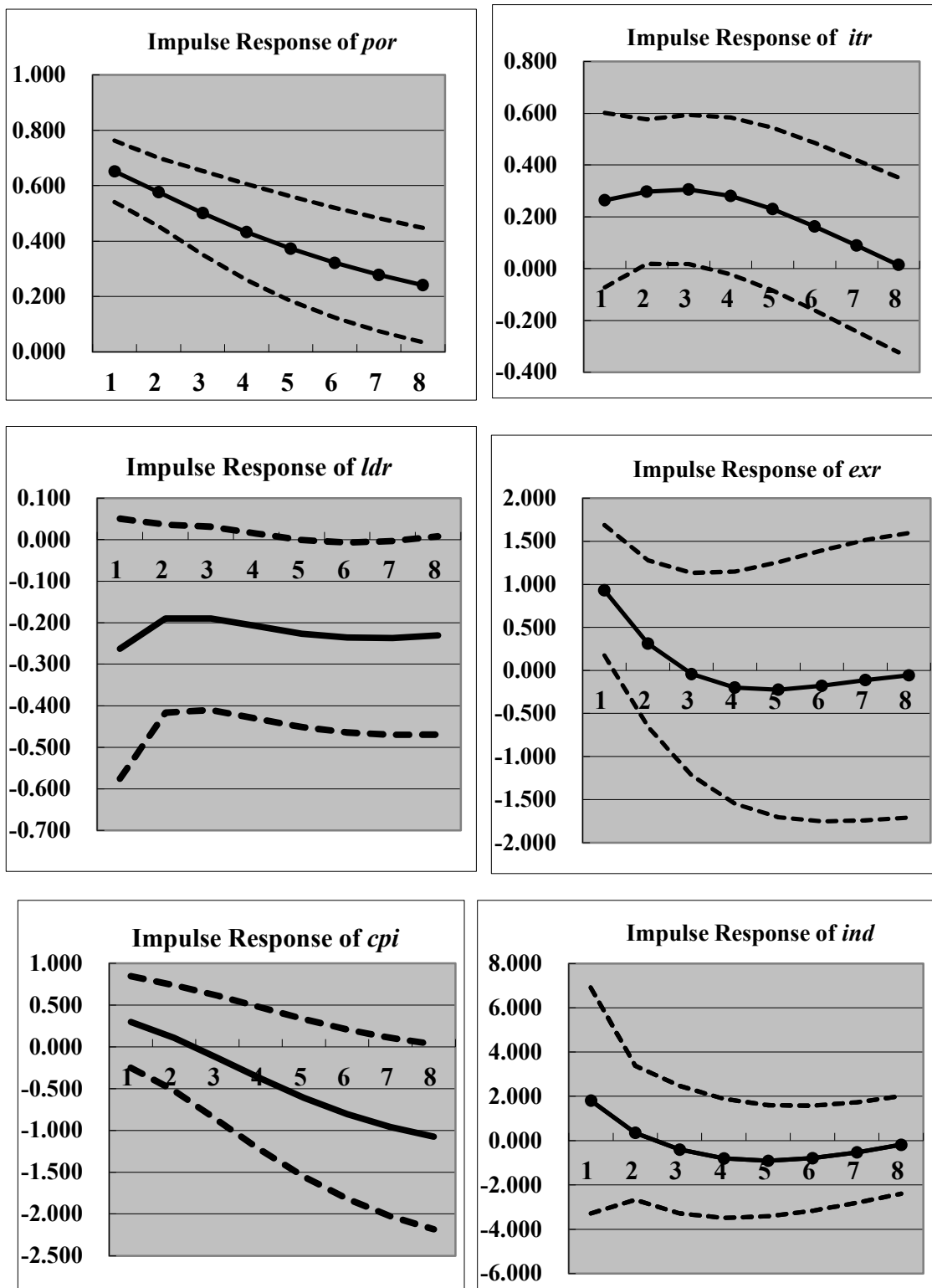
Table 2.10 and Figure 2.8 report the estimation outcomes of the impulse responses of transmission variables to the structural shock of central bank policy rate with 95 percent significant level over eight-month horizon, for the pre-corridor period of June 2007 - February 2013 in Table 2.10.1 and Figure 2.8.1, and for the post-corridor period of March 2013 - August 2017 in Table 2.10.2 and Figure 2.8.2.

Table 2.10.1: Impulse Responses to Policy Rate Shock for Pre-corridor Period

	<i>itr</i>	<i>ldr</i>	<i>exr</i>	<i>cpi</i>	<i>ind</i>
M1	0.264 (0.171)	-0.262 (0.156)	0.930 ** (0.384)	0.298 (0.274)	1.816 (2.587)
M2	0.297 ** (0.141)	-0.190 (0.113)	0.311 (0.490)	0.107 (0.315)	0.358 (1.536)
M3	0.305 ** (0.146)	-0.189 (0.110)	-0.043 (0.596)	-0.132 (0.373)	-0.405 (1.460)
M4	0.280 (0.153)	-0.208 (0.111)	-0.199 (0.684)	-0.379 (0.426)	-0.798 (1.365)
M5	0.229 (0.159)	-0.226 ** (0.112)	-0.224 (0.751)	-0.608 (0.471)	-0.905 (1.274)
M6	0.162 (0.164)	-0.235 ** (0.114)	-0.179 (0.798)	-0.804 (0.506)	-0.793 (1.203)
M7	0.088 (0.167)	-0.236 ** (0.116)	-0.113 (0.826)	-0.960 (0.533)	-0.533 (1.152)
M8	0.014 (0.171)	-0.230 (0.119)	-0.057 (0.838)	-1.075 (0.553)	-0.192 (1.119)

Source: Author's estimation based on the database of BOM and NSO  
 Note: \*\* denotes rejection of null hypothesis at the 95% level of significance. The numbers in parentheses are for standard errors.

Figure 2.8.1: Impulse Responses of Pre-corridor Period



Source: Author's estimation based on the database of BOM and NSO

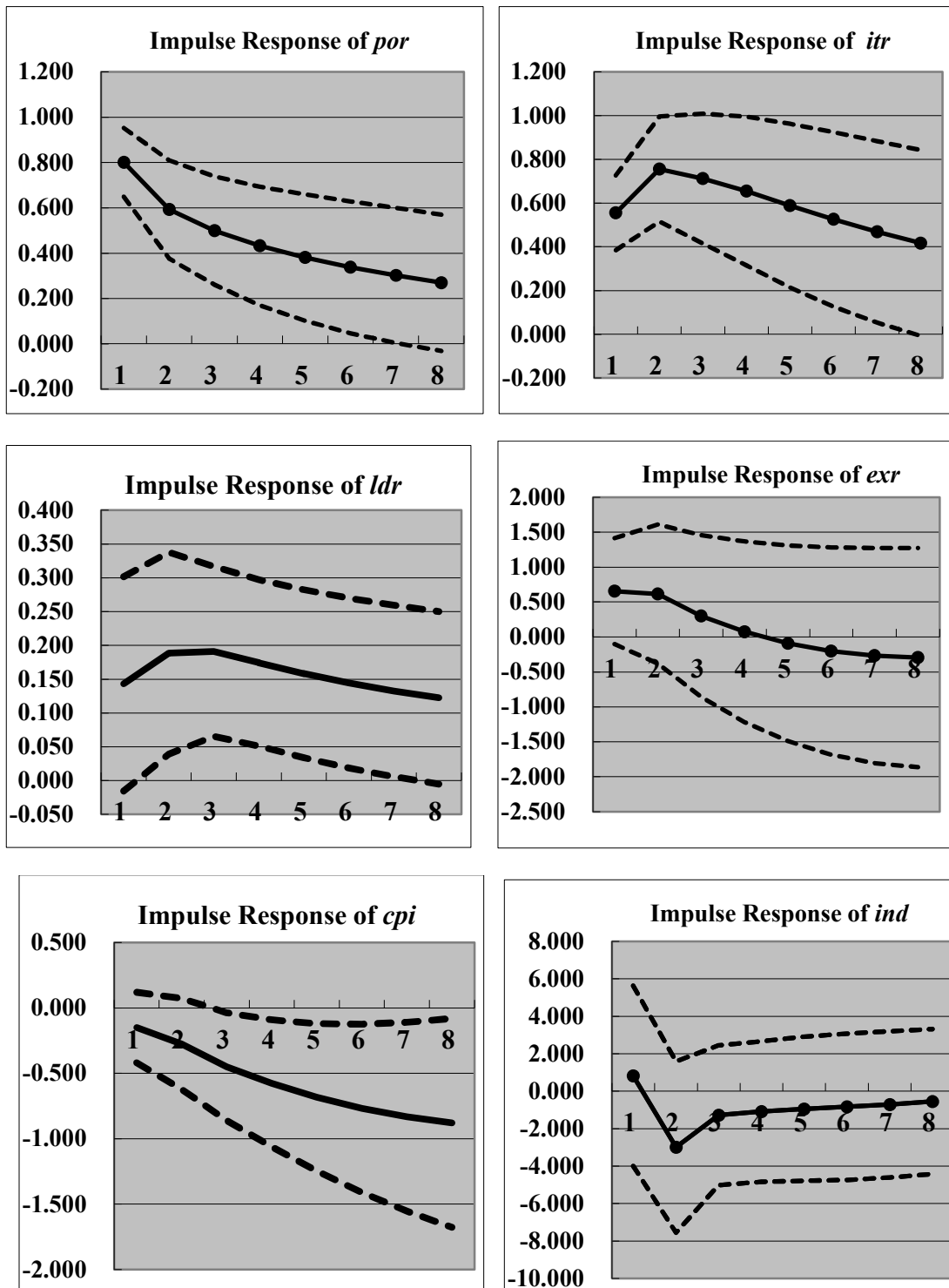
Table 2.10.2: Impulse Responses to Policy Rate Shock for Post- corridor Period

	<i>itr</i>	<i>ldr</i>	<i>exr</i>	<i>cpi</i>	<i>ind</i>
M1	0.555 ** (0.086)	0.142 (0.079)	0.655 (0.384)	-0.149 (0.134)	0.820 (2.445)
M2	0.755 ** (0.121)	0.188 ** (0.074)	0.613 (0.505)	-0.274 (0.173)	-2.981 (2.320)
M3	0.712 ** (0.150)	0.191 ** (0.062)	0.298 (0.587)	-0.448 ** (0.205)	-1.282 (1.895)
M4	0.655 ** (0.172)	0.174 ** (0.061)	0.073 (0.655)	-0.576 ** (0.242)	-1.091 (1.906)
M5	0.588 ** (0.189)	0.158 ** (0.062)	-0.091 (0.710)	-0.682 ** (0.281)	-0.935 (1.955)
M6	0.525 ** (0.202)	0.144 ** (0.062)	-0.201 (0.752)	-0.767 ** (0.321)	-0.830 (1.981)
M7	0.468 ** (0.210)	0.132 ** (0.063)	-0.265 (0.781)	-0.831 ** (0.360)	-0.703 (1.983)
M8	0.417 (0.215)	0.122 (0.063)	-0.294 (0.796)	-0.878 ** (0.398)	-0.550 (1.961)

Source: Author's estimation based on the database of BOM and NSO  
 Note: \*\* denotes rejection of null hypothesis at the 95% level of significance. The numbers in parentheses are for standard errors.



Figure 2.8.2: Impulse Responses of Post- corridor Period



Source: Author's estimation based on the database of BOM and NSO

Regarding the impulse responses for the pre-corridor period in Table 2.10.1, it is only interbank market rate (*itr*) that shows the expected responses: the interbank market rate responds positively to the policy rate shock at 95 percent significant level in 2<sup>nd</sup> to 3<sup>rd</sup> months after the shock. The lending rate (*ldr*) and the exchange rate (*exr*) shows even the opposite responses from our expectation, while the inflation rate (*cpi*) and the industrial production (*ind*) represent no significant responses.

As for the impulse responses for the post-corridor period in Table 2.10.2, three transmission variables of interbank market rate, lending rate and inflation rate clearly indicate the expected responses: the interbank market rate and the lending rate respond positively to the policy rate shock at significant level in 1<sup>st</sup> (or 2<sup>nd</sup>) to 7<sup>th</sup> months after the shock; the inflation rate responds negatively to the shock in 3<sup>rd</sup> to 8<sup>th</sup> months after the shock. The exchange rate and the industrial production, on the other hand, reveal no significant responses. Another estimation of the impulse responses was conducted by changing the critical recursive order between *cpi* and *ind*, and the same results were obtained for the pre- and post-corridor periods. Thus the estimation outcomes assured their robustness in this context.

The estimation outcomes above could be interpreted as follows. First, there is a clear contrast in the responses of the transmission variables of lending rate and inflation rate between the pre-corridor period and the post-corridor one as shown in Figure 2.8.1 and 2.8.2. The post-corridor estimation demonstrates that the effect of policy rate is clearly transmitted to the lending rate and inflation rate through the longer responses of interbank market rate, whereas the pre-corridor one does not represent any significant transmission effects to their variables. This outcomes implies that the framework of the interest rate corridor the BOM has adopted since February 2013 has contributed successfully to enhancing monetary policy transmission mechanism, in particular, in controlling inflation rate. This is rather a new finding after the adoption of the interest rate corridor, which has not been studied previously in the existing literature.

Second, it should be noted that the responses of exchange rate and industrial production to the policy rate shock are still not significant even after the adoption of the interest rate corridor. This result is rather different from the outcomes of previous studies: Luvsannyam (2004) and Doojav and Borkhuu (2004) emphasized the exchange rate channel in the monetary policy transmission mechanism, and Bayarsaikhan et al. (2015) identified the effect of monetary policy

on both inflation and output. The background of the insignificance of exchange rate and industrial production seems to lie in the fact that the BOM has still kept its policy rate at rather high level, more than ten percent, even after the inflation rate was slowing down to around two percent in 2015 and 2016, with the intention to prevent Mongolian currency value from depreciating rapidly. The policy rate sticky to its double-digit rate to stabilize the exchange rate even after 2015, so-called a “fear of floating”, might lose the sensitivity of exchange rate and output in the Mongolian economy.

## **SUMMARY**

The Part II reviewed the monetary policy rule and its transmission mechanism in Mongolia under the inflation targeting framework since its adoption in 2007.

The first empirical analysis in Chapter 2 estimated the policy reaction function to see if the inflation targeting has been linked with a monetary policy rule emphasizing on inflation stabilization. The study contributed to the literature by examining the linkage between Mongolian monetary policy rule and inflation targeting directly and thoroughly for the first time and also by taking into account a recent progress in the inflation targeting framework toward forward-looking mode since 2012.

The main findings through the estimation outcomes of policy reaction functions were as follows. First, the Mongolian current monetary policy rule under inflation targeting is characterized as inflation-responsive rule with forward-looking manner (one quarter ahead). It might reflect the progress in inflation targeting framework toward forward-looking mode by adopting the FPAS since 2011. Second, the inflation-responsiveness is, however, not powerful enough to stabilize inflation in the sense that the real policy rate tends to be still pro-cyclical to inflation pressure. It would be quite different from the monetary policy reactions of advanced economies. Third, the Mongolian monetary policy rule is also responsive to exchange rate movement, due to the “fear of floating”. The policy reaction to exchange rate is typically represented by the fact that the BOM has still kept its policy rate at higher than ten percent even under the inflation rate below the targeted rate after 2015 to prevent currency value from falling. The “fear of floating” might weaken the policy reaction to inflation and output gap. The strategic policy implication to enhance monetary autonomy in the Mongolian monetary policy would be the

serious necessities to have more foreign reserves to cope with foreign capital mobility and to diversify manufacturing industries to acquire a resilience against currency depreciation in the long run.

The second empirical analysis in Chapter 3 examined the monetary policy transmission mechanism under the inflation targeting in Mongolia by applying a structural vector-autoregressive model. Under the inflation targeting framework, the BOM has introduced the policy rate since July 2007, and has established the interest rate corridor since February 2013, for the purpose of improving the interest rate channel of the transmission mechanism. The study then contributed to the literature by assessing whether the interest rate corridor has really improved the policy rate transmission effects by comparing the effects between the pre-corridor and the post-corridor period.

The main findings of this study were as follows. First, there is a clear contrast in the responses of the lending rate and inflation rate to the policy rate shock between the pre-corridor period and the post-corridor one: in the post-corridor period the effect of policy rate is clearly transmitted to the lending rate and inflation rate through the longer responses of interbank market rate, whereas the pre-corridor period does not represent any significant interest rate transmission effects. This outcome implies that the framework of the interest rate corridor has contributed successfully to enhancing monetary policy transmission mechanism, in particular, in controlling inflation rate. Second, the responses of exchange rate and industrial production to the policy rate shock are not significant even after the adoption of the interest rate corridor. This insignificance might come from the sticky policy rate to stabilize the exchange rate, so-called a “fear of floating”.

## CONCLUSION

This dissertation aimed to examine the monetary policy rule and its macro-economic performance in Mongolia. The Part I investigated the history of the Mongolian monetary policy in relation with its macro-economic conditions during 1990-2016. The Part II focused on empirical studies of the monetary policy rule and its transmission mechanism under the inflation targeting framework since its adoption in 2007.

The conclusion throughout the Part I and II is that the Mongolian monetary policy has shown steady progresses in its framework by adopting an inflation targeting and improving its operations; there have been still a serious problem, however, in its management in the sense that the “fear of floating” has prevented its policy rule from working effectively; therefore, the enrichment of foreign reserves in the short-run and the diversification of industries in the long-run should be recommended to enhance the monetary autonomy of Mongolia.

There are still remaining analytical issues to be addressed for future research as follows. First, the study should consider the difference in monetary policy reactions between under normal times and under crisis times. In this dissertation, the single policy reaction function was applied to examine Mongolian monetary policy rule regardless of its surrounding economic conditions, due to the constraint of sample data’s length. The crisis times have, however, forced the BOM to adopt an abnormal policy action: the BOM raised its policy rate in March 2009 at the time of global financial crisis and in August 2016 at the time of possible capital outflows from Mongolia, although the inflation rates were below its targeted rates, in order to avoid the capital flight and the rapid currency depreciation. The ordinary monetary policy rule should be estimated by excluding these extraordinary policy actions at the crisis times. For this purpose, the study should adopt a kind of a regime-switching model such as the Markov-switching model, to divide the estimations of monetary policy functions into those under different regimes, when it becomes possible to obtain time-series data sufficient to conduct the model estimation.

Second, the study should take into account some interactions between monetary policy and fiscal policy. At first, the fiscal expansion such as the cash handout to the public from the specific government fund during 2010-2013 might give some negative influences on monetary policy transmission mechanism. In the second place, the fiscal policy responses to serious capital inflows

and outflows might also affect the BOM monetary policy stances. As matter of fact, Mongolia established a fund to insulate the budget from volatile resource revenues. The Parliament of Mongolia approved the Fiscal Stability Law (FSL) in 2010 for running countercyclical fiscal policy and for offsetting the long-term adverse effects of commodity price volatility. The FSL spells out the vital fiscal rules that the structural budget deficit shall not exceed 2% of the GDP. Furthermore, by the FSL, the Government of Mongolia founded the “Fiscal Stabilization Fund” in 2010 for accumulating excess revenue from the mining sector. The fund accumulated the revenue assets to 430 billion MNT (2% of GDP) by 2013, and used them in accordance with the sharp decline in commodity prices in 2014. The establishment and operation of the fiscal stabilization fund as well as fiscal policy stances might also affect the monetary policy rule and its transmission mechanism.

Third, the monetary policy in Mongolia might require the advanced consideration to care about asset prices such as housing, land and stock prices. Asset prices have become a serious target of macroeconomic policies in emerging market economies as well as advanced economies. In particular, it has been a critical concern for policy makers and academic circles to prevent and address the boom-bust cycle of asset bubbles. The 2008 global financial crisis was a typical example of the product of asset bubbles in the United States. Most of emerging market economies have also experienced some large fluctuations in its property prices and stock prices during the recent decades. The boom-bust cycle of asset bubbles in emerging market economies have often been accompanied with massive foreign capital movements there. Large capital inflows may lead to excessive foreign borrowing, possibly fueling domestic credit booms and asset bubbles. Once capital flows reverse suddenly, however, a boom stage of credit expansion and asset price hikes may be turned into a bust stage, and the economies may finally suffer from serious financial and economic crisis. Mongolia is not an exception in that the fluctuation of the housing prices have sometimes tended to be strongly correlated with the volatile capital flows, and to incur the systemic risk in the financial sectors. In that case, the BOM monetary policy has introduced several “macro-prudential”<sup>18</sup> measures that prevent pro-cyclical and market risks by managing the excessive short-term liquidity and by mitigating its negative impacts on domestic banking system. The examples have been the increase in the liquidity ratio (18% to 25% in 2011), the increase in the capital adequacy ratio (12% to 14%

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<sup>18</sup> See Appendix 1 in more details

for 5 systemic banks) and the setting of a reserve requirement on all deposits. The asset price management including the “macro-prudential” measures could be a serious target of empirical studies to evaluate the BOM monetary policy framework.

## Appendix 1 Macro-prudential policy measures<sup>19</sup>

The main objective of macro-prudential policy is to ensure financial sector stability. With continuously expansive fiscal policy alongside high capital inflow it is more efficient for our country to take counter-cyclical monetary policy measures along with macro-prudential measures. Therefore, due to symptoms of economic overheating and increasing speed of credit growth, the Bank of Mongolia decided to implement a macro-prudential policy directed at the credit cycle and took policy measures to select an instrument directed at anchoring the speed of credit growth with minimum pressure on financial intermediaries and maximum results. In 2011, within the framework of macro-prudential policy, the Bank of Mongolia took the following measures to prevent economic overheating and to minimize overheating symptoms:

- Tightened the monetary policy in a counter cyclical way twice in February and August of 2011, increased statutory reserve requirement twice by a total of 6 percentage points, 4 and 2 percentage points respectively. This measure, based on the economic outlook and its main indicators, was beneficial in slowing down expected credit growth, increasing liquidity during economic downturn, to create certain reserves during economic expansion and meeting monetary policy objectives.
- Set the liquidity ratio (number of liquid assets to overall assets) for banks in November 2011 and then raised this ratio by 7 percentage points up to 25 percent starting from the January 1, 2012.
- In December 2011 to raise the first tier capital and risk weighted asset ratios up to 7 percent starting from June 30, 2012, up to 8 percent from December 31, 2012, and up to 9 percent from June 30, 2013. Furthermore, it was decided that banks which have contributed to more than 5 percent of assets of the banking system for the last 6 months shall be set an additional capital adequacy ratio (amount of capital a bank retains compared to its risk) semi-annually of 0.5 percent, 1 percent and 2 percent, respectively until June 30, 2013 and the total capital, risk weighted assets ratio was increased to 14 percent.

The overall aim of macro-prudential policy is financial stability and as for Mongolia, where banks dominate the financial sector, the banking system's stability is of high priority. Therefore, in order to strengthen banking sector capacity, the decision to raise banks' liquidity ratio and equity ratio during economic expansion was one of the measures of macro-prudential policy.

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<sup>19</sup> The Macro-prudential policy is described in the Annual Report 2011 of BOM



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