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Abstract From being one of the poorest nations in Europe to becoming one of the most successful economies in the West, the geographically isolated country of Iceland suffered a lot when its three major banks collapsed in the same week in October 2008. As a consequence of the banking crisis, Iceland entered a deep recession and deep cuts in employment were made and the exchange rate dropped sharply which caused the inflation to soar. The Central Bank of Iceland has been criticized for its monetary policy in the past and how it handled the collapse. This thesis is intended to examine the monetary policy in Iceland and how the Central Bank handled the collapse and to look into the causes that made the financial crisis to be so severe.

Keywords: Iceland, Financial Crisis, Monetary Policy, Central Bank, Inflation. 2

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Iceland went from being one of the poorest nations in Europe to becoming one of the most successful economies in the West. This was underlined when Iceland was judged the best place to live in the world by the United Nations in November 2007 (Pierce 2008). After a period of prosperity Iceland suffered a lot when its three major banks collapsed in the same week in October 2008. The collapse is related to the global financial crisis, but it seems the recession will be deeper in Iceland than in other European countries. In the OECD Economic Survey on Iceland it is stated: " It appears that the Icelandic financial supervisory authorities had become overwhelmed by the complexity of the national banking system, and had been unable to stop their expansion. By the end, the size of the banks far exceeded the limited capacity of the Icelandic authorities to rescue them. " (OECD 2009: 9). As a consequence of the crisis, Iceland entered a deep recession and deep cuts in employment and working time were made. Unemployment rate rose from 2. 5 percent in the third quarter of 2008 to 7. 1 percent by the first quarter of 2009. There was also a sharp drop in the exchange rate of the Icelandic krona (ISK), which caused inflation to soar, although it had slowed to 11. 6 percent by May 2009. Wages adjusted quickly to the crisis, falling by 6. 75 percent in real terms in the year to April 2009. The projected unemployment rate is expected to rise to a peak of 10 percent in 2010 while inflation should fall to around 2. 5 percent (OECD 2009). Iceland is now moving towards economic recovery with multilateral assistance from the International

Monetary Fund (IMF). The Icelandic banking sector had big impact on the economy when it was deregulated and privatized in the 1990s and early 2000s. At that time, the newly privatized banks had easy access to foreign capital at a low cost. The banking sector grew enormously after the privatization. The balance sheet of the three largest banks was nine-fold the country's annual GDP at the end of 2007, a big change from year 2004 when they were roughly equal to one year's GDP. This expansion was almost entirely driven by foreign borrowing (Danielsson & Zoega 2009a). At the end of July 2008, the size of the banking sector's debt was 850 percent of the national GDP and 73 percent of the debt was foreign (Euroweek 2008).<sup>6</sup> The monetary policy in Iceland also contributed to the crisis. Since inflation targeting was adopted in 2001, which failed in lowering inflation, the interest rate has been rising. The high interest rate motivated households and firms to borrow in foreign currency and attracted foreign carry traders. The inflow of foreign capital is not publicly known, but it appears to have exceeded 50 percent of GDP, and it is unclear why this did not raise concerns with the authorities (Danielsson & Zoega 2009a). Iceland's external liabilities swamped the Central Bank's ability to act as lender of last resort. The Icelandic economy was hit hard by the financial crisis when its three major banks collapsed in the same week in October 2008. The Central Bank of Iceland has been criticized for its monetary policy and how it handled the collapse. This critic attracted the attention of the authors of this thesis and therefore it is relevant to examine the monetary policy in Iceland and how the Central Bank handled the collapse. We also felt it was of interest to try to understand causes and consequences of changes

in the quantity of money in the economy. The authors seek to answer the following questions in this thesis: i, ii, iii, What efforts has the Central Bank of Iceland made to promote price- and financial stability? How did the Central Bank of Iceland handle the collapse? What caused the financial crisis to be so severe in Iceland? The development of the Icelandic financial system has reflected the political and economic evolution of the country from a poor dependency of the Danish Crown into a modern high-income republic. The first Icelandic bank, Landsbanki Áslands (National Bank of Iceland), was established in 1885 and it received as capital a small issue of treasury notes, which were freely convertible into Danish crowns. After World War I, monetary policy was not an active part in the management of the Icelandic economy and Landsbanki had the sole right to issue notes since 1927. In 1957 a note-issue department was given separate management and in 1961, the fully autonomous, Central Bank of Iceland was created out of Landsbanki's central banking department. Traditional central banking functions, including the sole right to issue notes and coins and manage the foreign exchange reserves, was assigned to the Central Bank, and it acted as a banker to the government and was for a period allowed to grant short-term credit to the Treasury. The Central Bank was also given power to regulate interest rates and also to influence the liquidity of the banking system through short-term lending and by requiring the banks to hold blocked reserves with the Central Bank. Although the Central Bank was formally independent, it was required by law to support the economic policy of the government which means that it could not make major changes in, for example, interest rates or reserve requirements, if these were objected by



the government. In 1984 a radical change in the monetary policy took place, when the first steps were taken to deregulate interest rates. In 1986, when the Central Bank Act was revised, the Bank's powers to regulate the interest rates of commercial banks and saving banks were abolished (Central Bank of Iceland 2002a). This thesis will put emphasis on roles and objectives of central banks. The thesis starts by explaining the major macroeconomic theories, which are relevant for this topic. The thesis goes further on clarifying the roles and objectives of central banks in general, and how they use their monetary tools to keep the economy stable. Consequently, actions of the Central Bank of Iceland will be discussed and related to the theories. Then the collapse of the Icelandic financial system in October 2008 will be discussed and related to the actions of the Central Bank. Furthermore, the authors discuss efforts made in the economic recovery and the future prospects of the Icelandic economy. In the end there will be a conclusion, which will act as a summary of our findings.

## 2. 0 Theoretical Framework

The following chapter will introduce some basic macroeconomic theories that are suitable for the research topic in attempt to understand the causes and consequences of short-run and medium-run fluctuations in the national economy. The theories will be briefly explained and simplified to make it easier to relate them to the subject of Icelandic monetary policy.

### 8 2. 1 Quantity Theory of Money

The amount of money available in an economy is controlled by the central bank and is called money supply. In practice, central banks use open market operations; purchase and sell government bonds from the public, to increase or decrease the amount of money in circulation in the economy. The demand for money depends on the sum of

monetary assets, such as cash and bank and other cheque accounts that people want to hold in their portfolios (Abel, Bernanke, McNabb 1998). Alfred Marshall and Irving Fisher formalized the quantity theory of money nearly a hundred years ago. " The quantity theory of money predicts that an increase in the supply of money will cause a proportional increase in the price level. " (Gwartney, Macpherson, Sobel, Stroup 2006: 311). The quantity theory of money describes that if there is a permanent increase in nominal money growth of, say, 10 percent, it is eventually reflected in a 10 percent increase in the inflation rate and a 10 percent increase in the nominal interest rate — leaving the real interest rate unchanged. The result that, in the medium-run, the nominal interest rate increases one for one with inflation is known as the Fisher effect, after Irving Fisher (Blanchard 2006). In Figure 1 it can be seen how the interest rate is determined, where the money supply and the money demand is in equilibrium. Figure 1: Quantity Theory of Money Source: Blanchard 2006. 1 Interest rates expressed in terms of a basket of goods is called real interest rates (Blanchard 2006). 9 The negative slope of the money demand curve reflects the effect of the opportunity cost of holding money, given the level of economic activity and the cost of converting funds. If we assume that the real GDP<sup>2</sup> and transaction costs are to remain unaffected, the demand curve does not shift. An increase in the real money supply<sup>3</sup> lowers the nominal interest rate and a decline in interest rate induces a higher demand to match the higher supply. This is a good example to illustrate the power of a central bank to influence the interest rates. The demand curve can shift when there is a change in real GDP, for example if the real GDP increases the money demand will increase as well and the

demand curve will shift to the right. If the real money supply stays the same, the interest rate must rise until the increased demand is entirely offset by the higher opportunity cost of holding money. This is why interest rates are often pro-cyclical, rising in booms and declining in recessions (Burda & Wyplosz 1997).

2. 2 IS-LM Relation A nation's economic performance depends heavily on macroeconomic policies. The two major types of macroeconomic policies are fiscal policy and monetary policy. Abel, Bernanke and McNabb describe macroeconomic policies in their book *Macroeconomics* as following: " Fiscal policy, which is determined at the national and local levels, concerns governments spending and taxation. Monetary policy affects short term interest rate and rate of growth of a nation's money supply and is under the control of a government institution known as the central bank. " (Abel et al. 1998: 12-13). The IS-LM model shows the relation between these two policies and how they may influence each other, but it is important to keep in mind that they may not be independent of each other. The model has been widely applied in analyses of cyclical fluctuations and macroeconomic policy, and in forecasting. To explain the fundamentals of the IS-LM relation in the simplest way, we assume that the economy is closed (Abel et al. 1998).

2 Real GDP is constructed as the sum of the quantities produced in an economy times constant price in a base year (Blanchard 2006).

3 Real money supply is money in terms of goods,  $M/P$  (Blanchard 2006).

10 Figure 2: IS-LM Relation

Source: Blanchard 2006. Along the IS curve, the goods market is in equilibrium, and along the LM curve the money market is in equilibrium; therefore, for both markets to be in equilibrium, the system must be on both

curves, which only occurs at the intersection of the curves. The LM curve shows the relationship between the real interest rate and the level of output that arises in the market for real money balance. The LM curve is drawn for a given supply of real money balances and is upward sloping because higher output raises money demand, and therefore raises the real interest that clears the asset market. Decrease in the supply of real money balances shifts the LM curve upward, which leads to a higher interest rate that stimulates savings. On the other hand, increase in the supply of real money balances shifts the LM curve downward which leads to a lower interest rate which stimulates investments. Blanchard made the assumption that people and firms do not revise their expectations of inflation immediately, which means that the IS curve does not shift. Instead the economy moves down the IS curve and the equilibrium moves from  $Y_1$  to  $Y_3$  as illustrated on Figure 2. This results in higher output and lower nominal interest rate (Mankiw 1997; Abel et al. 1998; Blanchard 2006). The IS curve shows the relationship between the interest rate and the level of output that arises from the market for goods and services. The IS curve is drawn for a given fiscal policy and is downward sloping because higher output raises savings, and leads to a lower market-clearing interest rate. Changes in fiscal policy that raise the demand for goods and services shift the IS curve to the right which leads to expansion in the economy. Changes in fiscal policy that reduce the demand for goods and service shift the IS curve to the left which leads to contraction in the economy (Mankiw 1997; Abel et al. 1998). Although the IS-LM model is a fundamental model in macroeconomics it has its limitations. If the model is meant as long-run, then its prediction that equilibrium can exist

at any level of output is very controversial. If the model is used as a short-run model it is also severely limited because it does not incorporate the rate of expected inflation because expected inflation creates a difference between real and nominal interest rates. Although this model has serious weaknesses, there is no other model that gives as much insight in macroeconomic thinking (Schenk 2007). The IS-LM model for an open economy is similar to the model for a closed economy. The main difference is that in the open economy IS-LM model, factors (other than output or the real interest rate) that increase a country's net export cause the IS curve to shift up. Economic shocks and policy changes are transmitted from one country to another by changes in the net exports, which lead to IS curve shifts. If we assume that a floating exchange rate regime is in use, it would indicate that the domestic interest rate must be equal to the world real interest rate, where the interest rate is helping to equilibrate the goods market and the money market (Abel et al. 1998).

### 2.3 AS-AD Relation

Another perspective on analysis of the effects of various shocks on the economy is to use the aggregated supply-aggregated demand (AS-AD) model. The IS-LM model shows the relation between real interest rates to output, but the AD-AS model relates the price level to output. Although the choice of the IS-LM framework or the AD-AS framework is a matter of convenience, the two models express the same basic macroeconomic theory. The aggregate supply curve shows the relation between the price level and the aggregate amount of output that firms supply. Blanchard assumes that when the AD curve shifts to the right, both output and price level will increase in the short-run. In the medium-run, when the adjustments

of price expectations come into play, as output is higher than natural level of output, the price level is higher than wage setters expected. When the wage setters revise their expectations, the AS curve shifts up over time and stops when output has returned to natural level. The aggregate demand curve slopes downward because an increase in the price level reduces the aggregate quantity of output demanded (Blanchard 2006). Figure 3 illustrates how a monetary expansion leads to a shift in the AD curve and increases output in the short run but has no effect on output in the medium-run because the AS curve shifts upwards until output reaches its natural level. Figure 3: AS-AD Relation Source: Blanchard 2006. Outputs in economies are constantly changing, and where any factor that changes the aggregate demand for output will cause the AD curve to shift, Olivier Blanchard goes through four underlying steps to explain the relation between output and price level. The first step is that, when there is an increase in output, e. g. tax reduction, it will lead to an increase in employment because the demand for workers will rise with growing output. The second step is that increase in employment leads to decrease in unemployment and, therefore, to a decrease in the unemployment rate. The third step is that due to lower unemployment rates, the wage setters are not in as good position to negotiate lower wages because workers can go elsewhere while looking for better wages. This leads to higher nominal wages. The fourth step is that when nominal wages have increased, the price level will increase as well. With higher nominal wages the purchasing power parity will grow and therefore consumption will increase which leads to further increase in price level (Blanchard 2006). 13 The AS-AD model draws a

good picture of a shock on the economy, and because the AS-AD framework is useful in describing the relationship between output and inflation, this model is relevant for this thesis.

#### 2. 4 Extension of IS-LM Relation<sup>4</sup>

In the IS-LM relation an assumption was made that the expected inflation was constant — that there was no expected inflation. It was also assumed that if output was below its natural level, a decrease in price level would adjust the output back to its natural level. The decrease in price level leads to an increase in the real money balance, as explained in the AS-AD relation. This tends to shift the LM curve down, which leads to an increase in output. However, if expected inflation is taken into account, we have a second effect at work. For a given nominal interest rate a decrease in inflation leads to a decrease in expected inflation that would lead to a higher real interest rate. Higher real interest rate induces savings and in turn lower spending which means output will decrease. This results in the IS curve to shift to the left<sup>5</sup> due to lower expected inflation. If only the IS curve shifted, the economy would go from A to B'. As a result of these two shifts, it is hard to predict whether output will go up or down; it depends on which shift dominates. In Figure 4,  $Y''$  is smaller than Y which means rather than returning to its natural level, output declines further away from it. This means that things get worse rather than better.

<sup>4</sup> <sup>5</sup> This section is based on literature from Blanchard (2006). All leftward shifts in IS curve cause recession.

14 Figure 4: Extension of IS-LM Relation Source: Blanchard 2006. The scenario in Figure 4 describes that the decrease in output Y to  $Y''$  leads to a further decrease in inflation and, so, to a further decrease in expected inflation. The decrease in inflation leads to a further increase in the real interest rate, which further

decreases output, and so on. When the output continues to decline rather than returning to the natural level of output, the initial recession can turn into a full-fledged depression.

2. 5 Phillips Curve In the 1950s A. W. Phillips analyzed the relationship between inflation and output (actual wage inflation and unemployment rates). Phillips demonstrated that unemployment rates are related to wage inflation. His work was entirely empirical, but it had substantial impact on Keynesian economists since it provided a framework for dealing with inflation (Wachtel 1989). The short-run relationship between inflation and unemployment is therefore often called the Phillips curve.

15 Figure 5: Phillips Curve Source: Michelen 2006. Blanchard explains how the unemployment rate affects the price level: “ Given the expected price level, which workers simply take to be last year’s price level, lower unemployment leads to a higher nominal wage. A higher nominal wage leads to a higher price level. Putting the steps together, lower unemployment leads to a higher price level this year relative to last year’s price level — that is, to higher inflation. ” (Blanchard 2006: 168). The negative relation between inflation and unemployment, in short-run, can be explained by changes in production. Mankiw explained how the model of aggregate supply and aggregate demand provides an easy explanation for the menu of possible outcomes by the Phillips curve. “ The Phillips curve simply shows the combinations of inflation and unemployment that arise in the short run as shifts in the aggregate-demand curve move the economy along the short-run aggregate-supply curve. ” (Mankiw 2003: 763). As explained earlier, an increase in aggregate demand for goods and service leads, in the short-run, to a larger output of goods and services and a higher price level. As a result



of the increase in output, the employment becomes greater, and therefore lowers the unemployment rate. Whatever the previous year's price level happens to be, the higher the price level in the current year, the higher rate of inflation. Thus, shifts in aggregate demand push inflation and unemployment in opposite directions in the short-run; this relationship is illustrated by the Phillips curve in Figure 5. Monetary and fiscal policy can shift the aggregate-demand curve, and therefore monetary and fiscal policy can move the economy along the Phillips curve. In a way, the Phillips curve offers policymakers a menu of combination of inflation and unemployment (Mankiw 2003). A shift in aggregate supply is associated with a similar shift in the short-run Phillips curve. Shift in aggregate supply leads to higher unemployment and higher inflation, and this will lead to the short-run tradeoff between inflation and unemployment shifting to the right. There is a question of whether the shift in the Phillips curve is temporary or permanent, which depends on how people adjust their expectations of inflation. If people view the rise in inflation as being due to the supply shock of a temporary aberration, expected inflation does not change, and the Phillips curve will soon revert to its former position. On the other hand, if people believe the shock will lead to a new era of higher inflation, then expected inflation rises, and the Phillips curve remains at its new, less desirable position (Mankiw 2003). The Phillips curve is very helpful to illustrate the trade-off between unemployment and inflation, and is therefore relevant to the research topic because in Iceland there has been low unemployment in the past, and in historical context the inflation has been relatively high.

## 2. 6 Marshall-Lerner Condition - Interest Parity Condition

Changes in trade balances are fundamentally dynamic phenomena. The Marshall-Lerner condition contains the impact analysis of trade changes in response to an instantaneous change in the exchange rate. The condition says that real depreciation in the exchange rate will have positive effect in trade balance i. e. export increases because foreign demand for domestic goods will increase and domestic goods will become relatively less expensive for foreigners. At the same time import will decrease because foreign goods will become relatively more expensive for the domestic country. Output in foreign countries is also a factor that impacts trade balance. Favorable exchange rate in foreign countries makes import more attractive (Blanchard 2006). For the rest of this thesis we assume that this condition holds; real depreciation leads to an increase in net export, i. e. positive effect of balance of payments. 17 The foreign exchange market is in equilibrium when deposits of all currencies offer the same expected rate of return. The condition that the expected returns on deposits of any two currencies are equal when measured in the same currency is called the interest parity condition. Oliver Blanchard explains the condition as a relation “ that the current exchange rate depends on the domestic interest rate, on the foreign interest rate, and on the expected future exchange rate. An increase in the domestic interest rate leads to an increase in the exchange rate. An increase in the foreign interest rate leads to a decrease in the exchange rate. An increase in the expected future exchange rate leads to an increase in the current exchange rate. ” (Blanchard 2006: 424). The interest parity condition plays a central role in the real world; if expected rate of return is greater in one country in terms of another, it could lead to unnatural transactions of

money between countries, which eventually could lead to shock in the monetary base. 2. 7 Net Capital Outflow Nouriel Roubini, a professor of economics and international business at New York University once said: " In today's uncertain economy, it is understandable that people may turn to foreign currencies in search of profit and a sense of control over their money(...) However, they may not realize it is a form of speculation, not investment, which may well end with lack of control and significant loss. " (Birnbaum 2008). Net capital outflow (NCO) is a method of determining the nature of a country's foreign trade. The NCO is the quantity of foreign assets held by residents of a given country less the quantity of domestic assets in that country held by foreigners. When the NCO is positive, the nation invests more outside than the world invests in it. When the NCO is negative, the world invests more in the country than the country invests in the world (Babylon 2009). When people begin to view a country as much less stable than they previously thought, they are willing to pull some of their assets out of the country in order to get them to a " safe haven. " This large and sudden movement of funds out of a country is called capital flight. An increase in NCO will lead to depreciation in the real exchange rate. Figure 6 shows the effect of capital flight. If people decide that it is too risky to keep their savings in a specific country, they will move their capital to a safer place, which will result in an increase in the country's NCO. Consequently, the demand for loanable funds will rise, and this drives up the interest rate, and at the same time shifts the NCO curve to the right. At the same time, in the market for foreign exchange, the supply of the country's currency will rise. This increase in the supply will cause the currency to depreciate, so the

currency becomes less valuable compared to other currencies (Mankiw 2003). This model is intended to gain a better understanding of capital controls, which are in use in Iceland, and will be discussed later in this thesis.

Figure 6: The Effect of Capital Flight Source: Mankiw 2003. It is also worth mentioning that if interest rate rises, it will result in an increase in capital inflow, which increases the demand for the currency. When demand for currency increases, the value of the currency appreciates which results in higher imports and less exports. On the contrary, if the interest rate is lowered, it will increase the NCO and the demand for the currency will decrease. When the demand for currency decreases the value of the currency depreciates which leads to lower imports and higher exports. 19 2.

8 Exchange Rate In an open economy with flexible exchange rates the nominal exchange rate is determined by supply and demand in the foreign exchange market. Changes in the money supply are neutral in the long-run. In the short-run, however, a decrease in the domestic money supply would reduce the output and raise the domestic real interest rate, which results in an appreciation in the current real exchange rate<sup>6</sup> and the net export will fall. The decrease in the money supply is transmitted to foreign trading countries by the effects on its net export, which will increase. On the other hand, if we assume that the effect on net exports of the drop in domestic income is stronger than the appreciation of the exchange rate, net exports would increase as domestic residents would demand fewer goods from abroad. This would affect foreign countries, with a fall in net exports which results in output and real interest rate to fall in the short-run. This example illustrates how a domestic monetary contraction can lead to a recession in

both the foreign country and the domestic country (Abel et al. 1998). When the model of the real exchange rate is determined, we combine the relationship between net exports and the real exchange rate with the model of trade balance. The real exchange rate is related to net exports because the lower the real exchange rate is, the less expensive domestic goods are relative to foreign goods, and the demand for net exports is greater as described in the Marshall-Lerner condition. The trade balance must be equal to the foreign investment, which means that net exports equal saving minus investment. This means that the quantity of currency supplied for net foreign investment equals the quantity of currency demanded for the net export of goods and services (Mankiw 1997). Under a fixed exchange rate system, nominal exchange rates are officially determined. If this determined exchange rate is greater than the fundamental value of the exchange rate as determined by supply and demand in the foreign exchange market, the exchange rate is said to be overvalued. If the central bank maintains the exchange rate at an overvalued level for a period of time, it has to use its official reserves to buy its own currency in the foreign exchange market. When a country has 6 Real exchange rate is the relative price of domestic goods in terms of foreign goods (Blanchard 2006). 20 tried to maintain an overvalued exchange rate for too long, it will run out of reserves and be forced to devalue its currency. This can leave the country vulnerable for speculative attack; if financial investors expect devaluation, they may sell large quantities of domestic assets (Abel et al. 1998). This would lead to an increase in the NCO, which results in a depreciation in the real exchange rate, as explained in section 2. 7. 3. 0 Central Bank's Actions and Policies

One of the most important institutions of any nation is the central bank. Central banks are different from commercial banks because they neither make loans to the public nor issue checking or saving accounts. Central banks are not concerned about making profit. They are governmental institutions, charged with providing certain services and achieving certain goals perceived to be in the nation's broad economic interest. A chief goal of central banks in industrial countries is to promote price- and financial stability. The following sections deal with the factors that can lead to short-run fluctuations in the money supply. Central banks are responsible for the long-run or trend behavior of the money supply. To be able to react and influence such circumstances central banks make forecasts to predict changes in future economic variables (Thomas 1997).

### 3. 1 Importance of the Independence of the Central Bank

Credibility is very important for central banks. Their actions must be consistent with their policy, and their independence is essential. Oliver Blanchard describes how to establish credibility in three steps. The first step would be making the central bank independent. Making the central bank independent, and making it difficult for politicians to fire the central banker, makes it easier for the central bank to resist the political pressure to decrease unemployment below the natural rate. Politicians, who face frequent reelections, are likely to want lower unemployment now, even if it leads to inflation later. The second step is to give incentives to the central bankers to take the long view; to take into account the long-run costs from higher inflation. One way of doing so is to give them long terms in office, so they have a long horizon and have the incentive to build credibility. The third step may be to appoint a “

conservative" central banker, somebody who dislikes inflation very much and is therefore less willing to accept more inflation in exchange for less unemployment when unemployment is at the natural rate. A conservative banker will be less tempted to embark on a monetary expansion when the economy is at the natural rate. Many countries have taken the steps described immediately above over the last two decades. As a result, central banks have become more independent, central bankers have been given long terms in office, and governments typically have appointed central bankers who are more " conservative" than the governments themselves (Blanchard 2006). The more stability there is in the economy that maximizes economic outcomes, the more credibility the central bank will have. By maximizing economic outcomes, we mean obtaining maximum employment, stable prices, and moderate long-term interest rates.

### 3. 2 Policy Instruments

For central banks to maintain price- and financial stability, the banks use different instruments to influence the macroeconomic objective such as the level of output, the unemployment rate, and price level behavior. These intermediate variables include the quantity of money in the economy and short-term interest rates. As discussed in the quantity theory of money: If the economy is in recession, the central bank is likely to want to increase the quantity of money to stimulate economic activity. To bring about these changes, the central bank uses certain instruments, or tools, to control its monetary policy. Central banks are capable of controlling completely these tools to control the quantity of money in circulation and short-term interest rates. In general, there are four tools central banks use: open market operations, interest rate, reserve requirement and intervention on the

foreign exchange market. In the following sub-chapters we will deal with these tools of monetary policy, beginning with open market operations (Thomas 1997).

### 2. 1 Open Market Operations

The main instrument used to control the money supply is open market operations, where central banks sell and buy securities, which are in the form of government bonds. Brue and McConnell define bonds as: "... bonds consist largely of debt instruments such as Treasury bills (short term securities) and Treasury bonds (longterm securities) issued by the Federal government to finance past and present budget deficits. These securities are part of the public or national debt. Some of these bonds may have been purchased directly from the Treasury, but most are bought in the open market from commercial banks or the public. The purpose of these bonds is to influence the size of commercial bank reserves and therefore their ability to create money by lending. " (Brue & McConnell 1993: 282). Governments usually lend directly to the public by issuing securities such as treasury bills, notes, and bonds. Once in the public domain, these securities are in the " open market", and central banks may purchase them. The reason why central banks do not buy these securities from the government is to keep as clear a line as possible between the treasury and the central bank. If the government has substantial influence over the central bank, it could coerce the central bank into purchasing excessive amounts of government debt. This would increase the nation's monetary base, money supply, and inflation rate. So, by separating the spenders from the money creators, fiscal and monetary authorities can act as checks and balances on one each other's actions (Marthinsen 2008).

### 2. 2 Interest Rate

Central banks can influence the money supply by loans to



the commercial banks. Central banks set a specific interest rate (discount rate), which influences the supply of money to the commercial banks. Central banks can decrease the money supply by raising interest rates, as the public will tend to save more money. On the other hand when central banks increase the supply of money, it decreases the interest rate and the commercial banks will be more willing to loan money to the public and the public tends to save less money. The relation between the money supply and the interest rates can be related to the quantity theory of money. Lending to banks is very similar 7 This section is based on literature from Marthinsen (2008). 23 to buying bonds in an open market operation. In both cases the central bank creates money. There is one big difference from borrowing on the interbank market and borrowing from the central bank; loans from the central bank are a source of new liquidity to the banking system. In contrast, on the interbank market, for every financial intermediary that borrows, there must be a financial intermediary with surplus funds that lends. This means that it is impossible for all banks to be net borrowers in this market, and this is why central banks are often called lenders of last resort because if the banking system should run short of liquidity, financial institutions could turn, as a last resort, to the central bank for relief.

### 3. 2. 3 Reserve Requirements

For precautionary and legal reasons the commercial banks need to keep an amount of reserves in some proportion of their checkable deposits. The central bank determines the reserve requirements ratio (R), and the amount of money the banking system generates with each currency unit of reserves is called the money multiplier (M). Changes in reserve requirements affect the money supply and cause the money supply multiplier to change. The

money multiplier is the reciprocal of the reserve ratio, which means if the reserve requirements are 20 percent the money multiplier is 5. The money multiplier is determined in the following equation:  $m = 1 / r$ . To simplify how the money multiplier works we can assume that the banking system as a whole holds a total of 100 ISK in reserves. It can have only 500 ISK in deposits as the multiplier generates 500 ISK of money where the reserves are 100 ISK and the money multiplier is 5. A rise in the reserve requirements reduces the amount of deposits that can be supported by a given level of the monetary base and will lead to a contraction of the money supply. On the other hand, a decline in reserve requirements leads to an expansion of the money supply because more multiple deposit creation can take place (Mankiw 2003). 24 The reserve requirements are a powerful tool because it has a strong effect caused by the money multiplier. Small changes in the money supply are hard to engineer by varying reserve requirements. In the USA, in 1996, the checkable deposits were hovering near the \$700 billion level. A ½ percentage point increase in the reserve requirements on these deposits would have reduced excess reserves by \$35 billion. Because this decline in excess reserves would result in multiple deposit contraction, the decline in the money supply would be even greater (Mishkin 1997).

### 3. 2. 4 Foreign Exchange Market Intervention

The foreign exchange market intervention has the same effect on a nation's monetary base as open market operations, but the main difference between these actions is that foreign currency, rather than government securities, is purchased or sold. When a nation purchases foreign currency, it increases the nation's monetary base and

therefore its money supply by injecting newly created reserves into the banking system. On the other hand, if the central bank sells currencies, it takes reserves out of the system and forces financial intermediaries to curtail their loans (Marthinsen 2008).

### 3. 3 Goals of the Central Bank

The monetary policy goals of central banks include economic growth, low inflation, and stability of the currency. However, many economists believe that the main contribution that monetary policy can make to economic management in the long-run is to maintain low inflation. It is generally agreed that low inflation provides a necessary base for sustained economic growth and development. In some cases governments have set indicative inflation targets, with central banks expected to maintain the rate of inflation within a target band. Many governments and central banks have made low inflation an explicit policy objective. This is clearest in the case of central banks that have adopted inflation targeting as their strategy for implementing monetary policy (Efobi 2006).

### 3. 4 Inflation

“ When the prices of most goods and services are rising over time, the economy is said to be experiencing inflation. ” (Abel et al. 1998: 8). As previously discussed, the main goal of monetary policies is to maintain price stability. Mankiw explains how central banks control the inflation. “ Thus, the quantity theory of money states that the central bank, which controls the money supply, has the ultimate control over the rate of inflation. If the central bank keeps money supply stable, the price level will be stable. If the central bank increases the money supply quickly, the price level will rise quickly. ” (Mankiw 1997: 156). The value of each currency unit decreases when the supply of money is increased, which leads people to keep less currency on

hand — for example, people are more likely to go more frequently to the bank or the automatic teller machine to make withdrawals. Similarly, inflation may induce firms to reduce their cash holdings by introducing computerized cash management systems or adding staff to the accounting department. The costs in time and effort incurred by people and firms who are trying to minimize their holdings of cash are called shoe leather costs. Another cost of perfectly anticipated inflation arises from menu costs, or the costs of changing nominal prices. When there is inflation and prices are continually rising, sellers of goods and services must use resources to change nominal prices. An example of menu costs is restaurants that must print new menu to report new prices frequently as a result of the inflation (Abel et al. 1998). Central banks follow economic policies to accomplish their objectives. Many economies have adopted inflation targeting with the aim of keeping the inflation on average as close to the target as possible. The practice of inflation targeting is largely a product of the 1990s although Sweden operated monetary policy with a price level target in the 1930s. New Zealand was the first country to adopt an inflation target in 1990 followed by Canada and Israel, the UK in 1992 and by many countries since. The advantage of the inflation targeting is that the central bank has a single objective for monetary policy. On the other hand the disadvantage of the inflation targeting could be that it is too narrow-minded. The cost of focusing on one economic variable could lead to disadvantage in other economic variables. The economic performance would not be maximized which could lead to an unstable financial system, although inflation is stable. If the objective is to keep inflation relatively low it could be reflected in high

unemployment rate according to the Philips curve. Higher unemployment rate could mean that the production is going down and therefore economic growth (Bain 2003). Nobel Prize-winning economist Joseph Stiglitz has rejected the idea that the most appropriate way to cope with macroeconomic shock was through inflation targeting. He said that he is strongly opposed to rigid inflation targeting in all countries and believes that the world economic crisis was at least partly, the result of banks focusing excessively on inflation. He also said that the inflation targeting should be just one of the things that should be addressed, and argued that other factors affecting the economy, such as growth and financial stability should not be ignored (Parker 2009). Both monetary policy and fiscal policy are concerned about short-run economic performance, but monetary policy is preferably designed to increase gross domestic product (GDP) and to control inflationary pressure in the long-run. On the other hand, fiscal policy is normally associated with principles of short-run economic growth while controlling long-term economic expansion is associated with overheated economic activities (AcaDemon 2007). Therefore it is important that the central bank promotes the government's policies so they do not conflict with the inflation target. For example, if we assume that inflation is above the inflation target the government should not lower taxes or increase government spending.

### 3. 5 Exchange Rate

Frederic S. Mishkin (1997) defines nominal exchange rate as the price of one currency in terms of another. The exchange rate affects the economy and our daily lives because when the domestic currency becomes less valuable relative to foreign currency, foreign goods and travel become more expensive. When the domestic currency rises in value, foreign goods

and travels become cheaper. However, the nominal exchange rate gives only a part of the information that we need. Tourists thinking of visiting foreign countries not only think about how much foreign currency they will get for their domestic currency. They also evaluate how much goods will cost in the foreign country compared to their home country. This is known as the real exchange rate.

### 27 3. 5. 1 Balance of payments

When payments to and from foreigners are conveniently summarized, we get a balance of payments, which shows the payments made to foreigners and the receipts of funds from them. A deficit in the national balance of payments is similar to a deficit in a household's budget, which means that collectively the nation is paying out more money abroad than it is taking in. A deficit produces a demand for foreign exchange greater than supply, and as a result, the price of foreign money will rise — foreign exchange rate will appreciate in value relative to the national currency. Another way to explain this is that the supply of the national currency is greater than the demand for it on a foreign exchange market, so the national currency will depreciate in value relative to other kinds of money. On the other hand, surplus in the national balance of payments is the opposite, which means the nation is taking in more money than it is paying out. This produces a greater supply of foreign money than the demand for foreign money, so the prices will fall. As a result, the foreign exchange rate will depreciate, and the national currency will appreciate. When exchange rates are floating they react freely to demand and supply, they often generate self correcting changes in imports and exports and in other types of international transactions, which eliminate balance of payments deficits and surpluses. As explained earlier, when a nation is

running a payments deficit, the price of foreign exchange will rise and foreign goods and services become more expensive. This means that the nation will import less, and at the same time it will probably export more because foreigners will find out that the nation's products are less expensive. This would result in lower balance of payments deficit. The same applies if a nation has payments surplus (the nation exports more goods than it imports). This results in cheaper foreign goods and the nation's products will be more expensive. This would increase imports and decrease exports, and thereby reduce the surplus. 8 This section is based on literature from Ritter, Silber and Udell (1997). 28

### 3. 6 Monetary Tools in Action

9 Now we will consider how the monetary tools of the central banks are used in practice. In the following example we suppose that a nation had a low level of unemployment, but its inflation was beginning to rise at an unacceptable rate. Now the central bank wants to remove the inflationary pressures from the economy by contracting the money supply or reducing its rate of growth by increasing the reserve ratio, raising the interest rate, selling government securities in the open market, and/or selling foreign currencies in the foreign exchange market. These monetary actions have one thing in common: They will decrease the banking system's ability to lend. When the reserve requirements are increased, financial intermediaries react to the curtailed availability of reserves by raising interest rates in order to ration their reserves. When real interest rates are getting higher, it will discourage borrowers from taking new loans and would be enough to dissuade some consumers from financing new cars, televisions, appliances, vacations, and furniture. Also, higher rates would discourage businesses from financing

marginal investment projects, e. g., new machinery, renovations or plant expansion. When the loan demand is falling, the demand for goods and service will also fall which leads business inventories to rise. When firms have excess inventories caused by a fall in the demand, firms might reduce production by running factories for fewer hours, cutting back labor hours, and/or laying off workers. This situation can be related to the AS-AD model because when the production is decreasing, the demand for factory inputs (i. e. labor and materials) would fall, putting pressure on suppliers to cut back employment and production. This will lead to a chain reaction of cause-and-effect events in the economy, which usually results in higher unemployment and a lower price level. Workers respond to lower income by reducing their demand for goods and services, and businesses would face even weaker demand. A central bank regulates a nation's money supply by using these four major tools. To adjust the money supply, they must change the monetary base and/or the money multiplier. The nation's monetary base changes due to open market operation, foreign exchange market intervention, and discount loans, while the money multiplier changes with the reserve requirements adjustments. Only transactions between central banks and non-central bank counterparts change a nation's monetary base. This means that foreign exchange transactions by individuals, central bank swaps, and fiscal policies have no effect on a nation's monetary base.

4.0 The Objectives and Roles of the Central Bank of Iceland In May 2001, a new Act on the Central Bank of Iceland entered into force. With the approval of the Prime Minister, the Bank is authorized to adopt an inflation target as a



framework for the conduct of monetary policy, the main objective of monetary policy is to maintain price stability. An inflation target was adopted on March 27, 2001 through a joint declaration of the Government and the Central Bank. The target was intended to keep the twelve-month inflation as close as possible to 2.5 percent. If the inflation deviates by more than 1.5 percent in either direction, the Central Bank is obligated to present the Government with a report, which will be made public, explaining the reasons for the deviation from the target and the bank's reaction to the deviation. The Bank is required to publish an inflation forecast, which projects inflation two years into the future (Central Bank of Iceland 2002a). The Central Bank's approach to keeping to its inflation target is to use its main instrument in this matter, the interest rate on its loans to financial undertakings against collateral. The bank can also influence the exchange rate of the ISK and thereby domestic inflation by buying or selling foreign currency on the interbank market (Central Bank of Iceland 2002c). By law, the Bank shall also promote other objectives, such as maintaining foreign reserves and promoting an efficient and safe financial system, including domestic payments systems and with foreign countries, and other tasks consistent with its role as a central bank. The Bank shall support the economic policy of the Government as long as it does not deem it inconsistent with the objective of price stability. The Central Bank's main objective should not be used to accomplish other economic factors, e. g. balance in net export unless it upsets the inflation target. With the approval of the Prime Minister, the Central Bank specifies a numerical inflation target (Central Bank of Iceland 2002a). 30 Other roles of the Bank are to issue bank

notes and to mint and issue coins or other currency that may circulate in place of banks notes or lawful coins. The Central Bank also accepts deposits from deposit institutions, which consist of commercial banks, savings banks, branches of foreign deposit institutions and other institutions and companies authorized by law to accept deposits from the public for safekeeping and investment. In addition the Bank shall compile economic and monetary data, provide opinions and advise the Government on all foreign exchange and monetary issues (Central Bank of Iceland 2002b).

#### 4. 1 Interest Rate Inflation

in Iceland has been unstable in the past and in an effort to manage the inflation the Central Bank has unsuccessfully kept interest rates high for several years. When the ISK grew less in value it added to inflationary pressure because Iceland imports so much of its goods, because of its isolated geographical position in the world. In recent days, however, politicians have been calling for lower rates (The New York Times 2008). The Central Bank has kept interest rates over 10 percent since autumn 2005, which has resulted in difficulties for households and firms. *Árvaldur Gylfason*, a professor of economics at the University of Iceland, has criticized the Central Bank for its interest rate policy. Professor Gylfason (2007) stated that the interest rate set by the Central Bank has not worked as it should have. Furthermore, he explains it was a serious mistake abolishing the reserve requirements because the interest rate instrument alone is not effective enough.

#### 4. 2 Inflation in Iceland

Icelandic economy is very small with the population being around 300, 000 (i. e. 0. 3 percent of Germany or similar to the city of Aarhus in Denmark). Therefore the economy is more vulnerable to global economic fluctuation than it would otherwise be. In

Figure 7 the history of inflation in Iceland is illustrated; it is clear that the price level has been very unstable. To examine the fluctuations in inflation it is important to look back and study the actions of the Icelandic authorities when inflation was soaring. Figure 7: Historical Inflation in Iceland Twelve-Month Changes in the Consumer Price Index 100% 80% 60% 40% 20% 0%

1940 1943 1946 1949 1952 1955 1958 1961 1964 1967 1970 1973 1976 1979 1982 1985 1988 1991 1994 1997 2000 2003 2006 Source: Statistics Iceland 2009b. Sigurður Snævarr analyzed, in his book *Haglífsing Á Íslands*, the history of inflation in Iceland and highlighted the main reasons for the inflation and actions of the Icelandic authorities to deal with it. During World War II prices were rising in Iceland and the average inflation was about 24 percent. The exchange rate of the ISK was devalued by 18 percent in April 1939. In 1941 wages were indexed to price level and the inflation after World War II can be explained by the inflation during the war, where the purchasing power was higher than the national economy could handle. The war in Korea in 1950-51 led to a high inflation all around the world. Raw material and fuel prices were rising rapidly as a result of speculations caused by the fear that the war would spread out and lead to a war between big powered countries. In March 1950 the ISK was devalued by 43 percent, which led to increase in domestic inflation. Because of the wage indexation, wages got higher as the price of foreign products was rising and consequently the domestic prices did too. The inflation rose rapidly from 1972 to 1975 and during 1975 the inflation peaked at 50 percent. Changes in the exchange rate system in the world (collapse of the Bretton Woods system) had a big impact on the exchange rate of the ISK, which was

depreciating rapidly. In 1973 the oil prices were rising and the authorities devalued the ISK regularly which resulted in a huge deficit. In the years 1978 to 1983, inflation was stuck around 45 — 60 percent and one of the factors that induced this inflation was the oil crisis. In May 1983 the ISK was devalued by 14 percent and the inflation rose to 102. 8 percent in August. The same year a stable exchange rate policy was adopted, this worked and in 1984 the inflation was around 30 percent. In 1984 there was a strike by employees in the public sector who got in the end a wage increase of 10 percent, the Government respond to this was to devalue the ISK by 12 percent which resulted in a 32. 4 percent inflation in 1985. In the next two years the inflation got down to 18. 8 percent. In 1988 the ISK was devalued three times and the inflation started to rise again and got up to about 26 percent. In 1990 the expansion in the economy was decreasing and unemployment was rising which resulted in diminishing inflation. The inflation in Iceland was at this time at the same level as in other Nordic countries and in 1993 the inflation was about 3 percent (SnÃ|varr 2005). In 2008 the financial system in Iceland collapsed when the three major banks were nationalized. A great mistrust was on the financial system that lead to a large outflow of capital. This resulted in a collapse of the ISK, which further raised inflation to 18. 6 percent in January 2009 (Statistics Iceland 2009a). Throughout history it can be clearly seen how the small Icelandic economy is dependent on the world economy. The combination of wage indexation and currency devaluation has at times resulted in a very high inflation in the past. Because Iceland