Swedish Quantitative Easing

How has Unconventional Monetary Policy Affected the Swedish Economy?

Kvantitativa lättnader i Sverige
Hur har okonventionell penningpolitik påverkat Sverige ekonomi?

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Abstract

The purpose of this thesis is to evaluate what influences Quantitative Easing, QE, have had on the Swedish economy during 2015.

The methodology employed to answer the research question is to analyze secondary sources. Statistics have been collected from SCB (Statistics Sweden) and Trading Economics. Previous research has been obtained via academic databases, and further information has been found via reports from public authorities and financial news articles.

Data of several macroeconomic variables have been presented and analyzed. Researched variables include government bond yields, the exchange rate, inflation, interest rates, growth in loans to non-financial corporations and mortgage loans, and growth in the money supply and the monetary base. The impact of QE on the functioning and vulnerability of Swedish financial markets is also assessed.

QE seems to have affected the Swedish economy both positively and negatively. Interest rates for mortgages and companies have been lowered, while growth rates in mortgage loans and loans to Swedish non-financial corporations have increased. Moreover, in Sweden as well as in other countries, QE has increased the monetary base to a great extent. However, this has not increased the growth rate in the money supply notably, and neither has it increased inflation near its target rate. CPI was low in Sweden throughout 2015, and deflation was recorded in some months. In addition, the Swedish financial system has arguably become more vulnerable due to lower interest rates, while QE might have made bond markets less liquid.

JEL Classification: E41, E52, E58

Keywords: QE, Repo Rate, Unconventional Monetary Policy, Macroeconomics, Financial Economics, Central banks, the Riksbank, Sweden, 2015
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## Abbreviations and expressions

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<td>QE</td>
<td>Quantitative Easing</td>
<td>BOJ</td>
<td>Bank of Japan</td>
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<td>Repo rate</td>
<td>Sweden’s official interest rate</td>
<td>BoE</td>
<td>Bank of England</td>
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<td>GFC</td>
<td>Great Financial Crisis</td>
<td>ECB</td>
<td>European Central Bank</td>
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<td>CPI</td>
<td>Consumer Price Index</td>
<td>Riksbank</td>
<td>Sweden’s central bank</td>
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<td>CPIF</td>
<td>Consumer Price Index, Fixed Interest</td>
<td>Fed</td>
<td>Federal Reserve</td>
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<td>HICP</td>
<td>Harmonized Index of Consumer Prices</td>
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1. Introduction

1.1 Background

More than seven years after the Great Financial Crisis (GFC), high employment, low inflation and sluggish growth haunt economies around the world. Central banks have tried to counter this by so called unconventional monetary policy. Caruana (2009), former head of the Bank for International Settlements defines unconventional monetary policy as central banks taking an active role to influence broader financial conditions, instead of conventional monetary policy where central banks have a passive role of maintaining a stable money supply and inflation in an economy. Measures of unconventional monetary policy include, among other things, pushing official interest rates close to zero, at zero or below zero, and to launch Quantitative Easing (QE) measures, such as to buy government bonds or other financial instruments on a larger scale on the open bond market. QE has been pursued by a handful of central banks, such as the Fed, Bank of England, Bank of Japan and ECB, while around a dozen central banks have lowered interest rates below zero (Anderson et al. 2010).

QE seems to have helped equity indices increase in many countries, as will be presented later in this thesis. Economists also are in agreement that QE depreciates currencies, which is beneficial to exports. But inflation remains low in areas where it has been practiced: the US, Japan, the UK and the Eurozone, Switzerland, etc. In the meantime, John Plender (2015b), Gallo (2015) among others, say that QE might help to bring about asset price bubbles.

Although growth in Sweden has been comparatively high the last years, inflation has been low, and deflation has occasionally been recorded. The central bank has reacted by continuously lowering the repo rate, and in October 2014, the repo rate was cut to zero (Trading Economics 2015a).

The 12th of February, the Riksbank (2015e) announced its intentions to cut interest rates to minus 0,1 percent (and hence pushing interest rates to negative territory for the first time in Sweden’s history) while engaging in Quantitative Easing by purchasing government bonds on a larger scale.

Economists are in disagreement of the success of QE. So how might QE have affected the Swedish economy in 2015? This report will try to give some answers to this question.
1.2 Research question

- How might Quantitative Easing have affected the Swedish economy and financial system in 2015?

It is important to observe how the research question is stated: howQE might have affected the Swedish economy is explicitly asked, and not how these monetary policies have affected Sweden. This is underscored as one should be cautious when making evaluations of how monetary policy has affected the economy, as numerous other variables are at play.

1.3 Purpose

The purpose of this report is to define QE and explain how monetary policy affects an economy. While these clarifications are done, it will be evaluated how QE might have affected Sweden’s economy and financial system.

1.4 Research Methodology

The report is based upon secondary sources. These are primarily gathered from previous international research articles found via academic databases such as Scopus and Business Source Premier. Other used sources are reports from Swedish public authorities and the Fed, financial news articles and other news articles, and macroeconomic statistics from Statistics Sweden (SCB) and Trading Economics. No sophisticated statistical, econometrical or mathematical models have been applied.

The theory behind how QE, and negative interest rates, affect an economy has been brought up. The Mundell-Fleming framework is presented to show how monetary policy should affect a small open economy like Sweden. The monetarist view on inflation and other theories on what causes inflation have been brought up. Theories on QE’s transmission channels are also explained.

Statements from Swedish authorities and international economists and market participants’ opinions have been taken into account when analyzing if the functioning and/or vulnerability of the Swedish financial markets have been altered as a result of unconventional monetary policies. Some evaluations of macroeconomic data have been made by comparing the recorded data of 2015 to data of one 2014. On some occasions, evaluations of some variables have been done visually by inspecting obtained graphs.
As this report was finished in mid-January 2016, data about mortgage interest rates, interest rates to non-financial corporations, the growth in the monetary base and various measures of the money supply as of December 2015 was not applicable. Annual rates of these variables have been assessed for 2015 despite of this shortfall, and the lack of data for December has been stated explicitly in paragraphs where these data have been stated.

1.5 Critique of applied methodology

Data from 2015 have only been compared with data from 2014. Perhaps 2014 was not a representative year of the seven years following the GFC. For this reason, it would have been more suitable to compare 2015 with data from all years seceding 2009. However, data before 2014 was harder to obtain than from 2014 and after.

It was occasionally difficult to state if a certain macroeconomic variable was affected by either QE, or negative official interest rates, or both, and to what extent. Furthermore, it is not easy to claim with complete certainty that certain variables have changed in certain ways thanks to QE and negative interest rates, as many other variables are at play. Perhaps fewer variables should have been studied, while actually observed variables should have been scrutinized more profoundly. Usage of econometric models could possibly have given more precise answers about how some variables have been affected by unconventional monetary policies.

1.6 Limitations

This paper is limited to what consequences QE launched by the Riksbank has had on the Swedish economy in 2015. How the economy responded to Swedish monetary policy before the announcement of QE in February will not be brought about, with some few exceptions. Macroeconomic data prior to 2015 will not be analyzed, but rather compared with data succeeding the initiation of QE and negative interest rates in February.

International experience of QE presented in this report is scarce compared to information about unconventional monetary policies in Sweden. Moreover, experience of unconventional monetary policies of other countries will only be limited to that of QE, and not to policies such as major currency interventions as have been practiced by Switzerland, or bank lending-procedures such as the “Funding-for-Lending Scheme” made by BOE.

Some important macroeconomic measures, such as unemployment, consumption and exports and imports of goods and services have not been brought up at all.
1.7 Thesis structure

In chapter 2, the Mundell-Fleming model of how the small open economy is affected by monetary policy is presented. Also, the monetarist view on inflation is outlined. Lastly, how QE is supposed to affect the economy is also brought up in this chapter.

In chapter 3, empirical findings are put forward on a fairly wide range of macroeconomic issues. Examples of topics raised are some history and the definition of QE; how QE have affected inflation in other countries and in Sweden; and how key private interest rates have been affected by unconventional monetary policy in Sweden during 2015. See the table of contents on page iii for more information.

Conclusions of the report are outlined in chapter 4. Used sources are presented in chapter 5, and chapter 6 finally presents figures of how the monetary base, the money supply and inflation have developed in the US, the UK, the Eurozone and Japan during initiations of QE in these countries.
2. Theoretical framework

2.1 The Mundell-Fleming (IS-LM-FE) model

2.1.1 Overview of the model

This chapter is based on two sources: Jones (2011) and Fregert & Jonung (2010).

The Mundell-Fleming model describes, among other things, how monetary policy affects a small open economy, and is hence appropriate to apply over the Swedish economy. It is an extension of the IS-LM model, which shows how monetary policy and fiscal policy affect GDP output and interest rates in a closed economy. The Mundell-Fleming model consists of two curves: the LM-curve (Liquidity-preference Money supply curve) and the IS-curve (Investments and Savings curve). These two curves are associated with two markets: the LM curve is associated with the monetary market and the IS-curve is associated with the goods and services market. When the LM-curve and the IS-curve are put in the same framework, their equilibrium, i.e. the diagonal where the two curves are crossed, will show the nominal exchange rate, interest rate and GDP output for the economy.

The most important modification from the IS-LM model is an added horizontal curve, called the FE-(Foreign Exchange) curve, which runs parallel to the equilibrium of the Mundell-Fleming model.

![Diagram of LM-curve](https://example.com/figure1.png)

*Figure 1. The LM-curve*

*Source: Economc.co (2015)*

The LM-curve shows the relationship between the money supply (which according to the model is equaled to the supply of money), monetary demand and interest rates. (See figure 1
on the previous page). Monetary supply is assumed to be fixed, and hence will only monetary demand change in the short run. If monetary demand increases or decreases, the LM-curve shows how this will change interest rates and GDP. No shift in the LM-curve takes place when money demand is changed. However, when money supply is changed (which according to the model will happen when the central bank increases the monetary base), a shift in the LM-curve takes place. When money supply is increased (decreased), the interest rate will decrease (increase).

The IS-curve and the goods and services market share the same variable in their X axis, namely GDP output. The IS-curve shows the relationship between aggregate demand and interest rates. (See figure 2). Aggregate demand contains of Consumption, Investments, Government spending and Net Exports. This can also be expressed as

$$AD(Y) = C(Y) + I + G + NX(Y)$$

If aggregate demand increases (decreases), the IS-curve will shift up (down) leading to higher (lower) GDP and interest rates.

![Figure 2. The IS-curve](Source: Wikiwand (2016))

Interest rate parity is assumed in the Mundell-Fleming model, which implies that the domestic real interest rate only in the short run can differ from the international interest rate. In the
medium and the long run, the FE-curve and hence the IS-LM equilibrium is exogenously determined.

2.1.2 Expansionary monetary policy according to the model

Expansionary monetary policy will affect the small open economy according to the Mundell-Fleming model: when the central bank increases the monetary base in the economy, the monetary supply will increase as well. This will decrease the interest rate in the country, which depreciates its currency (the LM-curve shifts downward after the central bank’s policy decision). The less valuable currency will trigger a rise in net-exports, which hence increase GDP and the domestic interest rate. (The IS-curve shifts upward as aggregate demand increases).

2.2 The monetarist view on inflation

The belief that inflation primarily is positively correlated with the monetary supply in an economy stems from monetarism. It rests on the Quantity Theory of Money (Werner 2011), which can be expressed accordingly:

\[ M \times V = P \times Y \]

or in its logarithmic form:

\[ m + v = p + y \]

in which \( M = \) Money (various definitions are used, M0, M1, M2, M3, M4.)
\( V = \) Income Velocity of Money
\( P = \) The GDP Deflator, inflation
\( Y = \) Real GDP

If a central bank hence succeeds to increase the money supply with conventional or unconventional monetary policy, inflation and/or GDP growth should be the outcome according to the model, as long as \( V \) is fixed during this period.

2.3 Swedish the money supply aggregates

Statistics Sweden defines the variables for Swedish money supply as follows:

M1 equals total notes and coins held by the Swedish non-bank public and on-demand deposits in monetary financial institutes by the Swedish non-bank public.
M2 equals M1 and certain deposits in Swedish monetary financial institutes by the Swedish non-bank public. Deposits subject to certain terms consist of deposits redeemable at a notice of up to three months or deposits with terms to maturity of maximum two years.

M3 equals M2, repos and public’s shares in money market funds and interest-bearing securities with maturities to two years.

M1, also known as “narrow money”, is considered more liquid than M2 and M3, which also are known as “broad money”. (Statistics Sweden 2014):

2.4 How money is created

A common belief is that money is created solely by the public sector which prints money. But private sector banking institutes are actually responsible for around 95 percent of money that is created and available in an economy, while the remaining 5 percent are created by the public sector. Most money does not exist as physical cash, but as demand deposits. When banks make new loans, a deposit is created at the borrower’s bank account. But no money is transacted from the lending bank, so the total amount of money in deposits increases when loans are made. Moreover, banks in the so called “Fractional Reserve System”, that has been the standard system for centuries, are able to make new loans with deposited money within the banks. It is only regulated obligatory bank reserves that banks cannot loan out (Bank of England 2014). Banks’ reserve requirements are regulated by governments or supranational institutions. Swedish banks’ reserve requirements are decided by the European Union, who in turn has been instructed by the international forum of central banks, the Banking of International Settlements, or BIS (Europa.eu 2016).

The money multiplier is a model that explains how much money that will be created in an economy under certain periods. The following aggregates should be defined before the money multiplier is described:

- The monetary base: physical cash in circulation and central bank and obligatory bank reserves, i.e. central bank instruments held by commercial banks.
  \[ \text{MB} = \text{Currency} + \text{Reserves} \]
- Money supply: physical cash in circulation and bank deposits.
  \[ \text{M1} = \text{Currency} + \text{Deposits} \]
- Reserve ratio: amount of required reserves in relation to deposits.
  \[ r = \text{Reserves}/\text{Deposits} \]
- Publics desired ratio the hold cash instead of having money in demand deposits.
\[ \zeta = \text{Currency/Deposits (Auerbach & Kotlikoff 1998)}. \]

The money multiplier formula is defined as the following:

\[ \frac{M1}{MB} = \frac{c + 1}{c + r}, \]

and the relationship between the money supply, the money multiplier and the monetary base is expressed as the following:

\[ M = \text{Money multiplier} \times MB \]

As stated previously, the lower the reserve requirements, the higher the monetary multiplier. If banks lend out less cash than they are able to, “\( r \)” will be negative and the monetary multiplier will shrink. Similarly, the less the public prefers to hold cash, i.e. the smaller the “\( c \)” is, the larger is the money multiplier as banks have more reserve that can be lent out (Fregert & Jonung 2010). According to Economist Richard Koo, the money multiplier can turn negative, causing the money supply to shrink, if demands of borrowing are very low and if the economy aggregately pays off debt (Koo 2015).

**2.5 How a Central Bank can influence the growth of money**

**2.5.1 Money supply targeting**

Looking at the money multiplier formula, one obvious way to influence the money supply would be to regulate the amount of reserves banks are obligated to have. This is given exogenously in the case of Sweden, as has been described earlier. In the 80’s, some countries tried to influence the money supply by experimenting with the technique of “Money Supply Targeting.” It was tried in the US under Fed Chairman Paul Volcker, but the method did not seem to work in the US, nor in other countries. Money supply targeting has since been abandoned (Auerbach & Kotlikoff 1998). Another technique a central bank can pursue is “interest-rate targeting”. This will be explained in the following chapter.

**2.5.2 The ”repo rate” and interest-rate targeting**

Banks and other financial institutes are financed by short and long term loans. They lend and borrow to each other at different maturities, and therefore a common financial infrastructure is needed for different financial instruments to be transferred between banks. In Sweden, this infrastructure is called RIX. Payments in RIX are only made in SEK and participatory banks have their accounts monitored by the Riksbank. During the day, banks can borrow at zero interest at the Riksbank against collateral, so called intraday credit. This has been put forward
to make sure that payments in the financial system are made smoothly. At the end of each day, bank accounts at the Riksbank must be balanced – there should be no surplus or deficit in bank participants’ accounts. Banks are able to lend and borrow at the Riksbank “overnight” at 75 basis points above or under Sweden’s official interest rate, also called “the repo rate”. This interval is called the “interest rate corridor”, and it is the repo rate which is meant to affect the short term interest rates. (Riksbank 2016d)

The interest rate corridor gives banks incentive to borrow and lend with each other at the rate of interest within the spread of the interest rate corridor, and this brings about the overnight rate. The Riksbank does not only want to keep the overnight rate within the interest rate corridor. It also want the overnight rate to be stable and predictable as it influences market rates – short-term market rates up to six months represent, among other things, the average of overnight rates, and fluctuating overnight rates could hence produce unwanted fluctuating market rates. The Riksbank hence want to keep the overnight rate near the repo rate. (Ibid.)

To make banks borrow short term at rates near the repo rates, banks engage in repurchase agreements, called a “Repa”, with the Riksbank. A repurchase agreement is a combination of a spot contract and a forward contract, in which part A buys/sells a financial instrument from part B and then promises to sell/buy it back on a date. The Riksbank is normally able to make pretty accurate predictions about how much liquidity banks need on a weekly basis. The Riksbank can see the daily growth of the public’s demand for cash, which in turn determine if banks’ liabilities shrink or increase. The Riksbank’s repurchase agreements are made on a weekly basis every Tuesday. However, banks’ borrowing demand may change from day to day. The Riksbank counters this problem by so called “fine-tuning operations” providing the possibility of banks to borrow or lend at the Riksbank with 10 basis points under or over the repo rate (Nyberg et alt 2006).

Low official interest rates are meant to stimulate the economy in recessions by making loans cheaper in the economy. High official interest rates also are meant to subdue economic activity to bring about downward pressures on the inflation in times of economic prosperity. When the repo rate is lowered, lending and borrowing (normally) increases, which increase deposits, which ceteris paribus mean that the money supply increases. (Riksbank 2016c)

2.6 What is QE?

Richard Werner, Economics Professor at the University of Southampton, is often called the inventor of the term QE. In the 1990’s, he coined the term as an analyst employed by the
Japanese central bank. What Werner meant with QE was to increase the credit available to the real economy: the “expansion in broad credit creation”. (Herbsta et al. 2014) However, the term was instead interpreted by Japanese authorities to imply expansion of reserves, and the term “QE” was later used when expansion of bank reserves was practiced by the BOJ. Later, Werner has said that:

“[A]ll QE is doing is to help banks increase the liquidity of their portfolios by getting rid of longer-dated slightly less liquid assets and raising cash. . . . Reserve expansion is a standard monetarist policy and required no new label.” (Brown, E., 2013)

Statements from the Federal Reserve and former Fed Chairman Bernard Bernanke fortify Werner’s position. In 2009, Bernanke said that “in a pure QE regime focus of policy is the quantity of bank reserves, which are liabilities of the central bank”. Moreover, a Fed article stated that “QE describes any policy that unusually increases the magnitude of central bank liabilities [i.e. expansion of central bank reserves] – currency and bank reserves…” (Fawley, B.W., Neely, C.J. 2013)

Although the name QE first emerged in the 1990’s, it has certainly been practiced decades before. To stem a recession in 1923, the Fed purchased government bonds on a large scale, which increased the Fed’s reserves of bonds from 73 million to 477 million dollars. This procedure successfully lowered interest rates. (Federal Reserve 2016) According to economic historian Nomi Prins (2014), this was the first measure of Quantitative Easing that has been executed by any central bank.

According to Anderson, R.G, (2012), Vice President and Economist at the Federal Reserve Bank of St. Louis, the Riksbank engaged in QE measures in 2008 through 2010 during the GFC, on a magnitude which equaled 9 percent of Sweden’s GDP. These measures were more expansionary than QE of 2015.

QE proceedings have taking place in many countries the latest decades, which Figure 4 shows.
2.7 The yield curve

While the repo rate primarily affects short term interest rates, one of the main aims of QE is to influence long term interest rates. In this section, explanations on how bond yields are made and how QE theoretically can influence these yields.

The yield curve shows the graphical correlation between yields and maturities on the same types of bonds, for example Swedish government bonds. A downward yield curve shows that short term bonds rates are higher in the short term than in the long term. Conversely, an upward sloping curve shows that yields with short term maturities are lower than yields with long term maturities (Swedbank 2016). Both up- and downward curves have existed on Swedish government bond market between the beginnings of the 1990’s until today (Nyberg et al. 2006). Several theories on what influences yield curves exist. Two of these are:

**Market expectations theory**: assumes that investors’ collective expectations about forward rates define the yield curve. The yield curve is based upon aggregate, cumulative forward yields on conventional and synthetic zero-coupon bonds.

**Liquidity premium theory**: provide an explanation why yield curves most often are steep. Long term interest rates are not only influenced by expectations but also by investors demand.
a compensation of accepting higher risk which increases when time to maturity increase. (Ibid.)

2.8 The liquidity trap

2.8.1 The Trap

According to Economist Richard Werner, two definitions of “liquidity trap” exist: that short-term official interest rates are close to zero, which makes it difficult to manage successful monetary policy (as Krugman and others mean); or that short-term interest rates cannot be lowered further (as Keynes and Hicks meant) (Werner 2003). In 2010, Keynesian Nobel Prize Laureate Paul Krugman said that almost all advanced countries faced a liquidity trap. (Krugman 2010) Furthermore, Keynes meant that in an environment when a liquidity trap is present, demand for money becomes perfectly elastic, and the money created by central banks is not spent on investments or consumption but hoarded by a risk-averse private sector. Expansionary monetary policy in this case only means that the public and the central bank trades interest free bonds with interest free money. Following sentences are often cited as the essence of the liquidity trap as Keynes saw it:

“There is the possibility ... that, after the rate of interest has fallen to a certain level, liquidity-preference may become virtually absolute in the sense that almost everyone prefers cash to holding a debt which yields so low a rate of interest. In this event the monetary authority would have lost effective control over the rate of interest. But whilst this limiting case might become practically important in future, I know of no example of it hitherto.” (Peng et al. 2016)

2.8.2 Other theories on economic policy during deep recessions economic

Other theories that bring up the subject of how the economy works in a deep recession have been produced the latest century. Some of these are relevant in the discussion of the topic of this thesis. One theory that was presented in the same decade as the liquidity trap is Irving Fisher’s “debt deflation” theory. Debt deflation is described as a situation where an over indebted economy pays off its debt, which is causing the money supply to shrink, prices to decrease, and hence deflation (Fisher 1933). A second theory developed several decades later is the “balance sheet recession theory” by Japanese Economist Richard Koo, who says that monetary policy is useless in a deep recession as a debt-burdened private sector is not interested in new loans with lower interests. Instead, companies are paying off old loans, or
are “debt-minimizing”. Fiscal policy is therefore the only successful policy in improving bad macroeconomic results, in accordance with what Keynes thought (Koo 2015).

2.9 The transmission channels of QE

Figure 5 shows how the repo rate and market participants’ expectations affect interest rates in the economy via government bond yields. The repo rate has a direct effect on short-term government bond yields. Government bond yields act as an anchor for corporate bonds, mortgage bonds and other types of bonds, which in turn affect the funding costs of banks. This does ultimately affect interest rates on loans and leases which companies and households receive.

Official interest rates and interest-rate targeting/ inflation targeting are primarily designed to affect short term interest rates. QE is an attempt to further make monetary policy successful when it is no longer easy to use official interest rates to stimuli the economy. The aim of QE is to affect longer term interest rates. QE measures try to directly stimulate bond yields (blue arrow), in contrary with conventional monetary policies, which starts at the red arrow.

Figure 5. How changes in repo rates via bond yields affect interest rates in the economy
Source: Riksbank (2015b)

Theoretically, QE is supposed to improve the economy via various transmission channels. These are supposed to increase investments and consumption and hence reduce unemployment and raise inflation. Figure 5 outlines many of the various transmission channels that have been articulated the last decade. Different international research and opinions exist on which of the transmission channels that are more or less effective.

Below are some transmission channels mentioned and shortly described:

The liquidity effect: Also called the credit channel and the bank lending channel. By purchasing non-performing assets and government bonds, central banks decrease risk premiums, lower volatility and increase liquidity in the system. (Williams, M., 2013)
The portfolio rebalancing effect increases demand and hence prices for riskier assets than government bonds. This happens as yields for government bonds decreases when they are purchased by central banks. (The Riksbank 2015b)

The exchange rate channel: Lowered interest rates (which theoretically are lowered via QE) will theoretically lower returns on instruments on its financial markets. This makes the domestic currency less attractive. The country’s exchange rate will then depreciate, which stimulates the country’s export-competitiveness. (The Riksbank 2015b)

The signaling effect/confidence effect: Inflation and stock markets indices are partly based on expectations of market participants. Perceptions and prospects are to some extent made of rhetoric and actions by the central bank. Actual purchases of financial vehicles by a central bank increase its credibility and can increase confidence in market participants that authorities are committed to aggressive monetary policy. This can in term increase investments and spending which impose inflation. (The Riksbank 2015b) The signaling /confidence effect is made inter alia via forward guidance, which according to Investopedia (2015) is defined as follows: “Verbal assurances from a country’s central bank to the public about its intended monetary policies. Forward guidance attempts to influence the financial decisions of households, businesses and investors by letting them know what to expect from [monetary policy].”

The premium channel: QE reduces the supply of bonds. This increases the competition of remaining bonds. The higher the demand for bonds, the heavier the pressure will be on the premium and the more prices will increase while yields on the bonds decrease. (Alsterlind et al. 2015)

Other channels such as the scarcity channel and the duration channel exists. (IMF 2013) These channels will not be described here. According to Alsterlind et al. (2015) four of the aforementioned channels are said to be more influential over the Swedish economy: the signaling channel, premium channel, portfolio rebalancing channel, and liquidity channel.

Especially two of QE’s transmission channels can influence the yield curve defined by the abovementioned theories. The “signaling effect/confidence effect” leads the market expectations in the central bank’s desired direction, while the “premium channel” pushes down risk premiums on long term bonds.
As central banks heavily trade financial instruments for currency on large scales, QE does to a large extent increase the monetary base. This should according to the money multiplier formula also increase the money supply in economies where QE is pursued.

![QE and its transmission channels diagram](Image)

*Figure 6. QE and its transmission channels*

*Source: Gern, K.J. et al (2015)*
3. Empirical findings

3.1 QE and inflation prior to 2015

Several historical scenarios of balance sheet expansions by central banks imply that increases in an economy’s monetary base do not automatically increase inflation. One example is the Swedish financial crisis in the beginning of the 1990’s (FMB 2011). The country’s monetary base was more than doubled by the Riksbank, but inflation remained moderate during this expansionary period, as figure 7 shows.

Figure 1. Swedish CPI (Left axis) and the Riksbank’s balance sheet (right axis) in the 90’s. Source: FMB Wealth Management (2011)

Other instances of QE and low inflation exist after the initiation of the GFC (Koo, R., 2015). Graphs of following examples are presented in Appendix.

- In the early autumn of 2008 until the end of the second quarter of 2014, the Federal Reserve increased the US monetary base by 366 percent, while inflation at the end of this time span was 1,42 percent and did hardly increase over 1,5 percent during this period. During the same time, the US money supply did only increase by 46 percent.

- In the third quarter 2008 to the second quarter of 2012, ECB almost doubled the monetary base in the Eurozone. The inflation did not reach pre-crisis numbers however.
• Since 2008 to mid-2014, the Bank of England increased the UK monetary base with 371 percent. At the end of this time, inflation in the UK was about 1.4 percent.

• Graph 24 in Appendix show permanently low inflation and deflation in the Japanese economy from 1990 until 2014, while the Bank of Japan during this time had increased its country’s monetary base by 523 percent. Money supply did only increase by 87 percent during this period. (Ibid.)

Figure 8 shows that the narrow money measure M1 increased to a great extent while inflation remained at near zero percent in the Japanese economy before and after the Bank of Japan proceeded with Quantitative Easing measures in 2001. The National Institute of Economic Research (2015), (Konjunkturinstitutet in Swedish), also describes how increases of the Japanese monetary base failed on enhance inflation growth. It moreover writes rather critically about the effectiveness of QE:

"The hope [of QE] is that it will increase bank lending to households and firms [italics added]… However, it is not self-evident that such measures work. For example, QE in Japan between 1993 and 2003 resulted in an increase of the Japanese monetary base of 300 percent while bank lending barely increased marginally and expected inflation was continuously low. Similar developments can be seen in the UK where bank reserves have increased equally with the money supply while lending to firms and households do not increase in the same pace… Quantitative Easing seems to have small effects on the economy."
3.2 The Riksbank’s QE measures as of 2015

The 12th of February, the Riksbank announced its intentions to cut interest rates to minus 0.1 percent, pushing interest rates to negative territory for the first time in Sweden’s history. It also declared that it would engage in QE by purchasing government bonds on a larger scale. (Riksbanken 2015e) Further announcements of new bond purchases were made by the Riksbank throughout the year. Figure 9 shows the evolution of QE in Sweden during 2015. The Riksbank started modestly in February by buying bonds of an amount of 10 billion SEK. Since then, decisions to increase the purchases have increased substantially. The Riksbank had in October of 2015 decided to increase purchases of government bonds by 65 billion SEK, and total purchases of 2015 now amounts to 200 billion SEK. This equals six percent of Sweden’s GDP and about 34 percent of the outstanding stock of Swedish government bonds. (Riksbank 2015c) No further decisions to increase the bond buying have been announced since October however.
Meanwhile, the repo rate was lowered on three occasions, from 0 to -0.1 percent in February, down to -0.25 percent in March, and finally lowered to -0.35 percent the first of July. (Trading Economics 2015a)

Despite these efforts, the Riksbank (2015i) stated in a press release in December that the consequences for monetary policy in the coming period are deemed to be minor.

3.3.1 The Riksbank have considered unconventional alternatives

In February, the Riksbank (2015a) was also considering other unconventional policies than QE, such as encouraging lending to companies via commercial banks, which have been done in the UK under the “Funding for Lending Scheme” and in the eurozone under TLTRO. In December, the Riksbank stated that it was ready to intervene on the foreign exchange market if inflation remains low. Once more this month, the Riksbank said it is prepared to start a program of lending to companies via banks (Riksbank 2015i). However, the Riksbank did not make any such aforementioned measures in 2015. The fourth of January 2016, the Riksbank (2016a) took in “an extraordinary monetary policy meeting” the decision to intervene on the foreign exchange market if the SEK is to appreciate further. It had appreciated markedly in December 2015.

3.3.2 Forward guidance by the Riksbank

The Riksbank has continuously said that it is prepared to do engage in more expansionary monetary policy, and is also stating why expansionary monetary policy is applied. “The
Riksbank is prepared to do more. There is still a high level of preparedness to quickly make monetary policy even more expansionary if inflation prospects deteriorate” (Riksbank 2015a). Similar statements are mentioned in press releases and reports throughout 2015. Also, it has proclaimed alternative unconventional measures it is considering to do, which are mentioned under the previous headline.

### 3.4 Interest rates

As explained earlier, the repo rate is supposed to adjust interest rates in the economy (see figure 4 on page 9). QE are in turn directly influencing the monetary base, and indirectly supposed to influence the money supply.

Figure 10 shows how unconventional monetary policies have affected interest rates, loan growth, the monetary base and the money supply. Interest rates for new loans to corporations and mortgage loans have been lowered in 2015 compared to one year earlier, while loan growth to corporations and mortgage loans have increased. Loans made for consumption have decreased however. Growth rates are expressed in percentage change. Data for 2015 excludes December, as data for this month did not exist as of the writing of this report, and includes January, when negative interest rates or QE had not been implemented.

The monetary base did not change much in 2014, amounting around 135 billion SEK throughout the year. In 2015, monetary base increased more than 100 percent, from 135 billion SEK in February to consecutively increasing each month to 287 billion SEK in November.

<table>
<thead>
<tr>
<th></th>
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<th>2015</th>
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<tbody>
<tr>
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</tr>
<tr>
<td>Average lending rates for new loans to non-financial corporations</td>
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<td>1.66 %</td>
</tr>
<tr>
<td>Monthly growth rate in loans to non-financial corporations</td>
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<td>3.5</td>
</tr>
<tr>
<td>Monthly growth rate in mortgage loans</td>
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<td>Monthly growth rate in loans to households for the use of consumption</td>
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*Figure 4. Change in interest rates, money supply, monetary base and lending growth. Source: Statistics Sweden (2014), Statistics Sweden (2015g)*
3.5 Swedish inflation in 2015

The Riksbank’s unconventional monetary policies’ main goal was to promote inflation. According to CPI, the most widely used measure of inflation, very low inflation and deflation throughout 2015 was recorded in Sweden. On some occasions, changes in CPI were lower than one year before. Below are some other inflation measures presented. Inflation according to these measures and to CPI is presented in figures 12-15 on the next page.

CPIX is a measure of inflation which in contrast to CPI excludes official interest rates, mortgage rates, changes in housing prices and changes in some taxes and government subsidies. (Statistics Sweden 2015e)

CPIF is a measure of inflation that contrary to CPI excludes official interest rates and mortgage rates, but similarly to CPI does not exclude changes in housing prices. (Statistics Sweden 2015f)

HICP is an inflation measure used by many European countries. The methodology to calculate HICP is similar in countries who apply HICP, and it is therefore a good measure when it comes to comparing inflation rates among European countries that use the HICP measure. (ECB 2015)

Finally, market surveys done by TNS Sifo Prospera show that inflation expectations have increased after the initiation of QE and negative interest rates.

![Inflation expectations in 2015](image)

*Figure 5. Inflation expectations in 2015. Source: De Rezende et al (2015)*
### Consumer Price Index, annual rates, percent (Inflation rate)

<table>
<thead>
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**Figure 6.** CPI Sweden, 2015. Source: Statistics Sweden (2015a)

### Underlying Inflation According to CPIX, annual changes, percent

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**Figure 7.** CPIX Sweden, 2015. Source: Statistics Sweden (2015b)

### Underlying Inflation According to CPIF, annual changes, percent

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**Figure 8.** CPIF Sweden, 2015. Source: Statistics Sweden (2015c)

### Harmonized Index of Consumer Prices, annual changes, percent

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**Figure 9.** HICP Sweden, 2015. Source: Statistics Sweden (2015d)
3.6 Government bond yields

Figure 16 shows how yields on 10-year government bonds have developed during 2015. Yields were actually lower before the initiation of unconventional monetary policy measures during most of the year. This has among other things to do with the decline in demand of high-risk assets since the summer of 2015, due to international circumstances. This did in turn increase risk premiums and demand for government bonds, why yields on bonds have risen. (Riksbank 2015j)

De Rezende et al. (2015) have analyzed how Riksbank announcements of increased bond purchases, (which on some occasions have been announced in combination with lowered interest rates), have affected government bond yields. In their so called “event study”, the researchers have compared bond yields one day before the Riksbank announcement to the price at the end of the announcement day. Previous international research on the topic shows results of yields falling from 20 to 40 basis points as central banks are announcing unconventional monetary policy. Swedish yields have on average also decreased between these numbers after Riksbank’s announcements during the first months of QE measures. Here follow developments on each announcement day of monetary policy between February and July:
• In February, interest rates were cut by 10 basis points and the Riksbank announced its plans to buy bonds with maturities of up to 5 years. This made government bond yields with maturities of 2, 5 and 10 years to decrease by 12, 16 and 11 basis points.

• In March, when the Riksbank announced its intentions to buy bonds with longer maturities than 5 years, while the repo rate was lowered, the longer government bonds yields were more affected than previously.

• In April, the Riksbank made clear that it would not cut the repo rate, although further new purchases of bonds were declared. This actually made various yields to rise by between 5 to 7 basis points. (However, Sweden Government Bond 10Y reached a record low of 0.23 basis points in April of 2015 according to Trading Economics (2015b)).

• In July, both an increase of government purchases and a lowered repo rate caught market participants by surprise, and 2-, 5- and 10-year bond yields were hence lowered 11, 13 and 9 basis points respectively.

In total, 2-year government bonds yields decreased by 28 basis points on four days of Riksbank announcements between February and July; 5-year yields decreased by 34 points during these days; 10-year yields have decreased by 28 points. Yields differential between Swedish and German government bonds were also altered. In total, Swedish 2-, 5- and 10-year yields fell 29, 37 and 32 basis points respectively to German yields. Also Swedish mortgage bonds and corporate bonds were to some extent altered, decreasing 27 and 20 basis points for 2- and 5-year mortgage bonds, and 17 basis points for 5-year corporate bonds.

De Rezende et al (2015) highlight the “surprise factor” as an important reason for lower yields, as yields have seemed to change the most in cases where market participants did not foresee the Riksbank’s actions: “it is unexpected changes which influence market rates.” Data the researchers used as expectations were based on surveys made prior to Riksbank announcements.

The authors have made estimations of how much yields have been effected by lower repo rates versus the effect of bond purchases. This can be seen in figure 17.

Furthermore, the signaling channel comes in effect on monetary policy announcement days. But many other channels might be at play that cannot be recorded only by studying announcement days. The authors underline the limitations of the event study as method as it is difficult to analyze other potential channels than the signaling channel with it. Finally, the
authors conclusions are that Swedish QE has made yields rates lower than it otherwise would have been.

According to the Riksbank’s monetary policy report of December, yields did further decrease in late October when the Riksbank announced to expand QE measures. This happened despite the fact that the repo rate was not lowered, which market participants had expected. The Riksbank additionally writes that “Swedish government bond yields also rose dramatically following the ECB's monetary policy announcement.” (Riksbank 2015d)

3.7 Exchange rates

The Riksbank does not have any stated mandate to influence the Swedish currency. However, in reports and discussions distributed by the Riksbank, the progression of SEK exchange rate is high up on the agenda, and to depreciate it is an increasingly unofficial goal of Swedish monetary policy. In 2015, the Riksbank (2015k) stated that “The future development of the exchange rate is thus an important factor in the Riksbank's forecasting work.”
Initially, the SEK did depreciate during the low and negative repo rate and QE measures. CNBC (2015) reported that the SEK reached a six-year low the same week as the Riksbank announced QE measures. The SEK fell nearly two percent against the dollar – the lowest since April 2009. The SEK also depreciated 1.7 percent against the euro this week.

According to De Rezende et al (2015), the SEK has depreciated on four of five studied Riksbank monetary policy announcement days. (See figure 18). However, it has appreciated against the euro from February to July 2015. The Riksbank (2015g) writes that "Since the Riksbank's most recent decision in April, the krona has strengthened more than expected against several currencies." Khan (2015) wrote that Sweden's currency appreciated by 5 percent between March and October 2015. A Bloomberg (2015a) article claims the same thing, that the SEK according to a correlation-weighted index of 10 currencies. But the SEK would have appreciated more if it were not for unconventional monetary policy measures by the Riksbank, according to De Rezende et al (2015).

![Table](image.png)

*Figure 12. Changed valuations of the SEK immediately after Riksbank monetary policy meetings with announced government bond purchases. Source: De Rezende et al (2015)*

With exception of August, the SEK appreciated against the euro during most of 2015. (Bloomberg 2015d) It also appreciated against the Australian dollar (XE.com 2015a) and the Swiss Franc (XE.com 2015b). The SEK depreciated against the dollar in 2015 (Trading Economics 2015d). It remained on average unchanged towards the Japanese yen and British pound sterling (XE.com 2015c), (XE.com 2015d). Most importantly, the SEK has appreciated according to the KIX-index, which is the Swedish currency compared with all currencies of the OECD plus the BRIC-economies. (Riksbank 2016b)

In some of the aforementioned cases, the exchange rates between currencies can be explained by countries' monetary policies. While the euro has depreciated by a major QE program launched by the ECB in January (Financial Times, 2015), the Swiss franc has depreciated heavily since its peg to the euro was scrapped and other monetary policy implemented. At the beginning of the year, Switzerland’s official interest rate was dropped to minus 0.75 percent. Also, the Swiss central bank has intervened on the currency market to depreciate its currency during 2015. (Wall Street Journal, 2015)
3.8 The wealth effect

3.8.1 Overview of the wealth effect

Numerous of the transmission channels mentioned under paragraph 2.3 are supposed to increase investments and consumption in the real economy via the “wealth effect”. Some commentators argue that this resembles the “trickle-down theory” spawned by the Reagan and Thatcher governments (The Economist 2015). This will be discussed in later chapters.

QE is supposed to increase equity prices, which in turn enables owners of equity to invest and consume more. In the Washington Post 2010, Bernanke (2010) wrote:

“Lower corporate bond rates will encourage investment. And higher stock prices will boost consumer wealth and help increase confidence, which can also spur spending. Increased spending will lead to higher incomes and profits that, in a virtuous circle, will further support economic expansion.”


3.8.2 Wealth effect in the US

Figure 19 show the correlation between equity values of 500 major US companies and the Fed’s balance sheet. QE measures seem to have been beneficial to stock markets in the US. Some economic commentators say that the wealth effect has been the most visible of QE’s transmission channels in the US. Cox (2015) writes that “The primary place where QE seems to have worked is in the stock market, where the S&P 500 has soared by 215 percent since the
recession lows in March 2009. Elsewhere, though, deflation fears have permeated and interest rates have remained low.”

### 3.8.3 Wealth effect in the UK

The wealth effect also seems to have been present in the UK. The BOE calculated that shares and bonds had risen by 26 percent, or 600 billion pounds, due to QE. As the richest 5 percent of households are holding 40 percent of these assets, these households have directly benefited the most from the British wealth effect. According to data from the Office for National Statistics, the richest 10% of households would have been either £128,000 richer per household or £322,000 richer depending on the methodology used, thanks to QE measures by the BOE. (The Guardian, 2015)

### 3.8.4 Critique of the wealth effect

The wealth effect has its critics. Some commentators say that the wealth effect is not stimulating the real economy. Gallo (2015) writes that “The wealth effect is weak too: higher asset prices reward people who own assets in the first place and the wealthy tend to save more of their gains, reducing the impact of QE on demand.” Furthermore, according to Roach (2015) former executive of Morgan Stanley, only 3-5 cents of every dollar of asset price appreciation leads to higher personal spending.

### 3.8.5 Wealth effect in Sweden

Riksbank analysts do not mention wealth effect as the primary transmission channel for the Swedish QE. However, it is mentioned as a potential positive result of the Swedish QE and negative repo rate in a monetary policy report: "[QE is expected] to affect prices of mortgage bonds and corporate bonds, as well as other assets. For instance, equity prices or even housing prices can rise.” (Riksbank 2015a)

Sweden is a small open trade-dependent economy. What happen with Sweden’s major trading partners does also affect Sweden. Moreover, Sweden’s stock markets are highly correlated with many European stock markets. Hence, QE in Sweden might have a less significant
influence on Swedish equity prices than QE in the US for example, whose stock indices are less correlated with other economies than Sweden’s. (Macroaxis Inc. 2015)

According to Macroaxis Inc. (ibid.), correlation coefficient (where +1 implies perfect positive correlation and -1 implies perfect negative correlation) in 2015 between OMX Stockholm and the British FTSE 100 was 0,85; between OMX and the German DAX: 0,88; OMX and the French CAC 40: 0,88; between OMX and the Irish ISEQ: 0,81; between OMX and the Spanish IBEX35: 0,80.

According to research by De Rezende et al. (2015), Swedish stock markets have between February and July 2015 moved in line with European stock markets, with exceptions on Riksbank announcement days of changed monetary policy in March and February, where Swedish stock markets showed greater upturns than European stock indices.

Figure 20 shows how the Swedish stock index OMXS30 has developed during 2015. The graph also shows the correlation between the Eurozone index Euro Stoxx 50. As mentioned earlier, decreasing upturns in the indices from May/June has to do with decline in demand of high-risk assets since the summer of 2015, due to international circumstances. (Riksbank 2015j)

![Graph showing OMXS30 and Euro Stoxx 50 indices with correlation]
3.9 Negative side-effects of QE

3.9.1 Overview

The potential beneficial effects of QE and low official interest rates have been described under paragraph 2.3. This chapter presents some negative side-effects that unconventional monetary policy might bring.

QE and lower official interest rates are supposed to make it cheaper for corporations take up more loans and invest more. At the same time, Swedish authorities and other economists are expressing concerns that the financial system may become more vulnerable due to low interest rates. Back on May 22, 2013, in remarks to the Joint Economic Committee of Congress, former Fed Chairman Ben Bernanke brought up the topic of increased systemic risk in financial markets as a result of low official interest rates:

“…the Committee is aware that a long period of low interest rates has costs and risks… one that we take very seriously, is the possibility that very low interest rates, if maintained too long, could undermine financial stability. For example, investors or portfolio managers dissatisfied with low returns may ‘reach for yield’ by taking on more credit risk, duration risk, or leverage.” (Bernanke 2013)

In similar fashion, the Riksbank writes that as policy makers consciously increases market risk with low interest rates and QE, these policies are also increasing systemic vulnerability in the financial system as assets become overvalued and market risks are not fully anticipated. (Riksbank 2015b)

3.9.2 Swedish asset price bubble


Plender (2015a) further writes that "the impact of QE [in the United States] has been much more striking in the housing market." This seems also to be the case in Sweden.

Two financial journalists write that “Sweden’s record-low interest rates risk fueling a property bubble, with a growing chorus of bank executives and analysts warning that the nation’s housing price growth is unsustainable.” (Bloomberg 2015a) They are referring to average
interest rates for new mortgages, which have decreased from an average of 2.70 percent in 2014 to an 1.76 percent average in 2015 (including January, excluding December). These lowered interest rates have been an important factor to the increased monthly growth rates in mortgage loans, which were 5.8 percent on average in 2014, and 7.4 percent in 2015. (Statistics Sweden 2014), (Statistics Sweden 2015g)

Mortgage borrowing has increased twice as much than economic growth in Sweden since 2009 according Khan (2015), while housing prices have increased by almost 50 percent. Moreover, almost 80 percent of household debt comprise of mortgage debt. Homes are used as collateral of much of this debt and comprise a large part of households’ total wealth, according to Finansinspektionen (2015b), a Swedish public authority responsible for regulating financial markets and supervising market participants.

Increasing housing prices and household debt is a major concern of Swedish authorities. For the first time ever, the National Institute of Economic Research, (Konjunkturinstitutet in Swedish) in October 2015 officially alarmed that Sweden may experience a housing bubble that can implode. The institute’s director, Mats Dillén, said that “There is a significant risk that [housing] prices are on an unsustainable level.” (SVT 2015)

According to the Riksbank’s Financial Stability Report 2015:2 (Riksbank 2015j), low interest rates have increased systemic risk in the Swedish financial system primarily via increased mortgage lending. Swedish banks were already highly exposed to the housing sector before the time of unconventional monetary policy, and “have become more exposed to the mortgage market, which has expanded as a result of the low interest rates.” In the same report, the Riksbank states that the Swedish housing market is highly valued in a historical perspective, which increases the probability that housing prices will fall.

A press release from the Riksbank (2015h) cited a survey made by the Riksbank in which participants also worried about Swedish household’s increasingly high debts.

If housing prices were to decrease, Swedish household wealth would decrease, and consumption would suffer. Household debt would still be in place, but proportionally larger to household equity than before descending housing prices. If housing prices were to decrease markedly, some home-owners would have to default on their debts, which would give banks liquidity problems. This could in turn make it more difficult for Swedish banks to get new loans, which could force them to become insolvent. Sweden has the third biggest banking sector in relation to GDP in Europe (The Riksbank 2015j). One state authority moreover
writes that Swedish banks are systematically important and hence are “too-big-to-fail”, meaning that authorities will have to apply different measures to save a bank if it defaults, which could be costly for tax-payers (Finansinspektionen 2015b). Such an event would force the economy into a major recession: “In the event of a serious economic shock, the consequences for the Swedish economy could be great” (The Riksbank 2015l).

3.9.3 QE might worsen financial market functioning

If a bond market shrinks, chances are high that it becomes less liquid. This is the case with the Spanish government bond markets. Spanish bonds are offered better credit rates than Italian government bonds. But due to the fact that the Italian bond market is twice as big as the Spanish, Spanish bonds are less liquid than Italian bonds. (Bloomberg 2015b) The Swedish government bond market is significantly smaller than before the QE project was launched, as close to one third of bonds are being bought by the Riksbank (Riksbank 2015c). Moreover, German bond volatility is nine times its average since the last 15 years. This should be expected according to Central Bank President Mario Draghi, who the 3rd of June said that increased volatility in bond markets is a byproduct of QE. (Bloomberg 2015c) In a similar way, unconventional monetary policies in Sweden seem to have made some financial markets functioning less well. According to a press release from May 2015 based on a risk survey from the Riksbank (2015f), one in two respondents “consider that the Swedish financial markets are functioning slightly less well than they were six months ago. Moreover, more respondents than before believe that market functioning will deteriorate further in the coming six months.” Declining market makers, declining risk willingness among market makers and various increased financial regulations were causes that respondents made for their perception as less well-functioning financial markets. Numerous respondents also blamed the Riksbank’s QE program:

“Several respondents also think that the Riksbank's purchases of government bonds have had a negative effect on market liquidity in the Swedish fixed-income market. Respondents worrying more about risks linked to expansionary monetary policy… The respondents assess that there is a relatively high probability that risks linked to the expansionary monetary policy will be realised. Examples mentioned are the risk that asset price bubbles will build up and have negative consequences for the Swedish financial system.”
The Riksbank’s Financial Stability Report 2015:2 says that “A majority of market participants surveyed in a Riksbank risk survey think that the functioning of the fixed-income market has become impaired. One of the reasons for this is considered to be the Riksbank’s purchases of government bonds as these have led to a decrease of the outstanding volume of bonds available for trade on the secondary market.” (Riksbank 2015j)

The Riksbank said in a press release from November that according to another risk survey, 50 percent of respondents felt that financial markets are “functioning less well than they were six months ago and that this is primarily due to lower market liquidity… One reason for this is that market liquidity on the Swedish financial markets has declined.” Participants said that market makers are more scarce and more risk-averse than before, which among other things has to do with uncertainty. However, worsened liquidity also had to do with a negative repo rate and QE according to the contributors of the survey, just like the survey from May reported mentioned above. “Several participants also consider that the purchasing of government bonds by the Riksbank has impaired market liquidity in the Swedish fixed-income market. A number of participants think that the risks associated with low interest rates are palpable.” Negative interest rates have investors looking for riskier assets than government bonds which in turn may “lead to the underestimation of risks and to the accumulation of bubbles in several asset types”. Riksbank (2015h)

3.9.4 QE, “trickle-down” and wealth inequality

Some commentators argue that QE resembles the “trickle-down theory” spawned by the Reagan and Thatcher governments. (The Economist 2015) According to this theory, lower taxes on wealthy individuals are perceived to benefit the whole society as the wealthy would invest their increased income, which would lead to the trickle-down of wealth to all parts of society.

Economics Professor John P. Watkins (2014) says that "Quantitative Easing represents a variation of trickle-down economics […] Data suggests that the policy has exacerbated the inequality in the distribution of wealth and income, has done little to reduce unemployment, and has violated the principles of social justice."

Jean Pisani-Ferry (2015), French politician and economics professor says the following about ECB’s QE measures:
"QE probably will increase inequality. The rise in the price of stocks, bonds, and land will increase their owners’ wealth. Obviously, those without property will not benefit. But the ECB’s monetary initiative will also help re-ignite growth and create jobs, thereby benefiting the poor."

Gallo, A (2015) of Financial times supports the two previous statements further claims that QE is increasing wealth inequality.
4. Analysis

4.1 Transmission channels

As claimed earlier, the repo rate is primarily designed to affect short term interest rates. QE is an attempt to further make monetary policy successful when it is no longer easy to use official interest rates to stimulate the economy. The aim of QE is to affect longer term interest rates. Long term interest rates are determined by short term interest rates, which the Riksbank can influence by the repo rate, and by market expectations, which central banks also can influence with “forward guidance” if they are viewed as credible among private actors, and/or via different transmission channels that are made via QE. One of these is the “signaling channel/confidence effect”. This channel has been among the most visible transmission channels during 2015. Yields have been significantly lowered, on average, when announced monetary policy has caught market participants by surprise. On such days, various bond yields have decreased more than on most other days.

QE does also affect long term rates via the “Premium Channel”, which is explained in the theory part of this thesis. The premium channel should have come into effect since as much as one third of government bonds are being bought by the Riksbank. Bond yields were initially lowered, but rose since April due to higher demand of safe assets due to increased international uncertainty. As mentioned earlier in this report, Swedish government bond yields have also risen when ECB has announced new measures of unconventional monetary policy in 2015.

A low repo rate in concert with QE measures can potentially lower the whole yield curve. But the potential benefits of lower long term rates that QE enhances may thwart future monetary policy. As mentioned before, long term rates are correlated with short term rates, and the lowered long term rates adjusted via QE can, against the will of policy makers, be raised once the repo rate is raised. The Riksbank hence may make it more difficult for itself to pursue monetary policy in the future by practising QE. To assess what may happen with long term bond yields if the repo rate where to be increased, one should perhaps take a look at what happened with US long term interest rates when the Fed increased its official interest rates in early 2016.
4.2 QE and inflation in Sweden

Despite unconventional monetary policies in 2015, inflation did not increase much according to the CPI measure. To the contrary, inflation was lower in 2015 than the year before on some months, and deflation was recorded on some months that year. Again, this is similar to most other international cases where QE has been practiced.

All three of the presented alternative inflation measures to CPI show a higher inflation rate than CPI. This make sense as the CPIX and CPIF measures are not affected by the low interest rates, which pushes down inflation levels of the CPI measure. The inflation measure that shows the highest inflation rate is CPIF. This is logical as housing prices are not excluded from the measure, as is the case with CPI and CPIX that do exclude changes in housing prices. The rise in housing prices has therefore affected the CPIF measure positively. Although the CPIF measure records the highest inflation, the inflation rate according to this measure is still slightly below one percent, which is one percent below the Swedish inflation target. Inflation according to CPIX is about 1,5 percent below the inflation target on average.

4.3 Swedish money supply and monetary base under QE

When it comes to the monetary base and money supply, unconventional monetary policy seems to have affected these measures similarly as in other countries, when one compare Figure 10 to various figures in Appendix, as mentioned above. While the monetary base has increased markedly, a little more than 100 percent in 2015 compared to about zero percent in 2014, growth in money supply hardly increased at all. A monetarist would explain this to be the reason why inflation does not occur despite QE measures: QE does not increase the money supply, and hence are will not inflation increase sufficiently.

4.4 Why is the successffulness of QE limited?

An increase in the monetary base has not brought about inflation or a rise in the money supply in any developed country in recent years. The appendix presents four countries where this has been the case. Nor in Sweden has the inflation got anywhere near its target rate, and the money supply has not increased more than marginally. Hoarding and uncertainty seem to be important reasons why the monetary supply does not increase – borrowing is scarce and hence
is the money multiplier small or perhaps negative in some countries, which Japanese Economist Richard Koo claims can be the case. This has resulted in a revitalization of the Liquidity Trap, which says that monetary policy is unable to improve activity in the economy as interest rates are already pushed very low. A liquidity trap takes its form when a risk-averse private sector hoard newly created central bank money, and that interest rates can no longer be pushed down significantly. Perhaps monetary policy cannot stimulate the economy at the present state.

The Quantity Theory of Money equation, \( MV = PY \), might be a useful framework in explaining the abovementioned insight. The Velocity of Money (or \( V \)) seems to have decreased significantly after the crisis of 2008, due to low economic activity. This may influence the other factors in the equation.

The Keynesian school and the Monetarist school view monetary policy differently. The former says that monetary policy is useless in depression-type recessions, while the latter is much less critical against monetary policy in times of deep recessions. But likeminded assumptions that is possible to deduct from the two frameworks of the different schools of economic thought is that central bank policy alone cannot bring about positive economic result. Other theories, such as “debt deflation” and “balance sheet recession” that are shortly mentioned in this thesis’ theoretical framework, can explain why QE cannot lift an economy out of certain bad traits. Both theories explain low inflation or deflation as a result of the private sector’s low demand of borrowing. The low demand does not change by any large extent even if interest rates are lowered, if possible, and hence is monetary policy not a powerful tool in bring about improvements in the economy.

4.5 Wealth effect

Normally, asset prices are increased by positive economic results. Conversely via the wealth effect, asset prices are artificially increased by QE’s transmission channels in order to put forward positive results in the real economy by increasing spending and consumption from wealthier asset owners. It is difficult to spot any particular increase in Swedish stock market indices in relation to after February where QE and a negative repo rate were introduced. The OMXS30 was actually lower on most days after QE was announced, than before the announcement day. This is probably due to the fact that Swedish stock indices are highly
correlated to European stock indices. It is difficult to assess what impact QE has had on stock indices, and the question of this topic is hence left unanswered in this thesis.

4.6 QE and financial vulnerability

The Riksbank’s QE measures have increased the vulnerability of Swedish financial markets, as the Riksbank’s own economists, amongst others, claim. Unconventional monetary policy might have decreased bond market liquidity, as one third of outstanding government bonds are possessed by the Riksbank. It might also have helped inflating a housing bubble as mortgage rates have been lowered. The Riksbank seems to consequently have sacrificed a less vulnerable financial system in the pursuit of higher inflation.
5. Conclusions

QE in Sweden seems to both have brought about positive and negative effects. Key interest rates have been lowered and loan growth have increased, which could have been a result of increased confidence in the Riksbank that QE may have brought about. (Certainly, a lowered repo rate have probably also contributed to lower short term interest rates.) Moreover, inflation expectations have increased as QE has been launched, and on Riksbank announcement days of further QE measures, bond yields have on average been lowered. Also, several Swedish economists claim that QE have helped to depreciate the Swedish exchange rate.

However, QE has failed to bring about some desired results. As in other countries, QE has not increased the Swedish money supply, nor has inflation been pushed anywhere near its target rate. QE also seem to have had some negative side effects. Financial vulnerability and less well-functioning bond markets have been negative side-effects of monetary policy of 2015. Many market participants say that the bond markets have been less well-functioning this year than previously due to Riksbank QE measures, according to market surveys.

QE seems to lower bond yields, an especially long term yields. One self-made problem the Riksbank creates when it engages in QE measures is that it is more difficult to increase the repo rate in a future scenario where QE has lowered long term yields. This is because long term yields are interrelated with short term yields, and achievements that QE has made can be crushed as a higher repo rate pushes the whole yield curve upward. The Riksbank hence may make it more difficult for itself to pursue monetary policy in the future by practising QE.

Three theories explain why monetary policy might fail to stimulate the economy to a great extent during a large recession:

- Keynes’ liquidity trap claims that interest rates already are maximally or almost maximally reduced, and that newly created central bank money are not spent on productive purposes by the private sector but rather hoarded, which does not result in an increase in the money supply.
- Fisher’s debt deflation theory means that a highly indebted private sector above all strives to decrease its debt burden. This means that debts are paid off, which lowers the total amount of bank deposits, which in turn decreases the money supply, which might cause deflation.
• Koo’s balance sheet recession is similar to the abovementioned debt deflation theory, which states that the private sector is heavily indebted and that companies are not interested in new cheaper loans as they instead strive for minimizing their debt.

All three of these theories claim that the private sector is temporarily exhausted during a deep economic crisis and that it is not very willing to invest more even if loans are becoming cheaper, i.e. if interest rates are lowered (if possible). The first and the third, if not even the second theory, claim that fiscal stimulus might be a good alternative to monetary policy in reviving the economy.
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7. Appendix
Following figures are gathered from Koo (2015).

Figure 15. Monetary base, money supply and inflation in the US since 2007

Figure 16. Monetary base, money supply and inflation in the eurozone since 2007
Figure 17. Monetary base, money supply and inflation in the UK since 2007.

Figure 18. Monetary base, money supply and inflation in Japan since 1990.