

# SPEECH



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## The Riksbank's bond purchases affect government finances\*

Prior to the financial crisis of 2008, the Riksbank could make profits without taking any actual risks. The assets on our balance sheet mainly consisted of foreign debt securities while the main liability items were outstanding banknotes and coins and our equity. The assets generated a reliable return, although their value fluctuated with foreign exchange rates, while the liabilities were interest-free. The Riksbank could therefore easily fund the bank's operations as well as distribute a surplus to the government.

But the current picture of the Riksbank's financial position and risks is entirely different, something that, in part, can be illustrated by how the balance sheet has grown and changed in nature (see Chart 1). One important change is that the decline in the use of cash and the low interest rates have impaired our earning capacity, something which my colleague Kerstin af Jochnick has previously highlighted.<sup>1</sup>

Another important change is that the Riksbank has purchased large volumes of Swedish government bonds since the beginning of 2015. These purchases have increased the risks on our balance sheet and made our profits and dividends more sensitive to interest rate changes. The bonds have so far increased in value but there is every indication that they will lead to a loss in the future, and hence contribute to a period of lower or zero dividends to the government.<sup>2</sup> Today, I would like to outline how the bond purchases have created these interest-rate risks and how future interest-rate developments will affect the Riksbank's profits and dividends.

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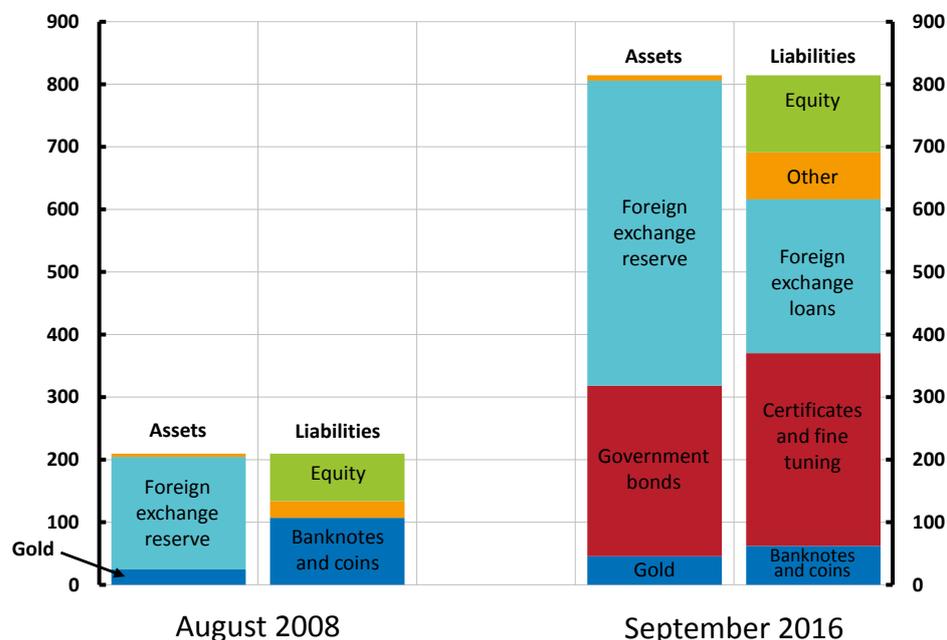
\* Thanks to Carl-Johan Belfrage, who has helped me write the text, and to Jan Alsterlind, Heidi Elmér, Henrik Erikson, Rickard Eriksson, Ola Melander, Marianne Stemer, Ulf Söderström and Anders Vredin, who have contributed valuable comments and observations.

<sup>1</sup> See af Jochnick (2015).

<sup>2</sup> Another change is that the Riksbank has built up a larger foreign exchange reserve. This larger reserve does not, however, involve any actual increase in the currency or interest-rate risks as it is funded by foreign exchange loans with approximately the same maturities as the new assets. But the larger foreign exchange reserve will still lead to the Riksbank's reported profit being more sensitive to interest rates. This is because the Riksbank's assets but not its liabilities are reported at market value. The lower interest rates have therefore improved the Riksbank's reported profit via value increases in the foreign exchange reserve, but will contribute to lower reported profit a few years ahead.

**Chart 1. The Riksbank's balance sheet**

SEK billion



Source: The Riksbank

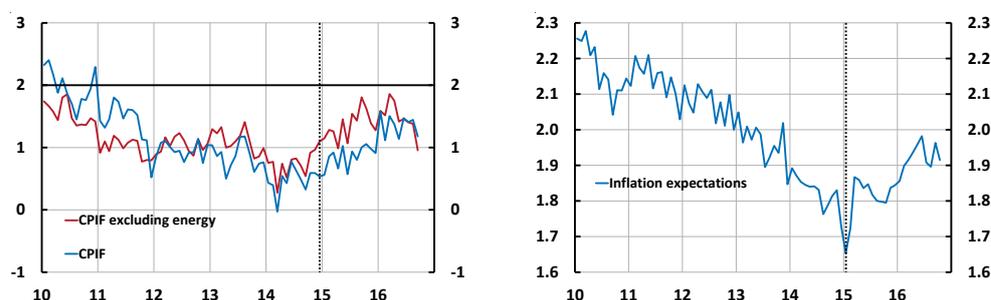
### The Riksbank purchases government bonds to support the upturn in inflation ...

To begin with, I would like to remind you that the aim of the Riksbank's operations is not to make a profit and deliver dividends to the government. Our task is to maintain price stability, and bond purchases are one component of the expansionary monetary policy we are conducting in order to safeguard the credibility of the inflation target. The Riksbank started purchasing government bonds in February 2015. At that time, inflation had been low for a long time, long-term inflation expectations had fallen to a record-low level and a period of falling oil prices risked pushing down inflation expectations even further (see Chart 2). In this situation, the Riksbank needed to safeguard continued confidence in its ability and willingness to stabilise inflation around the inflation target. As we know, a credible inflation target lays the foundation for efficient price-setting and wage formation and hence promotes good growth in the economy.<sup>3</sup>

At the same time, the problems of falling inflation and inflation expectations also became increasingly apparent in the euro area. This led to the European Central Bank signalling the need for even more expansionary monetary policy in the period ahead, with low interest rates for even longer, supplemented by extensive asset purchases. The increasingly expansionary monetary policy in the euro area also led to monetary policy reactions from several smaller countries on the outside.

<sup>3</sup> The significance of the inflation target for the economy is explained in detail in Sveriges Riksbank (2015a) and Flodén (2015).

**Chart 2. Inflation and inflation expectations have picked up**



Note. Annual percentage change and per cent. The CPIF is the CPI with a fixed mortgage rate. Inflation expectations 5 years ahead according to money market participants. The broken line indicates the time of the monetary policy decision in February 2015.

Sources: TNS Sifo Prospera and Statistics Sweden

For the Riksbank, this development led us during the spring of 2015 to reduce the Swedish policy rate, the repo rate, to negative levels and to start purchasing government bonds. One purpose of the bond purchases was to push down interest rates on longer maturities.<sup>4</sup>

My assessment is that this monetary policy has, on the whole, been successful. The bond purchases seem to have pushed down interest rates more or less in the way we expected.<sup>5</sup> And the monetary policy also seems to have had the intended effect on inflation and inflation expectations. The downward trend has been reversed and both are now on significantly higher levels than at the end of 2014 (see Chart 2). At the same time, the Swedish economy has developed positively, with high growth and falling unemployment.

### **... but the effects on the Riksbank's finances must nevertheless be taken into account**

The purpose of the Riksbank's bond purchases is thus to support the inflation target's role as nominal anchor for price-setting and wage formation, and thereby to contribute to a positive development in the Swedish economy. How the Riksbank's financial position is affected is therefore of subordinate, but not negligible, importance. I see at least two reasons to monitor how the Riksbank's finances develop. First, the Riksbank's finances are part of public finances. The size of the Riksbank's profits and losses affect the dividends we can deliver to the government. The Riksbank's annual dividends to the government have been SEK 5 billion on average over the past five years. This is a considerable sum, albeit small in relation to total tax revenues.

Second, the Riksbank, like other central banks, needs to have a balance sheet that does not undermine its financial independence.<sup>6</sup> Central banks differ from other banks and companies, of course, in that they can always create new money to fund their expenditure and because they are not subject to normal bankruptcy legislation.

<sup>4</sup> Alsterlind et al. (2015) describe how bond purchases can affect interest rates via several different mechanisms.

<sup>5</sup> See De Rezende, Kjellberg and Tysklind (2015) and De Rezende (2016).

<sup>6</sup> A detailed review of the research and discussion of the view of central banks' finances can be found in Archer and Moser-Boehm (2013). Stella and Lönnberg (2008), Del Negro and Sims (2015) and Sims (2016) discuss the importance of the balance sheet for the ability of central banks to pursue an effective monetary policy. See Ernhagen, Vesterlund and Viotti (2002) for Swedish perspectives.

But a central bank that is forced to create money in order to fund its expenditure cannot simultaneously pursue a monetary policy that safeguards price stability. Neither is it desirable for central banks to rely on funding from the government as there is then a risk of the funding being linked to conditions being put on the bank's management or actions. This is exactly why EU legislation requires a central bank to have adequate financial resources to be able to carry out its tasks independently.<sup>7</sup>

This reasoning does not necessarily mean that a central bank must have positive equity. Negative equity can be compensated for by a large amount of outstanding banknotes and coins, at least if there is confidence in the bank's continued earning capacity.<sup>8</sup> But in Sweden, the demand for cash is low and continues to fall. Therefore, the Riksbank can hardly count on having sufficient earning capacity in the future unless its equity remains positive.

But how does this reasoning about the Riksbank's financial position relate to the bond purchases?

### **Bond purchases increase the risks on the Riksbank's balance sheet**

When the Riksbank purchases a government bond, both the assets and the liabilities on our balance sheet increase. The bonds purchased by the Riksbank are of course reported as an asset. But we fund the purchases by simultaneously selling Riksbank certificates with a maturity of one week. And these certificates become a liability on the Riksbank's balance sheet, and the interest rate on the liability is the repo rate. As the bonds we buy have a much longer maturity (about five years on average) than the certificates, the Riksbank has to renew the borrowing every week by selling new certificates.

It is this maturity transformation that poses an interest-rate risk for the Riksbank. If we hold the bond until it has matured, we know exactly how many Swedish kronor the Riksbank will receive in interest on it. And we also know how much it cost to buy. But we don't know what the funding cost for the bonds will be. Because the cost depends on how the repo rate develops up until the bond matures.

This maturity transformation is actually quite similar to operations pursued by commercial banks to make a profit, i.e. holding long-term assets funded by short-term borrowing. And even if such operations are associated with an interest-rate risk which makes for an uncertain return, one can normally count on making a profit more often than making a loss. This is because short-term rates (such as the repo rate that has a one-week maturity) are usually on average slightly lower than long-term rates (e.g. the rate for five-year government bonds). In economics jargon, this is referred to as term premiums on the financial markets normally being positive.

In practice, however, it is very difficult to determine how large these term premiums are at any one particular time. The premiums cannot be directly observed on the financial markets but must either be estimated based on a forecast for future short-term rates or estimated using statistical methods based on historical connections between interest rates at various maturities and different asset-types.

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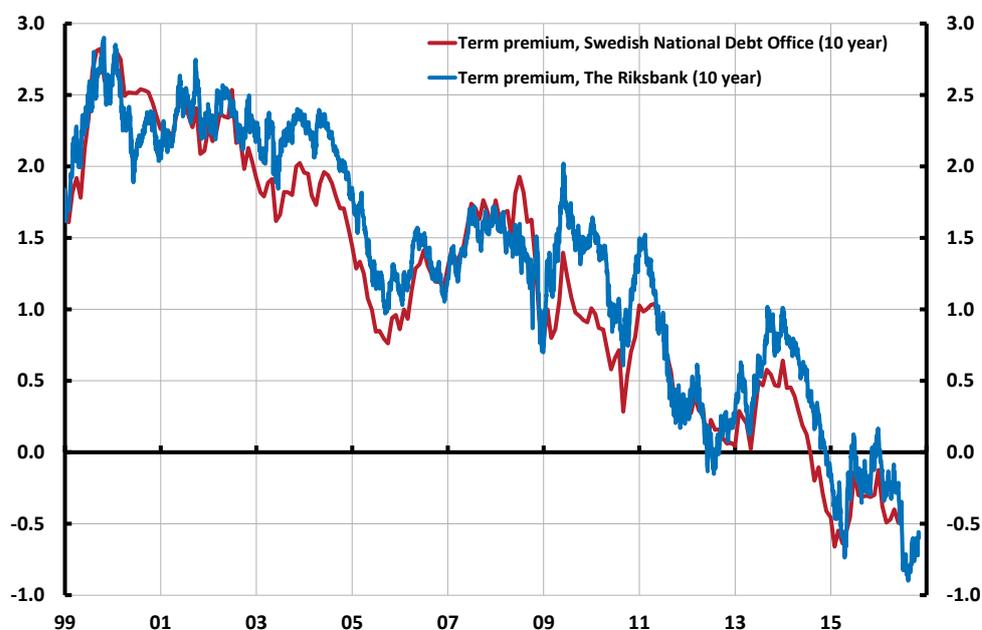
<sup>7</sup> The ECB's (2012) interpretation of this is that central banks should avoid prolonged periods with negative equity.

<sup>8</sup> For example, the central banks in Chile, the Czech Republic, Israel and Mexico have been able to fulfil their tasks despite having worked with negative equity for long periods of time (Archer and Moser-Boehm, 2013).

Both the Riksbank's own interest rate forecasts and the statistical methods suggest that the term premiums are now very low, and maybe even negative. Chart 3 shows the Riksbank's and the Swedish National Debt Office's estimations of the term premium on ten-year government bonds based on similar statistical methods. These statistical methods, as I have said, produce fairly uncertain results, but they clearly indicate that premiums have fallen sharply in the last decade.<sup>9</sup> Both the Debt Office's and the Riksbank's estimates indicate that the term premium is negative. If the premium really is negative, the Riksbank is expected to lose money on purchasing bonds and funding them at the repo rate. The Riksbank's estimate points to the term premium currently being around -0.7 per cent on bonds with long maturities.<sup>10</sup> This would mean that the loss is expected to be around 0.7 per cent of the purchase price for each year of maturity. Since the average maturity on the bonds is about five years, this would mean that the losses are expected to be 3.5 per cent of the purchase price.

**Chart 3. Estimated term premium**

Percentage points



Note. The Swedish National Debt Office's estimate is based on swap rates while the Riksbank's estimate is based on government bond rates.

Sources: Swedish National Debt Office and the Riksbank

<sup>9</sup> One uncertainty factor is how well these methods can capture changes in the interest rate's normal level. There are some signs that the fall in the estimated term premium has been caused by a decline in interest rate expectations, rather than by an actual change in the premium.

<sup>10</sup> In this assessment, it is actually not a question of only the premium, but also of a difference in valuation between Riksbank certificates and government securities, where the market has valued government securities higher in the past year. The interest rate on government securities with a maturity of one week is now almost 0.4 percentage points lower than the repo rate despite them referring to the same maturity.

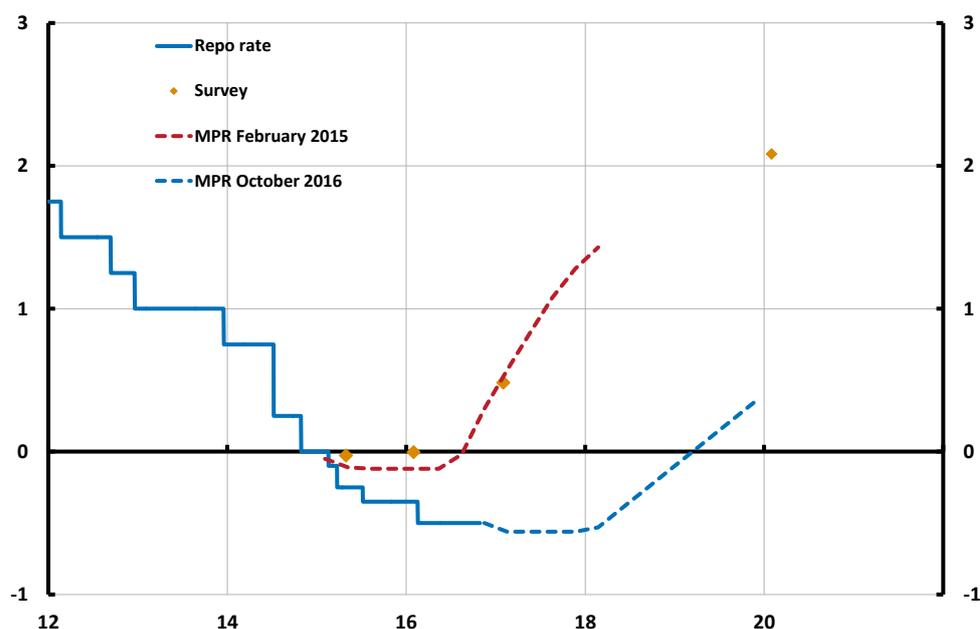
## So far, interest rates and the Riksbank's costs have been lower than expected

As the statistical estimates of the term premium are uncertain in many ways and have several possible sources of error, I think we obtain a clearer picture of the effects of bond purchases on the Riksbank's balance sheet by studying different interest rate scenarios.

Let us begin with the situation in February 2015 when we started purchasing bonds. The interest rate on five-year government bonds fell to just under zero after our monetary policy announcement. But Chart 4 shows that those of us on the Executive Board of the Riksbank as well as the money market participants in Prospera's survey thought at the time that the repo rate would be brought back into positive territory towards the end of 2016 and then continue to increase. One can say that the Riksbank purchased government bonds that gave a return of approximately zero but that were expected to be funded according to the repo rate forecast. The chart shows that the Riksbank therefore expected to make a loss, as the funding costs were expected to be higher than the yield.<sup>11</sup>

**Chart 4. Actual and expected interest rate developments**

Per cent



Note. Survey responses show the mean value for the repo-rate expectations of money market participants in February 2015. "MPR" refers to the Riksbank's forecast for the repo rate in its monetary policy reports. Sources: Statistics Sweden and TNS Sifo Prospera

But Chart 4 also shows that the repo rate has so far turned out to be much lower than the interest rate forecasts. The bonds have therefore risen in value and the funding of the bond purchases seems to become cheaper than expected, something which, at least in the short term, has led to higher profits than expected for the Riksbank. This is

<sup>11</sup> An alternative measure of the future repo rate is provided by the market's pricing of certain derivatives. This pricing suggested that the repo rate would increase more slowly than in the Riksbank's forecast, but the bond purchases would realise losses also according to these market-based expectations.

reflected in, for example, the forecast for the Riksbank's dividend-qualifying profit in 2015 and 2016.<sup>12</sup> At the end of 2014, a total loss of just over SEK 10 billion was expected for those two years.<sup>13</sup> In March 2015, when bond purchases had begun on a small scale, the expected loss had risen to almost SEK 14 billion. The latest forecast, from October this year, has the benefit of hindsight and indicates that the outcome will instead be a profit of almost SEK 13 billion.

### Losses likely in the period ahead

The fact that the Riksbank's bond purchases have so far been profitable does not mean that this will always be the case. For example, the ever-lower interest rates have made bond purchases after the spring of 2015 increasingly costly. The Riksbank has now purchased bonds for about SEK 275 billion and several bonds have a long remaining maturity. How expensive it will be to fund this portfolio will therefore depend on the development of the repo rate for a long time to come.

According to the current assessments made both by ourselves and others, it is more likely that the bonds that we have purchased in recent months will lead to losses rather than profits for the Riksbank. For example, the yield on ten-year government bonds is now 0.2 per cent. The Riksbank does not make forecasts for the repo rate for more than three years in the future. Even within this limited time horizon, interest rate developments are very uncertain, but let us in any case assume that the repo rate develops in line with the forecast. And let us assume that the repo rate then continues to rise slowly towards 4 per cent (see Chart 5).<sup>14</sup> The average interest rate level up until the bond matures in 2026 will then be 1.2 per cent. Paying on average 1.2 per cent in interest and receiving on average 0.2 per cent in interest represents a loss of 1 per cent a year. Overall, this would be about 10 per cent up until the bond matures. This loss can be seen in Chart 5 as the difference between the repo rate, i.e. the funding cost, and the forward curve that follows from the pricing of the bonds. This difference increases from about 0.3 percentage points on short-term maturities to about 2 percentage points on the ten-year horizon, and is hence on average 1 per cent.

The example shows that the interest rate risk and the possible loss are particularly large when we purchase bonds with long maturities. But ten-year bonds are not, as I have said, representative of the bonds purchased by the Riksbank. A more representative bond has a maturity of five years. For a five-year bond purchased today, the loss will be between 3 and 4 per cent of the purchase sum if the interest rate develops as in this example. This is of a similar magnitude to the calculations based on the estimated term premium.

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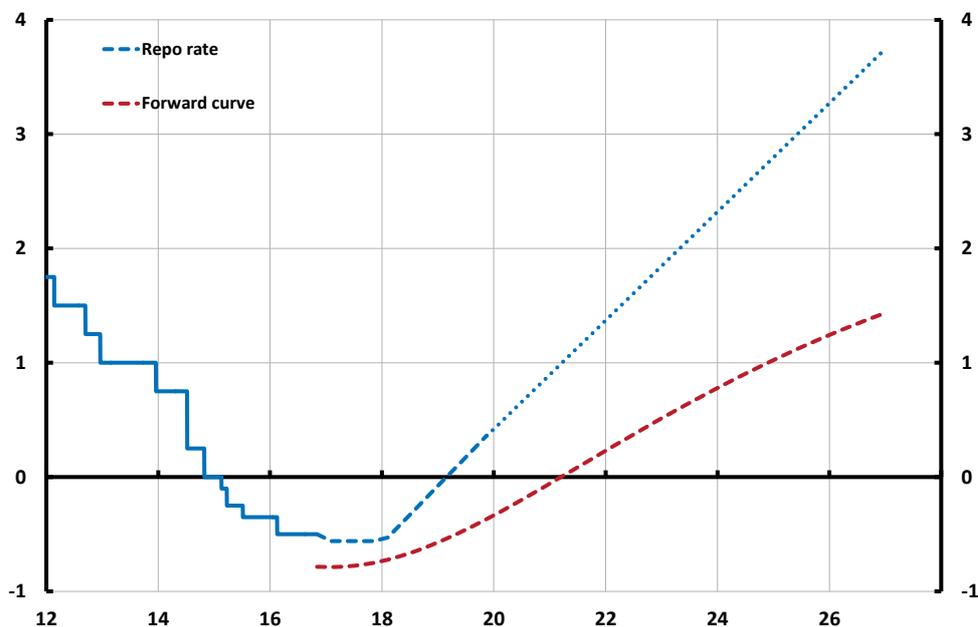
<sup>12</sup> This forecast is based on the National Institute of Economic Research's interest rate forecasts. The low interest rates have also led to an increase in the market value of the foreign exchange reserve, which has contributed significantly to an improvement in the Riksbank's reported profit. This improvement is however almost entirely an accounting illusion that will be counterbalanced by lower profit in the period ahead even if interest rates remain at their current low level.

<sup>13</sup> cf Jochnick (2015) described why income was expected to be negative.

<sup>14</sup> The Riksbank has communicated that the interval of 3.5–4.5 per cent is a reasonable assumption for the level of the long-term normal repo rate (Sveriges Riksbank, 2010). There is a great deal to suggest, however, that the normal level of interest rates has fallen (see, for instance, Armelius et al., 2014, and Holston, Laubach and Williams, 2016). For example, members of the US central bank's monetary policy committee, the FOMC, have recently lowered their assessment of the level of the long-term US policy rate from just over 4 per cent to just under 3 per cent.

**Chart 5. Yield in accordance with the forward curve but funding at the repo rate**

Per cent



Note. Projection of the repo rate extended from the forecast in the Monetary Policy Report in October 2016. The forward curve is estimated on 26 October 2016.

Source: The Riksbank

### Changed interest rate environment directly impacts the Riksbank's profit and dividend

Up to now, the bond purchases have thus been profitable for the Riksbank. There are, however, good reasons to anticipate counteracting losses in the period ahead, but it is still unclear what the total effects on the Riksbank's financial position will be. The effects depend, of course, on how the interest rate develops in the long term. What is clear, however, is that the interest rate risk on our balance sheet has increased substantially.

The interest rate risk will also be reflected in major fluctuations in the Riksbank's profit and its dividends to the government. This is due to the practice of market valuation of the assets on the Riksbank's balance sheet.<sup>15</sup> I mentioned earlier that the forecast for the dividend-qualifying income for 2015 and 2016 has been transformed from a loss of SEK 14 billion into a profit of SEK 13 billion over the last year or so. A major part of this improvement can be explained by the increase in the market value of the bond portfolio due to interest rates being lower than expected.

A back-of-the-envelope calculation shows how interest rate changes now have a considerable impact on the Riksbank's profits. The bond portfolio has a market value of just under SEK 300 billion and an average maturity of five years. The value of the bonds then increases by about SEK 15 billion if interest rates suddenly fall by one

<sup>15</sup> The Riksbank's dividend-qualifying profit is calculated as the Riksbank's profit adjusted for changes in the price of gold and in exchange rates. Changed market prices of Swedish bond holdings hence have an immediate effect on the dividend-qualifying profit.

percentage point on all maturities.<sup>16</sup> And correspondingly, the value of the bonds falls by SEK 15 billion if interest rates instead rise. Such changes in value immediately affect the Riksbank's dividend-qualifying profit, but the impact on the dividends delivered by the Riksbank to the government is dampened by the fact that the dividend is calculated as 80 per cent of the average dividend-qualifying profit over the last five years.

## Lower borrowing costs for the government

The bond purchases affect government finances in ways other than via dividends from the Riksbank. They are supposed to push down interest rates in order to push up inflation. If this works, it reduces the government's costs for both its outstanding debt and new borrowing. This is because lower interest rates reduce the nominal cost of the government's new borrowing, while inflation reduces the real cost of both the outstanding debt and new borrowing when the policy rate is restricted by its effective lower bound.

It is difficult to determine what effect the Riksbank's monetary policy has had on interest rates and the development of inflation, and it is of course even more difficult to say how much the bond purchases have contributed to this development. Nevertheless, I would like to try to calculate how monetary policy may have affected the costs of government borrowing. Due to the high level of uncertainty, these calculations should mostly be seen as providing a ball-park figure.

The underlying inflation rate, the CPIF excluding energy, was 0.7 per cent in 2014 but rose to 1.4 per cent in 2015 and is expected to remain on the same level this year and next year. Of course, we do not know how inflation would have developed with a different monetary policy, but let us assume that all this inflation upturn of 0.7 percentage points can be explained by the unconventional monetary policy with bond purchases and a negative repo rate. Since the repo rate has been and is expected to remain close to its effective lower bound during 2015-2017, we further assume that the upturn in inflation has not affected the repo rate in this three-year period. If this is true, the unconventional monetary policy has led to lower real interest on both the outstanding debt and new borrowing. With a bond stock of SEK 700 billion, the result is that the monetary policy, by avoiding excessively low inflation in 2015-2017, has reduced the real borrowing costs for the outstanding debt by  $0.007 \times 700 \times 3 = \text{SEK } 15$  billion.

According to some studies, central bank bond purchases in Sweden and other countries have also had a significant impact on nominal interest rates when policy rates have been restricted by their effective lower bounds. De Rezende, Kjellberg and Tysklind's (2015) study indicates that Swedish interest rates may have been pushed down by 0.4 to 0.7 percentage points of the purchases.<sup>17</sup> I find it a little hard to believe that the effects are in the upper region of this interval, but the lower figure does not seem at all unreasonable. As the Riksbank has purchased an increasingly large share of the outstanding government bonds, the interest rate for treasury bills (government securities with short maturities) has fallen to almost 0.4 percentage

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<sup>16</sup> The increase in value will be approximately  $\text{Bond value} \times \text{Maturity in years} \times \text{Change in rate} = \text{SEK } 30 \text{ bn} \times 5 \times 1\% = \text{SEK } 15 \text{ bn}$ , which can also be described as the change in funding cost for the bond portfolio, i.e. 1 per cent lower interest on SEK 300 billion over 5 years.

<sup>17</sup> The results in their study are of a similar magnitude to the results in studies based on central bank asset purchases in other countries. Their study is based on data from bond purchases in the spring of 2015 and my calculation is based on the assumption that bond purchases since then have had a similar effect.

points below the repo rate. As a result, the interest rate for these is now close to the Swedish National Debt Office's "repo facility" which allows the Debt Office's dealers to borrow bonds from the Debt Office at a cost of the repo rate minus 0.4 percentage points. It gives market participants the opportunity to make secure profits at even lower interest rates and hence sets a lower bound for how low the interest rate on short-term government securities can fall.<sup>18</sup> It seems reasonable that this price development has been caused by our bond purchases and that the interest rate on government securities with short maturities has been pushed down by at least 0.3 percentage points, and that a similar price effect has also been exerted on government bonds with longer maturities.

As the public sector budget is more or less balanced, the government's total borrowing requirement does not increase over time, but the government must nevertheless take out new loans when older ones mature. In other words, new government bonds and treasury bills need to be issued on a continuous basis. According to the Debt Office's latest forecast, bond borrowing will amount to about SEK 90 billion a year in 2015-2017 while borrowing via treasury bills is expected to amount to just over SEK 110 billion a year. Government bonds have an effective maturity of just over 7 years while all treasury bills by definition mature within a year. If the Riksbank's bond purchases push the nominal interest rate down by 0.3 percentage points on average, this produces a total profit in terms of lower interest expenditure of approximately  $0.003 \cdot (7 \cdot 90 + 110) \cdot 3 = \text{SEK } 7 \text{ billion}$  for these three years.

These calculations indicate that the bond purchases and other unconventional monetary policy in recent years have reduced the government's borrowing costs quite considerably, compared to a monetary policy that had not kept interest rates down and avoided excessively low inflation in the same way. But the calculations should be taken with a large pinch of salt as they take a very narrow perspective on government finances. They ignore, for example, the fact that the government has other assets and liabilities, as well as other commitments, that are also affected by the development of nominal and real interest rates. The calculations also ignore the fact that bond purchases also stimulate GDP growth and employment in the short term and that by strengthening confidence in the inflation target, also contribute to healthy, long-term growth. This benefits Swedish households and strengthens public finances by boosting tax revenues and reducing expenditure.

### **The Riksbank's finances are strong but sensitive to interest rate changes, and dividends will be lower**

Concern has sometimes been expressed over the fact that bond purchases are expensive and lead to losses for the Riksbank.<sup>19</sup> This concern is hardly unwarranted, even though it is not certain that the purchases actually do lead to losses. The Riksbank's balance sheet, profit and equity are now being affected more by interest rate adjustments than before purchases began. Dividends will therefore fluctuate considerably more year on year in the future than they have done in recent decades. So far, the bond purchases have generated a profit but our interest rate forecasts indicate future losses and thereby lower or zero dividend payments to the

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<sup>18</sup> Sveriges Riksbank (2010).

<sup>19</sup> See, for instance, my own reasoning in the minutes of the monetary policy meeting in February 2015 (Sveriges Riksbank, 2015b) and Annika Alexius in Svenska Dagbladet (2016).

government. Despite the increased risks, my assessment is that the Riksbank's financial position remains healthy. The Riksbank's equity has increased from just over SEK 70 billion before the financial crisis to its current level of just over SEK 120 billion. Even though it is likely that equity will shrink substantially in the coming years, it is my opinion that profit fluctuations are unlikely to be large enough to cause equity to fall to worryingly low levels.

Finally, I would like once again to remind you that the aim of the Riksbank's operations is not to make a profit and deliver dividends to the government. Our task is to maintain price stability, and we do that by safeguarding the credibility of the inflation target. In this way, we promote efficient price-setting and wage formation in the economy, which forms the basis of sustainable economic development with high employment.

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