Central-banking challenges for the Riksbank: Monetary policy, financial-stability policy and asset management *

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In this lecture I will discuss the challenges faced by the Riksbank with regard to each of its three core functions. These three functions are conducting monetary policy with the objective of stabilising inflation around the inflation target and resource utilisation around a sustainable level, promoting a safe and efficient payment system and thereby conducting a policy for financial stability, and managing its financial assets to attain a good risk-adjusted rate of return without prejudice to the first two core functions.

A challenge for the Riksbank in its monetary policy is to make sure that this policy is transparent, consistent and clearly focused on stabilising inflation and resource utilisation and nothing else. Otherwise there is a risk that target attainment for inflation and resource utilisation will be poorer and that a lack of clarity will make it more difficult to evaluate monetary policy and hold the Riksbank accountable.

More specifically, the policy rate should not be treated as an independent target variable with an explicit or implicit objective to "normalise" the policy rate, at the cost of worse target attainment for inflation and/or resource utilisation. Attempts to justify such a normalisation policy are frequently made with references to unspecified "imbalances" that may threaten financial stability if policy rates are low over a long period of time. However, there is no theoretical or empirical support for the idea that low policy rates in themselves would lead, for instance, to excessive leverage in the Swedish financial system, since this system is dominated by a few major banks and has no shadow-banking sector to speak of. The policy rate is moreover a blunt and ineffective instrument for achieving financial stability, and any "imbalances" can be much better handled using micro- and macroprudential instruments within financial-stability policy, such as capital and liquidity requirements.

Nor should housing prices and household debt be treated as explicit or implicit target variables for monetary policy. The levels of housing prices and household debt should not be considered problematic without thorough analysis. Even if these levels were considered to be problematic, the policy rate is still a blunt and ineffective instrument for influencing them and attempts to use it in this way would have negative consequences for inflation and resource utilisation. There are other instruments, such as the mortgage ceiling and stricter loan terms, that are more effective.

A related challenge for the Riksbank is the risk of conceptual and practical confusion between monetary policy and financial-stability policy. For instance, it is sometimes stated that the objectives of monetary policy should be expanded to include financial stability and that monetary policy and financial-stability policy should be integrated and conducted together. Such suggestions are arguably inappropriate, since they do not take into account the fact that monetary policy and financial-stability policy are distinct and separate policies.

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Monetary policy and financial-stability policy are distinct policies with different objectives and different instruments, and different public authorities have responsibility for them, in the same way as monetary policy and fiscal policy are different policies that have different objectives and instruments, and different authorities responsible for them. Fiscal policy has its objectives – such as economic stability, efficiency and an even income distribution – and its instruments – primarily taxation and spending – with the Ministry of Finance and the Riksdag (the Swedish parliament) as the authorities in charge. Monetary policy has its objectives – stable inflation and resource utilisation – its instruments – primarily the policy rate and communication – with the Riksbank as the sole authority in charge. Financial-stability policy has its objective – financial stability – and its instruments – primarily micro- and macroprudential supervision and regulation – with responsibility for this policy divided between Finansinspektionen (the Swedish Financial Supervisory Authority), the Riksbank, the Swedish National Debt Office (SNDO) and the Ministry of Finance. Monetary policy should be conducted taking the conduct of fiscal policy into account, and vice versa. In the same way, monetary policy should be conducted taking the conduct of financial-stability policy into account, and vice versa. But they should not be confused with one another. Confusion risks leading to a poorer outcome for both policies and makes it more difficult to hold the policymakers accountable.

The third challenge I would like to discuss concerns asset management. The Riksbank's asset management does not attract the same attention in the media or in evaluations of the Riksbank's performance as monetary policy and financial-stability policy. This lack of attention makes it all the more important that the Riksbank works internally to develop an understanding of, and methods for, the management of these assets. Otherwise there is a risk that the Riksbank's financial assets will be managed in a routine fashion, with lower returns or higher risks than necessary when the Riksbank's first two core functions, conducting monetary policy and promoting financial stability, are taken into account.

The Riksbank's net foreign-currency assets in April 2012 amounted to around SEK 180 billion, the size of an average Swedish public pension fund. This foreign currency reserve makes it possible for the Riksbank to promote financial stability by providing liquidity support in foreign currency to Swedish banks when necessary. It represents a substantial amount of taxpayers' money, about SEK 38 000 per household. Without prejudice to the Riksbank's possibilities to carry out its first two core functions, these assets should be managed with the same care and efficiency as any pension fund.

Traditionally, however, the Riksbank's assets, and thereby the taxpayers' money, have been managed in a way that exposes them to a large currency risk and thereby a risk of large losses due to exchange-rate fluctuations. The currency risk is larger than the sum of all other financial risks to the Riksbank's assets. This currency risk is unnecessary, in the sense that it does not contribute to increasing the return or improving the Riksbank's possibilities to conduct monetary policy or promote financial stability. The Riksbank's Asset Management Department has worked out a method that would eliminate the currency risk through an agreement with the SNDO that entails the latter taking over the currency risk. This method leaves the Riksbank's foreign currency reserve assets untouched, so that they can still be used, if necessary, to provide liquidity support in foreign currencies. The Riksbank's independence is not affected. As the SNDO has a foreign currency debt to start with, the method also implies that the SNDO's currency risk also declines. The SNDO will then take responsibility for the total currency risk for the government as a whole, which allows the currency risk to be dealt with more efficiently.

Eliminating the currency risk would reduce the financial risk in the Riksbank's balance sheet by more than half, and it would more than double the risk-adjusted rate of return. Reducing financial risk this much without eliminating the currency risk would reduce the expected return by around SEK 2.7 billion a year. This amount is thus a measure of the opportunity cost of not eliminating the currency risk. It is almost four times the cost of conducting the Riksbank's operations, which is around SEK 700 million a year. Another measure of the opportunity cost of not eliminating the currency risk is the extra capital requirement arising from the risk of currency losses. This was in April 2012 around SEK 39 billion, which is more than a fifth of the Riksbank's net assets in foreign currencies and more than SEK 8 000 per household.

Several central banks have managed to reduce or eliminate the currency risk by various means. Eliminating the currency risk for the Riksbank's assets and the taxpayers' money has long been an urgently needed improvement to the Riksbank's asset management.

Monetary policy should focus on stabilising inflation and resource utilisation

Flexible inflation targeting means stabilising inflation around the inflation target and resource utilisation around a sustainable level. Inflation and resource utilisation are the two target variables. The policy rate should only be an instrument, not a target variable whose level is of independent value. But sometimes it seems like the policy rate is treated as a target variable and that "normalisation" of the policy rate is of independent value and can motivate less target attainment for inflation and resource utilisation.[1]

Thus it is sometimes argued that, all else equal, low interest rates would lead to unspecified financial imbalances and unspecified threats to financial stability. This argument seems to relate to worries about increased leverage and increased risk-taking – consistent with the so-called risk-taking channel (Borio and Zhu 2008) – and possible misallocation of investment. Such arguments imply that, for given forecasts of inflation and resource utilisation, more normal interest-rate levels are preferred. And more normal interest-rate levels may be preferred even if they imply too low inflation and/or resource utilisation. There are several references to "normalisation" in Riksbank press releases, *Monetary Policy Reports* and *Updates*, minutes and speeches.

However, I am not aware of any evidence that low interest rates lead to more leverage or more risk-taking in Sweden. The Swedish financial sector is dominated by an oligopoly of four large commercial banks, and there is no shadow-banking sector to speak of. There is no evidence that these commercial banks tend to increase their leverage when the policy rate is low.[2] [3] Furthermore, even if there were more risk-taking with lower policy rates, it does not follow that there would be too much risk-taking. That depends on what the optimal level of risk-taking is. After the recent crisis, it might be that risk aversion and the perception of uncertainty are exceptionally high and that there is overall too little risk-taking. Without further analysis, this cannot be known.[4]

The argument that low interest rates would lead to misallocation of investment is much weakened by the fact that the level of investment in Sweden has been very low and is still lower than before the crisis. There has been little construction; there has certainly not been any construction boom and no

[1] The "normalisation" argument for a higher policy rate is further discussed in Svensson (2011).

[2] The change in leverage for commercial banks has been negatively correlated with total asset growth, indicating that leverage has been countercyclical (Apel and Claussen 2011). A possible explanation is that lower policy rates increase real activity and the value of the banks' assets, which all else equal reduces leverage. Banks then do not seem to increase lending sufficiently to maintain leverage.

[3] Woodford (2012) sets up a model where the probability of a financial crisis is assumed to be an increasing function of a state-variable that may be identified with leverage. Furthermore, leverage is assumed to be increasing in lagged leverage and the current output gap and is also subject to shocks. From these assumptions obviously follow a case for tighter monetary policy, "leaning against the wind," in order to, everything else equal, reduce the output gap and thereby leverage and the probability of a financial crisis. However, as shown in Svensson (2012), the introduction in Woodford's model of financial-stability instruments such as capital requirements, possibly cyclical ones, would allow leverage to be controlled more directly than indirectly and bluntly by the policy rate via the output gap. Monetary policy would be free to focus on stabilising inflation and the output gap and need not lean against the wind. In the realistic case when the state variable affecting the probability of a financial crisis is a vector that includes not only leverage but, for instance, maturity mismatch and liquidity mismatch, it is even more the case that additional financial-stability instruments such as restrictions on maturity and liquidity mismatches are superior to the policy rate in achieving and maintaining financial stability.

[4] Furthermore, the optimal adjustment of risk when real rates of return fall depends on the precise preferences for expected real rates of return and risk, as is revealed by the simplest mean-variance analysis when the investment line is shifted down. "Search for yield" regardless of the risk is difficult to understand in such mean-variance analysis, other than as the result of an unfortunate and ill-conceived unconditional promise of a particular rate of return that regulators should prohibit.

overinvestment in housing. The argument would further require that there is a downward bias in the estimate of capital costs during the lifetime of the investments that are undertaken. I am not aware of any evidence of this.

Furthermore, the general discussion and the existing models concerning policy rates, the risk-taking channel and so on consistently seem to suffer from confusion between nominal policy rates and the general level of real interest rates. Models such as those of Adrian and Shin (2011) and Diamond and Rajan (2011) include a short real rate but no nominal policy rate and no explicit monetary policy. [5] Furthermore, there is no distinction between the short real rate and the neutral real rate. All that monetary policy can do by setting a short nominal policy rate is to temporarily make the short real interest rate deviate from the neutral real interest rate, which in turn is beyond the control of monetary policy. The effects that are attributed to monetary policy should be the effects of the difference between the short real rate and the neutral rate, not the level of the neutral rate and the overall level of the real rate. The neutral real rate is affected by many things and can be low for many years for several reasons, including global imbalances, fiscal policy and shocks to aggregate demand and supply.

Neither should housing prices and household debt be treated as independent target variables. However, several Board members have at several Riksbank policy meetings expressed worries about an increasing debt-to-disposable-income ratio for households – currently about 170 per cent – and about rising housing prices. The suggestion is that a policy-rate increase would dampen the growth of household indebtedness and housing prices. This raises the question of whether (1) household debt and housing prices present a problem for the macro economy and/or financial stability, and (2), if there is a problem, whether the policy rate is a suitable instrument to address the problem or whether there are other better instruments.[6]

On (1), household debt is not considered to be a problem for financial stability in Sweden. The likelihood that Swedish banks would suffer any losses from mortgages is very small. The reasons for this are that mortgages are full recourse, credit reviews are thorough and the households' capacity to repay their debts is good, for several reasons.[7] Not even during the severe crisis in the early 1990s did mortgage issuers make any losses to speak of because of mortgage defaults. Sweden is indeed very different from the United States in these respects.[8]

The question remains whether household debt and housing prices could cause problems for the macro economy. Could a housing-price fall induce a deleveraging process and a fall in aggregate demand? Model simulations with a housing-price fall show that the negative effects on aggregate demand and inflation can be neutralized by expansionary monetary policy, even taking into account the zero lower bound on policy rates. Furthermore, Swedish households have assets (excluding pension liabilities) that are three times the size of their debts, so household equity is two thirds of household assets, a quite low leverage. There is no trend towards higher leverage. The households' savings ratio is high, so there is no evidence of aggregate consumption financed by mortgage equity withdrawals. In addition, the Riksbank's ambitious research project on the housing market (Sveriges Riksbank 2011c) has confirmed that housing prices are consistent with fundamentals and there is no evidence of a bubble or overvaluation. The size and probability of a housing-price fall should depend a lot on whether housing prices are consistent with fundamentals or not. If housing prices exceed a level consistent with fundamentals, so that there is a possible bubble, a quick correction could be triggered, which could even undershoot the level consistent with fundamentals. If housing prices are consistent with fundamentals, fundamentals themselves have to fall for a housing-price fall to take place. That is very different from a bursting bubble.

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[5] Adrian and Shin (2011) and Diamond and Rajan (2011) do not contain the frictions, such as sticky prices, that allow meaningful modelling of the effects of monetary policy.

[6] The role of housing prices and household debt in Riksbank monetary policy is further discussed in Svensson (2010, 2011).

[7] For instance, since mortgages are not securitized but stay with the mortgage institutions, the institutions have incentives to perform more thorough credit reviews.

[8] See Sveriges Riksbank (2011a, c) and Finansinspektionen (2010).

Finally, even a debt-to-disposable-income ratio as high as 170 per cent is fully sustainable and a constant ratio at this level requires only a very small "primary surplus" as a share of disposable income, when not only nominal interest payments but the households' complete net cash flow, that is, the net debt service considering after-tax interest payments and net amortization, is taken into account. For instance, a high 7 per cent nominal mortgage rate and a 30 per cent deductible capital income tax means that the after-tax nominal mortgage rate is about 5 per cent. With a modest 4 per cent steady-state nominal disposable-income growth, the resulting steady-state primary surplus is only about 1 per cent of to the debt-to-disposable income ratio. For a 170 per cent debt-to-disposable income ratio, the steady-state primary surplus is only 1.7 per cent of disposable income. Furthermore, households that own their housing need not pay rent, which is normally around 20 per cent of disposable income, and need instead only pay condominium fees or the costs of heating, garbage collection and maintenance, which are normally smaller than rents. Importantly, for the macroeconomic effects, it is the aggregate of all households, that is, the average household, that matters, not the most indebted or the most vulnerable households. The latter matters from a consumer-protection point of view, but not from a macroeconomic point of view.

On (2), even if household debt and housing prices were considered to be a problem, there is considerable research that indicates that the policy rate has a limited impact on housing prices and household debt (which are highly correlated since most of the debt is mortgages to finance housing purchases) but can cause sizeable collateral damage in the form of negative effects on inflation and real activity.[9] There are a number of more efficient and available instruments to affect household debt and housing prices, such as loan-to-value ceilings, amortization floors, property taxes, deduction limitations and so on (Sveriges Riksbank 2011c).

In general, if there is some probability of a future housing-price fall, and such a price fall is deemed to have an impact on future aggregate demand, resource utilisation and inflation, then that impact should be taken into account in the construction of the mean forecasts of inflation and resource utilisation. Thus, the impact of household debt and housing prices should be incorporated in the forecasts. This would make it possible to derive the correct implications for the policy rate. The impact could imply a downward shift of future resource utilisation and inflation, which in itself would seem to imply more expansionary rather than contractionary policy. Furthermore, if the policy rate is deemed to have some effect on the probability and/or the magnitude of a housing-price fall, this should also be taken into account. It could imply more contractionary policy, if a higher policy rate was deemed to reduce the probability and/or magnitude of a housing-price fall. But in the absence of such an analysis it is not clear what the policy implications are.

Kohn (2006, 2008) mentions three conditions that should be fulfilled before central banks implement 'extraordinary measures' to handle possible asset-price bubbles, such as unsustainable increases in housing prices: "First, policymakers must be able to identify bubbles in a timely fashion with reasonable confidence. Second, a somewhat tighter monetary policy must have a high probability that it will help to check at least some of the speculative activity. And third, the expected improvement in future economic performance that would result from the curtailment of the bubble must be sufficiently great." These conditions will rarely be fulfilled in practice. Therefore, using monetary policy in this way will rarely be justified.

Treating the policy rate, housing prices and housing debt as explicit or implicit target variables means that the Riksbank's monetary policy risks becoming non-transparent and inconsistent and directed towards other things than the two objectives of flexible inflation targeting, that is, to stabilise inflation around the inflation target and resource utilisation around a sustainable level. Instead, the policy rate should be an instrument only, and housing prices and housing debt should for monetary-policy purposes be indicators only, indicators that matter to the extent they have an impact on the forecast of inflation and resource utilisation. To the extent the level of housing prices and household debt is considered problematic, they can be handled by better instruments than the policy rate.

[9] See Assenmacher-Wesche and Gerlach (2010), Sveriges Riksbank (2011c) and references cited in Svensson (2010).

Other risks to the transparency and consistency of the Riksbank's monetary policy include the shifting relative emphasis on the CPI and CPIF inflation measures and the use of resource utilisation measures other than the unemployment gap, resource utilisation measures that are less relevant as target variables, have larger measurement errors and are indicators of inflation pressure rather than target variables. These things are discussed in the latest Riksbank minutes (Sveriges Riksbank 2011b).

Financial-stability policy should not be confused with monetary policy

This leads me to the more general question of what the relation between monetary policy and financial stability should be. For instance, it is sometimes said that the objectives of monetary policy should be expanded to include financial stability (Eichengreen, Rajan and Presad 2011 and Eichengreen et al. 2011). Such suggestions give the impression that monetary policy and financial stability are the same thing. But they are not. It is important to conceptually distinguish financial-stability policy from monetary policy and avoid conceptual and practical confusion between the two policies. Confusion risks leading to a poorer outcome for both policies and makes it more difficult to hold the policymakers accountable. Trying to use monetary policy to achieve financial stability leads to poorer outcomes for monetary policy and is an ineffective way of trying to achieve financial stability.

Different economic policies, such as fiscal policy, monetary policy and labour market policy, can be distinguished according to their objectives, the policy instruments that are suitable for achieving the objectives and the authority or authorities that control the instruments and are responsible for achieving the objectives. From this point of view, it is clear that monetary policy and financial-stability policy are distinct and different, and understanding this is important. The challenge for the Riksbank is therefore to avoid conceptual and practical confusion between the two policies.

Monetary policy, in the form of flexible inflation targeting, has the objective of stabilising both inflation around the inflation target and resource utilisation around a sustainable level. Under normal circumstances, the suitable instruments are the policy rate and communication, including the publication of forecasts of inflation, the real economy and (by some central banks) the policy rate. In times of crisis, as we have seen during the financial crisis, in particular when the policy rate is at or close to the zero lower bound, other more unconventional methods can be used. These methods include fixed-rate lending at longer maturities, asset purchases (quantitative easing) to affect longer interest rates and expectations of future short rates and foreign-exchange intervention to prevent currency appreciation or even to induce currency depreciation. The authority responsible for monetary policy is typically the central bank. In many countries, including all the member states of the EU, the central bank is given exclusive authority over monetary policy by statute and various measures to protect this policy independence are put in place.

Financial-stability policy has the objective of maintaining and promoting financial stability. Financial stability can be defined as a situation where the financial system can fulfil its main functions of submitting payments, transforming saving into financing and providing risk management with sufficient resilience to disruptions that threaten these functions. The available instruments are, under normal circumstances, supervision, regulation and financial stability reports with analyses and leading indicators that may provide early warnings of stability threats.

In times of crisis, authorities may use instruments such as lending of last resort, variable-rate lending at longer maturities (credit policy, credit easing), government lending guarantees, government capital injections, special resolution regimes for insolvent financial firms and so forth. The responsible authorities vary across countries, but the powers are typically divided between several authorities. The lender of last resort function is with the central bank, but other instruments are often in the hands of other authorities. In Sweden, the responsibility for financial-stability policy is shared between the Riksbank and Finansinspektionen as far as preventive policies are concerned, and between the Riksbank, the Swedish National Debt Office (SNDO) and the Ministry of Finance as far as crisis management is concerned.

So, financial-stability policy and monetary policy are conceptually distinct, with distinct objectives and distinct suitable instruments. The interest rate is a blunt and unsuitable instrument for affecting financial stability and it thus makes little sense to assign the objective of financial stability to *monetary*

policy. However, it may make sense to assign the objective of financial stability to the *central bank*, if the central bank is given control of the appropriate supervisory, regulatory and crisis management instruments. Whether giving the central bank such a broad remit would also be the best solution is too complex an issue to address in this context.

The fact that financial-stability policy and monetary policy are distinct and different does not mean that there is no interaction between each policy and the other policy's objectives. Monetary policy affects the real economy and thus profitability, asset prices and balance sheets. Thereby it also affects financial stability. Financial-stability policy directly affects spreads, lending and other aspects of financial conditions as well as the transmission mechanism of monetary policy. This means that monetary policy should normally be conducted taking the conduct of financial-stability policy into account, and financial-stability policy should be conducted taking the conduct of monetary policy into account. This is similar to how monetary policy is conducted taking the conduct of fiscal policy into account, and vice versa. Note that this way of conducting monetary policy and financial-stability policy – in line with a non-cooperative Nash equilibrium rather than a coordinated equilibrium – does not depend on how the authority for financial-stability policy is shared between different institutions. It should be conducted this way regardless of whether the central bank has the sole authority or whether it is shared between several institutions.

Thus, under normal conditions, financial stability is handled by financial-stability policy, not by monetary policy. In a second-best situation, without appropriate supervision and regulation, if the policy rate is the only available tool and there is a trade-off between its effect on the monetary-policy objectives and financial stability, that trade-off should be taken into account. Normally, however, the policy rate is not the only available tool, and much better instruments are available for affecting financial stability. Monetary policy should be the last line of defence of financial stability, not the first line.

Asset management should be efficient and eliminate unnecessary risks – including the currency risk

The third challenge that I would like to discuss concerns asset management, the third core function of central banks. Central-bank asset management does not attract the same attention in the media and in evaluations of central-bank performance as monetary policy and financial-stability policy. This is in some sense understandable, considering that central banks are not put in place primarily as asset-managing agencies. But the lack of attention makes it all the more important that central banks work internally to develop an understanding of, and methods for, managing these assets. Otherwise there is a risk that central-bank assets will be managed in a routine fashion, with lower returns or higher risk than is necessary to achieve the objectives of monetary policy and financial-stability policy. This can be costly, because the Riksbank and other central banks manage large assets. These assets are in the end the assets of the country's taxpayers. They should be managed as efficiently as other assets, while taking into account the objectives of the first two central-bank core functions, monetary policy and financial-stability policy.

The Riksbank in April 2012 had about SEK 269 billion as foreign-exchange reserves (excluding gold reserves of about SEK 45 billion). The foreign-exchange reserves make it possible for the Riksbank to give liquidity support in foreign currency to Swedish commercial banks, if this should be needed for financial-stability purposes. They also make it possible for the Riksbank to conduct foreign-exchange interventions to affect the exchange rate, if this should be needed for monetary-policy purposes. Of the foreign-exchange reserves, about SEK 90 billion are financed by a foreign-currency loan from the SNDO. The net foreign-exchange reserves are hence about SEK 180 billion. These are held as an open foreign-exchange position. That is, the foreign-exchange reserves are not hedged and their value in kronor fluctuates with the exchange rate, decreasing if the krona appreciates and increasing if the krona depreciates. Since exchange rates are very volatile, this implies a large currency risk.

The problem of currency risk has been solved, wholly or partly, in different ways in different countries. In some countries, the foreign exchange reserves have been wholly or partly moved to the ministry of finance. In several other countries where the central bank holds the foreign-exchange reserves there is some form of currency hedging. In some, assets and liabilities are matched by

currency (as with the part of the Riksbank's foreign exchange reserves financed by the loan from the SNDO), in others the central bank hedges its dollar reserves with currency swaps on the market, and in some both of these methods are combined. It also happens that the currency risk for the central bank is handled by an agreement with the government similar to the method worked out by the Riksbank's Asset Management Department (AMD). But in several countries the foreign-exchange reserves are not hedged.

Analytical work within the Riksbank shows that the currency risk on the Riksbank's balance sheet is unnecessary and brings no benefits in terms of higher rates of return on the Riksbank's assets. Moreover, the currency risk can be eliminated without affecting the Riksbank's possibility to pursue its objectives for monetary policy and financial-stability policy.

The AMD has designed a method for eliminating the currency risk via an agreement with the SNDO that effectively transfers the currency risk to the SNDO (Degenne, Lindquist and Robertsson 2011). The method allows the foreign-currency assets of the Riksbank to be kept untouched on the Riksbank's balance sheet, to be used when needed for liquidity support in foreign currency to Swedish commercial banks or for other purposes. Thus, the method does not affect the Riksbank's possibility to pursue its objectives for monetary policy and financial stability. Furthermore, the method involves internal transactions between the Riksbank and the SNDO and does not affect the foreign-exchange market.

Since part of the public debt managed by the SNDO is in foreign currency, the SNDO has a negative foreign-exchange position. Transferring the Riksbank's currency risk to the SNDO thus reduces the currency risk for the SNDO. It thus allows both the Riksbank and the SNDO to reduce the currency risk in their balance sheets. [10] It also has the advantage that it entails the SNDO taking responsibility for the total currency risk of the consolidated government, including the Riksbank. This allows the SNDO to manage the total currency risk of the government as a whole more efficiently.

The currency risk is more than half of the total financial risk for the Riksbank's assets. With the elimination of the currency risk, the Riksbank's asset management would become much more efficient, and the risk-adjusted rate of return would more than double. Using data from April 1995 through April 2012, the average annual rate of return, measured in Swedish kronor, on the Riksbank's assets held in September 2009 was 6.1 per cent per year, of which 5.8 per cent was due to the bond holdings and 0.3 per cent was due to accumulated exchange-rate changes. I will use 5.8 per cent as an estimate of the expected rate of return on the Riksbank's assets and disregard the small rate of return due to accumulated exchange-rate changes. During the same period, the standard deviation of the annual rate of return was 8.1 per cent. Excluding exchange-rate movements, the standard deviation of the rate of return was 3.1 per cent. I will use 8.1 and 3.1 per cent as the estimates of the risk on the Riksbank's assets, with and without the currency risk. During the same period, the average annual return on a 12-month Swedish Treasury bill was about 3.4 per cent per year. Since the annual rate of return is known when the 12-month Treasury bill is bought, the risk for it can be considered to be zero. I will use 3.4 per cent as the estimate of the riskless rate of return.

In figure 1, risk is measured in standard deviation per year along the horizontal axis and the expected rate of return is measured in per cent per year along the vertical axis. Point A shows the expected rate of return and the risk for the Riksbank's assets with the currency risk. Point C shows the rate of return and zero risk for the 12-month Treasury bill.

The excess rate of return for the Riksbank's assets, the expected rate of return less the riskless rate of return, is here about 2.4 per cent per year (= 5.8 – 3.4). A standard measure of the risk-adjusted rate of return is the Sharpe ratio, the excess rate of return divided by the standard deviation of the rate of

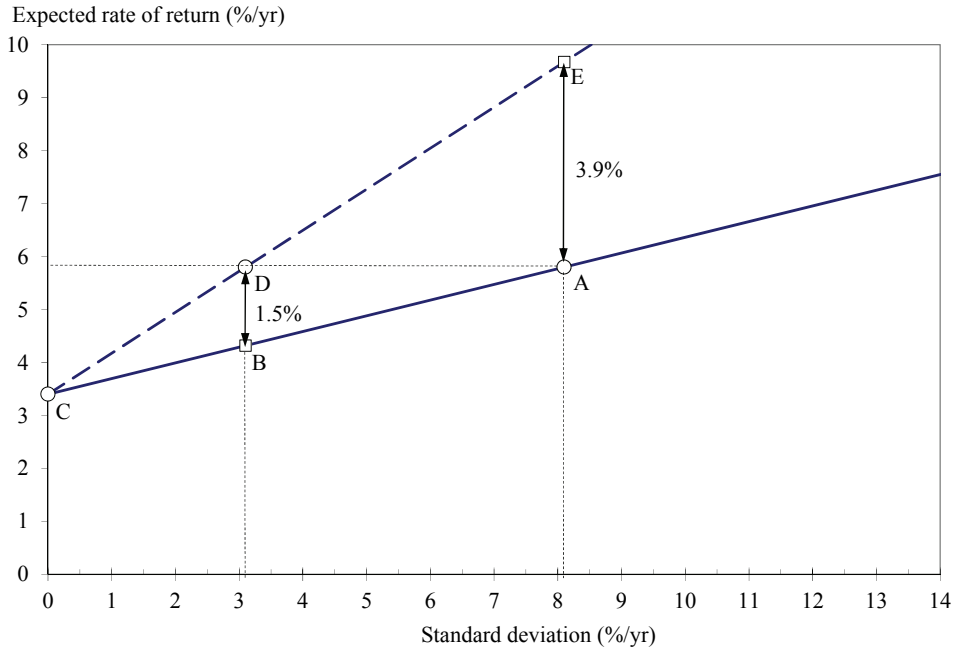
[10] The foreign currency debt of the SNDO is the result of a strategic decision, based on the objectives of the debt management policy. Whether it will be in the interest of the SNDO (or, more precisely, the Government that sets the guidelines for debt management) to use the transactions with the Riksbank to reduce the foreign exchange exposure is thus an open question. It has no bearing on the arguments for the Riksbank eliminating its foreign currency exposure, however.

return. In this case, with the currency risk, the Sharpe ratio is about 0.30 (= 2.4/8.1). This is the slope of the line CBA in figure 1.

By eliminating the currency risk with the AMD's method, the standard deviation falls from 8.1 to 3.1 per cent per year. The expected rate of return stays at 5.8 per cent per year. Point D shows the expected rate of return and risk when the currency risk is eliminated. The Sharpe ratio, the slope of the line CDE, rises from 0.30 to 0.77 (= 2.4/3.1), an increase of 0.47. Thus, the risk-adjusted rate of return more than doubles.

A reduction of the risk – measured as standard deviation of the rate of return – from 8.1 per cent per year to 3.1 per cent per year, that is, to less than half, is a great improvement. But can we express this improvement in kronor per year, to get a better idea of the benefit of eliminating the currency risk or the opportunity cost of keeping the currency risk? Yes, we can ask this question: How much would the expected rate of return fall if we would reduce the risk of the Riksbank's portfolio from 8.1 per cent per year to 3.1 per cent year without using the AMD's method? This reduction of the risk could be achieved by reducing the amount of foreign currency and increasing (from zero) the amount of 12-month Treasury bills in the Riksbank's assets. In figure 1, this corresponds to moving from point A along the line ABC to point B. At point B, the risk has been reduced to the same level as point D, 3.1 per cent. But at point B, the expected rate of return is lower. The fall in the expected rate of return is the vertical distance between points A and B, which is the same as the distance between D and B. The slope of the line BA is 0.30, the Sharpe ratio with the currency risk. The horizontal distance between A and B is 5.0 per cent per year (= 8.1 – 3.1). Thus the fall in the expected rate of return, the distance between D and B, is 0.30 x 5.0 = 1.5 per cent, the horizontal distance between A and B times the slope of the line BA.[11] This reduction of the rate of return multiplied by the level of assets, SEK 180 billion, results in a fall in the expected return of about SEK 2.7 billion per year.

Figure 1. Rates of return and risk



This amount is hence a measure of the opportunity cost of not eliminating the currency risk. It is here measured as the fall in return that would follow from reducing the risk to the same level without using AMD's method of eliminating the currency risk.

[11] Alternatively, the distance between D and B can be seen as the differences between the Sharpe ratios times the risk 3.1 per cent, that is, 0.47 x 3.1 = 1.5 per cent.

SEK 2.7 billion per year is a lot of money. The cost of operating the Riksbank is about SEK 700 million per year. The opportunity cost of not eliminating the currency risk is hence about 4 times the operating cost of the Riksbank.

Another measure of the opportunity cost of not eliminating the currency risk is the extra capital requirement that the currency risk results in. A standard 0.1 per cent Value-at-Risk measure of the Riksbank's capital requirement was in April 2012 about SEK 78 bn.[12] Without the currency risk, the capital requirement drops to SEK 39 bn. Thus, the extra capital requirement from the currency risk is SEK 39 billion (= 78 – 39). Thus, of the about SEK 180 billion in assets, more than a fifth has to be held as extra capital against possible losses due to exchange-rate fluctuations. This is another standard measure of the opportunity cost of not eliminating the currency risk.

We can get a different perspective on these sums by recalling that the Riksbank's foreign-exchange reserves are the Swedish taxpayers' money. According to Statistics Sweden, the number of households ("housekeeping units") was about 4.7 million in 2009 (Statistics Sweden 2012). Thus, the Riksbank manages about SEK 38 000 of the average household's money (= 180 bn/4.7 million).

This view of the Riksbank's asset management is illuminating. One question is whether the Riksbank should be risk averse or risk neutral in its asset management. We can get the answer by asking the average household whether it is risk averse or risk neutral with regard to the management of SEK 38 000 of its assets. Of course the average household is risk averse and would prefer that unnecessary risk is eliminated and that its SEK 38 000 is not held as an open foreign-exchange position.

Keeping the currency risk means more than doubling the financial risk for the average household. It also means asking the average household to keep more than a fifth of the SEK 38 000, more than SEK 8 000, as capital against possible currency losses. I am pretty sure that the average household would like the Riksbank to eliminate the currency risk on its SEK 38 000.

What are the possible arguments against eliminating the currency risk? Some might think that the currency risk falls with the investment horizon, and the Riksbank's asset management has a long horizon. But this is clearly wrong. Currency risk rises with the investment horizon. Throwing a dice once gives a result between 1 and 6. Throwing a dice 100 times gives an accumulated result between 100 and 600. The risk measured as standard deviation grows with the investment horizon. Currency risk rises over time also if exchange rates display moderate mean reversion.

Another possible argument against is that, since the NDO has foreign-exchange liabilities of similar magnitude as the Riksbank's foreign-exchange assets, DAM's method of eliminating currency risk is a zero-sum game. But this is not so. There is not an exact magnitude and currency match of Riksbank assets and NDO liabilities. With the proposed method, the NDO will to internalize the total currency risk of the government, which allows more efficient management of the currency risk. Furthermore, each authority should be responsible for its own budget and the efficient management of its own balance sheet, regardless of what other authorities are doing. Also, in the future, the NDO's foreign-exchange liabilities need not be of similar magnitudes as the Riksbank's foreign exchange assets.

A third possible argument against is that an agreement with the SNDO might threaten the Riksbank's independence and make the Riksbank dependent on the SNDO. The agreement allows both the Riksbank and the SNDO to reduce their currency risks. However, if the agreement proves not to be beneficial it can be cancelled by either party. If it is cancelled, the currency risk would gradually return to its original level. The Riksbank would not be in any worse a position than when it started out. Alternatively, the Riksbank can choose to continue to eliminate the currency risk by using currency swaps in the foreign-exchange market.

A fourth possible argument against is that a reduction of the Riksbank's capital requirements could threaten the Riksbank's financial independence. But this argument is also wrong. The Riksbank's financial independence only requires that the Riksbank's income from its assets exceeds the operating

[12] A 0.1 per cent Value at Risk measure is the threshold value such that the probability of a loss exceeding that value in a specified time period is 0.1 per cent.

costs of about SEK 700 million per year by a considerable margin. The Riksbank's income from just investing the value of the outstanding notes and coins (in April 2012) of about SEK 94 billion at an average rate of return of 6 per cent results in an average income of about SEK 5.6 billion per year. This is about 8 times the operating costs. If interest rates were to be much below average for a few years, the Riksbank would still be able to get by for a few years by selling assets. Central banks are different from commercial banks in that they can operate with negative capital.

Furthermore, a possible reduction of the Riksbank's capital does not mean that the size of the foreign-exchange reserves has to be reduced. The size of the foreign exchange reserves should in all cases be determined by the Riksbank's core function of contributing to financial stability and the need to supply liquidity support in foreign exchange. On the liability side, part of these assets (about SEK 100 billion) is financed by outstanding notes and coins. Whether the remaining assets are financed by borrowing from the SNDO or by the Riksbank's capital does not really matter, as long as the Riksbank's income exceeds its operating costs. In any case, the size of the foreign-exchange reserves and the Riksbank's capital will be examined by the government commission on the Riksbank's balance sheet headed by professor Harry Flam (Ministry of Finance 2011). The Riksbank's financial independence is not a reason to prolong the exposure to currency risk.

For several years now I have advocated in internal discussions that the currency risk in the Riksbank's balance sheet should be eliminated. The arguments in favour of eliminating the currency risk are very strong. There seem to be no valid arguments against, but the Executive Board has not yet reached agreement on this issue. However, the Riksbank has forwarded AMD's report on the method of eliminating the currency risk via an agreement with the SNDO to the Flam commission for consideration. The commission has been instructed to complete its report in the beginning of 2013. I hope and expect that the commission will find this proposal worthwhile and integrate it into its overall analysis of the Riksbank's balance sheet. This discussion will continue and I will continue to argue for measures that reduce unnecessary currency risks on the Riksbank's balance sheet and, more broadly, ensure that we manage the assets (and liabilities) put in our trust as best we can.

Conclusion

My conclusion is that the three challenges to the Riksbank's three core functions that I have discussed are best met in the following way: By focusing monetary policy exclusively on stabilising inflation around the inflation target and resource utilisation around a sustainable level and not treating the policy rate, housing prices or household debt as separate explicit or implicit target variables, by not confusing monetary policy with financial-stability policy but treating them as separate policies and by eliminating the large unnecessary currency risk in the Riksbank's balance sheet.

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