Inflation Targeting and Leaning Against the Wind:

A Case Study

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Abstract

Should inflation targeting involve some leaning against the wind? Sweden provides a case study, since the Riksbank has been leaning against the wind since 2010, stating concerns about risks associated with household indebtedness. The cost of this policy in terms of low inflation and high unemployment is high. According to the Riksbank's own analysis, the policy rate effect on household indebtedness is very small, and any effect on risks associated with household debt is miniscule. Indeed, much lower inflation than expected has *increased* households' debt burden and, if anything, increased such risks.

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Flexible inflation targeting

Let me start from standard flexible inflation targeting, according to which monetary policy aims at stabilizing inflation around an announced inflation target and resource utilization around a long-run sustainable rate. Furthermore, let me for concreteness assume that the unemployment rate is a satisfactory measure of resource utilization, so stabilizing resource utilization means stabilizing unemployment around an estimated long-run sustainable rate.

A main current question is, should standard flexible inflation targeting be combined with some degree of "leaning against the wind"?

Leaning against the wind?

Leaning against the wind implies a bias toward a somewhat tighter policy than justified by stabilizing inflation and unemployment, in order to avoid financial "imbalances" and threats to financial stability. As discussed by Smets (2013), it presumes that (1) macroprudential instruments or polices are ineffective, and that (2) a higher policy rate has a significant negative impact on threats to financial stability.

My view is that presumption (1) varies much from country to country, and that presumption (2) has little theoretical and empirical support, although the latter may depend on the structure of the financial sector, whether it is competitive or oligopolistic, the relative importance of shadow banking, and so on. This means that it is difficult to generalize from one country to another. Each country and economy needs to be scrutinized before one can judge whether there is a case for leaning against the wind or not.

Case study: Leaning against the wind in Sweden

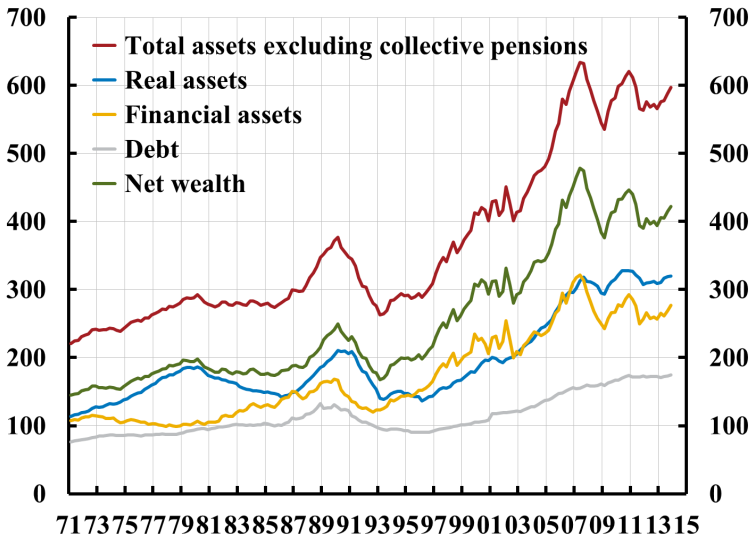
I will use the monetary policy and macroprudential policy in Sweden the last few years as a case study. Regarding monetary policy, the Riksbank has been leaning against the wind quite aggressively since the summer of 2010, stating concerns about risks associated with household indebtedness, as measured by the household debt-to-income (DTI) ratio. This has led to inflation much below the target and unemployment much above any reasonable long-run sustainable rate.

Figure 1 shows how Swedish households aggregate assets, debt, and net wealth have developed since 1971. Since the mid 1990s, that is, after the big crisis in the early 1990s, the DTI ratio almost doubled to a little above 170 percent now. This increase in the DTI ratio is what concerns the Riksbank. On the other hand, total assets (excluding collective pensions) have doubled, to about 600 percent of disposable income. Net wealth has increased to about

420 percent of disposable income. Real assets (owner-occupied houses and flats as well as leisure homes) have increased to about 320 percent of disposable income.

Figure 1. Swedish households' assets, debt, and net wealth

Percent of disposable income



Source: Sveriges Riksbank

For leaning against the wind to be justified, presumptions (1) and (2) above need to apply. Regarding presumption (1), it seems that macroprudential instruments and polices are indeed both effective and being used in Sweden, as discussed in Svensson (2013c). Finansinspektionen (the Swedish financial supervisory authority) and the government have in the last few years taken or announced several effective measures, namely a mortgage loan-to-value (LTV) cap of 85 percent (which has had a clear effect on the loan-to-value ratio for new mortgages, according to Finansinspektionen's annual mortgage market report, Finansinspektionen 2013), higher capital-adequacy requirements for systemically-important banks, and higher risk weights on mortgages. It has also recommended mortgage lenders to provide suggestions to borrowers about individually adjusted amortization plans. Furthermore, Finansinspektionen in its annual reports on the Swedish mortgage market thoroughly monitors that mortgage lending standards are sufficiently strict, that borrowers' debt-service capacity is good, and that borrowers' resilience to disturbances, in the form of increased mortgage rates, increased unemployment, and housing-price falls, is sufficient.

In particular, in August 2013, the government announced a new strengthened framework for financial stability in Sweden (Swedish Government 2013). Finansinspektionen will have the main responsibility for micro- and macroprudential policy and will control all the micro- and macroprudential instruments, including the new countercyclical capital buffer. Assigning the main responsibility and control of both micro- and macroprudential instruments to a single

authority allows for both efficiency and accountability. Furthermore, a Financial Stability Council has been created, with the Minister of Financial Markets as the chair and the Director Generals of Finansinspektionen and of the Swedish National Debt Office and the Governor of the Riksbank as additional members. The Council will assess financial stability, publish its positions and assessments, and manage crises. Sweden should now have an effective framework for financial policy and financial stability. Thus, presumption (1) does not seem to apply in Sweden.

What about presumption (2), that a higher policy rate has a significant effect on threats to financial stability? The Riksbank has admitted that a lower policy rate would result in better target achievement for inflation and unemployment, with inflation closer to the target and unemployment closer to a long-run sustainable rate. However, it has maintained that such a policy would lead to a higher household DTI ratio and thereby increase the risks associated with household debt. A minority of the Riksbank's executive board has argued that the beneficial impact of a higher policy rate and tighter monetary policy on any risks associated with household debt in Sweden is too small to compare with the costs of the resulting too low inflation and too high unemployment.[1] The question is, who is right, the majority or the minority?

The Riksbank's leaning against the wind was undertaken without presenting any previous supportive analysis of the impact of monetary policy on household debt and on any risks associated with it. In response to this I have recently undertaken such an analysis of the impact on household mortgages in Svensson (2013b).

A higher policy rate has, all else equal, a negative impact on housing prices and nominal mortgage debt as well as on the price level and nominal disposable income. Real debt is the ratio between nominal debt and the price level. The DTI ratio is the ratio between nominal debt and nominal income. Since a higher policy rate has a negative impact on both numerator and denominator of both real debt and the DTI ratio, it is a priori likely that the impact of a higher policy rate on these ratios is likely to be small. Furthermore, it is not a priori obvious whether the impact on the ratios will be positive or negative. That depends on the policy rate's relative impact on the numerator and the denominator.

Svensson (2013b) shows that, under assumptions that are realistic for Sweden, the policy rate is likely to have a slower impact on nominal debt than on the price level and nominal

[1] During my six-year term as a Deputy Governor and member of the executive board, which ended in May 2013, I belonged to that minority and dissented in favor of easier monetary policy.

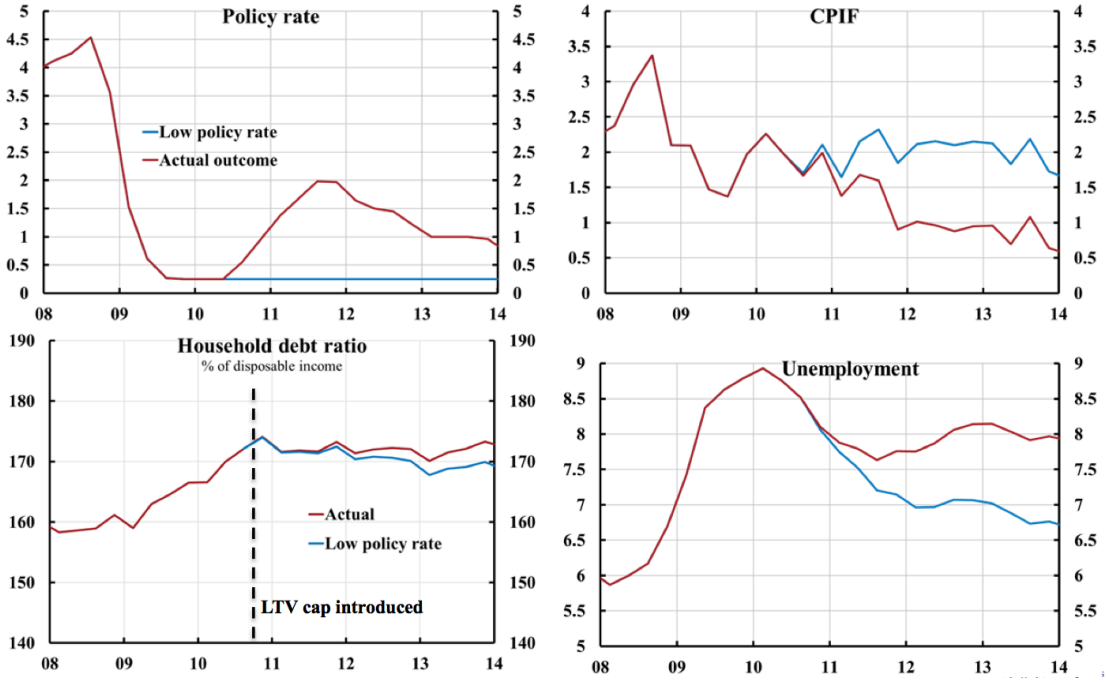
disposable income.[2] The main reason is that only a fraction of the mortgage stock is turned over each year. In Sweden, the average loan length of a mortgage is about 7 years, and there is little amortization of debt during the length of the loans. This means that nominal debt is quite sticky. As a result, a higher policy rate is more likely to increase real debt and the DTI ratio than to decrease them. In any case, the impact on real debt and the DTI ratio is likely to be small. Furthermore, the long-run impact of the policy rate on the ratios is likely to be zero, since these ratios between nominal variables are real variables, on which monetary policy normally has no long-run effect.

A counterfactual experiment

In order to summarize the effects of the Riksbank's leaning against the wind, I have used the Riksbank's main DSGE model, Ramses, to conduct a counterfactual experiment. This experiment compares the actual outcome for inflation and unemployment to the outcome if policy had been easier (Svensson 2014a). Furthermore, I have combined this with the results of Svensson (2013b) on the impact of the policy rate on the DTI ratio, in order to compare the actual and counterfactual outcome for the household DTI ratio. The results are shown in figure 2.

[2] See Svensson (2013b) for details. The assumptions are (1) new mortgages have a constant LTV ratio of 70 percent (the average LTV ratio for mortgages in Sweden in the last few years), (2) mortgages are refinanced every 7 years (the average loan length of mortgages in Sweden), and (3) mortgages are kept constant until refinanced (consistent with current amortization behavior in Sweden). As a result, only a seventh of the mortgages are turned over each year, resulting in the stock of mortgages being sticky and adjusting very slowly. Furthermore, for simplicity, (4) the stock of housing and the number of borrowers is assumed to be constant. In reality, there has been little construction of new housing, but the share of housing owned, and the number of borrowers has increased considerably. This trend may not continue in the future, though.

Figure 2. Actual and counterfactual outcome for the policy rate, inflation, unemployment, and the household DTI ratio



Source: Svensson (2014a)

The red lines show the actual outcome for the policy rate, CPIF inflation (CPI inflation calculated with constant mortgage rates), the unemployment rate, and the household DTI ratio.[3] The vertical dashed line in the panel for the DTI ratio marks the month, October 2010, when the LTV cap of 85 percent was introduced.

The blue lines show the counterfactual outcome, the outcome if the policy rate had been kept constant at 0.25 percent from the summer 2010. Inflation would have remained close to the target of 2 percent, and unemployment might have been about 1.2 percentage points lower. Furthermore, the DTI ratio might have been a bit lower, around 170 percent of disposable income instead of around 173, since nominal disposable income might have increased a bit more than the stock of nominal debt. However, the difference in the DTI ratio is in any case too small to have any impact on any risks associated with it.

The Riksbank's recent estimates

As mentioned, the Riksbank's leaning against the wind was undertaken without any previous supportive analysis of the impact of monetary policy on any risks associated with household debt. Very recently, however, the Riksbank (Sveriges Riksbank 2014a) has presented its own estimates of the impact of the policy rate on household real debt and the DTI ratio. The Riksbank also regularly publishes, in its *Monetary Policy Report*, its estimates of the impact

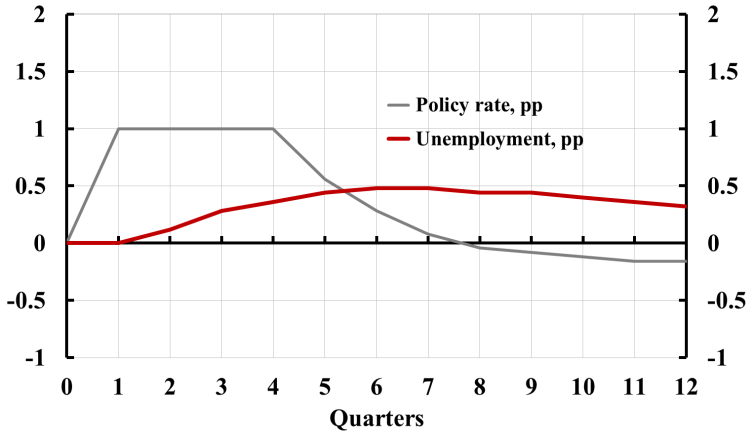
[3] The inflation target is 2 percent for the CPI. In Ramses, inflation is expressed in terms of the CPIF.

of alternative policy-rate paths on inflation and unemployment (Sveriges Riksbank 2014b). This makes it possible to assess the relative costs and benefits of the Riksbank's leaning against the wind, using the Riksbank's own estimated numbers.

The cost of a higher policy rate

A higher policy rate results in higher unemployment. According to Sveriges Riksbank (2014b, figures 2:13 and 2:15), a 1 percentage point higher policy rate during 4 quarters leads to about a 0.5 percentage points higher unemployment rate during the next few years (the red line in figure 3).[4] This represents the *cost* of a higher policy rate, to be compared with the any benefits of a higher policy rate.

Figure 3. The effect on the unemployment rate of a 1 percentage point higher policy rate during 4 quarters



Source: Sveriges Riksbank (2014b).

The benefits of a higher policy rate

A higher policy rate might reduce household indebtedness. The reduced indebtedness might lower the *probability* of a future crisis, with its associated bad macroeconomic outcome with low inflation and high unemployment. The reduced indebtedness might also, conditional on a crisis occurring, make the *consequences* of a crisis less severe, for instance with a lower increase in unemployment. The reduced probability of a crisis and the reduced depth of a crisis constitute the *benefits* of a higher policy rate.

What are then the benefits of a higher policy rate, according to the Riksbank's own estimates?

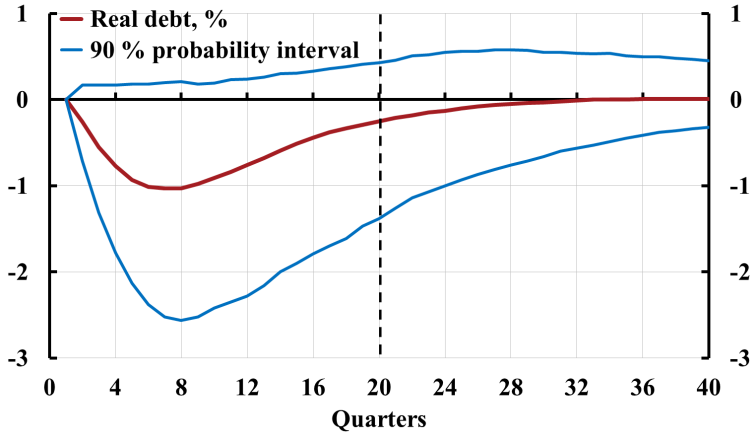
[4] The figure is constructed from the numerical data for Sveriges Riksbank (2014b, figures 2:13 and 2:15), available at www.riksbank.se. The effect on the unemployment rate of a 0.25 percentage point higher policy rate during 4 quarters has been multiplied by 4 to correspond to the effect of a 1 percentage point higher policy rate during 4 quarters.

How does a higher policy rate affect the probability of a crisis?

So, what is the effect of a higher policy rate on the probability of a crisis? First, regarding the probability of a crisis, Sveriges Riksbank (2013) refers to Schularick and Taylor (2012). According to that paper, lower growth of real debt over a 5-year period reduces the probability of a crisis occurring. More precisely, 1 percentage point lower annual growth of real debt for 5 years (that is, 5 percent lower real debt in 5 years) would, everything else equal, reduce the probability of a crisis by 0.4 percentage points.[5]

Second, according to the Riksbank's own estimate, a 1 percentage point higher policy rate during 4 quarters results in 0.25 percent lower real debt in 5 years (the red line in figure 4 for quarter 20).[6]

Figure 4. The effect on real household debt of a 1 percentage point higher policy rate during 4 quarters



Source: Sveriges Riksbank (2014a).

Altogether, this would thus imply a reduction of the probability of a crisis by 0.25*0.4/5 = 0.02 percentage points. This is of course an insignificant reduction of the risk.[7]

The benefit of a lower probability of a crisis can be expressed in terms of lower unemployment, if one makes an assumption of how much higher unemployment would be in

[5] See Table 3, Sum of lag coefficients, Column (1)-(3), in Schularick and Taylor (2012). I believe the coefficient 0.4 might be too high, because data for a number of reasonable control variables are not available. A lower coefficient would result in an even less effect of the policy rate on the probability of a crisis.

[6] The figure uses the numerical data for Riksbank (2014a, figure A20) with the opposite sign. We see that a 90-percent probability interval is not below the zero line, so the effect on real debt is not statistically significantly different from zero, and it may be positive. The policy rate behind figures 4 and 5 returns to zero after 4 quarters somewhat quicker than in figure 3, but this does not affect the conclusions.

[7] According to Schularick and Taylor (2012), the average probability of a crisis is almost 4 percent (per year). A probability of 4 percent then corresponds to a crisis on average every 25th year. A reduction of the probability by 0.02 percentage points to 3.98 percent means that the average time between crises increases by 1.5 months to 25 years and 1.5 months. This is hardly a big increase.

a crisis. Sveriges Riksbank (2013, figure A10) assumes a crisis scenario where the unemployment rate becomes about 5 percent higher.

If the probability of a crisis falls by 0.02 percentage points, that is, by 0.0002, the expected future unemployment rate will then fall by 0.0002*5 = 0.001 percentage points. This is thus the benefit expressed in terms of lower expected future unemployment because of a lower probability of a crisis. It is obviously miniscule relative to the cost of 0.5 percentage point higher unemployment during the next few years. I will use that assumption.

The benefit of a higher policy rate, in the form of a reduced probability of a crisis and thereby lower expected future unemployment, is thus completely insignificant, compared to the cost in the form of a 0.5 percentage point higher unemployment rate the next few years.

Furthermore, in the long run, as is seen in figure 4, the policy rate has no effect on real debt and thus, according to the Riksbank's estimates, no effect on any long-run risks associated with real debt.

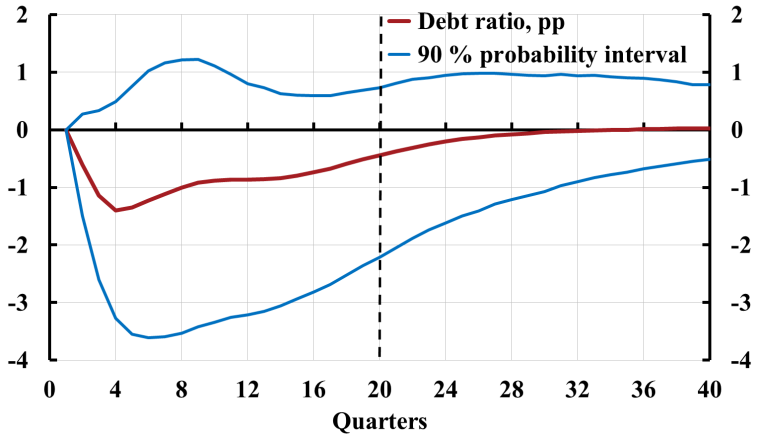
How does a higher policy rate affect the consequences of a crisis?

But what is the effect of a higher policy rate on the *consequences* of a crisis? First, according to a note by Riksbank Deputy Governor Martin Flodén (2014), a 1 percentage point lower DTI ratio might, all else equal, result in the increase in the unemployment rate in a crisis being 0.02 percentage points lower.

Second, according to Sveriges Riksbank (2014a, figure A22), a 1 percentage point higher policy rate during 4 quarters would lead to a 0.44 percentage points lower DTI ratio in 5 years (the red line in figure 5 for 20 quarters). [8]

[8] As noted in Svensson (2014b) and can be seen from the blue lines in figure 4, the change in the DTI ratio is not statistically significant from zero, and it cannot be excluded that it has the opposite sign.

Figure 5. The effect on the household DTI ratio of a 1 percentage point higher policy rate during 4 quarters



Source: Sveriges Riksbank (2014a).

Altogether, this means that the increase in the unemployment rate might be 0.44*0.02 = 0.009 percentage points lower, if the crisis occurs 5 years. If the crisis occurs with the probability 4 percent (the average probability of a crisis according to Schularick and Taylor 2012, corresponding to a crisis on average every 25 years), the expected lower increase in unemployment is only 1/25 of 0.009 percentage points. It is clearly completely insignificant. If we instead assume as high a risk as 10 percent, corresponding to a crisis every 10 years, the expected lower increase in unemployment is only 0.0009 percentage points. This is still completely insignificant.

Furthermore, in the long run, as can be seen in figure 5, the policy rate has no effect on the DTI ratio, and thus, according to the Riksbank's estimates, no effect on any long-run risks associated with the DTI ratio.

Adding up

Adding up the two benefits of a higher policy rate, in terms of a lower probability of a crisis and a less deep crisis, we get an expected lower future unemployment rate of 0.001 + 0.0009 = 0.0019 percentage points (where I have used the higher probability of a crisis, 10 percent). This is of course completely insignificant in comparison with the cost of a higher policy rate, 0.5 percentages points higher unemployment during the next few years.

The cost and benefits expressed in unemployment are summarized in table 1. Clearly, presumption (2) does not apply for Sweden.

Table 1. Cost and benefit in unemployment of 1 percentage point higher policy rate during 4 quarters

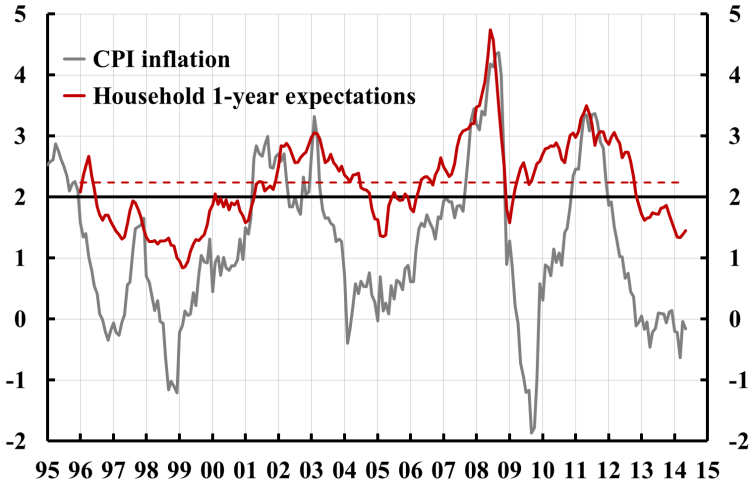
Cost: Higher unemployment during the next few years, percentage points	0.5
Benefit: Lower expected future unemployment, percentage points	
1. Because of lower probability of a crisis	0.001
2. Because of a smaller increase in unemployment in a crisis	0.0009
Total benefit, percentage points	0.0019
Total benefit as a share of the cost, percent	0.38

The effect of inflation below expectations

However, both the Riksbank's estimates in Sveriges Riksbank (2014b) and my discussion in Svensson (2013b) disregard the effect on real debt of low inflation falling substantially below household expectations during the last few years.

Since the end of 1996, household expectations of CPI inflation during the next 12 months have been on average somewhat above the inflation target, as can be seen in figure 6. But actual CPI inflation has been close to zero during the last few years. Actual inflation has thus fallen substantially below previous household expectations. This means that real value any given nominal debt has become higher than expected.

Figure 6. CPI inflation and household 1-year ahead inflation expectations



Source: National Institute of Economic Research and Statistics Sweden

Note: Household expectations are 3-month moving averages. The dashed horizontal line is the average of household expectations for 1996-2014.

Figure 7. The real value of a SEK 1 million loan taken out in November 2011, actual and for 2 percent inflation.

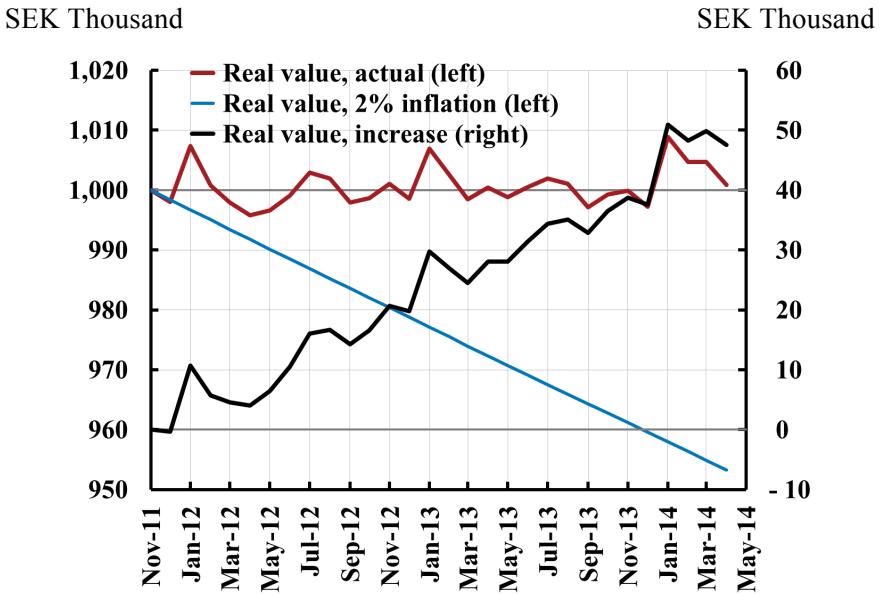


Figure 7 shows the real value of a given loan of SEK 1 million taken out in November 2011. The blue line shows the real value of the loan if inflation had been 2 percent. In April 2014, the real value would then have fallen to just above SEK 950,000. The read line shows the actual real value of the loan. Since inflation has been close to zero, the real value of the loan in April 2014 remains at SEK 1 million. The black curve shows on the right axis the difference between the red and the blue curves, the increase in the real value value of debt due to actual inflation falling below 2 percent. The real value is almost SEK 50,000 higher.

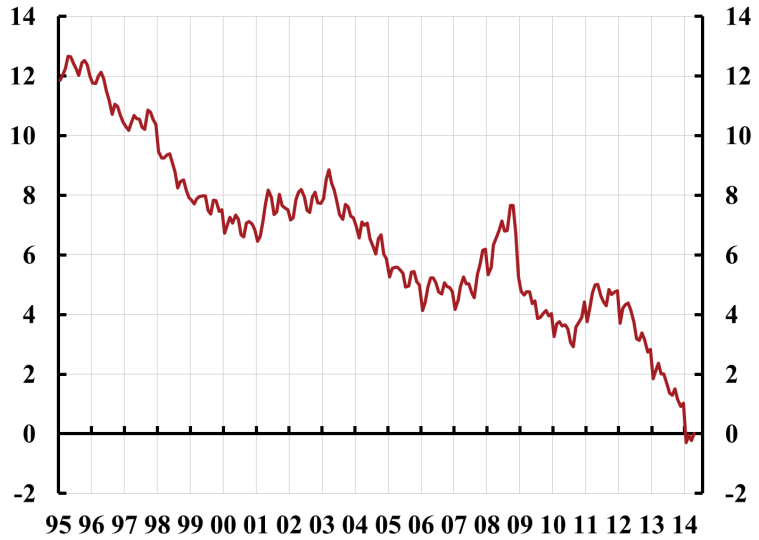
This means that the real value of nominal debt has become higher than expected and planned for. The real value of any mortgage that is two and a half or more years old has become 5 percent bigger, compared to if inflation had equaled 2 percent (Svensson 2013a). This is a substantial effect on the real debt, much larger than the ones discussed above.

This 5 percent increase in real debt in 2.5 years can be compared with the Riksbank's estimated reduction in real debt of 0.25 percent in 5 years in figure 2. It is 20 times larger in magnitude and of the opposite sign. Using the estimates of Schularick and Taylor (2012), it would lead to an increase in the probability of a crisis of 0.4 percentage points, compared with the reduction in the probability of a crisis of 0.02 percentage point. Using the Riksbank assumption of a 5 percentage point higher unemployment rate in a crisis, it implies an increase in the expected future unemployment rate of 0.02 percentage points, compared with the reduction of 0.001 percentage points. Fortunately, the increase in the expected future unemployment rate of 0.02 percentage points is still a small number.

Figure 8 shows, for each date a given nominal loan is taken out, the percentage increase in the actual real value to April 2014, relative to if inflation had been 2 percent. We see that the real value of a loan taken out in the fall of 2011 has increased about 5 percent, in line with the above detailed example shows. The real value of a loan taken out in 2002 has increased by about 8 percent, due to average inflation having been below 2 percent.

Figure 8. The increase to April 2014 in the real value of a given nominal loan, compared to if inflation hade been 2 percent

(depending on when the loan was taken out)



Conclusions

According to the Riksbank's own estimates, monetary policy has a very small effect on any risks associated with household indebtedness. Compared to the large costs of too high unemployment and too low inflation, the possible benefit of leaning against the wind is, according to these estimates, completely insignificant.

Also, the Riksbank's estimates are not statistically significant, and, as discussed in Svensson (2014b), there are reasons to believe that the VAR model used is misspecified. A more thorough empirical study is necessary to judge whether leaning against the wind might make real debt and the debt-to-income ratio actually increase rather than decrease, as under the assumptions in Svensson (2013b).

Furthermore, because the Riksbank's leaning against the wind has led to inflation much below household inflation expectations the last few years, the real value of nominal debt has become higher than expected and planned for. The real value of any mortgage that is two and a half or more years old has become 5 percent bigger, compared to if inflation had equaled 2 percent. This is a much larger effect on real debt than the ones that follow from the Riksbank's estimates. Given this effect, Riksbank policy has almost certainly increased real debt and actually been counterproductive; the Riksbank has consequently made any problem and risks with household indebtedness worse.

Thus, if the purpose is to limit household debt, leaning against the wind does not seem to be an effective policy – definitely not in Sweden. Macroprudential policies are more effective – definitely so in Sweden. As discussed above, Finansinspektionen and the government has used several effective macroprudential tools, and since August 2013 Sweden has a new strengthened framework for financial stability, with Finansinspektionen having the main responsibility and being accountable for financial stability. It then seems clear, that monetary policy in Sweden should definitely not lean against the wind but focus on stabilizing inflation around the inflation target and unemployment around a long-run sustainable rate.

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