

In this commentary, we analyse how Swedish banks, insurance companies and investment funds are affected by the current low interest rates, and the impact this can have on financial stability in Sweden. The conclusion is that vulnerabilities in Swedish financial institutions have increased. If interest rates remain low for a long time, there is also a risk that these institutions will increase their risk-taking. This would further increase vulnerabilities, for example to a fall in assets prices.

Swedish financial institutions and low interest rates

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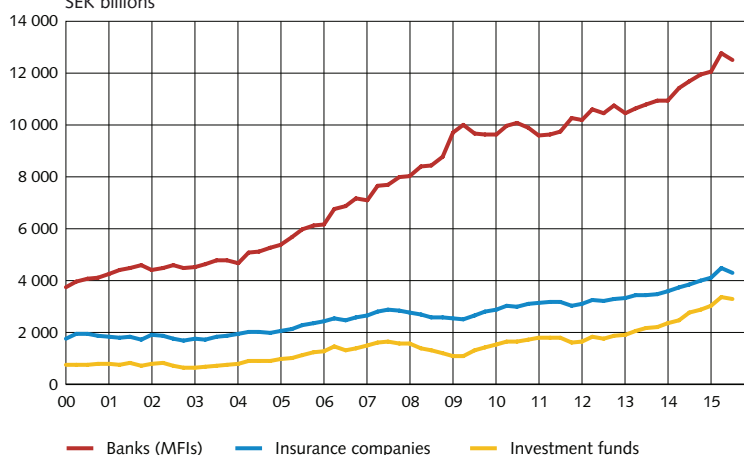
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Many countries, particularly within Europe, have in recent years been facing low inflation and stifled economic growth. Interest rates have also reached historically low levels compared to previous decades, as central banks have taken action to revive growth and combat low inflation. The Riksbank has reduced the repo rate and introduced a program to purchase government bonds to make inflation increase toward the target. In early 2015, interest rates in Sweden in some cases therefore became negative. The BIS noted in their latest annual report that “in the major advanced economies, central banks pursued significantly divergent policy trajectories, but all remained concerned about the dangers of inflation running well below inflation objectives”.²

The historically low interest rates introduce new questions and potential risks, especially if they persist for the foreseeable future.³ The objective of this commentary is to examine the consequences of low interest rates for three key types of Swedish financial institutions; banks, insurance companies and investment funds. As a result of low interest rates, these institutions could become more vulnerable, and financial stability could be affected. The institutions could also change their behaviour in ways that would increase their vulnerability to shocks.

In this commentary, we first analyse the impact of low interest rates on the Swedish banks, followed by insurance companies and investment funds. The banks are the largest type of financial institution in Sweden (see Figure A1). The insurance sector and investment funds are also of interest. One reason for this is that they hold a large part of the bonds issued by Swedish issuers, including banks and non-financial corporations.

Figure A1. Size of Swedish financial institutions' assets
SEK billions



Note. Does not include the Swedish banks' foreign operations. Insurance companies also include pension funds, except for premium pensions.
Source: Statistics Sweden

1. Helpful comments and suggestions on earlier drafts by Riksbank staff are gratefully acknowledged.

2. *BIS 85th Annual Report (2015)*, Bank for International Settlements.

3. The Riksbank has discussed the consequences of low and negative interest rates in previous publications. See for example, *Financial Stability Report 2015:1*, Sveriges Riksbank.

The low interest rate and Swedish banks

In this section, we explore how falling and low interest rates have affected Swedish banks and thereby financial stability in Sweden. We start by explaining how falling and low interest rates affect banks. We do so by identifying different channels through which banks are exposed to falling and low interest rates. We then move on to review the existing evidence on how Swedish banks have actually managed the existing period of falling and low interest rates. Finally, we discuss financial stability implications that stem from Swedish banks' current as well as potential future actions.

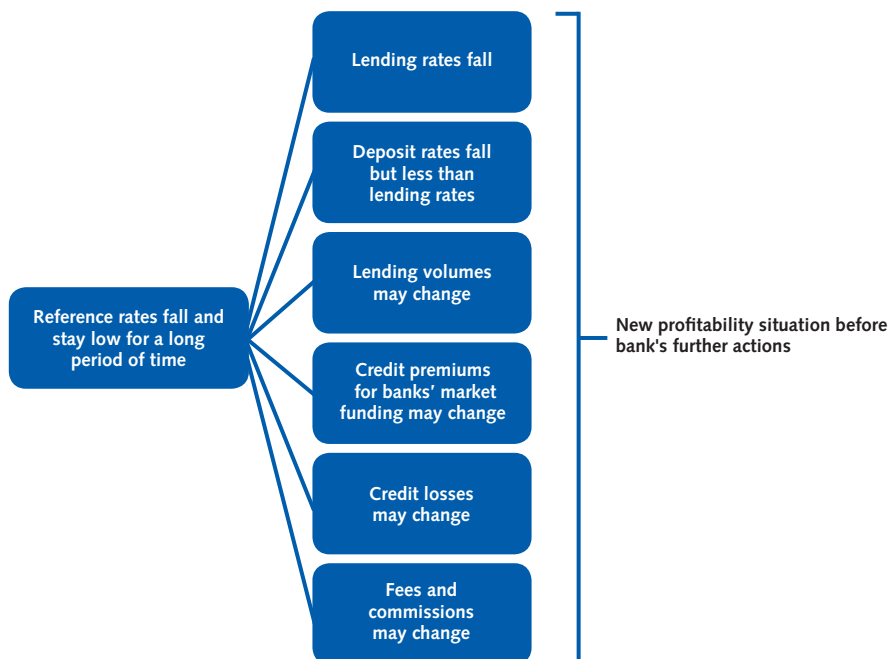
Falling and low interest rates affect banks via profitability

Profitability⁴ is one of the main channels through which falling and low interest rates affect banks (see Figure B1).⁵ This section starts by explaining the effects of falling and low rates on profitability. We identify different factors that determine the impact of falling and low rates on profitability. We also show quantitatively the importance of these factors in determining the effects of low and falling interest rates on profitability. We finish the section by discussing different actions that banks may undertake to counteract their new profitability situation and how these actions may affect stability in the banking sector.

The effect of falling and low interest rates on profitability: the role of deposits and equity

Low interest rates affect both the asset side of banks' balance sheet as well as the liability side. On the asset side, lending rates typically fall when interest rates fall. On the liability side, the cost of deposit funding also falls but typically to a lesser extent than lending rates. When lending rates fall more than the cost of funding, the profitability of banks will decrease.

Figure B1. The effect of falling interest rates on banks



Note. The figure assumes that banks do not take compensating actions for instance via increasing their lending margins. Lending rate can be also thought of as a rate of return that a bank can get from assets other than lending, such as fixed income securities.

4. In simple terms, profitability shows how much profit a bank makes for a unit of lending or for a unit of equity invested by shareholders. There are two popular measures of profitability: net interest margin and return on equity. Net interest margin shows how much a bank earns from lending out 1 SEK after it has paid for its own debt funding costs. Return on equity shows how much a bank earns per 1 unit of shareholder equity.

5. There are two reasons why we focus on profitability in addition to absolute profits. First, banks maximise shareholder value if and only if they achieve a return on equity that exceeds the required rate of return, that is, the return that shareholders would get from alternative investments with a similar risk level to banking. Secondly, it may be optimal for banks to react to increased lending opportunities with improved profitability rather than increased quantities. This stems from the fact that banks' ability to grow is hampered by their limited ability to increase their equity without a cost.

Banks offer loans with floating as well as fixed interest rates. Lending rates for loans with floating interest rates normally follow quite closely reference rates, such as 3-month STIBOR.⁶ Therefore, any fall in interest rates will in principle immediately be reflected in lower floating lending rates.⁷

However, for loans with fixed interest rates, the pass-through is slower and takes time. Over a short period of time, the stock of fixed interest rate loans limits the pass-through of falling interest rates to lending rates. Yet, the period during which the stock of fixed interest rate loans can dampen the pass-through of falling interest rates to lending rates is limited in nature. At some point in time, loans with fixed interest rates become due and must be re-priced at the prevailing interest rates. Therefore, falling interest rates do eventually lead to falling lending rates for all types of loans if interest rates fall and stay low for a long period of time.

Moving on to the bank's funding side, it is often the case that a significant share of bank's funding comes from retail deposits.⁸ A distinct feature of retail deposits is that their cost in terms of interest rate paid tends to be relatively low, especially compared to reference rates. While the low cost of retail deposits makes them an attractive source of funding for banks, it is this low cost that may limit the extent to which the funding cost of banks can fall when interest rates fall. If the initial cost of deposits is low, the extent to which the cost can be further reduced is limited unless banks introduce negative deposit rates.

The pass-through of falling interest rates to deposit rate is not uniform and varies across different types of deposits. Demand deposits in transaction accounts typically earn the lowest interest, since they are often held for reasons other than the return they offer. For these deposits, the pass-through typically breaks down first. Other demand deposits, such as those held in saving accounts, usually yield higher interest than demand deposits held in transaction accounts. Higher initial interest rates make it more likely that these deposit rates will first fall one-to-one with interest rates. However, as interest rates keep falling, the deposit rates will approach zero, limiting further pass-through of falling interest rates to these deposit rates.

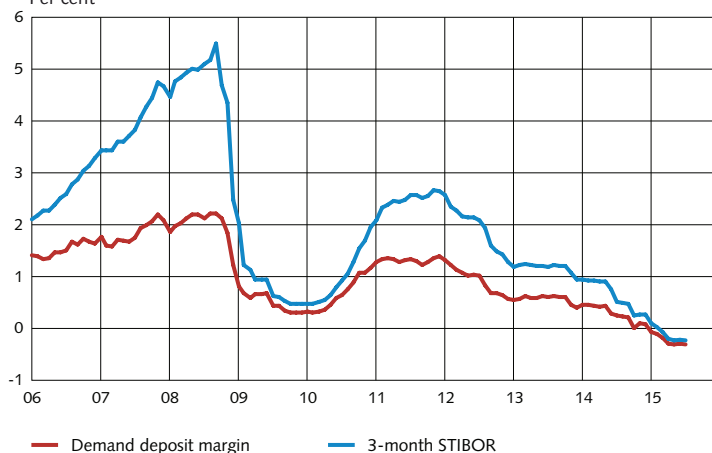
The fact that banks do not usually pass on the entire fall in interest rates to their demand deposit rates can be illustrated by the deposit margin, that is, the difference between the reference rate, such as 3-month STIBOR, and deposit rates. Figure B2 shows how the deposit margin has developed in Sweden. A full pass-through would mean that the deposit margin is constant. Yet, we can see that when interest rates increase, the deposit margin increases and when interest rates decrease, the deposit margin decreases.

6. In Sweden, lending rates to non-financial corporations are directly linked to 3-month STIBOR. Lending rates to mortgages are linked to 3-month STIBOR indirectly via banks' funding costs.

7. Banks can re-price their loans, limiting the pass-through of interest rates to lending rates. The re-pricing of loans is considered later in the text when banks' counterbalancing actions are considered.

8. By retail deposits we mean deposits from households and small and medium-sized non-financial corporations.

Figure B2. Deposit margin for demand deposits
Per cent



Note. Demand deposit margin is calculated as the difference between 3-month STIBOR and the cost of demand deposits.
Source: Statistics Sweden

The situation where banks cannot reduce their cost of deposit funding when interest rates fall can more generally be termed as a “floor problem”. The floor problem can have a number of different causes but often banks may be unwilling rather than unable to introduce negative rates to their investors. This is especially true with respect to retail deposits since the introduction of negative deposit rates means a risk of deposit or cash withdrawals. Losing retail deposits today may be costly for banks, since they would then need to attract these deposits back when interest rates rise. Furthermore, non-negative retail deposits, in a low interest environment, may still provide a cheaper source of funding compared to alternative sources of debt funding.

In addition to deposits and market debt, banks also need to fund themselves with equity. Unlike debt or deposits, equity does not have any interest rate expense explicitly attached to it. Nevertheless, the rate of return that a bank can achieve on its equity is directly dependent on the existing level of interest rates. This is so because the amount of funding that equity offers must be invested in some assets. The return on these assets also depends on interest rates, making the return that a bank can achieve on its equity also dependent on interest rates. Consequently, falling interest rates reduce the profitability of banks even if the bank does not have any deposit funding that limits the pass-through of interest rates to banks' funding costs.

In summary, the profitability of banks may be pressured by low and falling interest rates, since the lending rates tend to decrease more than the banks' funding costs.

Quantifying the effects of falling interest rates on profitability due to deposits and equity

We now consider a simple model to illustrate as well as quantify the importance of deposits, equity and potential floor problems in determining the effect of falling interest rates on bank's profitability. We simulate a fall in STIBOR from 3% to -1%, a fall slightly larger than the actual fall in 3-month STIBOR since 2012 (see Figure B2). We calculate profitability, measured as the return on equity⁹, for two hypothetical banks. The banks have the same asset side, but use different funding sources. One bank is entirely market funded, while the other bank has 50% deposits in addition to market funding. Both banks also have 5% of equity on their funding side. To capture the floor effect, we consider two types of deposits of equal sizes: demand deposits in savings accounts and demand deposits in transaction accounts.¹⁰

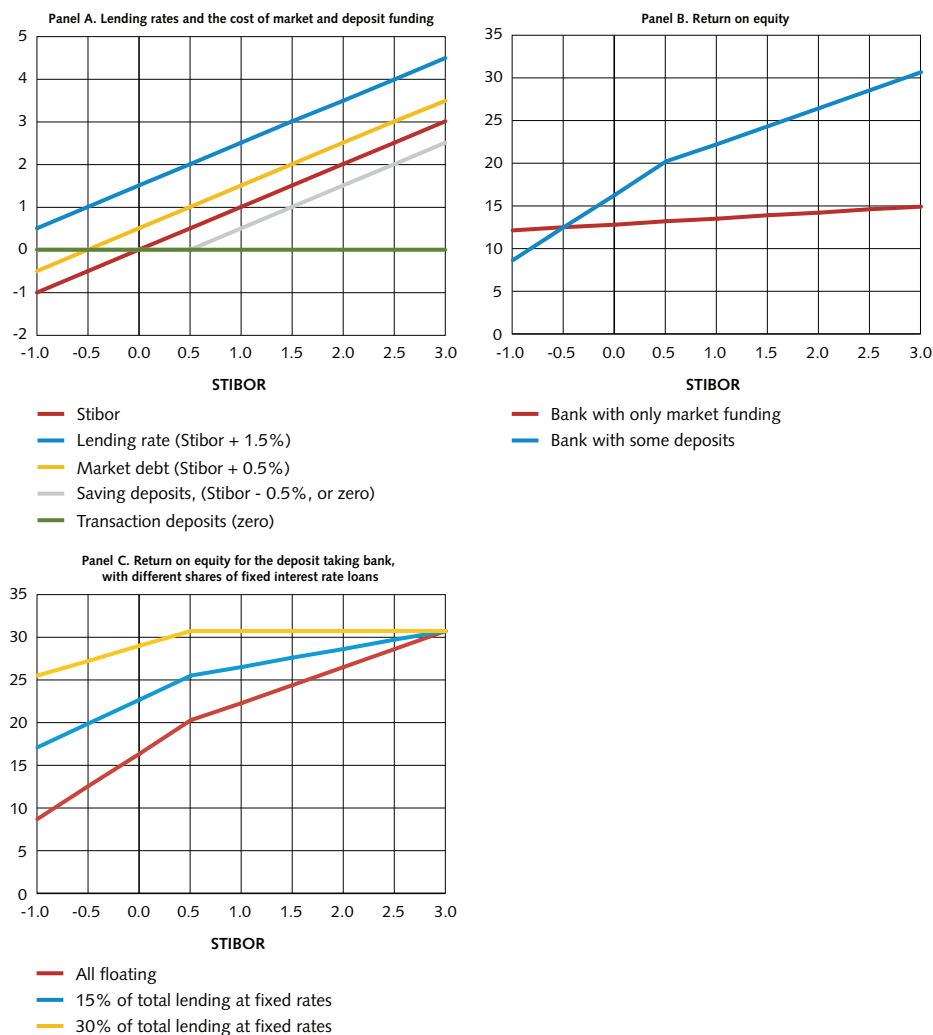
The lending rate of both banks is the same and is specified as a constant margin over STIBOR (see Panel A in Figure B3). The cost of market funding and deposits

9. Return on equity is defined as bank's profits over equity.

10. Taken together, these assumptions mean that the share of market debt and equity on the total liability side of the market-funded bank are 95% and 5%, respectively. For the deposit taking bank, the share of market debt, equity and two different types of deposits on the total liability side are 45%, 5%, 25% and 25%, respectively.

held in saving accounts are also linked to STIBOR, while the cost of deposits held in transaction accounts is constant at zero. It is also assumed that deposit rates cannot become negative, while the cost of market funding can fall under zero.

Figure B3. An illustration of how the effects of interest rates on bank's profitability depends on deposits, equity and floor problems
Per cent



Note. The cost of deposits at saving accounts is either STIBOR minus a spread of 0.5% or zero, depending which is the largest. The share of equity is 5% and tax rate is 30%. The non-interest cost as a fraction of lending is assumed to be 0.1%.

Source: Own calculations

Starting with the bank with only market funding, we can see that its profitability is affected by interest rate changes (see the red line in Panel B). In a world without taxes if interest rates fall by one percentage point, the bank's return on equity would also fall by one percentage point. However, assuming a 30% tax rate the return on equity would respond to a fall in interest rates of one percentage point with a corresponding fall of only 0.7 percentage points. These effects are caused by the equity in the bank's funding structure. We can also see that the bank has no floor problems even when interest rates become negative.

Moving on to the bank with deposits in addition to equity and market funding in its funding structure, we can first note that the profitability of the deposit-taking bank is most of the time higher than the profitability of the bank with only market funding (see the blue line in Panel B). This stems from the fact that the cost of deposits is lower than the cost of market funding provided that the prevailing interest rates do not become significantly negative. In addition, we can see that the falling interest rates affect the profitability of the deposit-taking bank more than the profitability of the bank with only market funding (the slope of the blue line is steeper than the slope of the red line). This is because the deposit taking bank has two interest rate insensitive

funding sources; equity and deposits in transaction accounts. Accordingly, when the lending rate falls, the cost of deposits in transaction accounts stays constant at zero putting pressure on the banks' profitability.

We can also observe that the deposit-taking bank is hit by a floor problem when STIBOR goes under 0.5%. This is a result of the other type of deposit funding i. e. savings accounts, which are priced 0.5% below STIBOR. This cost is floored at zero per cent when STIBOR goes under 0.5%. Finally, note that if STIBOR falls significantly below zero, the profitability of the deposit-taking bank falls below the profitability of the bank with only market funding.

We finish this section by showing how the effect of falling interest rates on profitability depends also on banks' initial exposure to interest rate changes. Banks can actively manage their exposure to falling interest rates. One way this can be done is for instance by matching interest rate insensitive funding with interest rate insensitive assets, e.g. if fixed rate lending is matched with fixed rate borrowing. As previously explained, such a matching cannot insulate banks from the negative effects of falling interest rates in the long term, but it can delay the adverse effects in the short run.

Panel C in Figure B3 illustrates how the effect of falling interest rates on banks' profitability depends on the share of loans with fixed interest rates to total loans. The bank with no fixed loans (the red line) is our baseline case. The profitability of this bank is affected most since lending rates fall together with STIBOR while the fall in funding rates is limited due to the presence of deposits. The profitability of the bank with the largest share of fixed rate loans (the yellow line) is not initially affected since the average lending rate and funding cost fall to the same extent as STIBOR falls. It is only when STIBOR approaches zero that the profitability of this bank will be impacted. This is because the cost of an additional funding source in the form of saving deposits will become zero and cannot fall further.

Other factors that determine the effect of falling and low rates on profitability

Falling interest rates may also affect bank's profitability in ways other than through equity, deposits and lending rates (see Figure B1). These other channels include increased lending volumes, increased revenues from activities other than lending, lower credit losses as well as lower credit spread for bank's market funding.

When interest rates fall and stay low for a long period of time, it is possible that, all else equal, the demand for bank lending will increase. Increasing demand for bank lending could improve banks' profitability in two ways. First, banks could meet increased demand with higher lending volumes. This case assumes that the banking sector has enough excess capital to accommodate the increased demand for lending. In such a case, profitability would increase under the circumstance that lending is more profitable than the alternative uses of banks' capital. Second, increased demand can also lead to higher lending margins if banks do not increase the volume of bank loans but instead choose to re-price their loans (see also the next section). This would be a realistic case if the existing capital in the banking sector is too small to accommodate the entire increase in the demand for bank loans.

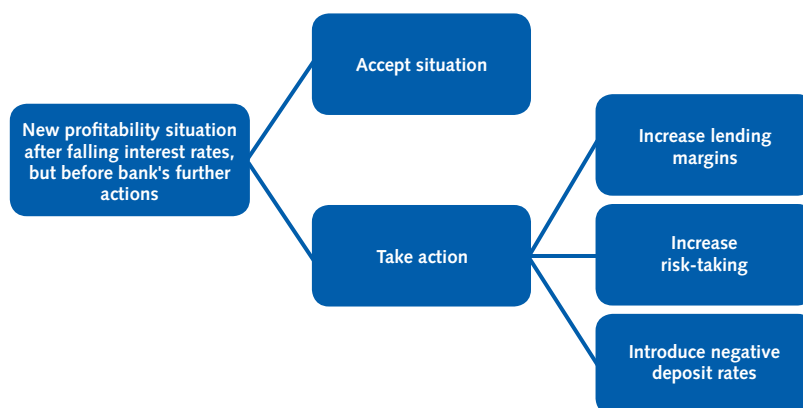
Banks may also have businesses other than lending that tend to boom when rates fall and stay low for a long period of time. An example of such a business is for instance the asset management industry. When rates fall, asset values increase. The increased assets under management mean increased fees since these fees are typically calculated as a percent of assets under management.

Low interest rates may also keep banks' current credit losses lower than otherwise since it is easier for banks' clients to meet low rather than high interest rate payments. To the extent that low interest rates increase the search for yield tendencies, low interest rates may also reduce credit premiums that banks pay for their market funding. This has a positive effect on profitability due to the decreased cost of bank's market funding, but also due to higher valuation of fixed income securities held in the banks' liquidity and trading portfolios.

Actions that banks can take to manage their profitability and potential risks in the banking sector due to low interest rates

Banks can take various actions to mitigate the effects that falling and low rates may have on their profitability (see Figure B4).

Figure B4. Actions banks can take if their profitability falls as a result of falling interest rates



One way that banks can deal with the negative effects of falling interest rates on profitability is to increase their lending margins.¹¹ Increasing lending margin would mean that banks increase the spread between their floating lending rates and STIBOR. Since the lending spread would be increased when STIBOR decreases, the pass-through of STIBOR to lending rates would fall.

Introducing negative deposit rates to retail customers is another potential action that banks could take to manage profitability pressures that arise from falling interest rates. However, negative deposit rates mean that there is an increased risk of cash withdrawals or deposit outflows. Banks can meet increased cash withdrawals by ordering more cash against banks' existing assets in the central bank or against suitable collateral. Similarly, banks can deal with deposit outflows via the interbank market, where liquidity shocks across banks are usually managed. This said, there is still a risk of disruption in the system, especially when cash withdrawals and deposit outflows are large, concentrated around few banks and take place fast.

Low rates may also lead banks to take on more risk than otherwise, especially if banks cannot meet their profitability targets in any other way. Increased risk-taking can take different forms. Banks can for instance relax their lending standards and start lending to new, riskier customers. In addition to credit risks, banks may also increase their liquidity, interest rate or currency risks.

Low interest rates may also increase risks in the banking sector even if banks do not take any active steps to maintain their profitability. One way this may happen is when low rates stimulate demand for certain types of bank loans more than others. For instance, it could be the case that mortgage-lending increases more than lending to businesses, leading to increased concentration risks for banks.

Finally it is also worth noting that increased risks, both at the individual bank as well the system level, should be seen in relation to the banks' capacity to manage these risks. In principle, banks could take compensating steps to deal with increased risks. Such steps include for instance increased capital and liquidity buffers that banks have. Therefore, if risks do indeed increase due to the banks' active or passive actions, then there is a need to evaluate whether the existing backstops in the form of the current regulations are sufficient to deal with these risks.

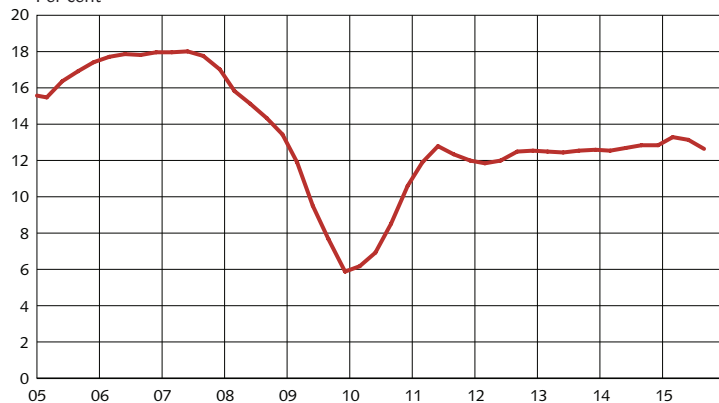
11. Whether banks can increase their lending margin when interest rates fall depends on a number of factors, such as, how the impact of falling interest rates varies across banks, how the demand for bank loans changes as interest rates fall, how much excess regulatory capital the banking sector has, how bank clients react to increased margins and so on.

How have Swedish banks managed falling interest rates?

In this section we will analyse the effects on Swedish banks profitability, measured as return on equity, and profits in absolute numbers.

The profitability of Swedish banks has been fairly stable over the latest years (see Figure B5) despite low and falling interest rates. This suggests that the adverse effects of the falling interest rates on banks' profitability due to equity as well as deposits must have been compensated by other factors or actions taken by the banks. Below we will go through more in detail how different factors have impacted return on equity.

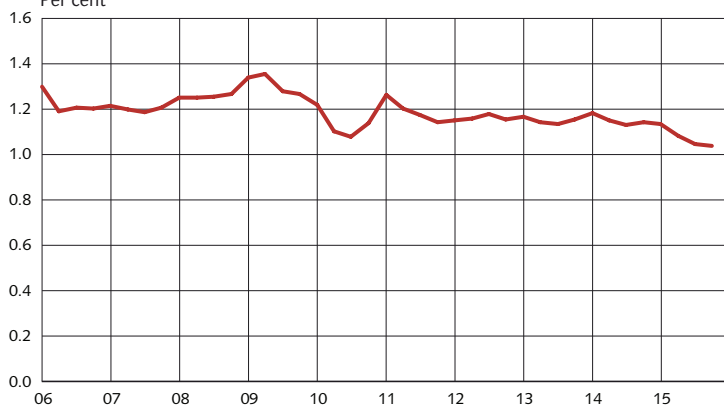
Figure B5. Return on equity for the large Swedish banks
Per cent



Sources: Banks' annual reports and the Riksbank

The interest rate that banks receive on their lending has fallen more than the one they pay for their funding. Put differently, the profitability of one unit lent has weakened somewhat over the last years. This is reflected in the so called net interest rate margin (see Figure B6). The fall in the net interest margin is, however, rather limited. There are several reasons why the net interest margin has been able to withstand the low and falling interest rates.

Figure B6. Net interest margin for the large Swedish banks
Per cent



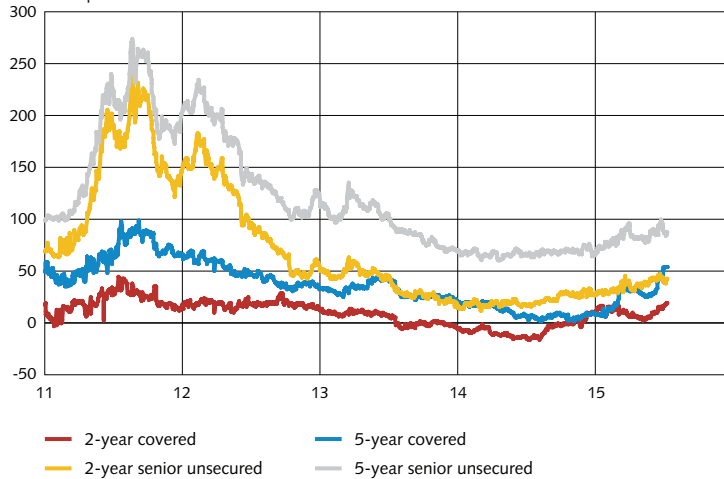
Note. Net interest margin is a ratio of net interest income to average interest bearing assets. Interest bearing assets include lending to the public and credit institutions as well as interest bearing securities. Balances at the central bank have also been included.

Source: Banks' annual reports and the Riksbank

One important factor is that the cost of banks' market funding has had a strong downward trend since 2012 (see Figure B7). The cost of senior unsecured funding has fallen particularly strongly, roughly 100 basis points in the 2- and 5-year segments. The initial rise and the subsequent fall in the cost of market funding have been mainly driven by global factors, such as the European debt crisis. Nevertheless, the fall in the cost of market funding has helped to compensate some of the profitability pressures that Swedish banks have had from the falling deposit margins since 2012

(see Figure B2). We can also note that the funding spreads have recently started to increase which could increase pressure on banks' profitability.

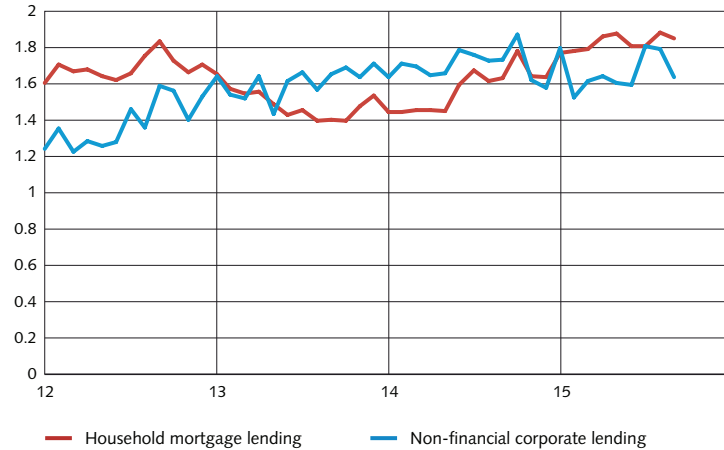
Figure B7. The cost of market funding as a spread over STIBOR
Basis points



Note. These costs are indicative
Sources: Reuters and the Riksbank

Another factor is that strong demand for bank loans has helped to maintain profitability, since it has helped the banks to re-price their loans in terms of 3-month STIBOR (see Figures B8 and B13). Since the beginning of 2012 mortgage rates have increased by approximately 25 basis points, while lending rates to non-financial corporations have increased by about 40 basis points in relation to 3-month STIBOR.

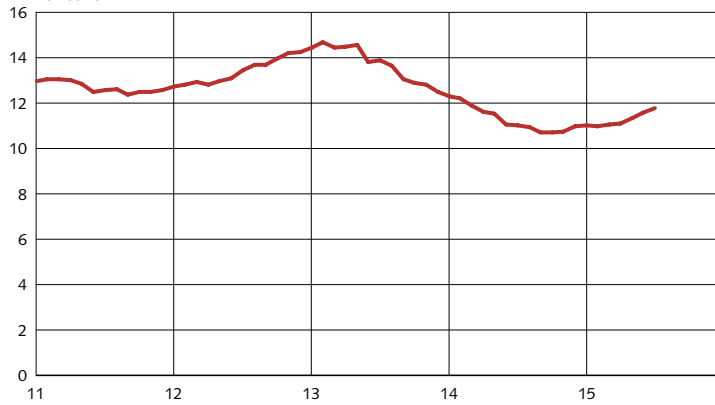
Figure B8. Lending rates over 3-month STIBOR in Sweden
Per cent



Note. Lending rates are for new loans with interest rate fixing periods of three months or less.
Source: Statistics Sweden

The banks' initial positioning against falling interest rates offers yet another potential explanation why profitability in banks' lending business has remained fairly stable despite falling interest rates. As explained in the previous section, one way banks can position themselves against falling interest rates is by matching rate-insensitive funding, such as fixed rate market funding, demand deposits in transaction accounts and equity, with fixed interest rate loans. The share of loans with fixed interest rate period of two or more years was around 12% in 2012 and increased somewhat during the period of 2012-2013 (see Figure B9). This stock of loans with fixed interest rates could have been used by the banks to delay and smooth out some of the negative effects of falling interest rates on the banks' profitability.

Figure B9. The share of lending to the public that has an interest rate period of 2 or more years in Sweden
Per cent



Note. Effective rather than original maturities are used.
Source: Statistics Sweden

In sum, different countervailing effects have resulted in only a minor reduction in the net interest margin, despite low and falling interest rates. Still, banks earn a little less per one unit lent that was the case a few years ago. At the same time, return on equity has been fairly flat which means that there must have been other factors that helped maintain the banks' overall profitability.

Income from activities other than lending has also helped to stabilize the overall profitability of the large Swedish banks at the time when profitability in the banks' lending business has been pressured somewhat by falling interest rates. It is mostly net fees and commission income that have shown increasing growth since 2013 (see Figure B10). An acceleration of the banks' net fees and commission income is partly driven by the banks' asset management activities as well as by investment banking services. Increased asset valuations, partly driven by the falling and low interest rates, have benefitted directly the large Swedish banks, since these banks own large asset management companies in Sweden.¹² Net inflows from households to investment funds have also increased significantly, giving an additional boost to the asset management companies owned by the banks (see chapter on Swedish investment funds). Low interest rates and higher asset valuations have also had a positive effect on activity on the Swedish corporate bond market which means improved fee income for the large Swedish banks with underwriting as well as advisory businesses.¹³

Figure B10. Net interest income and net fees and commission income for the large Swedish banks
Per cent, annual growth rate

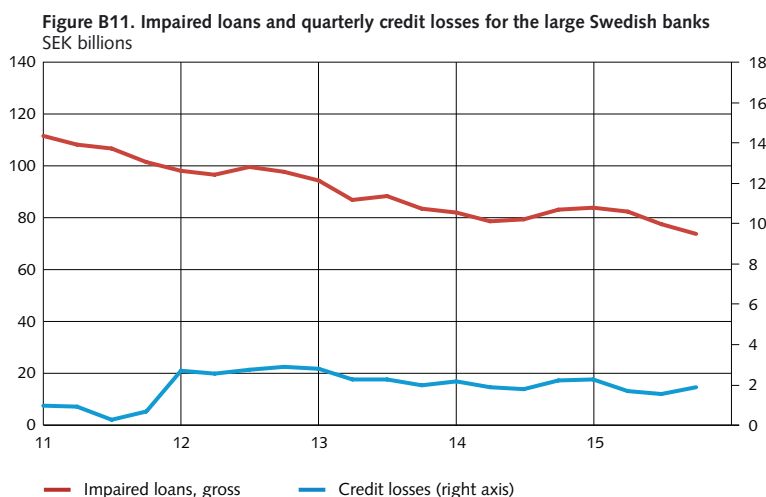


Sources: Banks' annual reports and the Riksbank

12. See Reimo Juks (2015), The Structural changes in the Swedish financial system, *Riksbank Studies*.

13. For more information on Swedish banks' activities on the corporate bond market see Fredrik Bonthron (2014), The developments of the Swedish market for corporate bonds, *Economic Commentaries* no. 7, 2014.

Low interest rates have also helped to maintain high asset quality for the large Swedish banks. The portfolio of impaired loans for the large Swedish banks has been falling since 2012. Credit losses have been stable at low levels at the same time as lending to the public has been increasing in Sweden (see Figures B11 and B13). A fall in the portfolio of impaired loans cannot be directly attributed to falling interest rates in Sweden, since a large share of impaired loans and credit losses actually come from the banks' lending in other Nordic countries as well as the Baltics. Nevertheless, the positive effect of falling and low interest rates on credit losses is likely to be high, since interest rates have been falling not only in Sweden, but also in other Nordic countries and the Baltics.

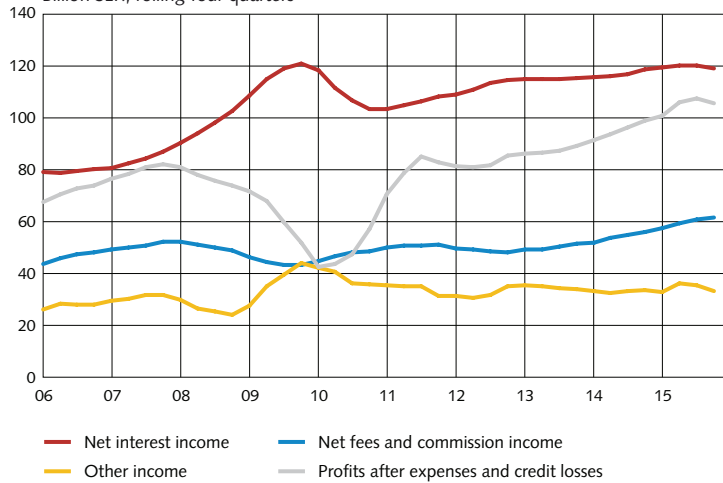


Note. Impaired loans are reported on the gross basis.
Sources: Banks' annual reports and the Riksbank

In sum, banks' profitability measured as return on equity has been rather stable despite low and falling interest rates. While low and falling rates has impacted the banks deposit margins negatively, other factors have contributed positively. Perhaps most notably, the costs of banks' market funding has decreased and the income and net fees and commission income has increased thereby compensating for the profitability pressure from the squeeze of the deposit margin.

While profitability has been stable, the profits in absolute numbers for the large Swedish banks have been steadily increasing since 2012 (see Figure B12). Increases in profits have been achieved through higher net interest income, that is banks' lending business, as well as higher net fees and commission income, which reflects revenue from banks' non-lending businesses. Increases in profits have also been supported by stable costs and low credit losses.

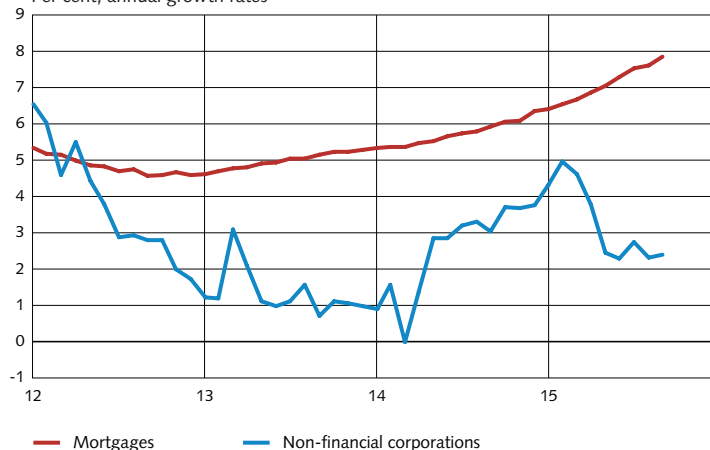
Figure B12. Profits for the large Swedish banks
Billion SEK, rolling four quarters



Note. Other income includes income from changes in value of fair-valued instruments.
Sources: Bank reports and the Riksbank

Net interest income has increased since there has been a strong demand for bank loans in Sweden and lending volumes have increased (see Figure B13). This is especially true for mortgage lending, which has shown increasing growth since 2013. Lending growth to the non-financial corporations has been positive, but lower than the growth in mortgage lending.

Figure B13. Banks' mortgage lending and non-financial corporate lending in Sweden
Per cent, annual growth rates

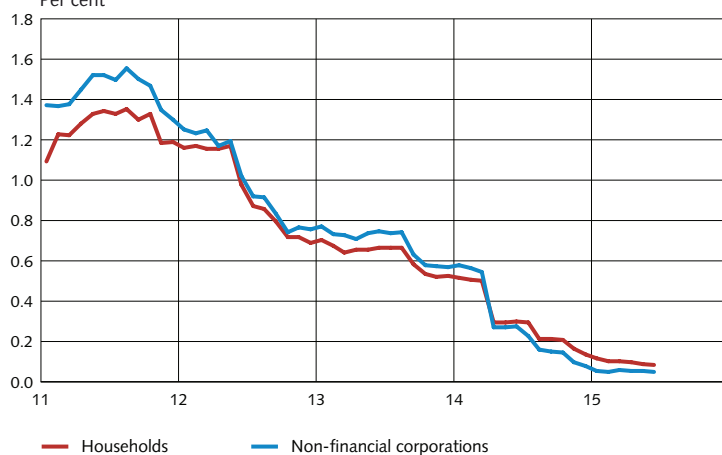


Source: Statistics Sweden

Banks have not introduced negative deposit rates to households, but the concentration risks in the banking sector have increased

Low interest rates may put pressure on banks' profitability which may spur them to take compensating actions that may have consequences for financial stability. One such action could be for banks to introduce negative interest rates on retail deposits. However, the available data shows that Swedish banks have not introduced negative deposit rates to retail customers (see Figure B14). One reason for this may be that the banks have found other ways to hold up their profitability as explained above. Another reason is that introducing negative deposits rates would mean an increased risk of deposit outflows. The risk of deposit outflows is especially high if some but not all the banks decide to introduce negative deposit rates.

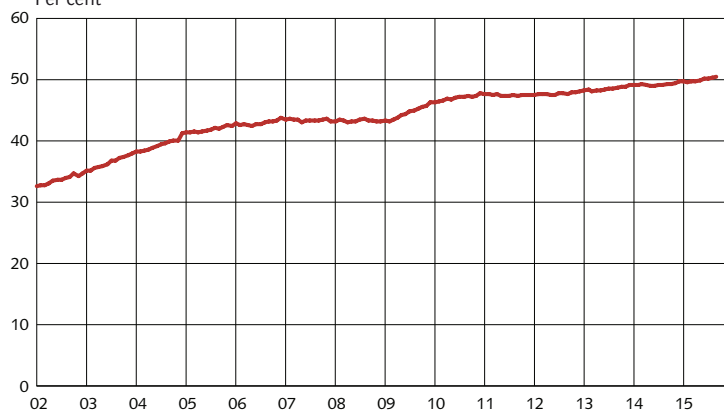
Figure B14. Deposit rates for households and non-financial companies
Per cent



Note. Deposit rates for new businesses
Source: Statistics Sweden

Increased risk-taking is a potential action that the banks could take to maintain their profitability. Regulatory measures do not indicate that the large Swedish banks as a group have taken active steps to increase their risks in relation to their capital and liquidity situation. We can however observe that low interest rates have increased risks for the Swedish banking sector through their increased exposure to the housing market. A rapid growth of mortgage loans means a higher concentration risk for the Swedish banks as they already have large exposures to this sector (see Figure B15).

Figure B15. Mortgage lending as share of total lending to the public in Sweden
Per cent



Note. Total lending to the public includes banks' lending to households as well as non-financial corporations.
Source: Statistics Sweden

Financial stability implications going forward

Going forward, a protracted period of low and potentially negative interest rates could exert downward pressure on the profitability of Swedish banks. As assets with fixed interest rates mature, the profitability pressure for Swedish banks will increase. Profitability pressures will also increase if some of the factors that have helped Swedish banks' profitability so far, such as falling credit spreads and fee income, were to reverse. There are therefore two broad scenarios going forward. One scenario is that the profitability of Swedish banks falls to a level that reflects the lower interest rates. The alternative scenario is that the banks take additional steps to counteract the negative effects of low interest rates on their profitability.

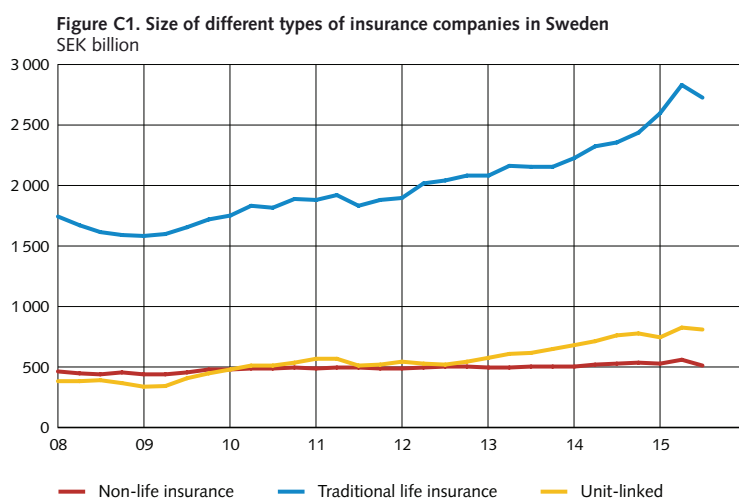
It is mostly this alternative scenario that is interesting from a financial stability point of view. It is clear that the way the banks maintain their profitability is crucial for the implications of financial stability. The banks can for instance try to increase their

lending margins further. Further increases of the margins may, however, be limited since increased margins may intensify competition within the banking sector as well as make it more attractive for some clients to obtain their banking services outside of the banking sector.

It is also possible that the banks will take on more risk to maintain their profitability going forward. It is therefore important to follow future developments in the banking sector closely as well as guarantee that the existing regulatory measures are able to identify and quantify such emerging risks in a quick and appropriate manner.

The low interest rate and Swedish insurance companies

Low interest rates may also pose challenges to insurance companies. Traditional life insurance companies provide financial guarantees for future payments to policyholders. Due to these longterm obligations (or commitments), traditional life insurance companies are the type of insurance companies that are most affected by low interest rates.¹⁴ The IMF has expressed concerns about Swedish life insurance companies' ability to handle a long period of low interest rates.¹⁵ In addition to being the most affected by low rates, traditional life insurance companies also account for a majority of Swedish insurance companies' total assets – around 70 per cent (see Figure C1). This section will therefore analyse how low rates affect these companies. Hereafter, any reference to life insurance companies refers to traditional life insurance companies.



Source: Statistics Sweden

Life insurance companies are affected by low rates since they have pre-committed guarantees

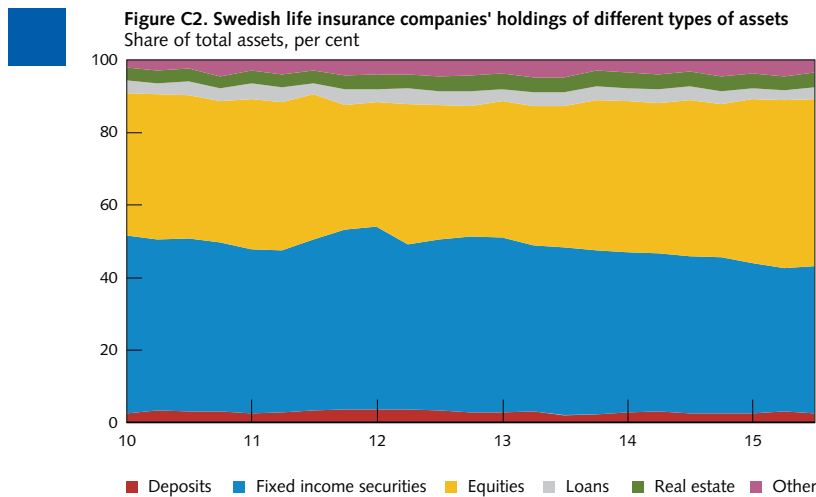
Life insurance companies offer guarantees to policyholders, i.e. a promise of future payment.¹⁶ In other words, they guarantee that a certain amount is paid out to the policyholder, for a determined period or throughout the remainder of the policyholder's life. In order to get this guarantee, policyholders have to pay premiums (or fees). The life insurance companies invest these premiums in different kinds of financial assets and, therefore, become exposed to financial risks.

One of the key asset classes that life insurance companies invest in is fixed income securities, mainly government bonds and covered bonds (see Figure C2). Lower interest rates will therefore lead to lower returns on the companies' assets. How much lower depends on what proportion of the assets is fixed income securities, as well as what return they receive on other assets, e.g. equities and real estate.

14. In unit-linked insurance, the policyholders decide in which investment funds the premiums shall be invested. In contrast to traditional life insurance, insurance companies do not provide any financial guarantees for unit-linked insurance. For a more thorough description of different types of insurance, see Finansinspektionen (2015), *Supervision of insurance undertakings*.

15. See International Monetary Fund (IMF) *Global Financial Stability Report 2015:1*.

16. Life insurers pay out compensation when an insured person is unable to work, dies or reaches retirement age.



Note. Fixed income securities include both bonds and certificates. Equities also include mutual funds, except for unit linked insurance. Real estate refers to land and buildings as well as shares in wholly owned real estate companies. Other refers to repos, derivatives and accrued interest income.

Source: Statistics Sweden

If life insurance companies only held bonds which matured at the same time as the (promised) payments to policyholders were due, the companies would have no exposure to changes in interest rates. This is however not the case for Swedish (and many other countries') life insurers. Their holdings of bonds mature before their payments to policyholders are due. If interest rates are still low when the bonds reach maturity, they will have to reinvest at a lower return. This will reduce the future value of their assets. As a result, the insurance companies' assets might not be sufficient to meet future obligations to policyholders.

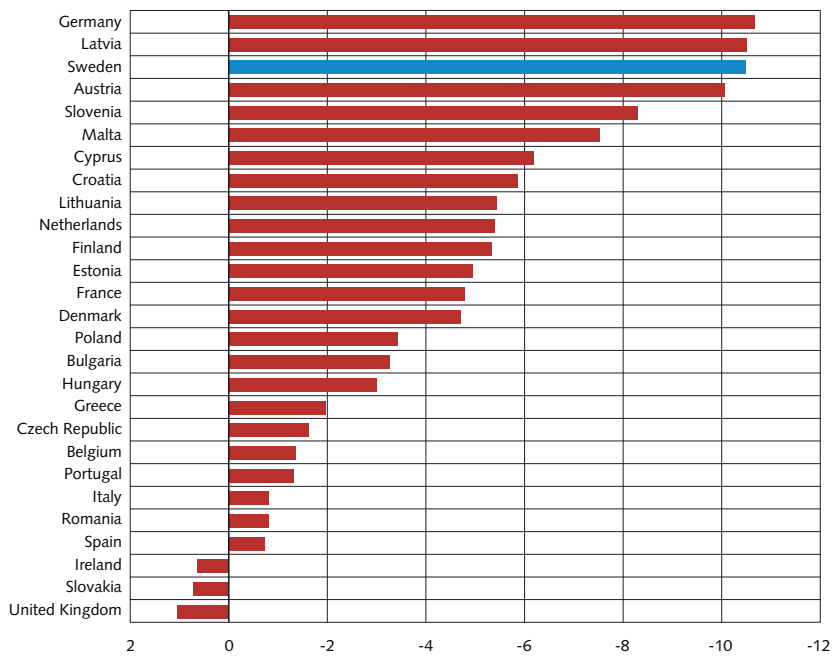
The problems with low interest rates would be reduced if insurance companies' guarantees could be adjusted to the interest rate level. While life insurance companies can adapt terms and premiums of new contracts to altered conditions, they cannot adapt already existing contracts. Hence, past commitments cannot be adjusted down if asset returns turn out to be lower than expected.

Swedish insurance companies, together with their German and Austrian counterparts, have the largest difference between the maturity of their assets and liabilities, i.e. maturity mismatch, of all EU insurance companies (see Figure C3).¹⁷ Swedish life insurance companies, therefore, are more exposed to an extended period of low interest rates than many of their EU counterparts.

17. EIOPA is the European Insurance and Occupational Pensions Authority.



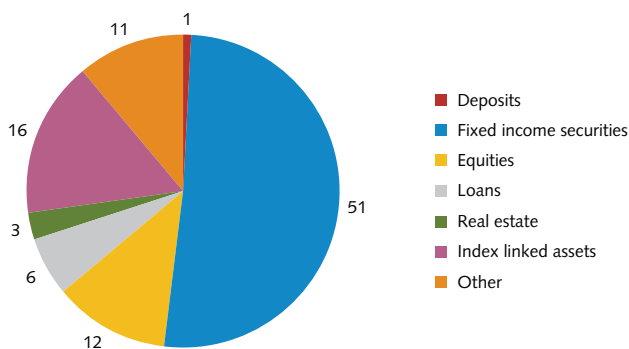
Figure C3. Difference in maturity between assets and liabilities of EU life insurance companies
Years



Note. Based on the EIOPA 2014 stress test for EU insurance companies. The chart refers to the duration of assets and liabilities. Does not include insurance companies' holdings of equities and real estate.
Source: IMF Global Financial Stability Report 2015:1

One possible explanation for the comparatively large maturity mismatch of Swedish life insurance companies is that they have a strong financial position. Therefore, they can take on more re-investment risk from their maturity mismatch as well as invest in riskier assets. This potential explanation is supported by the composition of Swedish life insurance companies' assets. They consist to nearly 50 per cent of equities (see Figure C2), while EU counterparts have only just above 10 per cent equities (see Figure C4). However, to determine the financial strength of a company, its asset size needs to be put in relation to its liabilities, where the liabilities in this case consist mainly of obligations to policyholders. The most frequently used measure of the financial strength of an insurance company is the solvency ratio.

Figure C2. EU insurance companies' holdings of assets
Per cent



Note. Based on the EIOPA 2014 stress test for EU insurance companies. However, it has been somewhat adjusted in that equities also include investment funds and other also includes reinsurance recoverables and participations.
Sources: EIOPA and Sveriges Riksbank

The solvency ratio falls when interest rates are low

The solvency ratio for an insurance company measures its financial strength. A high solvency ratio indicates that the company can most likely fulfil its obligations to the policyholders, whereas low solvency is a sign of the opposite.

The solvency ratio is calculated as own funds divided by solvency margin.¹⁸ Own funds are the difference between the value of the company's assets and liabilities, where the liabilities are mainly the net present value of the guaranteed commitments in the insurance contracts it has issued.¹⁹ The solvency margin is calculated based on the company's size and type of insurance. The solvency ratio of a company must exceed 1, meaning that the insurance company's own funds must exceed its solvency margin.

Mark-to-market valuations are applied to both the assets and the liabilities of Swedish insurance companies. This means that interest rates play a role on both the asset and the liability side. Interest rates affect the liabilities because when calculating the present value of the company's future obligations, a discount rate is used.²⁰ The discount rate can be seen as the risk-free return that is required to fulfil the obligations. If the discount rate falls, more assets are needed today to be sure of being able to fulfil the obligations in the future. The discount rate is usually based on a market interest rate for some type of financial asset or instrument with low risk, for example yields on government bonds or interest rate swap rates. All other things being equal, the liabilities therefore increase when the market interest rate declines.

Thus, the low interest rate is troubling for life insurance companies as their solvency ratio will decrease. However, they can reduce this effect by investing in bonds that follow the discount rate.²¹ When interest rates go down, the price of these bonds goes up and the insurance companies' assets will increase in value. Hence, when the interest rates (and discount rate) decrease, both insurance companies' liabilities and assets will increase in value. That is why Swedish life insurance companies invest in bonds, especially those issued in Sweden. However, as the maturities of their holdings of bonds in any case are shorter than on their liabilities, the solvency ratio still declines when the discount rate falls. This is shown in the example below.

An example of the impact on the solvency ratio of lower interest rates

A simplified example of a hypothetical life insurance company that has assets of SEK 140 billion and liabilities of SEK 100 billion can illustrate the consequences of a fall in the discount rate (Base case in Figure C5).²² Own funds in this case amount to SEK 40 billion and the solvency margin to SEK 4 billion, meaning that the solvency ratio is $(40/4)=10$ (see Base case in Table C1).²³

18. The new regulation for EU insurance companies, Solvency 2, enters into force in January 2016. It will among other things mean a major change in the solvency requirement. Despite this, we focus here on the current regulations. This is because the part of the Swedish insurance company business that relates to occupational pensions can be exempted from Solvency 2 for four years. Since a majority of the Swedish life insurance companies' assets are linked to occupational pensions, the current regulatory framework is the most relevant to discuss. Note that the discount rate will basically be the same in the Solvency 2 as the one discussed here.

19. Most of the Swedish life insurance companies' own funds are made up of surplus funds. These funds consist of accumulated profits in excess of guaranteed rates of return promised to policyholders.

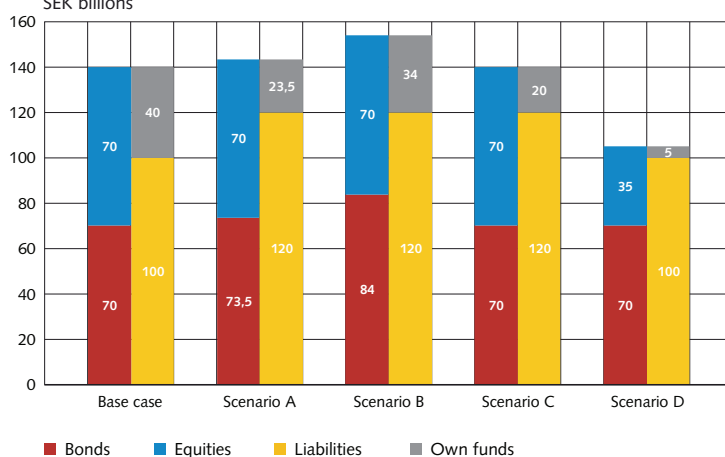
20. The liabilities consist mainly of so-called technical provisions. These provisions should be equivalent to the amount required by the company to ensure that it can meet all the obligations that may arise from its existing insurance policies.

21. Another possibility is to use interest rates derivatives as a risk management strategy.

22. To see the actual impact on the Swedish life insurance companies of these scenarios would require detailed balance sheet information, for example, their use of derivatives and other risk management strategies.

23. The solvency margin is here assumed to be 4 per cent of the liabilities (technical provisions), which is in line with the current regulation for Swedish life insurance companies.

Figure C5. Impact of the different scenarios on an assumed life insurance company
SEK billions



Note. Base case is the starting point for all scenarios. Bonds and equities constitute the companies' assets. The liabilities have an assumed duration of 20 years. In scenario A and B there is a decrease by 1 percentage point both on the yield on the bonds and the discount rate. In scenario A it is assumed that the duration on the bonds is 5 years, whereas in B, it is 20 years. In scenario C there is only an increase of the discount rate by 1 percentage point. Scenario D is a fall in equity prices by 50 per cent.
Source: Own calculations

Table C1. Own funds, solvency margin and solvency ratio for the different scenarios in Figure C5

	BASE CASE	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D
Own funds (SEK billion)	40	23.5	34	20	5
Solvency margin (SEK billion)	4	4.8	4.8	4.8	4
Solvency ratio	10.0	4.9	7.1	4.2	1.3

Note. The solvency margin is assumed to be 4 per cent of the liabilities. The solvency ratio is own funds divided by the solvency margin.

If the bond yields and the discount rate fall by 1 percentage point, then both the liabilities and the value of the bonds on the asset side will increase (Scenario A in Figure C5). If the duration²⁴ of the liabilities is 20 years and the duration of the bonds on the asset side is 5 years, the solvency ratio will fall from 10 to 4.9 (Scenario A in Table C1).²⁵ This decrease would be smaller if the insurance company had less of a maturity mismatch. For example, if the duration of the bonds is 20 years instead of 5 years, the solvency ratio would only fall to 7.1 (see Scenario B in Figure C5 and Table C1). In other words, Swedish life insurance companies are more sensitive to changes in the interest rates due to their maturity mismatch.

The solvency ratio for Swedish life insurance companies and changes in the discount rate

The average solvency ratio for large Swedish life insurance companies is currently above the required minimum level of 1 (see Figure C6).²⁶ However, there are large differences between the companies (see Table C2).²⁷

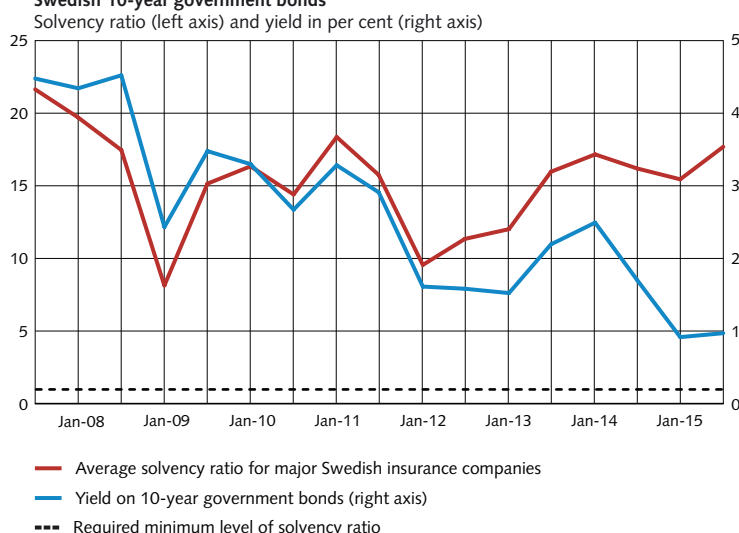
24. Duration is a measure of how sensitive assets and liabilities are to changes of the interest rate. Longer maturity typically means higher duration.

25. In EIOPA's stress test for EU insurance companies, it was reported that the average duration for Swedish life insurance companies is around 18 years for liabilities and around 6 years for assets.

26. The solvency ratio in Figure C5 refers to Swedish mutual life insurance companies. Here we focus on mutual life insurance companies as they are by far the biggest group of insurance companies in terms of assets among those for whom Finansinspektionen reports the solvency ratio.

27. Of the companies in Table C2, only SPP is dividend-paying, while the others are mutual insurance companies. For an explanation about the difference between dividend-paying and mutual insurance companies, see Sveriges Riksbank (2015), *The Swedish financial market 2015*.

Figure C6. Solvency ratio for major Swedish life insurance companies and yield on Swedish 10-year government bonds



Note. The solvency ratio refers to those classified as Swedish mutual life insurance companies by Finansinspektionen.

Sources: Finansinspektionen and Macrobond

Table C2. Solvency ratio and composition of assets for Swedish life insurance companies with predominantly traditional life insurance as of end 2014

COMPANY	SOLVENCY RATIO	ASSETS				
		TOTAL (SEK BN)	PER CENT OF TOTAL ASSETS			
			FIXED INCOME SECURITIES	EQUITIES	REAL ESTATE	OTHER
Alecta	14.1	679	54	43	4	-1
AMF Pension	24.7	445	45	46	9	0
Folksam Liv	11.9	159	58	39	2	0
KPA	15.8	131	52	44	3	1
Länsförsäkringar Liv	4.2	121	85	15	0	0
SEB Trygg Liv Gamla	25.0	170	35	54	13	-3
Skandia Livförsäkring	13.2	356	49	45	2	4
SPP Liv	1.7	100	89	11	0	0
Total		2 161				

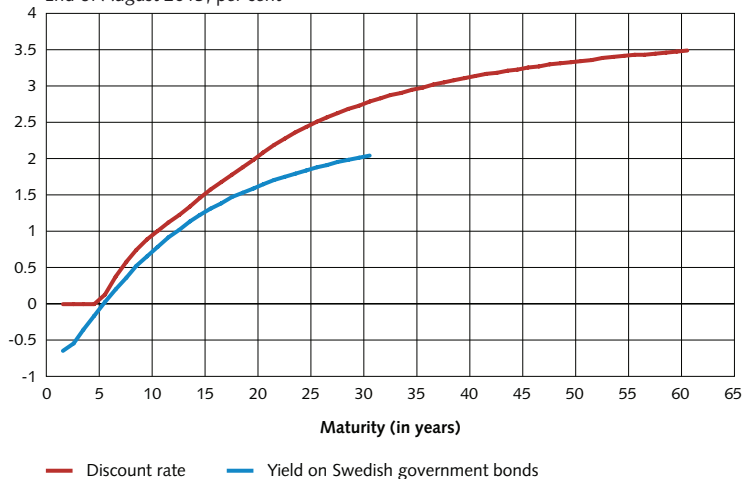
Source: Insurance Sweden

The solvency ratios for Swedish life insurance companies have since 2014 been relatively high in comparison to previous years, despite government bond yields being at low levels (see Figure C6). Before 2014, there was a stronger connection between the solvency ratio and government bond yields. The weaker connection post-2014 is to some extent a consequence of the recent years' strong development on the stock markets, as a large share of these companies' assets are equities.

In addition, the weaker connection is to some extent a consequence of Finansinspektionen (FI) changing the discount rate in the beginning of 2014. The new discount rate is based on the interest rate swap rates for maturities up to 10 years. For maturities above 10 years, it is assumed that the one-year interest rate over 20 years will always be 4.2%.²⁸ By using this method, the discount rate becomes less volatile, especially for longer maturities. However, another consequence of this method, together with the current low interest rate, is that there is now a large gap between the discount rate and the yield on Swedish government bonds, especially for longer maturities (see Figure C7). The gap becomes larger when interest rates fall (see Figure C8). For example, at the end of March 2015 the gap between the government bond yield and the discount rate was 1 percentage point. In comparison to the old method of calculating the discount rate (average of government bond yields and swap rate), the current discount rate has been up to 0.7 percentage points lower during 2015.

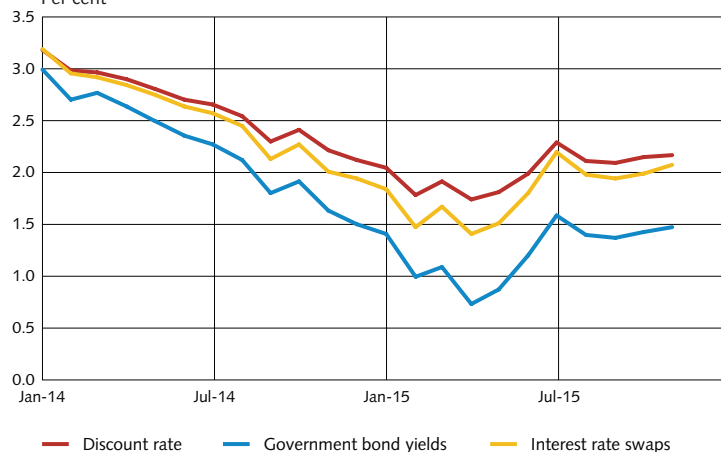
28. This new discount rate is similar to the discount rate that will be used in Solvency II, the new regulation for EU insurance companies as of 2016.

Figure C7. Discount rate for Swedish life insurers and yield on Swedish government bonds for different maturities
End of August 2015, per cent



Sources: Finansinspektionen and Sveriges Riksbank

Figure C8. Interest rates in Sweden with 20-year maturity
Per cent



Sources: Finansinspektionen and Bloomberg

If the discount rate was 1 percentage point lower in our simplified example in Figure C5 and Table C1, the solvency ratio would fall from 10 to 4.2 (scenario A). Note that this change is independent of the company's asset composition, i.e. this change in the solvency ratio would be the same even if the company had no maturity mismatch. Even though this example is not directly applicable to Swedish life insurance companies, it shows that the design of the discount rate can have a major effect on the solvency ratio and consequently impact the assessment of the companies' financial strength. If the financial strength of the insurance company is overestimated, the risk of the insurance companies not being able to fulfil their guaranteed obligations to their policyholders might be underestimated. An accurately designed discount rate is hence essential for consumer protection of policyholders.

Lower interest rates make life insurance companies more vulnerable to a fall on the stock market

As discussed above, the life insurance companies' liabilities solvency ratio drops when interest rates are low, all else equal. A lower solvency ratio makes them more vulnerable to a fall in the value of their assets. Swedish life insurance companies are especially sensitive to a fall in equity prices, as nearly half of their assets are equities (see Figure C2). In addition, the valuation of Swedish equities is historically high.²⁹

29. See Giordani et. al. (2015), Asset valuations and financial stability, *Economic Commentaries* No. 15 2015, Sveriges Riksbank.

If the stock market goes down, some companies may, therefore, have difficulties meeting the required minimum solvency ratio. Our simplified example above shows how insurance companies would be affected by a large fall in equity prices (scenario D in Figure C5 and Table C1). A 50-percent drop in equity prices will reduce the solvency ratio from 10 to just above 1.

However, there are differences among Swedish insurance companies in terms of their assets composition. This means that there are differences in how much they are exposed to the stock market (see Table C2). AMF and SEB Trygg Liv Gamla have the largest portion of equities, while Länsförsäkringar and SPP have the smallest exposure to the stock market. Thus, the same companies that have the highest (lowest) solvency ratio in Table C2 also have the highest (lowest) exposure to the stock market.

In addition, Swedish life insurance companies fulfil the requirements in the traffic light system.³⁰ This indicates that they can withstand a fall of 40 per cent in equity prices without any severe problems. Hence, it takes an even larger fall in equity prices to cause serious problems for the insurance companies. This type of fall is however not unlikely – for example, the Stockholm Stock Exchange fell by about 70 percent in connection with the so-called dot-com bubble in the early 2000s.

Limited consequences for the financial system if a life insurance company runs into problems

There is, thus, a risk that a major fall in equity prices could cause solvency problems for Swedish life insurance companies. If the solvency ratio of an insurance company fell below the required level, Finansinspektionen (FI) would intervene.³¹ If the solvency problems are severe, FI can as a last resort revoke the insurance company's license to conduct insurance business, which in practice means that the company must cease its operations and go bankrupt. In the event of bankruptcy, the insurance contracts (liabilities) together with the assets should be transferred to another insurer, if possible. This would ensure that there is continuity in the life insurance, and that the policyholders receive all or some of their promised payments.

Another option is to close the company for new policyholders, a so-called “run-off”. The purpose of a run-off is to ensure that existing policyholders receive their promised payments. The success of this depends on whether the insurance company's assets are sufficient to pay the claims of policyholders. This is generally not known until many years later. To increase the possibility of success, the insurance company would only invest in less risky assets, such as government bonds.

Thus, if a Swedish insurance company had severe problems, the process could most likely be handled in a sound manner without any major consequences for the financial system. To some extent, this is due to the fact that life insurance policyholders are typically locked in. In other words, policyholders cannot take out the money from a life insurance company in the same way as they can withdraw bank deposits. However, there may be circumstances when it is difficult to handle a bankrupt life insurance company. This could for instance happen when the value of the company's assets and liabilities is highly uncertain, for example if the discount rate is believed to be too high. Thus, a correct discount rate is important when handling insurance companies with solvency problems.

Swedish life insurance companies can amplify a fall in the equity prices

In case of a fall in equity prices, life insurance companies' solvency ratios could decrease towards the regulatory minimum level of 1. To reduce the risk of the solvency ratio declining even further, they may then sell their riskier assets, such as

30. The Swedish regulation currently in place does not fully capture the risk in the insurance companies' assets and liabilities. Finansinspektionen has, therefore, implemented the traffic light system. The traffic light system tests how well Swedish insurance companies can handle a number of adverse developments, including a fall on the equity markets by 40% and a decrease by 100 basis points in the interest swap rates that are used when calculating the discount rate. The traffic light system is not binding, like the solvency ratio. If an insurance company does not meet the requirements of the traffic light system, Finansinspektionen initiates a discussion with the company on how to improve its financial situation.

31. Actions that can be taken include requesting the company to draw up a plan for how to restore capital levels (own funds), i.e. up to a solvency ratio above 1. Measures to restore capital levels include capital injections by the owners or policyholders (depending on company structure).

equities, and instead buy fixed income securities, such as government bonds and covered bonds. This could cause equity prices to fall even further, as the Swedish life insurance companies are major investors on the Swedish stock market. Then the solvency ratios would decrease even more, which, in turn, could further amplify the fall in equity prices. This could trigger a vicious circle of falling equity prices and solvency ratios.

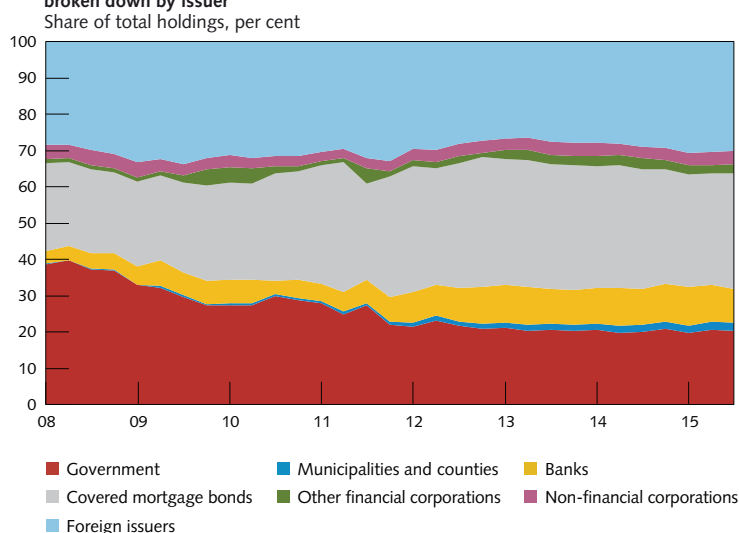
A major fall on the stock market may in turn result in decreased risk-taking among other financial market participants. It could also force other financial institutions to redistribute their holdings of financial assets, among other reasons to comply with statutory requirements. The vicious circle could then spread to other financial markets, causing falling prices and reduced market liquidity, for example assets that are important to the funding of banks. The risk of a vicious circle is larger when interest rates are low since the solvency ratios are typically lower.

Low interest rates can lead to excessive risk-taking among life insurance companies

In summary, the main effect of the current low interests on Swedish life insurance companies – from a financial stability perspective – is that the companies become more vulnerable to a large fall on the stock market. This because, all else equal, their solvency ratio is lower when the interest rates are low. Therefore, it is a concern if they would engage in excessive risk-taking (“search for yield”) in an attempt to match the level of returns promised to policyholders when interest rates were higher.

Looking at the life insurance companies' aggregated composition of assets in Figure C2 or holdings of fixed income securities in Figure C9, there are no strong signs of increased risk-taking among them. The slight increase in the proportion of equities in relation to fixed income securities in recent years (in Figure C2) is estimated to mainly have been driven by the increased value of their holdings of equities, rather than being a result of increased risk-taking. However, it cannot be ruled out that some of these companies have increased their risk-taking by investing in more risky assets. In addition, too high a discount rate can, as discussed earlier, give a false picture of the companies' financial strength and overestimate their solvency ratio. As shown in Table C2, companies with a high solvency ratio invest more in riskier assets, such as equities. Hence, too high a discount rate can incentivise excessive risk-taking. If Swedish life insurance companies increase their risk-taking, they may be more vulnerable to falling asset prices. And if they become more vulnerable, the risk is higher that they end up in a vicious circle where they further amplify a price fall for these assets. For that reason, it is very important to monitor Swedish life insurance companies for signs of excessive risk-taking.

Figure C9. Swedish life insurance companies' holdings of fixed income securities, broken down by issuer



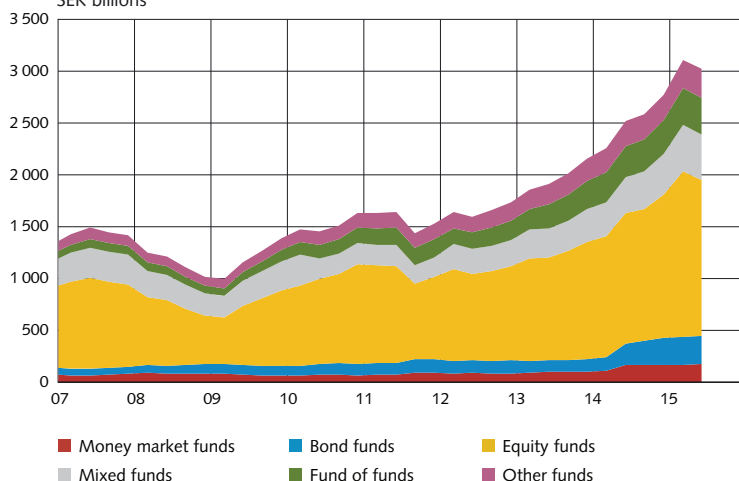
Note. Fixed income securities include both bonds and certificates. The issuers are Swedish, except in the category Foreign issuers.

Source: Statistics Sweden

The low interest rate and Swedish investment funds

Investment funds, such as equity funds, bond funds, and money market funds, have been affected by the low interest rates just like the banks and life insurance companies. The main effect of the low interest rates for Swedish investment funds has been a large inflow and growth.³² In absolute numbers, they are three times bigger than they were in 2009 (see Figure D1). They have also grown in relation to Swedish banks, which is a sign that they have become more important for the Swedish financial system (see Figure A1).

Figure D1. Size of Swedish investment funds
SEK billions



Note. Money market funds are those investment funds classified as short-term fixed-income funds by Statistics Sweden, while bond funds are those classified as long-term fixed income funds.

Source: Statistics Sweden

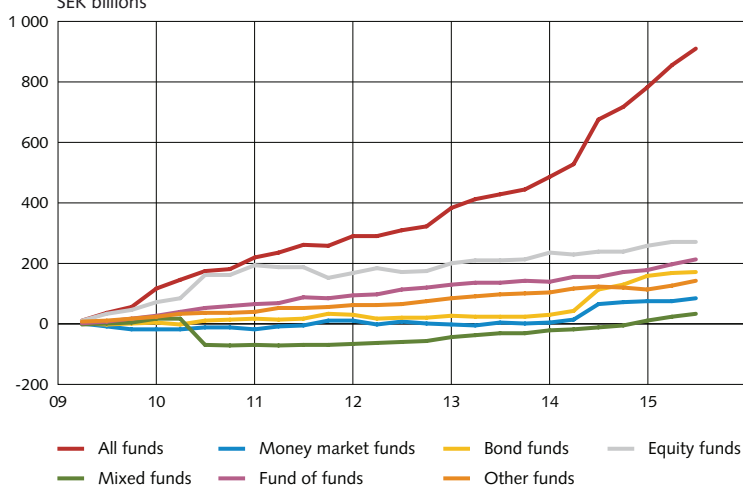
The growth of investment funds reflects some of the broader trends that have shaped financial markets in recent years, such as low inflation and consequently historically low interest rates. When interest rates are low, households and companies will typically try to increase the return on their savings by investing in riskier assets, including investment funds. To a certain degree, there are signs of this behaviour in Sweden. Swedish investors, mainly households, have migrated slightly towards high-risk funds, especially equity funds. Fixed income funds, i.e. money market funds and bond funds, have also grown since 2009. These funds' investments include fixed income securities issued by Swedish banks and non-financial corporations. Slightly less than half of the growth in Swedish investment funds since 2009 is an effect of a net inflow (see Figure D2).³³ The remaining growth can be explained by an increase in the value of their assets. In addition, the inflow to the funds is also to some extent a consequence of the pension system, especially premium pensions.³⁴

32. When Swedish interest rates became negative, an outflow was correspondingly noted from money market funds. However, the outflow from these funds was reversed during the summer of 2015. For more information, see for example *Financial Stability Report 2015:1*, Sveriges Riksbank.

33. Since 2009, the size of investments funds has grown from around SEK 1000 billion to SEK 3000 billion in Figure D1. The accumulated flows from 2009 are somewhat less than SEK 1000 billion in Figure D2.

34. For further discussion, see, Christian Nilsson, Jonas Söderberg and Anders Vredin (2014), The significance of collective pension saving for the Swedish financial system, *Economic Commentaries No. 3 2014*, Sveriges Riksbank.

Figure D2. Accumulated net flows to Swedish investment funds since 2009
SEK billions



Note. During 2014 foreign fixed income funds were registered in Sweden and around SEK 130 billion was moved in total. In addition, two mixed funds were closed during 2010, and the holdings moved to an equity fund and a bond fund. See also note to Figure D1.
Source: Statistics Sweden

It is important to understand the consequences of these funds' growth on the financial system. Since they are a major player in the Swedish financial markets, for example through their holdings of covered and corporate bonds, they could have an impact on financial stability. The rest of this section will therefore focus on the implications of the growth in the size of Swedish investment funds.

Implications for the financial system from the growth in investment funds

Investment funds can have a positive effect on the financial system. For example, money market funds and bond funds invest in fixed income securities issued by non-financial corporations and hence offer such companies an alternative source of funding to bank borrowing. In addition, investment funds expand the set of investable securities available to households, who thereby can get a more diversified portfolio of assets.

The IMF and BIS, among others, are however concerned that the large inflows into investment funds have made the financial system more vulnerable.³⁵ The vulnerability lies in the fact that fund investors could at any time redeem (sell) their investments in most investment funds. Redemptions would result in an outflow from the funds, who in turn would have to sell a corresponding share of their assets. A significant outflow from the funds in a short time would likely trigger a fall in the prices of those assets. Such a price fall would reduce the value of the remaining holdings of the funds and investors in the fund will lose some of their savings. Increasing price volatility and declining asset prices could also have an impact on other market participants.

Furthermore, such an outflow can have a negative impact on banks and corporations who are dependent on financing from these markets. Banks and non-financial corporations borrow from the investment funds by issuing debt instruments, and if there are redemptions, the funds cannot lend as much to these borrowers. The borrowers may then face higher refinancing costs, and even difficulties to borrow. Consequently, a large outflow could have negative consequences for the financial system.

Consequences for financial stability differ between investment funds

There are few evident differences between investing in equities directly or through an equity fund. In general, equities are seen as liquid assets and can be sold rather easily and rapidly on the stock markets. Thus, these funds can typically handle a large outflow. In addition, banks and corporations do not have to refinance equities,

³⁵ See for example IMF *Global Financial Stability Report 2015:1* and BIS *85th Annual Report (2015)*, Bank for International Settlements.

as the equities have no maturity like fixed income securities have. An outflow from the equity funds will hence not have a direct impact on the financing of banks and corporations or on financial stability. When discussing how the investment funds can impact the vulnerability of the financial system, it should therefore be recognized that this to some extent is driven by the structure of the financial market as a whole.

However, the features and structure of some funds can increase this vulnerability. This concerns funds that offer short-notice redemption for their investors despite investing in less liquid assets, for example corporate bonds. These less liquid assets can be difficult to sell, especially during periods of market stress. The combination of less liquid investments and short-notice redemption features hence gives rise to a potential misalignment between the liquidity (i.e. redeemability in cash) of their fund versus the actual liquidity of the fund investments. As a result, investors' demand for these types of investment exposures may be larger than it otherwise would have been had they been more directly exposed to the low liquidity of the funds' investments. In addition, the possibility of short-notice redemption may also lead to a fund experiencing even larger redemptions in a stress situation, if investors believe that by selling their holdings in the funds quickly, they may be able to avoid some of the losses.

The consequences for the fund investors, those borrowing from the fund and the financial system, are larger if the funds invest in less liquid assets, such as corporate bonds. The sudden decline in the prices of such bonds could trigger sizeable outflows from the funds investing in these bonds, a movement which could be amplified by the reduced market liquidity due to e.g. financial stress. A large price fall on for example the corporate bond market could lead to it becoming harder and/or more expensive to refinance maturing bonds.

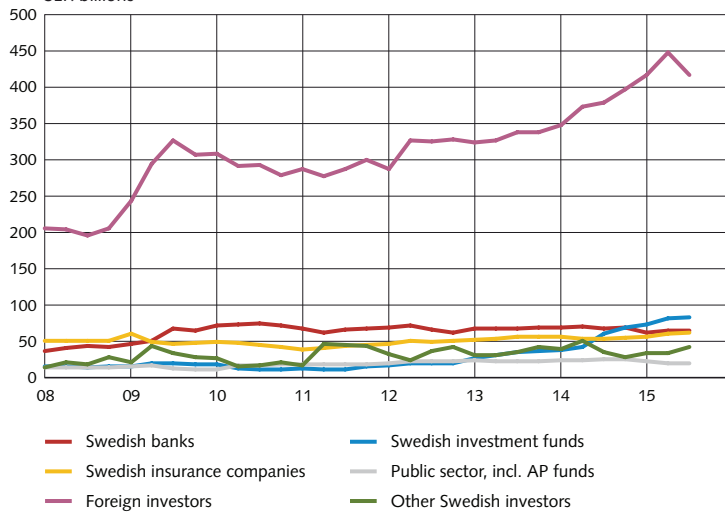
For this reason, international policy organizations such as the IMF and BIS are especially concerned that the inflows into investment funds have led to the funds investing in riskier and less liquid assets, such as fixed income securities issued by non-financial corporations.³⁶ The funds can often increase their risk-taking within its pre-defined investment strategies (mandate) by investing in riskier, and sometimes less liquid, assets. If risk-taking increases among the investment funds, outflows from them will likely have more severe implications for the financial system.

Vulnerabilities could increase if Swedish investment funds continue to grow

Most of the growth in Swedish investment funds has come from funds investing in Swedish and foreign equities (see Diagram D1 and D2). For these funds, as discussed previously, there are no other significant consequences for the financial system besides those from directly owning equities. However, fixed income funds have also grown. For example, these funds are now the largest domestic investor in Swedish corporate bonds (see Figure D3). Since these funds hold a non-negligible share of the corporate bonds, a sell-off triggered by outflows could cause a large fall in the prices of these bonds. An outflow from the funds could thus have implications for companies that obtain some or all their financing by issuing bonds.

36. Another option for how the funds can increase their risk-taking is to use leverage by borrowing cash directly or through securities lending and repurchase agreements. For most investment funds in Sweden, there is very limited scope for using leverage. However, funds like hedge funds can, to some extent, increase their expected returns and thereby their risk-taking by using leverage. Hedge funds are included in Other funds in Figure D1 and are thereby a limited type of investment fund in Sweden. Therefore, we will not discuss increased leverage among investment funds here.

Figure D3. Holders of Swedish corporate bonds
SEK billions



Source: Statistics Sweden

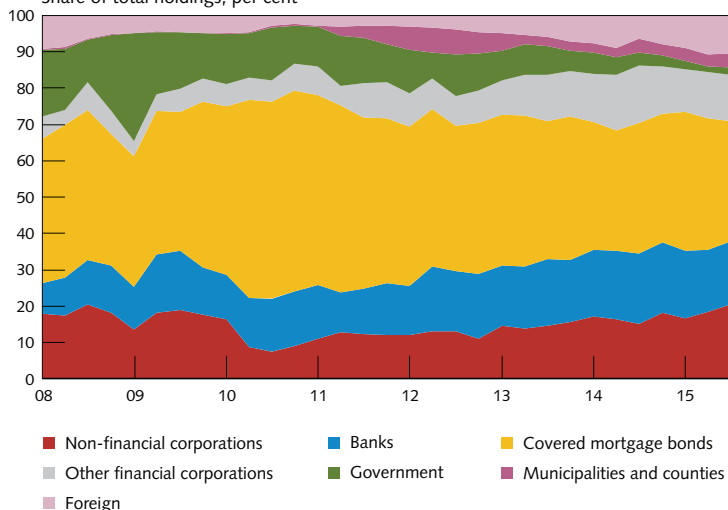
However, the implications for the Swedish bond market depend on various factors, such as the size of the outflow from the funds and the behaviour of other investors. The investment funds' holdings of fixed income securities are spread across different funds. In addition, most of these funds invest in other assets besides corporate bonds. For example, mixed funds invest both in equities and different kinds of bonds. The fact that these holdings are spread over a number of different funds reduces the risk of outflows being so large that they cause severe problems for these markets or for those that rely on market financing from these markets.

Further, the consequences of an outflow from Swedish fixed income funds also to a large extent depend on how other market participants react. For example, more than half of Swedish corporate bonds are held by foreign investors (see Figure D3). If other investors are willing to buy the corporate bonds that the funds sell, the consequences of an outflow will be limited.

There are some signs that Swedish investment funds have increased their holdings of riskier assets and decreased their holdings of low-risk assets. For example, Swedish money market funds now have nearly no holdings of fixed income instruments issued by the Swedish government (see Figure D4). Instead, they have increased their investments in other assets, such as securities issued by non-financial corporations. Hence, these funds have increased their risk-taking when interest rates have been low.

Figure D4. Swedish money market funds' holdings of fixed income securities, broken down by issuer

Share of total holdings, per cent



Note. Fixed income securities include both bonds and certificates. The issuers are Swedish, except in the category Foreign issuers.
Source: Statistics Sweden

In summary, the growth in Swedish investment funds, and in particular fixed income funds, can have both positive and negative effects on the financial system. If the fixed income funds become even larger, vulnerabilities will also increase. Therefore, it is important to monitor developments in this sector, much like it is in the bank and insurance sectors.

Summary and concluding discussion

In summary, low interest rates have so far affected financial stability mainly by making Swedish financial institutions more vulnerable to shocks.³⁷ Life insurance companies' solvency levels are typically lower when rates are lower, which makes them more vulnerable to a share price fall. However, life insurance companies would not be as sensitive to lower rates if they could reduce the level of their previously issued guaranteed returns. As for banks, they are now more exposed as credit to households has increased, partly due to the low interest rates. The vulnerabilities of life insurance companies and banks that have been discussed here hence partly stem from the institutions' business models and previous decisions, rather than solely being a consequence of low interest rates.

The main risk to financial stability, if low interest rates persist for a long time, is increasing vulnerabilities caused by additional risk-taking by these institutions. Banks may choose to invest in riskier assets in order to maintain their profitability. Life insurance companies may wish to compensate for low interest rates by investing in riskier assets such as stocks. Fund investors could move into riskier funds, which may increase the vulnerability of, for example, the Swedish corporate bond market. If interest rates remain low over a long period of time, it is therefore important to continue monitoring these financial institutions in order to be able to detect any changes in their behaviour towards more risk-taking, which in turn could lead to increased risks to financial stability.

37. In this commentary we have not analysed separately how the so-called shadow banking sector has been affected by the low interest rates. However, in Sweden this sector mainly consists of the investment funds discussed above. For more information, see Daniel Hansson, Louise Oscarius and Jonas Söderberg (2014), Shadow banking from a Swedish perspective, *Economic Review* 2014:3, Sveriges Riksbank