Analysis

Slightly negative central bank interest rates ease financial conditions

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AUTHORS



Kimmo Koskinen
Adviser



Eeva Kerola
Senior Economist

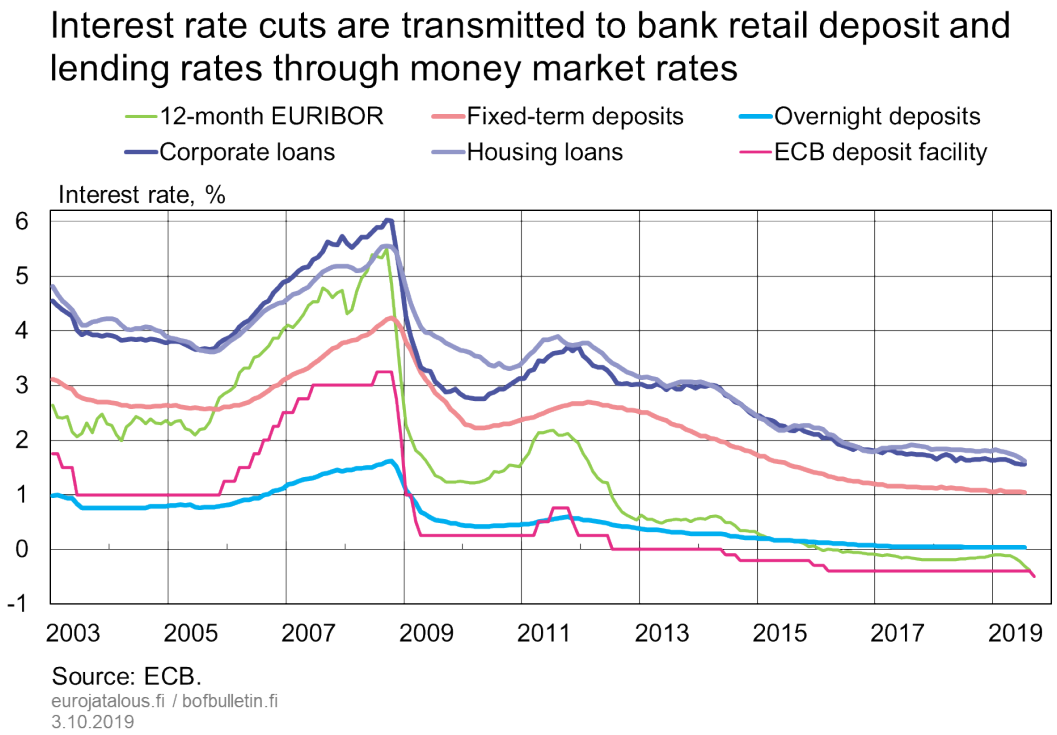
Negative interest rates have been an integral part of the ECB's overall monetary accommodation for just over five years now. The ECB lowering its deposit facility below zero has especially reduced the cost of market-based funding for banks and has been passed through to the real economy as lower interest rates on bank loans. Although low levels of interest rates do compress banks' net interest margins, challenges to bank profitability in the euro area are largely related to long-term structural issues. Studies suggest that the benefits of negative interest rates outweigh their drawbacks.



Negative interest rates at work in the euro area for six years now

The ECB was the first major central bank to lower one of its key interest rates below zero. The ECB initially lowered its deposit facility rate to -0.1% in June 2014. Since then it has lowered its key interest rates four times, most recently in September 2019. Currently, the deposit facility rate is -0.50% and the main refinancing operations rate 0.0%. In Denmark, the central bank lowered its deposit facility rate into negative territory for the first time already in July 2012, with similar rate cuts in Sweden in July 2014, in Switzerland in December 2014, and in Japan in January 2016.

Chart 1.



Because there is a large amount of excess liquidity in the euro area banking system[1], the shortest money-market interest rates have tracked the Eurosystem's deposit facility rate since late 2008, instead of the main refinancing operations (MRO) rate (Chart 1). Accordingly, there is immediate pass-through from the central bank's negative deposit facility rate to the money market rates. Additional excess liquidity is created by the ECB's expanded asset purchase programme when the central bank purchases a security and a counterparty bank's current account balance is increased. At present, there is a total of some EUR 1,700 billion in excess liquidity. Current account holdings that exceed the minimum reserve requirement are remunerated at the deposit facility rate.[2] When the deposit facility rate is negative, a bank will have fewer funds available for withdrawal

the following morning than what it had deposited with the central bank the night before. Although individual banks can reduce their own excess liquidity by lending it out to other banks, purchasing assets, or by processing their clients' payments, the banking system as a whole cannot shed its total excess liquidity. Liquidity is always passed on from one bank to another, and the banking system is, in this sense, fully self-contained. The interest expense carried by the banking sector from the negative deposit facility rate is mitigated by two decisions taken by the ECB Governing Council at its meeting in September, namely to introduce a two-tier system for reserve remuneration[3] and to ease the modalities of the new series of targeted longer-term refinancing operations (TLTROs).

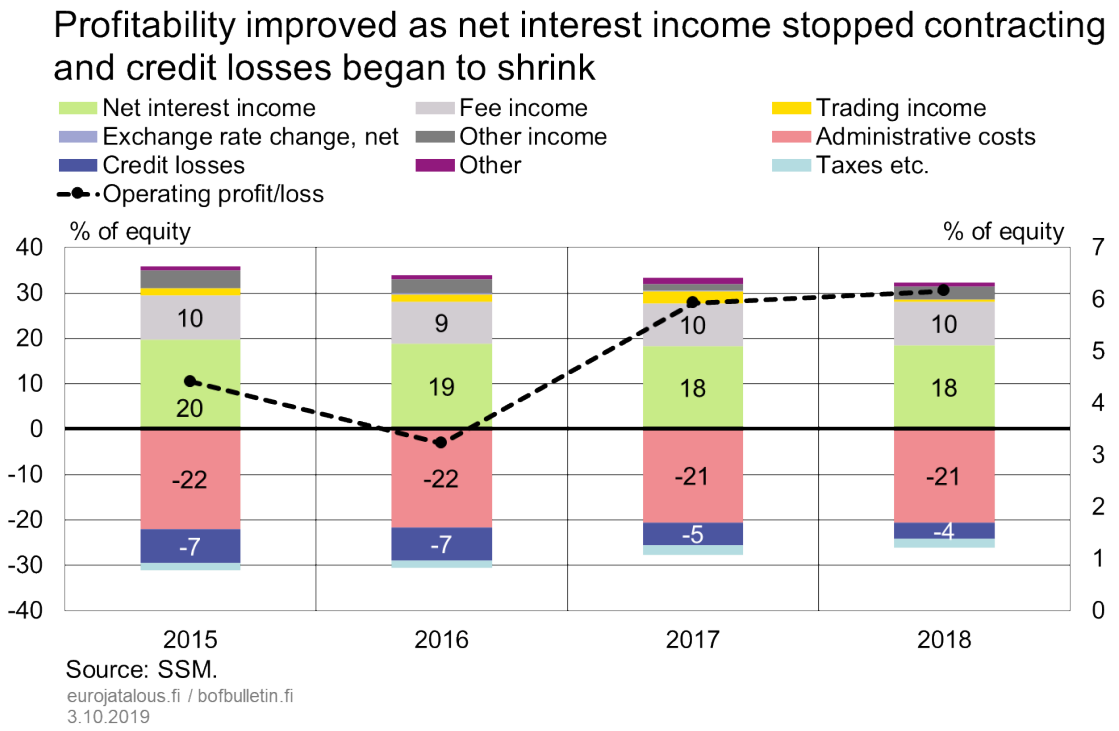
Because negative interest rates are a relatively new phenomenon and the ECB Governing Council further lowered its deposit facility rate in September, it is worth examining how negative interest rates differ from positive ones. This article looks at the effects of negative interest rates in light of the current research literature, and examines their pass-through to the real economy in the euro area. A key transmission channel for negative interest rates in the euro area is the bank lending channel, which serves as the focus of this article. When evaluating the effects of negative interest rates, it is important to look at both sides of banks' balance sheets, so as to understand the benefits of negative interest rates as well as their drawbacks.

How are interest rate cuts below zero different from rate cuts in the past?

Let us begin by examining the transmission of monetary policy in normal circumstances, i.e. when interest rates are positive. When the central bank lowers its main policy rate, this change has immediate pass-through to money market rates with different maturities. Because banks are also able to lend and borrow funds from one another, the reference rates on interbank overnight deposits and fixed-term deposits (EONIA and EURIBOR, respectively) will follow the central bank policy rate fairly smoothly. As a result, both interbank and market-based (wholesale) funding become more affordable. Banks will also cut the rate of interest paid on retail deposit accounts, reducing banks' interest expenditure even further. Lowering the central bank's policy rate thus results in an overall reduction in banks' financing costs.

Because firms can turn to financial markets for at least some their funding and banks have to compete with one another for customers, any reduction in banks' borrowing costs will be channelled to households and firms as lower interest rates on bank loans. As the cost of finance provided by the banking sector declines, the demand for bank loans goes up and thus results in increased lending, investment and private consumption.

Chart 2.

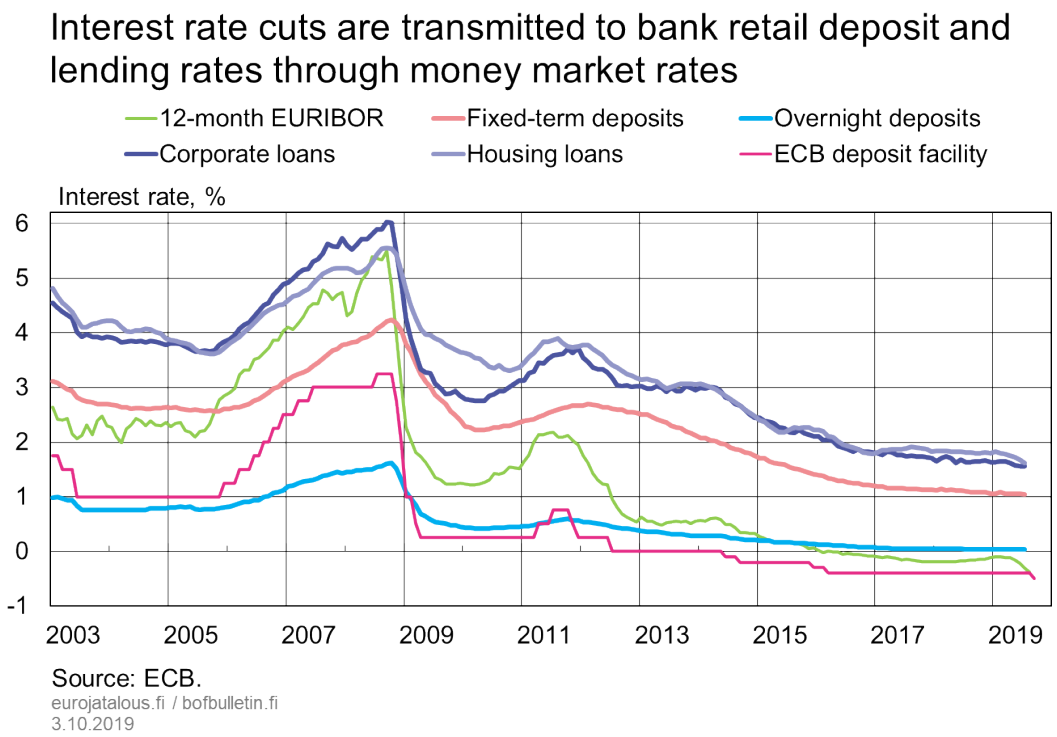


In countries where bank loan rates on both household and corporate loans are primarily based on the EURIBOR rates, as is the case in Finland, an easing of the ECB's monetary policy will be quickly transmitted to the private sector. In addition to households and firms that rely on bank loans, firms which finance their investments by issuing bonds also directly benefit from low interest rates.

How negative interest rates and central bank asset purchases influence banks' interest rate income and expenses is illustrated in Chart 3. In the context of traditional banking, a bank earns its profits by transforming short-term deposits and other short-term debt finance into longer maturity loans or other receivables. Put simply, a bank draws its profits from the long-end of the yield curve (interest rate at point A1, Chart 3) and pays its expenses at the short-end (interest rate at point A2). The net interest margin, i.e. the profit earned by the bank, is the difference of these two levels of interest rates (A1–A2). The steeper the yield curve, i.e. the greater the difference between the short-term and long-term rates, the greater the bank's profit.

The central bank can steer the short end of the yield curve by adjusting its policy rate. Similarly, central bank asset purchases will compress the long end of the yield curve. This is one reason why the yield curve has flattened out in the euro area in recent years (yield curve B). However, the transmission of monetary policy through the bank lending channel becomes less straightforward when the central bank lowers its policy rate into negative territory.

Chart 3.



When the short end of the yield curve settled below zero (yield curve C), banks' funding costs did not come down by as much as they had before. This was because banks generally did not want to lower their own retail deposit rates into negative territory. Retail customers, such as households and small firms, might at a relatively low expense either change banks or withdraw their deposits in full and hold cash, whose nominal interest rate is zero. Motivated by fears of deposit withdrawals, banks have predominantly remunerated their retail deposits at an interest rate of at least zero.

This has implications for the pass-through of interest rates, especially since retail deposits have become increasingly important for euro area banks after the financial crisis.[4] From a bank's perspective, the short end of yield curve C in the chart rises from point C2 to C2*, flattening the yield curve further and compressing the interest rate margin. If the lion's share of bank funding becomes immune to lower levels of interest rates, this will also dampen the transmission of monetary policy, if private sector loan rates respond less to changes in the central bank's policy rate.

The ECB's longer-term refinancing operations (TLTROs) have also contributed to lowering banks' funding costs, as these operations provide banks with the opportunity to receive central bank liquidity at very affordable terms. The interest rates on these loans are lower the more the recipient bank increases its lending to the private sector. These operations guarantee banks

affordable longer-term funding, which enhances the pass-through of interest rates to households and firms. Studies show that the longer-term refinancing operations have also had a favourable impact on lending volumes (Laine, 2019 and Bank of Finland Bulletin 1/2019).

Prolonged negative interest rates may prompt banks to change their practices

Over time banks will adapt to changes in their operating environment. When the ECB lowered its deposit facility rate to -0.40% in March 2016, banks increasingly began charging negative interest rates on the deposits of large corporate customers and institutional investors. Yet although a fifth of all enterprise deposits in the euro area are already subject to negative remuneration, this only amounts to 5% of all bank deposits. Germany's share is the euro area's largest—negative interest rates are charged on every second enterprise deposit, which amounts to 15% of Germany's total deposits (Altavilla et al., 2019). Charging firms negative deposit rates has become increasingly common in recent times, which may be related to growing expectations of the current situation persisting. In spite of this, not a single bank has begun charging negative remuneration on household retail deposits.*

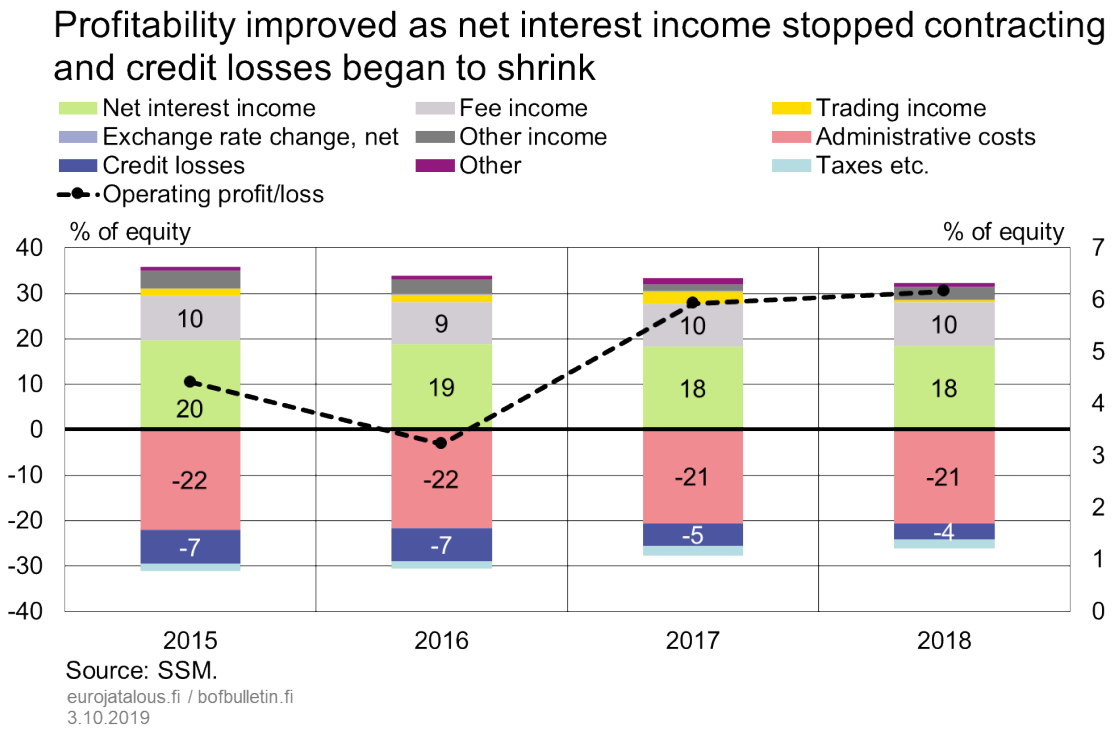
Banks have also modified their practices surrounding reference rates for residential mortgages. Interest rate floors on reference rates, which set the lower bound for mortgage rates at 0%, have already been widely adopted in Finland. If the reference rate dips below zero, these effects are not passed on to the loan rate as the borrower will always pay the bank its negotiated loan margin. The bank can thus protect some of its interest income from negative interest rates. On the other hand, increasing monetary accommodation by lowering the main policy rate will no longer have pass-through to the borrower's debt-servicing costs, as long as the reference rate is below zero.

Bank funding costs have gone down in the wake of firmly negative market interest rates and the central bank conducting TLTROs at extremely affordable terms. In addition, banks have begun charging their large enterprise clients negative deposit rates. In Chart 3, all of these measures contribute to pushing down the short end of yield curve C below zero (C2*[5] shifts downwards). At the same time, the transmission of monetary policy is constrained by practices like interest rate floors, which banks use to lock in the decline of the long end of the yield curve (C1) no less than zero.

The profitability of euro area banks is not determined by interest rates alone

The euro area banking sector's net interest income[6] began growing in 2018, when banks' returns on lending started to stabilise. This was because most of the decline in bank loan rates was now behind and credit growth remained favourable throughout the year. The cost of banks' wholesale funding has clearly gone down on account of the Eurosystem's negative deposit facility rate, and the prices of covered bonds in particular have fallen to historical lows. In addition, the affordable terms on the central bank's longer-term refinancing operations (TLTROs) have contributed to lowering bank funding costs.

Chart 4.



Negative interest rates together with central bank asset purchases have raised asset prices and increased the capital gains on securities held by banks. Monetary accommodation has also strengthened the capacity for banks to expunge credit risk from their balance sheets, on account of low financing costs and the improved availability of finance. Indeed, the ECB's monetary policy has given rise to favourable effects on both sides of banks' balance sheets. Banks' net interest income will continue to remain under pressure, however, given the deterioration of the economic outlook in 2019 and the decline in the overall interest rate level.

Although net interest income is a key component of banking, the interest rate environment is hardly the sole determinant of bank profitability in the euro area. The euro area banking sector is especially blighted by long-term structural issues.

One of the main issues underlying bank profitability has to do with the weak ability of banks to substitute net interest income with other income sources. European banks are highly locally concentrated, which limits the ability of banks to expand their income sources. In many euro area countries banks continue to operate under rigid cost structures and within a banking sector in dire need of efficiency improvements. There is often a large number of banks relative to the size of the economy, and banks sometimes have sprawling and inefficient branch networks. In the coming years, banks will increasingly need to rise to the challenge of major trends, such as digitalisation. This will require investments that are not only expensive outright but which may strain profitability in the short term. On the other hand, investment is also needed to increase future efficiency. Using monetary policy measures to address the banking sector's structural ailments is not only unfeasible in practice but also unwarranted.

The research literature suggests the benefits of negative interest rates outweigh their drawbacks

The research literature has examined the pass-through of negative interest rates into the real economy both theoretically and empirically. The positive effects of negative interest rates are especially associated with improved economic conditions, which contributes to bank profitability (Altavilla et al., 2018; Genay and Podjasek, 2014; Erikson and Vestin, 2017; Bräuning and Wu, 2017; Dell'Ariccia et al., 2017). When the interest rates on loans decline and borrowing becomes cheaper, the demand for loans goes up. Even though the returns earned on an individual loan will decline as the interest rate margin shrinks, a significant enough rise in lending volumes will raise a bank's total profits. Loan stocks, private consumption, and investment all increase, which improves overall economic conditions and further boosts demand. Lowering interest rates is also often associated with external depreciation of the domestic currency, which contributes to foreign trade. Lower debt-servicing costs lead to lower credit losses and a smaller number of non-performing loans, which in turn boosts lending activity and bank profitability. These positive effects have been seen to compensate for the narrowing of interest margins. In addition, when risk-taking and demand increase, banks will see a variety of their balance-sheet items appreciate.

Research findings support the course of events depicted in Chart 3, where a policy rate cut by the central bank to, and especially below, 0% compresses banks' net interest income and profitability more than when the policy rate is lowered from a higher level of interest rates (Borio et al., 2017; Claessens et al., 2017). This is because banks cannot reduce their interest expense by as much as

they lose interest income on lending.

In addition, susceptibility to negative interest rates varies by bank. The more banks rely on retail deposits for funding—deposits on which they are hesitant to impose negative interest rates—the more susceptible they are towards negative interest rates affecting their profitability. When the central bank policy rate is lowered further and further into negative territory, banks who strongly rely on retail deposits have been observed to have reduced their lending more than other banks and reposition their lending towards risker firms (Heider et al., 2018)[7]. These banks' share prices have also been observed to decline more sharply in the wake of interest rate cuts, thus reflecting a greater decline in their profitability compared with other banks (Ampudia et al., 2017). Dell'Ariccia et al. (2014) and Molyneux et al. (2019) find that banks which have primarily relied on market funding have benefited more, in relative terms, from negative interest rates and their effect on lowering market funding costs, and that this has supported their lending to the private sector. On the other hand, Demiralp et al. (2019) obtained results suggesting that banks that had more retail deposits and, at the same time, excess liquidity on their central bank current accounts, displayed a greater proportion of lending on their balance sheets. Although counter to some earlier research (e.g. Heider et al., 2018), this finding may be due to more robust bank data and the study's inclusion of banks' excess liquidity holdings.

Brunnermeier and Koby (2019) postulate a theoretical lower bound (the reversal rate) on how much the central bank's policy rate can be lowered into negative territory before additional rate cuts lead to monetary tightening. Past certain a theoretical threshold, further policy rate cuts will force banks to raise their lending rates, resulting in a decline in lending and a slowdown in aggregate output growth. In a theoretical framework, this threshold is reached when banks can no longer offset the negative effects of rate cuts on loan earnings by raising their lending volumes. Eventually banks' capital constraints will lead to the loan stock not being able to grow quickly enough to offset the impact of lower loan rates.

So far relatively little empirical research has been done on this front. Molyneux et al. (2019) observe that up until 2016 lending growth was slowest in those OECD countries with negative central bank interest rates. In their study, Eggertsson et al. (2019) use a macro model calibrated on Swedish data. According to their findings, even a -0.50% interest rate will lead to such a decline in profitability that banks will begin to increase their loan rates. However, relevant statistical data mostly provides evidence to the opposite effect (e.g. Erikson and Vestin, 2019). In Switzerland, on the other hand, there have been documented cases of especially longer-maturity mortgage rates increasing in the wake of negative policy rates (Basten and Mariathasan, 2018).

In Brunnermeier and Koby (2019), the authors also theoretically demonstrate that the reversal rate for monetary policy rises when interest rates are at extremely low levels for an extended

period. Prolonged negative interest rates cause banks to take on excessive risk in hopes of profit. When bank profitability declines at the same time, the economy faces risk to financial stability (Arteta et al., 2017). In addition, studies including Genay and Podjasek (2014), Busch and Memmel (2015) and Bundesbank (2015), among others, reaffirm the view that it is especially the duration of low interest rates that poses the greatest risk to bank profitability.

Negative interest rates are an integral part of the ECB's overall monetary accommodation

The transmission of negative interest rates has occurred fairly smoothly in the euro area so far, reducing bank loan rates on both household and corporate loans. In the couple of years following the introduction of negative interest rates, banks lowered their rates on both household and corporate loans by just over one percentage point. In recent months average bank rates have once again begun to edge down, in response to a decline in the overall level of interest rates. In addition to the transmission of negative interest rates, bank loan rates have been reduced by other measures that have eased funding costs. These include the TLTRO programmes and purchases of banks' covered bonds.

Assessing the impact of negative interest rates on banks in a way that is both straightforward and independent of the effects of other monetary policy measures is challenging. The ECB's policy measures since the financial crisis have acted simultaneously (and partly to opposite effect) on both banks' interest rate income and expenditure. The new interest rate environment has also prompted banks to partly change their operating models.

A growing number of banks have introduced negative interest rates on enterprise deposits, and others have protected their interest income by setting interest rate floors on loan reference rates. At the same time, the majority of funding available to banks is unlikely to become markedly cheaper, as banks have been reluctant to impose negative interest rates on households' retail deposits so as to prevent these from being turned into zero-interest holdings of cash. In the future, these practices may together slow down the transmission of policy rate changes through the banking sector. On the other hand, policy rates will continue be reflected in the cost of banks' market-based funding and will also be directly passed through to firms' market funding.

Negative interest rates also have constraints from the perspective of monetary policy transmission. It has been postulated that there is a certain level of interest rates beyond which rate cuts are no longer effective or may even prompt banks to raise loan rates and reduce lending. Because this particular interest rate level depends on the structure of the banking system[8], it may vary considerably by country, but also change over time.

Prolonged periods of extremely low interest rates inevitably carry risks. Yet the introduction of negative interest rates has also allowed for substantial monetary easing where demanded by the price stability objective. A much greater risk would have been taken if nominal interest rates had not been lowered into negative territory in June 2014. Negative interest rates have successfully contributed to easing financing conditions in the private sector, and are still needed to support economic activity in the euro area.

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Notes

1. Banks need liquidity to e.g. satisfy the demand for cash and meet their minimum reverse requirements. Prior to the financial crisis, the ECB operated on the basis of ensuring that the banking system as a whole received the new liquidity it required. Once inside the banking system, this new liquidity was divided up among banks through interbank lending, ↑

to meet the needs of individual banks. The onset of the financial crisis brought liquidity sharing on the interbank market to a halt, and in October 2008 the ECB began carrying out its main refinancing operations as fixed-rate tenders with full allotment. This introduced a build-up of liquidity inside the banking system.

2. Banks are required to maintain a certain proportion of their received deposits as reserve holdings with the central bank. Minimum reserve holdings are remunerated at the main refinancing operation rate (currently 0.0%). ↑
3. The two-tier system for reserve remuneration means that banks will have part of their excess liquidity holdings exempted from the negative deposit facility rate. For an individual bank the maximum amount of holdings exempt is six times the bank's minimum reserve requirement. This exempt tier is remunerated at the main refinancing operations rate (currently 0.0%). ↑
4. Retail deposits currently comprise almost 70% of bank funding, on average. ↑
5. * Retail deposits refer to deposits under EUR 100,000. ↑
6. Net interest income is the difference between a bank's interest income and expense. In addition to the level of interest rates, net interest income is affected by quantities—such as lending and deposit volumes, portfolio holdings, or outstanding issued bonds. Even if the average return earned on a single loan declines, a bank can increase its net interest income by sufficiently raising its lending volume. ↑
7. The study focused on syndicated lending in the euro area after the first interest rate cut in June 2014. ↑
8. In Brunnermeier and Koby (2019), the theoretical lower bound on interest rates is determined by banks' balance-sheet holdings, the strictness of capital constraints, and the degree of pass-through from negative interest rates to banks' lending and deposit rates. ↑

Keywords

banking sector, negative interest rate, transmission of monetary policy