

Benoît Cœuré: Assessing the implications of negative interest rates

Speech by Mr Benoît Cœuré, Member of the Executive Board of the ECB, at the Yale Financial Crisis Forum, Yale School of Management, New Haven, 28 July 2016.

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I would like to thank Glenn Schepens and Skander Van den Heuvel for their assistance in preparing this speech. All views expressed herein remain mine.

Accompanying slides can be found on the ECB's website: [Slides](#) (PDF).

Introduction

I would like to thank Glenn Schepens and Skander Van den Heuvel for their assistance in preparing this speech. All views expressed herein remain mine.

Interest rates have been low across all major advanced economies for some time now. The decline in interest rates – both nominal and real – has been a persistent trend since the 1990s and is visible in the long-term interest rates on government bonds [*Slide 2: 10 year government bond yields*]. A range of structural factors have been proposed for this secular decline in the rate of return on safe assets, including demographic changes, a slowdown in the rate of technological progress, and a high demand for safe assets relative to their supply.¹

This decline in long-run interest rates has consequences for monetary policy. Monetary policymakers often think in terms of a concept known as the real equilibrium rate or the “natural” rate of interest.² This equilibrium rate is the interest rate that is consistent with stable inflation and output at its potential level. Setting short-term interest rates above this rate puts downward pressure on activity and inflation. Setting them below this rate of course has the opposite effect. While this real equilibrium interest rate is difficult to estimate precisely, and while there are competing explanations for it, there is a broad consensus that it has declined in advanced economies over the past two decades. By some estimates it is currently negative in the euro area.³

Since the global financial crisis, inflation has been low worldwide, and growth subdued. Central bankers are responding to this low inflation and output below potential by conducting accommodative policies. Both these cyclical factors and the longer-term decline in the equilibrium real rate of interest have required policy rates to be set at record low levels in advanced economies [*Slide 3: Policy rates in major economies*]. As short-term policy rates approached zero, central banks carried out further loosening by providing forward guidance about the expected future path of interest rates and by lowering term premia through large-scale asset purchase programmes.

¹ See Bean C., C. Broda, T. Ito and R. Kroszner, “Low for Long? Causes and Consequences of Persistently Low Interest Rates” Geneva Reports on the World Economy 17, 2015.

² See Cœuré B., “The economic consequences of low interest rates”, lecture at the International Center for Monetary and Banking Studies, Geneva, 9 October 2013. The natural starting point for an economist is K. Wicksell, *Interest and Prices*, Royal Economic Society, 1936. For a definition of the natural rate of interest in the context of dynamic economic models, see Woodford M., *Interest and Prices: Foundations of a Theory of Monetary Policy*, Princeton University Press, 2003.

³ See Laubach T. and J. Williams, “Measuring the Natural Rate of Interest Redux”, Federal Reserve Bank of San Francisco, Working Paper, No. 2015–16, October 2015, and V. Constâncio, “The challenge of low interest rates for monetary policy”, lecture at the Macroeconomics Symposium, Utrecht School of Economics, 15 June 2016.

In June 2014, following in the footsteps of the Danish National Bank, the European Central Bank (ECB) became the first major central bank to lower one of its key policy rates to negative territory. The rate of interest on our deposit facility is now -0.4% while the rate on our main refinancing operations is zero.⁴ At the same time, we launched an asset purchase programme (APP) covering a broad range of investment grade securities.

These various policy measures are complementary instruments and are necessary to ensure that sufficient stimulus is provided to the economy to return inflation to the ECB's objective. Failure to take into account the downward trend in real equilibrium interest rates would have resulted in downward pressure on inflation and activity, pushing real interest rates up and driving the economy further away from full employment.

It is difficult to know how long these low interest rates will persist, but it seems possible that they will be low for quite some time. That certainly is the view of financial markets, where the return on government bonds is negative for a range of countries, even at long maturities. *[Slide 4: Government bonds with negative yields]*

While low or negative rates and the asset purchase programmes are needed to provide sufficient monetary stimulus, a number of observers have voiced concern about their impact on the behaviour of economic agents, on the resilience of financial intermediaries and, ultimately, on financial stability.⁵

Today, I will offer some thoughts on these issues, focusing on the banking sector, which plays a key role in the transmission of monetary policy in the euro area.

The specialness of negative nominal interest rates

So what makes negative rates special? *[Slide 5: The specialness of negative nominal interest rates]* The first answer is cash. Since cash (i.e. paper money and coins) offers a zero nominal return, at some point it will dominate holding assets with negative nominal yields.⁶ For example, if banks were to charge significantly negative rates on deposits, then the higher return on cash could lead households and businesses to withdraw their deposits. And this disintermediation would be likely to pose risks to financial stability.

Of course, holding cash is not entirely convenient or costless. It would be cumbersome (not to mention risky) to buy a car or a house in cash, and storing a large amount of cash requires high-security storage as well as insurance. These costs of holding and insuring cash explain why the effective lower bound on interest rates is below zero.⁷

⁴ The ECB's deposit facility rate has become its most important policy rate in an environment of very ample excess liquidity. The overnight money market rate, which was previously driven by the rate on the ECB's main refinancing operations, is now close to the deposit facility rate.

⁵ See, for example, The Economist, "Negative creep", 6 February 2016.

⁶ For an early discussion from an ECB perspective, see Cœuré B., "Central banks and the challenge of the zero lower bound", intervention at the "Meeting on the Financial Crisis" organised by the University of Chicago Booth School of Business, Miami, 19 February 2012.

⁷ The literature on substitution between cash and deposits at the lower bound, and on technical devices which can push the "physical" lower bound down, starts with the proposal by Gesell (1911) to attach stamps to banknotes to accelerate their demurrage. It was revived by Goodfriend (2000) and Buiter and Panigirtzoglou (2001) and more recently by Agarwal and Kimball (2015). See Gesell S., *Die Natürliche Wirtschaftsordnung*, 1911, published by Rudolf Zitzman Verlag, 1949; Fisher, I. "Stamp scrip", Adelphi Company, 1933; Buiter W. and N. Panigirtzoglou, "Liquidity traps: How to avoid them and how to escape them," in W. Vanthoor and J. Mooij (Eds.), *Reflections on Economics and Econometrics, Essays in Honour of Martin Fase*, De Nederlandsche Bank, 2001, pp. 13–58; Goodfriend M., "Overcoming the Zero Bound on Interest Rate Policy", *Journal of Money, Credit and Banking*, Vol. 32, No. 4, pp. 1007–1035, 2000; and R. Agarwal and M. Kimball, "Breaking Through the Zero Lower Bound," IMF Working Paper, No. 15/224, 2015.

The academic discussion of negative rates has centred around cash, but in public debate other issues have recently emerged.

One issue is associated with money illusion, i.e. the tendency of people to value assets and goods in nominal rather than in real terms.⁸ This led to the notion that *negative nominal rates* are unnatural, which has become a popular theme in the public debate.⁹ In contrast, we have been through episodes of *negative real rates* in the past without having such debates. Indeed, as the Bundesbank has noted, negative real rates of interest on deposits have been the norm rather than the exception in Germany in recent decades.¹⁰ [Slide 6: *Real remuneration of savings deposits in Germany*] People may gradually understand the rationale behind negative nominal rates and adapt to this new situation. For instance, the popular assumption that the negative income effect on household consumption dominates the positive substitution effect when nominal yields are very low is not in line with the evidence. In fact, the average net interest income of euro area households has been largely unaffected, thanks to lower interest payments. Low interest rates have mainly redistributed resources from net savers to net borrowers. As the latter typically have a higher marginal propensity to consume than the former, this has further supported consumption.¹¹ But one cannot rule out that negative nominal interest rates raise broader cognitive issues as they challenge the rules of thumb used by economic agents in their everyday decisions.

Finally, negative rates may be special due to institutional features embedded in the financial system, such as legal restrictions on the application of negative rates or at least uncertainty regarding the legal standing of such an arrangement,¹² or the tax treatment of negative interest rate income, which is often not symmetric with the treatment of positive interest rate income. In addition, some IT systems may not be able to cope with negative rates.

In the euro area, however, these scenarios have not yet materialised. Thanks to intensive technical cooperation between the ECB and market participants ahead of the introduction of negative rates, our experience has been very smooth, allowing large parts of the government bond and secured and unsecured money markets to operate at negative rates without any disruption.¹³ The introduction of negative rates has been smooth also in other jurisdictions outside of the euro area.¹⁴

⁸ On money illusion, see Shafir E., P. Diamond and A. Tversky, “Money Illusion”, *The Quarterly Journal of Economics*, Vol. 112, Issue 2, 1997, pp. 341–374. On the interaction between negative rates and money illusion, see Borio C. and A. Zabai, 2016 “Unconventional monetary policies: a re-appraisal”, BIS Working Paper No 570, 2016.

⁹ “Imagine a world in which tax offices harry people who file their returns promptly; where big supermarket chains pay their suppliers before the goods fly off the shelves and not months afterwards; and where a pre-paid annual gym membership is more costly than paying month by month. It sounds fanciful, absurd even.”, in *The Economist*, *op. cit.*

¹⁰ See Deutsche Bundesbank, “Nothing new about real interest rates on deposits”, 30 June 2014, https://www.bundesbank.de/Redaktion/EN/Topics/2014/2014_06_30_nothing_new_negative_interest_rates.html.

¹¹ See European Central Bank, “Low interest rates and households net interest income”, ECB Economic Bulletin, Issue 4 / 2016, Box 3.

¹² See McAndrews J., “Negative Nominal Central Bank Policy Rates: Where Is the Lower Bound?”, remarks at the University of Wisconsin, 8 May 2015. For example, some financial contracts (e.g. money market funds or floating rate notes) may not foresee the possibility of payments from the lender to the borrower and in any case the logistics of collecting interest payments from holders of securities can be complex.

¹³ See Cœuré B., “Life below zero: learning about negative interest rates”, presentation at the annual dinner of the ECB’s Money Market Contact Group, 9 September 2014.

¹⁴ Jackson, H. “The international experience with negative policy rates”, Bank of Canada Staff Discussion Paper, No. 2015–13, November 2015.

How low and for how long?

There are two key questions for central bankers [*Slide 7: How much lower can we go?*]. First, how much lower can we go? Second, does the persistence of low and/or negative interest rates pose particular challenges to the stability of the financial system?

Answering the first question appears to be simple. As I said earlier, the “physical lower bound” of nominal interest rates, at which disintermediation risk will materialise, is imposed by the opportunity cost of holding cash.

But is there an “economic lower bound”, different from the physical one, where further rate cuts cease to provide aggregate stimulus to the economy? This economic lower bound could then potentially but not necessarily impose an earlier binding constraint for monetary policy.

Indeed, in the current discussion, it has been suggested that at some point the level of rates can become low to the extent that the detrimental effects on the banking sector outweigh the benefits of lower rates. In a recent paper, Brunnermeier and Koby refer to this rate as the “reversal rate”.¹⁵ At the reversal rate, bank profitability will fall, reducing capital generation via retained earnings, which is an important source of capital accumulation, and thereby eventually restricting lending. The risk that low rates might cause short-term dislocation in financial markets was already identified by Bernanke and Reinhart in their 2004 paper on the implications of very low rates.¹⁶

Low (and negative rates) have both a one-off short-term impact and more persistent effects on a bank’s profitability and capital. And bank capital matters for credit provision and for financial stability, as low bank capital means high leverage.

The short-term impact partly stems from one-off capital gains on the outstanding fixed-income portfolio of a bank. When rates are falling, the value of fixed-income securities on a bank’s balance sheet goes up, leading to higher profits. A decline in the level of interest rates can also boost net interest margins in the short run. Banks carry out maturity transformation by borrowing short term and lending long term. As short-term interest rates fall, funds become cheaper. Since existing fixed-rate loans take some time to reprice to lower rates, the initial impact of lower rates on net interest margins could be positive.

Other things being equal, lower rates will decrease net interest income over the long term. If the decline in rates is accompanied by a flattening of the yield curve, the margin between lending and borrowing eventually compresses, reducing net interest income. Such a flattening may result from expectations of a prolonged period of low short-term rates, and it may be compounded by a compression of the term premium if the central bank also operates a large-scale asset purchase programme.

Even for a given slope of the yield curve, a low level of interest rates can also compress net interest margins for banks reliant on retail deposits. The reason is that retail deposits tend to have low and sticky interest rates, and banks are reluctant to charge negative rates on them. As market rates decline, the yield on bank assets will eventually drop, but this funding source will still cost the same to banks, resulting in a decline in net interest margins. The decline in present and future net interest margin reduces the forward-looking measure of bank capital,

¹⁵ See Brunnermeier M. and Y. Koby, “The “Reversal Rate”: Effective Lower Bound on Monetary Policy”, presented at the BIS research network meeting, 14 March 2016. See <https://www.bis.org/events/confresearchnetwork1603/brunnermeier.pdf>.

¹⁶ See Bernanke B. and V. Reinhart, “Conducting Monetary policy at Very Low Short-Term Interest Rates”, American Economic Association Papers and Proceedings, Vol. 94, No. 2, pp. 85, May 2004.

hence the risk-bearing capacity of the bank, and its supply of credit. This is turning upside down Adrian and Shin's "credit supply channel" of transmission of monetary policy.¹⁷

The exact magnitude of the effect of negative interest rates on aggregate bank profitability is uncertain, since it has to be put in the context of what would happen in the absence of monetary policy action. First of all, servicing floating-rate loans and mortgages becomes more affordable as interest rates fall. Borrowers who are struggling in the adverse economic climate are therefore less likely to default. Second, and more importantly, accommodative monetary policy should create a more favourable macroeconomic environment, which ought to improve the financial situation of bank borrowers. Indeed, empirical research shows a clear negative relation between economic growth rates and non-performing loans.¹⁸ These positive effects are present at all rate levels and are likely to dominate when rates are moderately negative.

Also, the economic lower bound is not uniquely determined at the aggregate level, since it will vary across banks and markets. The larger the share of floating-rate lending in the stock of loans, the faster the negative impact on interest margins will be. Banks with large fixed-income holdings and holdings of bonds which benefited the most from spread compression will be better able to offset decreases in interest margins, due to the revaluation effect I mentioned earlier. The reversal rate is also likely to be lower for those banks that are more reliant on wholesale rather than retail funding. Market-based funding suffers less from this zero lower bound, meaning that these banks will be better able to protect their interest margin. Similarly, banks with greater market power will be better able to avoid passing on the lower rates to borrowers, which will shield their interest margin.

In the euro area, this translates into geographic differences based on national banking structures, implying that the negative interest rate policy has distributional consequences across banks located in different jurisdictions.

The second important question for central bankers is whether the persistence of low and/or negative interest rates poses other challenges to the *stability of the financial system*.

Challenges to financial stability could potentially materialise if banks were to increase their exposure to lower quality counterparties in order to boost returns.¹⁹ This could reflect a portfolio rebalancing towards riskier assets when yields on safe assets are low, or a greater concentration of lending to small and medium-sized enterprises (SMEs), which generate higher returns but have historically exhibited higher default risk.

The effect is similar to the "search for yield" by managers targeting a minimum return on assets.²⁰ Note that this mechanism may as well apply to shadow banks insofar as they rely on short-term funding. Financial stability risks could also materialise outside of banks, through excessively inflated financial asset prices and if zero or negative rates encourage asset price volatility.

Existing empirical evidence, mainly relying on periods with low, but positive rates before the global financial crisis, indicates that periods of lower interest rates are indeed associated with

¹⁷ See Adrian, T., and H.S. Shin (2011), "Financial Intermediaries and Monetary Economics", in B. Friedman and M. Woodford (Eds.), *Handbook of Monetary Economics, Volume 3*, Chapter 12, pp. 601–650.

¹⁸ See Beck, R., P. Jakubik and A. PiloIU, "Non-performing loans: What matters in addition to the economic cycle?" ECB Working Paper, No. 1515, February 2013.

¹⁹ See Borio, C. and H. Zhu, "Capital regulation, risk-taking and monetary policy: a missing link in the transmission mechanism?", *Journal of Financial Stability*, Vol. 8, 2012, pp. 238–251, and Caballero R., Hoshi T. and A. Kashyap, "Zombie Lending and Depressed Restructuring in Japan," *American Economic Review*, Vol. 98, 2008, pp. 1943–77.

²⁰ See Rajan R., "Has financial development made the world riskier?", *European Financial Management*, 12(4), 2006, pp. 499–533.

lower bank lending standards and with a shift of credit towards borrowers with a lower credit quality.²¹ Additionally, the latest ECB Survey on the Access to Finance of Enterprises in the Euro Area (SAFE) shows an improvement in the availability of bank loans for SMEs between October 2014 (shortly after negative rates were introduced) and March 2016.²² This could indicate that one way that banks are taking on more risk is by lending more to smaller, and typically riskier, firms.

Of course, promoting lending, including to risky borrowers, is one of the goals of accommodative monetary policy.

But the main question, however, is whether negative rates can also lead to excessive risk-taking by banks. If accommodative monetary policy works as intended, then more investment projects will gain a positive net present value and will be financed – including some riskier ones. That's the “good” risk-taking. However, banks may be tempted to finance risky but negative net present value loans – that is excessive or “bad” risk-taking. The theory suggests that this possibility is more likely when interest rates are low, if banks are highly leveraged or if they can easily adjust their capital structure.²³

Empirical evidence

While theoretically appealing, a precise estimate of the point where accommodative monetary policy becomes contractionary and/or an issue for financial stability is extremely challenging.

What I can offer you today is an overview of the situation of financial intermediaries in the euro area, in order to see whether there are signs that we have reached or are reaching a reversal rate.

But let me start by referring to the most recent data on monetary developments in the euro area. They show no signs of cash substitution, indicating that we are still far from the physical lower bound for nominal interest rates.²⁴

In a second step, let me focus on bank income and profitability. Slide 8 shows the main sources of operating income for banks in the euro area, based on aggregate numbers. [*Slide 8: Euro-area banks: Income sources*] In recent years, the distribution of these sources has been fairly stable, with approximately 60% of income coming from net interest income, 25% from fees and commissions and 15% from other income sources.

Given its large share, net interest income thus plays an important role in bank profitability. As I mentioned, a reduction in interest rates could harm interest margins, and this could be even

²¹ See, for example, Ioannidou V., S. Ongena, and J.-L. Peydrò, “Monetary policy and subprime lending: a tall tale of low federal funds rates, hazardous loans and reduced loan spreads”, European Banking Centre Discussion Paper, No. 45, 2009; Maddaloni A. and J.-L. Peydrò, “Bank Risk-Taking, Securitization, Supervision and Low Interest Rates: Evidence from the Euro Area and U.S. Lending Standards”, *Review of Financial Studies*, Vol. 24, No. 6, pp. 2121–165, 2011; Jiménez G., S. Ongena, J.-L. Peydrò and J. Saurina, “Hazardous Times for Monetary Policy: What Do Twenty-Three Million Bank Loans Say About the Effects of Monetary Policy on Credit Risk-Taking?”, *Econometrica*, Vol. 82, No. 2, pp. 463–505, 2014; and Dell’Ariccia G., L. Laeven, and G. Suarez, “Bank Leverage and Monetary Policy’s Risk-Taking Channel: Evidence from the United States”, *Journal of Finance*, forthcoming.

²² See the October 2014 – March 2015, April 2015 – September 2015 and October 2015 – March 2016 SAFE surveys.

²³ See Dell’Ariccia G., L. Laeven, R. Marquez, “Real interest rates, leverage, and bank risk-taking,” *Journal of Economic Theory*, 149, 2014.

²⁴ The annual growth rate of the narrower aggregate, including currency in circulation and overnight deposits (M1), decreased to 8.6% in June, from 9.1% in May. See ECB, “Monetary developments in the euro area: June 2016,” <https://www.ecb.europa.eu/press/pdf/md/md1606.pdf>.

more pronounced when rates enter negative territory, due to a potential zero lower bound for retail deposit rates.

Slide 9 illustrates average loan and deposit rates for both non-financial corporations and households in the euro area.²⁵ [Slide 9: Euro-area banks: Interest rates on new loans and deposits] The vertical red line indicates June 2014, the first time deposit facility rates became negative in the euro area. The gap between loan rates and deposit rates narrows because declining rates are passed on more strongly to loan rates than to deposit rates, indicating that there indeed seems to be a zero lower bound for deposits. While average deposit rates only decreased by around 0.2 percentage point between June 2014 and May 2016, loan rates decreased by around 0.8 percentage point, effectively reducing the interest margin. This is also shown on slide 10, using profit and loss data of a group of large euro area banks, which on average indeed have seen a reduction of their net interest margins – defined here as net interest income over total assets – since mid-2014. [Slide 10: Euro-area large banks: Net interest margin]

But what about overall income? ECB staff estimates show that the overall impact on bank profitability of recent monetary policy actions is net positive, compared with a scenario without any monetary policy action.²⁶ [Slide 11: Monetary policy and bank profitability: estimates]. Decreasing net interest income and charges on excess liquidity do put pressure on bank profitability. But there are also two strong positive effects of lower rates. First, the positive impact of lower rates on the macro environment reduces firm default risk and lowers the debt servicing cost of borrowers, which should improve credit quality. Second, lower rates will lead to capital gains on the bond portfolio of banks.

The ECB's latest Financial Stability Review²⁷ broadly confirms these model-based estimates. As slide 12 shows, the net income of euro area significant banking groups actually increased between 2014 and 2015 [Slide 12: Euro-area large banks: Aggregate net income]. This was mainly driven by lower impairments and higher non-interest income. Even net interest income made a positive contribution, despite a small decline in interest margins. This reflects an increase in volumes, which is of course an intended consequence of accommodative monetary policy. As discussed earlier, however, interest margins are likely to stay low and might even further decline, while profits from one-off capital gains will fade away. Indeed, analysts forecast a decline in bank profitability in 2016 and 2017, mainly due to lower net interest income. And the recent decline in euro area bank share prices can be at least partially ascribed to market concerns over future banks profitability.

As such, if very low or negative rates are here for a prolonged period of time due to the structural drivers highlighted above, banks might have to rethink their business models. The revenue structure of euro area banks was stable for a long time but it has recently begun to change and there is at least some evidence of banks tending to offer fee-based products to clients as substitutes for interest-based products.²⁸ Another way forward is to improve cost efficiency. Although a number of banks have reduced their operating costs over the last couple of years, overall cost efficiency has remained low in the euro area, with aggregate cost-income ratios between 63% and 65% over the last five years.²⁹ Action taken by euro-

²⁵ See English W., J. Skander Van den Heuvel, and E. Zakrajsek, "Interest Rate Risk and Bank Equity Valuations", Finance and Economics Discussion Series 2012–26, Board of Governors of the Federal Reserve System, for evidence on the reaction of net interest margins of US banks to changes in rates.

²⁶ See Rostagno M. et al., "Breaking through the zero line: The ECB's Negative Interest Rate Policy", Brookings Institution, Washington DC, 6 June 2016. Presentation available on the Brookings website.

²⁷ See the May 2016 ECB Financial Stability Review, p. 60, Chart 3.4.

²⁸ See Nouy D., "Risks and resilience – the European banking sector in 2016", speech at the Bank Capital Forum, London, 23 February 2016.

²⁹ Consolidated ECB banking data for domestic banks in the euro area.

area banks to remedy this situation will also help them cope with a prolonged period of very low rates. Action to dispose of their stocks of legacy non-performing loans, which has been identified by ECB Banking Supervision as one of its priorities for 2016, will also safeguard their profitability.

Moving away from profitability, deposit growth rates for euro area banks show that there is no sign of disintermediation risk at the moment. Deposits of both households and non-financial corporations have been growing over the past two years, at a similar pace to the period before we entered negative interest rate territory [*Slide 13: Euro-area banks: Deposit growth*]. This risk is not materialising mainly because rates on retail deposit seem to have a zero lower bound, as shown earlier.

With regard to bank lending, it is clear that we have not yet reached the reversal rate for the euro area. Bank lending has improved since mid-2014, both for non-financial corporations and households. [*Slide 14: Euro-area banks: Loan growth*] Similarly, results from the ECB's July 2016 euro area bank lending survey clearly indicate that loan supply conditions for enterprises in the area are continuing to improve.

Finally, what about the risks to financial stability? The ongoing economic recovery should help bolster the income and earnings position of euro area households and non-financial corporations, thereby mitigating the risks associated with a continued debt overhang which persists in some countries. At the same time, the recovery of euro area real estate markets has gained further momentum. While overall residential property valuations remain contained, prime commercial property valuations have moved above long-term averages. Against this backdrop, as highlighted in the ECB's latest Financial Stability Review, the best way to counter any potentially emerging risk in any market segment is targeted action by the macroprudential authorities.

Conclusions

Let me conclude. As is well known from the academic literature, the "physical lower bound" of short-term nominal interest rates is equal to the opportunity costs of holding cash. Monetary developments in the euro area show no signs of cash substitution, indicating that we are still far away from the physical lower bound. Central bankers should however be mindful of a potential "economic lower bound", at which the detrimental effects of low rates on the banking sector outweigh their benefits, and further rate cuts risk reversing the expansionary monetary policy stance.

The ECB is mindful of these risks. In the euro area, the potential adverse impact on bank profitability, if it materialises, would be compounded by low growth prospects and a legacy of high non-performing loans.³⁰ The current conditions of financial intermediation suggest, however, that the economic lower bound is safely below the current level of the deposit facility rate and that the impact of negative rates, combined with the APP and forward guidance, has clearly been net positive. Indeed, we should not look at the implications of negative interest rates in isolation. Negative nominal rates have reinforced forward guidance in the euro area, sped up the process of portfolio rebalancing associated with the APP and supported the effectiveness of the recent targeted longer-term refinancing operations.

But there can be cumulative effects on financial intermediation and financial stability if rates remain very low for a very long time. One might argue that disintermediation may have benign effects if non-bank entities are equally capable of collecting and channelling savings, while being less vulnerable to the adverse effects of negative interest rates. The shift towards a more market-based financial structure, as promoted by the European Union's capital

³⁰ See Constâncio V., "Challenges for the European banking industry", lecture at the conference on "European Banking Industry: what's next?", University of Navarra, Madrid, 7 July 2016.

markets union project, would then help our economy cope with a longer period of very low or negative rates. But there is a limit to this argument. Non-banks are also affected by very low rates: for example, fixed net asset value money market funds may not be able to maintain the value of their shares close to par, while asset managers and insurance companies face the same shrinking margins as banks. Regardless of the entities that originate and distribute, household savings will be collected and long-term assets will sit on a balance sheet.

So what can be done to address this situation? The ECB's monetary policy measures, including the deposit facility rate set at its current negative level, are proving to be effective in lifting inflation towards its medium-term objective and reducing the overall level of risk in the economy. Fiscal and structural policies should act more decisively to support aggregate demand and productivity, thereby preventing the economy from falling into a low interest rate trap. And banks should adapt continually to the changing environment by adjusting their business models, cutting their operating costs and reducing their non-performing loans. In doing so, they will also improve their resilience to a prolonged period of very low rates.