HAL
open science

Negative interest rates: incentive or hindrance for the banking system?

Christophe Blot, Paul Hubert

To cite this version:

Christophe Blot, Paul Hubert. Negative interest rates: incentive or hindrance for the banking system?. [Research Report] Parlement européen. 2016. hal-03459162

HAL Id: hal-03459162

https://sciencespo.hal.science/hal-03459162v1

Submitted on 30 Nov 2021

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

European Parliament

DIRECTORATE GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Negative interest rates: incentive or hindrance for the banking system?

IN-DEPTH ANALYSIS

Abstract

Since 2014, the ECB has applied a negative interest rate on the excess reserves (and deposit facilities) of commercial banks. This policy is complementary to Quantitative Easing (QE), a program whereby the ECB purchases securities on financial markets. Indeed, the QE provides liquidity to the banks and negative interest rates encourage them to reallocate this liquidity. The negative reserve rate amplifies the fall in short-term and long-term market rates and reinforces the incentive for commercial banks to operate reallocation on their portfolios towards riskier assets. The total amount of liquidity subject to a negative interest rate is 1047 billion euros. Negative interest rates should reduce interest rate margins but the impact on profitability is mitigated by the capital gains banks realise when selling securities to the ECB under QE, by the possibility banks have to finance themselves at negative rates, by a decrease in the risk of default and by the possibility to raise non-interest income.

IP/A/ECON/2016-04 November 2016

PE 587.328 EN

DRAFT

This document was requested by the European Parliament's Committee on Economic and Monetary Affairs.

AUTHOR

Christophe BLOT, Paul HUBERT (OFCE)

RESPONSIBLE ADMINISTRATOR

Dario PATERNOSTER

LINGUISTIC VERSIONS

Original: EN

ABOUT THE EDITOR

Policy departments provide in-house and external expertise to support EP committees and other parliamentary bodies in shaping legislation and exercising democratic scrutiny over EU internal policies.

To contact the Policy Department or to subscribe to its newsletter please write to:
Policy Department A: Economic and Scientific Policy
European Parliament
B-1047 Brussels
E-mail: poldep-economy-science@europarl.europa.eu

Manuscript completed in November 2016
© European Union, 2016

This document is available on the internet at:
http://www.europarl.europa.eu/committees/en/econ/monetary-dialogue.html

DISCLAIMER

The opinions expressed in this document are the sole responsibility of the authors and do not necessarily represent the official position of the European Parliament.

Reproduction and translation for non-commercial purposes are authorised, provided the source is acknowledged and the publisher is given prior notice and sent a copy.

DRAFT

CONTENT

EXECUTIVE SUMMARY **4**

1. INTRODUCTION **5**

2. NEGATIVE INTEREST RATES: A NEW UNCONVENTIONAL MEASURE **6**

2.1. The Negative Interest Rate Policy 6

2.2. Negative interest rate: beyond monetary policy rates 8

3. THE ECONOMIC IMPACT OF NEGATIVE INTEREST RATES **11**

3.1. A direct cost for banks to put into perspective 11

3.2. Have negative rates prompted banks to allocate more credit or buy securities? 12

3.3. Bank Profitability 13

3.4. Will the banking sector become riskier? 17

CONCLUSIONS **18**

REFERENCES **19**

EXECUTIVE SUMMARY

- Since 2014, the ECB has applied a negative rate on the excess reserves (and deposit facilities) of commercial banks. This policy aims to amplify the expansionary character of monetary policy. It is complementary to Quantitative Easing (QE), a program whereby the ECB purchases securities on the markets. Indeed, the QE provides liquidity to the banks and encourages them to reallocate this liquidity.

  Whereas the constraint of the zero lower bound (ZLB) was hit, the blurred notion of effective constraint on the interest rate (ELB for effective lower bound) now seems more relevant. The ECB is neither the only nor the first central bank to have dropped a key rate below the 0% mark.

- This shift to negative rates has contributed to lower interbank and market interest rates. Beyond the interest rates set by central banks, some rates on interbank markets and the return on certain assets have also become negative.

- The negative reserve rate amplifies the fall in short-term and long-term market rates and reinforces the incentive for commercial banks to operate reallocation on their asset portfolios. It should lead to an increase in loans to business and households in the euro area.

- At the end of October 2016, excess reserves and deposit facilities subject to negative interest rates amounted to 1047 billion euros, representing an annual gross cost of 4.2 billion euros for commercial banks. This cost may be offset by the capital gains realized by selling securities to the ECB.

- By flattening the yield curve, the negative interest rate policy reduces the net interest margin and thus the profitability of the maturity transformation activity is carried out by the banks. In the short term, a flattening yield curve may be positive since the average maturity of the asset is generally longer than that of the liability. Nevertheless, in the medium term, the net interest margin of the banks should decrease.

- The impact on banks profitability could be mitigated if commercial banks decided to pass on the cost associated with the negative rates through the levying of additional fees and commissions. Moreover, the decline in interest rates could decrease the risk of default of banks' debtors.

DRAFT

1. INTRODUCTION

Since 2008, central banks have deeply changed the operational framework of their monetary policy with the implementation of so-called unconventional measures. By deciding to set a negative nominal interest rate on deposit facilities in June 2014, the ECB has taken a further step in the unconventional dimension of its monetary policy. Whereas the constraint of the zero lower bound (ZLB) was hit, the blurred notion of effective constraint on the interest rate (ELB for effective lower bound) now seems more relevant. The ECB is neither the only nor the first central bank to have dropped a key rate below the 0% mark. In July 2009, the central bank of Sweden - the Riksbank - reduced the deposit rate to -0.25%.

This shift to negative rates as a new unconventional monetary policy tool raises many questions about its impact on the economy and the ability of central banks to achieve their objectives. Beyond the interest rates set by central banks, some rates on interbank markets and the return on certain assets have also become negative.

In this policy brief, we attempt to analyse consequences of this situation on the banking system of the euro area. Commercial banks play an important role in the financing of the euro area economies and are directly affected by the effect of negative rates due to their lending and deposits activity.

DRAFT

2. NEGATIVE INTEREST RATES: A NEW UNCONVENTIONAL MEASURE

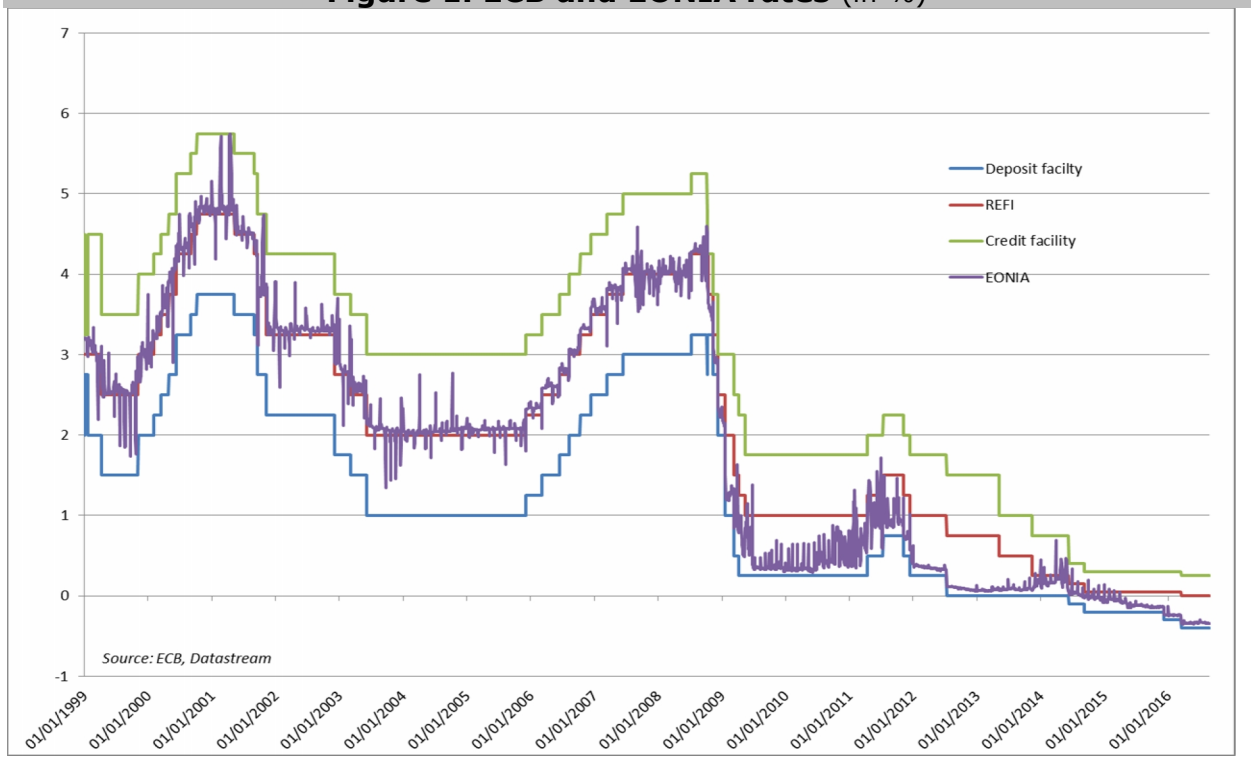
2.1. The Negative Interest Rate Policy

Central banks' actions are most often based on the setting of several interest rates allowing them to influence bank and market interest rates and more generally all financing conditions of non-financial agents. The central bank rates are generally threefold: a central rate that acts as a signal on the direction of monetary policy and can also serve as a reference in the conduct of monetary policy operations and two rates (floor and ceiling) framing it.

In the case of the ECB, the central rate (referred to as the REFI rate) is a minimum rate applied to refinancing operations for credit institutions in the euro area. The rate of refinancing operations allows the ECB to influence the rate charged by credit institutions for inter-bank loans (EONIA for Euro overnight index average), and then the overall bank rates and market interest rates. To better control EONIA fluctuations, the ECB offers two facilities available to banks: lending facilities by which banks in the euro area may borrow from the ECB for a period of 24 hours and deposit facilities at the ECB for a period of 24 hours. These two devices constitute upper and lower bounds for the EONIA and it is the lower bound that is negative today (Figure 1).

Within the euro area, banks obtain liquidity via main or long-term refinancing operations at a zero rate since March 2016. However, the ECB has also opened up the possibility for targeted refinancing operations (TLTRO II for Targeted Long Term Refinancing Operations II) with the interest rate to be set at the level of the deposit facility rate, that is, negative. In other words, the ECB will pay banks that meet some criteria for granting credit to consumers and non-financial corporations to lend in turn.

Figure 1. ECB and EONIA rates (in %)

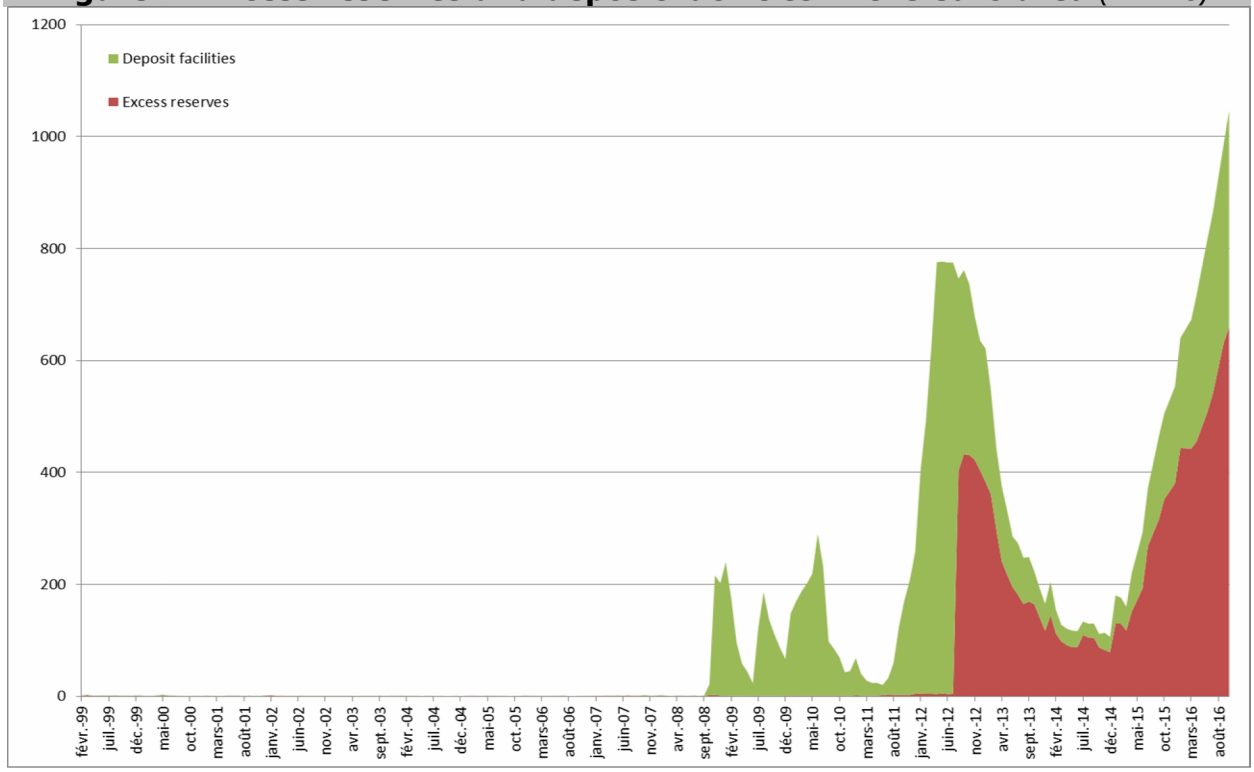


Source: ECB, Datastream.

These negative rates are made possible because commercial banks use the central bank as their bank. The funds they hold at the central bank account are called reserves. Commercial banks must first hold a minimum amount of reserves (reserve requirements) set by the central bank for regulatory and liquidity control matters. Reserves held by commercial banks above this regulatory amount are said to be excess reserves and can only be held by institutions that have a deposit account at the central bank. Commercial banks also use these reserves to manage transactions between them through the banking system. These excess reserves evolve in an (almost) closed circuit between the central bank and commercial banks that lend and borrow these reserves between them. Excess reserves - electronic - can be exchanged for banknotes. Besides, commercial banks by granting credits or purchasing securities to non-financial agents will create deposits on behalf of these non-financial agents, deposits that will substitute required reserves for excess reserves. The possibility for getting rid of excess reserves then depends on the credit multiplier and credit demand.

In normal times, commercial banks only have the required reserves. The ECB deposit facility account and excess reserves, subject to negative rates, had virtually no outstanding amounts until the end of 2008 (Figure 2), with commercial banks going through the interbank market to refinance. During the crisis, central banks created huge volumes of liquidity and de facto replaced the interbank market. While commercial banks did not want to lend to each other, the ECB allowed commercial banks to borrow directly from the ECB itself while commercial banks with liquidity preferred to leave them on deposit at the central bank. When a commercial bank borrows from the central bank, the central bank credits the account of the commercial bank: more reserves are created. In addition, the purchase of bonds through quantitative easing programmes also contributed to an increase in excess reserves. Each time the central bank buys a bond, it credits the reserve account of the bank whose customer was the seller. It should be noted, however, that banks are not at any time forced to sell their securities to the ECB.

Figure 2. Excess reserves and deposit facilities in the euro area (in Bn€)



Source: ECB.

2.2. Negative interest rate: beyond monetary policy rates

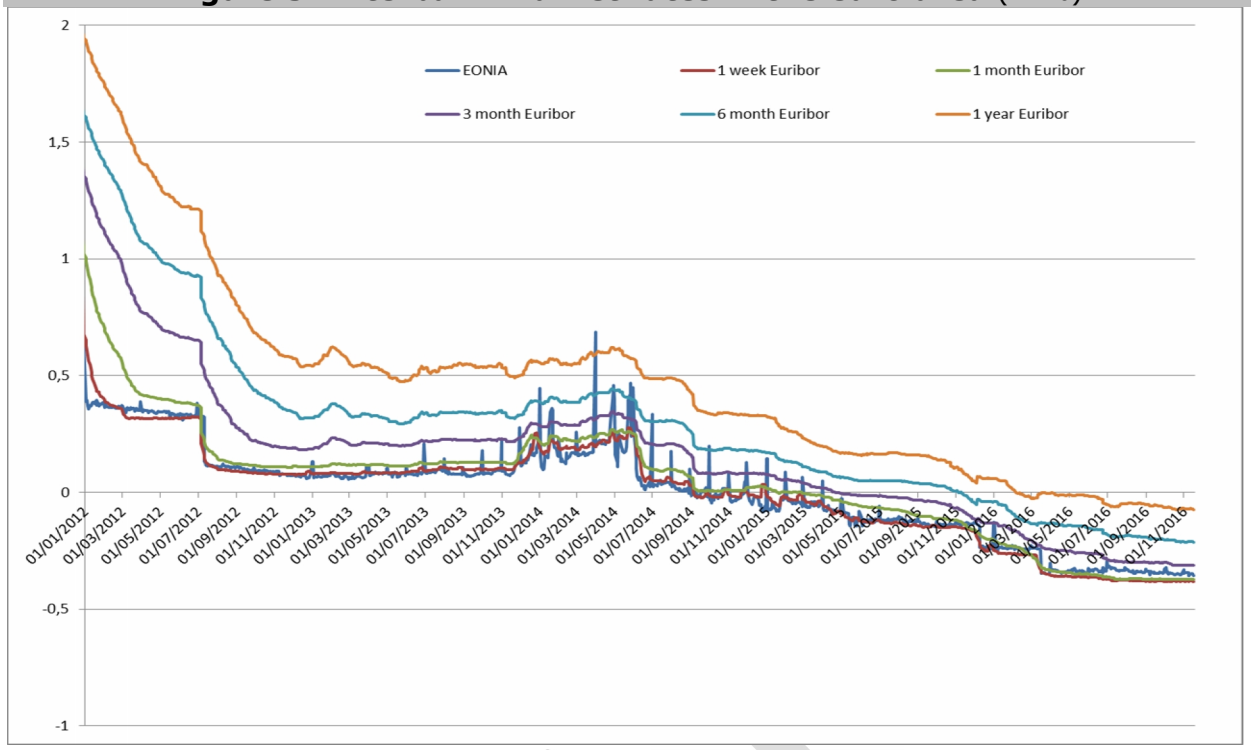
The emergence of negative nominal interest rates is not the preserve of exogenous decisions taken by central banks to satisfy internal or external objectives. Some interest rates in the interbank or bond markets are also negative today. In this case, the negative interest rate results from the transmission mechanism of monetary policy decisions.

This is primarily the case of the EONIA rate. With the abundant liquidity provided by the ECB, commercial banks are trying to lend excess reserves to other banks (liquidity supply is higher than demand). This competition pushes the interbank interest rate on a day-to-day basis down until it is close to the ECB deposit rate (Figure 1), at a negative level today. Through its refinancing operations at various maturities - 1 week for MROs, 3 months normally, and for LTROs with extensions of 6 months to 3 years during the crisis – of commercial banks in the euro area, lower interest rates have been transmitted to interbank market rates, which are negative for all maturities from 1 week to 1 year (Figure 3).

The fall in interest rates has been transmitted to the entire money market, but also to longer maturities, as evidenced by changes in yields on French sovereign bonds (Figure 4). The influence of monetary policy on market rates results from both the transmission of interest rate changes and the other measures taken by the ECB. Under the expectations hypothesis theory of the term structure of interest rates (as opposed to the preferred habitat theory), the interest rate at a given maturity - for example, 5 years - is determined by the interest rate on a lower maturity - for example 1 year - and expectations of future rates, for example 1 year in 1, 2, 3 and 4 years. Falling interest rates on longer maturities is also stimulated by the quantitative easing programme implemented by the ECB, which conducts securities purchases on different segments of the bond markets. In the case of France, this downward pressure on the entire term structure of rates leads to negative rates for all maturities of less than 5 years, the 5-year interest rate being also negative. In the case of Germany, the 7-year rates were also negative at -0.46% at the end of August 2016. These interest rates in turn influence interest rates granted to businesses and consumers. The average interest rate on a mortgage over 5 years in the euro area is thus falling. According to the ECB, it was 3.28% the month before the change to a negative deposit rate, and it is now 2.71%.

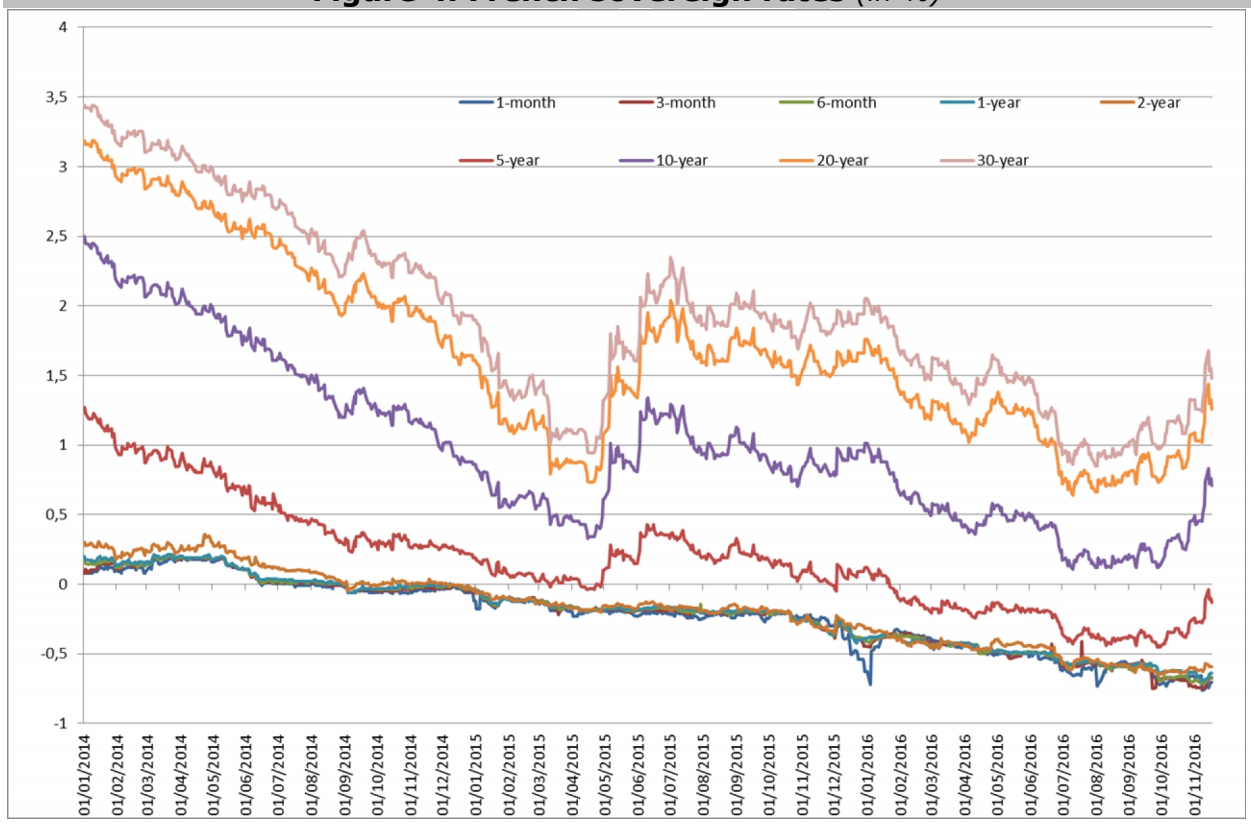
DRAFT

Figure 3. Interbank market rates in the euro area (in %)



Source: Datastream.

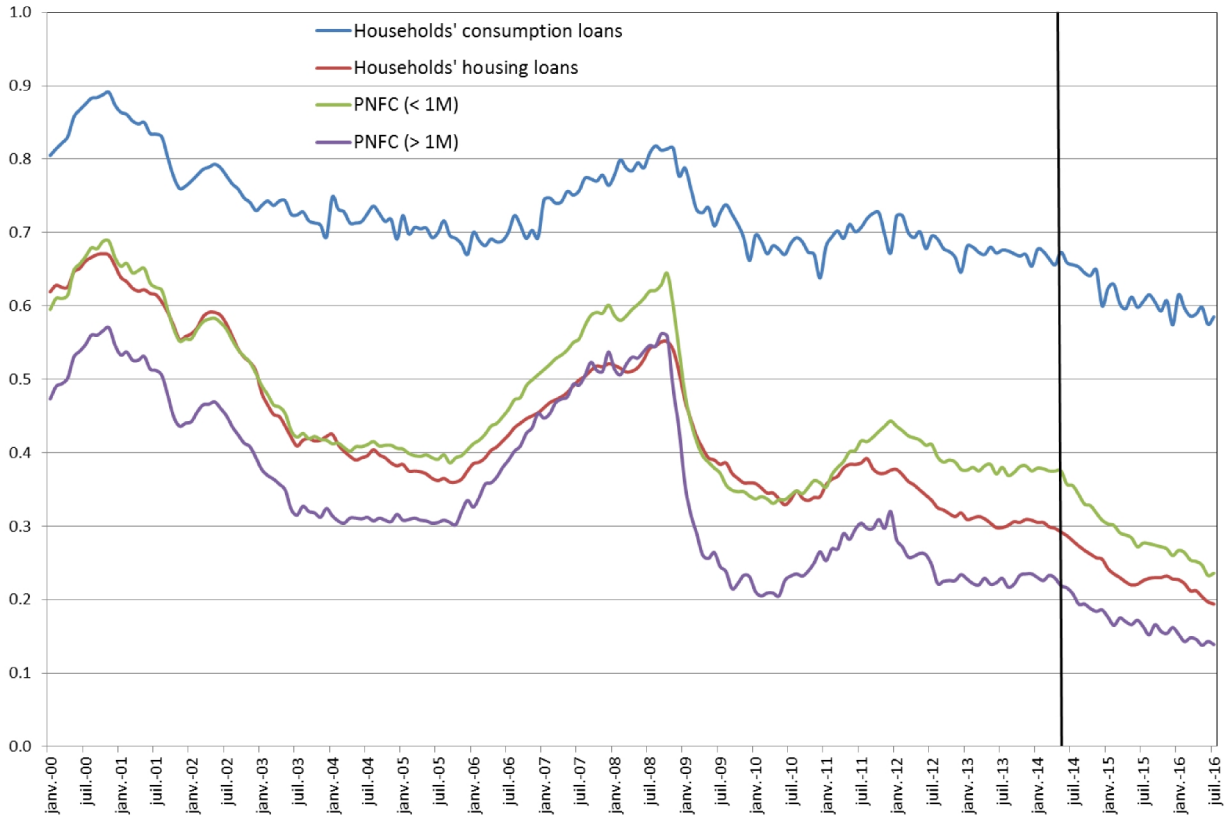
Figure 4. French sovereign rates *(in %)*



Source: Datastream.

Negative rates appear to have contributed to lower borrowing costs for firms and households (Figure 6). However, it is difficult to determine what proportion of the decline is attributable to negative rates, and how much is due to developments in the economy or to other ECB programmes, such as its long-term targeted refinancing operations (TLTROs) and Public Securities Purchase Programme (PSPP). Blot and Hubert (2016) estimate the degree of pass-through from policy rates to banking rates and suggest that the decline in the retail banking interest rates has been accentuated since the EONIA rate became negative.

Figure 6. Interest rates to non-financial firms and households in the euro area *(in %)*



Source: ECB. Interest rates on new loans granted.

3. THE ECONOMIC IMPACT OF NEGATIVE INTEREST RATES

With this measure, the objective of the ECB is to strengthen the expansionary nature of its monetary policy. By sending the signal of an additional cut in interest rates, the central bank wants to relax the financing conditions and support inflation as well as inflation expectations. To the extent that negative rates impose a financial cost, their impact on the economy may also reduce the profitability of credit institutions and hence the effectiveness of the measure.

3.1. A direct cost for banks to put into perspective

The existence of a negative rate on deposits implies that the depositor incurs a cost. In the euro area, banks are required to have an account at the ECB and deposit reserve requirements in proportion to the deposits they receive from their customers. However, the negative rate does not apply to all reserves but to the deposit facilities as well as to the average reserves exceeding reserve requirements and other deposits at the Eurosystem. Before the crisis, the average stock of excess reserves and deposit facilities was barely 1 billion euros. It has increased quite substantially since October 2008 (Figure 1) as a result of the interbank market paralysis and measures implemented by the ECB. At the end of October 2016, total reserves held by euro area credit institutions with the ECB amounted to 777.4 billion euros, of which 117.8 billion were required reserves and 659.6 were surplus reserves. Deposit facilities amounted to 387 billion euros. The total amount of liquidity subject to a negative rate is 1047 billion euros, representing an annual gross direct cost of 4.2 billion euros for commercial banks. This figure must be put into perspective and be compared with the balance sheet size of euro area banks is 31,700 billion euros, including 11,900 billion loans to non-financial agents. Beyond this direct cost, negative rates modify all rates, which can affect the profitability of financial institutions whose activity relies on the transformation of maturities and an asset / liability management that depends on interest rates.

It is noteworthy that the counterpart of the Public Securities Purchase Programme (PSPP) is the quasi-mechanical increase in excess reserves, and that with the capital structure of the PSPP, negative rates have differential effects on commercial banks within the euro area. Given that the PSPP program is highly concentrated in core countries of the euro area and the majority of purchases of bonds are from specialized brokerage banks, the distribution of excess reserves is not homogeneous between banks and reinforces the concentration of excess reserves in the banks of the least vulnerable countries of the euro area. The cost attributable to the negative rate is therefore not the same between the countries of the euro area.

Finally, it is important to understand why commercial banks agree to sell securities to the ECB and thus to see their excess reserves increase. Since the quantitative easing programme increases the demand and thus the price of bonds, commercial banks will agree to sell their securities when the capital gain realized offsets the loss of yield incurred (i.e. the difference in yield between the transferred security and the excess reserves paid at a negative rate). The argument that negative rates have a detrimental effect on the profitability of commercial banks thus appears, at least in part, misleading. Moreover, because yields of securities targeted by central bank purchases decrease with QE programmes, the difference between the interest rate on securities and the interest rate on excess reserves decreases, and thus the cost of negative rates also decreases.

DRAFT

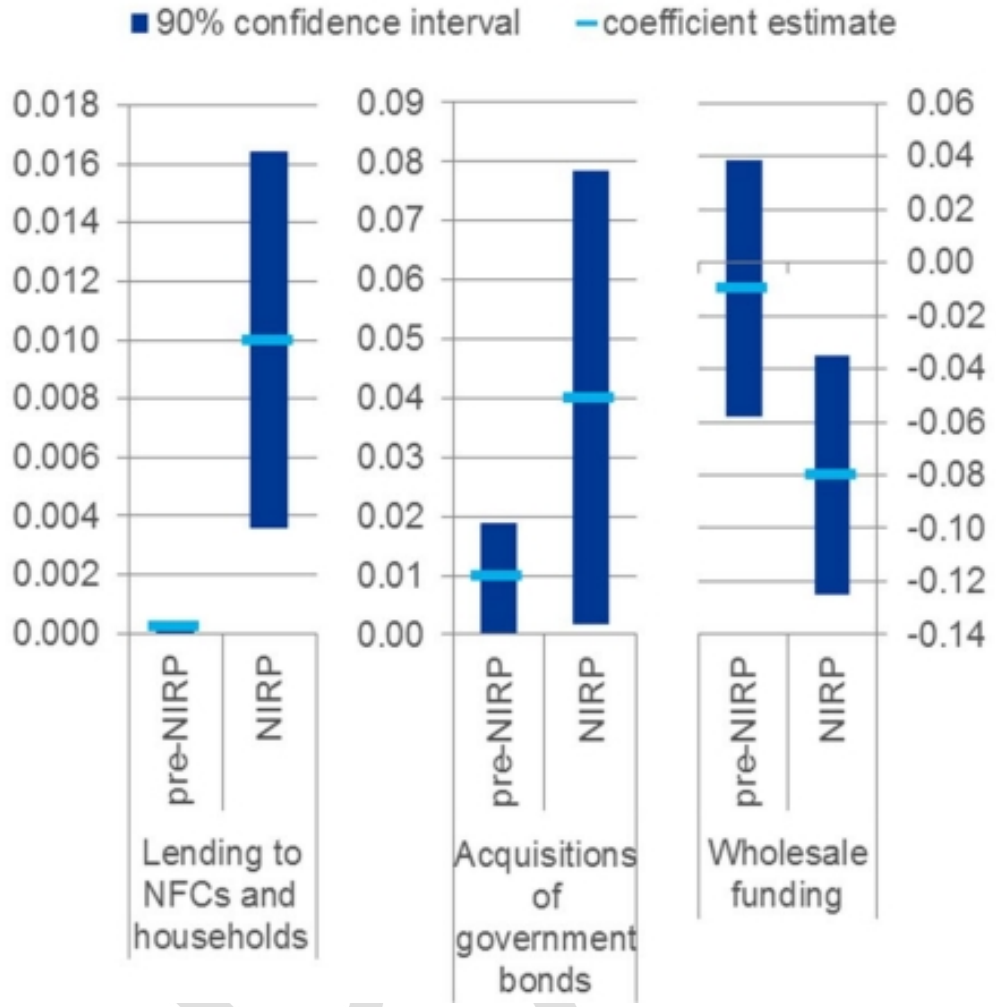
3.2. Have negative rates prompted banks to allocate more credit or buy securities?

According to the ECB's Bank Lending Survey (2016b), negative rates appear to have led to an increase in loans to businesses and households in the euro area, and the impact is expected to continue. To assess the extent to which banks are likely to convert their excess liquidity (excess reserves that are subject to the negative rate) into loans or purchases of securities, Demiralp et al. (2016) use panel banking data and estimate the response of a given bank's loans to non-financial corporations and households (as a percentage of core assets) to the excess liquidity of the same bank and excess liquidity multiplied by a dummy variable "negative rates". They also include several controls, such as loans from the previous month to non-financial corporations and households, and bank and time fixed effects. Their objective is to assess whether the coefficient associated with excess liquidity during the period at negative rate has increased, suggesting that negative rates make banks more inclined to convert excess liquidity into loans.

According to their analysis, a one percentage point increase in a bank's excess liquidity (as a percentage of its assets) leads to a 0.01 percentage point increase (Figure 7) in its loans to households and non-financial corporations (as a percentage of its assets), which represents an economically significant increase corresponding to about 20% of the average monthly flow of new loans to households and non-financial corporations by banks in the euro area. It is also significantly higher than the estimated response in the period prior to the introduction of negative rates. Similarly, the holding of excess liquidity leads to a slight increase in purchases of sovereign bonds.

DRAFT

Figure 7. Responses of banks to the holding of excess liquidity
(estimated coefficient)



Source: Demiralp, S., J. Eisenschmidt and T. Vlassopoulos, (2016) [figure 4 and annex III, figure A4].

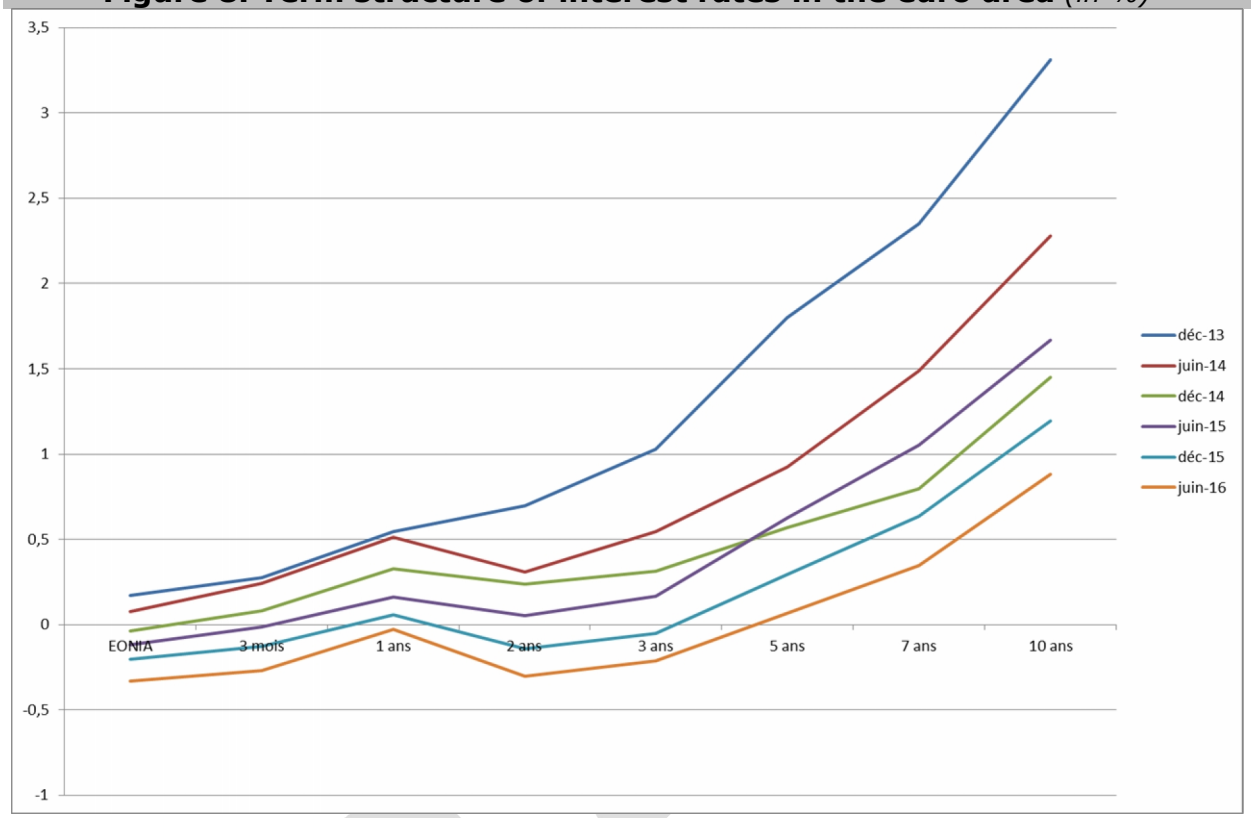
3.3. Bank Profitability

Due to their deposit-taking and lending activities, the profitability of banks depends to a large extent on the intermediation margin, i.e. the difference between the interest rate applied to loans and the interest rate applied to deposits. The banks' balance sheet structure means that they have short-term resources - deposits - while their assets have a longer maturity. By flattening the yield curve (Figure 8), the negative interest rate policy reduces the net interest margin and thus the profitability of the maturity transformation activity carried out by the banks.

Beyond the negative effect for banks of the flattening of the yield curve, a second negative effect for banks with low or negative rates comes from the difference in sensitivity of the returns of the bank's assets and its financing costs. Since the remuneration of household and business deposits cannot be negative by choice (the bank does not want to lose customers) or by constraint (legal), commercial banks see their margins reduce. This argument, however, needs to be put into perspective, as the TLTRO II programme allows banks to finance themselves at negative rates from the central bank. This depends on the type of activities carried out by the banks. Deposit banks with a larger credit activity will

benefit more from refinancing at negative rates via TLTRO II than investment banks. The negative rates will therefore have redistributive effects within the banking sector.

Figure 8. Term structure of interest rates in the euro area *(in %)*



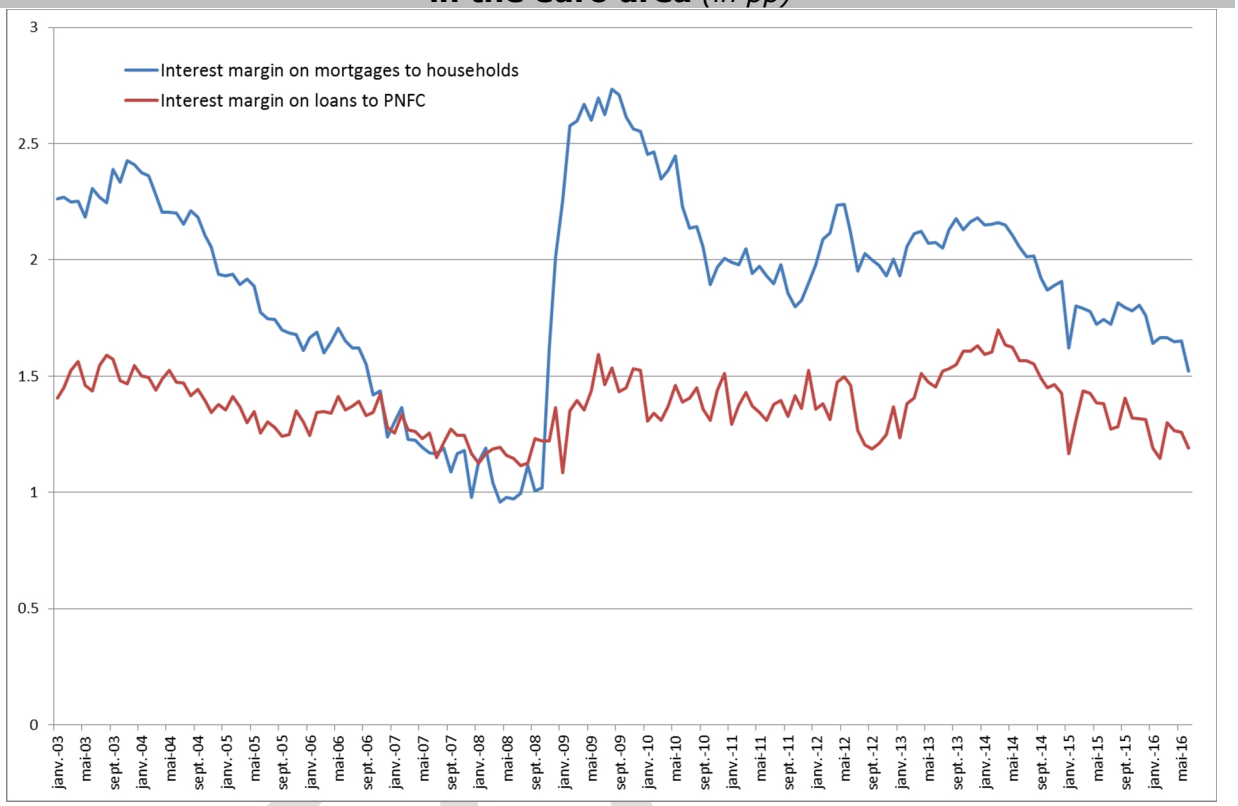
Source: Datastream.

The impact of the flattening of the yield curve on the profitability of banks is not immediate and depends both on the balance sheet structure of the banks and on the speed of diffusion of the fall in monetary policy rates to bank rates. The effect may even be positive in the short term since the average maturity of the asset is generally longer than that of the liability. As a result, while banks will continue to raise revenues at higher rates on previously granted loans, they will benefit from lower costs on deposits whose average maturity is generally shorter than that of loans. This positive effect decreases with the share of variable rate loans since, in this case, the fall in interest rates is more rapidly reflected in interest income. In June 2016, the share of property loans at variable rates was 12% in Germany, 2% in France, 41% in Italy and 48% in Spain.

In fact, there has been an improvement in the profits of banks in 2015, partly in relation to net interest income (ECB, 2016a). While interest margins on housing loans and loans to non-financial corporations have declined in the euro area over the past few months, they do not appear to be significantly lower than those observed before the crisis (Figure 9). Nevertheless, in the medium term, the net interest margin of the banks should decrease. The impact on banks profitability could be mitigated if commercial banks decided to pass on the cost associated with the negative rates through the levying of additional fees and commissions. Indeed, if there are legal or economic constraints - banks fearing losing customers who would be tempted to keep their cash in the form of banknotes - preventing banks from setting a negative rate on deposits, banks have the possibility to raise account-keeping fees. Such a choice would replace the profit resulting from the net interest margin by fees and commissions. On the other hand, as noted above, if banks incur a cost in

holding surplus reserves, they have also benefited from capital gains (unfortunately very complicated to quantify) via the revaluation of their holdings and the capital gains from the sales of securities to the ECB as part of the quantitative easing programme.

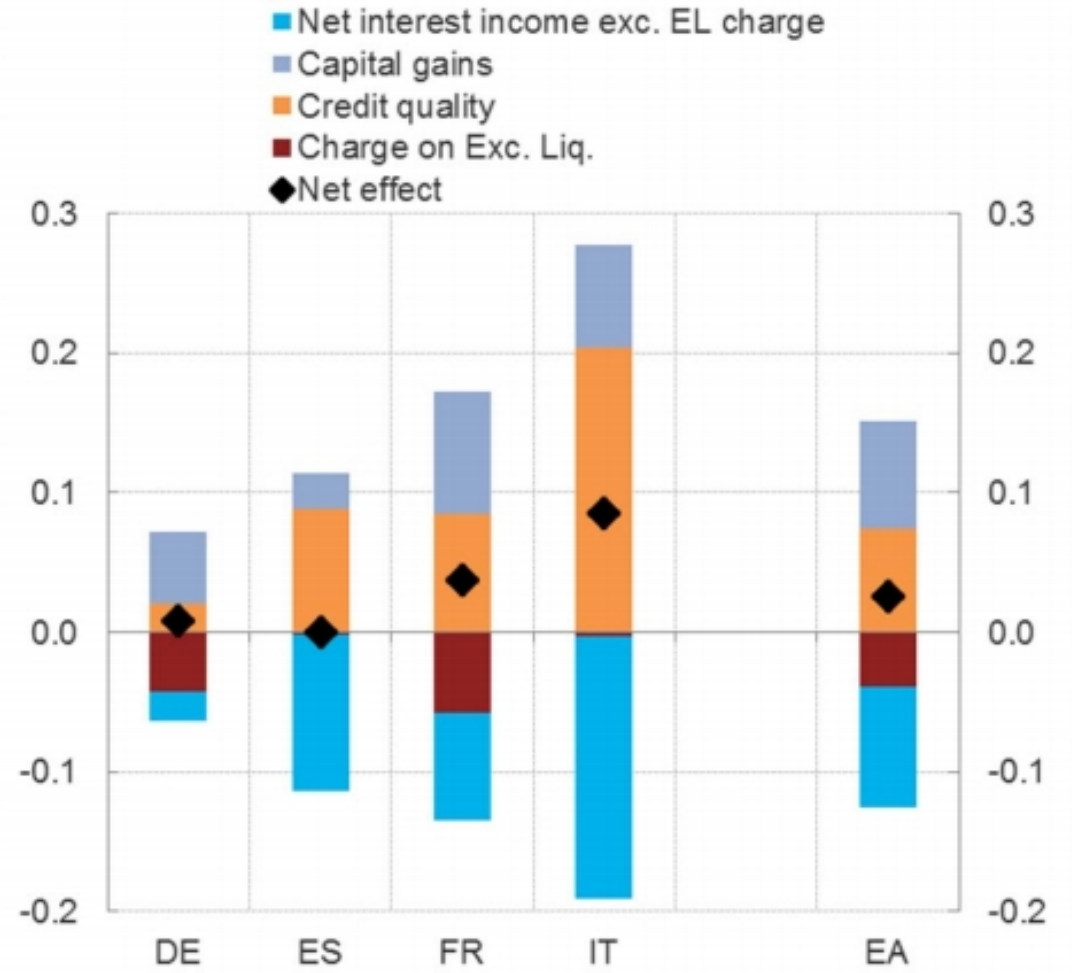
Figure 9. Interest margin on mortgages to households and PNFCs in the euro area *(in pp)*



Source: ECB. Authors' calculations. The average margin on loans in the euro area is calculated on the basis of margins for the 5 largest euro area countries weighted by the weight of credits granted by MFIs to non-financial agents. PNFC stands for Private non-financial corporations.

Moreover, the decline in net interest margins could also be mitigated by a decrease in the risk of default of their debtors. Indeed, the fall in interest rates should increase the solvency of non-financial agents, thus reducing non-performing loans. A recent analysis by Claessens et al. (2016) confirms, however, that the net interest margin falls when interest rates fall, especially when banks operate in a low-interest environment. Demilrap et al. (2016) argue that, contrary to the expectations of many experts, bank profitability has not been affected by negative rates, although they have reduced net intermediation margins (interest earned on assets less interest paid on deposits). They suggest that the cost of negative rates is offset by the improvement in the creditworthiness of their borrowers and the increased value of their assets (bonds, equities, etc.) that negative rates - as well as all ECB measures - have helped to generate.

Figure 10. Banks profitability
(in pp, contribution to the ROA between 2014 and 2016)



Source: EBA and ECB estimates. ROA: Return on Assets. Rostagno *et al.* (2016), « Breaking through the zero line, The ECB's Negative Interest Rate Policy », Conference « Negative interest rates: Lessons learned...so far », Brookings Institution, Washington DC, 6 june 2016.

A higher aggregate demand and a lower probability of default are expected to increase investment income, reduce financing costs and provisions charges, thereby mitigating the negative impact on bank profitability in the euro area and suggest that the floor linked to negative rates could be much lower than the ZLB. However, these benefits appear to be lower in countries where the transmission of policy rates to other rates in the economy is stronger and where low credit demand limits the extent to which banks can increase their loan supply to offset the impact of negative rates. According to Jobst and Lin (2016), the profitability of banks has recently declined and is expected to remain affected. Credit growth is currently insufficient to compensate for the impact of lower interest margins and the positive correlation between credit growth rates and interest margins over the last few years suggests that it is unlikely that the volume of loans would go upwards in these conditions.

3.4. Will the banking sector become riskier?

Finally, the question of the risks associated with this policy of negative rates arises. By encouraging banks[1] to substitute safe assets for negative returns by riskier assets and by facilitating the granting of credit to ex-ante non-solvent agents, the central bank potentially increases the level of risk taken by the banking sector. This could eventually create problems of financial instability. These risks, however, reflect the very channels of transmission of the policy of negative rates and its ability to bring about such effects. It should also be stressed that they are not specific to negative rates but more generally concern the expansionary monetary policy implemented by the central bank. Thus, if these risks cannot be overlooked, they must be considered in terms of their expected gains (return of inflation towards its target). There is therefore a trade-off between financial stability and macroeconomic stabilization, and central banks seem to consider that the potential cost of negative rates and, more generally, of all unconventional measures is less than their positive effects. In addition, the macro-prudential tools set up since the financial crisis aimed at framing these risks could also be mobilized.[2]

DRAFT

[1] This question also arises for other financial actors such as monetary and bond funds.
[2] See Couppey-Soubeyran and Dehmej (2014) on the topic of the policy-mix, monetary policy and macro-prudential policy.

CONCLUSIONS

The adoption of a negative interest rate by some central banks has provoked many reactions and raises many questions about the conduct of monetary policy. If the existence of negative *real* rates is common, it is less so for a nominal rate. Beyond the psychological factor, this decision mainly marks the desire of central banks to increase the expansionary character of their monetary policy, or for the central banks of small open economies in the euro area, the desire to reduce capital inflows. In the case of the ECB, this decision complements the range of measures already taken, in particular to increase its effectiveness. While the asset purchase programme allows the ECB to bring in a large amount of liquidity in order to push down interest rates, the negative reserve on excess reserves and deposit facilities should reinforce this decline in interest rates and encourage banks to make portfolio reallocations in favour of loans in order to mitigate the cost of holding reserves. In doing so, some argue that the negative effect on bank profitability may be counterproductive. However, analyses carried out so far suggest that this risk should not be overestimated. In the short term, lower interest rates could improve the profitability of banks. Their margins should be reduced and banks in the euro area will in future be more sensitive to monetary policy normalization which, if neither announced nor even envisaged, should occur in the medium term.

DRAFT

REFERENCES

- Andries N., and S. Billon (2016). "Retail bank interest rate pass-through in the euro area: an empirical survey". Economic Systems, 40, 170-194.
- Bindseil, U. (2016), "Evaluating monetary policy operational frameworks", Speech at the Jackson Hole conference on 31 August 2016.
- Blot, C. and P. Hubert (2016), "Causes et consequences des taux d'intérêt négatifs", Revue de l'OFCE, 148 (forthcoming).
- Borio C. and A. Zabai (2016), "Unconventional monetary policies: a re-appraisal", BIS Working Paper n°570.
- Buiter W. (1999c). "Liquidity traps: how to avoid them and how to escape them", NBER Working Paper n°7245.
- Buiter W. (2009a). "The wonderful world of negative nominal interest rates, again", voxeu 4 juin 2009.
- Buiter W. (2009b). "Negative nominal interest rates: three ways to overcome the zero lower bound", NBER Working Paper n°15118.
- Cecchetti, S. and K. Schoenholtz (2016), "How Low Can They Go?",29 February 2016, http://www.moneyandbanking.com/commentary/2016/2/28/how-low-can-they-go
- Claessens S., N. Coleman and M. Donnely (2016). "Low interest rates and bank's net interest margins", voxeu 18 may 2016.
- Couppey-Soubeyran, J. and S. Dehmej (2014), " Pour un nouveau policy-mix en zone euro : La combinaison politique monétaire / politique macroprudentielle au service de la stabilité économique de la zone euro", Policy Paper n° 4 - Labex Réfi.
- Demiralp, S., J. Eisenschmidt and T. Vlassopoulos (2016), "The impact of negative interest rates on bank balance sheets: Evidence from the euro area", mimeo ECB.
- Disyatat, P. (2008), "Monetary policy implementation: Misconceptions and their consequences", BIS Working Paper No 269.
- ECB (2016a). "Euro area financial institutions", Financial Stability Review, May.
- ECB (2016b). The Euro Area Bank Lending Survey (First Quarter of 2016), April (Frankfurt am Main: European Central Bank), available at the following address: https://www.ecb.europa.eu/stats/pdf/blssurvey_201604.pdf .
- Jackson H. (2015). "The international experience with negative policy rates", Bank of Canada Staff Discussion Paper 13.
- Jobst, A., and H. Lin (2016), "Negative Interest Rate Policy (NIRP): Implications for Monetary Transmission and Bank Profitability in the Euro Area", IMF Working Paper, 16/172.

DRAFT