

THE RECENT APPLICATION OF NEGATIVE POLICY INTEREST RATES IN THE EURO AREA AND IN OTHER ECONOMIES: RATIONALE AND PRELIMINARY EVIDENCE ON THEIR EFFECTS

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This article analyses the recent application of negative policy interest rates by several central banks, including the ECB. The preliminary evidence presented suggests that the use of this additional monetary policy headroom appears to have been effective in the euro area, prompting – together with the other expansionary measures – easier financial conditions. The article also discusses possible adverse effects associated with the application of negative interest rates.

Introduction

In mid-2014 the ECB initiated a phase that saw a further easing of its accommodative monetary policy stance. Among other measures, it placed for the first time one of its policy interest rates – the deposit facility – below zero. The adoption of this measure was followed by subsequent cuts, meaning that at present the deposit facility rate stands at -0.4%.

In recent years other central banks, those of Sweden, Denmark and Switzerland, and more recently Japan and Hungary, have also placed their policy interest rates at negative levels. In some cases, this measure has been in response to external factors (especially in small, open economies such as Denmark and Switzerland), contributing to containing capital inflows and the subsequent appreciation of their currencies. In other cases, meanwhile, the justification arose from internal factors (the ECB and the Bank of Japan), related to the need to provide a greater degree of monetary stimulus, against a background of sluggish aggregate demand, now that policy interest rates had reached zero.

The second section of this article reviews the economic arguments behind the application of negative interest rates as a monetary policy tool, and analyses the recent experience of the countries that have applied this measure, along with the attendant rationale and implementation.¹ The third section addresses the evidence available to date on the impact of this monetary policy instrument in the case of the euro area and of Spain. The fourth section focuses on the discussion of possible unwanted effects associated with this measure.

Negative interest rates: economic rationality and recent experiences

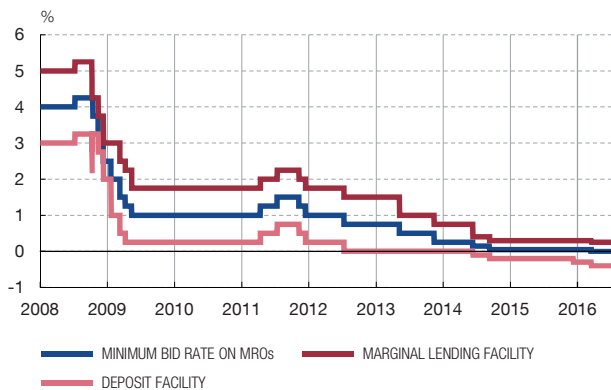
Traditionally, zero has been considered as the effective lower limit for nominal interest rates.² This notion was based on the view that no investors would be prepared to acquire an asset with a lower-than-zero return (i.e. one where investors would ultimately have less capital than their initial outlay), as they would have the alternative of keeping their funds in cash, whose nominal return is zero, but not negative.

However, recent experience as described below has shown that nominal interest rates may stand at negative values. This is so since, although cash does not lose nominal value over time, it does have non-negligible costs compared with other assets (bank deposits, securities, etc.) that lend themselves to electronic management. These costs, which include storage, insurance and transaction costs, are generally limited for small amounts, but higher if bigger amounts are involved. Usually, such costs particularly affect large

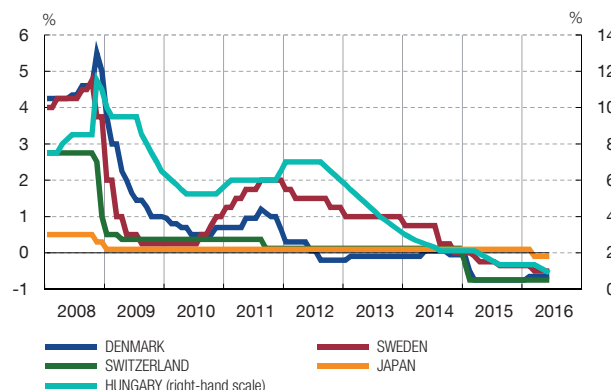
¹ This experience is also reviewed in Bech and Malkhozov (2016) and in Jackson (2015).

² Indeed, there is extensive economic literature on the implications of the zero lower bound (ZLB) on interest rates for optimal economic policies.

1 EURO AREA POLICY INTEREST RATES



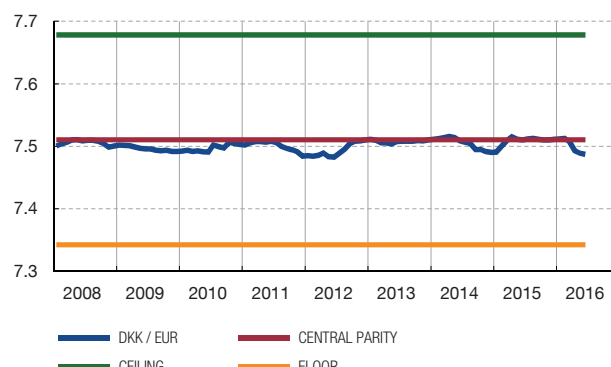
2 POLICY INTEREST RATES



3 SWISS FRANC EXCHANGE RATE AGAINST THE EURO



4 DANISH KRONE EXCHANGE RATE AGAINST THE EURO



SOURCES: Datastream and Banco de España.

corporations and financial institutions, which carry out frequent transactions involving high volumes. Accordingly, investors would be prepared to accept negative interest rates on certain investments, if the amount they have to pay for them is less than the cost of the alternative of keeping these funds in cash. In practice, then, the lower interest rate bound will not necessarily be determined by the zero level, but by cash maintenance costs.

In fact, in recent years several economies have placed their policy interest rates at negative levels. Specifically, in chronological order, Sweden, Denmark, the euro area, Switzerland, and, in 2016, Japan and Hungary too (see Chart 1), have done so.

At the onset of the global financial crisis, the ECB deployed a broad range of measures with the dual aim of providing liquidity against the collapse of the interbank market and of responding to the acute economic recession then commencing. The measures included a sharp, swift cut in interest rates, the provision of abundant liquidity (using fixed rate tender procedures with full allotment, i.e. at the demand of banks) and the progressive lengthening of the maturities of refinancing operations up to three years in the two very long-term refinancing operations (VLTROs) conducted in late 2011 and early 2012.³ In the context of the European sovereign crisis, the ECB also took measures (including most notably the

³ These two operations were conducted to address bank debt rollover risk at a time when the wholesale debt markets were closed down in some euro area countries as a result of financial fragmentation.

OMT⁴ programme) to restore its monetary policy transmission mechanism and to defuse the risk of the area breaking up. Subsequently, from June 2014, faced with the loss of momentum in activity and the growing risk of the deanchoring of inflation expectations, the ECB embarked on a fresh path of monetary accommodation. For the first time, it placed its deposit facility rate in negative territory, subsequently cutting it on several more occasions, down to -0.4% in March this year. Moreover, the ECB created liquidity-providing instruments conditional upon bank credit expansion, namely the TLTROs⁵, and, in the last quarter of 2014, it introduced new private-sector asset purchase programmes, which it extended notably in early 2015 with a government debt purchase programme and again in 2016 with a corporate debt programme.

The ECB was not the first central bank to adopt negative interest rates following the global financial crisis. Excepting a distant precedent in the 1970s, when Switzerland imposed penalty rates on non-residents' Swiss franc deposits, in recent years Sweden (whose monetary authority pursues an inflation-targeting strategy) has been the first country to implement them, as part of a package of measures to respond to the recession prompted by the 2008 financial crisis. Hence, after cutting its key (repo) rate to 0.25% in July 2009, it adopted a negative deposit rate of -0.25%, which it held until September 2010. In July 2014, in the face of persistently low inflation, it reduced its deposit rate to -0.5%. In February 2015, after the announcement of the ECB's extended quantitative easing programme, the Swedish central bank set its repo rate below zero for the first time, placing it at -0.5% in February 2016.

Denmark, the second country to adopt negative rates, has followed a fixed exchange rate policy since 1982, first against the Deutschmark and later against the euro. Generally, the Danish central bank reacts to an exchange rate fluctuation intervening on the foreign exchange markets, which it occasionally reinforces with adjustments of its interest rates. Using these means the central bank countered the European Monetary System crisis in the early 1990s, the global financial crisis in 2008 and the successive bouts of crisis on the European sovereign debt markets. In this latter context it cut its certificate of deposit (CD) rate to -0.2% in July 2012, in order to deter capital inflows that were exerting upward pressure on the Danish krone. In January 2013, once tensions had partially abated, the central bank placed this rate at -0.1%, at which it held until April 2014, when it returned to positive territory. In September 2014, to check the appreciation of the krone, due in part to the deepening of the Eurosystem's expansionary monetary policy stance, the central bank cut its CD rate to -0.05%. Following the announcement of the ECB's extended asset purchase programme in January 2015, it once again substantially cut the CD rate, lowering it to -0.75% in February that year.⁶

Switzerland, for its part, targets an inflation rate of lower than 2%. However, as a small, open economy, and a financial centre that attracts investment flows seeking safety (safe-haven assets), the monetary authority is concerned to maintain a degree of exchange rate

4 In its OMT (Outright Monetary Transactions) programme, announced in the summer of 2012, the ECB declared its readiness to undertake purchases of sovereign debt of highly stressed countries on the secondary market in exchange for their accepting an ESM conditionality-based financial assistance programme. The mere announcement of the programme considerably lessened the risk of a break-up, and there has been no need to date to activate it.

5 This type of longer-term refinancing operation (LTRO), known as a targeted longer-term refinancing operation (TLTRO), allowed institutions to obtain liquidity at a term of up to four years provided their lending to the non-financial private sector (excluding mortgage lending) exceeded certain reference levels. Into 2016, the ECB has announced new operations of this type (TLTROII), the first auction of which was in late June, at which negative rates could be applied if certain credit expansion conditions were to be met.

6 A year later, in early 2016, the Bank of Denmark raised its CD interest rate to -0.65 %.

stability. From late 2007, the Swiss franc began swiftly to appreciate and, at the end of 2008, the Swiss central bank placed its interest rates close to zero, while it began to use non-conventional instruments, such as exchange rate interventions, which burgeoned in episodes of financial market stress.⁷ In September 2011, it set a minimum exchange rate of Swiss Franc 1.2 per euro, and it defended this parity over the following three years at the cost of increasing its external reserves. Following the ECB's announcement of OMT in September 2012, reserves stabilised at around Swiss Franc 500 billion. Since mid-2014, however, coinciding with the new accommodative phase of the ECB, capital inflows rose once more and, faced with a growing incurrence of euro-denominated exposures, the Swiss central bank adopted negative interest rates of -0.25% in December that year. In January 2015, given the acceleration in the build-up of reserves, the monetary authority had to abandon the minimum exchange rate and cut its interest rates further to -0.75%.⁸

Finally, the most recent examples of countries that have placed their interest rates at negative values are Japan and Hungary. The Bank of Japan, in a pre-emptive step against the increase in downside risks to economic activity and inflation, decided in January 2016 to place its interest rates at -0.1%, applied to a portion of financial institutions' reserves at the central bank, thereby contributing to reinforcing the quantitative and qualitative expansion (QQE) measures it undertook in April 2013.⁹ Likewise in April, the Bank of Hungary placed its interest rate on overnight deposits at -0.05%, owing too to similar considerations of downside inflation risks, and like the Bank of Japan it has expressed its readiness to make further interest rate cuts if necessary.

Transmission of negative rates and evidence of their impact in the euro area and in Spain

In the current context of a growing aggregate surplus of reserves held by credit institutions in the Eurosystem, short-term interbank market interest rates are chiefly determined by the interest rate on the deposit facility. Accordingly, since the deposit facility rate turned negative in June 2014, the average interest rate on overnight lending transactions in the euro area (EONIA) has tended to draw closer to this benchmark and has been negative since late 2014, standing, on average, at -0.33% in June this year (see Chart 2.1). The recent reductions in the EONIA and expectations that policy interest rates will stand at negative levels for a further period have contributed to bringing about likewise negative returns on longer-dated interbank transactions (-0.27%, -0.16% and -0.03%, at the three-, six- and twelve-month terms, respectively, on average in June this year).

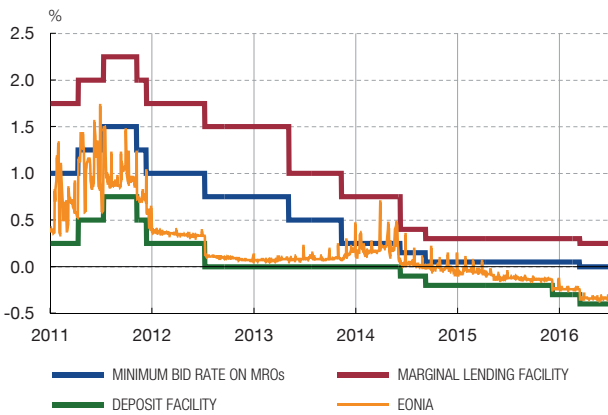
The amounts traded on the interbank market at the very short term have also fallen appreciably in the recent period (see Chart 2.2). Nonetheless, this appears to be in response above all to the abundant surplus of liquidity prompted by the debt purchase programme and not so much to the adoption of negative deposit facility rates. Operations on this market usually respond to the redistribution of liquidity among institutions, in a setting in which some require funds and others have surpluses. When, as is now the case, liquidity is so high that few banks have net requirements, such redistribution becomes clearly less necessary. It is worth highlighting, in this respect, that the traded volume did not begin to fall as from the introduction of negative interest rates in June 2014, but rather from the opening months of 2015, which is when the purchase programme was considerably extended to encompass purchases of government debt securities.

⁷ In the opening months of 2010, in mid-2011 and in the systemic phase of the European sovereign crisis in 2012.

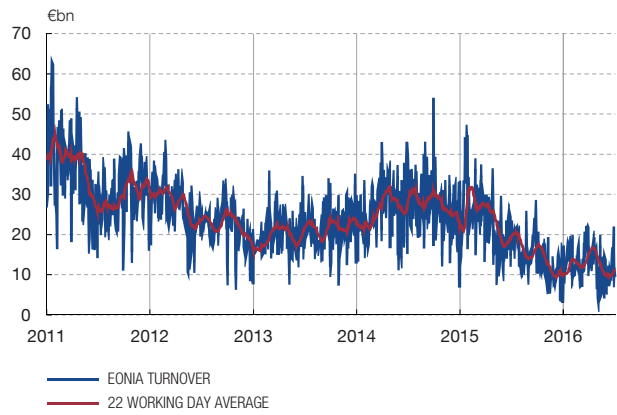
⁸ On both occasions, the mention of interest rates refers both to the mid-point of the target band for the three-month Swiss Franc LIBOR fluctuation and to the central bank's sight deposit rate.

⁹ At that time the Bank of Japan, given its difficulties in placing the inflation rate close to target, announced its intention to double the monetary base within a timespan of two years in order to achieve inflation of 2%.

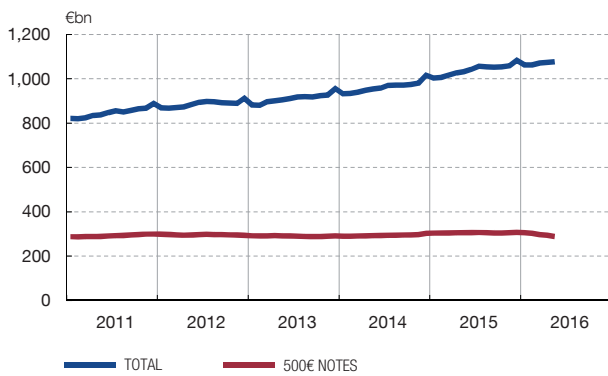
1 EONIA AND ECB INTEREST RATE



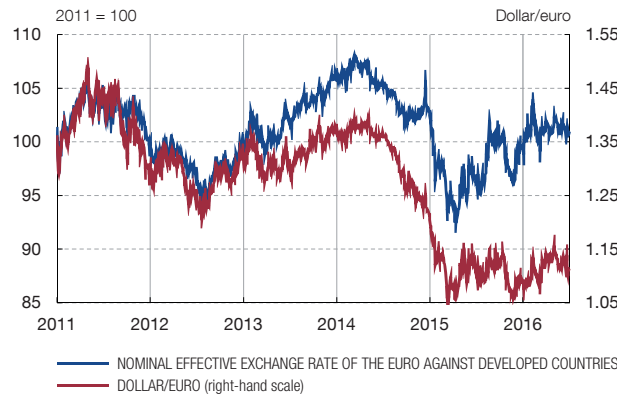
2 EONIA TURNOVER



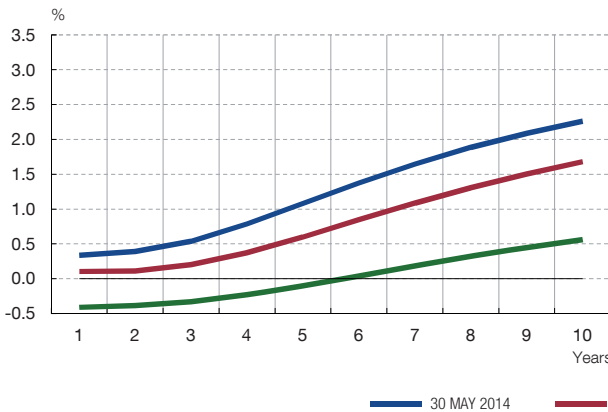
3 CIRCULATION OF BANKNOTES IN THE EURO AREA



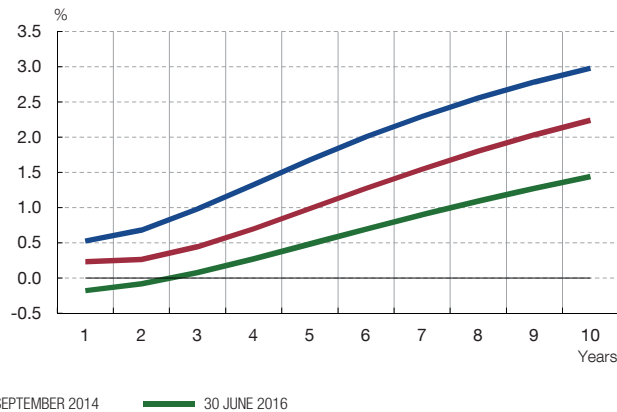
4 NOMINAL EXCHANGE RATE OF THE EURO



5 SOVEREIGN DEBT YIELD CURVE IN THE EURO AREA



6 SOVEREIGN DEBT YIELD CURVE IN SPAIN



SOURCES: ECB and Banco de España.

To date, there has been no noticeable increase in the circulation of banknotes in the euro area (see Chart 2.3) that might signal agents' wish to avoid negative returns by accumulating cash. In 2015 there was a minor acceleration in the pace of increase of the outstanding balance of cash, but it was moderate and subsequently reversed.

Under normal conditions, the reduction in actual and expected short-term interbank rates also translates into a compression to some extent of longer-dated interest rates. At the

same time, the lower resulting returns act as an incentive to reinvest in higher-risk alternative assets and to grant bank loans, an effect that may be even greater with negative interest rates. Further, the lower return on euro-denominated assets, other things being equal, would prompt a depreciation of the euro by increasing investors' preference for the higher returns in other currencies.

The evidence available since the introduction of negative interest rates in the euro area is consistent with an easing in financial conditions, although it should be borne in mind that such conditions have, in the recent period, also been influenced by other monetary policy measures, such as asset purchases and TLTROs.¹⁰ That hampers assessment of the specific impact associated with the cut in policy interest rates to below zero. As Chart 2.4 shows, the euro depreciated significantly following the announcement in June 2014 of the ECB's new package of expansionary measures until the opening months of 2015. Subsequently, there was a partial reversal in this movement as a result of the tensions on global markets, the change in expectations about interest rate rises in the United States and the depreciation of sterling. There was a downward shift in Spanish and euro area government debt yield curves practically in parallel (see Charts 2.5 and 2.6). The movements in the longer-dated terms are logically more related to the Eurosystem's government debt purchase programme than to cuts in policy rates. Yet the significant decline in the shorter-dated segments of the curve, which is more directly affected by the changes in monetary policy rates, is also expected to have contributed to the observed easing in financial conditions.

Regarding the impact on credit institutions, Chart 3.1 shows the response of certain market interest rates and of rates on banks' new lending and deposits in the last three episodes of declines in the Eurosystem's policy interest rates, the last of which corresponds to the period of negative interest rates. The exercise is performed for the euro area aggregate, for its core¹¹ and for Spain. Given the different scope of the cuts in each case, the changes are shown re-scaled (divided) by the change in the interest rate on the deposit standing facility. An initial conclusion of this exercise is that the relative impact on bank interest rates has not been less in the last episode of cuts than in the two previous ones, although a contributing factor here, especially in the case of loans, would have been the other expansionary measures applied by the Eurosystem (asset purchases and TLTROs)¹².

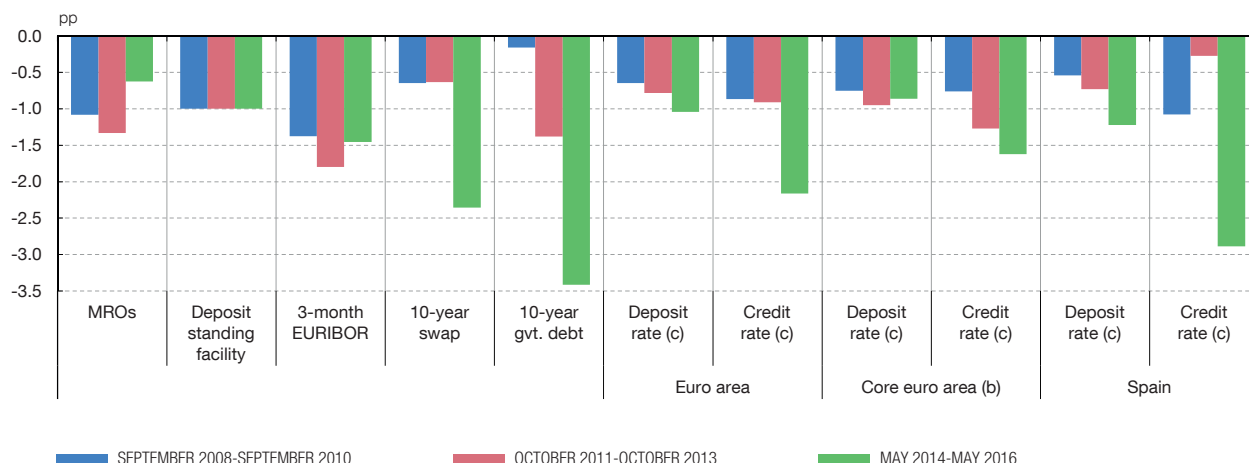
Asymmetry is observed in the response of interest rates on lending and on customer deposits (with a greater decline in the former than in the latter), which occurs in all episodes and not only when policy interest rates are negative. In the last episode this asymmetry is somewhat greater, which may be partly linked to the existence of a certain floor effect in deposit interest rates when these draw close to zero, although it should also be borne in mind that the Eurosystem's other expansionary measures would have been a contributing factor here. The presence of a floor to deposit interest rates can be most clearly discerned in Charts 3.2 to 3.5. Although the average deposit rate has tended to fall since June 2014 (both in Spain and the euro area), in those countries where rates were already close to zero there has been practically no additional reduction and this barrier has only been breached (i.e. negative average rates have been applied) in the case of the deposits of non-financial corporations in certain countries.

¹⁰ See Banco de España (2016a).

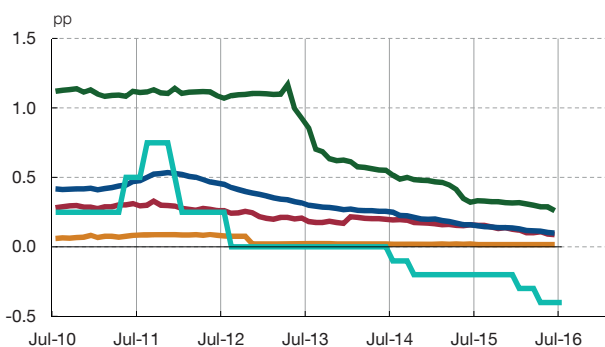
¹¹ Including countries whose government debt maintains an AAA rating (Germany, Austria, the Netherlands and Luxembourg).

¹² An analysis with Spanish bank lending interest rate equations, available at the Banco de España, does not show evidence of a significant change in the response of such rates to reductions in market interest rates since June 2014.

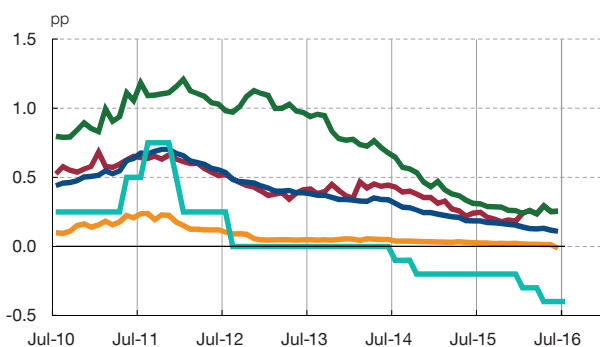
1 INTEREST RATES. RE-SCALED CHANGES (a)



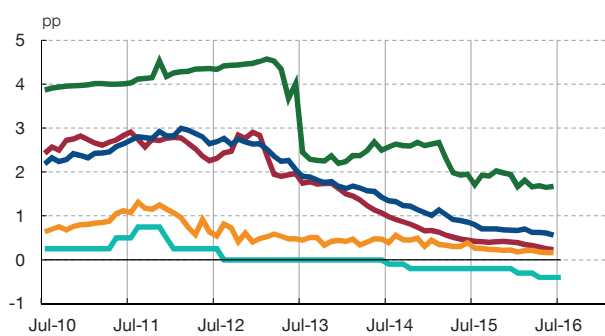
2 SIGHT DEPOSITS. HOUSEHOLDS



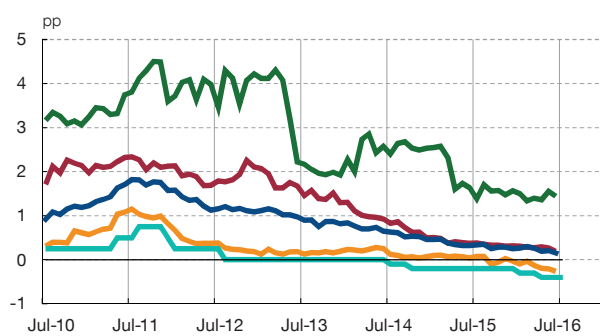
3 SIGHT DEPOSITS. NON-FINANCIAL CORPORATIONS



4 TIME DEPOSITS. HOUSEHOLDS



5 TIME DEPOSITS. NON-FINANCIAL CORPORATIONS

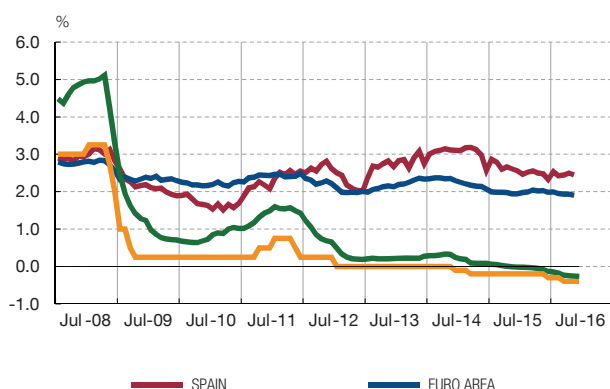


— SPAIN — EURO AREA — MAXIMUM (d) — MINIMUM (d) — DSF (e)

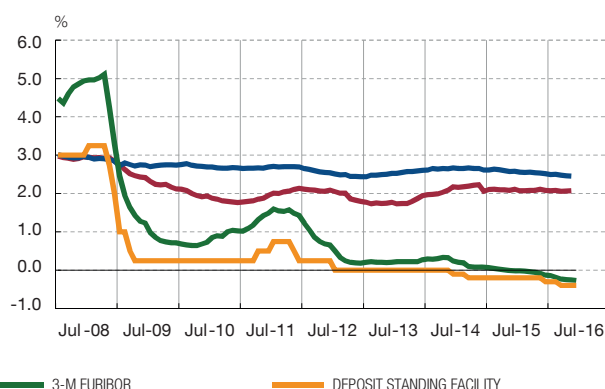
SOURCES: ECB and Banco de España.

- a All the changes are re-scaled, being divided by the change in the deposit standing facility interest rate of the related episode.
- b Includes AAA-rated countries: Germany, Austria, the Netherlands and Luxembourg.
- c The different average rates (NDER) on new business are weighted by outstanding balances, provided these are available, and otherwise by the volume of new transactions.
- d Maximum and minimum values per country, within the euro area, in each period.
- e Deposit standing facility.

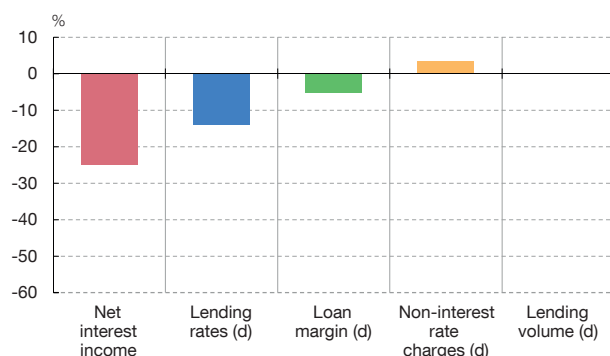
1 MARGIN ON NEW BUSINESS (a)



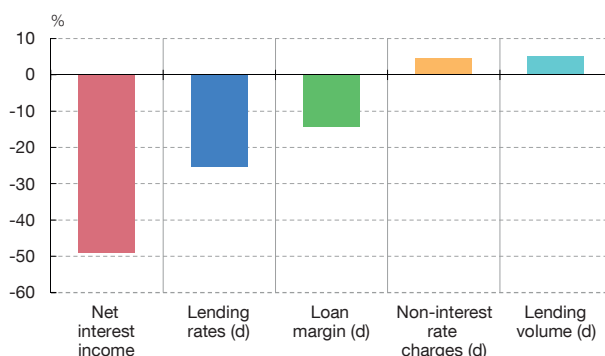
2 MARGIN ON OUTSTANDING AMOUNTS (b)



3 BANK LENDING SURVEY, APRIL 2016. SPAIN
NET REPORTED IMPACT ON DIFFERENT VARIABLES (c)



4 BANK LENDING SURVEY, APRIL 2016. EURO AREA
NET REPORTED IMPACT ON DIFFERENT VARIABLES (c)



SOURCES: ECB and Banco de España.

- a Using average rates (NDER) on new business, weighted by outstanding balances, provided these are available, and otherwise by the volume of new business.
- b Using the average rates (NDER) of outstanding amounts, weighted by balances.
- c Percentage of banks indicating an increase minus percentage of banks indicating a reduction, weighting considerable changes by 1 and lesser changes by ½.
- d Simple mean of values relative to loans to non-financial corporations, loans to households for house purchase and loans to households for consumption and other purposes.

This asymmetrical pattern of bank interest rates has translated into a narrowing of the spread between the return on lending and the cost of new business deposits since June 2014, both in the euro area and in Spain, with the effect somewhat more pronounced in our country, where the starting point was at higher levels (see Chart 4.1). However, in terms of the margins associated with outstanding balances, which are those that most directly affect banks' income statements, changes have been very moderate in the euro area as a whole and virtually zero in Spain (see Chart 4.2). It is interesting to note the greater stability of the margin on balances in Spain compared with the euro area, especially bearing in mind that, in Spanish banks, the weight of variable rate loans is greater than in the euro area on average. This result is largely due to the fact that Spanish banks have so far been able to offset the adverse effects on their net interest income associated with the decline in interest rates by means of a re-balancing of liabilities from term deposits to (lower-yielding) sight deposits. Specifically, from May 2014 to May 2016, the proportion of term deposits to total retail deposits fell from 52% to 37%.

The replies from institutions taking part in the April 2016 Bank Lending Survey (see Charts 4.3 and 4.4) confirmed that the introduction of negative interest rates in the euro area has contributed to reducing the cost of credit and has exerted a negative impact on banks' net

interest income. Banks would, to some extent, have attempted to counter this with increases in non-interest rate charges, such as commissions.

Outside the Eurosystem, the international evidence also suggests that the application of negative interest rates in the recent period appears to have been broadly effective, prompting easier financial conditions and stabilising exchange rate tensions in countries where this was the intended objective.¹³

Possible adverse effects of negative interest rates

Further to the recent application of negative policy interest rates, discussion has arisen on the possible problems and unwanted effects of this measure.¹⁴ An initial raft of questions refers to their possible impact on the functioning of specific payment systems and financial instruments, the interpretation of the interest rate applicable in certain credit contracts and the difficulties in the tax treatment of negative interest. Even though these problems can on occasion be significant, the recent evidence in the euro area and in other countries that have applied negative rates shows that such problems have, so far, been manageable and that they do not, in principle and given the levels of negative rates observed, constitute a decisive argument against their introduction.

It has also been indicated that the expected expansionary effect of negative interest rates would not occur or would do so to a lesser extent as a result of the adverse impact that this measure would have on savers' and financial intermediaries' income. Savers, facing low returns on their investment, would have to save more to attain the same future income, which would dampen consumption; and financial intermediaries, with their profitability squeezed by the difficulty of passing through cuts in rates to their liabilities, might contract rather than expand their supply of credit.

In this connection, it should first be stated that these arguments, notwithstanding their greater or lesser validity, are not confined exclusively to negative interest rates; rather, they apply broadly to any expansionary monetary policy. Hence, a decline in interest rates always penalises savers and benefits debtors. The scale of these distributive effects depends on numerous factors, such as the marginal propensity to consume of the agents concerned or the predominant type of loan (fixed or variable rate). In any event, empirical evidence shows that a reduction in interest rates generally has an expansionary effect on aggregate spending. This is so, in part, because along with the aforementioned redistributive effects, there is another effect that encourages aggregate demand (consumption and investment demand alike) as opposed to saving, through the intertemporal substitution channel. In this respect, there are no clear reasons for believing that this channel operates differently when nominal interest rates are moderately negative.

As regards the impact of negative interest rates on financial intermediaries¹⁵, it should be borne in mind that these agents raise funds and grant financing simultaneously, meaning that in principle they are affected both on their assets and liabilities sides. Accordingly, insofar as the reduction in policy rates into negative territory feeds through symmetrically into returns on both sides of the balance sheet, their unit net interest margin would not be affected. In practice, however, and as seen in the previous section, asymmetries usually arise in the pass-through of movements in interest rates. This occurs, firstly, because the maturities of assets and liabilities need not be equal, exposing banks to interest rate risk.

¹³ In this respect, see Jackson (2015), Viñals *et al.* (2016) and Demiralp *et al.* (2016).

¹⁴ See, for example, Bank for International Settlements (2016).

¹⁵ See also Banco de España (2016b) and European Central Bank (2016).

Thus, for example, insurance companies (especially in central European countries) have liabilities with insured returns at very long terms, whereas their assets have shorter-dated maturities. In this setting, the reduction in interest rates hampers the obtaining of sufficient returns with which to meet liabilities-side commitments. Conversely, banks at which fixed rate loan transactions predominate and which finance themselves at shorter terms tend to benefit from a context of falling interest rates.

But reductions in policy interest rates also squeeze banks' liabilities margin (the difference between the short-term market return and that on customer deposits). This is so because of the practical difficulties of applying interest rates lower than zero to depositors. While, as indicated earlier, there is some scope for introducing negative returns on deposits, such scope is limited, especially in the case of retail customers. Indeed, the evidence available to date is that while in countries that have been applying negative policy rates there are some instances in which large corporations and financial intermediaries are facing negative returns on their deposits, this has not been the case in any circumstances with retail depositors.

The potentially adverse effects on banks' income will tend to be greater in those cases in which retail financing predominates and in which the return on assets is swiftly updated, either because the bulk of loans are short-term or because they are referenced to short-term market interest rates. In this respect, these effects would foreseeably be comparatively greater in Spain than in the euro area as a whole, since both the weight of retail financing and the proportion of variable rate loans are greater in Spain than in the euro area on average.

In extreme scenarios, marked by interest rates that are very negative and persistent over time, the adverse effects on credit institutions' income statements might ultimately hinder their capacity to generate own funds and give rise to a tightening of credit supply, which would limit the effectiveness of the monetary policy measure. Likewise, faced with the marked narrowing of their net interest margin, banks might restrict the extent to which they pass through cuts in policy rates to the cost of their loans, thereby dampening the positive effect of an expansionary monetary policy on the supply of financing in the economy.¹⁶

It should further be borne in mind that, from the standpoint of macroeconomic effects, the counterpoint of this potential adverse impact on banks' income is greater net income for the other sectors (households and non-financial corporations), by means of lower net payments by these agents to financial intermediaries (interest on loans less returns on deposits). As with the previously mentioned asymmetrical effect between savers and debtors, this channel entails a certain redistribution of income, whose net aggregate effects will depend on the relative situation of economic agents, including banks and the financial system in general. This redistribution, for example, improves the position of debtors by reducing their interest payments and it contributes to a decline in non-performing loans, which positively affects banks' income statement, thereby mitigating the negative effects on net interest income. There is also a positive effect on banks' income derived from the higher aggregate spending that the reduction in interest rates entails and, therefore, a higher volume of financial transactions.

Finally, it has been pointed out that negative interest rates might prompt excessive risk-taking, with negative consequences for the economy and for financial stability in the

¹⁶ As appears to have happened to some extent in Switzerland and Denmark, as shown in Bech and Malkhozov (2016).

medium and long term, although these possible effects are not exclusive to negative rates but broadly apply to a setting of highly expansionary monetary policies over a prolonged period. As in the case of the effects on banks' income statements, the possibility of these unwanted effects arising warrants a monitoring of these risks and an assessment of the measures which, where appropriate, might be applied to mitigate them. Here, macroprudential policies appear especially suited in instances in which situations of risk in specific parts of the financial system are detected.

6.7.2016.

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