

IN-DEPTH ANALYSIS

Requested by the ECON committee



Post-crisis Excess Liquidity and Bank Lending

Monetary Dialogue September 2018



Policy Department for Economic, Scientific and Quality of Life Policies
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Abstract

With the Asset Purchase Program, the European Central Bank has supplied significant amounts of liquidity into the financial system starting from 2015, resulting yet into a new upswing in excess liquidity. The expanded asset purchase programme (APP) program broadly coincided with further cuts in the ECB's deposit facility rate, which currently stands at -0.4%. Against this background, this note assesses the ECB policy of negative rate on the deposit facility and discusses the associated risks in the context of an excess liquidity overhang for the euro area, including risk-appetite for banks.

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LIST OF ABBREVIATIONS

ABSPP	Asset Backed Securities Purchases Programme
BLS	Bank Lending Survey
CBPP3	Third Covered Bond Purchase Programme
APP	Expanded Asset Purchase Program
ECB	European Central Bank
LTROs	Long-Term Refinancing Operations
MROs	Main Refinancing Operations
NCB	National Central Bank
NFA	Net Foreign Assets
RAQ	Risk Assessment Questionnaire
SMP	Security Market Program
TLTROs	Targeted Long-Term Refinancing Operations

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EXECUTIVE SUMMARY

- The rise in excess liquidity between 2008 and 2012 was the result of at least three factors: banks' higher demand for central bank liquidity; the ensuing change in the auction procedure in the Eurosystem refinancing operations to fixed rate full allotment; and the stretch of long-term refinancing operations (LTROs) to longer-maturities.
- As parts of the first 3-year LTROs being repaid, excess liquidity has been on a declining trend for the period 2013-14.
- With the expanded asset purchase programme (APP), the Eurosystem has supplied significant amounts of liquidity starting from 2015, resulting yet into a new upswing in excess liquidity. In the case of the APP, however, excess liquidity is essentially supply-driven rather than demand-driven. This created a situation where asset purchases have become the dominant central bank operation and driving factor of excess liquidity over time.
- The growth in excess liquidity since 2015 should not be seen as a reflection of high demand in the Eurosystem refinancing operations by a banking sector under stress, as it was the case during the financial and the sovereign debt crisis. The available empirical evidence suggests that risk aversion has played a less important role in explaining the liquidity concentration observed since 2013/4 than it did at the time of the "flight-to-safety" crisis in 2010/11.
- When the ECB cut the deposit rate to zero, first, and then progressively into negative territory – currently standing at -0.4% – banks felt less and less the need to move money to the deposit facility, as money yielded zero interest or even it became costly to hold deposits. The implication of this policy was that banks started to pay a charge for their excess deposit holdings. Banks were generally unable to pass this cost to retail depositors, resulting into lower profit margins.
- With negative rates, individual banks had therefore to try to minimise this charge by reducing their excess liquidity holdings through active portfolio rebalancing and balance sheet adjustments, exchanging very safe assets such as central bank reserves for riskier assets such as loans or bonds.
- The empirical evidence suggest these measures amplified the effect of the bank-lending channel, which, in turn, exacerbated the home-bias in banks' assets holding. According ECB data, this was particularly the case for banks with a high share of retail deposit funding and/or located in lower-rated countries.
- When looking at the distribution of excess liquidity currently, data suggest the latter is the result of at least three factors: the interaction of remaining risk aversion, the investment opportunities created by yield differences across the euro area (versus the negative rate on the deposit facility) and the incentives created by new regulations. All together, these leave liquidity in much the same countries as before, with banks in lower-rated countries finding more attractive to invest liquidity in home bonds or assets with higher yields (foreign assets and repos against domestic collateral) rather than deposit them with the Eurosystem. At the same time, banks in higher-rated countries or institutions anyway facing stricter internal risk limits often found excess liquidity holdings more attractive, in the light of the low yields on own domestic bonds and repos.
- Banks' profit margins differ widely between 'core' and peripheral' euro area countries and there is still evidence of interbank market fragmentation. Recent evidence suggests high non-performing loan (NPL) ratios in the 'periphery' may still hinder banks' access to the interbank market.

- According to the ECB Bank Lending Survey, banks' risk aversion has declined since 2014, as the ECB ultra-accommodative monetary policy has compressed risk premia. Still, banks report that their decisions remain subject to internal risk limits and new regulations.
- Regarding the impact of ongoing regulatory or supervisory changes, the banks surveyed by the ECB reported a further strengthening of their capital positions and a reduction in risk-weighted assets predominantly related to riskier loans. This means that the easing of financial conditions and enhanced regulation seem to be going hand in hand.
- The EBA (2017) Risk Assessment Questionnaire suggests banks' lending especially to small and medium sized enterprises is growing. Similarly, the low general level of interest rates is supporting net demand for consumer credit, household lending, in turn boosting, consumer confidence and spending on durable goods.
- In the euro area as a whole, there is little evidence of increased banks' risk appetite (risk-taking), even though credit standards have clearly loosened.
- Going forward, excess liquidity is expected to moderate in tandem with the normalisation of ECB monetary policy.

1. THE EUROSISTEM MAIN LIQUIDITY COMPONENTS

In normal times (i.e. before the financial crisis), the monetary policy of the Eurosystem works by providing banks with just enough liquidity . This normally happens through:

- Open market operations (Main and Long Term Refinancing Operations)
- Standing Facilities (Deposit and Marginal Lending Facility)
- Reserve requirements

Table 1 presents a simplified framework, which illustrates the key entries in a standard central bank balance sheet.

Table 1: Simplified balance sheet of the Eurosystem

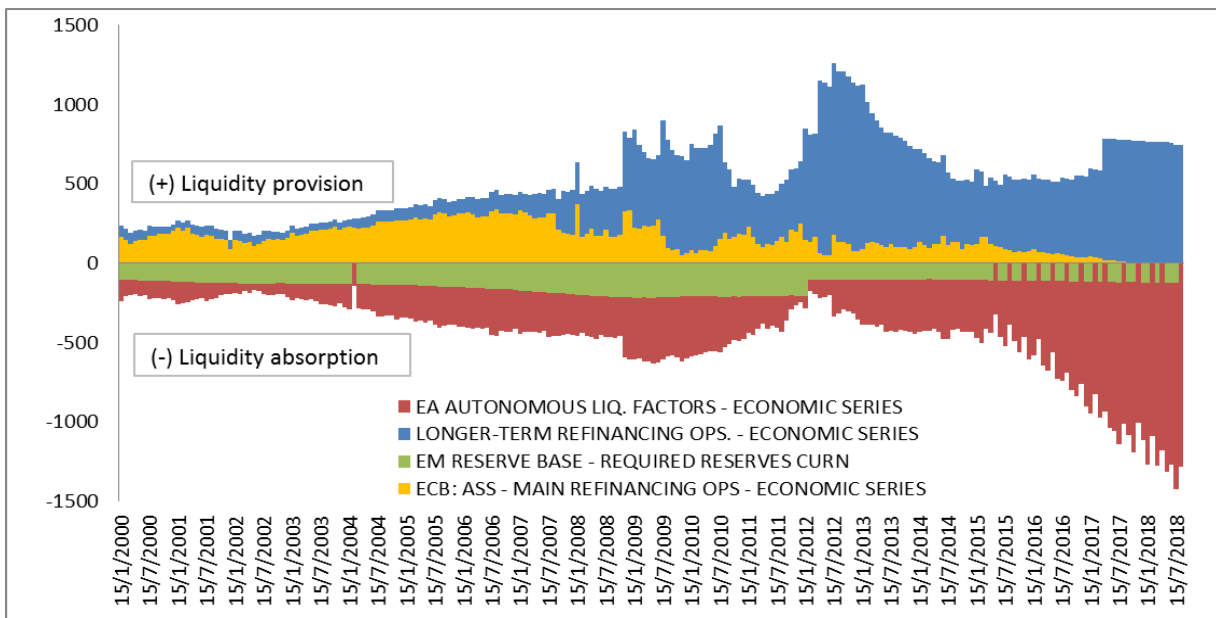
ASSETS (liquidity supply)	LIABILITIES (liquidity demand)
Autonomous liquidity factors NFA	Autonomous liquidity factors Cash in circulation Government deposits Credit institutions' deposits Overnight deposits Other autonomous factors
Monetary Policy MROs LTROs Marginal lending facility	Monetary Policy Deposit facility
Monetary policy securities Investment assets	Current account holding Required reserves Excess reserves

Monetary policy activities include assets, such as lending to banks, and liabilities, such as credit institutions' deposits and minimum reserves deposits that financial institutions hold with the central bank.¹

On the liability side, reserves represent current account balances (minimum reserves) held by commercial banks with the Eurosystem. They can also hold additional 'excess reserves' (deposit facility), although recourse to the latter is relatively low during normal times. Turning to the assets side, two components deserve attention: liquidity provision through monetary policy operations and central bank investments.

¹ A central bank is typically exposed to four broad categories of risks, namely (Donnery et al, 2017): credit risk (reflecting exposure to monetary policy and counterparty risk); market risk (reflecting the market price volatility of the assets held); liquidity risk (reflecting the exposure to low liquidity levels); and currency risk (reflecting volatility in foreign currency reserve exposures whenever these are held by the central bank).

Figure 1: The Eurosystem's main liquidity components



Source: Datastream/ECB.

Liquidity provision and absorption is driven by liquidity demand and supply factors. On the supply side (assets), the key liquidity providing items are the refinancing operations (MROs or LTROs), while on the demand side (liabilities), the key liquidity absorber items are the reserves and the deposit facility. Autonomous factors such as currency and government deposits are also important entries of the balance sheet. They are termed autonomous or “exogenous” because the central bank has little control on them, at least in the short run (Svendsen and Wojt, 2014).

Prior to the crisis, the ECB kept the banking system in a ‘liquidity deficit’, providing credit institutions with just enough liquidity to meet their demand. In normal times, banks typically want to borrow an amount covering at least their minimum reserve requirements, in order to reduce the recourse to the marginal lending facility, whose interest rate exceeds the market rate. On the other hand, credit institutions commonly do not want to hold excess central bank money. Excess reserves are, in fact, not remunerated by the Eurosystem and therefore constitute a cost; banks could, in principle, have them transferred as equivalent central bank deposits to the deposit facility (ECB, 2015), which is an interest-bearing deposit, setting the lower bound for the ECB’s rate.² In the next section, we briefly review some of the Eurosystem key liquidity demand and supply factors during and after the crisis.

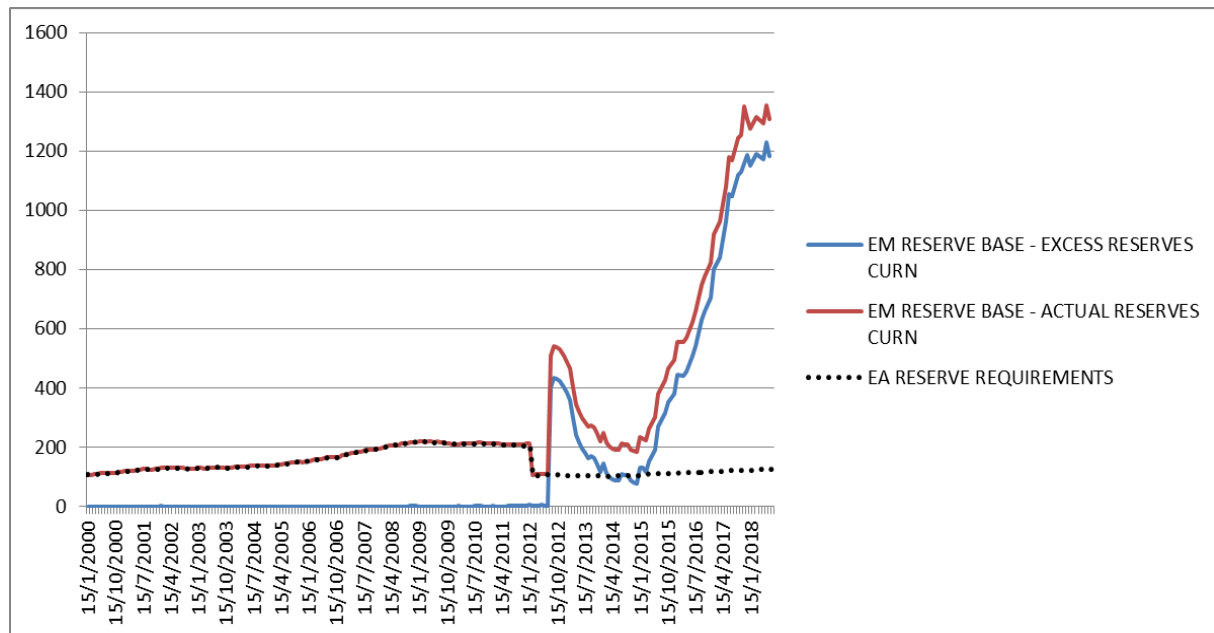
² While the deposit facility rate is, in normal times, less than the interest rate charged on the liquidity providing operations, monetary policy is typically not profitable from the Eurosystem’s viewpoint. This is the case since the level of excess deposits is generally close to zero, implying that the interest earned on liquidity providing operations tends to be netted out by the interest paid to banks on their minimum reserves (Donnery et al, 2017). When a key policy such as the deposit facility rate was set at -0.4%, in turn directly affecting banks’ profitability, the negative deposit facility rate has enabled NCBs to achieve a positive income stream from liquidity related policy operations (Donnery et al, 2017).

1.1. Liquidity Demand

1.1.1. Reserve requirements

Banks in the euro area have to hold minimum reserves on accounts with their national central bank (NCB). These minimum reserves have constituted about 50% of the liquidity needs in the euro area since 1999 (Svendsen and Wojt, 2014) and up until 2012. Once they have fulfilled their minimum reserve requirements, financial institutions can accumulate reserves in excess.

Figure 2: Eurosystem’s reserves



Source: Datastream/ECB.

While excess reserves are the result of credit institutions’ idiosyncratic behaviour in normal times (ECB, 2005), with the crisis they started to reflect glut liquidity demand and supply side factors, particularly since 2012, when the accumulation of total reserves well exceeded the required minimum (Figure 2). Due to market fragmentation, many commercial banks started to hoard reserves instead of lending in the interbank market, both as an insurance against potential liquidity shocks and to cope with perceived and actual increase in counterparty risk.

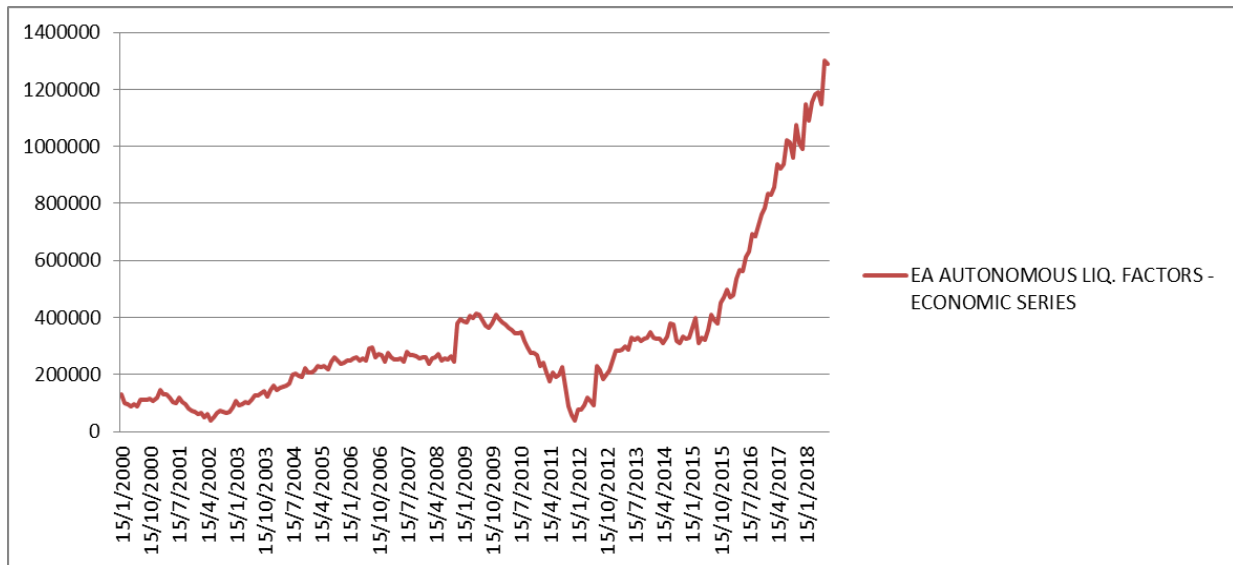
The ECB started to provide unlimited liquidity to ensure the smooth settlement of transactions, through fixed-rate full allotment, as well via longer and cheaper rounds of LTROs. During the early stage of the crisis, the increase in the central bank balance sheet was thus liability driven, as liquidity increased to fulfil the banks’ extra liquidity demand. Importantly, this did not correspond to an increase of reserves in excess of the minimum requirement up until mid-2012.

1.1.2. Autonomous factors

Autonomous factors reflect items on the Eurosystem balance sheet, which may be important drivers of liquidity demand/supply in the short-term, but are not under the direct control of monetary policy. Averages of autonomous factors are published weekly by the ECB, typically as a proxy of liquidity needs

by the banking sector (Svendsen and Wojt, 2014). As shown in Figure 3, autonomous factors have increased throughout 2009-10, decreased in 2011 and started to rise again since early 2012.

Figure 3: Autonomous factors



Source: Datastream/ECB.

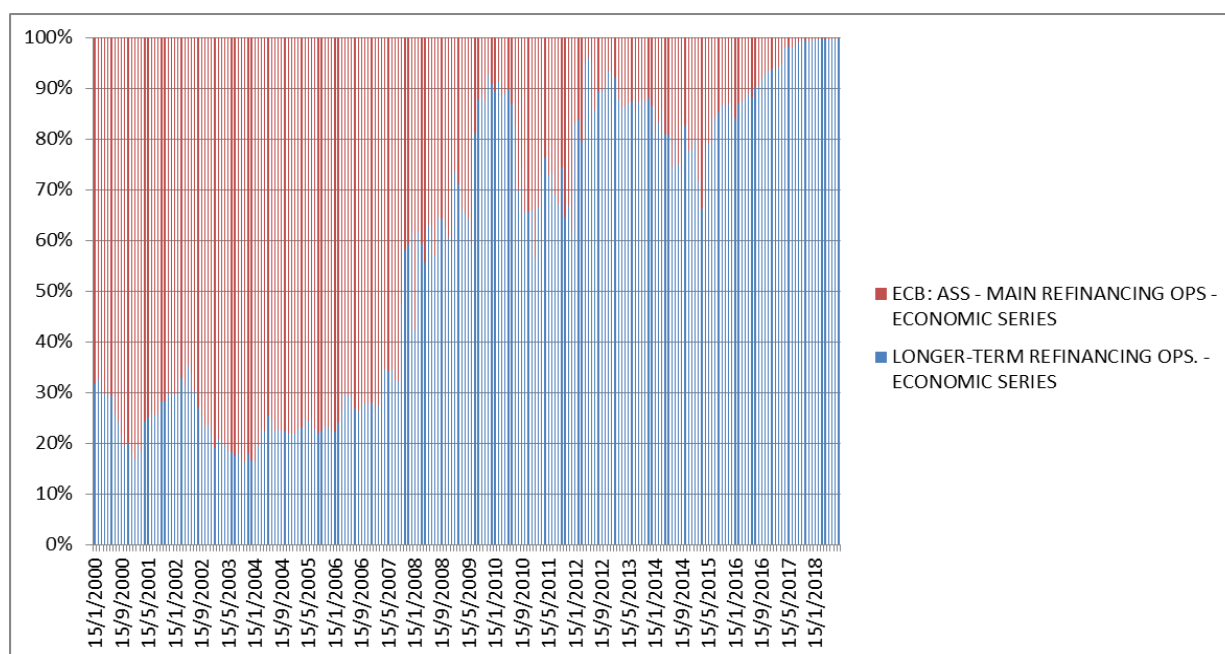
1.2. Liquidity Supply

1.2.1. Main and Long Term Refinancing Operations

Before 2008, financial institutions could bid for a specific amount of money on supply each week and the ECB allotted a specific amount of money in the MROs to meet these needs. Since the crisis, it became increasingly difficult for the ECB to estimate the exact amount of liquidity needs by banks. The ECB thus decided to switch to a fixed-rate full allotment, which indicates that a bank will receive any amount it wishes in refinancing operations. As evidenced in figure 4, this was followed by rounds of exceptionally cheaper and longer-maturity liquidity provisions (LTROs).

From Figure 4, one can track the rise of the LTRO share (wrt MRO) on total refinancing needs, which rose from about 20-30% before the crisis to over 90% at the peak in 2010 and has averaged around 70% since. This extra liquidity is provided against collateral, with the range of eligible securities widened throughout the crisis (see Macchiarelli and Monti, 2018).

Figure 4: Share of MROs and LTROs over total refinancing operations



Source: Datastream/ECB

Besides the introduction of fixed rate full allotment for the refinancing operations and the provision of longer-term liquidity to counterparties, the ECB's non-standard monetary policy measures included setting policy rates to zero (or even negative as in the case of the deposit facility) and, since 2015, the start of large scale asset purchases (APP).

1.3. Standing Facility

1.3.1. Lending and deposit facility

The ECB offers two standing facilities, the deposit facility and the marginal lending facility or minimum bid rate, creating a floor and a ceiling for the ECB's overnight policy rate. Banks can borrow money overnight at the marginal lending facility and lend money overnight through the deposit facility. The introduction of the 3-year LTROs significantly increased the supply of money in the banking system and resulted in increased usage of the deposit facility in 2011.

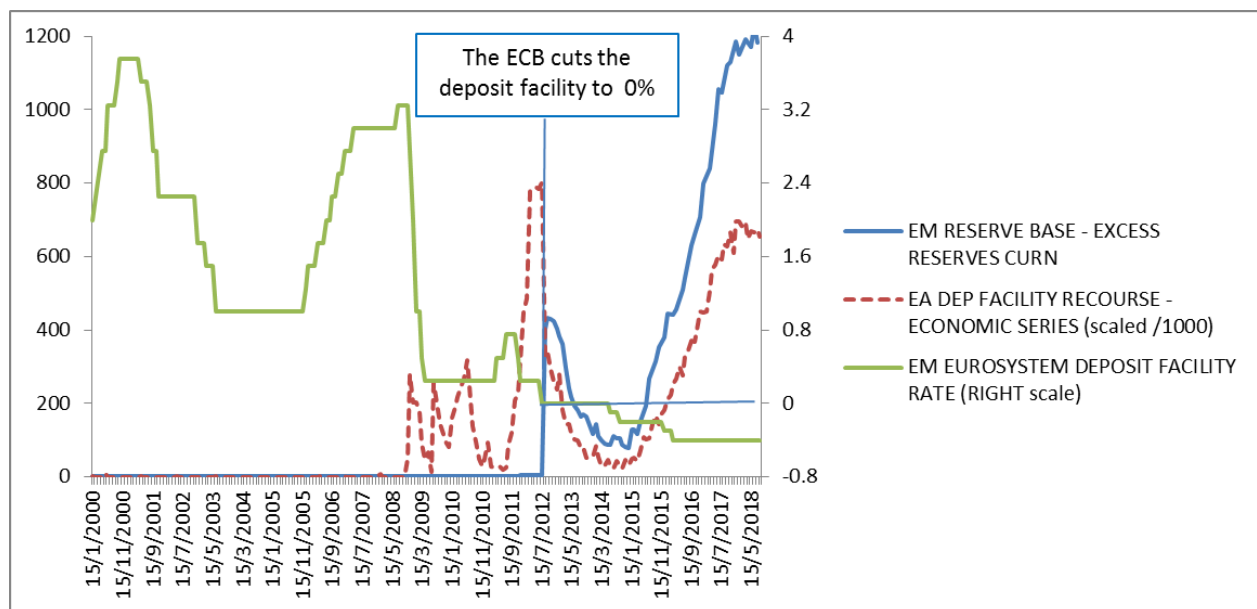
When the ECB cut the deposit rate to zero, first, and then progressively into negative territory – currently standing at -0.4% – banks felt less and less the need to move money to the deposit facility, as money yielded zero interest or even it became costly to hold deposits. The implication of this policy was that banks started to pay a charge for their excess deposit holdings. Banks were generally unable to pass this cost to retail depositors, resulting into lower profit margins. That overall increased the amount of excess reserves and reduced the amount of money in the deposit facility (see also Svendsen and Wojt, 2014). This is well evident by looking at Figure 5. Following on from the discussion in Section 1.1, in 2010-11, the increased use of the deposit facility reflected increased central bank reserves' creation, not direct hoarding by commercial banks.

With the negative rates, individual banks had therefore to try to minimise this charge by reducing their excess liquidity holdings through active portfolio rebalancing and balance sheet adjustments, including reduced wholesale borrowing – on the liability side – and/or increased loan provisions or government bond holdings – on the asset side (see Section 3). These overall amplified the effect of the

bank-lending channel (Baldo et al., 2017), particularly due to negative charges on excess liquidity and increased risk taking (see Demiralp et al., 2017), as we shall discuss in Section 3.³

In fact, the introduction of the negative deposit facility rate in June 2014 occurred in conjunction with other important policy measures, as underlined by Demiarlp et al. (2017). The first reduction of the deposit rate into negative domain coincided with the announcement of the first Targeted LTROs (TLTRO I). The subsequent reduction of the deposit facility to -0.2% roughly coincided with the asset backed securities purchases (ABSPP) and the covered bond purchase programmes (CBPP3); the further cuts in 2015 and 2016 broadly coincided with extensions of the ECB's asset purchase programme (APP).

Figure 5: Shift from deposit facility to excess reserves



Source: Datastream/ECB.

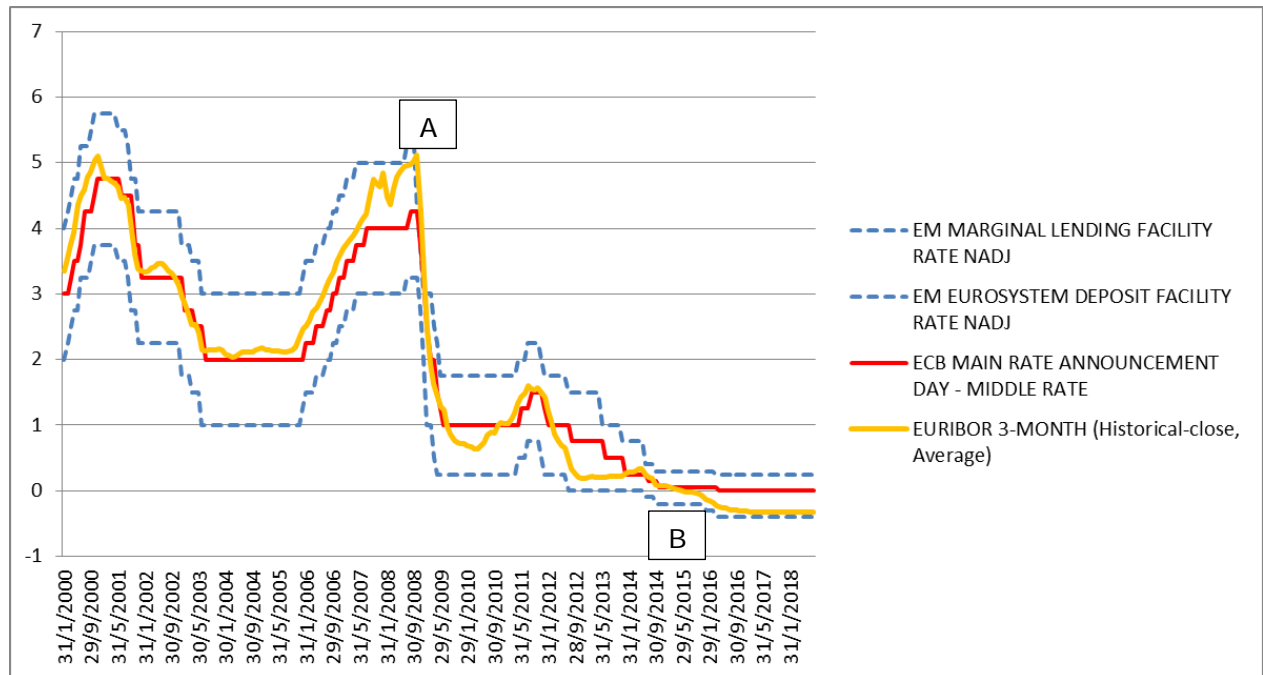
At the zero lower bound, the ECB thus switched from a policy merely supporting the transmission mechanism to a wider approach designed to sustain (core) inflation and credit to the real economy. As these asset purchases were financed by the creation of reserves, the Eurosystem's balance sheet continued to increase, mainly under the push of these new purchases. The provision of liquidity under the longer term refinancing operations also contributed to this expansion, as the Eurosystem has maintained its full allotment procedure and offered liquidity at attractive terms in the form of two rounds of TLTROs in 2014 and 2016, respectively. However, asset purchases have become the dominant central bank operation and driving factor of excess liquidity over time. These elements progressively replaced the MRO operations as the primary source of liquidity provision to the banking system.

The consolidated balance sheet increased from a pre-crisis level of approximately €1,000 billion in 2006 to about €4,200 billion at end-June 2017 (Baldo et al., 2017). The large amount of liquidity provided via these measures had a subsequent effect on the liabilities of the Eurosystem, as credit institutions'

³ Said that, the literature suggest there might be "tipping points" beyond which banks cannot tolerate further squeezes and further reductions in interest rates can in fact be contractionary (e.g. Bech and Malkhozov, 2016).

recourse to the deposit facility also increased significantly (Figure 5).⁴ This means the costs for banks increased not only because of the negative rates but also with the additional monetary policy easing.

Figure 6: Short rates and liquidity management



Source: Datastream/ECB Data Statistical Warehouse.

The APP programme was extended twice since the first implementation, raising the expected level of excess liquidity from the original EUR 300 billion, before the programme, to EUR 1.7 trillion extending, at the same time, the horizon until full reabsorption from 2019, as initially planned, to after 2025 (Demiarlp et al., 2017).

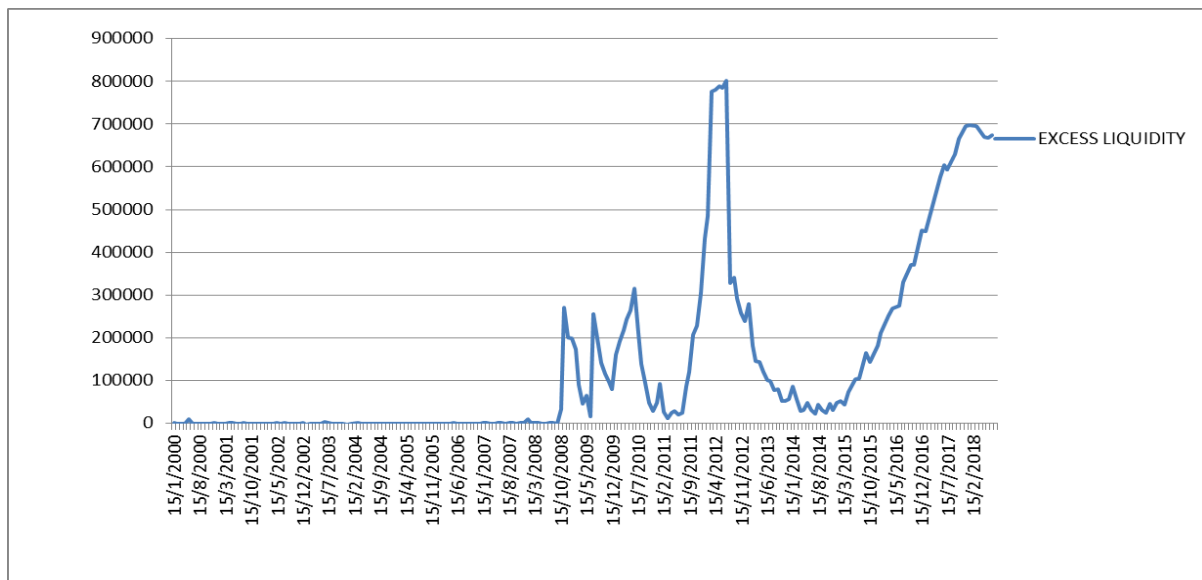
Looking at Figure 6, we visually assess the response of interbank interest rates (like the Euribor) to changes in the ECB policy. Prior to the crisis, the market interest rate has been mostly close to the ECB’s policy rate, as the Eurosystem kept short-term market rates close to the policy rate by adjusting the amount of liquidity to be adequate for the prevailing conditions in the market, in a situation of liquidity deficit indeed. In 2008, the amount of central bank money was not enough to cope with banks’ needs, so the latter had to resort to the marginal lending facility. This is well evidenced by the Euribor rate climbing up to levels close to the interest rate on the marginal lending facility (point A; Figure 6). This situation was evidently different from when the system experienced a liquidity excess. Here, banks reacted by making overnight deposits with the ECB, through recourse of the deposit facility, driving the interbank rate close to the deposit facility rate (point B; Figure 6). This has been the case since 2012, and particularly so with the extension of the APP.

⁴ See Donnery et al (2017) for a discussion on the accounting treatment of these non-standard measures and what they mean for the Eurosystem balance sheet.

2. EXCESS LIQUIDITY

Excess liquidity is defined as the liquidity supplied in excess of banks' demand. In this section, we are looking to identify excess liquidity more clearly and discuss some of the consequences in the light of the negative deposit facility and the APP. Following a common practice, we calculate excess liquidity as excess reserves plus money in the deposit facility minus money borrowed in the marginal lending facility (e.g., Svendsen and Wojt, 2014). This implies that when banks have used the refinancing operations and paid for the interest on reserves and autonomous factors, the outstanding liquidity which remains is 'in excess' (Figure 7).

Figure 7: Excess liquidity



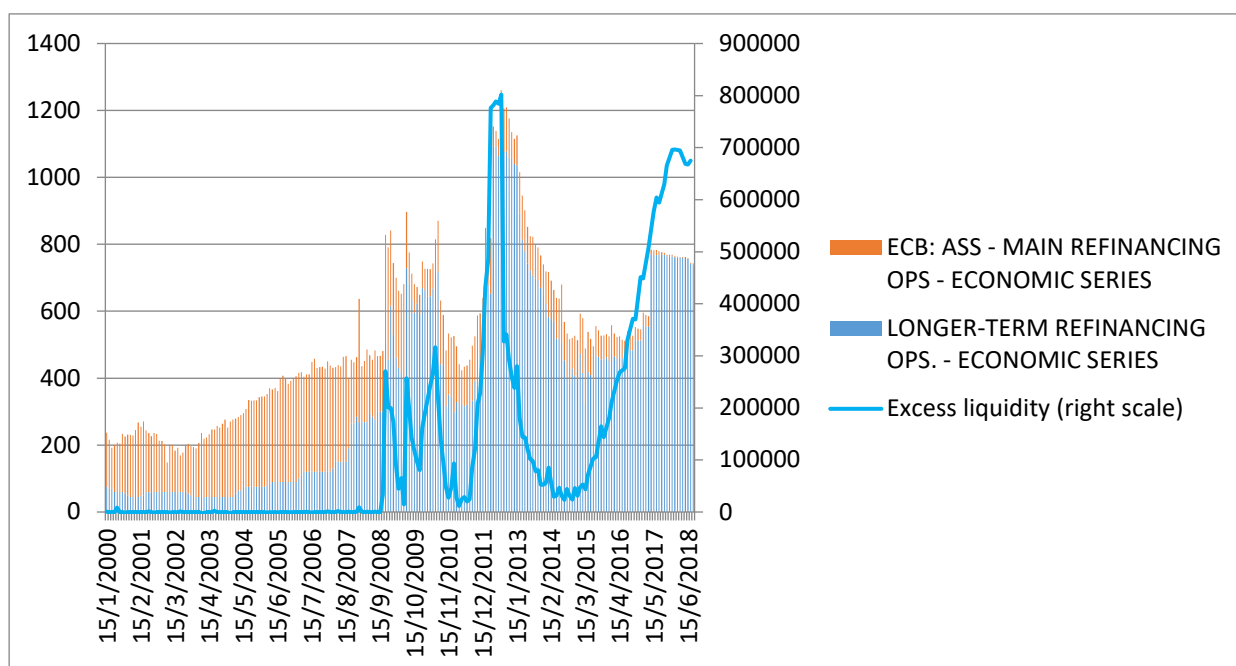
Source: Authors' calculations based on Datastream/ECB Data Statistical Warehouse data

Banks' higher demand for central bank liquidity, the ensuing change in the auction procedure in the Eurosystem refinancing operations to fixed rate full allotment, and the stretch of LTROs to longer-maturities, all help explain the rise in excess liquidity between 2008 and 2012 (Baldo et al., 2017). As parts of the first 3-year LTROs being repaid, excess liquidity has been on a declining trend for the period 2013-14. With the APP, the central bank has supplied significant amounts of liquidity into the financial system starting from 2015, resulting yet into a new upswing in excess liquidity.

In the case of the APP, however, excess liquidity is essentially supply-driven rather than demand-driven. Consequently, the growth in excess liquidity since 2015 should not be seen as a reflection of stress in the banking sector with high demand in the Eurosystem refinancing operations, as it was during the financial and sovereign debt crises (Baldo et al., 2017).

In other words, the higher level of excess liquidity observed as of 2015 is largely the result of the Eurosystem's own purchases instead of the participation in the refinancing operations by banks (see also Baldo et al. 2017).

Figure 8: Take-up in refinancing operations vs excess liquidity



Source: Authors' calculations based on Datastream/ECB Data Statistical Warehouse data.

2.1. What are the Eurosystem risks associated with the current levels of 'excess liquidity' holding?

As the ECB will normalize monetary policy, excess liquidity should come down to lower levels. Given the more recent "balance sheet" policies (Borio and Disyatat, 2010) as the result of non-standard monetary policy measures, the Eurosystem's exposure to financial risk as a whole has increased, as many have underlined (see, e.g. Nagel, 2012; Donnery et al, 2017). In particular, this is related to the more direct credit risk, owing to the expansion of the balance sheet, including, at times, the relaxation of collateral requirements for collateralized monetary policy credit operations. The latter risk was – particularly at the height of the sovereign debt crisis – managed by the *ad-hoc* risk mitigation measures (such as haircuts) implemented by the Eurosystem (see Monti and Macchiarelli, 2017). Secondly, and possibly more importantly, the risk related to the expected interest rates' hikes, pointing to a potential widening spread between rising cost of funds on the liabilities and low return on assets. As the economy will improve and non-standard measures will wade out (meaning the deposit facility rate and the main refinancing rate will have to increase over time), the Eurosystem may find itself with a potential assets-liabilities mismatch. This will be because of different sensitivity of the two sides of the Eurosystem's balance sheet to rising policy rates (see Donnery et al., 2017).⁵

2.2. Excess liquidity holdings and banks' risk

The distribution of the observed excess liquidity has been rather stable, with concentration in specific euro area countries and in a small, and rather stable, group of financial institutions (Baldo et al., 2017). Despite this, the relevance of the individual drivers behind excess liquidity has changed, the assessment of which requires looking at bank level data. Consistent with the discussion presented

⁵ The latter possibly resulting in the cost of associated liabilities being greater than the revenue from the purchased assets (for a broader discussion, including risk-mitigation see Donnery et al, 2017; Goodhart, 2017).

previously, the empirical evidence equally suggests that risk aversion has played a less important part in explaining the liquidity concentration observed since 2013/4 than it did at the time of “flight-to-safety” behaviour during the sovereign debt crisis. Still, the concentration of excess liquidity can be observed in some “core” countries such as Germany, France, the Netherlands, Finland and Luxembourg, and this pattern does not seem to have reversed much (see Baldo et al., 2017).⁶

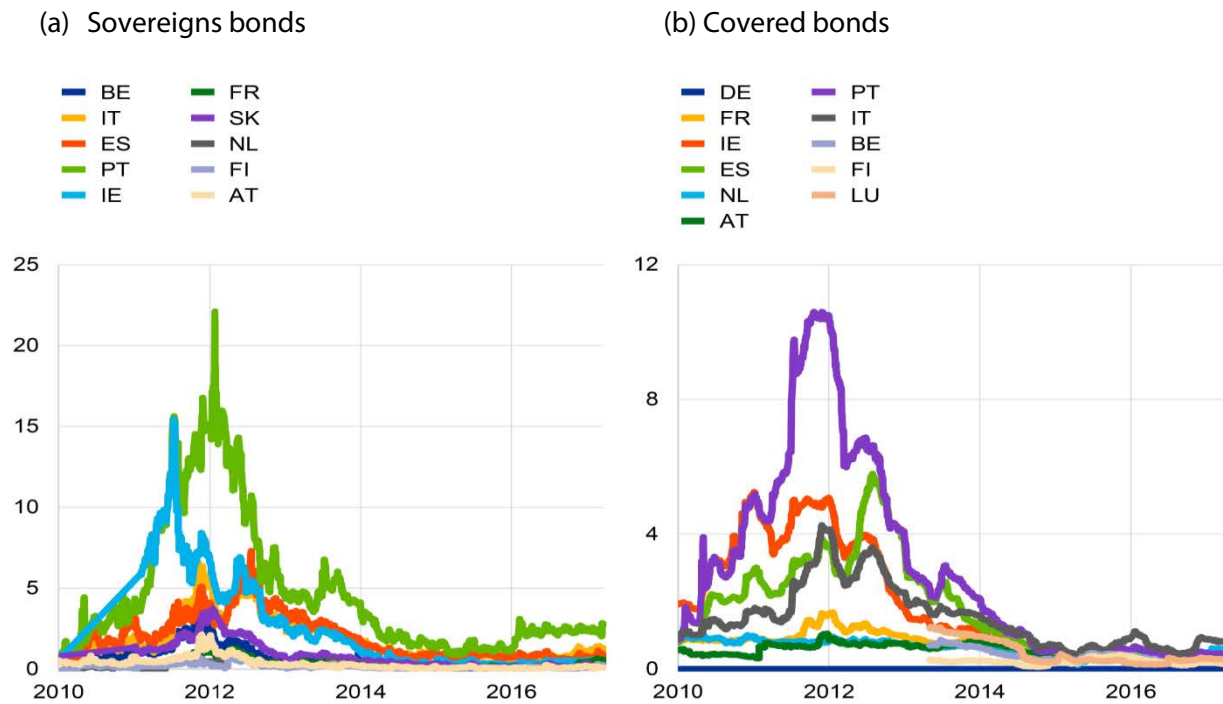
Figure 9 illustrates how risk spreads have come down for both government and covered bonds. According to the ECB Bank Lending Survey, banks’ risk aversion has indeed declined and played a much smaller role ever since; still, banks report that their decisions remain subject to internal risk limits and new regulations.

The distribution of excess liquidity currently is thus the result of at least three factors (Baldo et al. 2017): the interaction of remaining risk aversion, the investment opportunities created by yield differences across the euro area (versus the negative rate on the deposit facility) and the incentives created by new regulations. All together, these leave liquidity in much the same countries as before, with banks in lower-rated countries finding more attractive to invest liquidity in home bonds or assets with higher yields (foreign assets and repos against domestic collateral) rather than deposit them with the Eurosystem. At the same time, banks in higher-rated countries or institutions anyway facing stricter internal risk limits often found excess liquidity holdings more attractive, in the light of the low yields on own domestic bonds and repos.

Since the start of the APP, the concentration of excess liquidity at institution level has decreased slightly with the composition of the top liquidity holders’ institution shifting slowly. In particular, the top liquidity holders which held more than 80% of excess liquidity in 2012 accounted for slightly more than 50% of the aggregate amount in 2016 (Baldo et al., 2017). Recent empirical evidence suggests that bank business models play a certain role also (Demiarlp et al., 2017).

⁶ The same authors also highlight how the location of central securities depositories, securities settlement systems and TARGET2 accounts used by the Eurosystem counterparties has been a more important driver over the period 2015-16.

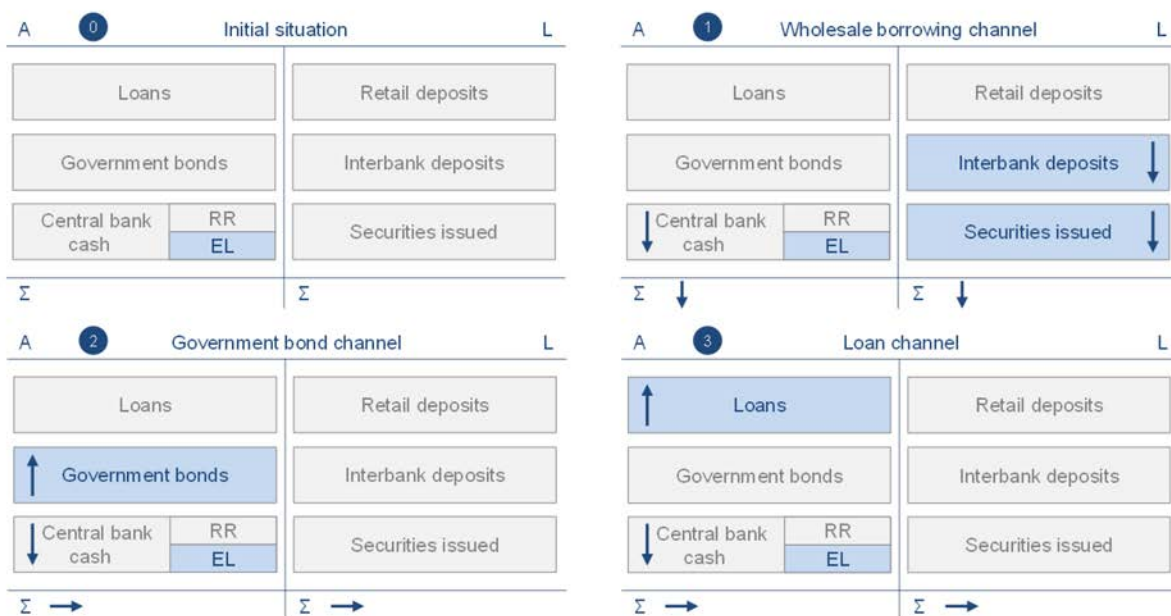
Figure 9: Spreads relative to Germany



Source: Baldo et al. (2017).

Demiarlp et al. (2017) examine this question empirically, by using individual bank data for the euro area, to identify possible adjustments patterns of banks triggered by the introduction of the negative deposit facility rates. They particularly focus on three channels: government bond holdings, bank lending, and wholesale funding. This is summarized in Figure 10.

Figure 10: Possible adjustment channels for banks to reduce their excess liquidity holdings

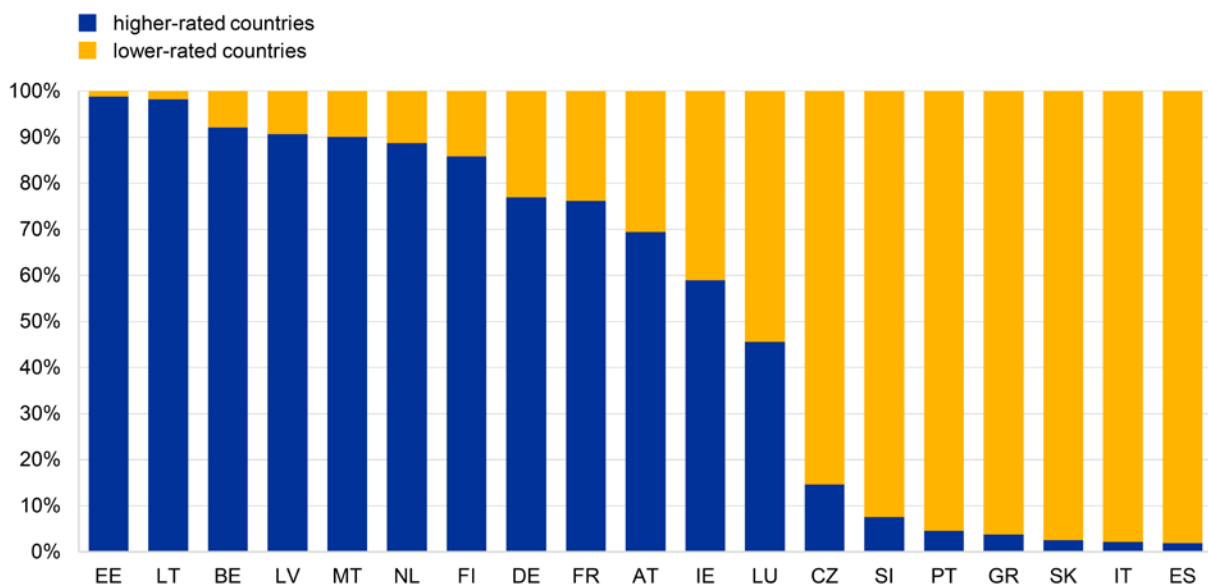


Source: Demiarlp et al. (2017).

On the assets side, adjustments imply banks can increase vault cash holdings or simply buy (sovereign own or foreign) bonds (lower left panel in Figure 8) when faced with excess liquidity. Similarly, banks can try to reduce liquidity overhang by granting more loans (lower right panel), either to households and firms or through loans on the interbank market (Demiralp et al., 2017). Adjustments on its liability side would be another option (which is not considered here).

Under negative deposit facility rate, the incentive of banks to expand their supply of loans is strengthened by the fact that additional reserves created by the central bank entail a cost. Thus, while the negative deposit facility might weaken the interest rate channel by reducing the ability of banks to pass this cost to retail depositors, the empirical evidence suggests it amplifies the lending channel and exacerbates the home-bias in banks' asset holding, in particular for banks with a high share of retail deposit funding (Demiralp et al., 2017).⁷

Figure 11: Shares invested in bonds issued by lower-rated sovereigns per investor country (mid-2014 to 2016 average)



Source: Baldo et al. (2017) based on ECB Securities Holdings Statistics.

The exchange of very safe assets such as central bank reserves for riskier assets such as loans or bonds can also be seen through the lens of increased risk-appetite or risk tolerance (see, more recently, Dell’Ariccia et al., 2016). While it is not possible to put forward a unique benchmark distribution for excess liquidity, the high concentration of the actual distribution raises questions about the consequences for risk taking by the banking sector, especially against the backdrop of a successful boosting in the banking credit activity: from 0% at the beginning of 2014, the annual growth rate of banks to the private sector was standing at around 3% in the first half of 2018.

More generally, the increase in asset prices and collateral values prompted by lower rates and the ultra-accommodative monetary policy can be thought to have increased indeed banks' risk tolerance. Based

⁷ The evidence is indeed that of a shift of excess liquidity from banks with high costs of holding to those with lower costs, as Demiralp et al. (2017) underline, with the share of institutions highly reliant on retail deposit shifting from 73% in June 2012 to 58% in October 2016 (Demiralp et al., 2017)

on feedback from Eurosystem counterparties from the ECB Bank Lending Survey, it seems that a certain level of risk aversion has been persisting, particularly in some countries, expressed in the form of strict risk management practices. As banks face stricter internal risk limits for the reassignment of excess liquidity they are unable to adjust their balance sheet despite potentially attractive yields. This seems to be the case in higher-rated countries, in particular.

The Securities Holdings Statistics from ECB confirm a search-for-yield argument in lower-rated countries. Figure 11 shows the shares invested in short-term bonds issued for lower- and higher-rated sovereigns per investor country. It suggests that residents of lower-rated countries hold large shares of government bonds from their own sovereign or anyway lower-rated sovereign(s), reinforcing the home-bias argument, despite the higher credit risk of domestic investments.⁸

The empirical findings in Demiralp et al. (2017) suggest that affected banks – particularly those holding the highest retail deposit share and banks relying heavily on wholesale funding – react to negative policy rates by significantly higher acquisitions of non-domestic bonds, by extending more loans to the non-financial private sector and by lowering their levels of wholesale funding. They also note that banks that have more liquid balance sheets, higher leverage ratios and obtain more funding through core deposits typically generate more loans. These results can be seen as suggesting that the negative interest rates may have indeed amplified the APP (also due to negative charges on excess liquidity and increased risk taking) and enhanced the credit channel (see Demiralp et al., 2017).

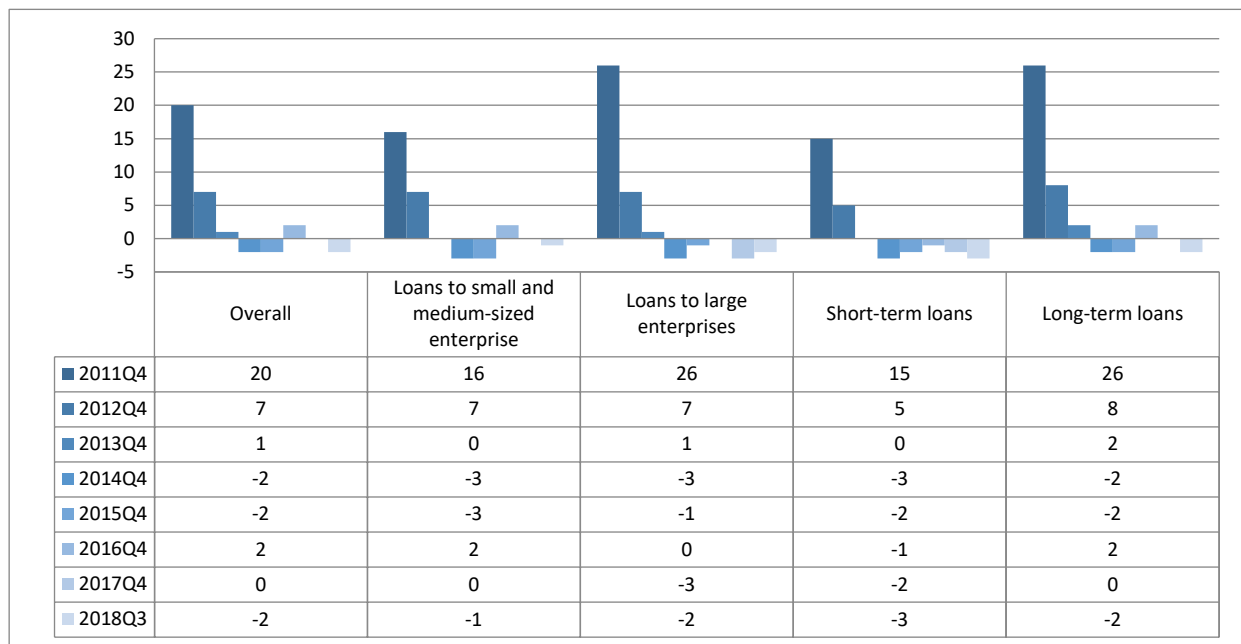
2.2.1. Has banks' risk tolerance changed?

While lending has increased, banks' willingness to lend does not exclusively have to do with the reaction to the amount of money supplied in the context of the Eurosystem non-standard policies; there are other important factors to take into account, such as risk perception and risk tolerance. The evolution of the financial conditions index made by Goldman Sachs/Bloomberg (see Figure in the Annex) is a measure of current financial and credit conditions in the euro area. The latter suggests an overall improvement in credit and financial sentiment in the euro area with a general reduction in market tightness.

This has been mirrored by a progressive relaxation of the lending standards on credit to both households and firms (Figure 12 and 13), after the net tightening between 2011-13 as the result of the adverse combination of a weakening economic outlook and the euro area sovereign debt crisis, together with increased market scrutiny of bank solvency risks ever since. Based on the ECB Bank Lending Survey, while risk perceptions contributed to the increase in the net tightening of loans in 2011-13, credit conditions for firms and households started to stabilize and credit standards to relax gradually. Here, the contribution of borrowers' risk to the tightening of bank lending policies decreased further, becoming almost nil (ECB, 2014). Factors related to banks' liquidity and market funding conditions contributed to a small net easing for loans, particularly to non-financial corporations. Credit standards for all loan categories continued to ease in net terms starting since 2014, with changes in credit standards and loan demand continuing to support a recovery in loan growth throughout 2015 and 2016, particularly for enterprises. As discussed in the previous section, banks' cost of funds and balance sheet constraints certainly contributed further to an easing of credit standards, driven in particular by banks' liquidity positions, and under the push of reduced banks' risk perception in the light of non-conventional ECB policies compressing risk premia.

⁸ As underlined by Baldo et al. (2017), substitution between government bond holdings and excess liquidity is facilitated by the new regulatory initiatives which recognize both types of assets are treated as Level 1 high-quality liquid assets (HQLA) for the fulfilment of the liquidity coverage ratio.

Figure 12: Bank's credit standards as applied to the approval of loans or credit lines to enterprises (Diffusion Index)



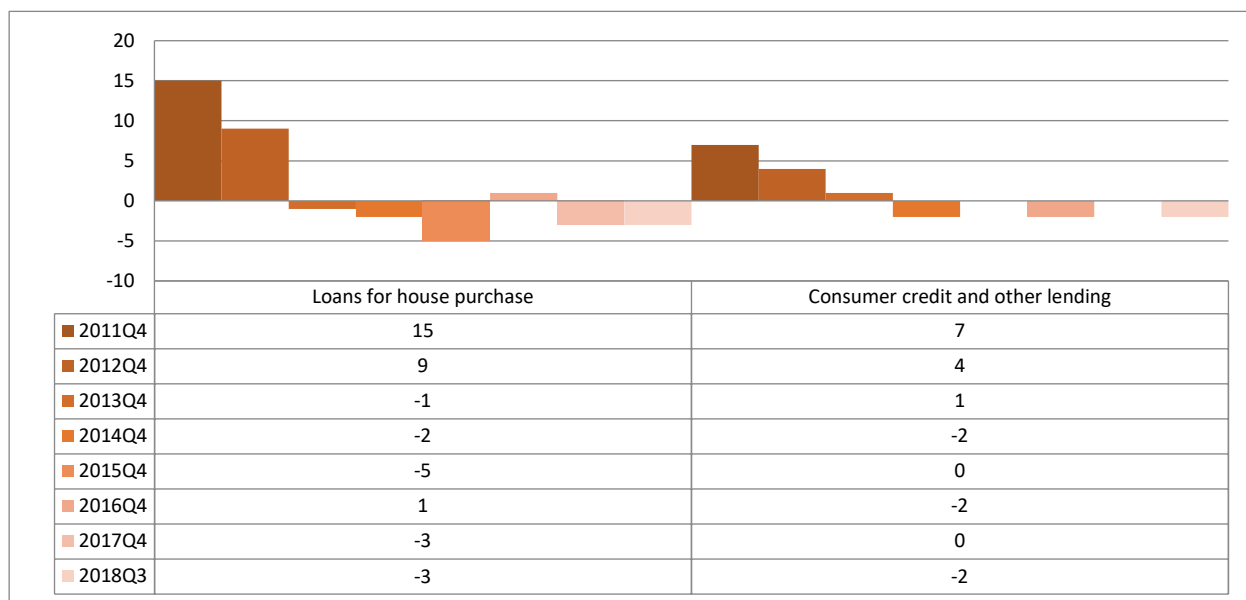
Source: ECB Bank Lending Survey 2011 through to 2018.

Note: The results refer to Q4 for each year, with the exception for 2018 for which the results refer to Q2. ECB BLS Question: "Over the past three months, how have your bank's credit standards as applied to the approval of loans or credit lines to enterprises changed?" See next Figure's note.

However, competition remained the main factor driving the easing in banks' credit standards on loans to enterprises, with the reduction in margins on average loans remains the main driver of the easing across all categories of lending. By contrast, cost of funds and balance sheet constraints and banks' risk tolerance remained broadly neutral as contributing factors.

In 2016, credit standards for loans to enterprises tightened somewhat in net terms, driven mainly by developments in some specific countries, such as the Netherlands (ECB, 2016). In 2016, banks' lower willingness to tolerate risk was the main factor contributing to the slight net tightening of credit standards on loans to enterprises in 2016. In 2017, loan growth continued to be supported by increasing demand across all loan categories, while credit standards for loans to enterprises started to broadly stabilise and credit standards on consumer credit and other lending to households continued to ease. The net easing of banks' overall terms and conditions on new loans continued across all loan categories, mainly driven by a further narrowing of margins (defined as the spread over relevant market reference rates) on average loans (see ECB, 2016; 2017).

Figure 13: Bank’s credit standards as applied to the approval of loans to households (Diffusion Index)



Source: ECB Bank Lending Survey 2011 through to 2018.

Note: The results refer to Q4 for each year, with the exception for 2018 for which the results refer to Q2. ECB BLS Question: “Over the past three months, how have your bank’s credit standards as applied to the approval of loans to households changed?” The possible answer in the survey are “tightened considerably” (++) “tightened somewhat” (+), remained basically unchanged (=), “eased somewhat” (-) and “eased considerably” (--). The diffusion index is defined as the net percentage weighted according to the intensity of the response, giving lenders who have answered “considerably” a weight twice as high (score of 1) as lenders having answered “somewhat” (score of 0.5).

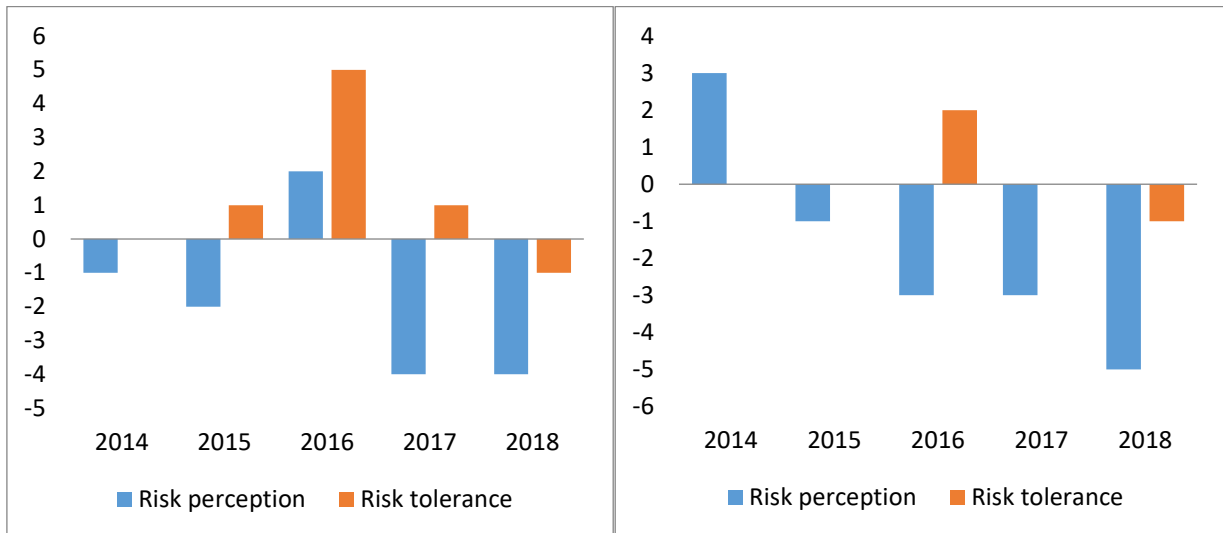
Credit standards for loans to enterprises, as well as to households for house purchase and consumer credit, eased in net terms in the second quarter of 2018 (the last data point available), according to the 2018 Bank Lending Survey. Across the three segments, competitive pressure and risk perceptions had an easing impact on credit standards, while banks’ cost of funds and balance sheet constraints and their risk tolerance were broadly neutral. This means that albeit risk perceptions have eased, banks, on average in the euro area, are not taking any more risks. Regarding the impact of ongoing regulatory or supervisory changes, the banks surveyed by the ECB reported a further strengthening of their capital positions and a reduction in risk-weighted assets predominantly related to riskier loans. This means that easing of financial conditions and regulation seem to be going hand in hand.

Across the largest euro area countries, overall terms and conditions for new loans or credit lines to enterprises eased in all countries. This was mainly due to a further narrowing of margins on average loans. Margins on riskier loans narrowed in net terms in France and Germany, while they tightened in Spain and remained unchanged in the other large countries (ECB, 2018).

Net demand continued to increase across all loan categories in the second quarter of 2018. The net increase in demand for loans to enterprises was driven mainly by the general level of interest rates, inventories and working capital, and M&A activity, as well as a more upbeat sentiment on the macroeconomic outlook (EBA, 2017). The EBA (2017) Risk Assessment Questionnaire (RAQ) further suggests the growth of banks’ core lending business especially for small and medium sized enterprises and corporate lending. Equally, consumer confidence, spending on durable goods and the low general

level of interest rates continued to contribute positively to net demand for consumer credit and other lending to households (ECB, 2017).

Figure 14: Euro area bank’s risk perception vs. risk tolerance in the factors contributing to the net tightening of credit standards for loans to enterprises (left) and mortgages (right)



Source: ECB Bank Lending Survey 2011 through to 2018.

Note: The results refer to Q4 for each year, with the exception for 2018 for which the results refer to Q2. “Risk perceptions” are an unweighted average of “general economic situation and outlook”, “housing market prospects including expected house price developments” and “borrower’s creditworthiness” (the latter from the first quarter of 2015 onwards); Risk tolerance” was introduced in the first quarter of 2015.

In this context, it is worth mentioning banks’ NPL ratios affected their lending policies through their impact on risk perceptions, risk tolerance and the cost of balance sheets’ clean-up (EBA, 2017), with a marginal tightening in 2018, as evidenced in Figure 14. This seems to be evident particularly in ‘peripheral’ countries, where high NPL ratios on banks portfolio seems to have hindered banks’ access to the interbank market (Gabrieli and Labonne, 2018). As underlined by EBA (2017), any deleveraging would mainly stem from regulatory pressure, including a progressive reduction of the outstanding NPLs, capital level constraints and reduced demand for credit owing to a large degree of private non-financial sector indebtedness preventing further borrowing.

3. CONCLUSIONS

When the ECB cut the deposit progressively into negative territory, it became costly for banks to hold deposits at the ECB. Banks therefore minimised this charge by reducing their excess liquidity holdings through active portfolio rebalancing and balance sheet adjustments, exchanging very safe assets such as central bank reserves for riskier assets such as loans or bonds.

This amplified the effect of the bank-lending channel, which, in turn, exacerbated the home-bias in banks' assets holding. According ECB data, this was particularly the case for banks with a high share of retail deposit funding and/or located in lower-rated countries.

Data suggest that banks' liquidity holdings is the result of at least three factors: the interaction of remaining risk aversion, the investment opportunities created by yield differences across the euro area (versus the negative rate on the deposit facility) and the incentives created by new regulations.

All together, these has left liquidity in much the same countries as before, with banks in lower-rated countries finding more attractive to invest liquidity in home bonds or assets with higher yields (foreign assets and repos against domestic collateral), while banks in higher-rated countries often found excess liquidity holdings more attractive, in the light of the low yields on own domestic bonds and repos.

Banks' profit margins differ widely between 'core' and peripheral' euro area countries and there is still evidence of interbank market fragmentation. High non-performing loan (NPL) ratios in the 'periphery' still hinder banks' access to the interbank market. Banks' risk aversion has declined since 2014, as the ECB ultra-accommodative monetary policy has compressed risk premia. Still, banks report that their decisions remain subject to internal risk limits and new regulations.

There is evidence that the low general level of interest rates is driving net demand for consumer credit and household lending, in turn supporting consumer confidence, spending and, ultimately, growth. However, banks' risk appetite (risk-taking) remains muted even though credit standards have clearly loosened.

QUESTIONS

Under the APP, the Eurosystem NCBs have effectively fixed the interest income on some of the bonds purchased at low or negative rates. As monetary policy will normalise, there may be potential risks related to a Eurosystem asset-liability mismatch, in particular, as the costs of the associated liabilities may result greater than the income from the purchased assets, with the deposit facility rate and the MRO rate increasing over time. In other words, in the context of rising policy rates, the potential for a widening interest rate gap may result in the cost of associated liabilities being greater than the revenue from purchased assets. Does the ECB see any risks in this respect?

The interaction of remaining risk aversion, the investment opportunities created by yield differences across the euro area versus the current negative rate on the deposit facility, and the incentives created by new regulations leave excess liquidity in much the same countries as before, with banks in lower-rated countries finding more attractive to invest liquidity in home bonds or assets with higher yields, exacerbating the home bias. Is the ECB considering the distribution (as opposed to the volume) of excess liquidity and the extent to which this may contribute to the concentration of vulnerabilities and/or risk-taking in some countries?

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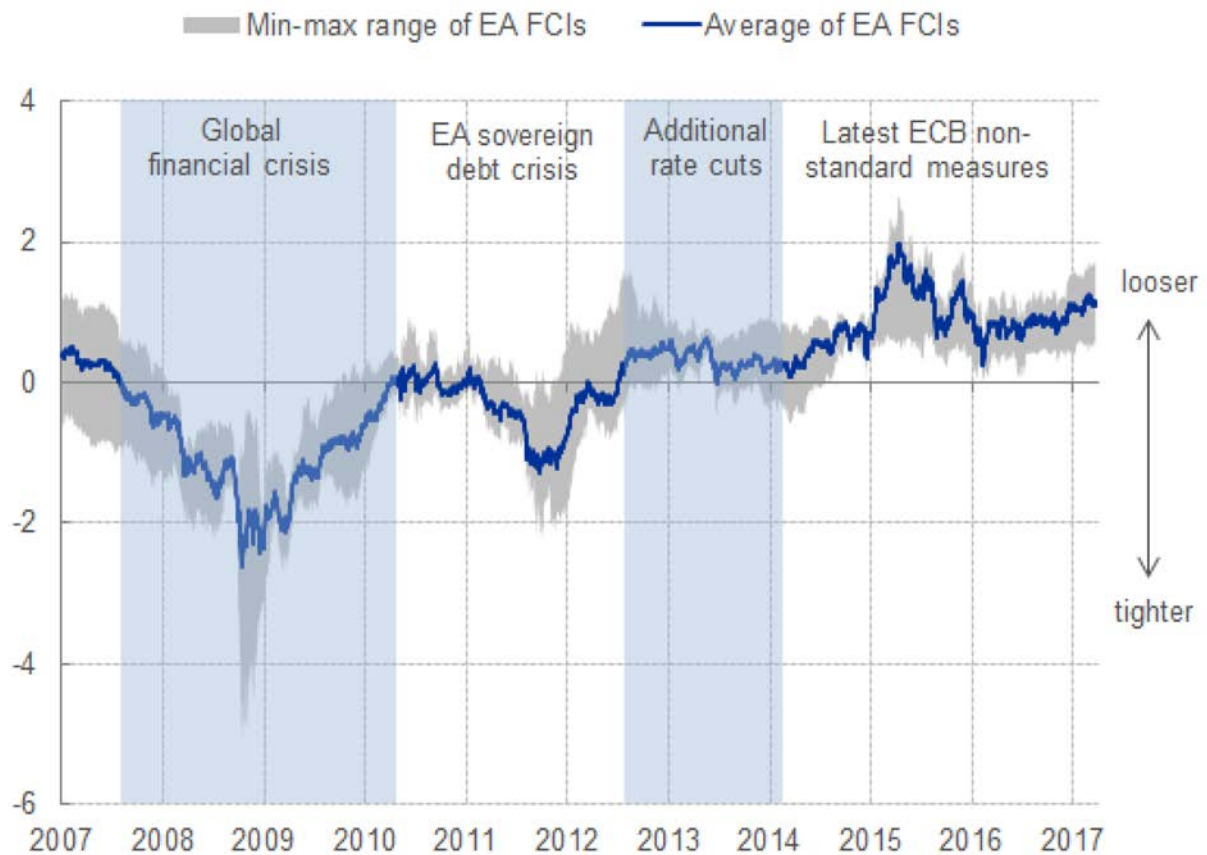
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ANNEX

Figure 15: Financial Conditions Index in the euro area



Source: Bloomberg/Goldman Sachs.

Note: The evolution of financial conditions indexes made by Goldman Sachs/Bloomberg is a measure of the number of standard deviations (z-score) the current financial conditions are above or below the average index value for the period 2007 to 2017 in the euro area. The index is calculated using yield spreads and indices from the Equity, Bond and Money Markets. Because this index represents a number of standard deviations, its values can be positive or negative, where a positive (negative) number reflects looser (tighter) financial and credit conditions and vice versa (i.e. a value of -1, for instance, would mean that the Financial Conditions Index is one standard deviation below the average value for the period under consideration).

With the Asset Purchase Program, the European Central Bank has supplied significant amounts of liquidity into the financial system starting from 2015, resulting yet into a new upswing in excess liquidity. The expanded asset purchase programme (APP) program broadly coincided with further cuts in the ECB's deposit facility rate, which currently stands at -0.4%. Against this background, this note assesses the ECB policy of negative rate on the deposit facility and discusses the associated risks in the context of an excess liquidity overhang for the euro area, including risk-appetite for banks.

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