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(Occasional Papers)

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# A TWO-TIER SYSTEM FOR REMUNERATING BANKS' EXCESS LIQUIDITY IN THE EURO AREA: AIMS AND POSSIBLE SIDE EFFECTS

by Alessandro Secchi\*

## Abstract

This note focuses on a two-tier excess reserve remuneration system, a measure recently introduced by the ECB Governing Council that aims at supporting the bank-based transmission of monetary policy by exempting part of banks' excess reserves from the negative remuneration resulting from the current application of the deposit facility rate. The analysis shows how this tool helps to preserve the positive contribution of negative rates to the accommodative stance of monetary policy, although a careful calibration is necessary to avoid unwarranted effects on euro short-term rates. The initial experience with the two-tier excess reserve remuneration system has been positive so far: its introduction has taken place without any major tensions in money market rates.

**JEL Classification:** E42, E43, E52, E58.

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\* Bank of Italy, Economic Outlook and Monetary Policy Directorate.



## 1. Introduction\*

This note analyses the functioning and first effects of a two-tier excess reserve remuneration system recently adopted by the Governing Council of the European Central Bank (ECB) to reduce the risks of the negative interest rate policy for the bank-based monetary transmission channel.

It first describes the traditional ECB liquidity management under a “corridor” system, the issues that emerged with the eruption of the global financial crisis and the *de facto* transition to a “floor” regime with the introduction of the Asset Purchase Programme (Section 1). It then focuses on the objective, implementation and possible side effects of a two-tier excess reserve remuneration system (Section 2). It finally provides some evidence on the first consequences of the introduction of this new monetary measure in the euro area (Section 3).

## 2. Liquidity management of the ECB: from a “corridor” to a “floor” system

In normal times, central banks conduct monetary policy solely by steering official interest rates. Their liquidity management is a mechanical exercise aimed exclusively at providing credit institutions with the amount of reserves necessary to satisfy the liquidity needs of the system, a prerequisite for the implementation of the desired level of short-term interest rates. The monetary impulse is then transmitted, through different channels, to the whole term structure, to all other financial markets and, eventually, to economic activity and inflation.

This is also the approach adopted by the ECB before the global financial crisis. Open market operations, one of the elements of its operational framework, were used to keep liquidity supply in line with the needs of the system and, in turn, short-term interest rates aligned to the key official rate, namely the rate applied on the main refinancing operations (MRO rate).<sup>1</sup> Liquidity needs include banks’ reserve holdings plus other demand factors, which encompass components such as banknotes in circulation.<sup>2</sup> The operational framework of the ECB also includes two standing facilities that can be used by banks on their own initiative to borrow

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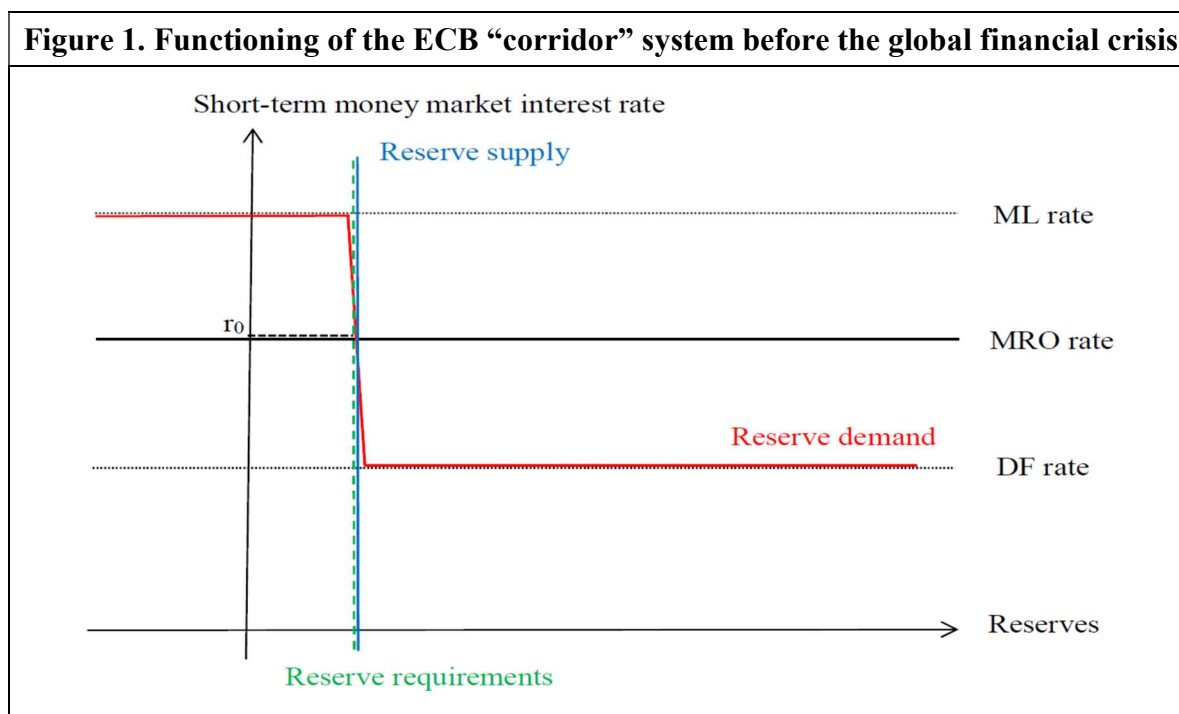
<sup>1</sup> Before the global financial crisis monetary policy implementation was almost exclusively based on three types of open market operations. First, the main refinancing operations, which are regular liquidity-providing transactions conducted by the Eurosystem with a frequency and maturity of one week. Second, the longer-term refinancing operations, which are liquidity-providing transactions with a longer maturity than the main refinancing operations and, finally, the fine-tuning operations, which are executed on an ad hoc basis to manage the liquidity situation in the system.

<sup>2</sup> For further information, see ECB (2004).

(marginal lending facility, ML) or to deposit overnight funds with the Eurosystem (deposit facility, DF). The interest rates applied on these two facilities (ML rate and DF rate) define the so called “corridor”, which is intended to limit possible daily oscillations of short-term rates in case of shocks to liquidity demand.

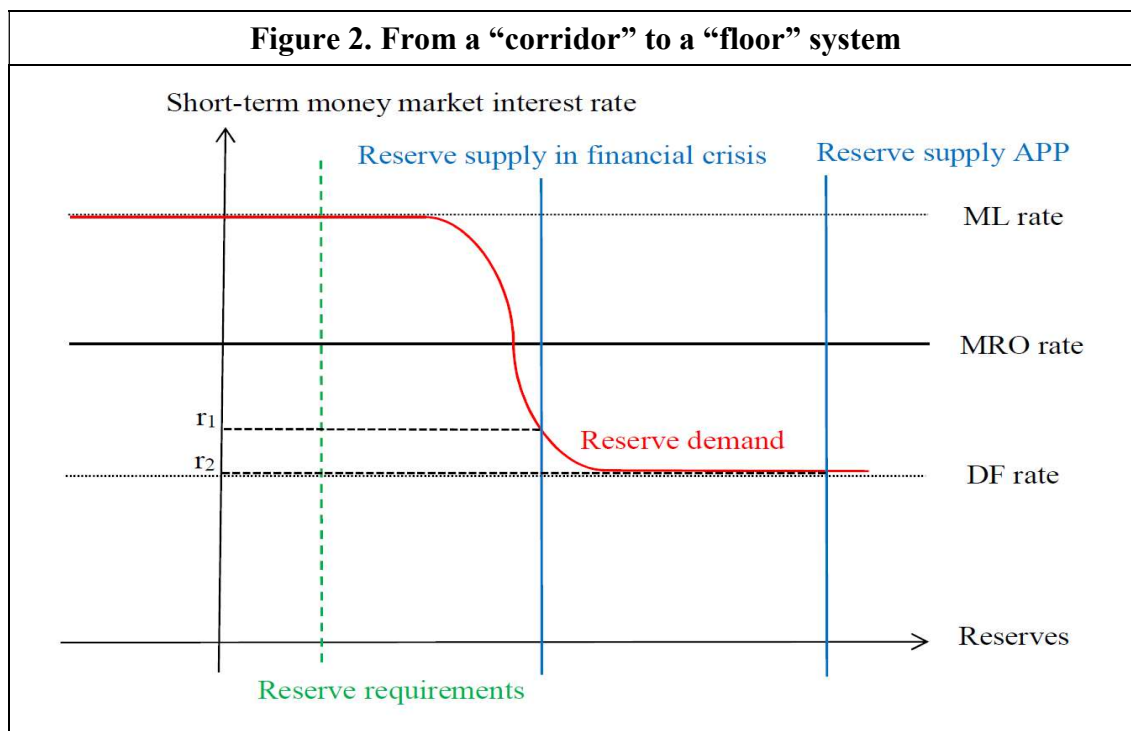
This framework is depicted in Figure 1 where, for simplicity and without loss of generality, we assume that liquidity demand is solely driven by banks’ needs (we will maintain this assumption also in the rest of the paper). In the figure, the equilibrium short-term rate  $r_0$  is determined by the intersection of the demand for liquidity (red line) and the supply of reserves (vertical solid blue line). The demand for liquidity is a function of the short-term market rate: arbitrage considerations imply that its slope is flat (demand is perfectly elastic) when the market rate is either at the floor (DF rate) or at the ceiling (ML rate) of the corridor, while it tends to be steep (demand is less elastic) for interest rates within the corridor.

In the “normal” interbank market conditions that prevailed until the eruption of the global financial crisis, any positive gap between liquidity supply and reserve requirements (blue vertical line moving to the right) induced downward pressures on money market rates towards the DF rate, the floor of the corridor. On the contrary, any negative gap between liquidity supply and reserve requirements (vertical solid blue line moving to the left) implied an upward pressure on money market rates towards the ML rate, the ceiling of the corridor.





With the eruption of the global financial crisis, precautionary motives pushed banks' liquidity demand well above the reserve requirements (Figure 2; the red line shifted to the right of the vertical dashed green line). Furthermore, their liquidity needs became more uncertain and volatile (uncertainty increased the elasticity of the reserve demand schedule or, to put it differently, the slope of the red line within the corridor became flatter).<sup>3</sup>



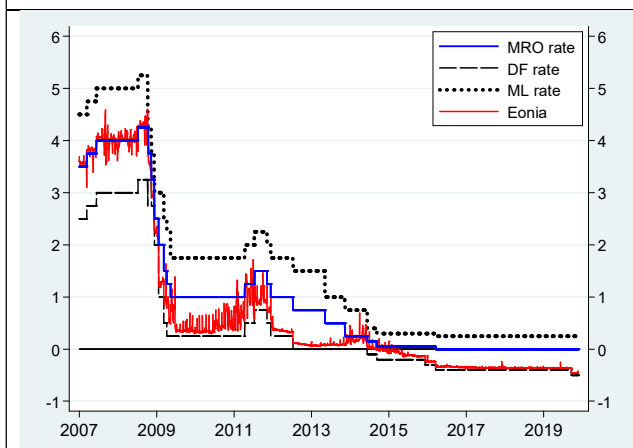
To avoid an unwarranted rise in money market rates, the Governing Council of the ECB extended the amount of reserves offered at its open market operations.<sup>4</sup> As a consequence, short-term money market rates moved towards the lower part of the corridor ( $r_1$  in Figure 2); they however continued to be erratic, oscillating between the DF rate and the MRO rate, due to the volatility in banks' liquidity needs (Figures 3 and 4). Short-term interest rates remained in the lower part of the corridor also during the sovereign debt crisis when their volatility decreased hand-in-hand with the sizeable surge in excess liquidity mainly associated with banks' conspicuous recourse to the 3-year refinancing operations settled in late 2011 and early 2012.<sup>5</sup>

<sup>3</sup> Cecioni, Ferrero and Secchi (2018) provide a description of the effects of the global financial crisis on banks' liquidity demand in the euro area and the United States. Whitesell (2006) evaluates from a theoretical perspective competing frameworks for monetary policy implementation and the impact of an increase in banks' uncertainty about their future liquidity needs on current liquidity demand.

<sup>4</sup> In late 2008 the ECB decided to fully accommodate banks' liquidity demand at main refinancing operations with a fixed-rate full-allotment procedure.

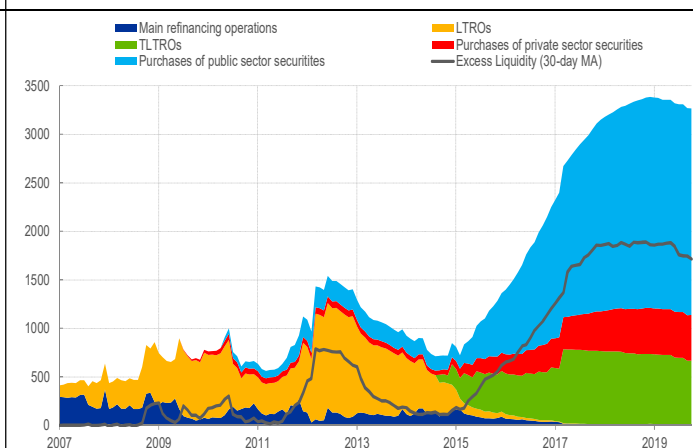
<sup>5</sup> Excess liquidity is defined as the sum of reserves held by banks in their current accounts with the Eurosystem in excess of the reserve requirements plus their recourse to the deposit facility.

**Figure 3. ECB official interest rates and short-term money market rate**  
(per cent; daily data)



Source: ECB. Notes: Eonia is a measure of the cost of overnight unsecured interbank lending transactions in the euro area.

**Figure 4. Eurosystem consolidated balance sheet: monetary policy assets**  
(€ billion)



Source: Cœuré (2019).

During 2013-14 the excess liquidity demanded by banks at refinancing operations gradually decreased as ECB monetary measures, European institutional reforms and progress in fiscal consolidation at the national level helped to ease financial tensions. However, in the same period the prolonged weakness in euro-area aggregate demand started to exert a growing downward pressure on consumer prices. To counter the worsening of the economic outlook and support prices, in 2014 the ECB adopted a series of unconventional measures, including the decision to bring for the first time the DF rate into negative territory (negative interest rate policy, NIRP; Neri and Siviero, 2018).<sup>6</sup>

Amid increasing risks of deflation, in early 2015 the ECB also decided to launch a sizeable Asset Purchase Programme (APP) that in the following years gradually raised excess reserves to unprecedented levels (Figure 4). Since then, the abundant supply-driven amount of funds has kept short-term interest rates in line with the DF rate ( $r_2$  in Figure 2).<sup>7</sup> The operational framework of the ECB has thus *de facto* moved from a “corridor” system, in which the MRO rate provided the crucial signal of the monetary stance, to a “floor” system where the DF rate becomes the key rate to signal the orientation of monetary policy, together with a series of other unconventional measures.

<sup>6</sup> To guarantee the full transmission of this decision to market interest rates the ECB decided to apply the negative DF rate also to average reserve holdings in excess of the minimum reserve requirements, which are normally remunerated at 0.0 per cent.

<sup>7</sup> The preservation of a sizeable amount of excess liquidity has also reflected the adoption of the reinvestment policy in December 2015. Since then the ECB reinvest the principal payments on the securities purchased under the APP as they mature. The ECB has announced that this policy will remain in place for as long as necessary.

The measures adopted in 2014-15, which were recalibrated in the following years in line with the evolution of the economic and inflation outlook, were successful in offsetting the deflation risks and in supporting economic activity. This allowed the ECB to start a gradual process of monetary normalization in the second half of 2018.

However, signs of economic slowdown and weakening inflation resumed intensifying in 2019 as geopolitical tensions, including those relating to trade tariffs, and the sharp decline in international trade progressively weighed on firms' confidence, investment and industrial production. To counter the significant risk that the economic slowdown and the low level of inflation could translate into a permanent reduction in inflation expectations or a re-emergence of the threat of deflation, in September 2019 the ECB introduced a very broad set of expansionary measures (Visco, 2019). The package included a cut of the DF rate (by 10 basis points to -0.5 per cent), the restart of net asset purchases within the APP, the relaxation of the terms of the new series of targeted longer-term refinancing operations (announced in June of the same year) and the introduction of a two-tier excess reserve remuneration system.

### **3. A two-tier excess reserve remuneration system: aims and possible side effects**

The available evidence suggests that so far the NIRP has supported actual and expected inflation, economic activity and banks' balance sheets and profits.<sup>8</sup> However, it has been argued that the deeper interest rates fall into negative territory and the longer they stay there, the higher the likelihood that banks' conditions will be negatively affected due to (i) the direct cost of holding excess liquidity and (ii) the squeeze in net interest margins arising from downward rigidities in deposit rates, which limit the scope for funding cost repricing in a negative-interest rate world.<sup>9</sup> Since these factors could impair banks' ability to grant credit, beyond a certain level a reduction in official rates could become counter-productive.

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<sup>8</sup> See, for example, Altavilla, Boucinha and Peydró (2018) and Lane (2019).

<sup>9</sup> See, for example, Brunnermeier and Koby (2016) and Eggertson et al. (2019). As far as the euro area is concerned, Altavilla et al. (2019) show that so far euro-area sound banks have been able to pass negative rates on to their corporate depositors without experiencing a contraction in funding and that the transmission mechanism of monetary policy has not been impaired by the zero lower bound, even though it has worked differently.

The introduction of the two-tier excess reserve remuneration (TTERR) system aims at mitigating this risk.<sup>10</sup> Under this scheme a certain fraction of the liquidity holdings of banks in their current accounts with the central bank in excess of their reserve requirements is exempted from the negative remuneration resulting from the current application of the deposit facility rate.<sup>11</sup> The Governing Council of the ECB has decided that the volume of excess reserve holdings that will be exempted from the deposit facility rate will be equal, for each bank, to 6 times its minimum reserve requirements and that this “exempt tier” of excess liquidity holdings will be remunerated at 0.0 per cent.<sup>12</sup> The Governing Council also announced that both the remuneration rate of the exempted tier and the multiplier can be changed over time.

Under a TTERR system the calibration of the exempted excess reserves plays a crucial role. Its introduction changes the shape of the reserve demand schedule (red line in Figure 5) due to arbitrage considerations. When excess reserves are below the exemption limit, the demand for liquidity becomes perfectly elastic with short-term market rates equal to 0.0 per cent (which is currently also the level of the MRO rate); when they are above that limit, the demand for liquidity becomes perfectly elastic when market rates are equal to the DF rate.

Due to exempted reserves, banks save some costs on their excess liquidity (savings are equal to the grey area in Figure 5). At the same time, the amount of un-exempted reserves, if it is large enough, would still keep short-term money market rates very close to the DF rate.

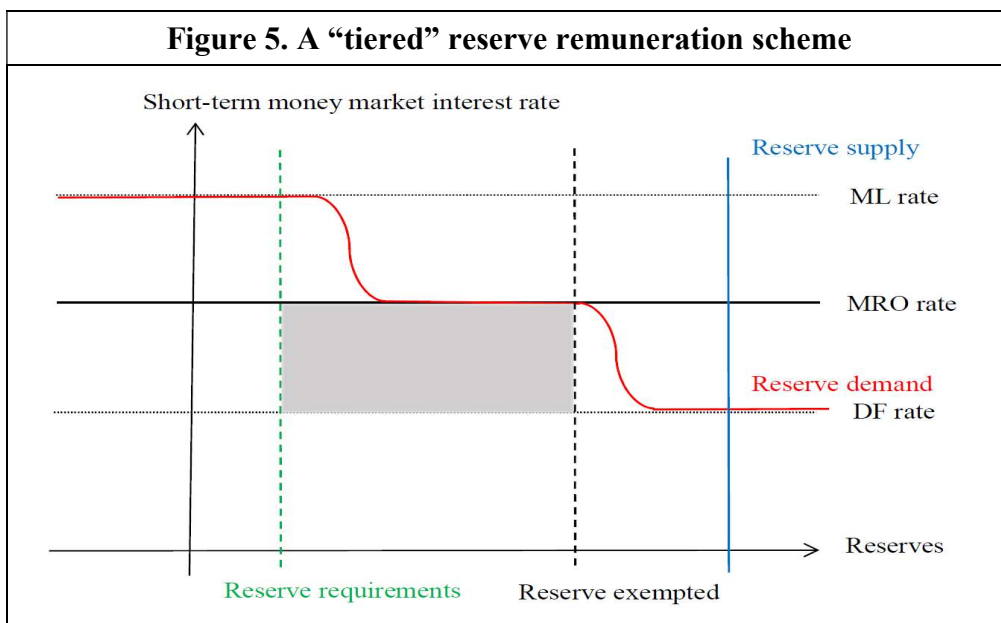
However, the exact shape of the demand for reserves is uncertain. This implies that if the amount of exempted reserves is poorly calibrated (i.e., the amount of exempted reserves is too large: the vertical black dashed line in Figure 5 moves too close to the blue vertical line), a TTERR system could exert unwarranted upward effects on money market rates, pushing them up in the direction of 0.0 per cent (currently equal to the MRO rate). There is therefore a trade-off between the ability to support the bank-based transmission of monetary policy (which would require a large amount of exempted reserves) and the risk of inducing upward pressure on money market rates (which would suggest a more cautious calibration).

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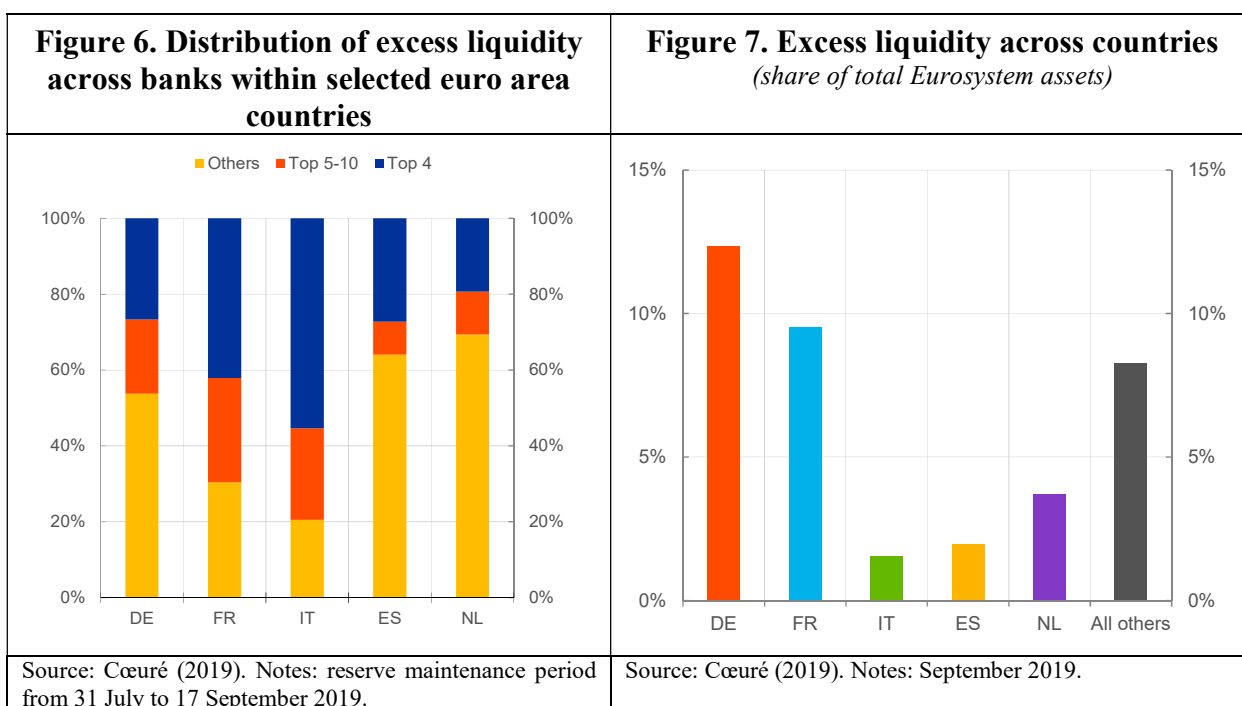
<sup>10</sup> A TTERR has been implemented in several other jurisdictions that have also resorted to NIRP (e.g., Switzerland, Denmark and Japan). For a theoretical analysis on the functioning of the TTERR, see Butros and Witmer (2019).

<sup>11</sup> The TTERR system applies to excess liquidity held in current accounts with the Eurosystem but does not apply to holdings at the deposit facility.

<sup>12</sup> The non-exempt tier of excess liquidity holdings will continue to be remunerated at zero percent or the deposit facility rate, whichever is lower. See ECB (2019).



In the euro area, where excess liquidity is unevenly distributed not only within but also across Member States (Figures 6 and 7) and, after the peaks reached during the sovereign crisis, the possibility of some residual fragmentation in money markets along national borders cannot be excluded, matters may be even more complicated. In addition to the need to carefully calibrate the amount of exempted reserves in the euro area as a whole (as it would be the case in a frictionless economy) and take into account the distribution of excess liquidity across banks, it is also necessary to carefully assess whether there are cross-border segmentations that complicate the perspective.



In the euro area, discrepancies in money market rates between countries exist, due, for example, to the different characteristics and scarcity of the sovereign securities used as collateral in repo operations (Figure 11) that affect arbitrage opportunities. These factors contributed so far to the coexistence of banking systems with low excess reserves (i.e. an amount of excess reserves below the exempted quota under the TTERR system) and banking systems with high excess liquidity (i.e. above their exemption allowances).<sup>13</sup>

The introduction of a TTERR system creates space for trading liquidity in the money market, with an effect on interest rates that would be proportional to the degree of cross-border segmentation.<sup>14</sup> Liquidity could be in principle traded at rates ranging anywhere between -0.5 (DF rate and current level of short-term money market rate) and 0.0 per cent (the interest rate paid on the exempted fraction of excess reserves). Banks with excess liquidity above exemption allowances will be ready to lend on the interbank market at rates higher than the DF rate; those with unused allowances to borrow at rates lower than the zero remuneration rate on the exempted quota.

An ex-ante estimate of the rate at which liquidity could be traded in this environment thus depends on the extent of cross-country market fragmentation. If the latter is low, there should be no significant increase in money market rates or, at most, a temporary one since the flows of reserves from liquidity-rich to liquidity-poor banks should gradually reduce unused exemption allowances.

#### **4. Introduction of a two-tier excess reserve remuneration system in the euro area: first effects**

The ECB TTERR system is in place since 30 October 2019. The amount of exempted excess reserves (equal, for each bank, to 6 times its minimum reserve requirements) has been calibrated by the Governing Council on the basis of the available information and analyses in such a way to avoid the adverse effects on euro short-term money market rates described in the previous section.

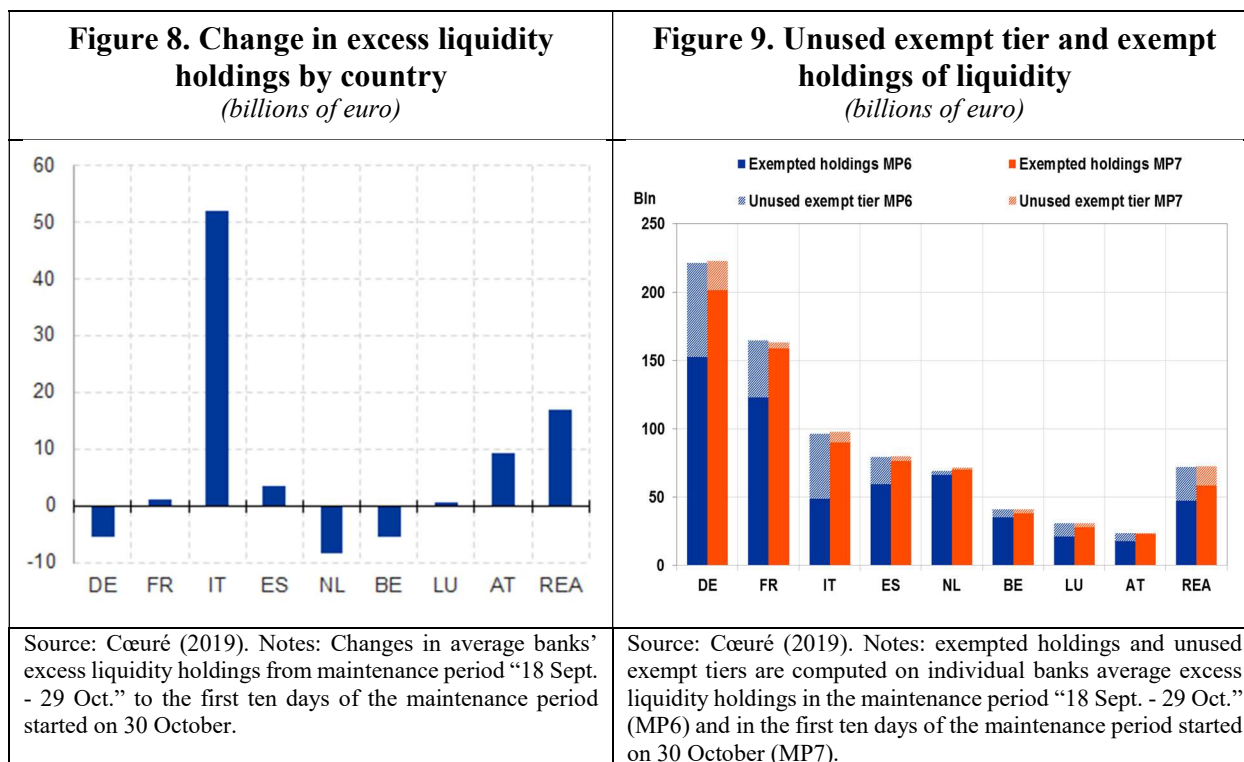
The introduction of the TTERR system has led to an outflow of liquidity from reserve-rich countries – including Germany, the Netherlands and Belgium – towards Member States whose

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<sup>13</sup> See Baldo et al. (2017).

<sup>14</sup> This possibility has been pointed out also by market analysts. See for example Barclays (2019) and Unicredit (2019).

banking system holdings of liquidity were below or close to the amount exempted under the new reserve remuneration scheme (Figure 8).<sup>15</sup> At the same time, the TTERR system has led to a more homogeneous distribution of liquidity within countries, as shown by the strong reduction of the unused exempt tier also in cash-rich countries such as Germany, France and Luxembourg (Figure 9).

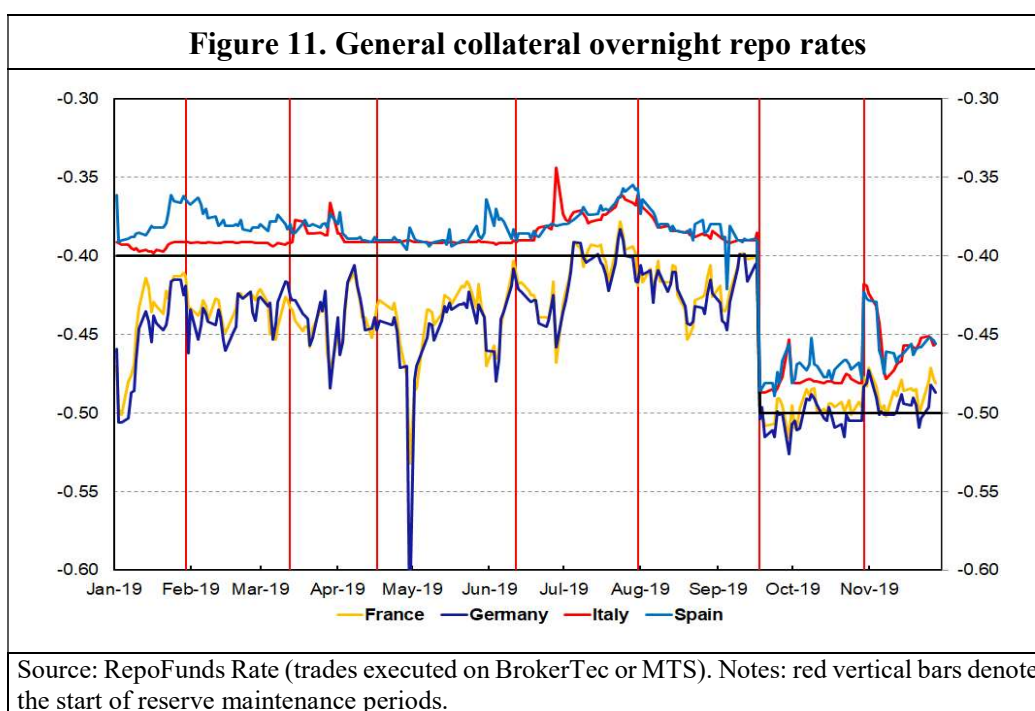
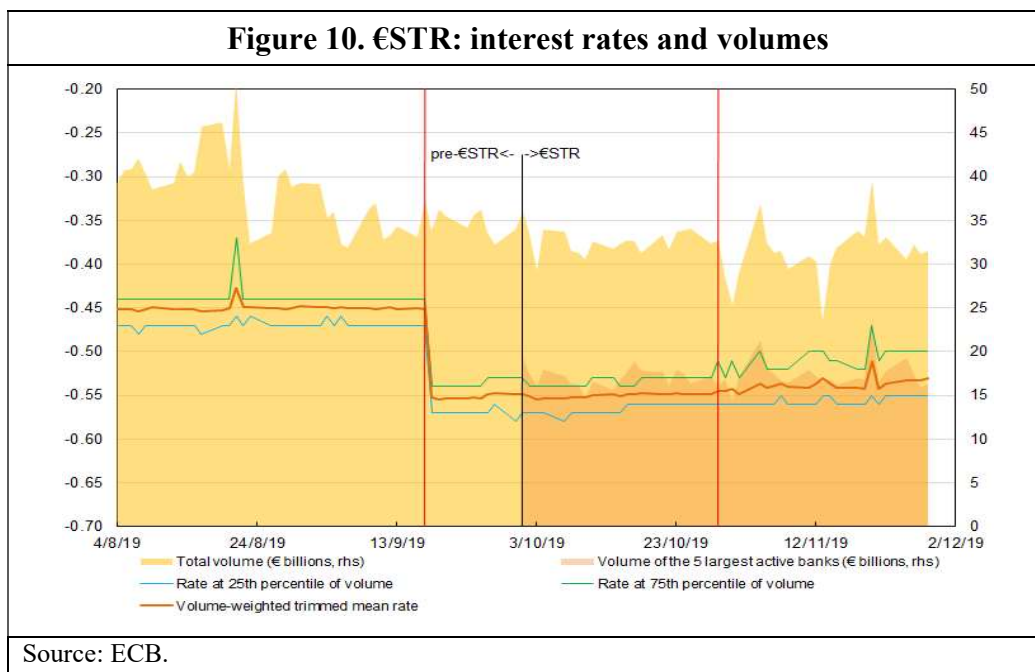


As far as the risk of possible tensions on short-term money market rates is concerned, so far the impact on the unsecured rate €STR has been very limited (Figure 10).<sup>16</sup>

The effects on secured short-term money market interest rate have also been extremely contained (Figure 11). After an initial limited spike on the first days of the introduction of the TTERR system – which affected in particular Italy and Spain, but also France and Germany –, general collateral overnight repo rates have returned to levels broadly in line with those observed in the weeks following the reduction of DF rate to -0.5 per cent.

<sup>15</sup> Cœuré (2019) provides a more detailed analysis of the first effects of the TTRR on liquidity flows and short-term interest rates that also includes an assessment of the implications of the distribution of liquidity across sectors for the smooth functioning of money markets.

<sup>16</sup> €STR in the new index of wholesale euro unsecured overnight borrowing costs of banks located in the euro area. €STR is published by the ECB on each TARGET2 business day based on transactions conducted and settled on the previous TARGET2 business day.



Overall, this evidence suggests that the introduction of the TTERR scheme, on top of reducing the risks for the bank-based monetary transmission channel, has so far supported a more homogeneous distribution of liquidity within and across countries. The redistribution has taken place without any significant tensions in money market rates, an evidence which suggests that the degree of integration of liquidity markets across countries has markedly improved since the end of the sovereign crisis and that no major fragmentations exists at this stage.



## 5. Conclusions

This note has described the traditional ECB's liquidity management under a "corridor" system, the issues that emerged after the eruption of the global financial crisis and the *de facto* transition to a "floor" regime with the large increase in banks' excess liquidity associated with the introduction of the Asset Purchase Programme. Under a "floor" regime the interest rate on the deposit facility becomes the key official interest rate to influence money market rates and, in turn, the whole term structure.

The second part of the analysis has focused on aims, functioning and possible implications of a two-tier excess reserve remuneration system. The negative interest rate policy has so far provided an important contribution to the monetary accommodation in the euro area. Looking forward, the two-tier system, by exempting a certain fraction of banks' excess reserves from the negative remuneration resulting from the current application of the deposit facility rate, aims at countering the risk that negative policy rates if maintained for a prolonged period may impair banks' ability to grant credit.

The calibration of the parameters of a two-tier system is crucial, as it requires finding the right balance between the aim of preserving banks' ability to provide credit, and the risk of inducing upward pressure on money market rates if the amount of un-exempted excess reserves turns out to be too small. The initial evidence suggests that the introduction of a two-tier system and its calibration has so far supported a more homogeneous distribution of liquidity within and across euro-area countries and it has also taken place without tensions in money market rates. In the euro area institutional set-up, this also suggests that the degree of integration between countries' interbank markets has markedly improved since the end of the sovereign crisis and that no major fragmentations exist at this stage.

Of course, a continued and careful assessment of the liquidity conditions remains necessary to ensure that the very accommodative policy stance needed for the sustained convergence of inflation to the ECB's definition of price stability is not jeopardized.

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