

CAHIER D'ÉTUDES WORKING PAPER

N° 92

THE EUROSISTEM, THE BANKING SECTOR AND THE MONEY MARKET

PAUL MERCIER

JULY 2014



BANQUE CENTRALE DU LUXEMBOURG

EUROSISTÈME

The Eurosystem, the banking sector and the money market¹

Paul Mercier

Abstract

Since October 2008, the credit granted by the Eurosystem to the Euro zone banking sector increased in a substantial way, as a result of the implementation of non-conventional measures, in particular the fact that the Eurosystem left to the banks the faculty to determine themselves the quantity of credit that they wished to obtain.

This paper first recalls the foundations of the interbank money market and then analyses the evolution of the “net liquidity needs” of the banking sector. It provides a clarification of the relation between the Eurosystem, the euro zone banking sector and the money market. In particular, it develops arguments against the myth of “idle money parked with the Eurosystem”.

Keywords: monetary policy implementation, central bank, central bank’s balance sheet, money market, liquidity deficit, excess liquidity

¹ This paper should not be reported as representing the views of the BCL or the Eurosystem. The views expressed are those of the author and may not be shared by other research staff or policymakers in the BCL or the Eurosystem.

Table of content

1. Foundations of the money market	11
2. Recourse to the central bank	13
3. “Forced” recourse to the central bank	15
3.1 <i>The demand for banknotes</i>	15
3.2 <i>Reserve requirements</i>	19
3.3 <i>Banknotes and reserves requirements: joint impact</i>	21
4. Distribution of liquidity through the banking sector	22
5. Use of deposit facility	25
5.1 <i>Voluntary injection of liquidity by the central bank</i>	25
5.2 <i>“Excess liquidity” generated by the banking sector</i>	28
6. The case of the Eurosystem	34
6.1 <i>Before 9 August 2007</i>	34
6.2 <i>Effect of the “Full allotment”</i>	40
6.3 <i>Developments in 2012</i>	44
6.4 <i>Volatility of the Deposit Facility</i>	47
6.5 <i>Effect of the deposit facility rate at zero percent</i>	48
7. Conclusions	54
7.1 <i>Absence of link between credit and central bank balance sheet size</i>	54
7.2 <i>The large recourse to the Eurosystem deposit facility is a sign of the malfunctioning money market.</i>	54

The Eurosystem, the banking sector and the money market

Paul Mercier

Résumé - Summary

Depuis octobre 2008, les prêts accordés par l'Eurosystème au secteur bancaire de la zone euro se sont accrus de manière substantielle, passant d'un montant de l'ordre de € 500 milliards à plus de € 1000 milliards au cours de l'année 2012, pour ensuite décroître progressivement. Une telle évolution a été rendue possible par la mise en œuvre de mesures dites « non-conventionnelles », en particulier le fait que l'Eurosystème a laissé aux banques elles-mêmes la faculté de déterminer la quantité de crédit qu'elles souhaitaient obtenir. Depuis le 1^{er} janvier 1999, c'était l'Eurosystème lui-même qui, semaine après semaine, mois après mois, contrôlait avec précision la quantité de crédit qu'il souhaitait accorder aux banques de la zone.

Dans le même temps, au passif du bilan de l'Eurosystème le recours à la facilité de dépôt, très limité jusque là, a lui aussi considérablement augmenté (notamment après deux opérations d'open market à trois ans, les 21 décembre 2011 et 29 février 2012), atteignant plus de € 800 milliards au printemps 2012, contre 0 à 1 milliards avant le début de la crise en août 2007 (la crise dite des « sub-prime »). Cette abondance de fonds déposés auprès des banques centrales de l'Eurosystème a suscité de nombreuses interprétations, dont celle qui voit un lien de causalité entre cet accroissement des dépôts et une stagnation, sinon une réduction des crédits bancaires accordés à l'économie, menant au mythe de la monnaie inutilement parquée auprès de la banque centrale : « the idle money parked with the central bank ».

En réalité l'accroissement des dépôts auprès de l'Eurosystème, corollaire de la mise en œuvre de la politique dite « d'allocation illimitée à taux fixe », est le reflet du rôle grandissant des banques centrales de la zone euro comme intermédiaires entre les acteurs d'un marché monétaire, grippé depuis 2007 et pratiquement inactif après la faillite de Lehman Brothers en septembre 2008.

Pour comprendre ce qui s'est vraiment passé, il convient de remonter aux fondations du marché monétaire, en partant tout d'abord d'un simple modèle à deux banques, puis en généralisant le raisonnement.

Une banque bénéficiant d'un surplus de liquidité (qui, par exemple, vient juste de recevoir un nouveau dépôt) va chercher à l'employer tandis que, symétriquement, une banque faisant face à un déficit de liquidité (qui, par exemple, fait face à un retrait de dépôt) cherchera à le financer. Fondamentalement deux possibilités s'offrent à ces deux banques. Première possibilité, la banque jouissant d'un excès de liquidité dépose celui-ci auprès de la banque centrale tandis que la banque en déficit couvre son déficit en empruntant auprès de cette même banque centrale. Une deuxième possibilité serait que la banque en surplus accorde un prêt sur le marché interbancaire à la banque en déficit. Avant la crise des « sub-prime », ce marché des dépôts interbancaires était très actif et permettait à l'ensemble du secteur bancaire de trouver un emploi pour les excès de liquidité et un financement pour les déficits, les banques cherchant à régler leurs déséquilibres de liquidité entre elles.

Néanmoins l'ensemble du secteur bancaire, collectivement, devait et doit toujours faire face à un **déficit net de liquidité** vis-à-vis de l'Eurosystème : en effet, l'acquisition de billets de banque par les banques (pour compte de leurs clients), ainsi que l'imposition de réserves obligatoires, obligent le secteur bancaire, dans son ensemble, à emprunter auprès des banques centrales (d'autres facteurs dits « autonomes » s'ajoutent encore comme, par exemple, les dépôts des pouvoirs publics auprès des banques centrales ou les portefeuilles de devises détenus par celles-ci). Pour les banques de la zone euro ce besoin net de liquidité, correspondant à la somme des surplus et déficits de liquidités de chacune des quelque 6000 banques de la zone euro, est de l'ordre de € 500 milliards. En d'autres termes, l'ensemble des banques n'a d'autre choix que d'emprunter cette somme auprès des banques centrales. Avant la crise, l'Eurosystème accordait ses crédits, au travers de ses opérations de politique monétaire, pour un montant équivalent au besoin net de liquidité du secteur bancaire, le marché monétaire assurant efficacement la redistribution de cette liquidité entre toutes les banques.

Une des caractéristiques de la crise financière est que le marché monétaire de la zone euro ne fonctionne plus aussi efficacement qu'auparavant, les activités ayant même pratiquement cessé à certains moments. De plus le système bancaire, fragmenté, est maintenant composé d'un groupe de banques faisant face à un besoin de liquidité mais qui ne trouvent plus de contreparties disposées à la leur prêter, et d'un autre groupe de banques jouissant d'un excès de liquidité, mais qui refusent de prêter aux premières. Les banques en déficit n'ont d'autre choix que de se tourner vers l'Eurosystème et lui emprunter la liquidité dont elles ont besoin, tandis que les banques en surplus transfèrent celui-ci vers la facilité de dépôt offerte par ce même Eurosystème.

L'injection **nette** de liquidité par l'Eurosystème n'a que peu évolué, mais les modalités ont considérablement changé. Dorénavant il prête des montants beaucoup plus élevés qu'auparavant, mais ces prêts sont compensés par des dépôts des banques disposant d'un surplus de liquidité. L'Eurosystème est donc l'intermédiaire majeur qui s'est substitué au marché monétaire défaillant.

Le crédit « additionnel » accordé par l'Eurosystème, souvent qualifié de « liquidité excédentaire », c'est à dire le montant des crédits accordés au-delà du besoin net de liquidité de l'ensemble du secteur bancaire est nécessairement égal au recours à la facilité de dépôt (ou encore à d'autres éléments figurant au passif du bilan de la banque centrale comme les comptes courants ou des comptes à terme).

Les deux situations, l'une dans laquelle le marché monétaire assure la redistribution efficace de la liquidité, l'autre dans laquelle les banques centrales complètent ou remplacent un marché monétaire défaillant, sont compatibles avec un même montant de crédit accordé par les banques à l'économie et un même montant de dépôts détenus par les agents économiques auprès de ces mêmes banques. Aujourd'hui le crédit bancaire accordé à l'économie stagne, en raison à la fois d'une faiblesse de l'offre et de la demande, mais la cause n'est pas à situer dans le recours des banques à la facilité de dépôt de la banque centrale. Au contraire, si l'Eurosystème n'avait pas accepté de jouer ce rôle d'intermédiaire, les banques faisant face à un besoin de liquidité auraient été amenées, entre autres mesures correctrices, à réduire encore plus leur crédit à l'économie (par exemple en ne renouvelant pas certains crédits venant à échéance).

Enfin, si au lieu de déposer leur excès de liquidité auprès de la banque centrale, les banques décidaient (ou étaient « forcées ») d'accorder plus de crédit à l'économie, ces crédits engendreraient en fin de compte un surplus de liquidité pour une autre banque, qui n'aurait d'autre possibilité que de procéder à un dépôt auprès de la banque centrale.

Ce n'est que si le marché interbancaire redevient le lieu d'échange des surplus et déficits de liquidité qu'aussi bien l'actif que le passif de l'Eurosystème se contracteraient.

* *

*

Since October 2008, the credit granted by the Eurosystem to the euro zone banking sector increased substantially, moving from around € 500 billions to more than € 1000 billions in the course of 2012, to then decrease gradually. Such an evolution was made possible by the implementation of non-conventional measures, in particular the fact that the Eurosystem left to the banks the faculty to determine themselves the quantity of credit which they wished to obtain. Since 1 January 1999, it was the Eurosystem itself that, week after week, month after month, controlled exactly the quantity of credit it wished to grant to the banks of the zone

At the same time, on the liabilities side of the Eurosystem balance sheet, the recourse to the deposit facility, very limited until then, considerably increased too, (in particular after two open market operations with a three-year maturity, on 21 December 2011 and 29 February 2012), reaching more than € 800 billions in Spring 2012, against 0 in 1 billions before the beginning of the crisis in August 2007 (the so-called "sub-prime crisis"). The abundance of funds deposited with the central banks of the Eurosystem triggered numerous interpretations, among which the one that sees a link of causality between this increase of the deposits and a stagnation, if not a reduction of bank credits granted to the economy, leading to the myth of the money pointlessly parked with the central bank: "the idle money parked with the central bank".

Actually the increased deposits with the Eurosystem, a corollary of the "fixed rate full allotment policy", reflects the euro zone central banks increasing role as intermediary between the participants of the malfunctioning (since 2007) or almost inactive (since Lehman collapse in September 2008) money market.

Using initially a two-bank model, then generalising the reasoning, the note first briefly recalls the foundations of the money market.

A bank benefiting from a liquidity surplus (having for instance received a new deposit) will try to use it, while symmetrically a bank facing a liquidity deficit (facing for instance a deposit withdrawal) will try to finance it. Two ways are available. First, the bank with a liquidity surplus makes a deposit with the central bank while the bank with

a liquidity deficit finances it by borrowing from the same central bank. A second possibility would be that the bank with a surplus lends to the other one on the interbank market. Before the “sub prime” crisis the interbank deposits market was very active and allowed the entire banking sector to finance the individual deficits and employ the surpluses. Banks aimed at resolving their liquidity imbalances between themselves.

However collectively the entire banking sector faced, and still does, a liquidity deficit against the Eurosystem: indeed the purchase of banknotes (on behalf of their clients) and the imposition of reserves requirements, force the banking sector, in its whole, to borrow from the central banks (other so-called “autonomous factors” play a role, like for instance the deposits maintained by the Governments with the central banks or the foreign exchange reserve portfolios held by the central banks). In the euro zone the net liquidity needs, corresponding to the sum of the individual surpluses and deficits of the 6000 banks or so, amount to an order of € 500 billion. In other words, the whole banking sector has no other choice than borrowing that amount from the central banks. Before the crisis the Eurosystem granted its credit, through the monetary policy implementation framework, for an amount equal to the banking sector net liquidity needs, while the money market ensured the efficient redistribution of liquidity among all the banks.

One of the characteristics of the financial crisis is that the money market does not function as efficiently as before, activities even reaching a stand still for a while. In addition, the banking sector is fragmented: on the one side, banks facing a liquidity deficit are unable to find other banks ready to grant them the necessary credit, while on the other hand the banks enjoying a liquidity surplus refrain from lending to the first ones. Consequently, the “cash poor” banks have no other choice than borrowing from the Eurosystem the liquidity they need, while “cash rich” banks transfer their surpluses on the deposit facility with the same Eurosystem.

*The **net** injection of liquidity by the Eurosystem evolved only slightly over time, but the modalities changed quite considerably. Now it lends much larger amounts than before, but these loans are compensated with deposits by banks with a liquidity surplus. The Eurosystem is now the major intermediary substituting the failing money market.*

The “additional” credit granted by the Eurosystem, often called “excess liquidity”, i.e. the amount of credit granted beyond the net liquidity needs of the entire banking sector is necessarily equal to the recourse to the deposit facility (or any other item on the liabilities side of the central bank, like current accounts or term deposits).

The two situations, one in which the money market ensures the redistribution of liquidity, the other in which the central bank complements a failing money market, are compatible with the same amount of credit granted by banks to the economy and the same amount of deposits held by the public with the banking sector. Nowadays banks credit to the economy shows a stagnation as a consequence of both weak supply and weak demand, but the cause is not to be found in the recourse to the central bank deposit facility. Quite the contrary: the credit extended by banks to the economy would be allegedly much) smaller if the central bank would not complement a failing market. Indeed banks facing a liquidity deficit would have been forced to deleverage and reduce further their credit to the economy (not renewing credit coming to redemption, for instance).

Finally if banks decided (or were “forced” to grant more credit to the economy, those credits would eventually generate a liquidity surplus for one or the other bank who would have no other choice than making a deposit with the central bank.

The asset side as well as the liabilities side of the Eurosystem balance sheet will further contract only if and when the money market would again be the place where liquidity surpluses and deficits are exchanged.

1. Foundations of the money market

To describe the foundations behind the money market, let us consider an economy with two banks, Alpha and Beta. The balance sheet of a financial institution is generally quite complex and contains many items however in the simplified presentation adopted at this stage, we concentrate on the credit to the economy, on the assets side, and deposits from clients on the liabilities side. For the sake of illustration, we assume that all the other items are balancing each other's (liabilities in the form of capital and own funds, issuance of debts... on the one side, and assets in the form of specific credits, portfolios of assets, etc, on the other side).

Fig. 1

BANK ALPHA			
<i>Assets</i>		<i>Liabilities</i>	
Credit to the economy	1000	500	Mr X's Current account
		500	Other deposits
	1000	1000	

At this moment of time, the outstanding amount of credit to the economy (1000) finds its counterpart in the form of deposits by several clients, one of them being Mr X, who holds 500 on his current account (Fig. 1). The figures are chosen for the sake of the example and are not meant to inform about actual values.

Mr X decides to use what he has available on his account with Alpha to transfer 100 to Mrs Y, who holds an account with bank Beta. At that very moment, two movements take place: on the one hand, the account of Mrs Y with bank Beta increases and reaches 100 (assuming that initially, Mrs Y did not have any amount outstanding on her account), while the current account of Mr X with Alpha is reduced by an equivalent amount.

Bank Alpha is "loosing" some resources from its liabilities, while Bank Beta benefits from new resources.

Fig. 2 - Imbalances: liquidity deficit and surplus

BANK ALPHA			
<i>Assets</i>		<i>Liabilities</i>	
Credit to the economy	1000	400	<i>Mr X Current account (500-100)</i>
		500	Other deposits
	<hr/> <hr/> 1000	<hr/> <hr/> 900	

BANK BETA			
<i>Assets</i>		<i>Liabilities</i>	
		100	<i>Mrs Y Current account (0+100)</i>
	<hr/> <hr/>	<hr/> <hr/> 100	

At that very moment, the two balance sheets are precisely not “balanced” (Fig. 2): Alpha faces a “liquidity need” or “liquidity deficit” of 100, having fewer resources at its disposal than needed to “finance” its assets, while Beta enjoys a “liquidity surplus” or “excess liquidity” equal to 100 as well. Alpha has to find some resources that will compensate its liquidity need, while Beta should find some usage for the new deposit it has received.

Many instruments are available to the two banks to fill their respective gaps: Alpha could raise some capital or issue bonds that, in turn, Beta could buy. Alternatively, Alpha could deleverage by selling some of its assets.

However the simplest and most direct solution would consist in the granting of a short-term loan by Beta to Alpha, assorted with a precise maturity and interest rate: then the two balance sheets would be “balanced” again (Fig. 3), and the liquidity surplus of one bank meets the liquidity need or deficit of the other.

Fig. 3

BANK ALPHA			
<i>Assets</i>		<i>Liabilities</i>	
Credit to the economy	1000	400	Mr X Current account
		500	Other deposits
		100	<i>Money market Loan from Beta</i>
	<hr/>	<hr/>	
	1000	1000	

BANK BETA			
<i>Assets</i>		<i>Liabilities</i>	
<i>Money market Loan to Alpha</i>	100	100	Mrs Y Current account
	<hr/>	<hr/>	
	100	100	

The negotiation of such short term loans with maturities ranging from “overnight” (from today to tomorrow), up to several months (by convention up to 12 months, but in practice such loans are often granted for very short maturities up to one month), between financial institutions, takes place on the *money market*.

In the example described above, the nature of the loan is not specified, while in reality various forms coexist: *unsecured bank loans* (the lender has no other guarantee than the word of the borrower), *repurchase agreements* (the borrower sells a financial assets, and promises to re-purchase it at the term of the operation), *lending guaranteed by a pledge* and many others.

One can reason behind this stylised description and extend it to several banks, with Alpha filling its liquidity needs by borrowing from a third bank, and Beta lending to the latter. The model can indeed be generalised to any number of banks.

2. Recourse to the central bank

The simple model described in the first section implicitly assumes that banks Alpha and Beta are ready to transact on the money market. However, this cannot be taken for granted: Beta could be reluctant to lend to Alpha. Risks considerations play a decisive role in the decision to grant a credit or not. The crisis that emerged in 2007 showed precisely that banks could become extremely reluctant to grant loans, even for a very short period, to other banks.

Alpha could make recourse to the central bank to meet its liquidity need. On its balance sheet a loan granted by the central bank will then substitute a loan that is not provided

through the money market. Then Beta has to find a usage for its liquidity surplus and if reluctant to lend to another bank (or if there is no other bank that wants to borrow from it) there is always the ultimate possibility to make a deposit with the central bank. The liquidity needs and surpluses are then reconciled by making recourse to the central bank rather than by using the money market (Fig. 4): the central bank acts as an intermediary between the banks running a liquidity surplus and those facing a liquidity deficit.

Fig. 4 - Recourse to the central bank

BANK ALPHA			
<i>Assets</i>		<i>Liabilities</i>	
Credit to the economy	1000	400	Mr X's Current account
		500	Other deposits
		100	<i>Loan from the central bank</i>
	<u>1000</u>	<u>1000</u>	

BANK BETA			
<i>Assets</i>		<i>Liabilities</i>	
<i>Deposit to the Central Bank</i>	100	100	Mrs Y's Current account
	<u>100</u>	<u>100</u>	

CENTRAL BANK			
<i>Assets</i>		<i>Liabilities</i>	
<i>Loan to Alpha</i>	100	100	<i>Deposit by Beta</i>
	<u>100</u>	<u>100</u>	

Extending the presentation from a model with two banks to a larger number of banks is quite straightforward: let us just consider that the banking system is composed of two categories of banks: in the first category (the Alpha banks...) they have a liquidity deficit, in the other category (the Beta banks) they face the opposite situation. Some banks will use the money market while others will make recourse to the central bank. The choice between the two avenues will be influenced by risks considerations, as already mentioned, but also by the relative prices and, possibly more forcefully in a crisis, by rationing. In particular, depositing with and borrowing from the central banks may be quite unattractive in financial terms but they are, in normal circumstances, not rationed.

Comparing the two different ways for banks to settle their liquidity deficits and surpluses, using the money market (Fig. 3) or the central bank (Fig. 4), it appears that the size and composition of the balance sheets of Alpha and Beta remain unchanged,

with only one difference: the counterpart for their respective liquidity deficit (Alpha) and surplus (Beta) is not another bank as it was the case in the first scenario, but the central bank.

In particular, the amount of credit to the economy is identical in both cases. The size of the central bank balance sheet is however deeply affected. Acting as an intermediary, substituting the money market to settle the imbalances between banks, has indeed an impact on the central bank, as both sides of its balance sheet increase as long as banks prefer avoiding transacting on the money market.

The size of the central bank operations, in particular the volume of deposits it receives does not tell anything about the credit granted to the economy by the banking sector. It is just a measure of the intermediation of the central bank. So far the balance sheet shows clearly that in “net” terms, the central bank doesn’t provide liquidity to the banking sector as a whole: the central bank loans to some banks is exactly compensated by the deposits received from other banks. Of course, if the central bank were not willing to lend the needed amount to bank Alpha, the latter would face an undesirable dilemma: either deleverage, reducing the credit to the economy, or default. Both would have serious macroeconomic consequences, which the action of the central bank may at least attenuate.

However, some exogenous factors do have an impact on the position of the entire banking sector vis à vis the central bank: in other terms, the banking sector as a whole can be “obliged” to systematically borrow from the central bank.

3. “Forced” recourse to the central bank

The presentation adopted in the previous sections implicitly assumes that the sum of individual liquidity surpluses and the sum of individual liquidity deficits are equal. In other words the *net liquidity deficit* of the banking sector, considered as a whole, is equal to zero. Indeed one can intuitively derive from the small model that the emergence of liquidity deficits within some banks goes necessary together with liquidity surpluses in other banks.

However, this is not the case, because of two factors in particular: the demand for *banknotes* by the public at large, and the imposition of *reserves requirements* by the central bank.

3.1 The demand for banknotes

Again, let us consider the simple model (as it appeared in Fig. 3) when banks use the money market to settle their respective liquidity surplus and deficit).

Mr X would like to have some banknotes, say 300, at his disposal rather than having money exclusively in the form of a sight deposit (another name for current account).

However the bank Alpha cannot provide the banknotes to its client without acquiring them from the central bank, the exclusive issuer of banknotes². Of course the central bank does not provide the banknotes for free, which means that the bank Alpha will have to “buy” them. Not having the money to do so, Alpha will nevertheless be able to receive the banknotes in exchange of a debt³. As a first step, the balance sheets of both Alpha and the central bank will be affected (Fig. 5): banknotes appear as an asset for Alpha and as a liability for the central bank, while Alpha “pays” that acquisition by issuing a debt that becomes an asset for the central bank.

Incidentally, holding banknotes in vaults is very costly for banks, because the handling costs are not negligible (transport, security, space necessary...) and because banknotes are assets that do not yield revenue: there is indeed no interest rate associated to the holding of banknotes. In practice, bank will maintain the stock of banknotes they hold at a minimum necessary to face immediate withdrawal by clients, and will adapt their purchases to the clients demand.

Fig. 5 - First step: banknotes “moving” from the central bank to Alpha

BANK ALPHA			
<i>Assets</i>		<i>Liabilities</i>	
Credit to the economy	1000	400	Mr X Current account
		500	Other deposits
		100	Money market Loan from Beta
<i>Banknotes in the vault</i>	<i>300</i>	<i>300</i>	<i>Loan from the Central bank</i>
	<hr/>	<hr/>	
	1300	1300	

CENTRAL BANK			
<i>Assets</i>		<i>Liabilities</i>	
<i>Loan to Alpha</i>	<i>300</i>	<i>300</i>	<i>Banknotes issued</i>
	<hr/>	<hr/>	
	300	300	

² The central bank is granted the exclusive right to issue the only legally valid banknotes in the economy (the “legal tender”). History shows that it has not always been the case: for many years, other public authorities or even commercial banks were entitled to issue banknotes.

³ As illustrated later, bank Alpha could pay for the purchase of banknotes by selling other assets to the central bank, among others, it could provide foreign currencies. The model presented here remains valid if one assumes that the banking sector is not able to purchase all the banknotes requested by its clients, because it does not have enough of these other assets: at least a portion of the banknotes have to be bought against a debt.

In a second step, bank Alpha will provide the banknotes to Mr X, whose current account will decrease in due course as Mr X *purchases* them. Simultaneously the banknotes will disappear from the assets side of Alpha's balance sheet (Fig. 6): they are now in the pocket (alternatively under the mattress) of Mr X.

Fig. 6 - Step 2 Alpha delivers the banknotes to Mr X

BANK ALPHA			
<i>Assets</i>		<i>Liabilities</i>	
Credit to the economy	1000	100	Mr X's Current account (400-300)
		500	Other deposits
		100	Money Market Loan from Beta
<i>Banknotes in the vault</i> (300-300)	0	300	Loan from the central bank
	<u>1000</u>	<u>1000</u>	

CENTRAL BANK			
<i>Assets</i>		<i>Liabilities</i>	
<i>Loan to Alpha</i>	300	300	<i>Banknotes issued</i>
	<u>500</u>	<u>500</u>	

Seen from the perspective of an individual bank, it is conceivable that the bank Alpha would buy or borrow some banknotes held by another bank but considering the entire banking sector (excluding the central bank), the banknotes can only be provided by the central bank.

The demand for banknotes by the public leads the banks to borrow, necessarily, from the central bank.

The other bank in the economy also faces a demand for banknotes, say 50, from its own client, Mrs Y, and at the end of a process similar to the one described for the bank Alpha, its balance sheet will also reflect the debt it has against the central bank (Fig. 7).

Of course Mrs Y's current account decreased by 50, reflecting that she has received banknotes instead, while the bank Beta is indebted vis à vis the central bank for the same amount.

The issuance of banknotes does not affect the balance sheet total of Alpha and Beta, but the composition: loans from the central bank substitute (some of) the deposits by clients

on the liabilities side. Is it necessary to underline that the balance sheet of the central bank increases?

Fig. 7

BANK ALPHA			
<i>Assets</i>		<i>Liabilities</i>	
Credit to the economy	1000	100	Mr X's Current account
		500	Other deposits
		100	Money market Loan from Beta
		300	Loan from the central bank
	<u>1000</u>	<u>1000</u>	

BANK BETA			
<i>Assets</i>		<i>Liabilities</i>	
Money market Loan to Alpha	100	50	Mrs Y's Current account
		50	Loan from the Central bank
	<u>100</u>	<u>100</u>	

CENTRAL BANK			
<i>Assets</i>		<i>Liabilities</i>	
Loan to Alpha	300	300	Banknotes issued via Alpha
Loan to Beta	50	50	Banknotes issued via Beta
	<u>350</u>	<u>350</u>	

The presentation of balance sheets of the banking sector on the one side and of the central bank on the other side can be generalised by adding up the individual balance sheets of all banks. There are many ways for presenting these balance sheets, the one adopted here aims at underlining that banks *have to* borrow from the central bank. Some items are netted out: for instance possible loans by bank Beta to bank Alpha necessarily appear for the same amount on both sides of the banking sector balance sheet, and can therefore be consolidated. However, in a simply aggregated balance sheet (the simple sum of individual balance sheets, without netting) of the banking sector (Fig. 8), they still show off explicitly.

Fig. 8 - Aggregated balance sheet of the banking sector

BANKS ALPHA AND BETA			
<i>Assets</i>		<i>Liabilities</i>	
Credit to the economy	1000	100	Mr X Current account
		50	Mrs Y Current account
		500	Other deposits
Money market Loan by Beta (to Alpha)	100	100	Money market loan to Alpha (from Beta)
		350	<i>Loan from the central bank</i>
	<u>1100</u>	<u>1100</u>	

CENTRAL BANK			
<i>Assets</i>		<i>Liabilities</i>	
Loan to Alpha	300	300	<i>Banknotes issued via Alpha</i>
Loan to Beta	50	50	<i>Banknotes issued via Beta</i>
	<u>350</u>	<u>350</u>	

3.2 Reserve requirements

Banks can be requested to maintain deposits with the central bank, in the form of current accounts. To distinguish these deposits from those that a bank could freely decide to hold with the central bank, they are usually called “mandatory reserves” or “required reserves”⁴ to be held on banks current accounts.

Being obliged to build up its current account with the central bank for the sake of fulfilling its reserve obligations, bank Alpha faces a additional liquidity deficit of, say, 200. Contrary to what happened when its liquidity deficit resulted from a transfer from the account of Mr X to the account of Mrs Y (client of Beta), in this case there is no equivalent liquidity surplus with Beta: the liquidity need derives from the imposition of reserves requirements by the central bank.

Beta too is subject to the reserves requirements, and similarly faces a new liquidity deficit of, say, 150.

⁴ The precise modalities can vary from one central bank to another. In the case of the Eurosystem, banks have to maintain a certain amounts of deposit, on average over a period of 4 or 5 weeks. In the case of the Federal Reserve System of the United States, the period is 2 weeks. However such modalities do not matter much in the context of this note.

The immediate answer to the reserves requirements would for both banks consist in borrowing from the central bank the amount they need to meet their obligations. Consequently, on the balance sheet of both banks appears an asset equivalent to the holdings of reserves with the central bank and an equivalent liability corresponding to the credit they asked from the central bank to meet the same reserves requirements (Fig. 9).

Fig. 9 - Impact of reserve requirements

BANK ALPHA			
<i>Assets</i>		<i>Liabilities</i>	
Credit to the economy	1000	100	Mr X's Current account
		500	Other deposits
		100	Money market Loan from Beta
		300	Loan from the central bank
<i>Reserves Holdings at the central bank</i>	200	200	<i>Additional Loan from the central bank</i>
	<u>1200</u>	<u>1200</u>	

BANK BETA			
<i>Assets</i>		<i>Liabilities</i>	
Money market Loan to Alpha	100	50	Mrs Y's Current account
		50	Loan from the Central bank
<i>Reserves Holdings at the central bank</i>	150	150	<i>Additional Loan from the central bank</i>
	<u>250</u>	<u>250</u>	

CENTRAL BANK			
<i>Assets</i>		<i>Liabilities</i>	
Loan to Alpha	300	300	Banknotes issued via Alpha
Loan to Beta	50	50	Banknotes issued via Beta
<i>Additional Loan from the central bank to Alpha</i>	200	200	<i>Reserve account of Alpha</i>
<i>Additional Loan from the central bank to Beta</i>	150	150	<i>Reserve account of Beta</i>
	<u>700</u>	<u>700</u>	

3.3 Banknotes and reserves requirements: joint impact

By aggregating again the balances sheets of the banks, the presentation becomes lighter (Fig. 10).

The central bank balance sheet illustrates that the banking sector borrows from the central for two purposes: purchasing the banknotes (that banks will in turn sell to their clients) and fulfilling their reserves requirement.

Incidentally, the imposition of reserves requirements contributes to an increase (everything equal otherwise) of the banks balance sheets and of the central bank balance sheet, the one mirroring the other.

It is precisely in this respect that the central bank acts as the *lender of last resort*. The banking sector cannot find any other lender than the central bank to face its liquidity deficit⁵. The central is the source of such a situation as it is the sole issuer of banknotes and can impose, if it so wishes, reserves requirements.

⁵ Unfortunately, because of a semantic drift, the notion of lender of last resort is nowadays confuse and often relates to the fact that a particular bank facing difficulties to survive, has no other alternative than beg a support by the central bank.

Fig. 10 - Aggregated balance sheet of the banking sector, including reserves requirements

BANKS ALPHA AND BETA			
<i>Assets</i>		<i>Liabilities</i>	
Credit to the economy	1000	100	Mr X Current account
		50	Mrs Y Current account
		500	Other deposits
Money market Loan by Beta (to Alpha)	100	100	Money market loan to Alpha (from Beta)
Reserve Holdings at the central bank	350	700	Loan from the central bank
	<u>1450</u>	<u>1450</u>	

CENTRAL BANK			
<i>Assets</i>		<i>Liabilities</i>	
Loan to Alpha and Beta (for both reserves requirements and banknotes purchases)	700	350	<i>Banknotes issued via Alpha and Beta</i>
		350	<i>Reserves accounts of Alpha and Beta</i>
	<u>700</u>	<u>700</u>	

4. Distribution of liquidity through the banking sector

So far it was assumed that each single bank, Alpha and Beta, was borrowing directly from the central bank so as to build up its respective reserve account.

Knowing that banks, at least in normal circumstances, exchange their liquidity surpluses and deficits, and organise the circulation of the liquidity borrowed from the central bank, the latter may decide to lend the exact net amount of liquidity the banking sector needs, without considering each individual liquidity deficit.

In a large banking sector, some banks do not borrow directly from the central bank, but rely on other banks that indeed borrow from the central bank more than what they actually need, using the surplus to grant money market loans to the former ones.

For instance only Alpha would receive a credit from the central bank, while lending further to Beta what this one needs to maintain its reserve account.

This process can be presented in a sequence (Fig. 11). Alpha borrows 350 from the central bank, of which it deposits 200 for the sake of its own reserves requirements, while the remaining 150 are lent to Beta, on the money market. This in turn allows Beta to make the necessary deposit on its current account with the central bank.

Fig. 11 - Only Alpha borrows from the central for the sake of Reserves Requirements

BANK ALPHA			
<i>Assets</i>		<i>Liabilities</i>	
Credit to the economy	1000	100	Mr X's Current account
		500	Other deposits
		100	Money market Loan from Beta
<i>Reserve Holdings at the central bank</i>	200	300	Loan from the central bank
<i>Money market loan to Beta</i>	150	350	<i>Additional Loan from the central bank</i>
	<u>1350</u>		<u>1350</u>

BANK BETA			
<i>Assets</i>		<i>Liabilities</i>	
Money market Loan to Alpha	100	50	Mrs Y's Current account
<i>Reserve Holdings at the central bank</i>	150	50	Loan from the Central bank
	<u>250</u>	150	<i>Money market Loan from Alpha</i>
		<u>250</u>	

CENTRAL BANK			
<i>Assets</i>		<i>Liabilities</i>	
Loan to Alpha	300	300	Banknotes issued via Alpha
Loan to Beta	50	50	Banknotes issued via Beta
<i>Additional Loan from the central bank to Alpha</i>	350	200	<i>Reserve account of Alpha</i>
	<u>700</u>	150	<i>Reserve account of Beta</i>
		<u>700</u>	

What is the impact on the aggregated balance sheet of the banking sector, and of the central bank (Fig. 12) as compared with the former situation (when both Alpha and Beta made recourse to the central bank to borrow the amounts necessary to fulfil their respective reserves requirements)?

As for the central bank, the size of the balance sheet remains unchanged, which is quite an intuitive observation: the central bank still grants credit for the same amount necessary for banks to fulfil their reserve requirement, only the recipients have changed: the credit goes to Alpha only in this new configuration, but for an amount corresponding to the needs of both Alpha and Beta.

Fig. 12 - Aggregated balance sheet of the banking sector, with only Alpha borrowing from the central bank

BANKS ALPHA AND BETA			
<i>Assets</i>		<i>Liabilities</i>	
Credit to the economy	1000	100	Mr X Current account
		50	Mrs Y Current account
		500	Other deposits
Money market Loan by Beta (to Alpha)	100	100	Money market loan to Alpha (from Beta)
<i>Money market Loan by Alpha (to Beta)</i>	<i>150</i>	<i>150</i>	<i>Money market loan to Beta (by Alpha)</i>
Reserve Holdings at the central bank	350	700	Loan from the central bank
	<hr/>	<hr/>	
	1600	1600	

CENTRAL BANK			
<i>Assets</i>		<i>Liabilities</i>	
Loan to Alpha and Beta (for both reserves requirements and banknotes purchases)	700	350	<i>Banknotes issued via Alpha and Beta</i>
		350	<i>Reserves accounts of Alpha and Beta</i>
	<hr/>	<hr/>	
	700	700	

The *aggregated balance sheet of the banking sector however has increased*: indeed the intermediation between the central bank and bank Beta, provided by Alpha, “inflates” the latter’s balance sheet, as its money market loans are growing. Incidentally, in this model Alpha is both lending and borrowing from Beta, which could look odd at a first

glance. Yet this is not unusual as two banks can indeed both provide credit and borrow to and from each other's, because each individual transaction takes place at different moments, for different maturities, at different conditions. In addition, there are more than two banks in the economy, and assuming that Alpha and Beta are two groups encompassing many banks it is again quite intuitive to understand that some banks in one group receive a loan from some other banks in the other group and vice-versa.

Incidentally, the *consolidated* balance sheet of the banking sector is not affected by interbank loans as they net out each other's: seen in its entirety there is no additional liability or asset against the rest of the economy.

5. Use of deposit facility

Until here, the assumption prevailed that the central bank provides credit to the banking sector for an amount exactly equal to the liquidity needs (the liquidity deficit) of the banks, resulting from the demand for banknotes and the fulfilment of reserves requirements.

5.1 Voluntary injection of liquidity by the central bank

There are circumstances in which the liquidity provided to the banking sector can exceed its actual liquidity deficit. One of them relates to the deliberate decision of the central bank, which controls the liquidity it injects (the credit it provides...), and decides to lend *more than strictly necessary*⁶.

The reserves requirements of Alpha (200) and Beta (150) amount together to 350. We just assumed above that Alpha was the only one to borrow for that purpose from the central bank, for an amount of 350.

Let us now consider that Alpha borrows 400, i.e. 50 more than necessary (Fig. 13). Consequently Alpha is facing an excess of liquidity of 50. Of course it could try to find in the market a counterpart facing a liquidity deficit, however in this case there will be none: Alpha excess liquidity is the result of an "excess" injection of liquidity by the central bank while the other bank in the economy, Beta, is ready to borrow only 150 (corresponding to its own needs). If it borrowed 200, Beta would itself face an excess of liquidity.... Only a deposit by Alpha (or the bank to which Alpha would have succeeded in handing over the "hot potato"...) would resolve this imbalance. *Alpha will increase its deposit with the central bank.* A straightforward approach would consist for Alpha to maintain on its required reserves account a larger amount than necessary (250 instead of 200 in the example). Depending on the institutional set up, the central bank may want to avoid such an "excess reserves" situation and discourage it, for instance by not remunerating the amount deposited in excess of the requirement, which is the practice of the Eurosystem. However the central bank may offer a "deposit facility",

⁶ The reasons why a central bank could do so are linked to the fact that through its liquidity injection, it aims at controlling the level of short-term interest rates in the money market. There may be circumstances in which the central bank wants to inject more liquidity, or less, than strictly necessary to cover the banknotes demand and the reserves requirements in order to steer interest rates in a desired direction. The description and explanation of that behaviour go beyond the scope of this note.

where banks can indeed park their excess reserves⁷. The Eurosystem indeed makes such a deposit facility available to the banking system.

Fig. 13 - Central bank inject more liquidity than necessary

BANK ALPHA			
<i>Assets</i>		<i>Liabilities</i>	
Credit to the economy	1000	100	Mr X's Current account
Reserve Holdings at the central bank	200	500	Other deposits
Money market loan to Beta	150	100	Money market Loan from Beta
<i>Use of the deposit facility at the central bank</i>	<i>50</i>	300	Loan from the central bank
		400	<i>Additional Loan from the central bank</i>
	<u>1400</u>	<u>1400</u>	

BANK BETA			
<i>Assets</i>		<i>Liabilities</i>	
Money market Loan to Alpha	100	50	Mrs Y's Current account
Reserve Holdings at the central bank	150	50	Loan from the Central bank
	<u>250</u>	150	Money market Loan from Alpha
		<u>250</u>	

CENTRAL BANK			
<i>Assets</i>		<i>Liabilities</i>	
Loan to Alpha	300	300	Banknotes issued via Alpha
Loan to Beta	50	50	Banknotes issued via Beta
<i>Additional Loan from the central bank to Alpha</i>	<i>400</i>	200	Reserve account of Alpha
		150	Reserve account of Beta
		50	<i>Use of the deposit facility by Alpha</i>
	<u>750</u>	<u>750</u>	

⁷ In the case of the Eurosystem, the rate offered on the deposit facility is below the rate attached to the required reserves, but as the reserves in excess are not at all remunerated, the deposit facility still exert some attraction. In any case, as shown, there is no alternative!

Both the aggregated balance sheet of the banking sector and the balance sheet of the central bank (Fig. 14) have increased by 50, corresponding to the excess of liquidity injection.

When the central bank provides credit in excess of the exact “net liquidity deficit” of the banking sector, not only the liquidity injection increases but the recourse to the deposit facility increases at the same time.

Beyond this quite straightforward observation, the comparison of the different illustrations (Fig. 8, 10 and in particular 12) indicates that the emergence of excess liquidity (leading to a recourse to the deposit facility) is compatible with unchanged credit to the economy (stubbornly remaining at 1000 in our examples), and unchanged current account deposits from clients.

An increase of the deposit facility does not provide any information about the credit activity of banks.

Fig. 14 - Aggregated balance sheet of the banking sector, with excess liquidity

BANKS ALPHA AND BETA			
<i>Assets</i>		<i>Liabilities</i>	
Credit to the economy	1000	150	Current accounts of Mr X and Mrs Y
Money market Loan by Beta (to Alpha)	100	500	Other deposits
Money market Loan by Alpha (to Beta)	150	100	Money market loan to Alpha (from Beta)
Reserve Holdings at the central bank	350	150	Money market loan to Beta (by Alpha)
<i>Use of the deposit facility at the central bank</i>	<i>50</i>	<i>750</i>	<i>Loan from the central bank</i>
	1650		1650

CENTRAL BANK			
<i>Assets</i>		<i>Liabilities</i>	
<i>Loan to Alpha and Beta (for both reserves requirements and banknotes purchases)</i>	<i>750</i>	350	Banknotes issued via Alpha and Beta
		350	Reserves accounts of Alpha and Beta
		<i>50</i>	<i>Deposit Facility</i>
	750		750

5.2 “Excess liquidity” generated by the banking sector

The previous section illustrates the first reason for excess liquidity, i.e. the action of the central bank leading to make recourse to the deposit facility. In such a case the central bank takes the deliberate decision to inject more liquidity than the actual “net liquidity deficit” faced by the banking sector as a whole.

To generalise the argument, let us now suppose that there are more than 2 banks in the economy, but split in two groups, one group usually lending on the money market (the so-called “cash-rich” banks), and the other one structurally borrowing (the “cash-poor” banks). The liquidity deficit faced by the latter group should correspond by definition to the liquidity surplus that the former enjoy. However, as illustrated above, banks are subject to reserve requirements to be held at the central bank, and have to buy the

banknotes demanded by their clients, therefore for the entire banking system a structural liquidity deficit appears.

First (Fig. 15) at the current juncture both the issuance of banknotes (800)⁸ and the current accounts held for the sake of the reserve requirements (200) appear on the liabilities side of the central bank balance sheet. The assets side displays the credit granted to the banks (1000) allowing them to both accommodate the demand for banknotes and their own reserve requirements (as explained in section 3).

The *cash-rich banks* find their resources from depositors (9800), and in addition they borrow from the central bank (Loan from the central bank: 200) i.e. more than what is necessary to comply with their own reserves requirements (Reserves Holdings at the central bank: 150). They are active in the money market and contribute to the redistribution of liquidity. On the other side, in addition to the reserves held at the central banks, they provide credit to the economy (8850). They are left with a liquidity surplus that allows them to lend to other banks on the money market (Money market loans: 1000).

The *cash-poor banks* are banks benefiting from their depositors (4200), and borrowing from the central bank (800). To the extent that the sum of the credit granted to the economy (5950) and the maintenance of their reserve requirements is not covered by the resources they have available, they borrow in the money market, precisely what the cash-rich banks are ready to lend (1000). As explained earlier, the net liquidity deficit of the banking system, equal to the sum of banknotes in circulation and the reserves requirements, is met by the credit provided (the liquidity injected) by the central banks.

⁸ The following example relies on a different set of figures than the ones used in the earlier examples.

Fig. 15 - Active money market

CENTRAL BANK			
<i>Assets</i>		<i>Liabilities</i>	
Credit to banks	1000	800	Banknotes issued
		200	Reserves Requirements accounts
	<u>1000</u>	<u>1000</u>	

CASH-RICH BANKS			
<i>Assets</i>		<i>Liabilities</i>	
Credit to the economy	8850	9800	Deposits
Reserve holdings at the central bank	150		
Money market loans	1000	200	Loan from the central bank
	<u>10000</u>	<u>10000</u>	

CASH-POOR BANKS			
<i>Assets</i>		<i>Liabilities</i>	
Credit to the economy	5950	4200	Deposits
		800	Loan from the Central bank
Reserve Holdings at the central bank	50	1000	Money market deposits
	<u>6000</u>	<u>6000</u>	

As described earlier, if the central bank decides to inject more liquidity than strictly necessary, some recourse to the deposit facility will occur.

However, a second reason explaining the recourse to the deposit facility resides in the preference of banks for not lending to other banks, on the money market. This is the

situation observed in the euro area (as already mentioned in section 2) since 2007, which aggravated after the collapse of Lehman Br⁹.

In addition the central bank can decide to allow banks to borrow without limit¹⁰, on tap, from the central bank, as the Eurosystem does since autumn 2008.

Assuming that the money market comes to a stand still, with no transaction taking place any more, the only way for cash-poor banks consists in borrowing more than before from the central bank. Correspondingly the cash-rich banks will find no other usage for their excess liquidity than making use of the deposit facility (Fig. 16).

⁹ The banks hesitated to lend to each other mainly because they were no longer certain that the loans they could have granted to others were secure enough. The so-called sovereign crisis that followed also contributed and even reinforced the mal-functioning of the money market.

¹⁰ In reality, banks can be limited to the extent that they are not allowed to borrow without providing collateral, securities that protect the central bank in case of default.

Fig. 16 - Central bank substituting the money market

CENTRAL BANK			
<i>Assets</i>		<i>Liabilities</i>	
Credit to banks	1000	800	Banknotes issued
		200	Reserves Requirements accounts
Additional credit to cash-poor banks	1000	1000	Deposit facility
	<u>2000</u>	<u>2000</u>	

CASH-RICH BANKS			
<i>Assets</i>		<i>Liabilities</i>	
Credit to the economy	8850	9800	Deposits
Reserve Holdings at the central bank	150		
Money market loans	0	200	Loan from the central bank
Deposit facility at the central bank	1000		
	<u>10000</u>	<u>10000</u>	

CASH-POOR BANKS			
<i>Assets</i>		<i>Liabilities</i>	
Credit to the economy	5950	4200	Deposits
		800	Loan from the Central bank
		0	Money market deposits
Reserve Holdings at the central bank	50	1000	Additional loan from the central bank
	<u>6000</u>	<u>6000</u>	

Again, as already underlined, the absence of money market transactions leads to a greater recourse to the central bank on both sides of its balance sheet, which, in our example, has doubled, but the *net liquidity injection* remains unchanged. Indeed the credits to the banking sector was initially 1000, and now reaches 2000, however from that amount, 1000 “come back” in other words are re-absorbed, in the form of deposits with the central bank and, when considering the entire banking sector as a whole, should therefore be subtracted from the liquidity injection. This simply confirms the observation made in section 5.1.

A given *net liquidity injection* can take place with a central bank provision of credit equal to the *net liquidity deficit* of the banking sector, or by a *greater provision of credit compensated by the use of the deposit facility by banks*. In net terms, the credit provision remains unchanged.

The *additional* central bank credit is equal to the use of the deposit facility and reflects the fact that *the central banks acts as an intermediary complementing the money market*.

Considering the entire banking sector on its whole one could be inclined to conclude that they are banks borrowing some “liquidity” from the central bank just to re-deposit it with the same central bank, but the reality is quite different. Notwithstanding a slight overlap between the two populations of borrowers and depositors, a number of banks (belonging to the population of cash-poor institutions) borrow from the central bank to cover their liquidity needs, not having access anymore to the money market. Symmetrically *other banks* (qualified as cash-rich) prefer depositing their excess liquidity with the central bank rather than lending it to the first group of banks¹¹.

The two situations, one in which the money market ensures the redistribution of liquidity, another in which the central bank complements a failing money market, is compatible with exactly the *same amount of credit granted by banks to the economy* and the *same amount of deposits held by other economic agents with the banking sector*.

¹¹ After the organisation of two operations with a 3-year maturity in December 2011 and February 2012, some banks indeed appeared on both sides of the Eurosystem balance sheet. The majority of participating banks belong to the category of cash-poor banks that did not have any other possibility to find the necessary liquidity. However, some cash-rich banks, or banks not facing particular difficulties to raise the necessary liquidity also participated in the operations in order to build up a buffer, borrowing funds they did not immediately need, and making recourse to the deposit facility of the Eurosystem. They acted for reason of prudence.

6. The case of the Eurosystem

After the simplified approach adopted so far, let us consider the actual situation of the Eurosystem. Among other developments, the use of the deposit facility has evolved in quite a spectacular way, reflecting the malfunctioning of the money market.

6.1 Before 9 August 2007

Fig. 17 - Consolidated balance sheet of the Eurosystem (€ billion): 29 June 2007

		<i>Assets</i>		<i>Liabilities</i>	
AFA	<u>Autonomous liquidity factors (assets)</u>	449	730	<u>Autonomous liquidity factors (liabilities)</u>	AFL
	Net foreign assets	318	633	Banknotes issued	
	Domestic assets	131	70	Government deposits	
			27	Other autonomous factors (net)	
	<u>Monetary policy instruments</u>			<u>Monetary policy instruments</u>	
MRO	Main refinancing operations	313	182	Current accounts*	RR + ERR
LTRO	Longer term refinancing operations	150			
MLF	Marginal lending facility	1	1	Deposit Facility	DF
		913	913		
				* reserves requirements during the current maintenance period: 186	

Source: ECB, Weekly Financial Statements

The Eurosystem balance sheet¹² (Fig. 17) results from the consolidation of the balance sheets of the National Central Banks¹³ (NCBs) and the European Central Bank (ECB).

At the end of the second quarter of 2007, i.e. a few weeks before the beginning of the so-called “sub-prime” crisis¹⁴ it offers an example of what that balance sheet looked like since the outset of the euro (even if figures have evolved since 1999).

Before commenting that balance sheet, some clarification is warranted.

The Eurosystem balance sheet is organised along several categories¹⁵.

¹² The Eurosystem balance sheet presented here derives from the “weekly financial statements” published regularly by the ECB. For the sake of clarity, some items are grouped together or consolidated.

¹³ The National Central Banks are the central banks of the 18 countries (currently) that have adopted the euro.

¹⁴ It is commonly admitted to consider that the financial crisis started on 9 August 2007, when indeed the lingering problem suddenly became apparent and affected the functioning of the financial markets, in particular the money markets both in the USA and in Europe.

Both sides of the balance sheet display so-called autonomous factors¹⁶.

- AFL (Autonomous liquidity Factors on the Liabilities side): these autonomous factors include the banknotes in circulation and, to complete the simple presentation of section 3.3, government deposits and a net residual item encompassing all sorts of autonomous factors¹⁷;
- AFA (Autonomous liquidity Factors on the Assets side): they contain different portfolios (foreign and domestic).

The monetary policy instruments used to provide credit (often called “liquidity”) to the banking sector appear on the assets side of the balance sheet.

- MRO (Main Refinancing Operations): they are the main instrument of the monetary policy, providing liquidity with a one-week maturity and signalling the monetary policy stance as their rate is the main policy rate of the Eurosystem;
- LTRO (Longer Term Refinancing Operations): they provide further liquidity to the banking sector for longer periods of time (initially for 3-month maturity, but later on the tenor has been lengthened, up to 3-year maturity);
- MLF (Marginal Lending Facility): an overnight facility, which enables the banks to cover their end-of-day liquidity needs at an interest rate well above the MRO rate.

Other liabilities are singularised.

Banks are holding current accounts with the Eurosystem.

- RR (reserve requirements): this part of the current accounts holdings of banks results from their obligation to maintain reserves which are remunerated at MRO rate;
- ERR (Excess Reserves beyond the Requirements): banks may decide to maintain amounts in excess of the required reserves, but these do not benefit from any remuneration.

Finally banks may use the possibility of maintaining funds beside their current account.

- DF (Deposit Facility): an overnight facility, which enables the banks to place their surplus end-of-day liquidity at a rate well below the Main Refinancing Operation rate.

¹⁵ Other items, not yet relevant at that moment, will appear further down the note.

¹⁶ The autonomous factors are so qualified because they are not under the control of the central bank (the demand by the public drives the volume of banknotes in circulation) or at least their management is subject to other considerations than monetary policy implementation (like, for instance, the management of domestic and foreign assets portfolios).

¹⁷ For instance the capital or the buildings used by central banks, like several other elements of their balance sheet, are also considered as autonomous factors and fall within this residual element.

It is of course not necessary to recall that the sum of liabilities equals the sum of assets, therefore:

$$\text{AFA} + \text{MRO} + \text{LTRO} + \text{MLF} = \text{AFL} + \text{RR} + \text{ERR} + \text{DF} \quad (\text{identity 1})$$

However grouping differently the different elements of that identity underlines the relation between the central bank and the banking sector.

The need to borrow from the central bank, designated here as *net liquidity deficit* of the banking sector, correspond to the net value of the autonomous factors (AFL - AFA), plus the reserves requirements. This need is “financed” by the recourse to the different monetary policy instruments offered by the Eurosystem.

$$\text{Net liquidity deficit} = \text{AFL} - \text{AFA} + \text{RR} \quad (\text{identity 2})$$

Where AFL = Autonomous factors on the liabilities side
 AFA = Autonomous factors on the assets side
 RR = reserves requirements

The banking sector *has* to borrow that amount by using any of the monetary policy instruments used by the Eurosystem: the main refinancing operations (MRO), the longer term refinancing operations (LTRO), or the Marginal Lending Facility¹⁸ (MLF). If the banks were to borrow more than necessary, the excess liquidity (see section 5) could remain deposited on the current accounts held for the sake of reserves requirements. However individual banks would then run the risk that at the end of the maintenance period their average deposit exceeds their requirement in which case the excess is not remunerated¹⁹ (see also footnote 5). To avoid such a loss of remuneration, banks prefer using the Deposit Facility²⁰. Of course, symmetrically, if banks did not borrow enough to cover their liquidity needs, they will maintain less than required on

¹⁸ The marginal lending facility allows bank to borrow on an overnight basis, but is quite expensive, which explains that banks do not use it for large amounts. The interest rate was, at that time 100 basis points higher than the rate applied to the MRO.. Between October 2008 and January 2009, the interest rate was fixed at 50 basis points above the MRO rate, this spread becoming 75 bps from May 2009 onwards.

¹⁹ The reserves requirements have to be fulfilled on average over a period of approximately one month. That means that, as already indicated, during the maintenance period the current accounts could be lower or higher than the requirements. It is only at the end of the maintenance period that the Eurosystem verifies whether did indeed fulfil their requirements. The exact holding of reserves is remunerated at the MRO rate. If the average holding of a given bank over the period is below its required reserves, the bank is subject to a financial sanction, while any excess reserve is not remunerated at all.

²⁰ The deposit facility is remunerated at a rate that is at that time 100 basis points below the MRO rate, therefore that facility is not very attractive. Between October 2008 and January 2009, the interest rate was fixed at 50 basis points below the MRO rate while this spread became 75 bps from May 2009 onwards.

their current account. If such a situation occurs during a reserve maintenance period, they may still have enough time before the end of the period to borrow what is necessary to reach the required average. Ultimately, banks may use the marginal lending facility (MLF). The averaging provision in theory allows banks to wait until the last day of the maintenance period before taking recourse to the MLF, which explains indeed the observation that both standing facilities were normally used only at the very end of the maintenance period.

$$\text{Net borrowing of the banking sector} = \text{MRO} + \text{LTRO} + \text{MLF} - \text{DF} - \text{ERR} \quad (\text{identity 3})$$

Where

- MRO = borrowing via the main refinancing operations
- LTRO = borrowing via the longer term refinancing operations
- MLF = borrowing via the marginal lending facility
- DF = use of the deposit facility
- ERR = current account holding in excess of the required reserves (a negative sign means that the holdings are below the requirement)

The Eurosystem balance sheet of 29 June 2007 illustrates several elements.

Using the above notation (identities 2 and 3) one can write the tautological identity:

$$\text{AFL} - \text{AFA} + \text{RR} = \text{MRO} + \text{LTRO} + \text{MLF} - \text{DF} - \text{ERR} \quad (\text{identity 4})$$

Or:

$$(\text{MRO} + \text{LTRO} + \text{MLF}) - (\text{AFL} - \text{AFA} + \text{RR}) = \text{DF} + \text{ERR} \quad (\text{identity 5})$$

Where

- $\text{MRO} + \text{LTRO} + \text{MLF} = \textit{gross borrowing}$
- $\text{AFL} - \text{AFA} + \text{RR} = \textit{net liquidity deficit}$
- MLF = borrowing via the marginal lending facility
- $\text{DF} + \text{ERR} = \textit{Excess Liquidity}$ (i.e. use of the deposit facility current account holding in excess of the requirements, and use of the deposit facility)
- $(\text{MRO} + \text{LTRO} + \text{MLF}) - (\text{ERR} + \text{DF}) = \textit{net borrowing}$

Of course, identity 4 and 5 are equivalent to identity 1, but they underline some concepts.

The notion of *net borrowing* is useful. It makes explicit that the banking sector indeed borrows from the Eurosystem through the different types of operations (MRO, LTRO, and MLF), let us call this the *gross borrowing*. Yet the banking sector, as a whole, may simultaneously *lend* to the central bank by maintaining deposits on the current accounts in excess of the required reserves (ERR) or on the deposit facility (DF).

The notion of “excess liquidity” simply refers to a situation where the gross borrowing of the banking sector is larger than the actual liquidity deficit, leading either to the accumulation of excess reserves or recourse to the deposit facility (or both, of course). Identity 4 shows that *the net borrowing of the banking sector is necessary equal to its liquidity deficit*. Nevertheless, in practice either the *gross borrowing* equals the *net liquidity deficit*, in which case there is no excess reserve or recourse to the deposit facility, or the gross borrowing is larger than the net liquidity deficit, then (identity 5), the banking sector uses the deposit facility and / or maintains excess reserves. It is also possible that, at a specific moment, the banking sector borrows less than its *net liquidity deficit* in which case, the excess reserves turn negative (i.e. the actual current account holdings are smaller than the required reserves)²¹.

As illustrated (in Fig. 17), on 29 June 2007, the net liquidity deficit reached:

AFL	730
<i>minus</i>	
AFA	449
<i>plus</i>	
RR	186 ²²
=	
Net liquidity deficit of the banking sector	467

²¹ Of course, this cannot be the case at the end of a maintenance period, unless banks are ready to afford the sanction imposed for not fulfilling the reserves requirements.

²² In June 2007, for the maintenance period during which the balance sheet was established, the Reserves Requirements for the whole banking sector, reached 186 billion.

While the net borrowing by the banking sector was:

MRO	313
<i>plus</i>	
LTRO	150
<i>plus</i>	
MLF	1
<i>minus</i>	
DF	1
<i>minus</i>	
ERR	-4
=	
Net borrowing by the banking sector	467

The banks that participate in the monetary policy operations of the Eurosystem borrow 464 bn, namely 313 bn through the MRO, 150 bn via the LTRO, and another 1 bn consisting in recourse to the MLF (marginal lending facility). On 29 June 2007, the outstanding amount of what banks borrowed from the central bank was 3 bn short of meeting the liquidity needs, which explains that the current account holdings were slightly below the reserves requirements (182 instead of 186), while some banks were using the Deposit Facility for 1 bn.

The formulation and its concrete illustration lead to some observations.

First the exercise offers a confirmation of the simplified description used earlier (section 5): there is a “mechanical” link between what the banks have to borrow (their *net liquidity deficit*), what they actually borrow, and what they deposit with the central bank: if they borrow more than necessary, the excess will appear as excess liquidity, either in the form of excess holdings on the current accounts or as recourse to the deposit facility (or a combination of both).

Second, in June 2007, banks accessing the Eurosystem borrowed an amount equivalent to the *net liquidity deficit* of the whole banking sector (a small number of banks made recourse to the MLF, for 1 bn, while this was compensated by the fact that another very small number of other banks made a deposit of 1 bn on the deposit facility). This simply means that the banks participating in the operations of the Eurosystem borrowed what the entire banking sector needed while the money market “took care” of the redistribution. At that time a group of 800 banks, out of a population of more than 6.500, actually participated in the monetary policy operations (although not necessarily in each of them: for instance out of that sub-population of 800 banks, 400 were present at the weekly MRO, some of them coming every other week, other only now and then).

Third, the recourse to both standing facilities (marginal lending facility and deposit facility) is very limited in size. In practice, it was only for technical reasons, and more particularly on the last day of a given maintenance period, that this occurred. A bank left with a surplus that could lead to an over-fulfilment of its reserves requirements would lose potentially some remuneration (the excess reserves not being remunerated) while a bank facing a liquidity deficit leading to an under-fulfilment of its reserves obligations would be subject to a sanction. These imbalances could compensate each others if the two banks met on the money market, but in reality it is not always possible and there are banks that never enter in contact (either there is no business relation, or no credit line opened, or more trivially, the banks do not know each other).

Fourth, at that moment the *supply* of liquidity, i.e. the quantity of credit provided through MRO and LTRO operations was under the strict control of the Eurosystem. Indeed week after week (for the MRO), month after month (for the LTRO), the Eurosystem tried and provided through tender procedures the exact amount of credit that the banking sector needed to meet its net liquidity deficit, nothing less nothing more. Therefore, there was no recourse to the standing facilities, unless there was an error in the calculated amount of liquidity to be injected²³, or in the case of a few banks, in spite of the balanced liquidity condition for the entire banking sector, were not able to settle their individual imbalances on the money market, as indicated above.

6.2 Effect of the “Full allotment”

One characteristic of the financial crisis, that appeared with the so-called “sub-prime crisis” and that was reinforced in the aftermath of Lehman Brothers collapse, is that the money market does not function as smoothly as it was indeed the case from the inception of the Euro until August 2007. Banks became and still are quite reluctant to lend to each other.

In 2008 the Governing Council of the ECB took an exceptional decision. As indicated earlier, since 1999 the Eurosystem had controlled the quantity of liquidity to inject into the banking sector. In October 2008 the Governing Council decided to leave to the banking sector itself the choice of the quantity of liquidity to be injected through monetary policy operations. Indeed it decided that all its allocations of credit, for all maturities, 1-week, 1-month²⁴, three-month, six-month, and later-on 1-year and 3-year operations will be based on a fixed rate (the policy rate, i.e. the MRO rate)²⁵ with full

²³ In practice, the autonomous factors are not constant, and the ECB has to anticipate their evolution over a given maintenance period : this exercise can lead to minor forecast errors that are in principal compensated by the ad-hoc use of fine tuning operations, and/or by limited recourses to the standing facilities.

²⁴ In fact the ECB organises an operation covering the full length of a maintenance period, therefore the maturity can be different from a period to another, and is not strictly speaking equal to one month. In addition, the rate applied to all LTRO with a maturity equal or above 3-month, is equal to the average MRO rate over the life of a given operation.

²⁵ To be precise, for the operations with a maturity of 3 months or more, the rate to be paid at maturity is equal to the average rate of the MRO over the life of the respective operations.

allotment. From then onwards the banking sector decides itself how much liquidity it acquires from the Eurosystem.

Until that decision, the Eurosystem managed the supply of liquidity through its operations while the demand was reflecting the autonomous factors evolutions. The Eurosystem also influences the demand by imposing reserves requirements one of their functions being precisely increasing the demand of liquidity by banks (hence the name *enlargement* attached to that function). Since October 2008, the banking sector itself determines the supply of liquidity, available on tap.

Yet, the net supply of liquidity still corresponds to the net liquidity deficit, in turn determined by the autonomous factors and the reserves requirement!

In a nutshell providing to the banking sector an amount of liquidity equal to the *net liquidity deficit* is considered as no longer appropriate: the banks that benefit from a liquidity surplus are no longer ready to lend on the money market, which forces the banks in search of liquidity to borrow from the central bank!

The balance sheet of the Eurosystem at the end of September 2011 illustrates these changes (Fig. 18).

Fig. 18 - Consolidated Balance sheet of the Eurosystem (€ billion): 30 September 2011

<i>Assets</i>		<i>Liabilities</i>			
	USD Repos	0	0	<u>Claim US Federal Reserve</u>	
AFA	<u>Autonomous liquidity factors (assets)</u>	982	1228	<u>Autonomous liquidity factors</u>	AFL
	Net foreign assets	611	857	(liabilities)	
	Domestic assets	371	52	Banknotes issued	
			319	Government deposits	
				Other autonomous factors (net)	
CBBP + SMPA	<u>Monetary policy instruments</u>			<u>Monetary policy instruments</u>	
	Securities held for mon. pol. purposes	220	157	Absorbing operations related to SMP	SMPL
MRO	Main refinancing operations	208	205	Current accounts*	RR +
LTRO	Longer term refinancing operations	379			ERR
MLF	Marginal lending facility	1	200	Deposit Facility	DF
		<u>1790</u>	<u>1790</u>		
				* reserves requirements during the current maintenance period: 208	

Source: ECB, Weekly Financial Statements

Before applying the same arithmetic as in 2007, a few elements deserve further clarification.

First, operations in USD appear on the top of the balance sheet: they correspond to the dollars lent to the Eurosystem by the Federal Reserve System that the Eurosystem then lent further to banks located in the euro area. However, the two amounts are strictly equivalent and do not affect the liquidity in euro provided by the Eurosystem. In particular, on the 30 September 2011 there was no outstanding amount.

Second, a new item appears: “Securities held for monetary policy purposes”. It encompasses the purchases of covered bank bonds under the so-called Covered Bond Purchase Programme (CBPP) and the purchases of bonds under the Securities Markets Programme (SMP). However in the latter case, the injection of liquidity resulting from the purchases, appearing on the assets side (SMPA), is specifically withdrawn through ad-hoc absorbing operations that appear on the liabilities side (SMPL: Absorbing Operations related to SMP). Without these specific absorbing operations, the recourse to the deposit facility would simply increase by an amount equal to the SMP outstanding amount²⁶. Consequently, identity 5 should now include the CBPP and SMP liquidity injection (equal to CBBP + SMPA – SMPL where, normally, SMPA equals SMPL²⁷).

$$\begin{aligned} & (\text{MRO} + \text{LTRO} + \text{MLF} + \text{CBPP} + \text{SMPA} - \text{SMPL}) - (\text{AFL} - \text{AFA} + \text{RR}) \\ & = \text{DF} + \text{ERR} \quad (\text{identity 5.2}) \end{aligned}$$

$$\text{As } \text{SMPA} - \text{SMPL} = 0,$$

$$\begin{aligned} & (\text{MRO} + \text{LTRO} + \text{MLF} + \text{CBPP}) - (\text{AFL} - \text{AFA} + \text{RR}) \\ & = \text{DF} + \text{ERR} \quad (\text{identity 5.3}) \end{aligned}$$

Taking these changes into accounts, applying the arithmetic used before and knowing that the reserves requirements amounted to 208 bn during the maintenance period, leads to identify:

²⁶ These absorbing operations are often qualified as “sterilisation” tools. Actually the size impact of SMP on the liabilities side of the Eurosystem balance sheet is not modified by the specific absorbing operations: simply, instead of appearing on the deposit facility, the liquidity effect of the purchases appears on another item, namely the “term deposits” (that offer a one-week maturity). To really sterilise the purchases another item on the assets side of the balance sheet should have ensured the compensating measure, or at least the absorbing operations should have offered a much longer maturity (more than one year, for instance). The Eurosystem could have reduced in due course the volume of liquidity injected through monetary policy operations (e.g. MRO, LTRO ...). However this was not possible because at that moment the Eurosystem was under the regime of “fixed rate, full allotment”.

²⁷ However it happened now and then that the absorption of SMP related liquidity, that takes place week after week (in the form of an always renewed one-week term deposit), failed to counterbalance the outstanding amount of SMP. In the terms adopted here, SMPL should be equal to SMPA, but it can happen, occasionally that a difference remains

$$\text{Net liquidity deficit} = \text{AFL} - \text{AFA} + \text{RR} = 1228 - 982 + 208 = 454$$

At the same time, the *gross borrowing* from the Eurosystem (including the injection of liquidity through the CBPP), equals:

$$\text{Gross borrowing} = (\text{MRO} + \text{LTRO} + \text{MLF} + \text{CBPP}) = 208 + 379 + 1 + 63^{28} = 651$$

Therefore, following the mechanics of the central bank balance sheet, the identity 5.3 (adapted for CBPP), tells that:

$$\begin{aligned} (\text{MRO} + \text{LTRO} + \text{MLF} + \text{CBPP}) - (\text{AFL} - \text{AFA} + \text{RR}) &= 651 - 454 = 197 \\ &= \text{DF} + \text{ERR} \end{aligned}$$

Indeed the balance sheet shows that the sum of the recourse to the deposit facility (200) and the excess reserves deposited on the current accounts (ERR is negative, as the current accounts outstanding is below the reserves requirements: $205 - 208 = -3$), equals to 197.

It is striking to observe that the *net liquidity deficit of the banking sector* in June 2007 and September 2011 are very similar: 467 and 454 bn respectively. Indeed, the composition of the autonomous factors has evolved but, for instance, the movements in other autonomous factors compensated an increase of banknotes in circulation from 633 to 857 bn. Therefore the *net borrowing by the banking sector* is equal to the amount of 454 bn.

However the *gross borrowing*²⁹ is much larger, reaching 651 bn, compensated by a large recourse to the deposit facility.

To summarise (Fig. 19):

²⁸ The Eurosystem publishes the exact outstanding amount of CBPP portfolio. In the present case owing to the fact that the SMP share of the outstanding “CBPP + SMP” portfolios (220 bn) is compensated by the specific SMP related absorbing operations (157 bn), one can easily infer that the sole CBPP portfolio amounts to 63 bn.

²⁹ Strictly speaking the banking sector does not “borrow” liquidity when selling Covered Bank Bonds to the Eurosystem, yet is “receives” it. For the sake of the argument, they also contribute to the “injection” of liquidity to the banking sector.

Fig. 19 - Allocation of excess liquidity between Excess Reserves and Deposit Facility

		29.06.07	30.09.11
<i>a</i>	<i>Gross borrowing = (MRO + LTRO + MLF + CBPP)</i>	464	621
<i>b</i>	<i>Net liquidity deficit = AFL – AFA + RR</i>	467	454
<i>c</i> = a - b = d + f	Excess Liquidity	-3	197
d	DF	1	200
f	ERR	-4	-3

6.3 Developments in 2012

Fig. 20 - Consolidated Balance sheet of the Eurosystem (€ billion): 30 December 2011

		<i>Assets</i>		<i>Liabilities</i>	
	USD Repos	66	66	Claim US Federal Reserve	
AFA	<u>Autonomous liquidity factors (assets)</u>	1010	1299	<u>Autonomous liquidity factors (liabilities)</u>	AFL
	Net foreign assets	631	889	Banknotes issued	
	Domestic assets	379	65	Government deposits	
			345	Other autonomous factors (net)	
CBBP + SMPA	<u>Monetary policy instruments</u>			<u>Monetary policy instruments</u>	
	Securities held for mon. pol. purposes	274	211	Absorbing operations related to SMP	SMPL
MRO	Main refinancing operations	145	224	Current accounts*	RR + ERR
LTRO	Longer term refinancing operations	704			
MLF	Marginal lending facility	15	414	Deposit Facility	DF
		2214	2214		
		0	0		
				* reserves requirements during the current maintenance period: 206	

Source: ECB, Weekly Financial Statements

In 2012, especially after the launch of two LTRO with a 3-year maturity³⁰, quite a substantial evolution took place, in sequences.

First (Fig. 20), after the launch of the first 3-year LTRO the net liquidity deficit has increased by around 40 bn in comparison with the situation 3 months earlier.

$$\text{Net liquidity need} = \text{AFL} - \text{AFA} + \text{RR} = 1299 - 1010 + 206 = 495$$

The *gross borrowing* has been influenced by the 3-year LTRO that took place in December 2011 (even if the 489 bn borrowed through that precise operation have been partially compensated by a reduction of the outstanding amount of other operations: the net impact was limited to 210 bn). Compared with the balance sheet of September 2011, the banking sector borrowed quite a larger amount from the Eurosystem.

$$\text{Gross borrowing} = (\text{MRO} + \text{LTRO} + \text{MLF} + \text{CBPP}) = 145 + 704 + 15 + 63 = 927$$

A substantial increase in the gross borrowed amount (by around 275 bn) adjacent to a more limited evolution of the net liquidity deficit leads necessarily to an increased use of the deposit facility.

$$\begin{aligned} (\text{MRO} + \text{LTRO} + \text{MLF} + \text{CBPP}) - (\text{AFL} - \text{AFA} + \text{RR}) &= 927 - 495 = 432 \\ &= \text{DF} + \text{ERR} = 414 + 18 \end{aligned}$$

Fig. 21 - Allocation of excess liquidity between Excess Reserves and Deposit Facility

		29.06.07	30.09.11	30.12.11
a	Gross borrowing = (MRO + LTRO + MLF + CBPP)	464	621	927
b	Net liquidity deficit = AFL - AFA + RR	467	454	495
c	Excess Liquidity	-3	197	432
	= a - b			
	= d + f			
d	DF	1	200	414
f	ERR	-4	-3	18

Pursuing the exercise (Fig. 22), the launch of second 3-year LTRO also had an impact on the Eurosystem balance sheet, even more pronounced because the net liquidity deficit (Fig. 23) became smaller since mid-January, due to the reduction of the reserves

³⁰ On 21 December 2011 and 26 February 2012, respectively.

requirement ratio decided in December 2011 and applicable from mid-January 2012 onwards³¹.

These developments, including the introduction of a second 3-year LTRO, shaped the Eurosystem balance sheet further.

Fig. 22 - Consolidated Balance sheet of the Eurosystem (€ billion): 2 March 2012

		<i>Assets</i>		<i>Liabilities</i>	
	USD Repos	53	53	<u>Claim US Federal Reserve</u>	
AFA	<u>Autonomous liquidity factors (assets)</u>	1013	1283	<u>Autonomous liquidity factors</u>	AFL
	Net foreign assets	621	871	(liabilities)	
	Domestic assets	379	135	Banknotes issued	
			277	Government deposits	
				Other autonomous factors (net)	
CBBP +	<u>Monetary policy instruments</u>			<u>Monetary policy instruments</u>	
SMPA	Securities held for mon. pol. purposes	284	220	Absorbing operations related to SMP	SMPL RR + ERR
MRO	Main refinancing operations	29	91	Current accounts*	
LTRO	Longer term refinancing operations	1100		Deposit Facility	DF
MLF	Marginal lending facility	1	821		
		<u>2468</u>	<u>2468</u>		
				* reserves requirements during the current maintenance period: 104	

Source: ECB, Weekly Financial Statements

Compared with the situation at the end of 2011 (Fig. 20), the composition of the balance sheet has changed: in particular the share of the MRO has been reduced substantially, while the LTRO outstanding amounts have increased further (even if some substitution took place, within that category, between credits with a 3-month or a 6-month maturity and the recourse to the 3-year LTRO).

Necessarily, the liabilities side has followed the same evolution.

The reader will easily identify the *net liquidity deficit* (387 bn, taking into account the reduction of the reserves requirements to 104 bn), the *gross borrowing* (1194), that in turn explain the recourse to the *deposit facility* (821 bn) while the *current account outstanding* was only 91 (below the reserves requirements, see section 6.4).

³¹ The reserve ratio has been reduced from 2% to 1%, which implies a reduction of the reserves requirements by half, provided the reserve base remains unchanged, which was practically the case in January 2012.

Fig. 23 - Allocation of excess liquidity between Excess Reserves and Deposit Facility

		29.06.07	30.09.11	30.12.11	02.03.12
<i>a</i>	<i>Gross borrowing</i> = (MRO + LTRO + MLF + CBPP)	464	621	927	1194
<i>b</i>	<i>Net liquidity deficit</i> = AFL – AFA + RR	467	454	495	387
<i>c</i> = <i>a</i> - <i>b</i> = <i>d</i> + <i>f</i>	Excess Liquidity	-3	197	432	807
d	DF	1	200	414	821
f	ERR	-4	-3	18	-13

6.4 Volatility of the Deposit Facility

As illustrated the recourse to the deposit facility of the Eurosystem has evolved quite substantially over the last years, from occasional and anecdotic amounts to levels occupying a substantial share of the whole Eurosystem balance sheet.

The previous sections clearly showed that the evolution is not due to any dramatic changes in the net liquidity deficit of the banking sector, at least until the beginning of 2012 (when the reserves requirements were reduced by half). In other words the *net borrowing by the banking sector* did not move much either.

The main factor behind that evolution is the increase of excess liquidity, defined as the difference between *gross borrowing and net borrowing by the banking sector* that reflects the increased role of the Eurosystem as an intermediary between cash-rich banks that prefer maintaining deposits with the central bank to lending to other banks. This in turn obliges the cash-poor banks to borrow more from the central bank.

Other factors have an impact on the recourse to the deposit facility.

Before the crisis, banks not only avoided maintaining excess reserves beyond their actual reserves requirements, but in addition, in line with the allotment policy of the Eurosystem, maintained their current accounts at an almost constant level during the maintenance period. With the crisis, an appetite for “frontloading” appeared, following which the current account holdings are well above the required average at the beginning of the maintenance period, and well below later on, while reaching the average over the entire period. The banks are quite keen at securing quite early in the maintenance period their fulfilment of the reserves requirements, in order not to be obliged to “struggle” when the end of period arrives. This phenomenon is illustrated (Fig. 27) by the serrate evolution of the current accounts of banks with the Eurosystem.

The *excess* reserves therefore move from a large positive level at the beginning of the maintenance period (up to 100 bn recently) to an equally large negative level at the end.

This has a direct impact on the recourse to the deposit facility. For a given amount of excess liquidity to be deposited with the Eurosystem, large excess reserves mechanically imply a lower recourse to the deposit facility while negative excess

reserves implies a larger use of the latter: the two are mutually substitute. As illustrated by evolution since the second half of 2011, this pattern remains present, while the total excess liquidity (defined as the *gross borrowing* minus the *net liquidity deficit*) increases.

Using the terminology adopted earlier, DF and ERR are substitute, whether the sum of the two increases or not.

Finally, a technical element influences the evolution of the sum of DF and current accounts: in the past at the end of maintenance periods, the Eurosystem systematically organised a *liquidity absorbing fine-tuning operation*. It collected funds for one day (overnight), on a specific account that was neither the current account nor the deposit facility. Of course the total balance sheet, and in particular the liabilities did not change at all, but instead of using two possibilities, banks had on that day a third one. January 2012 saw the discontinuation of this systematic liquidity absorption..

6.5 Effect of the deposit facility rate at zero percent

On 5 July 2012, the Governing Council of the ECB decided to decrease the interest rate on the main refinancing operations by 25 basis points to 0.75 %. At the same time it decided to decrease the interest rates on both the marginal lending facility and the deposit facility by 25 basis points, to 1.50% and 0.00% respectively.

As seen earlier (see section 5.1), banks normally have no interest in maintaining excess reserves on their current account as the required reserves only are remunerated. Banks facing an excess liquidity will use the deposit facility instead, because it usually offers some remuneration, even if rather low. However when the rate of the deposit facility doesn't offer a remuneration any longer, banks are indifferent between keeping funds in excess reserves on the current account and making recourse to the deposit facility.

Fig. 24 - Consolidated Balance sheet of the Eurosystem (€ billion): 6 July 2012

	<i>Assets</i>		<i>Liabilities</i>		
	USD Repos	30	30	<u>Claim US Federal Reserve</u>	
AFA	<u>Autonomous liquidity factors (assets)</u>	1000	1427	<u>Autonomous liquidity factors</u>	AFL
	Net foreign assets	649	898	(liabilities)	
		351		Banknotes issued	
	Domestic assets		135	Government deposits	
			394	Other autonomous factors (net)	
	<u>Monetary policy instruments</u>			<u>Monetary policy instruments</u>	
CBBP + SMPA	Securities held for mon. pol. purposes	281	210	Absorbing operations related to SMP	SMPL RR + ERR
MRO	Main refinancing operations	164	92	Current accounts*	
LTRO	Longer term refinancing operations	1078			
MLF	Marginal lending facility	1	795	Deposit Facility	DF
		<u>2554</u>	<u>2554</u>		
				* reserves requirements during the current maintenance period: 107	

Source: ECB, Weekly Financial Statements

Fig. 25 - Consolidated Balance sheet of the Eurosystem (€ billion): 13 July 2012

	<i>Assets</i>		<i>Liabilities</i>		
	USD Repos	31	31	<u>Claim US Federal Reserve</u>	
AFA	<u>Autonomous liquidity factors (assets)</u>	999	1451	<u>Autonomous liquidity factors</u>	AFL
	Net foreign assets	648	898	(liabilities)	
	Domestic assets	351	132	Banknotes issued	
			421	Government deposits	
				Other autonomous factors (net)	
	<u>Monetary policy instruments</u>			<u>Monetary policy instruments</u>	
CBBP + SMPA	Securities held for mon. pol. purposes	282	212	Absorbing operations related to SMP	SMPL RR + ERR
MRO	Main refinancing operations	164	480	Current accounts*	
LTRO	Longer term refinancing operations	1084			
MLF	Marginal lending facility	1	387	Deposit Facility	DF
		<u>2561</u>	<u>2561</u>		
				* reserves requirements during the current maintenance period: 107	

Source: ECB, Weekly Financial Statements

Fig. 26 - Allocation of excess liquidity between Excess Reserves and Deposit Facility

		29.06.07	30.09.11	30.12.11	02.03.12	06.07.12	13.07.12
<i>a</i>	<i>Gross borrowing = (MRO + LTRO + MLF + CBPP)</i>	464	621	927	1194	1314	1319
<i>b</i>	<i>Net liquidity deficit = AFL – AFA + RR</i>	467	454	495	387	534	559
<i>c</i> = <i>a</i> - <i>b</i> = <i>d</i> + <i>f</i>	Excess Liquidity	-3	197	432	807	780	760
d	DF	1	200	414	821	795	373
f	ERR	-4	-3	18	-13	-15	387

The comparison between the two situations (Fig. 24, 25 and 26), with an interval of only one week is quite straightforward (knowing that the reserves requirements were 107 bn in both cases, even if the first balance sheet corresponds to the end of a maintenance period, while the second is situated at the beginning of the following one)..

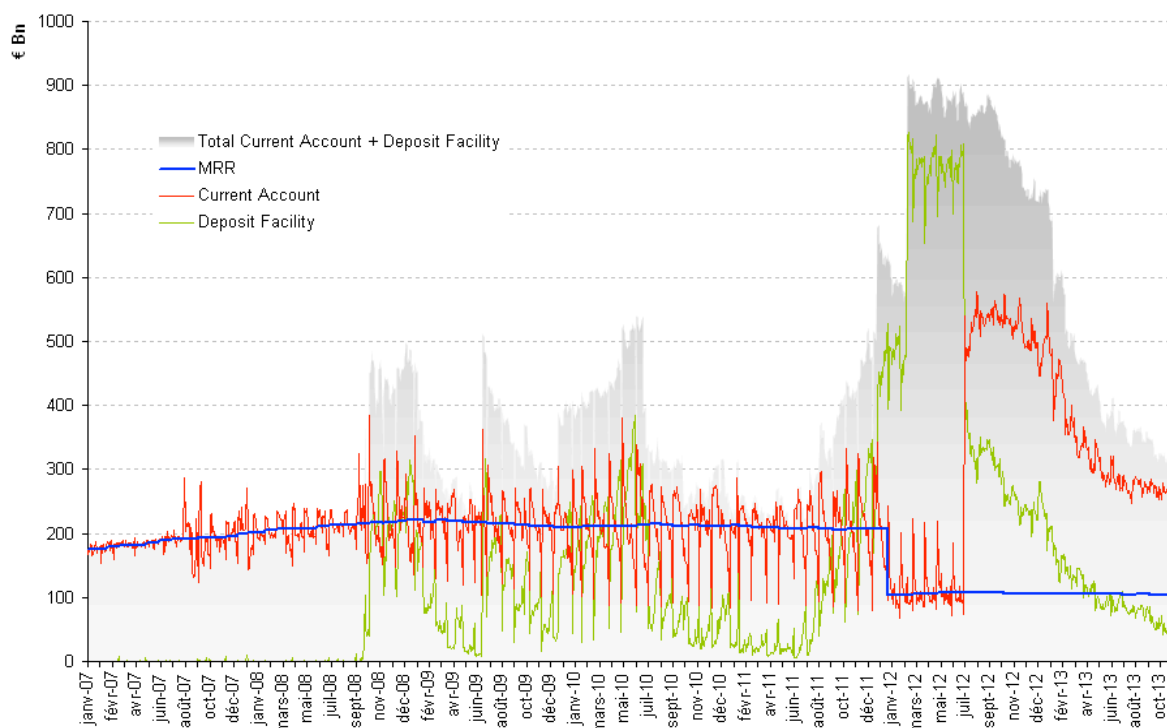
The net liquidity deficits are quite similar: 534 bn and 559 bn.
The gross borrowing barely moves: from 1314 bn to 1319 bn.

Therefore the excess liquidity is necessarily similar at both dates, and indeed it reached 780 bn on 6 July and 760 one week later.

However the distribution of that excess liquidity between excess reserves (ERR) and recourse to the deposit facility is very different. In the first case, the excess liquidity found its way towards the deposit facility exclusively. The excess reserves were even negative, which illustrates the behaviour of banks in relation with the fulfilment of the reserves requirements. Having frontloaded their reserves (as explained at the beginning of this section), they can afford reducing the amounts maintained on their current account, even below the required reserves when approaching the end of the maintenance period.

One week later, the distribution is very different: by a scissor effect, both excess reserves on the current accounts (373 bn) and the deposit facility (387 bn) share almost evenly the absorption of the excess liquidity. Again (Fig. 27) the sole observation of the deposit facility would provide a wrong measure of the excess liquidity, which cannot be appreciated without taking into account the level of reserves requirements and the use of the current accounts for parking part of the excess liquidity in the form of excess reserves.

Fig. 27 - Reserves requirements (RR), current accounts, and Deposit Facility



Finally, in January 2013, a new development took place. When announcing the launch of two 3-year LTROs, the ECB indicated among the various modalities, that “... after one year counterparties will have the option to repay any part of the amounts they are allotted in the operations, on any day that coincides with the settlement day of a main refinancing operation”³². The first anticipated repayment took place on 30 January (value date) when 137 bn of the initially 498 bn borrowed (Fig. 28) were reimbursed.

³² ECB Press release of 8 December 2011.

Fig. - 28 Consolidated Balance sheet of the Eurosystem (€ billion): 1 February 2013					
	<i>Assets</i>		<i>Liabilities</i>		
	USD Repos	5	5	<u>Claim US Federal Reserve</u>	
AFA	<u>Autonomous liquidity factors (assets)</u>	985	1474	<u>Autonomous liquidity factors</u>	AFL
	Net foreign assets	650	884	(liabilities)	
	Domestic assets	335	73	Banknotes issued	
			517	Government deposits	
				Other autonomous factors (net)	
CBBP +	<u>Monetary policy instruments</u>			<u>Monetary policy instruments</u>	
SMPA	Securities held for mon. pol. purposes	271	209	Absorbing operations related to SMP	SMPL
MRO	Main refinancing operations	124	408	Current accounts*	RR +
LTRO	Longer term refinancing operations	891			ERR
MLF	Marginal lending facility	0	181	Deposit Facility	DF
		<u>2277</u>	<u>2277</u>		
				* reserves requirements during the current maintenance period: 105	

Source: ECB, Weekly Financial Statements

During the course of 2013 the reimbursements continued albeit at a reduced pace. In parallel, both size of the Eurosystem balance sheet shrunk which could be interpreted as a sign of improvement on the money market, banks being less reluctant to lend to one another.

As illustrated by the Eurosystem balance sheet (Fig. 29) of mid October, both the excess reserves and the recourse to the deposit facility are much lower than by at the beginning of the year, while observing that the net liquidity needs are of an order of magnitude comparable to what it was since the beginning of 2012

Fig. - 29 Consolidated Balance sheet of the Eurosystem (€ billion): 18-10-2013					
	<i>Assets</i>			<i>Liabilities</i>	
	USD Repos	0	0	<u>Claim US Federal Reserve</u>	
AFA	<u>Autonomous liquidity factors (assets)</u>	932	1426	<u>Autonomous liquidity factors (liabilities)</u>	AFL
	Net foreign assets	551	919	Banknotes issued	
	Domestic assets	381	71	Government deposits	
			436	Other autonomous factors (net)	
CBBP + SMPA	<u>Monetary policy instruments</u>			<u>Monetary policy instruments</u>	
	Securities held for mon. pol. purposes	247	188	Absorbing operations related to SMP	SMPL
MRO	Main refinancing operations	914	269	Current accounts*	RR +
LTRO	Longer term refinancing operations	658			ERR
MLF	Marginal lending facility	0	46	Deposit Facility	DF
		<u>1929</u>	<u>1929</u>		
				* reserves requirements during the current maintenance period: 104	

Source: ECB, Weekly Financial Statements

Fig. 30 - Allocation of excess liquidity between Excess Reserves and Deposit Facility

		29.06.07	30.09.11	30.12.11	02.03.12	06.07.12	13.07.12	01.02.13	18.10.13
a	Gross borrowing = (MRO + LTRO + MLF + CBPP)	464	621	927	1194	1314	1319	1077	808
b	Net liquidity deficit = AFL - AFA + RR	467	454	495	387	534	559	594	597
c	Excess Liquidity	-3	197	432	807	780	760	483	221
	= a - b								
	= d + f								
d	DF	1	200	414	821	795	373	181	165
f	ERR	-4	-3	18	-13	-15	387	302	46

7. Conclusions

7.1 Absence of link between credit and central bank balance sheet size

The first sections of this note show that there is no immediate link between the credit activity by banks, and the size of the balance sheet of the central bank in particular the recourse to both the central bank credit and any form of central bank deposit.

The increase of the deposit facility does not provide information about the use by banks of funds borrowed from the central bank.

When a given bank borrows from the Central Bank, it can use these funds for different purposes. It may for instance grant a credit to an economic agent, company, household, who in turn uses that credit to buy goods. The seller of the goods will be paid on its bank account: this creates an excess of liquidity for that second bank. The “money” can be transfer 5, 10 or 100 times, at the end it appears on the balance sheet of a bank. That last bank faces a liquidity surplus that necessarily will be “deposited” in one form or the other with the Central Bank.

Another possibility, the bank that borrows from the Central Bank makes immediately a deposit with the central bank (however unrealistic and irrational this could be in terms of costs).

In both scenarios, an increase of deposits (in whichever form) with the Central Bank will reflect the increase of the liquidity provision by the central bank. Therefore it does not make sense concluding on credit development by observing the evolution of the deposit facility only.

7.2 The large recourse to the Eurosystem deposit facility is a sign of the malfunctioning money market.

Both the simplified model and the concrete illustrations show that the liquidity needs of banks are the results of flows, in and out. The imbalances resulting from those flows could be settled easily, with banks in surplus granting interbank loans to bank facing a liquidity deficit. In reality in a large banking sector, banks establish multilateral relations with many banks, and settle their liquidity needs on the money market, through different instruments (deposits, repos, etc.)

The net liquidity deficit of the entire banking sector is not nil: the whole banking sector faces a liquidity deficit because it has to “pay” for the banknotes it has to acquire (following the demand of their clients) and is obliged to maintain mandatory reserves with the Eurosystem. The net needs (net liquidity deficit) of the banking system hover around 400-500 bn over the last years (Fig. 30). However not each bank facing a liquidity need comes to the Central Bank; only some of them do, and redistribute the liquidity to other banks via the money market.

In quiet circumstances, it happened that the banks participating to the Eurosystem operations borrowed exactly the 400 to 500 bn corresponding to the net liquidity need of the euro zone banking sector and organised the redistribution of that liquidity among other banks. However, in crisis times, banks are reluctant to lend to each others, therefore those benefiting from an excess of liquidity prefer to lend to the central bank, and those that do not find the liquidity they need on the money market, borrow from the central bank.

Both sides of the balance sheet of the Eurosystem have significantly increased, while the net liquidity deficit is little changed, and the Eurosystem is now the main intermediary, replacing a malfunctioning money market.

Another way to present the same issue: any cent, or Euro, appearing on the assets side of the balance sheet of the central bank, has a counterpart on the liabilities side, bank notes, mandatory reserves or deposits (of different form, maturity, the “deposit facility” being the most “popular”). If the liquidity injection increases (and if there is no reduction of other assets), necessarily one of the liabilities has to increase: in practice the adjustment takes place via the deposit facility and more recently through excess reserves on the current account.

There is a “mechanical” link between the increased liquidity provision by the Eurosystem and the increase of recourse to the deposit facility



BANQUE CENTRALE DU LUXEMBOURG

EUROSYSTEME

2, boulevard Royal
L-2983 Luxembourg

Tél.: +352 4774-1
Fax: +352 4774 4910

www.bcl.lu • info@bcl.lu