A POSSIBLE ROLE FOR ASYMMETRIC STANDING FACILITIES IN LIQUIDITY MANAGEMENT

A possible role for asymmetric standing facilities in liquidity management

The authors of this article are Gabriel Pérez Quirós, of the Directorate General Economics, Statistics and Research, and Hugo Rodríguez Mendizábal, of the Institute for Economic Analysis (Spanish Council for Scientific Research).

Introduction

The Eurosystem's liquidity management policy was designed in such a way that money markets play a central role in distributing and reallocating the reserves injected by the central bank. Not surprisingly, therefore, the negative effects of the financial crisis, which commenced in August 2007, on the functioning of these markets led the monetary authority to modify its liquidity management policy, exploiting the opportunities provided by an operational framework designed to have a notable degree of flexibility. Given the origin of these changes, the need for them is naturally being reconsidered as normality returns to the money and financial markets. However, the experience gained in the meantime in the functioning of these modifications may be useful both for the design of the time-sequence of their withdrawal and for preparing responses in the event that some of the changes that have taken place as a consequence of the crisis prove to be more permanent in nature.

In particular, the process of recovery of market confidence in the solvency of credit institutions is proving complicated, although the recent publication of the results of stress tests has had a notable accelerator effect. The normalisation of the money markets is thus taking place rather gradually. Moreover, it is unlikely that the assessment of risk, in general, and of liquidity risk in particular, that the banks eventually make at the end of the crisis will be at pre-crisis levels. Both considerations make it reasonable to assume that the Eurosystem will continue over the coming months – and perhaps a longer period – to face a higher demand for reserves than before the crisis.

The ongoing provision of large volumes of reserves poses challenges not only in the area of the management of this liquidity (e.g. the maturities it is provided at), but also, for example, in the management of the risks associated with the collateral that the institutions provide for the Eurosystem liquidity loans and in terms of the financial market distortions that may arise if collateral requirements lead banks to demand some types of assets more than others, because the latter are not accepted by the central bank in its monetary policy operations. However, the extent of these challenges will depend crucially on the duration and scope of this greater demand.

Against this background, this article analyses the role that the standing facilities provided for in the Eurosystem's operational framework (the marginal lending facility and the deposit facility) could play in regulating institutions' demand for reserves. The analysis is performed in three stages. First, the role of standing facilities within the context of the operational framework for the implementation of monetary policy and liquidity management is briefly described. Then, the main changes made to this framework in response to the crisis are highlighted. Finally, a theoretical framework is constructed in which a change in the interest rates on the standing facilities to make an asymmetric corridor around the policy rate may reduce the demand for reserves.[1]

Standing credit and deposit facilities

The operational framework of monetary policy in the euro area consists of all the instruments and procedures that the Eurosystem has at its disposal to achieve price stability. A basic ele-

---

1. This article is a summary of Banco de España Working Paper No 1004 *Asymmetric Standing Facilities: An Unexploited Monetary Policy Tool,* by Gabriel Pérez Quirós and Hugo Rodríguez Mendizábal.

ment of these arrangements is the control of short-term interest rates. There are numerous references describing both the tools to control interest rates [see ECB (2008) for a general description of the operational framework] and their eventual repercussions on prices and real activity [see, for example, the papers on the Monetary Transmission Network, summarised in ECB (2002), Angeloni et al. (2003) and ECB (2010)].

The mechanisms for controlling interest rates include standing facilities: the marginal lending facility and the deposit facility. Banks with excess reserves can deposit their excess reserves and obtain a return, which is set by the monetary authorities, normally at below market rates and below the policy interest rate. The interest rate on this facility currently stands 75 basis points below the interest rate on main refinancing operations. Likewise, banks that require reserves can have recourse to the marginal lending facility and obtain financing by paying an interest rate above the market rate and the policy rate (currently 75 bp above the interest rate on main refinancing operations).

Obviously, the Eurosystem could have complete control over short-term market interest rates by reducing the width of the corridor formed by the interest rates on its standing facilities to zero: no bank would pay a higher rate in the market than that on the lending facility, nor would any bank be prepared to lend its surplus cash at a lower rate than that on the deposit facility). But the operational framework of the Eurosystem is designed with a "market" orientation, insofar as the interbank market itself determines the level of short-term interest rates, the task of the central bank being to provide liquidity to ensure that the interbank interest rate is sufficiently close to the interest rate on the main refinancing operations.

Given that the return obtained on the deposit facility is lower than that obtained from interbank market lending, even with collateral, it is costly for banks to build up reserves in deposit facilities. Accordingly, the use of these facilities is an indication of the degree of confidence of the latter in money markets as a source of liquidity. Before August 2007, the limited use of standing facilities showed that credit institutions could find liquidity much more easily in the interbank market and were also easily able to find counterparties for any cash surpluses. Moreover, most transactions were carried out at the end of the maintenance period when the bank knew its liquidity requirements quite accurately and, although the law of one price did not strictly hold – among other reasons, because each bank normally had various counterparties [see Gaspar, Pérez Quirós and Rodríguez Mendizábal (2008)] – the rate differentials between one bank and another and between the types of transactions without collateral and those on the collateralised market (repos) were small. The problems of excess demand or supply that arose at times were associated with technicalities in the functioning of the market, not with fundamental failures of confidence on the part of the banks in their ability to satisfy their liquidity requirements in the markets.

The financial crisis and liquidity management

From August 2007, the progressive loss of confidence among financial intermediaries reduced the ability of the interbank market to redistribute the liquidity injected by the Eurosystem to practically zero. The difference between the interest rates on uncollateralised and collateralised operations rose to completely unprecedented levels (see Chart 1) reflecting the reluctance of banks to lend to each other in the absence of security. In the face of a crisis of confidence of this magnitude, the market fragmented very easily and rapidly.

The Eurosystem responded to this situation by making some important changes to its arsenal of monetary policy and liquidity management instruments. On 8 October 2008, in addition to lowering the interest rates on the main refinancing operations, the ESCB reduced the width of

EURIBOR/EUREPO SPREAD CHART 1

SOURCE: ECB.

the corridor between the lending and deposit facility rates from 200 to 100 bp[2] and decided that the main refinancing operations would be at a fixed rate and with full allotment.

As a result of these changes the Eurosystem not only assumed the role of liquidity provider of last resort, but also the role of redistributing liquidity, which was previously performed by the market. Banks needing liquidity began to make heavy use of main refinancing operations in order to secure their reserves, while those with a long position in liquid funds resorted to the deposit facility in order to obtain a return on such reserves. As can be seen in Chart 2, at the end of September 2008 the use of the deposit facility as a percentage of reserve requirements had increased from levels of close to zero to fluctuate at around 100%, with highs of over 180%.

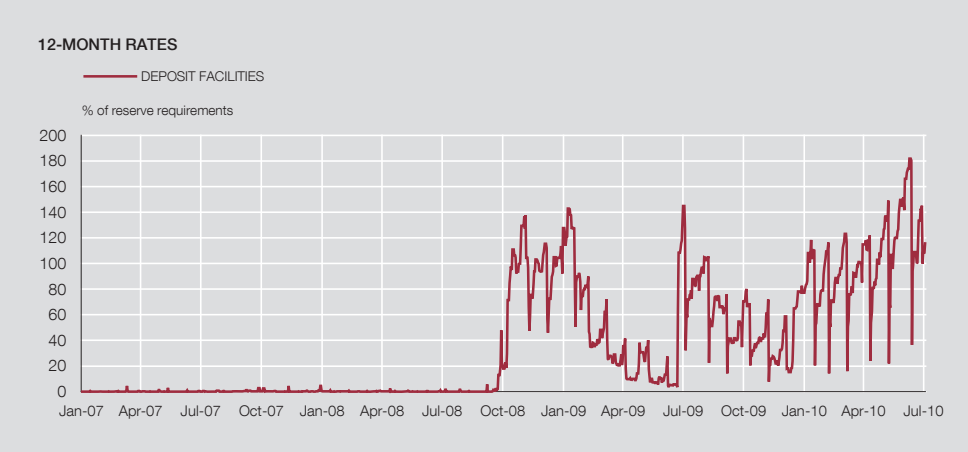
Standing facilities and the demand for reserves

Having briefly reviewed both the role of standing facilities and the strains in the money markets since the start of the crisis, this section outlines a scheme that reproduces the fundamental elements of the operational framework of monetary policy to enable the role performed by the interest rates on standing facilities in credit institutions' demand for reserves to be analysed.

This scheme consists of a set of credit institutions and a central bank with three instruments. The first instrument is a reserve requirement: the amount of reserves held by the credit institutions in their current accounts at the central bank cannot be negative at the end of the day and, over a specific period (known as the "maintenance period"), their cumulative amount cannot fall below a certain amount determined beforehand. The second instrument is the main refinancing operations (MROs), by means of which the central bank injects reserves into the system. In this scheme, the MROs are conducted at a fixed rate and with full allotment (i.e. all the reserves that the banks demand are supplied, at a single fixed interest rate determined by the central bank). To simplify the analysis, without any effect on the results, it can be assumed that there is only one main refinancing operation, which is conducted at the beginning of the maintenance period and matures at the end of the period. Likewise, the overall behaviour of the credit institutions can be assumed to reproduce that

2. This decision was revoked on 15 January 2009, when the Governing Council decided to return to a 200 bp corridor. For further details on these and other measures introduced in response to the crisis, see Millaruelo (2009).

USE OF THE DEPOSIT FACILITY COMPARED WITH RESERVE REQUIREMENTS CHART 2



SOURCE: ECB.

of a single representative bank. Finally, the third instrument of the monetary authority consists of standing facilities. More specifically, there is a marginal lending facility under which the representative bank can apply to borrow reserves at a lower interest rate than the one on main refinancing operations. There is also a deposit facility, under which the same bank can deposit reserves at a higher interest rate than the one on MROs. Since the start of Stage Three of EMU, the interest rate on MROs has always been in the middle of the corridor defined by the interest rates on the standing facilities. However, as will be seen below, the demand for reserves depends not only on the width of the corridor, but also on whether or not the corridor is symmetric with respect to the rate on MROs.

To explain the behaviour of the demand for reserves, in the presence of a reserve requirement, two shocks that affect the liquidity needs of the representative bank are considered. The first one is associated with normal banking business and results in increases or decreases in the balance sheet.[3] When the number of banks is sufficiently large, the law of large numbers guarantees that this shock will not have effects at the aggregate level and is limited to adding idiosyncratic risk to each bank. The second source of uncertainty is designed to capture the effect of the crisis of confidence after the summer of 2007, representing each bank's subjective perception of the possibility of encountering difficult market liquidity conditions. More specifically, it is assumed that the banks assign a certain probability to the existence of a certain amount of aggregate exogenous liquidity withdrawal. Both shocks arise after the MRO has been conducted.

In these circumstances, the problem the representative bank of this simplified economy faces is what amount of reserves to demand from the central bank in each MRO in order to comply with the reserve requirement and to protect itself against liquidity shocks at the lowest possible cost. Generally, the bank will demand reserves until the marginal cost of such reserves is equal to their marginal expected value. Since we assume open market operations with full allotment at a fixed interest rate, the marginal cost is equal to the central bank's key policy rate.

As regards the marginal expected value that the bank assigns to the reserves, it is important to observe that it must combine two possible results: that the amount of liquidity obtained in

3. This shock is modelled as a random variable independently distributed among banks as a normal variable with mean 0 and a strictly positive standard deviation.

the MRO enables it to comply precisely with the reserve requirement at the end of the maintenance period or that this amount is lower (higher) than required, in which case it will have to resort to the marginal lending (deposit) facility and pay (or receive) the related interest rate. Thus, the value of a unit of additional reserves (opportunity cost) is equal to the interest rate on the marginal lending facility when it does not satisfy the reserve requirement. By contrast, the value of a marginal unit of reserves is equal to the interest rate on the deposit facility when the bank has excess reserves at the end of the maintenance period.

Ex ante, at the time of bidding in the main refinancing operation, banks do not know whether they will comply with the reserve requirement at the end of the maintenance period. The marginal expected value will then be equal to the interest rate on the marginal lending facility multiplied by the probability of not satisfying the reserve requirement at the end of the maintenance period plus the interest rate on the deposit facility multiplied by the probability (consistent with the previous one) of having excess reserves at the end of the maintenance period.

At this point, it is important to stress that the marginal expected value of the reserves decreases as the amount of reserves demanded in the MRO rises. The larger the amount of reserves the bank has, the greater the probability of having excess reserves at the end of the period and the greater the weight of the deposit facility interest rate, which is lower than that on the MRO. In particular, the marginal expected value will be close to the interest rate on the marginal lending facility when the demand for reserves is close to zero and will decrease to the rate of interest on the deposit facility when such demand is high. Given that the rate of interest on the MRO is inside the corridor defined by the rates of interest on the standing facilities, there is a level of demand for reserves which equates their marginal cost with their marginal expected value.

Using this analytical scheme it is easy to generate the type of behaviour observed in the current financial crisis, i.e. autonomous increases in the demand for reserves in the MRO, which are deposited in the deposit facility. Starting from an initial equilibrium situation (marginal expected value equal to the MRO rate), if an increase occurs in the probability of an aggregate withdrawal of reserves, the probability of having to access the marginal lending facility at the end of the maintenance period increases and, thus, so does the marginal expected value of reserves. If the MRO interest rate does not change, the banks bring the marginal cost of reserves back into line with their marginal expected value by increasing their demand for reserves in the MRO. These reserves are deposited in the deposit facility and remain there until the shock (which results in an aggregate withdrawal of liquidity) occurs.

One way of reducing this excess demand for reserves would be to set the interest rates on the standing facilities in such a way that they form an asymmetric corridor around the MRO interest rate. Following the above reasoning, when the probability of an aggregate withdrawal increases, the marginal expected value of the reserves can be reduced by lowering the interest rate on standing facilities, while keeping the MRO interest rate unchanged.[4] If the objective is to bring the demand for reserves down to the level prior to the change in the banks' perception, the asymmetry of the rate corridor can be adjusted in this way. The higher the perceived level of risk, the closer the rate on the marginal lending facility must be to the MRO rate.

Final comments

The present crisis is having clear expansionary effects on the demand for reserves in the Eurosystem's main refinancing operations. As long as credit institutions continue to perceive an

4. Alternatively, the interest rate on the marginal lending facility could be reduced on its own, although this would reduce the width of the corridor. In less simplified schemes than the one used here, that may have other effects.

elevated risk of negative liquidity shocks with effects that could not be covered in the money markets, this excess demand will not subside. This poses a number of challenges for the monetary authority's liquidity management policy.

One possible way of regulating an excess demand for reserves without the need to change the operational framework of monetary policy is to set the interest rates on standing facilities in such a way that they form an asymmetric corridor around the level of the interest rates on the main refinancing operations. As explained in this article, autonomous increases in the demand for reserves that are not desired by the Eurosystem may be counteracted by moving the upper limit of this corridor closer to the policy interest rate (and reducing the lower limit by the same amount, if it is desired to keep the width of the corridor unchanged). Intuitively, an asymmetric corridor of this type makes it relatively cheaper to use the marginal lending facility at the same time as it penalises the use of the deposit facility. In this way, the excessive demand for reserves is discouraged, reducing the risk of an undesired accumulation of reserves.

This instrument could enable the monetary policy stance to be more clearly separated from liquidity management and may also be adjusted continually to any change in market conditions. For example, in the present circumstances, in which the exceptional liquidity providing measures introduced during the crisis are gradually being withdrawn, it may be useful to limit during the transition the extent of possible episodes of excessive reserve accumulation and their possible undesired effects on short-term market rates, although it should be pointed out that this transition raises a broader set of challenges, which may have different implications from those considered here. The analysis of these challenges goes well beyond the scope of the objectives of this article.

8.9.2010

REFERENCES

ANGELONI, I., A. K. KASHYAP and B. MOJON (2003) (eds.), *Monetary Policy Transmission in the Euro Area: A Study by the Eurosystem Monetary Transmission Network*, Cambridge University Press, Cambridge, United Kingdom.

EUROPEAN CENTRAL BANK (2002), "Recent findings on monetary policy transmission in the euro area", *Monthly Bulletin*, October.

— (2008), *La aplicación de la política monetaria en la zona Euro, documentación general sobre los instrumentos y los procedimientos de la política monetaria del Eurosistema.*

— (2010), "The ECB's monetary policy stance during the financial crisis", *Monthly Bulletin*, January.

GASPAR, V., G. PÉREZ QUIRÓS and H. RODRÍGUEZ MENDIZÁBAL (2008). "Interest rate dispersion and volatility in the Market for Daily Funds", *European Economic Review*, 52, pp. 413-440.

MILLARUELO, A. (2009). "La instrumentación de la política monetaria del Eurosistema y la crisis financiera", *Boletín Económico*, Banco de España, June.