

## 7 COLLATERAL REQUIREMENTS AND THE MONETARY TRANSMISSION MECHANISM<sup>1</sup>

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ANALYSES  
SPÉCIFIQUES

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### 1 INTRODUCTION

Until 2008, central bank collateral eligibility criteria were mostly viewed as an administrative instrument used for operational purposes, whereas their implications for the monetary policy transmission mechanism and the working of the money market were considered irrelevant. However, these implications have become much more prominent after the rise of the recent financial crisis. As liquidity vanished in the money market, banks used and, according to some commentators, abused central bank funding with greater intensity, in order to cover their financing needs. As a result, collateral eligibility criteria have become an important driver of liquidity in the interbank market as well as a binding factor in the transmission of monetary policy.

After Lehman's collapse, one major problem related to central bank collateral requirements concerned their use for two potentially conflicting objectives: 1) the protection against the counterparty risk implicit in monetary policy operations (implying a microeconomic dimension), and 2) the transmission of the monetary policy input to the banking sector (implying a macroeconomic dimension). Achieving a balance between these two goals is at the heart of the current debate surrounding the choice of optimal collateral eligibility criteria. Indeed, the crisis has clearly shown that collateral availability might place significant constraints on banks' access to liquidity. Central banks became much more conscious of the importance of this issue during the turmoil: in 2008 the Fed (in March), followed by the Bank of England (in April), and finally the ECB (in October, after a U-turn decision) each adopted softer collateral policy stances.

### 2 A CORRECT FRAMEWORK TO MODEL THE IMPLEMENTATION OF MONETARY POLICY

In order to illustrate the role of collateral in monetary policy, and how such a role has evolved over the course of the crisis, we need to reconsider the monetary transmission mechanism. In fact, the traditional view of the channels through which monetary policy achieves its targets is overly simplified and generally inadequate in capturing the significance of the events which have taken place since the summer of 2007<sup>2</sup>. Moreover, in the traditional representation of monetary policy, collateral as a discriminatory factor for banks' access to funding, via central banks or interbank markets, does not play a role. This is in apparent contrast with what has been observed in reality over the last two years.

According to Disyatat (2008)<sup>3</sup>, a properly specified model of the implementation of monetary policy should not interpret the amount of credit granted to the banking sector as a tool for interest rate setting. Indeed, the link between policy rate(s) and central bank balances is only indirect, while the mechanism used by central banks for implementing monetary policy is the opposite of what is usually assumed in neo-classical monetary theories<sup>4</sup>. In truth, this criticism is not new. In the academic debate on monetary policy, all the post-Keynesian schools start their analyses from this point, namely, from the assumption of an endogenous money supply function. The critical point here concerns the role of credit for the money supply formation. Post-Keynesian endogenous money theory emphasizes that the link between the financial and the real

1 This contribution is based on the BCL Working Paper No. 44 : "The role of collateral requirements in the crisis : one tool for two objectives ?", by P. Fegatelli (February 2010).

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2 E.g., 'unconventional' monetary policy measures are inexplicable on the basis of such models.

3 P. Disyatat, "Monetary policy implementation: Misconceptions and their consequences", BIS Working Paper, No. 269, December 2008.

4 Based on the observation of current central bank practice, Disyatat (2008) focuses on the link between key interest rate (the 'policy signal') and central bank balances as the result of using various 'instruments' (open market operations, standing facilities, reserve requirements, etc.).



sectors runs predominantly from credit to money to economic activity. The important feature is that credit is placed at the beginning of this sequence. This contrasts with conventional representations that place money first, as reflected in the typical money multiplier story in which bank deposits are said to create loans<sup>5</sup>.

The origins of the post-Keynesian endogenous money theory go back to Kaldor's (1970, 1982)<sup>6</sup> critique of monetarism. It is significant, however, that as early as 1959 the conclusions of the second Radcliffe Report<sup>7</sup> indicated that the velocity of circulation of money is unstable, so that a) central banks control interest rates, but have only a very indirect control of money aggregates, and b) overall, monetary policy has only a moderate effect on inflation, which depends on many other factors<sup>8</sup>.

Given this theoretical background, the analysis developed here is based on the following representation of the monetary transmission mechanism.

- a. As in Disyatat (2008), the central bank selects a 'policy signal' (to formally express the stance of monetary policy) by fixing a reference rate, or a system of reference rates; e.g., for the ECB the main reference rate is linked to a) the marginal lending facility rate (equal to the main reference rate *plus* a spread), and b) the marginal deposit facility (equal to the main reference rate *minus* a spread).
- b. The reference rate(s) affects the whole system of multiple rates that are used by banks to a) lend to the rest of the economy (corporate borrowers, individuals etc.), and b) borrow/lend in the interbank sector (e.g. money-market, repo, security lending etc.). Such a system of multiple rates is critically related to the degree of reliance by banks on the lender of last resort, namely, the central bank.
- c. Adrian and Shin (2008)<sup>9</sup> have shown that a major source of funding for banks is represented by the interbank market, in particular via repo trades. In normal times, the interbank short-term rates closely follow the pattern of the reference rate. This occurs because banks know that the supply of central bank funds is always sufficient to satisfy their demand, *at the reference rate*<sup>10</sup>. When this is not the case, however, tensions in the interbank market (e.g. due to an excess of demand for funds) determine an increased differential between money market rates and the policy rate (e.g. between the EONIA rate and the main reference rate of the ECB).
- d. Thus, as Disyatat (2008) correctly affirms, open market operations are not used to set interest rates. Instead, *the main function of central bank's open market operations is to satisfy the banks' demand for liquidity, given a certain level of the reference rate, so to avoid any turbulence in the interbank market (by smoothing money market rate volatility)*. In the words of Disyatat, "somewhat paradoxically, the ability to detect a liquidity effect [by monetary policy operations] is greater the less effective is the central bank's liquidity management" (p. 12).

5 T. Palley, "Endogenous money: implications for the money supply process, interest rates, and macroeconomics", P.E.R.I., University of Massachusetts Amherst, WP 178, August 2008, p. 2.

6 N. Kaldor: "The new monetarism", Lloyds Bank Review, 97, 1970, 1-17; and "The scourge of monetarism", Oxford University Press, 1982.

7 In May 1957 a committee chaired by Lord Radcliffe was set up in the U.K. to make recommendations to the government about the working of the British monetary and credit system.

8 M. Lavoie, "Money, Credit and Finance", Lecture at the Summer School on "Keynesian Macroeconomics and European Economic Policies" of the Research Network Macroeconomics and Macroeconomic Policies, Berlin, 28 July 2008.

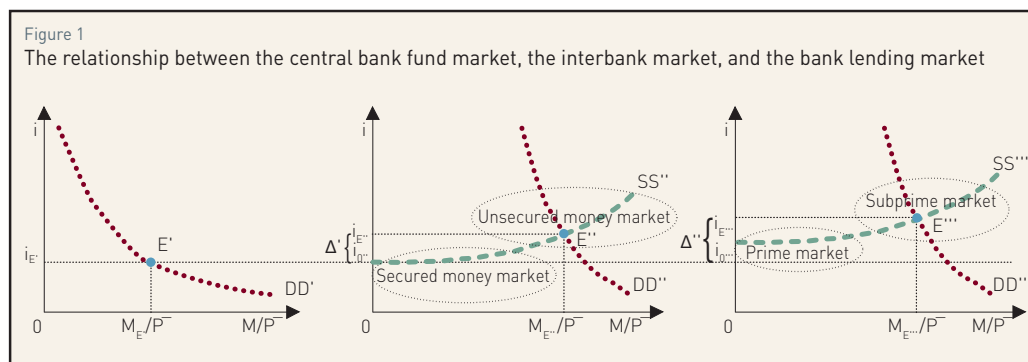
9 T. Adrian and H. S. Shin, "Liquidity, Monetary Policy, and Financial Cycles", Current Issues in Economics and Finance, Vol. 14, No. 1, Federal Reserve Bank of New York, Jan./Feb. 2008.

10 This is not the same as saying that banks could borrow *whatever amount* from the central bank at the reference rate: rather, it means that individual banks' demand for central bank funds is relatively small, so that it can always be fully satisfied, in spite of the limits imposed to the overall supply of central bank balances.

Schematically, our model considers three markets:

1. a market for central banks funds or balances;
2. a market for interbank funds (money market);
3. a market for bank lending to all the other non-bank sectors.

Figure 1 below describes their mutual relationships in terms of interest rate links and related spreads.



The first figure on the left represents the market for central bank funds, which is where open market operations take place. This market is strictly linked to the money market (or interbank market), here represented in the middle. We can suppose that under normal market conditions the spread differential,  $\Delta'$ , between the rates of the two equilibrium points,  $E'$  and  $E''$ , is relatively stable (i.e. its volatility is low) and small. The third market, the one on the right side, is the bank lending market. We suppose that under normal conditions also the spread differential,  $\Delta''$ , between the reference rate,  $E'$ , and the subprime lending rate,  $E'''$ , is relatively stable and not excessively large.

We assume that the transmission mechanism between the bank lending market and the previous two markets is given by the provision of money/credit. That is, banks finance their day-to-day changes to the provision of credit in the bank lending market via two alternative short-term funding channels: central bank funds and interbank (money market) funds. In this way, two further underlying assumptions are the following:

- i. Banks are liable to a maturity mismatch between the average duration of their long-term assets in the bank lending market and the average duration of their short-term liabilities in the two funding markets;
- ii. Deposits are not considered as a viable source for banks to adjust the volume of their liabilities to the volume of their assets in the very short-term, given a certain level of deposit resiliency. This is because depositors do not suddenly move their funds from one bank to another, except under very special circumstances like a bank run.

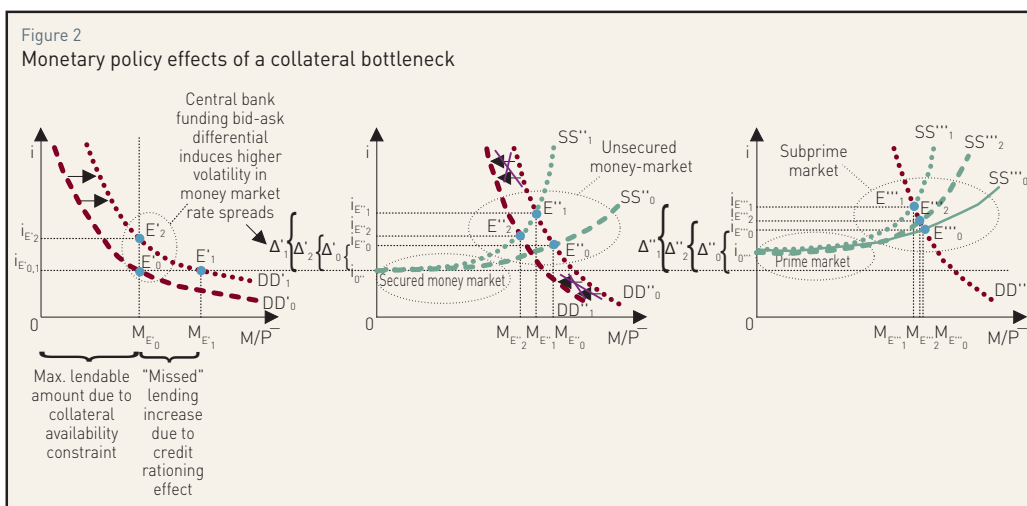
As a consequence, taking deposits as fixed, in our scheme the quantity of money/credit supplied in the bank lending market,  $M_{E'''}/P^-$ , is the sum of the quantities of money/credit collected in the previous two markets,  $M_{E'}/P^-$  and  $M_{E''}/P^-$ . That is, we suppose that funds obtained from the central bank can substitute for funds achieved in the interbank market, and vice versa. As for point d) above, we assume that the main function of central bank open market operations is to ensure the effectiveness of the use of the reference



rate as a monetary policy tool or, in other words, to ensure that the operational targets,  $\Delta'$  and  $\Delta''$ , have relatively low size and volatility. In fact, these two conditions are required for the central bank to pass its interest rate stimuli to the financial and real sectors in an effective way. In statistical terms, this means that even in the presence of a change of the policy rate,  $i_{E'}$ , the first two moments of the distributions of  $\Delta'$  and  $\Delta''$  should remain relatively small and stable<sup>11</sup>.

### 3 THE ROLE OF COLLATERAL ELIGIBILITY CRITERIA

This theoretical framework can be used to explain the rationale of the monetary and collateral policy measures taken by the ECB in the aftermath of Lehman's failure<sup>12</sup>. Among such measures<sup>13</sup>, the enlargement of collateral eligibility criteria for monetary policy operations was probably a *condition sine qua non* to make the ECB's course of action really effective. Thus, to ensure that collateral did not constitute a constraint after the provision of unlimited liquidity through fixed rate tenders with full allotment, the first element of the measures announced on 15 October 2008 was a temporary expansion of the list of assets eligible as collateral<sup>14</sup>. The ECB has publicly acknowledged that this enlargement was a necessary condition to ensure the effectiveness of other monetary policy actions taken in the aftermath of Lehman's default<sup>15</sup>. Indeed, excessively binding collateral eligibility criteria could have represented a serious bottleneck vis-à-vis the central bank's attempt to pump considerable volumes of liquidity into the banking system in a very short time frame. Figure 2 below illustrates the reason.



Following the ECB's introduction of the fixed rate procedure with full allotment, the adjustment of the equilibrium quantity from  $M_{E_0}$  to  $M_{E_1}$  in the central bank funding market helped to reduce the pressure in the interbank market by pushing the demand curve backward from  $DD''_0$  to  $DD''_1$ . A new equilibrium in the interbank market was finally achieved at  $E''_2$ , given by the combination  $(M_{E''_2}, i_{E''_2})$ , this equilibrium corresponds to a level of the secured-unsecured lending spread,  $\Delta''_2$ , which is still above the original spread,

- 11 Notice that in our model the macroeconomic effects of a change in the reference rate are not taken into consideration. Such effects are supposed to fully deploy over a period longer in comparison to the very short-term horizon assumed in our analysis.
- 12 Cf. Fegatelli (2010) for an extensive discussion.
- 13 For a summary of the measures included in the ECB's policy of 'enhanced credit support', cf. "The implementation of monetary policy since August 2007", in ECB Monthly Bulletin, July 2009, pp. 75-89.
- 14 For a detailed list of changes to the Eurosystem collateral framework, cf. European Central Bank, "EU banks' funding structures and policies", May 2009, p. 25.
- 15 ECB (July 2009).

$\Delta'_0$ , but much lower than the crisis level,  $\Delta'_1$ <sup>16</sup>. This ‘normalization’ of the secured unsecured lending spread was achieved by the ECB at the cost of a further contraction of credit volumes in the interbank market: the shift from  $M_{E'1}$  to  $M_{E'2}$  in our model. That is, in the attempt of minimizing the impact of the financial crisis on the real sector, the Eurosystem’s provision of refinancing has *de facto* largely substituted market-based borrowing in the interbank market, thereby crowding out further interbank activity in order to reduce money market spreads<sup>17</sup>. The prominent role of the Eurosystem as a major funding source for euro area credit institutions in Q4 2008 is clearly evidenced by both public and private sector data<sup>18</sup>.

Consider the case of a monetary bottleneck, due to a limited endowment of collateral by borrowing banks. In the figure on the left (central bank funding market), we suppose that the collateral held by banks for central bank refinancing operations is just sufficient to cover an amount of borrowing equal to  $M_{E'0}$ . This means that, in the presence of an incremental shift of the demand from  $DD'_0$  to  $DD'_1$ , even with an unlimited provision of central bank refinancing through fixed rate tenders with full allotment, banks would never be able to borrow more than the quantity  $M_{E'0}$ , due to the lack of proper collateral. Notice that, for  $M_{E'0}$ , banks would be willing to pay, at the margin, a much higher interest rate,  $i_{E'2}$ , than the fixed-rate offered by the central bank,  $i_{E'0,1}$ . A typical case of credit rationing would follow, whereas the distribution of liquidity among individual banks would depend on their access to central bank refinancing. This, in turn, would depend on each bank’s availability of proper collateral. The abnormal bid ask spread in the central bank fund market would immediately translate into a rising demand in the money market by those banks having limited or even no access at all to central bank refinancing; ultimately, this would entail a credit crunch for the real sector.

In graphical terms, this is visible in the second and third sections of Diagram 2. In the second section (interbank market), the demand curve would not shift to the left, from  $DD''_0$  to  $DD''_1$ , in spite of the unlimited provision of central bank liquidity with full allotment. The disparity in the distribution of liquidity among banks would exacerbate money market spreads both in terms of average values (rising up to  $\Delta'_1$ ) and in terms of their dispersion across different transactions (volatility). *That is, the benign impact of central bank’s unlimited provision of liquidity through fixed rate tenders with full allotment, would be, at the limit, completely impaired by excessively binding access conditions (due to a compelling collateral constraint) for certain banks.* Even worse, such banks might probably be the same ones needing liquidity most urgently, as the bad quality of their balance sheet and, in particular, of their asset (i.e. collateral) portfolio might have already prevented them from having recourse to other funding sources. These problems in the banking sector would finally pass to the real sector, as the money/credit supply curve would not recover from its acute-stress position,  $SS'''_1$ , in the right-hand chart (bank lending market), so that a credit crunch could not finally be averted.

As for the crowding-out effect mentioned above, our analysis implies that, in spite of the ECB’s adoption of softer collateral criteria, the substitution of interbank funding with central bank funding does not leave banks indifferent in terms of collateral needs. In the unsecured money market, collateral requirements are zero: having to replace this funding source with central bank refinancing certainly exacerbates banks’ “hunger” for central bank-eligible collateral. The ECB’s outright purchases of covered bonds as an additional measure of enhanced credit support could then be interpreted as an effort to stimulate new issues in an asset class which provides an important source of collateral in the (interbank) repo market (Fegatelli (2010)).

16 See again ECB (July 2009) for data and charts supporting this view.

17 The existence of a crowding-out effect vis-à-vis the interbank market, linked to the central bank’s direct provision of liquidity, is proved both theoretically (F. Heider, M. Hoerova, and C. Holthausen, “Liquidity hoarding and interbank market spreads: the role of counterparty risk”, working paper, April 2009), and from an empirical point of view (C. Brunetti, M. di Filippo and J. H. Harris, “Effects of central bank intervention on the interbank market during the subprime crisis”, working paper, June 2009).

18 ECB (July 2009), and Fegatelli (2010).



In conclusion, it is opportune to note the use that the ECB and other central banks have made of collateral eligibility criteria at the apex of the financial crisis. Indeed, central banks actions in this area have been driven primarily by concerns about monetary policy, besides financial stability. In the first instance, the ECB adopted wider collateral requirements with the main objective of ensuring the effectiveness of other, both conventional and unconventional, monetary policy actions. Thus, *collateral requirements were essentially used as an instrument of monetary policy, as a necessary condition to preserve the monetary policy transmission mechanism in the presence of a steep money/credit supply curve in the interbank market*. Notice that this factual role of collateral requirements as monetary policy enabler goes somewhat beyond their original nature of “administrative” tool to manage counterparty risk in monetary policy operations. A major implication is that, *ultimately, central bank’s collateral eligibility criteria are at least as important as the short-term rate when we want to define the degree of ease of a given monetary policy*. This is true today, in the presence of a steep money/credit supply curve in the interbank market combined with a horizontal supply curve in the central bank funds market, but it was also true in the post-Keynesian world that came to an end in September 2008<sup>19</sup>.

On the other hand, from a financial stability point of view, broader collateral eligibility criteria certainly contributed to facilitate the access to short-term credit and to alleviate the liquidity needs of those banks that were most struck by the turmoil, therefore lessening the risk of possible bank defaults with a potential impact also in terms of systemic risk. It was a fortunate occurrence that, in the harsh contingency of October 2008, both monetary policy and financial stability were required to maneuver the collateral requirements tool into the same direction.

#### 4 CONCLUSIONS

In terms of policy recommendations, this analysis proves that *in a neoclassical framework (i.e. with a steep interbank money/credit supply curve), broader collateral eligibility criteria may be necessary for a more expansive monetary policy. Depending on the banks’ effective endowment of collateral assets, collateral requirements may then be crucial for a smooth working of the monetary transmission mechanism, as their correct configuration may be a necessary condition for the efficacy of a lower policy rate*. Likewise, there may exist some binding constraints on the ECB’s ability to “choose the way in which interest rate action could be combined with the unwinding of the non-standard measures”<sup>20</sup> more specifically, with the re-tightening of collateral requirements. Indeed, *from a monetary policy perspective, unwinding the current collateral policy measures should require the occurrence of at least one of the three following preconditions (compared to the situation at the end of 2008): i) a recovery of the unsecured money market, thanks to a less steep interbank money/credit supply curve; ii) a broadening of banks’ endowment of collateral for secured central bank and/or interbank borrowing; iii) a widening of the standing facilities rates corridor – to stimulate the interbank money/credit supply – and/or a rise in the policy rate, thereby reversing the analogous actions taken by the ECB in October 2008*.

Nonetheless, from a financial stability point of view, central banks should consider that a relaxation of collateral eligibility criteria always implies a sacrifice of the major *raison d’être* of collateral in monetary policy operations: to protect the central bank against the default risk of its counterparties. *This sacrifice might be the lesser evil in times of crisis, but in the long term, it is certainly questionable from many points of view: in primis, because a higher risk profile may compromise the consistency of the monetary policy target as well as the same central bank financial independence; in secundis, because it may push the central bank outside its legal mandate (besides being morally unacceptable and politically inopportune); in tertiis, because it may raise moral hazard issues in terms of bank managers’ behavior, without really solving banks’ most structural problems*.

19 ...namely, in the presence of an endogenous (nearly-flat) money/credit supply curve in the interbank market. Again, cf. Fegatelli (2010) for a discussion.

20 J.-C. Trichet, “The ECB’s exit strategy”, Speech at the CFS conference “The ECB and Its Watchers XI”, Frankfurt am Main, 4 September 2009.

From a long-term perspective, central banks should consider the possible use of their collateral eligibility criteria as a countercyclical instrument, either by lending against a broader range of assets (provided that they are effectively able to properly estimate and 'charge' the risks incurred by accepting lower-quality assets), or by adopting 'cycle-neutral' haircuts, or – *in fine* – by using haircut changes as a tool to target asset price bubbles. Central banks should also take into account that their collateral requirements tend to influence collateral eligibility criteria in secured money-market trades and, down the trade processing chain, in clearing and settlement systems<sup>21</sup>. As a consequence, another major issue arises when such criteria are softened: central banks should ponder not only the counterparty risk they directly take on, but also the higher level of systemic risk likely endorsed in such circumstances by central counterparties and securities settlement systems. Due to a lower buffer in terms of protection and recovery against counterparty risk when collateral requirements are more relaxed, during these periods it becomes, therefore, even more important to strengthen the oversight activities aimed at an early detection of potential credit and liquidity problems in market infrastructures.

21 Indeed, even the business growth of infrastructures offering added-value services to the interbank market, like the 'international central securities depositories', might have been, in some way, affected by the impact of the ECB's collateral eligibility criteria on the secured money market standards (Fegatelli, 2010).