



Financial market failures and public policies: A central banker's perspective on the global financial crisis*

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Recibido: Marzo, 2009

Aceptado: Junio, 2009

Abstract

The financial turmoil, which began in the summer of 2007, has developed into one of the most disruptive financial and economic crisis experienced by the world in many decades. At the root of the crisis we find a combination of macroeconomic imbalances and microeconomic factors, including market failures and deficiencies in the design of regulatory and supervisory frameworks. This article analyses the underlying causes which contributed to the crisis and reviews the key measures adopted by public authorities to mitigate its effects as well as some of the lessons learned to make the international financial markets more resilient.

Keywords: Market failures, financial crisis, public policies, ECB.

JEL classification: E58, E61, E65, G28.

1. Introduction

The financial turmoil, which began in the summer of 2007, has developed into one of the most disruptive financial and economic crises experienced by the world in many decades. At the root of the crisis we find a combination of macroeconomic imbalances and microeconomic factors, including market failures and deficiencies in the design of regulatory and supervisory frameworks. This article analyses the underlying causes which contributed to the crises, and reviews the key measures adopted by public authorities to mitigate its effects as well as some of the lessons learned to make the international financial markets more resilient.

* I am grateful to R. Adalid, M. Blix, A. Consolo, M. Hoerova, K. Nikolaou, R. Peronaci, F. Pires, E. Rentzou, D. Rodríguez Palenzuela, S. Sauer, and very especially to A. Calza, for their inputs and suggestions. Comments from two anonymous referees are kindly appreciated.

The paper is structured in four sections. Section 2 is devoted to analysing the underlying causes that have contributed to the crisis. The following section, broadly describes the policy responses given by the major players in the global economy from four different angles: liquidity policy, monetary policy, fiscal policy and regulatory reform. Section 4 discusses in depth the actions undertaken by central banks –with special focus on the policies deployed by the ECB and the Eurosystem– and their rationale, as well as some of the challenges ahead. Finally, section 5 sketches the potential new environment for policy-makers, and in particular for central banks, that may become a key legacy of the current crisis.

2. Market failures in the financial system

2.1. Key developments of the crisis

The start of the financial crisis was triggered in the summer of 2007 with the increasing realisation that the risks associated with the US sub-prime mortgage market were not properly reflected in the price of related instruments, particularly mortgage-backed securities. A market-wide reassessment of financial risk led to sharp increases in premia and spreads across all segments of the credit market. Rapidly falling market valuations of credit instruments affected the net worth and profitability of the banking systems worldwide.

Tensions in the markets for credit instruments spread to the money markets in early August 2007, giving rise to concerns about systemic disruptions. Interbank trading came almost to a halt on 9 August as a result of the combination of: i) exceptionally high uncertainty about potential direct exposures of banks to “toxic” assets; and ii) increased demand for liquidity to honour credit lines committed to so-called conduits (i.e. bank-sponsored off-balance sheet investment vehicles).

In particular, lack of transparency about the extent of exposures prevented market participants from distinguishing good banks from bad banks, leading to a decline in trading as predicted by Akerlof (1970) in his “lemon market” paper on the role of asymmetric information in markets. In addition, as a result of great uncertainty about asset valuations, the outbreak of the turmoil led to disruptions in the issuance of short-term paper, such as asset-backed commercial paper, on which many banks had become increasingly reliant over time for the funding of their securitisation activities. Against this background, money market interest rates and spreads rose sharply, while liquidity dried up, prompting central banks to intervene through large-scale liquidity injections (see figure 1 and 2)¹.

As the year 2007 went on, the fall in US housing prices accelerated against the backdrop of the rising number of foreclosures and the slowdown of the domestic economy. This led to an increase in the number of defaults in mortgages, not only for sub-prime mortgages but also for the prime segment of the markets. An increasing number of securities linked to mortgages turned out to be much riskier than previously thought.

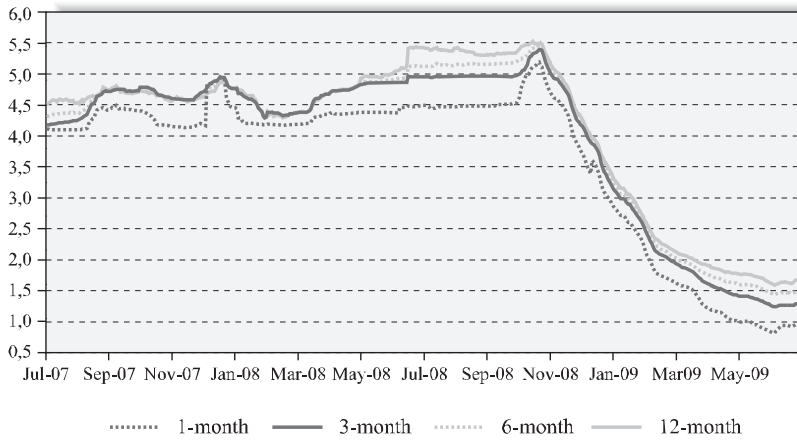


Figure 1. EURIBOR rates (percentage points)

Source: Reuters.

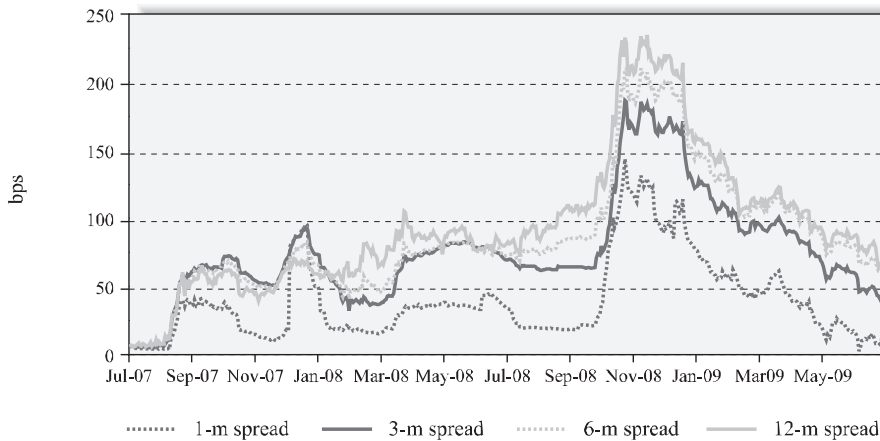


Figure 2. Spreads between EURIBOR rates and overnight interest swaps (basis points)

Source: Reuters.

All major central banks around the globe continued to address market disruptions through significant liquidity injections. However, the losses in several important markets for financial assets continued to mount and in March 2008, the Federal Reserve Bank had to engineer the rescue of Bear Stearns, then the fifth largest US investment bank, together with JP Morgan. In addition, it granted direct access to central bank financing to the other main investment banks for the first time since the Great Depression.

The financial turmoil deepened in the weeks following the collapse of the Lehman Brothers in mid-September 2008, eventually developing into a full-blown crisis with adverse spillovers into real activity. Within two weeks of the bankruptcy of Lehman Brothers, mounting losses from the sub-prime mortgage markets led to both the country's largest insurance company (AIG) and largest savings and loan institution (Washington Mutual) being seized by the government. Widespread concerns about the solvency of financial institutions ensued and spread to Europe, where government assistance was needed to avert the collapse of several institutions.

2.2. Underlying causes

In order to understand the causes of the crisis, it is important to distinguish between the macroeconomic factors and those of a microeconomic nature. As for the macroeconomic factors, the roots of the current crisis may go as far back as the late 1990s, when global imbalances in current account positions and capital flows across major economies, particularly in the United States, started to build up. At the time, several emerging economies enhanced fiscal discipline, while experiencing a collapse in investment, which contributed, alongside other factors, to substantial surpluses in savings investment and current account balances. In the industrialised countries, corporate investment fell after the collapse of the IT bubble in 2001. Meanwhile, in the United States, private saving fell, while domestic demand continued to expand. Excess savings in the world outside the United States—the so-called “savings glut”—together with accommodative global monetary conditions led to ample liquidity in the world financial markets and low interest rates across the maturity spectrum.

Turning to the micro factors, financial innovation allowed the repackaging of mortgages—traditionally, illiquid assets originated and held by local banks—into higher-yielding complex securities with triple-A ratings. Mortgage-backed securities or more complex products based on those securities were in high demand from banks and investors around the world seeking more profitable investment opportunities (the so-called “search for yield”) in a financial environment characterised by low interest rates. The situation endured as long as the sustained appetite of foreign investors for debt securities issued by the US government and government-sponsored agencies as well as by the corporate sector allowed the US to smoothly finance its current account deficit.

More generally, the “search for yield” fostered the demand for more complex forms of securitisation, which led to the creation of instruments entailing risks that were difficult to assess and price. No active secondary market existed for many of the new instruments, and the associated “opacity” of the credit risk distribution made it difficult to keep track of the exposures.

It is often questioned why investors did not look more closely into the risks associated with the securities purchased, thereby playing a disciplinary role in the securitisation process. The answer is likely to be related to the existence of “agency problems” associated

with the implementation of the “originate and distribute” model². This banking business model –that became prevalent among large banks over the past twenty years– was designed to deliver a more efficient allocation and distribution of risks in the economy.

However, because of information asymmetries and frictions, the “originate and distribute” model in practice gave rise to inefficient outcomes and distorted the behaviour of the various parties involved in the securitisation process: investors, rating agencies, intermediaries, and originators³. The main reason for such information asymmetries and frictions is that the goals of the various categories of agents involved tended to differ, and in some instances may have been in conflict. Besides, the different categories did not fully internalise the consequences of their individual actions in the overall process, and therefore did not have the right incentives to share information efficiently.

In particular, investors became over-reliant on the ratings provided by rating agencies and often did not properly conduct their due diligence. The fact that regulators gave ratings a prominent role in the risk assessment framework might have indirectly affected investors' incentives. Indeed, investors often ignored the fact that rating agencies' risk measures offer only a partial account of the risks embedded in the securities, as they focus primarily on the expected loss and do not take into account the tail of the loss distribution. In addition, they consider only some of the sources of risks and, in particular, do not take liquidity risks into account.

Moreover, rating agencies were themselves subject to potential conflicts of interest that may have diminished their incentives to undertake timely downgrades of structured products and provide adequate information to investors regarding the analysis underlying the rating decision. In fact, because ratings are paid for by issuers, rating agencies may have incentives to expand coverage to products whose risk assessment is difficult and, potentially unreliable, in order to maximise their revenues. Besides, agencies may also provide commercial advice and consultancy services to the issuers of those securities that are themselves requested to rate.

As regards originators of loans, their incentives to screen and monitor borrowers may have been reduced under the “originate and distribute” model, since this model allows them to dispose of the originated assets to intermediaries that subsequently take care of repackaging them into securities. Instead, the loan originators may have concentrated on expanding volumes of loans originated in order to boost their profits. The diminished incentive to screen and monitor borrowers for loan originators implies that investors may have ultimately acquired assets of relatively lower quality and performance. Besides, the intermediaries that purchased assets and bundled them into pools before securitising them are likely to have focused on maximising revenues stemming from the servicing fees charged to investors, without necessarily delivering the risk/return balance desired by investors.

More generally, remuneration schemes based on rewarding short-term profits tended to predominate throughout the financial system, often to the detriment of the longer-term health

of the financial institution. For example, compensation structures at the top management level are based on the comparison of the latest results vis-à-vis those of their peers and thus tend to encourage short-termism and risk-taking by managers keen on avoiding underperformance. The pressure to deliver quick profits makes it more difficult for risk management departments to curb excessive risk-taking at their financial institutions. The job of risk managers is also complicated by the fact that certain risks are hard to quantify and measure (for example, tail risks) and that commonly agreed valuation models are missing for more complex securities.

The focus on short-term profits magnified the more general “pro-cyclical” tendencies of financial systems, which are also induced by a host of both institutional and economic factors, such as accounting standards (e.g. mark-to-market accounting) and the dependence of collateral values and leverage ratios on asset prices.

These structural incentive problems may not have been taken fully into account in the design of regulatory and supervisory frameworks. The Basel I framework prevalent at the time of the turmoil’s outbreak underestimated banks’ exposures by not capturing the bulk of risks related to off-balance sheet vehicles as well as liquidity and reputational risks.

In addition, the ability of authorities to enforce the regulatory and supervisory frameworks was weakened by regulatory arbitrage. For instance, some financial innovation processes were triggered –among other considerations– in order to circumvent the existing regulation, particularly on capital requirements. The challenges stemming from regulatory arbitrage have become acute in the current environment characterised by large and complex financial institutions operating across borders, under different national regulatory and supervisory regimes.

To sum up, the causes of the current crisis can be traced back to macroeconomic imbalances and, at the microeconomic level, to incentive problems, with regulatory and supervisory deficiencies having also played a role. Nonetheless, the current crisis has shown the importance of system-wide externalities in propagating and exacerbating the crisis⁴. Problems of individual banks may have wide and serious implications for both the financial system itself and the economy as a whole. Overall, banks must ultimately respond to losses on risky assets by raising new capital. New equity, however, may be difficult to be issued in sufficient amounts in the short run. As a consequence, banks’ first responses have been both asset “fire sales” and the scaling back of their lending activity.

Widespread liquidation of assets in the current market conditions pushes prices down. Through mark-to-market accounting, declining asset prices lead to unwarranted contagion to other banks with similar assets. Those banks may be forced to adjust their positions by selling assets themselves, thus leading to further asset price declines. Similarly, when deciding to cut lending, banks may not internalise the impact of their decisions on the real economy in terms of foregone profitable investment opportunities, output and employment.

3. Policy responses

3.1. Liquidity policies

Central banks have represented the first line of policy defence against the adverse dynamics set in motion by the financial crisis, particularly through the massive provision of liquidity. Although the specific responses have varied across central banks⁵, these institutions pursued the common objective of addressing the global liquidity squeeze, particularly in order to mitigate the risk that protracted liquidity shortages turn into solvency problems.

Central bank liquidity provision has not been limited to the shortest end of the money market rates, but has, in some cases, also sought to ease pressures at term maturities through an increased supply of longer-term funds. Access to central bank funding has also been facilitated by enlarging the list of collateral eligible for the central bank lending operations and by widening the range of counterparties with access to these operations. In some countries, central banks have also extended lending to non-depository banks and to non-bank financial institutions. Additionally, some central banks have established securities lending facilities to improve the functioning of their interbank repo markets. Finally, in a limited number of cases, central banks have assisted their domestic governments in providing emergency liquidity assistance to institutions under stress.

An important characteristic of the global policy response to the financial crisis has been the strengthened cooperation among central banks. Cooperation has taken place, first, through enhanced information-sharing and collective monitoring of market developments, and later on by taking coordinated steps to ease liquidity tensions in the global money markets. The first initiative in this direction was the agreement in December 2007 between the ECB and the US Federal Reserve to grant loans in US dollars to euro area counterparties in connection with the Fed's Term Auction Facility (TAF). The US dollar-denominated loans to euro area banks were financed through a currency arrangement (swap line) between the two central banks.

The US dollar liquidity-providing bilateral agreements between the Fed and the ECB (as well as between the Fed and a growing number of central banks⁶) under the TAF programme has been significantly expanded over time in terms of scale. In addition, the Eurosystem has signed agreements with the Fed and the central banks of several European countries in order to improve the provision of euro liquidity to their banking sectors.

3.2. Monetary and fiscal policies

From the start of the crisis the major central banks around the world have also adjusted their respective monetary policy stances to reflect the diminished risks for price stability, albeit at different paces (reflecting differences in domestic macroeconomic conditions and specific monetary policy objectives). By doing so, these institutions have intended to anchor

inflation expectations and to address the macroeconomic issues and implications of the financial crisis.

On the fiscal side, governments around the world have announced a number of initiatives in order to tackle the effects of the financial crisis. The nature of the fiscal measures has evolved with the development of the financial crisis and its propagation to the real economy.

Government interventions initially focused on addressing problems at single institutions, mainly through rescues and provisions of guarantees. Some governments also announced measures to provide relief to struggling homeowners, and attempted to stimulate domestic economies, particularly in those countries where the slowdown in housing markets was more significant.

As the financial turmoil intensified and the need to support the entire financial system became clearer, the fiscal response in Europe and in the United States evolved into more comprehensive plans designed to support entire domestic financial industries rather than individual institutions. Such plans typically comprised capital injections in exchange for equity and the more systematic provision of state guarantees on bank liabilities. Some countries also set up asset support schemes aiming to either (1) help banks to transfer troubled assets to separate institutions or (2) provide insurance on assets retained by the banks on their balance sheets. Finally, stimulus packages aimed at fostering aggregate demand have also been announced, as the adverse effects of the crisis have worked through to the real economy.

In parallel with the increase in the scope of fiscal measures, there has also been a rise in the degree of international policy coordination, reflecting the global nature and amplitude of the current crisis. The G7 and G20 summits have represented major steps for policy coordination at the global level, while at the EU level international cooperation has been shaped by the exceptional procedures from the European Commission to coordinate and accelerate national rescue plans, as well as by the European Economic Recovery Plan. This plan provides a common framework for the efforts made by Member States and by the EU, with a view to ensuring consistency and maximising their effectiveness, in accordance with and within the framework of the Stability and Growth Pact.

In addition, other types of fiscal measures are currently at work. As the economic crisis has deepened, a significant contribution to the fiscal adjustment has come from the so-called automatic stabilisers. These are programmes linked to social security and unemployment benefits, which are generally more comprehensive in Europe than in the United States. As they act immediately and are proportionate to the depth of the business cycle, automatic stabilisers can be more timely and targeted than discretionary policies, and do not suffer from political economy risks that can undermine the effectiveness of the discretionary measures.

The volume of public resources made available or committed by governments is very substantial. For instance, the IMF estimates that in 2009 the additional fiscal stimulus in the

euro area (as measured by the change in the general government balance) will amount to as much as 3.6% of GDP (IMF, 2009). In this context, it should be noted that sustainability of the public finances is a pre-condition for the effectiveness of the extraordinary measures. Some of the fiscal stimulus packages that have been adopted recently in Europe have raised some concerns, as some of them have been adopted in countries where the fiscal situation already calls for particular prudence regarding its sustainability. In particular, in countries where the presence of automatic stabilisers is significantly important, governments should take the prospective burden of non-discretionary measures into account when designing their fiscal plans.

3.3. Regulatory reforms

With regard to regulatory reforms, the competent authorities at both the European and the global level have been actively involved in the development of measures aimed at restoring market confidence and enhancing the stability of the financial system.

At the European level, policy action has been guided by the ECOFIN Roadmap which identified four priority areas: i) enhancing transparency, ii) improving valuation standards, iii) reinforcing prudential rules and risk management, and iv) improving market functioning.

These priorities have been mirrored at the international level by the Financial Stability Forum (now Financial Stability Board) in its proposal of April 2008 (consisting of a set of 67 recommendations), subsequently endorsed by the G7 ministers and central bank governors. To recall, the Financial Stability Board (FSB) brings together central banks, banking supervisors and finance ministries from the largest economies. The Forum also involves international institutions such as the International Monetary Fund and the Bank for International Settlements. In recognition of the global dimension of the current financial crisis, the G20 Finance Ministers and central bank governors acknowledged in their November meeting last year the need to expand the FSB's membership to also include key emerging market economies. This is expected to contribute to further enhancing the forum's ability to coordinate global efforts towards a more resilient financial system.

4. What did central banks do? Why did they do it?

Central banks have acted on three different fronts to tackle the crisis, namely liquidity management, monetary policy and measures to preserve financial stability. As a starting point, it is useful to recall that the ECB's interventions on money markets have been historically based on the fundamental principle of the separation between monetary policy decisions and their implementation. Thus, under normal conditions, monetary policy decisions are conceptually different from the liquidity measures undertaken to implement them. However, as it will be discussed below, under non-conventional monetary policy, the distinction can become blurred.

4.1. Liquidity policy

4.1.1. Addressing liquidity risk through increased intermediation

From the start of the turmoil until the collapse of Lehman Brothers in mid-September 2008, the ECB engaged in active liquidity management by adjusting the temporal and quantitative distribution of its liquidity provision within the maintenance period⁷. Besides, from October 2007, the Eurosystem has engaged in increasing international cooperation to ease tensions in global money markets, particularly by facilitating the access of euro area banks to US dollar liquidity.

Through the adjustments to its euro operations, the ECB responded to the perceived change in the pattern of banks' demand for liquidity over the maintenance period, in particular responding to the increasing evidence that interest rates were no longer necessarily linked to liquidity conditions on the last day of the maintenance period (as postulated by the so-called "martingale hypothesis"). Indeed, unlike in normal times⁸, banks seemed to no longer regard reserve holdings on different days of the maintenance period as substitutes. By contrast, there was evidence of the emergence of precautionary demand for liquidity early in the maintenance period.

In order to illustrate this point, figure 3 shows the daily profile of bank's current account holdings with the ECB over two separate reserve maintenance periods: the period just before the outbreak of the turmoil (spanning from 11 July to 7 August 2007) and the subsequent maintenance period (from 8 August to 11 September 2007). As the figure shows, over the period preceding the outbreak, banks' aggregate current account holdings tended to remain stable at levels close to the average level of reserve requirements for the period. Deviations from this level remained in most days within a rather narrow range, in line with the typical pattern for liquidity conditions observed in previous maintenance periods.

By contrast, at the beginning of the reserve maintenance period starting on 8 July, aggregate current holdings rose well above the average level of reserve requirements as a result of strong precautionary demand for central bank liquidity. Because of the averaging mechanism used for the calculation of reserve holdings, this was followed during the second part of the maintenance period by a decline in current holdings to levels significantly below the reserve requirement level. Over the following maintenance periods, a similar pattern –i.e. large surplus deposits (relative those needed for reserve requirement purposes) at the start of the maintenance period followed by substantial shortfalls towards its end– became recurrent.

As mentioned earlier, the shift in the time pattern for liquidity demand was related not only to the fact that counterparties were reluctant to lend to each other on unsecured terms, but also to their fear of being confronted with unexpected liquidity shocks. As a consequence, banks seemed to prefer reducing their "liquidity gaps", also by fulfilling their reserve requirements relatively early in the maintenance period.

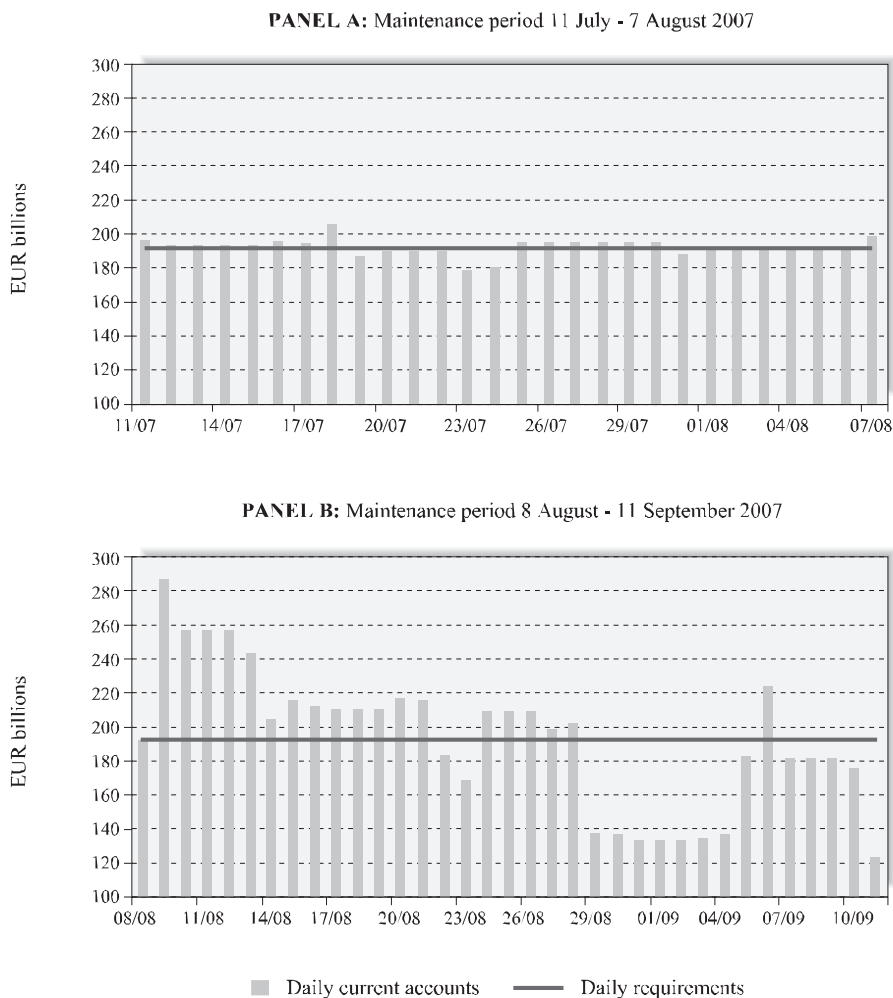


Figure 3. Aggregate banks' current account holdings with the ECB at selected reserve maintenance periods

Source: ECB.

The rise in precautionary demand implied a pricing of liquidity that was inconsistent with the martingale hypothesis, prompting the ECB to bring its supply of liquidity forward in the maintenance period (the so-called “frontloading”) in order to achieve the same level of short-term interest rates as before. Concretely, the ECB accommodated banks’ preference for the front-loading of reserves by systematically allotting more than the so-called “benchmark” amount in its weekly main refinancing operations. The allotments above the benchmark were reduced in the course of the maintenance period so that the average supply of liquidity over the entire maintenance period remained unchanged⁹.

In the same vein, the ECB increased the amount of refinancing provided via longer-term refinancing operations, with the objective of reducing the liquidity gaps of the banking system and smoothing conditions in the term money market. It correspondingly reduced the amounts allotted at the weekly main refinancing operations so that the total amount of outstanding liquidity supply remained unchanged.

Indeed, during the early phases of the turmoil, the Eurosystem aimed at keeping the overall level of euro refinancing provided to the banking sector at levels close to those prevailing just before the turmoil, in line with its longstanding policy of providing the banking system only with the amount of liquidity needed to smoothly fulfil its aggregate liquidity deficit over each maintenance period. The Eurosystem's intermediation role in support of the affected segments of the euro money market was, therefore, mainly achieved by adjusting the modalities of the liquidity provision operations, given the level of liquidity supply.

Following the collapse of Lehman Brothers in September last year, the financial market turmoil entered a more intense and disruptive phase, in which the money market became, to a large extent, dysfunctional. In response to the deterioration of market conditions, the Eurosystem expanded its temporary intermediation activity to ensure that the dysfunctions of the money market did not drive solvent banks out of business¹⁰. Out of the various measures implemented, perhaps the most important was the switch to fixed-rate tender procedures with full allotment in all refinancing operations –not only euro credit operations with maturities of one week up to six months, but also the ECB's US dollar operations with maturities from one week to three months– against a temporarily enlarged set of collateral.

In practice, these measures imply that the ECB's counterparties –which represent a very large number of euro area credit institutions– can borrow as much euro and US dollar liquidity as they wish, both at the weekly and at some key term maturities, against a larger than usual set of eligible assets. As a result, the amount of euro refinancing provided by the Eurosystem in collateralised dollar operations in euro and US dollar is currently close to €700 billion (after having reached a peak of around €900 billion at the end of last year), compared with €450 billion before the start of the crisis.

Figure 4 illustrates the importance of the shift over the last two years in the maturity composition of the ECB's refinancing operations. In the summer of 2007, just before the outbreak of the turmoil, the ECB typically provided about 2/3 of its euro liquidity via the main refinancing operations, with the rest via operations with a three-month maturity. Towards the end of May 2009, the relative importance of the operations was almost inverted and MROs accounted for just over 1/3 of total euro liquidity, with the rest supplied via operations at one-, three- and six-months. On 7 May 2009 the ECB also announced that, as part of a package of measures designed to enhance its credit support policies, it would introduce refinancing operations with a twelve-month maturity. The first of such operations, launched in June, met very strong demand (€442 billion).

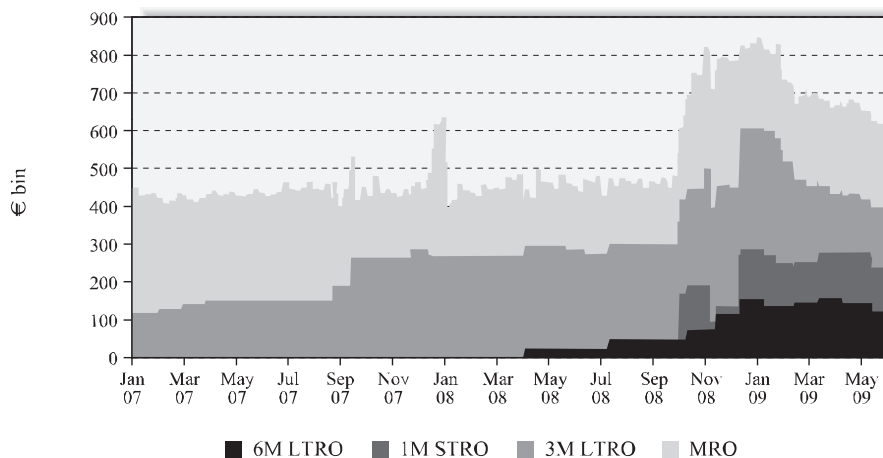


Figure 4. Maturity composition of the ECB liquidity operations

Source: ECB.

4.1.2. Reactivating the money market

The Eurosystem has moved from the situation before the start of the turmoil, in which it did not provide more refinancing to the banking system than was needed to satisfy the aggregate liquidity needs arising from autonomous factors and reserve requirements, to the present situation in which it effectively intermediates liquidity flows among individual banks. Therefore, the clearing of intrabank liquidity flows has, to a large extent, moved from the dysfunctional money market to the Eurosystem's balance sheet. Reflecting the increased role played in financial intermediation, the Eurosystem's consolidated balance sheet (weekly financial statement) has increased by over 50% since the start of the turmoil¹¹.

Taking up a significant intermediation role to guarantee the orderly functioning of the euro area economy was necessary in the wake of the collapse of Lehman Brothers in order to address an unprecedented deterioration in the degree of public confidence in the banking sectors of most developed economies, which seemed to undermine the ability of banks to perform their institutional financial intermediation task. This was particularly important in the case of the euro area since its economy is still predominantly "bank-based", despite significant changes in the area's financial landscape in recent decades (as a result of a number of structural developments, including the introduction of the euro). In 2007 aggregate bank lending to the private sector amounted to 145% of GDP in the euro area, compared with 63% in the US (see Table 1). By contrast, the value of outstanding debt securities issued by the euro area private sector was equivalent to 81% of GDP, compared with more than twice as much in the US.

Table 1
PRIVATE SECTOR CAPITAL MARKETS IN THE EURO AREA AND THE US

	Euro area		United States	
	1998	2007	1998	2007
<i>(percentage of GDP)</i>				
capital market related to the private sector	200%	311%	300%	375%
of which:				
quoted shares issued	63%	85%	145%	144%
debt securities issued by the private sector	45%	81%	107%	168%
bank loans to the private sector	92%	145%	49%	63%

Sources: BIS, DataStream, Eurostat, IMF, World Federation of Exchanges and ECB calculations.

Note: The size of the capital market is defined as the sum of stock market capitalisation (quoted shares issued), bank loans granted to the private sector and debt securities issued by the private sector.

4.1.3. Extending facilities to non-banks

Indeed, financial intermediation in the euro area has traditionally been, to a large extent, conducted via the banking system, rather than via capital markets (unlike in the United States and other Anglo-Saxon countries). The difference in relative importance of the banking systems and capital markets explains, to a large extent, why, in the course of the current crisis, the Eurosystem's efforts have focused on providing support to traditional banks, while other central banks, such as the Fed, have also extended their support to other financial institutions. The ECB's working assumption in designing its policy response to the crisis was that dysfunctions of the banking system have a relatively larger potential to cause disruptions to the economy in the euro area than in other regions of the world.

Since the inception of the euro, the Eurosystem's operational framework has granted access to the Eurosystem's credit operations to a very large number of counterparties¹², both via the marginal lending facility and the open market operations. Counterparty eligibility criteria have been defined in general terms so that a wide range of depository institutions, including small saving banks and co-operative banks, have direct access to central bank liquidity. The combination of a large list of counterparties and a similarly wide range of assets eligible as collateral (recently expanded further on a temporary basis), has proven very useful during the turbulence, since it has allowed the Eurosystem to reach a very large number of financial intermediaries at a time when short-term interbank markets are not functioning properly.

In May 2009 the Eurosystem announced plans to strengthen its efforts to support credit expansion by purchasing euro-denominated banks' covered bonds issued in the euro area amounting to a value of €60 bn. This non-conventional measure was introduced with the objectives of improving market liquidity in important segments of the private debt security market and to support credit expansion to the economy. At the same time, the portfolio of covered bonds means to serve as a monetary policy instrument to achieve the price stability objective,

illustrating the very exceptional connection between liquidity management and monetary policy when the severity of crisis requires the adoption of non-conventional measures.

4.2. Monetary policy

4.2.1. *Monetary policy under increased uncertainty*

The financial crisis has radically changed the environment of monetary policy-making. The rises in oil and commodity prices that generated concerns about upside risks to price stability in recent years suddenly stopped in the course of 2008. The materialisation of downside risks to growth and the decline in inflationary pressures (largely due to falling commodity prices and the effect of the deepening of the financial crisis and its spread to the real economy) have led to a significant reduction in upside risks to price stability.

Monetary policy-makers have had to adapt quickly to the current macroeconomic and financial environment, which can be best characterised by the concept of non-measurable risk, or “Knightian” uncertainty¹³. The very sharp increase in uncertainty that is typical of periods of financial instability had immediate consequences on the risk premia that led to a strong preference for safe and liquid assets with implications for the conduct of monetary policy over the more recent period.

Since the beginning of the financial turmoil in the summer of 2007, financial markets have gone through a dramatic process of gradual revaluation and re-pricing of risk, not only in the United States and the euro area, but also across the world. Following the bankruptcy of Lehman Brothers in September 2008, the deterioration of financial markets accelerated. Investors' loss of risk appetite, as well as the re-assessment of credit and liquidity risk, has been reflected in significant rises in credit and CDS spreads. This is a phenomenon that has particularly affected firms with lower ratings (both in the financial sector and in other sectors).

During this turbulent period, the transmission of policy rates to the money markets has experienced substantial impairments. This is most evident from the strong increase in the spread between the Euribor rates (indicative rates for unsecured lending among banks) and the corresponding euro overnight index swap rates (Eonia swap rates), compared with the levels prevailing before the turmoil (see figure 2).

The transmission of monetary policy decisions to very short-term money markets is just the first step along the transmission mechanism. Such decisions are subsequently passed through to bank lending rates, which represent one of the key channels through which monetary policy affects the economy. Reflecting contractual arrangements and banking practices, in many countries a variety of bank lending interest rates tend to adjust in line with the three-month Euribor rather than the policy rate. This implies that the borrowing costs of households and firms increased considerably before October 2008, also relative to the poli-

cy rate. More recently, most bank interest rates have started to decrease substantially reflecting the lowering of policy and money market rates which began in October 2008. Some signs of easing conditions for risk premia in financial markets have also been observed in recent months.

Looking, in particular, at the monetary policy reaction to the crisis, the size of the cumulated interest rate reductions, especially since the coordinated interest-rate cut on 8 October 2008 by six major central banks (the ECB, the Bank of Canada, the Bank of England, the Federal Reserve, Sveriges Riksbank and the Swiss National Bank) has been exceptional and has left the policy rates of most central banks at historically low levels.

4.2.2. Challenges for monetary policy making

This environment is not devoid of challenges for monetary policy. If a central bank keeps cutting rates, sooner or later it will hit its lower bound. However, this alone should not necessarily imply the end of monetary policy effectiveness, as other channels may remain available for the central bank to additionally stimulate the economy in order to achieve its monetary policy objective. The central bank, for instance, can change the size and/or the composition of its balance sheet (two categories of unconventional measures which are commonly referred to as “quantitative and qualitative easing”, respectively). Through both these channels and specific commitment technologies, the central bank might influence term and credit risk premia, and thus shape the yield curve and the cost of funds to the private sector even when the short-term nominal interest rate is constrained by the lower bound.

At the same time, unconventional measures entail non-trivial financial risks for the balance sheet of the central bank and their impact is subject to a high degree of uncertainty. Thus, a precondition for more radical unconventional quantitative easing measures (e.g. the large-scale purchase of government bonds by the central bank) seems to be that the standard interest rate policy and what could be defined as more “conventional” quantitative easing measures (e.g. the provision of support to the banking sector and the economy at large through expanded liquidity provision and inclusive collateral policies) are deemed insufficient to ensure the credible anchoring of price stability.

The outcome of the unconventional measures is likely to depend on sound communication with the public and on the existence of a clear, credible commitment of the central bank with respect to achieving its monetary policy objective (a quantitative definition of price stability in the case of the ECB). The central bank must explain the reasons and the mechanism through which these unconventional monetary policy channels operate in an environment of zero or very low nominal interest rates. Given the importance of expectations for macroeconomic developments, the central bank must also take the necessary actions to prevent the entrenchment of unacceptable deviations from its monetary policy objective in private sector expectations.

An environment of zero or almost zero interest rates may bring other policy challenges that go beyond the strict effectiveness of monetary policy. For example, the Japanese experience demonstrates that at very low nominal rates the interbank money markets are likely to be disrupted and the stability of some financial institutions, such as money market funds, may be jeopardised. While monetary policy could still be effective, an impaired money market has serious consequences for the private financial intermediation and eventually poses difficulties for the transmission of monetary policy and the optimal asset allocation within the economy as well as risks to financial stability.

An additional challenge for central banks is the concern that the lower rates fall, the more difficult it might become to reverse this policy, thus making it more likely that today's monetary policy may compromise future price stability and financial stability.

4.2.3. International monetary policy coordination

It is worth stressing that the adjustment to the ECB policy rate began with a coordinated move with five other major central banks (the Bank of Canada, the Bank of England, the Federal Reserve, Sveriges Riksbank and the Swiss National Bank) on October 2008. This coordinated interest rate cut was unprecedented by historical standards and gave rise to the question of whether the financial crisis may have ushered in a new era in which the global nature of the challenges faced by central banks required increased international monetary policy coordination.

The economic literature on policy coordination¹³ suggests that, under normal conditions, the international integration of goods and services markets provides a relatively high degree of risk pooling that makes mechanisms of formal policy coordination less necessary. This conclusion is derived from the fact that rule-based policies are based on common principles and their medium-term oriented nature implies that they anchor expectations and confidence so that the symmetric stabilisation of domestic conditions brings about stable global conditions as well.

The financial crisis, however, has shown that, if not from policy coordination, there are important benefits from cooperation in an increasingly integrated world economy, where adverse shocks to one market are not confined by national borders but rather propagate globally at a rapid pace. Indeed, while a coordinated rate cut is by nature exceptional, cooperation in different areas among world major central banks (particularly, liquidity provision and information exchange) has proven to be an effective policy response to global and domestic challenges, supporting confidence at times of heightened uncertainty.

4.2.4. Financial stability

The third front for central bank policy action is represented by the measures taken to preserve financial stability. Contributing to financial stability in the euro area is one of the core

responsibilities assigned by the Treaty to the ECB. By pursuing its primary objective of maintaining price stability and by contributing to the smooth functioning of the money markets, the ECB prevents unnecessary volatility from being introduced into economic activity and financial markets, thus providing an important contribution to safeguarding financial stability in the euro area, particularly at times of crisis like the present.

In addition, central banks have actively participated in a wide range of international committees and fora entrusted with the task of restoring market functioning and enhancing the resilience of the financial system.

Priority has been given to restoring market confidence. In this context, initiatives designed to strengthen transparency and valuation standards should be singled out as pivotal. In particular, improvements were warranted in the disclosure standards for financial institutions' exposures to structured products as well as in the practices followed for their valuation. In this respect, many large global banks have consistently applied the disclosure methodology set out in the FSB report to their holdings of complex and illiquid instruments, thus demonstrating the willingness of the private sector to contribute to strengthening market confidence. Furthermore, guidance has been provided by the Basel Committee on Banking Supervision on assessing banks' fair value practices for financial instruments.

In the same vein, the International Accounting Standards Board (IASB) has intensified its work to enhance accounting and disclosure standards of off-balance sheet entities and released draft guidance on fair value measurement when markets become inactive. Central banks as well as banking supervisors have contributed to this work by participating in the related expert advisory panel. Furthermore, a Financial Crisis Advisory Group whose primary role is to advise the IASB and the US Financial Accounting Standards Board (FASB) on the standard-setting implications of the global financial crisis and the potential changes to the global regulatory environment has been created.

While the aforementioned measures significantly improved the information available to markets, investors and competent authorities, the failure of Lehman Brothers generated an unprecedented deterioration in the degree of confidence in the banking sector, triggering the coordinated action of governments. In this context, the European Heads of State adopted a set of common principles aimed at addressing the financial turmoil and ensuring that the design of national stabilisation measures did not lead to negative spill-over effects across countries. The "EU common principles" endorsed at the European Council of 15-16 October laid down the common features for granting guarantees on new issuance of bank debt and recapitalisation measures adopted by the Member States.

The ECB contributed to this work by proposing recommendations encompassing the provision of government guarantees for bank debt and recapitalisation measures. First, the Governing Council of the ECB proposed a set of recommendations on the framework for granting government guarantees, which identified the following main objectives for this measure: i) addressing the funding problems of solvent banks; ii) safeguarding the level

playing-field among financial institutions in order to avoid market distortions; and iii) ensuring consistency with the operational framework of the Eurosystem to avoid impairing the implementation of the single monetary policy. Furthermore, these recommendations included a pricing system for the government guarantees on bank debt.

The EU governments agreed to provide guarantees for new medium-term bank senior debt (up to five years) under a scheme to expire on 31 December 2009. Banks have begun to make use of this measure. According to ECB (2009), at the end of May of 2009 the outstanding volume of government guaranteed unsecured bank bonds amounted to €397 billion in the euro area, and €544 billion in the EU. While more banks have indicated their intentions to issue similar bonds, the volumes issued remain low relative to the amounts potentially committed by euro area and EU governments (€1,677 billion and €2,096 billion, respectively).

Second, with regard to recapitalisation measures, the ECB also provided recommendations. The main aim of these measures has been to improve the functioning and stability of the banking system and to foster an adequate flow of credit to the economy by providing Tier I capital to fundamentally sound institutions. This would be carried out by acquiring equity in the form of ordinary shares, preferred shares or other hybrid instruments, such as subordinated debt. The total commitments regarding recapitalisation schemes reached €172 billion in the euro area and €247 billion in the EU at the end of May 2009, though also in this case the take-up ratios are low¹⁵.

Also in this regard, the Governing Council of the ECB proposed a methodology for benchmarking the pricing of State recapitalisation measures for fundamentally sound institutions in the euro area. These recommendations are, without prejudice to guidance from the European Commission, aimed at avoiding undue distortions to competition in accordance with the State aid rules of the Treaty.

The pricing system proposed by the Governing Council of the ECB considered that any recapitalisation should take into consideration the specific market situation of each institution, distinguishing in particular between fundamentally sound and distressed banks. Based on this premise, it provided for a required rate of return, captured by a “price corridor”, which varies depending on the type of instrument. The lower band of this corridor is applied to instruments with features similar to those of subordinated debt and the higher band to those with features similar to ordinary shares. It is also recommended that the temporary nature of recapitalisation measures should be ensured by providing financial institutions with incentives to redeem such instruments and that the pricing system be revised periodically to reflect possible changes in market conditions.

Overall, we can be fully confident that the actions taken by central banks and national governments provide an appropriate response to the challenges raised by recent events. Still, restoring market functioning and returning to normal market conditions ultimately depends on the banking sector. In this context, reactivating the interbank market and ensuring the proper financing of the economy is of the utmost importance.

5. Going forward: A new environment for central banking?

Looking forward, the current crisis is likely to bring important changes for the future of the economic and financial systems. These include revisions to the regulatory and supervisory domains, reforms of the international financial architecture as well as changes in the nature of the relationships and coordination among the different policies and public authorities, which are likely to bring a new environment for central banking. This gives rise to the following questions regarding the institutional framework in which central banks may operate.

5.1. More international convergence in liquidity frameworks?

Since August 2007 central banks have responded in a variety of ways to the financial market disruptions, reflecting differences in the extent to which markets have been hit by the turbulences, and differences in the design of their operational frameworks. However, the major central banks also showed a certain degree of convergence in their operating procedures. In particular, central banks:

- Pursued more active reserve management, reassuring banks of their orderly access to overnight funds and increasing the frequency of their operations.
- Increased the supply of funds (notably long-term); expanded to varying degrees the definition of collateral accepted in collateralised lending operations; provided access to collateralised lending to a large number of counterparties.
- Adapted tender procedures for open market operations in the direction of price rather than quantity-based schemes, akin to those used for standing facilities.
- As the turbulence developed, central banks strengthened their cooperation through enhanced communication and collective market monitoring and coordinated actions to provide liquidity. In this respect, a significant number of swap lines between central banks have been set up to facilitate the distribution of foreign currency liquidity to domestic counterparties.

One lesson that can be drawn from the turmoil is that there are certain key operational features that facilitate the implementation of monetary policy under stress. In particular, at times of impaired interbank lending, central banks are better positioned to effectively distribute reserves if they are capable of providing access to collateralised lending operations on a large scale to a wide set of counterparties and against a broad range of collateral.

Yet, a very important issue on which no clear answer can yet be provided is how much this convergence in the understanding of the “optimal” features of the operational framework under stress, should be reflected by the design of the operational framework in the steady state. This requires, in particular, to develop a better understanding of the optimal mix be-

tween private market and central bank intermediation as well as careful liaising with supervisory bodies.

In this context, it should be noted that to the extent that differences in monetary policy strategies, central banks' status vis-à-vis governments, and certain specific features of domestic financial systems persist, the optimal liquidity frameworks of each central bank should continue to reflect such country- or area-specific factors.

5.2. More scope for direct lending to the real economy?

An additional issue that has come up to the fore in the current crisis concerns the extent to which central banks may engage in direct lending to the real economy as the recent establishment by the Federal Reserve System of several liquidity facilities directed to non-banks shows (for instance, those directed to money market funds and issuers of commercial paper).

In principle, the scope for direct lending by the central bank to the real economy should depend on the extent that the malfunctioning of the money and credit markets distorts bank lending and prevents aggregate households and businesses from obtaining credit. In that sense, some central banks have decided to bypass the banking system and start lending to households and firms directly for the sake of preserving the orderly functioning of the economy.

In practice, even abstracting from possible institutional or legal constraints (e.g. the prohibition of monetary financing to the state in the European Monetary Union), there are several issues that central banks must consider before deciding on the appropriateness for their "own" economies of providing direct financing to the real sectors. Whether or not a central bank engages in direct lending will very much depend on a number of considerations referring to structural features of the economy, the gravity of the crisis, the state of the financial system and a number of institutional factors, notably those governing the relationship between the central bank and the government.

For instance, one apparently straightforward observation is that the need to provide direct credit to the economy at times of dysfunctions in banking activity is likely to depend on the relative importance of the banking sector for financial intermediation. Following this argument, one may argue that in a bank-based economy there may be relatively less need to provide credit to agents other than banks than in a market-based economy. Indeed, by focusing on providing support to the banking sector, the central bank may increase its chances of sustaining the economy as a whole. However, under extreme circumstances (notably, when the banking sector is no longer able to fulfil its institutional tasks as the main engine of financial intermediation), a central bank may reach the opposite conclusion: exactly because of the banking sector's predominance in financial intermediation, its dysfunctional state might prompt a central bank to intervene before the entire economy comes to a halt.

If so, the central bank will need to decide which sectors to target. This may imply the need for the central bank to take decisions on the optimal allocation of resources in the economy which, historical experience shows, are better left to the private sector.

Other concerns may relate to the risk of political pressure and government interference, especially if the scale of the financing programme requires support from the Treasury. If financing is ensured through the expansion of the central bank's liabilities, this may give rise to more general concerns about the fiscal costs of actions taken by the monetary authority¹⁶. Finally, but related to the previous arguments, direct lending to the real economy may imply an increase in the financial risks taken by the central bank, potential exposing the latter to risks to its financial independence and, ultimately, to its institutional independence.

Based on these considerations, the Eurosystem has chosen to indirectly provide support to the economy (i.e. using the banking sector as an intermediary sector) by making full use of the possibilities provided by its operational framework. In particular, by providing banks with unlimited access at fixed rates to its refinancing operations and by accepting a wide range of private paper as collateral, the Eurosystem has aimed to effectively support the provision of credit to the real economy. More recently, the Eurosystem has announced plans to purchase euro-denominated covered bonds issued in the euro area to provide further support to credit provision by the banking sector.

5.3. More domestic policy coordination?

Policy responses both at the global and the European level have been characterised by an increasing degree of coordination. A natural question, therefore, seems to be whether, looking forward, greater policy coordination at the level of the EU/euro area should be warranted. Given the existence of the single currency in the euro area, the focus will be first on the coordination among national fiscal policies. In the euro area the Stability and Growth Pact provides a coordination device for fiscal policies, particularly through peer pressure mechanisms that encourage sound and sustainable public finances.

On the fiscal side, a key challenge for the future is to prevent the financial crisis from eventually undermining the sustainability and credibility of public finances. An additional challenge is that EU countries are already facing considerable long-term challenges from the costs associated with population ageing that should be borne in mind when considering short-term demand policies. If the starting position is less strong, an inappropriate short-term response may make a country "age faster" by exposing even more strongly the need for adjustments to cope with the long-term challenges. Countries with large deficit and/or debt levels may be particularly vulnerable in this regard.

Unfortunately, many euro area countries entered the financial crisis and the economic downturn with relatively weak fiscal balances, having missed the opportunity presented by past years' revenue windfalls to consolidate their budgets. Indeed, in the past decade coun-

tries incurred fiscal policy errors by mistakenly interpreting budgetary improvements in good times as evidence of structural improvements, which were often used to motivate spending increases or tax cuts. On a more positive note, it can be said that while compliance with the Stability and Growth Pact during its first ten years has been somewhat uneven, the EU's overall fiscal performance in terms of avoiding high budget deficits and the build-up of government debt was much better than in the decades preceding the Pact¹⁷.

One additional dimension of policy coordination in the euro area is that between the single monetary policy and the national fiscal policies of the Member States. In this respect, the institutional set-up of European Monetary Union consists of a clear and efficient assignment of objectives and instruments to the different authorities, together with a strict division of responsibilities. The ECB must focus on its primary mandate of delivering medium-term price stability under conditions of full independence. Fiscal policy must focus on its traditional objectives related to allocation, redistribution and stabilisation (to varying extents), while contributing to maintaining an environment of macroeconomic stability.

Of course, in setting monetary policy the ECB takes into account the fiscal policy stance, as one of the factors which contribute to the outlook for price stability over the medium term. The ECB has repeatedly acknowledged that an open exchange of views and information among the different authorities is welcome if it enhances a common understanding of desirable objectives and strategies to pursue them. However, it is reluctant to engage into active ex ante coordination of fiscal and monetary policies out of concerns that this may blur the responsibilities of the various authorities involved at the expense of accountability, ultimately reducing their incentives to pursue their objectives. Thus, the current macroeconomic policy framework in the euro area based on a separation of responsibilities will continue to be seen as the most appropriate to ensure sustained and non-inflationary economic growth.

5.4. More international monetary policy coordination?

While cooperation in the field of liquidity management on an unprecedented scale has been certainly one of the hallmarks of public responses to the current turmoil, another example without precedents of central bank coordination was the decision by the ECB and five other major central banks to ease global monetary conditions on 8 October 2008. Commentators and observers have wondered whether this concerted policy decision may be the beginning of a new era of increased international monetary policy coordination in response to economic and financial globalisation.

It is important to notice that this coordinated interest rate cut was taken in a specific context and with a specific objective. There was extraordinary uncertainty at the time about the economic outlook and strong evidence that upside risks to price stability had diminished at the global level. The coordinated cut addressed the need to respond to a common shock that was being transmitted around the globe almost simultaneously. Through the joint communication, the international central banking community intended to provide a signal of its

strong commitment to responding to the macroeconomic implications of the financial market turmoil.

There is no doubt that over the past three decades the trade, economic and financial linkages among the different regions of the world have grown tighter, and of course policy-makers take this into account in the design of their policies. However, when talking about international policy coordination, it is important to define clearly what it is meant. Indeed, differences in cyclical positions, structures of the economies (e.g. in terms of market rigidities and frictions, sectoral leverage, financial systems, etc.), monetary policy institutional frameworks as well as shocks hitting the economy almost necessarily lead to differences in deciding the appropriate monetary policy stance. Thus, systematic monetary policy coordination may eventually come at the cost of weakening a central bank's commitment to its institutional objective.

Thus, for central banks international policy coordination is better understood as the continuous cooperation and exchange of information at both staff and decision-making levels, shared experience and mutual understanding, which very much lies on the consensus among central banks that monetary policies geared towards domestic price stability, sound public finances and flexible economic structures do create the conditions for long-term economic growth and financial stability.

5.5. More weight given to asset prices in monetary policy?

Another interesting debate that has gained renewed interest and strength over the past year is the role that asset prices should take in the monetary policy design. Indeed, as the present experience shows, large volatility in asset prices can jeopardise the stability of the financial system and potentially undermine macroeconomic stability. The repetition of boom-bust cycles and the potentially very high costs for macroeconomic stability associated with the typically abrupt reversal of the excessive valuation of assets beg the question of whether monetary policy should give more weight to asset prices.

It is often argued that bubbles are extremely difficult to identify in real time. Given that the assessment of whether or not asset prices are being driven by fundamentals is surrounded with uncertainty –perhaps even sometimes uncertainty in the “Knightian” sense– central banks should refrain from targeting asset prices. Moreover, while monetary policy actions can influence asset price developments, the magnitude of the swings in policy rates that would be needed to curb boom and bust cycles in asset prices could have adverse implications for macroeconomic stability in the short term. Based on these arguments, one view is that central banks should refrain from intervening until the bubble bursts and then ease monetary policy aggressively to provide support to the banking system and the economy (the so-called “mop up after” approach). The downside of this strategy is of course that it may risk creating moral hazard.

An alternative approach consists of “leaning against the wind”. According to this approach, the central bank should conduct a slightly tighter monetary policy than warranted by

its price stability objective, when the build-up of a potentially detrimental asset price boom is identified. By doing so, the central bank would buy insurance against the risk of a harmful asset boom-bust cycle, with its potential costs in terms of macroeconomic and financial stability.

The main argument against this approach is that the premium stemming from such a policy framework may be excessively high. In fact, a policy response to asset price increases may end up destabilising the economy if the asset price revaluation is driven by fundamentals. This risk is related to the difficulty concerning the identification of asset price misalignments in real time. However, several empirical studies have recently shown that it is possible to define early indicators based on money and credit variables that can assist the policy-maker in assessing the nature and the consequences of the reverse phase¹⁸ of extraordinary asset price developments, thereby providing reliable information about the opportunity of policy action.

Overall, the very high costs of the current financial crisis seem to provide support to the case for a flexible “leaning against the wind” strategy. How can one implement such a policy in practice? The ECB has long argued that its two-pillar monetary policy strategy is well suited to cope with the challenges brought about by asset price developments¹⁹. There is a close link between monetary and credit developments and evolving imbalances in asset and credit markets. By exploiting this link, the ECB’s monetary analysis (consisting of a comprehensive assessment of the liquidity situation) may provide early information on developing asset price imbalances and, therefore, allow for a timely response to the implied risks to price and financial stability. More in general, including relevant money and credit indicators in the information set of the monetary policy makers may represent a practical way of mimicking the “leaning against the wind” approach.

5.6. More central bank involvement in supervision?

The recent financial market crisis has also highlighted the important role that central banks play in safeguarding financial stability and the need to increase interaction between central banks and banking supervisors. This need for increased interaction, also identified by the FSB in one of its recommendations, would further support and enhance the central banks’ role in financial stability assessments, crisis management and resolution, and liquidity provision.

First, with regard to financial stability assessment: central banks can benefit from extended access to supervisory information especially in relation to systemically relevant institutions, in order to identify risks and vulnerabilities for the financial system as a whole in a more efficient way. In this context, the FSB and the IMF are already intensifying their co-operation with a view to enhancing the assessment of financial stability risks on a global scale, while in the EU the same is valid for the Banking Supervision Committee and the Committee of European Banking Supervisors. These efforts should also be mirrored at the

national and regional levels, through the intensification of the cooperation and exchange of information between central banks and supervisory authorities for an overall better monitoring and assessment of risks to the financial system. The other side of this coin relates to the issue of incorporating the outcome of the financial stability risk analysis into policy action in the field of supervision, which also needs to be reinforced.

Second, in the area of crisis management and resolution: the global nature of financial markets and the increased interlinkages between markets and institutions requires competent financial authorities, central banks, supervisors and ministries of finance to strengthen their coordination mechanisms for the management of crisis involving cross-border financial institutions. In the EU, an important milestone has been reached with the Memorandum of Understanding (MoU) signed by the competent authorities of all Member States in June 2008. This MoU establishes common principles, procedures and terminology to be used by all parties involved in a cross-border crisis.

Third, in relation to liquidity provision: in order to maintain stable money markets, central banks would benefit from enhanced access to supervisory information, including liquidity stress-testing and contingency funding plans of banks. At the same time, supervisors would benefit from information available at central banks, such as banks' bidding behaviour.

Overall, while the need for enhanced interaction between central banks and supervisory authorities is widely acknowledged, recent events have called into question whether improved interaction in cooperation suffices. In this context, the debate has recently turned towards the future supervisory architecture. The financial crisis has underscored the urgency of reviewing the EU supervisory framework, which is still based on national responsibilities against the background of increased financial market integration and the growing role of large cross-border financial institutions.

In the EU, a High Level Group set up under the chairmanship of Mr Jacques de Larosiére with the mandate to examine the allocation of tasks between the national and the European level and submit proposals to strengthen European supervisory arrangements issued its recommendations in February 2009. These recommendations that envisage, among others, a leading role of central banks and the ECB in particular in financial supervision, have been reflected in the recent proposal by the European Commission to set up a new European Systemic Risk Board in charge of macro-prudential supervision in the European Union.

6. Concluding remarks

The financial turmoil, which began in the summer of 2007, has developed over time into one of the most disruptive crises that the world has experienced in many decades. This is why from the start of the turmoil public authorities –both in the euro area and in other parts of the world– have implemented a large range of measures in key fields, including liquidity

management, monetary policy and fiscal policy, to prevent the turbulences from undermining financial stability and destabilising the economic systems. In addition, many initiatives have been undertaken to address weaknesses in the regulatory and supervisory framework in order to provide sounder foundations to financial systems.

Indeed, from the beginning of the crisis, a key concern has been to understand how disturbances stemming from a relatively small segment of the market presumably linked to local and regional conditions (such as the US sub-prime mortgage market) could spread through continents and markets at such a rapid pace, undermining the strength of economies and financial systems and, ultimately, giving rise to concerns about systemic stability. There is increasing consensus that at the root of the crisis, we can find a combination of macroeconomic imbalances and microeconomic factors, including market failures and deficiencies in the design of regulatory and supervisory frameworks, which are being addressed in order to make the international financial system more resilient. Specifically, in the case of Europe there is increasing concern that the current prudential framework based on national regulatory and supervisory regimes cannot address the many challenges arising from the activities of large, complex and highly interdependent financial institutions operating across borders.

The need to strengthen the role of central banks in preserving financial stability has also become the focus of the policy debate as efforts are made to address the causes of the crisis. The current crisis is likely to bring important changes for the future of the economic and financial systems in which we live. These include changes in the nature of the relationship and degree of coordination among the different policies and public authorities, revisions to the regulatory and supervisory domains as well as reforms of the international financial architecture. Therefore, we are likely to witness a number of institutional changes that will bring about a new environment for policy-making in a number of areas related to central banking.

Notes

1. See Cassola *et al.* (2008), Cecchetti (2009) and CGFS (2008) for further details. The effects of asymmetric information and counterparty credit risk on the structure of the interbank market and various policy responses are analysed in Heider *et al.* (2008).
2. See ECB(2008b).
3. See Ashcraft and Schuermann, (2008), Rajan (2005) and Sufi and Mian (2008).
4. See Kashyap *et al.* (2008).
5. See CGFS (2008) for an account.
6. In addition to the ECB, the Fed provides US dollar liquidity to the central banks of Australia, Brasil, Canada, Denmark, Japan, Korea, Mexico, New Zealand, Norway, Singapore, Sweden, Switzerland and the UK.
7. For illustration, one may adapt the Poole (1970) paradigm to liquidity management during a financial turmoil: when the demand for liquidity becomes unstable (different demand pattern), the central bank focuses on stabilising interest rates directly, rather than stabilising interest rates by managing the quantity ("excess" allotments above benchmark).

8. See Cassola (2008) for an empirical analysis of the reserve fulfilment behaviour of euro area banks.
9. In order to keep the average supply of liquidity over the entire maintenance period unchanged the ECB conducted liquidity-absorbing fine-tuning operations on the last day of the maintenance period.
10. See Brunnermeier and Pedersen (2009) for an analysis of how protracted funding and market liquidity may lead to solvent institutions becoming unable to continue operating.
11. From €1,546 billion at end-July 2007 to €2,400 billion at end-May 2009.
12. Currently, around 2,100 credit institutions are eligible for the Eurosystem's open market operations, almost 2,300 credit institutions can access the Eurosystem's marginal lending facility.
13. The notion of Knightian uncertainty refers to the distinction, introduced by the economist Frank Knight, between "risks" (to which probabilities can be assigned) and "uncertainty" (for which even these probabilities are unknown).
14. See, among others, Obstfeld and Rogoff (2002), Oudiz and Sachs (1984) and Trichet (2008).
15. There were also capital injections outside government recapitalisation schemes amounting to over €50 billion, which dealt with troubled institutions such as Fortis and Dexia.
16. See Cukierman (2006).
17. See ECB (2008a).
18. Alessi L. and C. Detken (2009).
19. See also ECB (2005) and Trichet (2005).

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Resumen

Las tensiones financieras que comenzaron en el verano de 2007 han terminado dando lugar a una de las crisis económicas y financieras más severas experimentadas a nivel mundial desde hace muchas dé-

cadass. En la raíz de la crisis se encuentra una combinación de desequilibrios macroeconómicos y de factores macroeconómicos, que incluyen fallos del mercado y deficiencias en el diseño de los marcos de regulación y supervisión. Este artículo analiza las causas subyacentes que han contribuido a la crisis, y valora las principales medidas adoptadas por bancos centrales y gobiernos para mitigar sus efectos, así como las principales enseñanzas para hacer más resistentes los mercados financieros internacionales.

Palabras clave: fallos del mercado, crisis financiera, políticas públicas, BCE.

Clasificación JEL: E58, E61, E65, G28.