

# THE ROLE OF BANKS IN THE MONETARY POLICY TRANSMISSION MECHANISM

## ARTICLES

The role of banks in the monetary policy transmission mechanism

*In the euro area financial system banks are traditionally of major importance for the allocation of savings and the financing of firms and households. Hence, banks' adjustment of their lending and pricing of loans in response to ECB monetary policy actions is an influential channel through which monetary policy affects the economy. The money and credit market tensions observed since mid-2007 have highlighted the importance of closely monitoring the role of banks in the monetary policy transmission mechanism. This article takes stock of recent research concerning this role, focusing in particular on the euro area. The article first describes the various channels through which banks may play a part in monetary transmission. It then assesses the monetary policy implications of recent changes in the financial landscape and in banking in particular. In view of these developments, it is likely that the transmission mechanism has evolved.*

## I INTRODUCTION

Banks are important players in the euro area financial system and facilitate the flows of financial assets from savers to those with investment and consumption needs. They are the main collectors of funds from and providers of finance to the non-financial corporate and household sectors. This contrasts with the United States, where capital market-based finance is more important (see Table 1). Hence, from a monetary policy perspective, a clear understanding of the role of banks in the monetary policy transmission mechanism is essential.<sup>1</sup>

This article takes stock of recent research concerning the role of banks in the transmission mechanism in the euro area. Section 2 highlights the various channels through which banks may play a role in the transmission mechanism. Section 3 reviews the fundamental changes banking has undergone in recent years owing

to financial innovation, regulatory changes and the process of financial integration and their potential implications for the role of banks in the transmission mechanism. Section 4 puts these findings into the perspective of the credit market tensions observed since mid-2007. Section 5 concludes.

## 2 THE ROLE OF BANKS IN MONETARY POLICY TRANSMISSION

In general, the financial soundness of banks and their counterparties may have more or less substantial effects on the real economy, depending on the existence and magnitude of credit market frictions. This can happen, in the presence of asymmetric information, as banks impose a risk premium on their provision of

<sup>1</sup> See also the studies conducted in the early 2000s by the Eurosystem's Monetary Transmission Network, which are collected in I. Angeloni, A. N. Kashyap and B. Mojon (eds.), *Monetary policy transmission in the euro area*, Cambridge University Press, 2003.

Table 1 Selected indicators of financial structure in the euro area and the United States

(as a percentage of GDP)

End-2007	euro area	United States
Total bank financial assets	249	144
Bank credit to non-banks	137	62
of which loans to the non-financial corporate sector	50	17
Debt securities issued by non-financial corporations	8	26
Stock market capitalisation	75	112
Securitisation	6	18

Sources: ECB, Eurostat, Dealogic, Thomson Financial Datastream and Federal Reserve Board of Governors.

Notes: Total bank financial assets refers to the aggregated MFI sector for the euro area and to the sum of commercial banks, savings institutions, credit unions, money market mutual funds, and security brokers and dealers for the United States. Securitisation figures are based on euro/dollar-denominated asset-backed securities, mortgage-backed securities and agency-related securities.

credit on top of borrowers' credit risk. Under certain circumstances, banks may even ration credit.<sup>2</sup> Moreover, the fact that credit risk evolves with economic cycles owing to fluctuations in borrowers' collateral values implies that bank lending behaviour has a generic tendency to be pro-cyclical and may, itself, cause macroeconomic fluctuations. It has been argued that these effects may even be amplified by minimum capital requirements, which are calculated using risk-weighted assets. Against this background, banks' behaviour may contribute to the transmission of monetary policy to real economic activity in a number of ways.<sup>3</sup>

#### STANDARD MONETARY POLICY TRANSMISSION CHANNELS

Academic research has identified several channels through which monetary policy may be transmitted to the real side of the economy. First of all, monetary policy may have an impact on real spending decisions via the traditional interest rate channel, whereby changes in key ECB interest rates affect the general level of interest rates and hence consumption and investment decisions and, ultimately, real economic activity and inflation.<sup>4</sup> Owing to the relatively large share of bank loans and deposits in total financial assets and liabilities in the euro area, the bank interest rate pass-through is a key element of the interest rate channel. The impact of this channel may vary with the amplitude and speed with which bank interest rates on loans and deposits are adjusted when policy rates change. It should be noted that the bank interest rate pass-through itself depends on a multitude of factors, such as the degree of competition among banks and financial market development, but also the balance sheet situation of banks and their borrowers, in which respect it can arguably also be viewed in relation to the credit channel (discussed below).

Second, owing to the potential presence of credit market imperfections and non-perfect substitutability of bank versus non-bank assets and liabilities, banks may play a distinct role in amplifying the effects of changes to monetary

policy. The extent to which bank lending behaviour affects the transmission of monetary policy largely hinges on whether bank loans and deposits are "special" (in terms of having no perfect substitutes), as emphasised by the literature on the credit channel of monetary transmission.<sup>5</sup> In essence, the existence of a credit channel depends, on the one hand, on the extent to which banks can easily substitute other funding sources for deposits and, on the other hand, on the extent to which bank borrowers are able to find alternative funding sources to bank financing. With respect to the latter, in particular, small and medium-sized enterprises and households could have difficulties in finding sources of external financing other than bank loans and hence largely depend on the ready availability of bank credit to fund their investment and consumption activities.

The "narrow" credit channel, or bank lending channel, operates via the effect of a monetary policy change on the liability side of banks' balance sheets, which may induce the adjustment of bank assets, including loans. For example, a monetary policy-induced reduction of banks' reserve holdings could lead to a contraction in loan supply if banks either are not fully able to substitute other sources of funding for deposits (for example, because

2 See J. E. Stiglitz and A. Weiss, "Credit rationing in markets with imperfect information", *American Economic Review*, 71, No 3, June 1981, pp. 393-410; and B. Holmström and J. Tirole, "Financial intermediation, loanable funds, and the real sector", *The Quarterly Journal of Economics*, Vol. 112, No 3, 1997, pp. 663-691. See also X. Freixas and J.-C. Rochet, *Microeconomics of Banking*, MIT Press, 1997.

3 As counterparties in monetary policy operations, banks clearly also play a direct role in the implementation of monetary policy.

4 The interest rate channel works on the assumption that some prices and nominal wages are inflexible (sticky) in the short run. For recent evidence on the broad monetary policy transmission mechanism in the euro area see for example J. Boivin, M. P. Giannoni and B. Mojon, "Macroeconomic dynamics in the euro area", invited contribution to D. Acemoglu, K. Rogoff and M. Woodford (eds.), *NBER Macroeconomics Annual 2008*.

5 See for example B. S. Bernanke and A. Blinder, "Credit, money, and aggregate demand", *American Economic Review*, 78, No 2, May 1988, pp. 901-921; B. S. Bernanke and M. Gertler, "Inside the black box: the credit channel of monetary policy transmission", *Journal of Economic Perspectives*, 9, No 4, fall 1995, pp. 27-48; and B. S. Bernanke, M. Gertler and S. Gilchrist, "The financial accelerator in a quantitative business cycle framework" in J. Taylor and M. Woodford (eds.) *Handbook of Macroeconomics*, Amsterdam, North-Holland, 1999.

of their size or capital position) or have insufficient liquidity buffers.<sup>6</sup> Part of the bank lending channel is related to banks' capital positions, in the sense that monetary policy can induce banks to adjust their loan supply by affecting capital positions (which are subject to minimum regulatory requirements and credit ratings-based target ratios).<sup>7</sup>

The "broad" credit channel (or balance sheet channel) relates to the balance sheet position of banks' borrowers. Monetary policy may, via the impact on real interest rates, which affect disposable income, firms' cash flows and (via the asset price channel) collateral values, change the net worth of borrowers and hence banks' willingness to supply loans. It thus may alter "the external finance premium" facing bank borrowers.<sup>8</sup>

### THE RISK-TAKING CHANNEL OF MONETARY TRANSMISSION

More recently the notion of a "risk-taking" channel of monetary policy transmission has been put forward.<sup>9</sup> This channel can work along several dimensions (see also Box 1 for a more detailed exposition of the relationship between monetary policy and risk aversion). First, by affecting collateral values, asset prices and cash flows, monetary policy may affect the risk perception and risk tolerance of banks (and non-banks) and hence the overall risk-taking behaviour in the economy. For example, Jiménez et al. (2007) show that banks tend to lend to riskier borrowers when the monetary policy stance is accommodative.<sup>10</sup> Arguably, one needs to distinguish in this context between the standard balance sheet channel effects on the net worth of borrowers and the additional amplifying effect from the induced risk-taking behaviour of banks and other economic agents. Furthermore, bank credit has also been shown to be related to economic fluctuations, as evidenced for example by the empirical correlation between credit and asset price cycles.<sup>11</sup> Second, in addition to this effect working through the risk-taking attitude of banks it has been suggested that monetary policy, by affecting asset prices, may drive a wedge between actual returns and

some institutional investors' nominal return targets, which may induce these investors to "search for yield" across a wider array of assets. For example, it could be the case that the environment of low interest rates observed in recent years has led some institutional investors (such as pension funds and insurance corporations) to invest increasingly in credit-related assets, which has allowed banks to increasingly fund themselves by selling loans in the secondary market, thus potentially boosting their ability to supply new loans. It has also been argued that if financial intermediaries and market participants expect some kind

6 Empirically, this channel has typically been explored using microeconomic data; see for example A. N. Kashyap and J. Stein, "What do a million observations on banks say about the transmission of monetary policy?", *American Economic Review*, 90, No 3, June 2000, pp. 407-28. For the euro area, see the collection of papers in I. Angeloni, A. N. Kashyap and B. Mojon (eds.), *Monetary policy transmission in the euro area*, Cambridge University Press, 2003.

7 A precondition for the bank capital channel is that the market for bank equity is imperfect; see for example S. Van den Heuvel, "Does bank capital matter for monetary transmission?", *Economic Policy Review*, Federal Reserve Bank of New York, May 2002, pp. 259-265; R. P. Kishan and T. P. Opiela, "Bank capital and loan asymmetry in the transmission of monetary policy", *Journal of Banking & Finance*, 30, 2006, pp. 259-285; L. Gambacorta and P. Mistrulli, "Bank capital and lending behaviour: empirical evidence for Italy", Banca d'Italia Economic Research Paper No 486, 2003; and Y. Altunbas, G. de Bondt and D. Marqués, "Bank capital, bank lending, and monetary policy in the euro area", *Kredit und Kapital*, 4/2004.

8 The external finance premium is the difference between the cost to the borrower of external versus internal funds.

9 See for example C. Borio and H. Zhu, "Capital regulation, risk-taking and monetary policy: a missing link in the transmission mechanism?", paper presented at the ECB conference on "The implications of changes in banking and financing for the monetary policy transmission mechanism", November 2007.

10 See G. Jiménez, S. Ongena, J. L. Peydró-Alcalde and J. Saurina, "Hazardous times for monetary policy: What do twenty-three million bank loans say about the effects of monetary policy on credit risk?", CEPR Discussion Paper No 6514, 2007 (and forthcoming ECB Working Paper). Likewise, it has been shown that bank lending standards tend to be pro-cyclical; see A. N. Berger and G. F. Udell, "The institutional memory hypothesis and the procyclicality of bank lending behaviour", *Journal of Financial Intermediation*, 13, 2004, pp. 458-495.

11 See for example C. Borio and P. Lowe, "Asset prices, financial and monetary stability: exploring the nexus", BIS Working Paper No 114, July 2002; C. Borio and P. Lowe, "Securing sustainable price stability: should credit come back from the wilderness?", BIS Working Paper No 157, July 2004; C. Reinhart and K. Rogoff, "Is the 2007 US sub-prime financial crisis so different? An international historical comparison", NBER Working Paper No 13761, 2008; and C. Detken and F. Smets, "Asset price booms and monetary policy", in Horst Siebert (ed.), *Macroeconomic policies in the world economy*, Springer, Berlin, 2004.

of “insurance” from the central bank against downside risks to asset prices, it may lead to moral hazard issues in the form of excessive risk-taking on average over the business cycle.

#### Box I

### RISK-TAKING AND RISK COMPENSATION AS ELEMENTS IN THE MONETARY POLICY TRANSMISSION PROCESS

The issue of risk-taking and risk management on the part of commercial banks is only one aspect of a possible risk-taking channel of monetary policy. The fact that monetary policy rates are among the set of potential driving factors behind financial risk spreads has long been acknowledged. Only recently, though, has the academic literature started to explore more systematically the mechanisms through which the strategy and conduct of monetary policy may influence risk assessment as well as the size and dynamics of financial risk premia. Complementing the analysis of risk-taking on part of commercial banks in the main text, this box takes a more general perspective on the relationship between monetary policy and risk premia.

#### The relevance of financial risk premia to the monetary policy transmission process

The key policy instrument of modern central banks is a nominal short-term interest rate. As current and expected levels of interest rates are a central element in the valuation of various financial securities, monetary policy has an impact on a broad range of asset prices and yields. These in turn are important factors influencing real economic activity and inflation.

As financial assets are claims to future payments, their prices can be interpreted as reflecting the expectation of these payments, discounted to the present. The discount factors used for this exercise can be understood as reflecting interest rates on different maturities augmented by premia whose size will differ according to the “riskiness” of the respective asset.<sup>1</sup> Hence, riskier assets will trade at a lower price or – alternatively – offer a higher return to investors. This decomposition of asset prices and returns implies that changes in monetary policy rates may have an impact on their values, by changing the outlook for future payments or by changing the risk-free component of the discount factor, but also by impacting on the required risk premium. Thus, for any part of the transmission mechanism that operates via changes in asset values and interest rates – which affect investment and spending decisions – potential amplifying or attenuating effects stemming from changing risk premia have to be taken into account.

Given the relevance of risk premia to the monetary policy transmission mechanism, the impact of monetary policy may be explored along two – interrelated – dimensions. First, there is a need to determine the channels of influence that may exist between the level of short-term interest rates on one side and the private sector’s assessment of risk and its desired risk compensation on the other. Second, it is important to understand the general relationship between risk premia and the conduct and strategy of monetary policy. This second aspect takes a more structural perspective, geared to the relevance of aspects such as the objective of monetary policy or central bank transparency and communication.

<sup>1</sup> See J. H. Cochrane, *Asset pricing*, Princeton University Press, 2005.

### Changes in policy rates and risk premia

Concerning the former aspect, changing monetary policy rates may in principle impact on both the perceived riskiness of certain assets and the risk compensation desired by investors.<sup>2</sup> The two effects should also hold, by analogy, from the viewpoint of a bank regarding the perceived riskiness of borrowers or their projects on one side, and the bank's general inclination to engage in riskier lending on the other.

As an example of the first type of impact, tighter monetary conditions may contribute to an increase in the riskiness of securities issued by firms through an induced rise in interest rate costs or a weakening of balance sheets. Hence this effect may be interpreted as an additional facet of the balance-sheet channel. This helps to explain why expected excess returns on stocks and corporate bond spreads would be likely to increase in response to a tightening of monetary policy.<sup>3</sup>

As regards the second type, changing interest rates could lead to a change in desired risk compensation. Risk compensation can be thought of as being closely related to investors' risk aversion, which is not constant over time but changes with economic conditions. A relationship between monetary policy and investor risk aversion may arise, for example, in economic models with habit persistence, in which risk appetite (the opposite of risk aversion) is higher the more investors' current consumption levels exceed a "reference level" of consumption. The latter can be best understood as an average of consumption levels over the recent past. If a contractionary monetary policy move negatively affects current real activity and consumption levels, it may at the same time increase investors' risk aversion.<sup>4</sup>

Regarding the empirical evidence for these effects, it is somewhat challenging to pin down quantitatively the relationship between monetary policy rates and risk premia. One approach is to explore the direct ("reduced-form") relationship between monetary policy rates on one side and measures of risk premia, risk assessment or risk compensation on the other.<sup>5</sup> However, as monetary policy reacts to changes in the economic environment, it is often deemed more appropriate to single out the pure effect, i.e. that of the unexpected part of changes in monetary policy rates, on risk premia. Concerning the effects of such monetary policy impulses, there is in fact evidence that increases in policy rates can lead to higher expected excess returns on stocks or to a widening of corporate bond spreads.<sup>6</sup>

2 See B. S. Bernanke and K. N. Kuttner, "What explains the stock market's reaction to Federal Reserve policy?", *The Journal of Finance*, 60, No 3, June 2005, pp. 1221–1257.

3 Concerning inflation risk premia contained in nominal asset prices, short-term interest rate increases may have the opposite effect, i.e. that of lowering premia, as found in the arbitrage-free model described in P. Hördahl and O. Tristani, "Inflation risk premia in the term structure of interest rates", ECB Working paper No 734, 2007. The authors argue that this effect may be a reflection of a monetary policy tightening increasing private sector confidence in the absence of future upside inflation surprises.

4 See for example J. Y. Campbell and J. H. Cochrane, "By force of habit: a consumption-based explanation of aggregate stock market behavior", *Journal of Political Economy*, 107, 1999, pp. 205–51. In the model by J. A. Wachter described in "A consumption-based model of the term structure of interest rates", *Journal of Financial Economics*, 79, 2006, pp. 365–99, in which risk itself is constant, the surplus consumption ratio – implying time-varying risk compensation – fully determines term premia on nominal bonds.

5 See for example S. Manganello and G. Wolswijk, "Market discipline, financial integration and fiscal rules – what drives spreads in the euro area government bond market?", ECB Working Paper No 745, 2007, which points to a strong co-movement of euro area sovereign bond spreads with the level of short-term interest rates. Another example is the relationship between the monetary policy stance and risk compensation in the credit default swap (CDS) market found in J. D. Amato, "Risk aversion and risk premia in the CDS market", BIS Quarterly Review, December 2005.

6 See for example Deutsche Bundesbank, "Corporate bond spreads", Financial Stability Report 2005, and Bernanke and Kuttner (2005; see footnote 2).

### Elements of monetary policy strategy and risk premia

Besides the question of how monetary policy rate changes impact on risk premia, it is important to know whether elements of a monetary policy strategy can influence the overall levels of risk premia. In fact, recent academic literature confirms the view – long held by monetary policy-makers and commentators – that investors’ risk assessment and risk compensation depend on aspects such as the transparency, credibility or predictability of monetary policy.

For instance, improved monetary policy credibility and predictability have been put forward as one explanation for the recent episode of surprisingly low government bond yields and associated term premia.<sup>7</sup> Moreover, it has been suggested that the policy objective itself – for example the perceived weight the central bank attaches to price stability as opposed to other conceivable objectives – plays a role.<sup>8</sup>

A perceived systematic reaction of a central bank to macroeconomic conditions, typically captured in the academic literature through the stylised concept of a “reaction function”, is also relevant. The degree to which a central bank reacts to undesired macroeconomic fluctuations, i.e. fluctuations that are incompatible with its objective of price stability, will certainly have an impact on the risk premium desired by investors holding assets that pay out in nominal terms.<sup>9</sup>

Finally, it is arguably important how well the public understands the working of the economy in general and the reactions of monetary policy in particular. In this respect, changes in households’ confidence in the monetary policy rule may well impact on the size of both inflation premia embedded in nominal bond yields and equity premia.<sup>10</sup>

Overall, the literature exploring the role of risk premia and their dependence on monetary policy in a consistent framework of modern monetary (equilibrium) models is still in its infancy. Further exploration of this nexus is certainly an avenue through which a more complete view of the transmission mechanism may be obtained.

7 See D. Backus and J. H. Wright, “Cracking the conundrum”, Finance and Economics Discussion Series Paper, Federal Reserve Board, 2007-46. Concerning the credibility issue more generally, F. J. Palomino, “Interest rates, bond premia and monetary policy”, mimeo, University of Michigan, 2007, finds that the stability benefits that arise from commitment policy (extensively discussed in the literature on optimal monetary policy) come with the by-product of lower inflation risk premia.

8 See P. Söderlind, “Monetary policy effects on financial risk premia”, University of St. Gallen Discussion Paper No 2006-26.

9 See M. F. Gallmeyer, B. Hollifield, F. J. Palomino and S. E. Zin, “Arbitrage-free bond pricing with dynamic macroeconomic models”, *Federal Reserve Bank of St. Louis Review*, July/August 2007, pp. 305-326.

10 Overall premia would then consist of proper risk premia as well as uncertainty premia. See O. Tristani, “Model misspecification, the equilibrium natural interest rate and the equity risk premium”, ECB Working Paper No 808, 2007.

### 3 RECENT DEVELOPMENTS IN BANKING AND THEIR IMPLICATIONS FOR THE MONETARY TRANSMISSION MECHANISM

The above-mentioned theoretical and empirical findings concerning the role of banks in the monetary policy transmission mechanism refer largely to a traditional financial system where banks act as intermediaries by taking deposits from and granting loans to the non-financial sector and where there is a clear distinction

between the functioning of banks and of capital markets. Over the past few decades, however, major changes have taken place in the ways banks conduct their business, as well as in the financial system more generally. An important question is how, in particular, the emergence of securitisation and structured credit products has – by transforming the traditional bank business model and bringing new investors to the credit markets – influenced the financial system and the ways it interacts with monetary

policy. The multitude of financial innovations, particularly in the area of credit risk transfer, is likely to have impacted on the monetary policy transmission mechanism. In the process, the conduct of monetary policy has become more complex than in the past.

### RECENT CHANGES TO FINANCIAL INTERMEDIATION

The favourable environment in recent years of low risk premia, low inflation and rapid technological progress combined with a long-running process of financial deregulation and integration as well as the parallel move to fair-value accounting standards and more risk-sensitive capital adequacy rules has spurred a large amount of financial innovation. One of the most remarkable developments in this regard has been the surge in securitisation activity and the spread of new, innovative credit risk transfer instruments more generally.<sup>12</sup>

Whereas securitisation activities in the US financial system have been important for a number of years, in the euro area they have developed more recently. Nonetheless, the growth of securitisation markets in the euro area until the recent slowdown owing to the financial market tensions that began in mid-2007 was remarkable (see Chart 1). Indeed, the issuance

of euro-denominated asset-backed securities increased from around €50 billion in 1999 to almost €400 billion in mid-2007.<sup>13</sup> It is worth noting, however, that progress in securitisation activity has been relatively uneven across euro area countries and that, despite the strong growth observed in recent years, the level of securitisation activity in the euro area remains well below that in the United States and the United Kingdom (see Chart 2).

Another illustration of the surge in credit transfer activities in the financial system is that the notional amount outstanding in the global credit default swap (CDS) market rose from virtually zero in 2001 to around USD 60 trillion at the end of 2007.<sup>14</sup> In addition, the past decades have seen the growing importance of a range of non-bank financial intermediaries.<sup>15</sup> While this process originated to a large extent in the United States, a similar

12 For a more detailed review of securitisation activity see the article entitled “Securitisation in the euro area” in the February 2008 issue of the Monthly Bulletin.

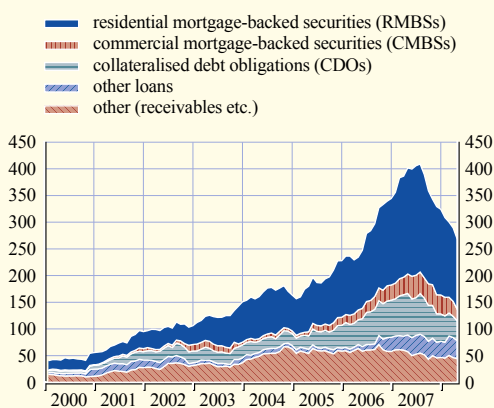
13 Based on a 12-month moving sum.

14 See for example “OTC derivatives market activity in the second half of 2007”, BIS, May 2008, and “ISDA Year-End 2007 Market Survey”, International Swaps and Derivatives Association, 2008.

15 See also R. Rajan, “Has financial development made the world riskier?”, NBER Working Paper No 11728, 2005.

Chart 1 Issuance of euro-denominated asset-backed securities

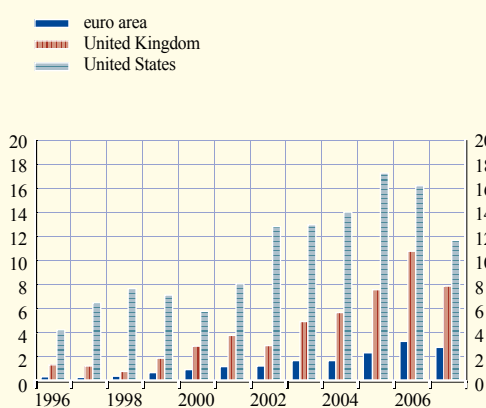
(monthly data; 12-month moving sum)



Source: Dealogic DCM Analytics.  
Note: The “CDO” category does not include synthetic CDOs.

Chart 2 Securitisation in the euro area, the United Kingdom and the United States

(as a percentage of GDP)



Source: Dealogic DCM Analytics.  
Note: By country of underlying risk. Figures include asset-backed securities but exclude CDOs and securities issued by US government-sponsored agencies.

development has been observed in the euro area financial system, whereby non-bank financial intermediaries such as investment funds, insurance companies, pension funds and credit card operators have become increasingly important. More recently, more esoteric financial players such as hedge funds, collateralised debt obligation (CDO) funds, special purpose vehicles and conduits have also expanded significantly.<sup>16</sup>

The emergence of these new players has created a larger investor base and hence has, on the one hand, facilitated the placement of financial assets originated by banks (such as securitised and syndicated loans) and, on the other, encouraged market-based financing (such as commercial paper and corporate bonds). A further implication of these developments is that the way banks provide and price their loans is increasingly determined by the extent to which the loans can be either hedged or sold in the market place. Hence, the loan granting process has become more sensitive to changes in market-based prices of credit risk (such as CDS spreads and secondary loan prices).

All in all, these developments have transformed the financial system, making it more market-oriented, and have also increasingly blurred the traditional distinction between a bank-based and a market-based system.<sup>17</sup> While these developments have resulted in financial intermediation becoming more based on market prices, they have also allowed a wider dispersion of risks across the system. Partly in light of these developments, the past decades have seen a relative decline in the importance of the traditional model of financial intermediation whereby banks obtain funding mainly via deposits and use these funds to grant loans that they hold to maturity. This model has over time been complemented with another, where banks increasingly rely on market-based funding and transfer a major part of their credit risk off balance sheet. In other words, some segments of the banking sector have moved away from the traditional

“originate-and-hold” model and towards an “originate-and-distribute” model. A simple illustration of the changing nature of banking is the increasing “funding gap” (i.e. the difference between deposits from and loans to the non-financial private sector) of euro area MFIs, which suggests that banks are tending to rely more on non-deposit funding, such as market-based debt and securitisation.<sup>18</sup> However, except for the larger banks, the majority of euro area banks have not adopted the “originate-and-distribute” banking model and still base their operations on the traditional “originate-and-hold” model.<sup>19</sup>

#### MONETARY POLICY IMPLICATIONS OF THE CHANGING FINANCIAL LANDSCAPE

Assuming that the trend of financial innovation has changed the nature of at least a part of the banking system, it may in the process have also altered the role of banks in the transmission of monetary policy in important ways.

With respect to the interest rate channel, it may be expected that the increasing degree of market-based pricing of bank loans has made bank interest rates more sensitive to changes in monetary policy rates via the latter’s effect on market interest rates. Indeed, evidence for the United States suggests that the growth of securitisation activities has speeded up the responsiveness of mortgage rates to changes in policy rates.<sup>20</sup> More recent evidence for the euro area also points to a

16 See for example “Corporate finance in the euro area – structural issues report”, ECB, May 2007.

17 See also J.-C. Trichet, “Some reflections on the development of credit derivatives”, keynote address given at the 22nd Annual General Meeting of the International Swaps and Derivatives Association (ISDA), Boston, 18 April 2007.

18 According to the MFI balance sheet statistics, the funding gap of euro area MFIs increased from around nil in 1997 to more than €1,300 billion (or 5% of total assets) in the first quarter of 2008. Moreover, this figure may be even higher depending on the extent to which securitised loans are derecognised from banks’ balance sheets.

19 See also Box 2.2 entitled “Medium-term challenges for the different banking models” in “Financial Stability Report”, Banco de España, April 2008.

20 See A. Estrella, “Securitization and the efficacy of monetary policy”, *Economic Policy Review*, Volume 8, No 1, Federal Reserve Bank of New York, May 2002, pp. 243-255.



stronger and faster bank interest rate pass-through from changes in policy rates for banks which are more active in securitisation and derivatives markets.<sup>21</sup>

A number of observations can also be made regarding the credit channel. First, “true sale” securitisation, in which the underlying assets are removed from the originating bank’s balance sheet, has provided banks with an additional funding source. This is likely to have reduced the sensitivity of bank loan supply to changes in monetary policy rates and, other things being equal, weakened the bank lending channel.

Second, by transferring credit risk off balance sheet, securitisation may help originating banks to obtain capital relief, which in turn may free up funds for additional provision of loans as well as reduce the possibility of balance sheet constraints in the face of monetary policy changes. This was an issue under the Basel I capital adequacy framework, as securitisation was often perceived as a means for banks to arbitrage on the level of required regulatory capital by transferring better-quality assets off balance sheet while retaining the riskier loans (as the capital requirements distinguished only to a limited degree between different kinds of credit risk). The new Basel II framework aims to, among other things, correct incentives for such regulatory arbitrage by aligning the regulatory capital requirements more closely with actual economic risk.<sup>22</sup> At the same time, it has been argued that this more risk-sensitive framework potentially amplifies the pro-cyclical nature of bank lending and thus may lead in certain periods to a reduction of loan supply.<sup>23</sup>

Third, the use of structured credit products should be seen in the context of advances in bank risk management systems. Notably, the combination of new credit risk modelling techniques and credit derivatives has allowed an improved allocation and dispersion of banking book risk at the portfolio level, which in turn may have enhanced banks’ ability to expand

their balance sheets. All in all the emergence of securitisation and credit derivatives is likely to have led in normal circumstances to a change in bank lending dynamics, possibly leading to a more muted reaction of bank loan supply to monetary policy changes.<sup>24</sup> Empirical evidence on the role of securitisation and bank risk-taking in the monetary policy transmission mechanism is provided in Box 2. Hence, by expanding the breadth of the credit markets the advances in credit risk transfer instruments are likely to have reduced the effectiveness of the bank lending channel in normal circumstances, while potentially making it more pronounced if the securitisation markets grind to a halt.

Furthermore, the advent of structured credit products has provided the markets with a range of new tools to assess the creditworthiness of borrowers. This increase in credit market information may contribute to compressing the overall external finance premium and hence to reducing the effectiveness of the broad credit channel. At the same time, the enhanced liquidity and more continuous pricing of credit market products offered by credit risk transfer

21 See R. Gropp, C. Kok Sørensen and J. Lichtenberger, “The dynamics of bank spreads and financial structure”, ECB Working Paper No 714, 2007.

22 It is currently uncertain what the net effect of the introduction of Basel II-based capital requirements on securitisation activities will be. Thus, according to the BIS’s latest quantitative impact study (QIS5), capital requirements related to banks’ securitised assets may either increase or decrease depending on the type of bank and on the approach applied (“standardised” or “internal ratings-based” (IRB)); see “Results of the fifth quantitative impact study (QIS5)”, Basel Committee on Banking Supervision, 16 June 2006.

23 The European Commission, also taking into account the contribution of the ECB, will on an ongoing basis monitor the extent to which the new capital adequacy requirements produce pro-cyclical effects on the economic cycle; see Article 156 of Directive 2006/48/EC of the European Parliament and of the Council of 14 June 2006 relating to the taking up and pursuit of the business of credit institutions (recast). See also recent initiatives by the Basel Committee on Banking Supervision (see footnote 31).

24 For empirical evidence, see for example Estrella (2002; see footnote 20); E. Loutskina and P. E. Strahan, “Securitization and the declining impact of bank finance on loan supply: evidence from mortgage acceptance rates”, NBER Working Paper No 11983; B. Hirtle, “Credit derivatives and bank credit supply”, Federal Reserve Bank of New York Staff Reports No 276, February 2007; and Y. Altunbas, L. Gambacorta and D. Marqués, “Securitisation and the bank lending channel”, ECB Working Paper No 838, 2007.

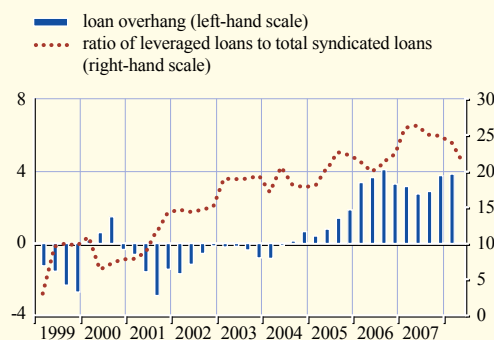
instruments as well as the parallel move to fair-value accounting standards may have accentuated the sensitivity of the external finance premium to changes in monetary policy.<sup>25</sup> Hence, a priori the net effect of financial innovation on the balance sheet channel is somewhat ambiguous.

With respect to the risk-taking channel of monetary policy transmission, financial innovation in parallel with changes to the capital regulatory framework (Basel II) is likely to have increased the importance of the perception, pricing and management of risk for the behaviour of banks and other financial intermediaries.<sup>26</sup> Similarly, more market-based pricing may have reinforced the incentive structures driving banks and institutional investors, potentially leading to more extreme risk-taking behaviour. These considerations point to a strengthening of the risk-taking channel.

While there is presently only scarce empirical research on the impact of financial innovation on the risk-taking channel, some recent studies provide evidence of a potential strengthening of monetary policy transmission through the risk-taking channel due to the changing role of banks. For example, it has been found that changes in monetary policy affect CDS spreads, as predicted by both the balance sheet channel and the risk-taking channel.<sup>27</sup> An easing of monetary policy would be expected to lower CDS spreads, which would make it less costly for banks to hedge their credit risk and hence may allow them to originate riskier loans (as they would then be able to off-load the loans more easily). Two other studies note a positive link between asset prices and (mainly investment) banks' risk-taking.<sup>28</sup> This derives from the fact that banks tend to target a specific leverage ratio, or a certain risk metric (e.g. the Value at Risk). Hence, the development towards more market-based pricing of bank balance sheets implies a higher volatility of liabilities in the sense that banks tend to increase leverage when asset prices increase and reduce it when they decline, which in turn may lead to amplified effects on the real economy of monetary policy changes.

**Chart 3 The ratio of leveraged loans to total syndicated loans and the "overhang" of loans to non-financial corporations in the euro area**

(percentage points and percentages; quarterly data)



Sources: Dealogic LoanAnalytics, ECB and ECB calculations. Note: "Leveraged loans" are defined as loans to non-investment grade and non-rated borrowers. The "loan overhang" is defined as the difference between actual loan growth and the implied loan growth derived from a standard vector-error correction model of loans to non-financial corporations.

In view of these considerations, Chart 3 presents some tentative evidence that during the recent period of low interest rates and vigorous credit transfer activity, euro area banks not only increased their lending to non-financial corporations by more than expected on the basis of developments in fundamental factors such as fixed investment, internal financing and the cost of financing (which traditionally explain loan growth fairly well) but also tended to engage in riskier lending, which only reversed around mid-2007 with the outbreak of the financial market tensions.

25 See also H. Zhu, "An empirical comparison of credit spreads between the bond market and the credit default swap market", *Journal of Financial Services Research*, Volume 29, No 3, June 2006, pp. 211-235, which shows that credit derivatives premia (i.e. CDS spreads) respond more than corporate bond spreads to changes in the availability and cost of financing.

26 See C. Borio and H. Zhu, (2007; see footnote 9).

27 See J. D. Amato (2005; see footnote 5 of Box 1).

28 See T. Adrian and H. S. Shin, "Liquidity and leverage", paper presented at the ECB conference on "The implications of changes in banking and financing for the monetary policy transmission mechanism", 29-30 November 2007, Frankfurt am Main; and D. Greenshaw, J. Hatzius, A. N. Kashyap and H. S. Shin, "Leveraged losses: lessons from the mortgage market meltdown", paper presented at the US Monetary Policy Forum conference, February 2008.

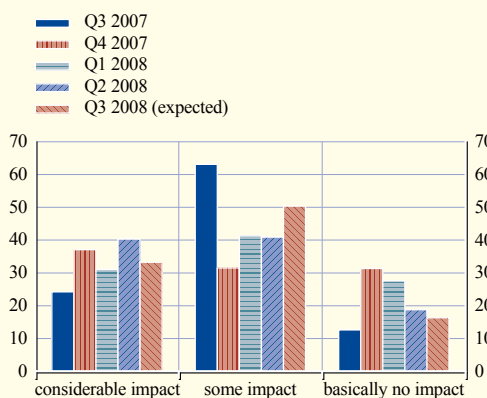
#### 4 THE IMPACT OF THE CREDIT MARKET TENSIONS SINCE MID-2007

The empirical findings on the impact of changes to the financial landscape on the monetary policy transmission mechanism (reported in Section 3) have mostly been derived for samples covering a period of booming securitisation and derivatives activities. Hence, it cannot be excluded that these findings only apply during periods of low financial market volatility, ample liquidity and benign risk levels. Indeed, recent events have shown that during periods of stress the securitisation and credit derivatives markets could come to a standstill. Questions concerning the implications of new financial instruments and the changing nature of banking have indeed come to the fore in the course of the financial market tensions since mid-2007.<sup>29</sup> The latest rounds of the bank lending survey for the euro area included a number of ad hoc questions related to the current tensions. For example, 70-80% of the banks (regularly using securitisation) responded that the current difficulties in accessing funding via securitisation would hamper their lending to either some or a considerable extent (see Chart 4).<sup>30</sup> Hence, the upward effect on loan supply stemming from the rise of credit risk transfer activities (including securitisation) may at least temporarily have evaporated.

Although the slowdown in securitisation activity is not likely to be permanent, securitisation may take different forms in the future, possibly as a result of a combination of regulatory requirements and changing market practices.<sup>31</sup> In any case, recent events have shown that the effects of financial innovations and the role of banks in monetary policy transmission could be highly non-linear. In particular, banks' ability and willingness to take on and distribute additional credit risk is likely to hinge crucially on the smooth functioning of the securitisation and structured credit markets. Certainly, an enhanced understanding of the overall impact of a drying up of credit risk transfer markets is essential. Generally, it is difficult to ascertain a priori how the financial system would function under such circumstances. Arguably, a certain degree of

Chart 4 The impact on bank lending of difficulties in raising funds via securitisation

(percentage of total respondent banks)



Source: Bank lending survey for the euro area.

reintermediation should be expected, although this very much depends on the financial soundness of banks. Furthermore, the financial market tensions have underlined the growing importance of market-based pricing in financial intermediation. The pressure on banks' profitability and balance sheets has been driven mainly by revaluation adjustments of their marketable assets and rising costs related to credit hedging activities rather than by outright losses on their loan portfolios. This also reflects the fact that so far the impact of the financial market tensions on the euro area non-financial private sector has been limited. Finally, recent events have highlighted the importance of a sufficiently high level of credit market transparency and supervision to ensure that market participants have confidence in the quality of the balance sheets of banks and other financial intermediaries.

29 See the Overview section and Boxes 5 and 13 in "Financial Stability Review", ECB, December 2007, and the Overview section and special feature article A in "Financial Stability Review", ECB, June 2008.

30 Moreover, about one-third of the banks responded that lending could be hampered by currently rising costs related to their capital position.

31 See also the recent initiatives by the Financial Stability Forum ("Report of the Financial Stability Forum on enhancing market and institutional resilience", 7 April 2008), the Institute of International Finance ("Interim IIF report on market best practices", April 2008), and the Basel Committee on Banking Supervision ("Principles for sound liquidity risk management and supervision", June 2008).

### THE IMPORTANCE OF BANK RISK AND SECURITISATION FOR BANK LENDING AND THE TRANSMISSION OF MONETARY POLICY

In the few years prior to the financial market tensions that started in the second half of 2007, most balance sheet and profitability indicators for euro area banks showed a very positive picture. Banks' credit risk was very low – as measured either by indicators extracted from their financial statements, such as the amount of loan loss provisions, or by market-based measures such as expected default frequencies, or spreads on CDSs or subordinated debt. Moreover, during this period banks' profits and capital positions stood at relatively high levels. These developments were supported by a favourable macroeconomic environment and strong increases in asset prices. Consequently, banks' funding conditions were very favourable due to their low cost of financing and the strong demand for deposits and their marketable debt. In this respect, banks also benefited from an increasing ability to securitise their assets in an environment of ample liquidity and strong demand for credit products from non-bank investors searching for yield, which resulted in a surge in securitisation of euro-denominated assets until mid-2007 (see Chart 1). There is accumulating evidence suggesting that these factors were in part the cause of a strong supply of bank credit and a progressive loosening in credit standards. This was reflected, for instance, in the results of the bank lending survey for the euro area and the strong loan growth observed over the past two to three years.<sup>1</sup>

It is inherently difficult to ascertain the possible impact of monetary policy on loan supply and in particular to disentangle demand and supply effects.<sup>2</sup> In the economic literature, this identification problem has traditionally been solved by using extensive micro data from the banking sector, as individual banks' characteristics are expected to mostly reflect supply effects. Building on this idea, and using data from banks' financial statements, securitisation activity and market-based indicators of banks' risk for around 3,000 euro area banks over the first seven years of EMU, a loan equation was constructed by regressing the growth rate of the lending of individual banks on GDP growth rates, interest rate changes and other country-specific characteristics as well as a number of bank-specific characteristics including capital, securitisation and risk positions. From a monetary policy perspective, this econometric exercise seems to provide evidence that in the years immediately prior to the market turmoil, securitisation activity partly sheltered banks' loan supply from the impact of monetary policy changes.<sup>3</sup> Chart A shows that the monetary policy impact on the lending of banks that securitise a major part of their loan portfolio is statistically insignificant. For banks that use securitisation to a lesser degree, monetary policy does seem to impact on their lending behaviour.

As a consequence of the tensions in credit risk markets beginning in the summer of 2007, the issuance of asset-backed securities slowed down markedly, while banks' risk profiles also deteriorated and their capital positions came under pressure. The bank lending channel

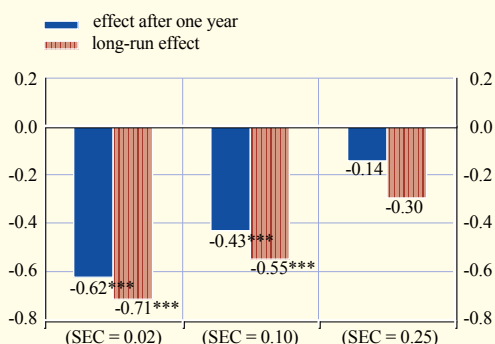
1 See for instance G. Dell'Ariccia, D. Igan and L. Laeven, "Credit booms and lending standards: evidence from the subprime mortgage market" or A. Sufi and A. Mian, "The consequences of mortgage credit expansion: evidence from the 2007 mortgage default crisis", papers presented at the Conference on Bank Structure and Competition entitled "Credit market turmoil: causes, consequences and cures", Federal Reserve Bank of Chicago, May 2008.

2 J. Peek and E. Rosengren, "Is bank lending important for the transmission of monetary policy: an overview", Federal Reserve Bank of Boston Conference Series; Proceedings, 1995, pp. 1-14.

3 See Y. Altunbas, L. Gambacorta and D. Marqués-Ibáñez, "Securitisation and the bank lending channel", ECB Working Paper No 838, 2007, and Banca d'Italia Working Paper No 653, 2007.

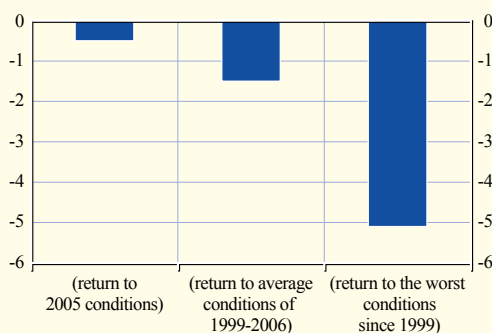
**Chart A Effect of a 1 percentage point increase in the key ECB interest rates on bank loan growth**

(percentage points)



Source: Altunbas et al. (2007).

Notes: "SEC" indicates the degree to which banks securitise their assets. For example, "SEC = 0.02" refers to banks that securitise up to 2% of their assets. "\*\*\*\*" indicates statistical significance at the 1% level.

**Chart B Estimated effects on the growth rate of total lending from a shock to loan supply**

Sources: Altunbas et al. and ECB calculations.

Note: "Conditions" refers to the level of securitisation activity, bank risk and capital position.

mechanism suggests that these developments would negatively affect bank loan supply. In this light, using the model described above, three different scenarios were conducted for changes in the baseline level of the growth of bank loans arising from a negative shock to the supply of loans. It can be assumed that the positive bank conditions prior to the credit market tensions (including banks' risk, capital-to-asset ratios and securitisation activity) are likely to have deteriorated. For that reason, the loan equation is "shocked" by adjusting bank conditions (i.e. their level of risk, securitisation activity and capital position) in order to evaluate the possible effect on loan supply. The results of the three scenarios (shown in Chart B) suggest a decline in the growth of supplied lending compared with the baseline scenario.

The first scenario assumes that securitisation activity – which was very strong in the first half of 2007 – bank capital and risk positions all return to the level of 2005, i.e. it assumes a relatively light effect of the credit market tensions. Under this scenario there is an exogenous decline in the volume of loans securitised by around 30%. This in turn produces an immediate reduction in the growth of loans to the non-financial private sector of around 0.5 percentage point (left-hand panel of Chart B).

Under the second scenario, securitisation activity, capital levels and bank risk are assumed to return to their average levels since the introduction of the euro. This would potentially result in a further decline in the supply of credit. It would produce a reduction in the growth of loans to the private sector of around 1.5 percentage points (middle panel of Chart B).

The third, extreme scenario assumes that bank conditions, measured by the three variables mentioned above, deteriorate from the current situation to the worst annual levels observed since 1999. This implies, for instance, a drop in securitisation activity to zero and a deterioration in the quality of credit to the level experienced in 2002. In this extreme case, the growth rate of the supply of loans to euro area residents would drop by around 5 percentage points (right-hand panel of Chart B).

When interpreting these results, at least three issues need to be considered. First, the decline in loan growth is linked to the loan supply effect only. Hence, it is merely an initial direct impact on top of the effects of other macroeconomic factors, such as a possible decline in economic activity, that are also likely to lead directly to changes in loan growth. Second, the model results are based on a sample of banks that is not directly comparable with the official MFI balance sheet statistics, which are constructed differently and have a more comprehensive coverage. Finally, possible effects due to non-linearities are not included in the model.

## 5 CONCLUSION

This article has argued that structural changes to the financial landscape in recent years, such as the multitude of credit market innovations, more risk-sensitive accounting and regulatory frameworks, and the emergence of non-bank credit market investors, have changed the nature of banking and the role of banks in transmitting monetary policy to the real economy. In light of these developments, banking may have become more flexible but also more risk-sensitive. The existing theoretical and empirical evidence suggests that the interest rate channel may have in the process been strengthened (in the sense of a faster bank interest rate pass-through). At the same time, the credit channel is likely to have weakened somewhat, whereas the factors driving the risk-taking channel are likely to have become more pronounced.

All in all, however, it is not easy to draw firm conclusions on the monetary policy implications of the trend of financial innovation and the changing role of banks. It is nonetheless likely that the transmission mechanism has become more complex over time in light of the increasing inter-linkages between the banking sector and financial markets. The credit market tensions that began in mid-2007 indeed highlight considerable interactions between monetary policy transmission, financial stability, banking supervision, and credit market oversight and transparency, and also point to important asymmetries in the transmission mechanism over time. In this regard, the fact that financial intermediation is more sensitive to market price adjustments than in the past also makes it more prone to abrupt disruptions and potentially

creates significant non-linear effects in monetary policy transmission. While the more disruption-prone and pro-cyclical nature of financial intermediation arising from financial innovation will have to be addressed in a structural manner (via regulatory initiatives and/or changes in market practices), recent developments have illustrated the importance of closely monitoring credit market indicators and call for a further strengthening of monetary and credit analysis by central banks. Likewise, recent events underline the need to monitor and further explore the links between monetary policy transmission and risk premia.