

## **A primer on the subprime crisis**

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## A PRIMER ON THE SUBPRIME CRISIS

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The catalyst of the current financial turmoil has been the losses on the subprime mortgage market. However, the low quality of these partly collateralised housing loans was known for a while and the default on subprime mortgages largely expected. Therefore, how to account for the fact that an expected shock on a small segment of the US mortgage market turned into a major financial crisis, causing the near-collapse of the Commercial Paper and of the interbank lending markets, that is to say of two of the most liquid financial markets?

Banks have transferred risks to special entities, the so-called “conduits”, SIV (Special Investment Vehicles) and SPV (Special Purpose Vehicles). Such a practice gave the false impression that credit risk was transferred from banks outside the financial system. This was indeed not the case. The funding needs associated in particular with backup lines of credit for off-balance sheet vehicles generated pressures on the the interbank markets and led central banks to massively intervene.

The roots of the current turmoil are therefore of a deeper and structural nature. For that reason, it is necessary to assess, from a longer term perspective, what are the main consequences of the recent structural changes on financial markets in order to have a good grasp on the current financial market dynamics and clarify what is meant nowadays by liquidity.

### *The recent trends on financial market and liquidity*

#### *Disintermediation, financial liberalisation and deregulation, and securitisation...*

Disintermediation, deregulation and securitisation are probably the most striking developments observed in financial markets over the past decade. They have not only profoundly changed the financial landscape but also the contour of liquidity.

Nowadays, a significant source of liquidity and credit lies outside the banking system. Besides banks-mediated liquidity, traditionally measured by monetary and credit aggregates, there is a second and growing component which depends on the amount of credit non-bank financial intermediaries are willing to extend to each others.<sup>1</sup> Those two components have tended to move together and, to some extent, reinforced each other over the recent years: ample liquidity, measured by aggregate money or credit, was considered as a key driver to easy money on financial markets. On the other hand, “easy” finance has exacerbated investor’s willingness to take on more risk and high levels of leverage, fuelling credit and monetary expansion.

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<sup>1</sup> See Cournède (B.), Ahrend (R.) and Price (R.) (2008): “Have financial trends changed the transmission of monetary policy?”, *OECD Economics Department Working Papers*, OECD, Paris, forthcoming.

The elimination of some structural barriers between investment banking and retail banking has also facilitated fluidity in credit flows from originators of loans to issuers of debt products. It has also fostered competition within the financial sector and has given an impetus to financial innovation.

Finally, securitisation has not only allowed banks to liquefy financial assets but also has opened new investment opportunities for the banking sector, involving the origination of loans for the purpose of packaging and selling them as securities. Over the recent years, securitisation has expanded to virtually all kinds of receivables.

*...have contributed to the emergence of the “originate and distribute model”*

These trends have given birth to a new business model, the so-called “originate and distribute model”, by which banks originate loans and then distribute the underlying risk to a pool of investors by means of dedicated instruments.

Previously the loans, mostly originated by banks, were kept on their balance sheet and monitored by the banks for their entire life. Banks, through the securitisation process, have now the possibility to offload credit risk from their balance sheet and transfer it to other investors. The steps underlying the production of a loan, such as a mortgage, are very complex nowadays<sup>2</sup> and are usually divided into distinct activities, in general carrying out each of them within different entities. For example, the complete process for the production of a mortgage typically involves as many different players as a borrower, an originator, an arranger who bundles loans together as a structured product, a warehouse lender credit risk agency, an asset manager and a mortgage loan servicer. Consequently, credit risk is more widely spread in the financial sector and sold to a wide spectrum of investors, not only better equipped but also more willing to bear it. In such a context, bank capital can be used more efficiently and consequently, the supply of credit increased.

The steady shift in banks' assets from loans to securities has magnified the sensitivity of bank balance sheets to valuation techniques. Indeed, the valuation of complex structured instruments is quite challenging. In effect, securities have to be evaluated at their fair value, *i.e.* marked to market or possibly to model. As the bulk of structured finance instruments are not traded in secondary markets, *i.e.* basically no market price exists, financial firms then tend to rely on a complex combination of credit pricing models, where external credit rating comes into play, and thinly traded derivatives that share more or less the same features as of the product to be valued.

### ***What are the main drawbacks of such a business model?***

- *Credit market imperfections.* In this model, issuers of loans may have less incentive to ensure loans viability since they expect to transfer credit risks to other investors. This type of moral hazard problem is even stronger when loans are originated by non-regulated entities. At the following step, the buyers of the loans that intend to repackage them into complex credit instruments have little incentive to scrutinise the quality of the acquired assets. The reason is that the ultimate buyers are mainly guided by the credit rating of the underlying assets. Asymmetric information thus plagues every step in the process and provides a powerful source of contagion. On the top of that, a key condition for such a system to operate is that liquidity is permanently made available to each market participant involved in the process.

- *Valuation.* By nature, structured products are not very liquid. The main reason is that they are structured to suit precisely the characteristics and the risk profile needed by their buyer. This restricts their ability to be sold later on to other investors who may not have the same preferences or needs. This involves an element of circularity since fair valuation must be based on a market price due to

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<sup>2</sup> See for instance Ashcraft (A. B.) and Huermann (T.) (2007): “Understanding the securitization of subprime mortgage credit”, Mimeo, Federal Reserve Bank of New York, December.

IFRS requirements, the ability to price an asset itself depends on sufficient liquidity in the market and, finally, liquidity depends on valuation.

In this setup, credit rating agencies are endorsed with an essential function as they gather and control information concerning borrowers. This information is essential to assess the risk and return on the various assets and therefore to facilitate price discovery. In addition, on securitised markets, the rating system enables all players to have access to simple, clear and concise information on the credit risk attached to the various classes and categories of financial instruments. The rating process has become an integral part of the design and financial engineering of these products. Rating agencies determine the size of the tranches, the seniority levels. They supply the methods and the models for assessing risks and their correlation and impose the necessary conditions securitisation vehicles have to meet in order to be able to issue. By allowing the comparability of tailored structured products with a wide array of assets, they ensure their marketability, or to put it another way, their liquidity.

There are however two striking weaknesses in this chain: first, rating agencies consider themselves as responsible for solely assessing credit risk and therefore, their ratings do not encompass liquidity risk whereby investors believe they do so. Second, the metric used for rating structured products is identical, in terms of presentation, to that used for traditional bond products. For investors, an AAA rating has traditionally been associated with a stable investment. In addition, it seems that given the low return on such products, investors have less incentive to thoroughly analyse the nature and the sensitivity of the ratings. This may not be the appropriate behaviour *vis-à-vis* structured products, which have shown huge volatility in their ratings, as evidence during the financial turmoil.

- *Increased uncertainty about asset valuation, risk exposure and counterparty risk.* The diversity and the complexity of valuation techniques can result in a considerable variation in fair value estimates across firms. As a consequence, a number of financial firms do not have a clear stake in the longer run performance of the underlying loans. In addition, wide distribution of risks associated to the complexity of structured product may obscure where the risk truly reside. In such a circumstance, the deterioration in the value of some assets, such as observed in US subprime-related assets, in particular mortgage-backed securities, can lead to an increase in uncertainty about the intrinsic value of several large classes of financial assets, whether they are exposed or not to the US subprime mortgage market. This is in sharp contrast with the standard bank-intermediation model where asset and credit valuations are tied to fundamentals and made at historical costs and therefore less prone to market price fluctuations. In the context of the securitisation model, valuation problems may translate into capital shortages through fair value accounting, as asset price fluctuations immediately show up on banks' balance sheet.

- *The relative inadequacy of capital to risk in the new securitisation model.* New entities, such as conduits and SIV did, until recently, perform maturity transformation on a significant scale without any capital to absorb shocks. However, most of them were equipped with backup lines of credit or other guarantees by the sponsoring banks which were substituting for equity which otherwise would have been required for these entities to issue highly rated AAA commercial papers. Securitisation does not fully shield banks from credit risk on the assets transferred. First, originators usually retain exposure to the first defaults on the loans they sell. In times of stress, this exposure will reduce profits and therefore equity capital. Second, large amounts of loan-backed instruments were acquired through conduits or SIV which benefit from large contingency credit lines from the banks that set them up, precisely to face liquidity risks. As illustrated this summer, as conduits call on their credit lines, bank balance sheets can expand considerably in times of stress, lowering the amount of excess capital available to back new lending.

## ***Consequences and challenges for policy makers***

### *From a liquidity shock...*

The combination of the above mentioned drawbacks has been responsible for this abrupt regime shift from a situation characterised by ample liquidity to a liquidity shortage. There are alternative explanations to account for such a shift: first, a rise in uncertainty.<sup>3</sup> Because of both the complexity and the rapid proliferation of structured instruments, market participants lack historical record to assess and measure how these financial instruments will behave in periods of stress. The fact that AAA ratings appeared less stable than normally expected for this class of assets, with examples of downgrades of several notches in a day, led investors to question the valuation of all types of credit products (*i.e.* not just mortgage). As a result, uncertainty<sup>4</sup> may have led market players to make decision based on worst-case scenario. Though this behaviour is rational in order to make robust decisions when confronted with uncertainty, the aggregation of individual rational decisions may have produced a suboptimal macroeconomic outcome: market participants that have the liquidity stayed out of the market. Some stopped trading due to perceived heightened counterparty risks; others hoarded liquidity in a context of heightened uncertainty regarding their own future liquidity needs and risk exposure.

Second, increased competition amongst financial intermediaries: the disintermediation process has fostered competition between financial intermediaries, in particular between banks and non-bank institutions. However, banks still play an important role in channeling liquidity from the banking system to where it is most needed. They have in particular access to central bank money and this may provide them, in particular in period of stress, with the ability to hoard the liquidity injected by central banks and organise rationing or liquidity squeezes *vis-à-vis* their main competitors. Another rationale, in the context of asymmetric information, is the potential link between competition and strategic hedging decisions. In such a setup<sup>5</sup>, financial firms may have an incentive to make risk management choices that transfer liquidity to those states in which its competitors are relatively cash constrained. As hedging strategies are not perfectly observable, the mechanism gives rise to adverse selection. In such a situation, a small liquidity shock may lead to the deterioration of the quality of the pool of financial institutions short of liquidity, which in turn leads liquidity providers to keep their liquidity on hand. Such behaviour questions the respective roles and tools of central banks, banks and non banks in creating and maintaining deep and liquid markets.

### *...to capital shortage?*

Since the beginning of the turmoil, banks have been experiencing increasing pressures on their balance sheet. On the asset side, the process of securitizing or syndicating assets have left banks with large loans and warehousing risks that were in the process of being sold, when the crisis arose. The lower ability of markets to absorb securitised assets abruptly reduced the capacity of banks to transfer assets off-balance sheet. Simultaneously, assets that were previously off-loaded by banks had to be brought back on balance sheet, on account of credit, liquidity or reputation risks. Indeed, banks are vulnerable to allegations that they have not screened borrowers adequately or not properly warned investors of the risks arising from the products they have securitised. Managing reputation risk has played a crucial role in banks' decision to support the vehicles they have sponsored or to participate in their restructuring even if they were under no strict legal obligation. On the capital side, valuation impacted capital buffers through write offs. Finally, the funding cost for banks has increased and the conditions for raising new capital have tightened while, on the equity side, the sharp fall of banks' market capitalizations has increased the implied cost of equity issuance. Signs of capital shortages have also materialised outside the banking sector. Monoline bond insurers, who are important counterparties

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<sup>3</sup> See Caballero (R.) and Krishnamurthy (A.) (2008): "Musical chairs: a comment on the credit crisis", *Financial Stability Review*, No. 11, Banque de France, February, forthcoming.

<sup>4</sup> We refer to Knightian uncertainty, *i.e.* uncertainty regarding the true underlying distribution of risks.

<sup>5</sup> See for instance Adam, Dasgupta and Titman (2008): "Financial constraints, competition and hedging", forthcoming, *Journal of Finance*.

selling credit protection on senior and super senior RMBS and CDO tranches, have also faced important mark-to-market losses.

### ***Policy responses and agenda***

#### *Adjusting regulation*

In the short-term, some dysfunctions need to be addressed without necessarily calling for more regulation. First, because many corrective initiatives are related to financial institutions' internal business decisions. Second, the scope for regulation is to provide the right incentives to improve market efficiency. This may call for marginal adjustments on both capital and valuation requirements but not more. Finally, tight regulation has been one of the major drivers of financial innovations over the past decades. Moreover, as neatly pointed out by Charles Goodhart, regulation should not be implemented in too a mechanical way as required liquidity would not necessarily correspond to usable liquidity.<sup>6</sup>

#### *Improving information and transparency*

The main feature of credit market is market imperfections and part of the current turmoil resides in the presence of asymmetric information, moral hazard and adverse selection. One way to restore confidence is to increase information and transparency. The gradual implementation of Basel II from 2008 will address some of these issues regarding regulated entities. From that perspective, the role and the importance of liquidity risk should be acknowledged and better factored in existent regulatory requirements. This requires for instance accounting for liquidity risk in stress testing exercises. Similar efforts should also be done vis-à-vis non regulated entities. Liquidity risk is intrinsically interconnected with other risks identified during the financial turmoil, namely market risks, credit risks and reputation risks. Mastering these risks all together in a transparency environment is an important step to avoid liquidity hoarding and restore confidence.

#### *Improving central banks' operating frameworks for providing liquidity*

Moral hazard considerations in the wake of a liquidity crunch are also a cause for concern for central banks. During the crisis, central banks have done their job by responding to an exogenous and general increase in the demand of central bank money and by ensuring smooth adjustment of liquidity conditions. However, carrying out monetary policy interventions in a disintermediated world raises additional issues as the bulk of liquidity needs may stem from non-banks financial institutions which do not have a direct access to central bank reserves, with some of them being in addition unregulated. As pointed out earlier, a significant source of funding lies outside the banking system and it is fair to say that central bank' control over such liquidity is quite indirect and fairly limited.<sup>7</sup> As a striking point in case, the financial turmoil has evidenced that while money and credit aggregates, *i.e.* bank-mediated liquidity, have so far continued to grow at rapid pace, other elements of liquidity, such as outstanding asset back commercial paper have on the contrary sharply contracted, raising a potential policy dilemma. During the crisis, some central banks had to adapt their operational frameworks by expanding the maturity of their operations or widening the list of eligible collaterals. Further refinements may be on the agenda to design robust monetary frameworks.

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<sup>6</sup> In his article entitled "Liquidity risk management", Financial Stability Review, No. 11, Banque de France, February (forthcoming), Goodhart (C.) uses the metaphor of a "the weary traveller who arrives at the railway station late at night, and, to his delight, sees a taxi there who could take him to his distant destination. He hails the taxi, but the taxi driver replies that he cannot take him, since local bylaws require that there must always be one taxi standing ready at the station."

<sup>7</sup> See Courmède *et al.* (2008).

### *Refining the assessment of risks to improve external rating*

Regulating rating agencies would possibly be an option. However, in the context of the implementation of Basel II, the rating process will inevitably play a pivotal role involving a refinement in the assessment of risks throughout the promotion of internal models and greater use of external ratings. To the extent that rating agencies are producing a public good in providing information on the quality of assets underlying transactions or risk exposure and constitute a key element in the marketability of structured products, some improvements can be considered. There are two areas, among others, that could deserve consideration for the future: first, greater transparency of rating methods and the overall role of rating agencies in the securitisation process. Second, a marked difference in the metric used for rating bonds and structured products, which would be a key condition to restore confidence in ratings. This could be done in two ways, which could also be combined: either by adopting another rating scale for structured products (with another symbol for example); or by including an additional measure in the credit rating, in particular on its volatility in times of market or liquidity stress.

### *Strengthening the capital framework*

Finally, the recent financial turmoil has evidenced that increasing risk taking with a shrinking proportion of capital is not sustainable. It is even more the case in the context of fair value accounting where each depreciation immediately impacts on capital. Ultimately, the ability of an investor to carry risk is determined by her capital base. And capital should act as a buffer, i.e. it must be sufficient to absorb shocks. To some extent, the crisis has pointed out a profound failure on the part of leading banks to understand how their on and off-balance sheet exposures interact together and with their capital. Is it therefore desirable to ask for increased capital buffers to banks, other financial intermediaries and off-balance sheet structures involved in risk transfer? This could draw upon the experience of the hedge fund industry where some devices like lock-up periods exist and have proved helpful in the current turmoil to stabilize their resources. More severe capital constraints could help to curb excessive leverage in the financial system. However, these stricter requirements should not destroy all incentives to use securitisation. Higher capital buffers should be conceived not so much to absorb all potential risks (they would never be sufficient for that), but to act as a disincentive to excess risk taking. A possible solution could be to use the flexibility within Basel II framework, in particular including its Pillar 2, to ensure that capital buffers are adequately forward-looking.