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INTERNATIONAL DEBT MARKETS AFTER THE FINANCIAL CRISIS

International debt markets after the financial crisis

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Introduction

This article describes the changes in the international primary markets for debt in the period during which the 2007-2009 financial crisis broke out, gained momentum and spread, placing it in a longer time frame. These markets are very important for financing the public and private sectors throughout the world and have been severely affected by the crisis. International debt markets include many segments, the largest being the bond, syndicated loan and structured finance markets. Chart 1 shows that debt market issuance expanded strongly between 2000 and 2008, doubling in volume. Subsequently, they recorded a notable contraction, particularly in the higher-risk segments which practically disappeared. Particular attention is paid to the analysis of and developments in the international structured finance markets, since they have played a crucial role in the deepest financial crisis since the Great Depression of the 1930s, although space is also devoted to issuance on the international bond and syndicated loan markets.

The structured finance markets include asset-backed securities, credit derivatives and resecuritisations.[1] Among these products, mortgage securitisations, collateralised debt obligations (CDOs) and asset-backed commercial paper (ABCP) grew particularly strongly in the years leading up to the crisis. It was in these instruments where the problems brought by the crisis were incubated and took shape. It is no surprise that their activity has diminished so drastically in recent years. Subsequently, a moderate recovery has been seen in some segments with a relatively high risk level, such as leveraged loan markets, high-yield bonds and, in some places, securitisation markets.

The next section briefly describes how the crisis developed and spread on debt markets. Then subsequent sections analyse each of the main markets, beginning with the structured finance market, given its importance in recent years. The last section presents the conclusions, which include most notably the drastic shift in the make-up of debt markets towards bonds, particularly government bonds, to the detriment of structured finance markets.

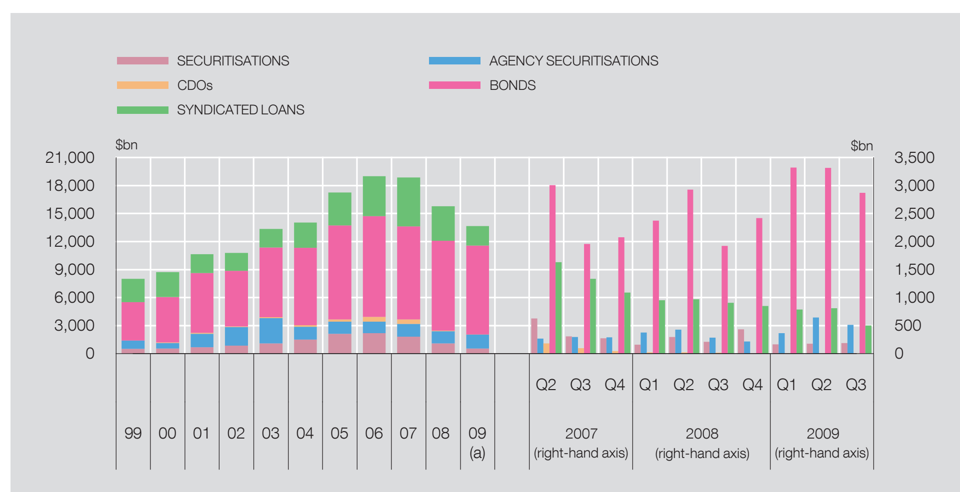
How the financial crisis developed and spread

The 2007-2009 financial crisis was preceded by a period of abundant liquidity worldwide, in a setting of exceptional macroeconomic stability (also known as the “Great Moderation”) [Mizen (2008), Bernanke (2009) and IMF (2009)]. That helped to bring interest rates down to historically very low levels and to diminish agents’ perception of risk or their caution regarding it. Both factors encouraged investors to increasingly seek out higher-return, albeit riskier, investment opportunities. This quest could not be satisfied by traditional investment opportunities. The consequence was growing financial innovation on debt and structured finance markets, where segments such as asset-backed securities (ABSs), collateralised debt obligations (CDOs) and other new financial instruments were developed [De Larosière Group (2009) and FSA (2009)]. A substantial portion of these was linked directly or indirectly to the US mortgage markets, which expanded considerably in parallel with the housing boom there. In particular, the US high-risk residential mortgage market grew very rapidly and subprime mortgages became an important source of underlying assets for many of the new complex financial instruments [Ashcraft and Schuermann (2007)].

1. Diagram 1 presents an exhaustive classification of structured finance instruments.

TOTAL ISSUANCE ON INTERNATIONAL DEBT MARKETS

CHART 1



SOURCES: Dealogic, SIFMA, Freddie Mac, Fannie Mae and Ginnie Mae.

a. 2009 data to 30 September.

From the beginning of 2007, when the housing cycle changed in the United States and, as a result the subprime delinquency rate rose, agents began to question the sustainability of this situation and to consider possible deficiencies in risk pricing [Brunnermeier (2009)]. International financial market conditions deteriorated sharply in summer 2007 due to financial institutions' exposure to US subprime mortgage markets and the related financial instruments. It is worth highlighting that the US subprime mortgage markets were simply what triggered the crisis and that previously there had been a much more widespread credit boom which encouraged excessive indebtedness and risk mispricing on all international financial markets. As risk was repriced, the financial strains spread to other segments of the financial markets. This gave rise to a flight from risky assets throughout the world, particularly those linked to structured or opaque finance, in favour of safe-haven assets such as government debt. The turmoil also spread to short-term markets, as was underlined by the notable rise in risk aversion on the ABCP market and the unprecedented rises in interbank money market interest rates [BIS (2009)]. These events prompted central banks worldwide to inject substantial liquidity and to begin monetary easing. Consequently, the crisis seemed to stabilise and even moderate during 2008 H1, although the underlying risks remained.

This picture changed completely on 15 September 2008, when the collapse of Lehman Brothers prompted the most serious shock on international financial markets since the Great Depression. Confidence on international debt markets and, in particular, structured finance markets dropped to all-time lows and investors fled en masse from complex financial instruments, such as asset-backed securities and CDOs. Banks and other financial institutions suffered heavy losses and some had to be bailed out by governments. The intensification of the crisis led authorities to adopt emergency measures which committed large sums of public money to combating the financial crisis. Even so, international financial market conditions did not begin to stabilise until March 2009, although the foundations of this stabilisation remained shaky. Since then, markets have improved considerably and the appetite for risk has recovered. This took the form of a moderate recovery of issuance in relatively high-risk segments of these markets such as securitisations placed on the market, high-yield bonds and leveraged loans.

The right-hand side of Chart 1 shows the strong impact of the financial crisis on international debt markets in 2007 H2 and in 2008, especially on the issuance of securitisations, CDOs and

syndicated loans, which stood at an all-time low. International debt markets recovered considerably during 2009, driven entirely by vigorous bond issuance. In fact, total issuance in these markets in 2009 Q1-Q3 has been the highest in their history. Consequently, in spite of the still low activity on securitisation, CDO and syndicated loan markets, worldwide debt market issuance in 2009 will possibly set a record high.

Structured finance markets

Structured finance is linked to a group of complex financial instruments and mechanisms and, although it is difficult to provide a straightforward universal definition, it could be described, in the broad sense of the term, as the restructuring of cash flows to transform the risk, return and liquidity characteristics of financial portfolios.[2] More specifically, structured finance consists of grouping assets together to subsequently sell them as securities in several "tranches", each with a different risk/return profile, in order to attract investors with different levels of appetite for risk [BIS (2005)]. Division into tranches is important, since by separating the securities into different risk categories, the securities can be adjusted to investors' specific needs and, therefore, can be sold more easily. At the same time, it also introduces an element of complexity into structured finance due to the difficulty involved in pricing and assessing risk to create these tranches.

Structured finance is characterised by the complexity of risk transfer instruments and the use (and abuse) of special purpose vehicles (SPVs) and special purpose entities (SPEs) by banks in off-balance sheet activities. Financial assets, such as residential mortgages, are transformed through these vehicles into asset-backed securities (ABSs) which are sold to investors. It should be underlined that covered bonds are not considered structured finance. The reason for this classification is that, unlike in asset-backed securities issued by banks, the underlying asset of covered bonds remains on institutions' balance sheets.

In structured finance, the process of division into tranches is a key feature, and, consequently, credit rating agencies play an essential role. The ratings provided by these agencies are an indicator of the credit (and other) risk associated with the instruments and depend on the solvency of the SPV and SPE issuers. In this context, it is customary to distinguish between investment grade (IG) rating and below investment grade (high-yield – HY) ratings. According to the credit ratings normally used in financial markets, investment-grade structured finance instruments are rated BBB or higher by Standard & Poor's and Fitch's rating services, and Baa or higher by Moody's Investors Service and are associated with lower returns, while below-investment-grade instruments are associated with relatively higher returns which compensate for the higher risk level.

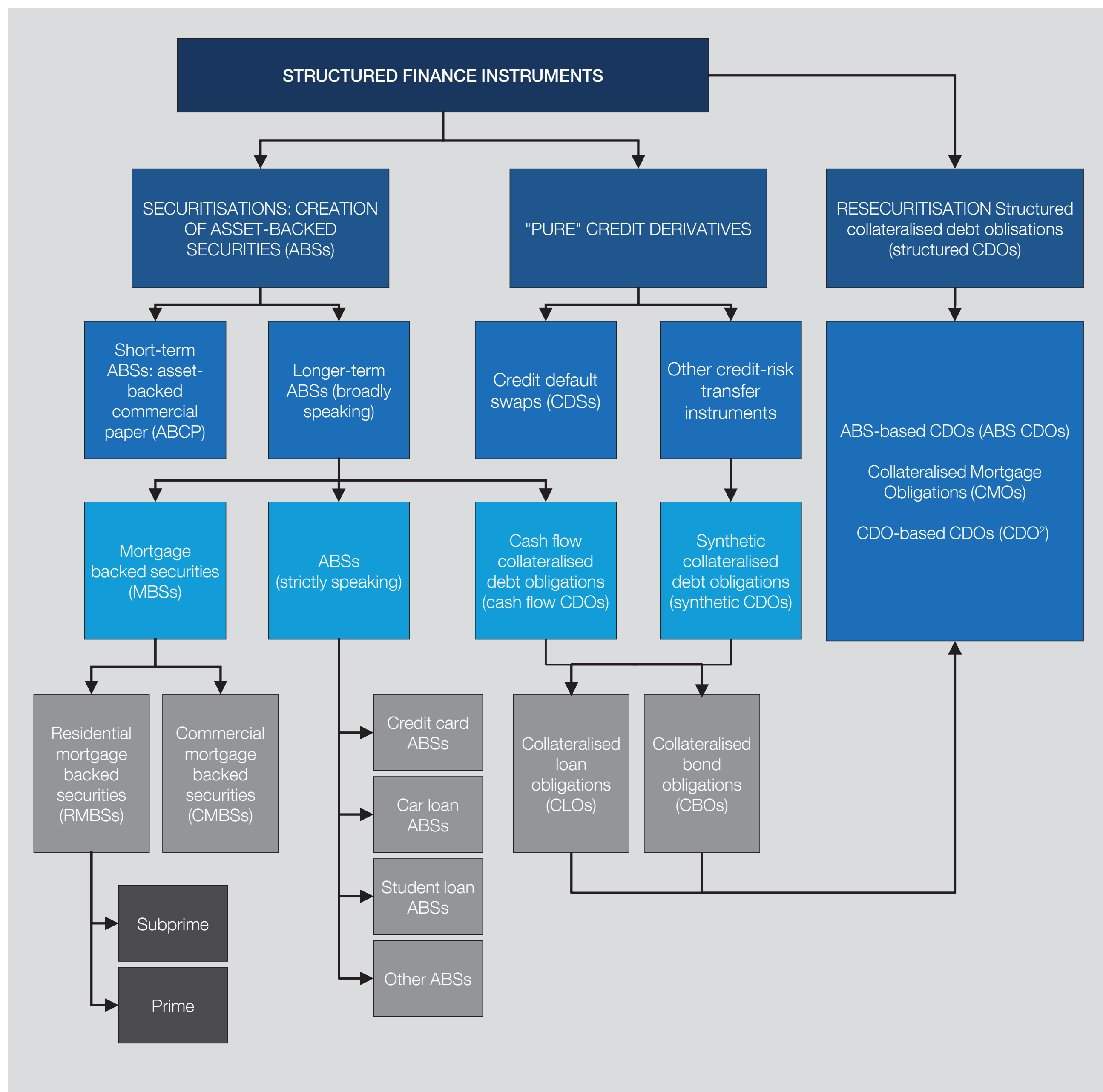
The financial crisis has raised strong doubts about the rating methodologies applied to structured financial products, in general, and about their soundness, in particular. A posteriori it has been seen that many complex instruments had high ratings which were far removed from their actual credit quality. Complex and opaque structured finance instruments, together with performance-bonus problems at originator institutions and deficiencies in the credit rating process, played a fundamental role in how the financial crisis began, developed and spread [IMF (2008), Caprio et al. (2008), Benmelech and Dlugosz (2009b), De Larosière Group (2009) and FSA (2009)].

Structured finance instruments can be classified into the two broad categories of securitisations and credit derivatives, although some times this separation is not clear-cut and depends

2. An extensive analysis of structured finance is presented in Criado and Van Rixtel (2008) and in Coval et al. (2009).

STUCTURED FINANCE INSTRUMENTS

DIAGRAM 1



SOURCE: Criado and Van Rixtel (2008).

on an arbitrary distinction. This difficulty is particularly patent in collateralised debt obligations (CDOs). In simple terms, securitisations are those transactions which consist solely of the transformation of cash flows; more complex structured finance instruments are deemed to be credit derivatives. Diagram 1 presents the main structured finance instruments, which are described in the following sections.[3]

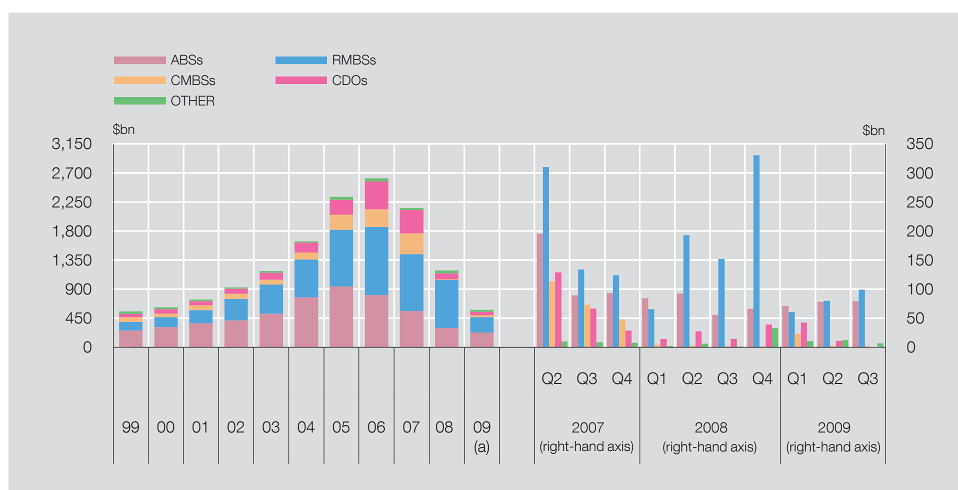
Structured finance securitisations

Securitisation markets comprise short-term asset-backed securities (short-term ABSs, essentially, asset-backed commercial paper — ABCP) and longer-term asset-backed securities (long-term ABSs) (see Diagram 1). Broadly speaking, asset-backed securities include three

3. This article will not address more specific credit derivatives, such as credit default swaps (CDSs), nor their role in the financial crisis. For example, CDSs played an important role in the insurance company, AIG's problems.

SECURITISATIONS WORLDWIDE (EXCLUDING US AGENCIES) BY UNDERLYING SECURITY

CHART 2



SOURCE: Dealogic.

a. 2009 data to 30 September.

main categories: mortgage-backed securities (MBSs), narrowly defined asset-backed securities (ABSs which are basically backed by all manner of assets, such as automobile loans, student loans, etc., except for mortgages) and cash flow collateralised debt obligations [Criado and Van Rixtel (2008)].[4]

In practice, when the term "asset-backed securities" or the abbreviation "ABSs" is used, the markets interpret them according to the narrow definition of the term which refers solely to asset-backed securities (ABSs) excluding mortgage-backed securities (MBSs) and cash flow CDOs. MBSs include commercial mortgage-backed securities (CMBSs) and residential mortgage-backed securities (RMBSs). The mortgages backing RMBSs issues may have high quality (prime) ratings or low quality (subprime) ratings, depending on the solvency of the respective borrowers.

Chart 2 displays the changes in international securitisation market issuance, including the above-mentioned MBSs, ABSs and cash flow CDOs. Charts 3 and 4 provide information on securitisations placed on the market and securitisations retained. These charts exclude the mortgage securitisations of US agencies which, due to their size, are presented separately in Chart 5.

Chart 2 shows very rapid growth of gross issuance on international securitisation markets (excluding US agencies) in the last ten years from scarcely $500 bn to $2,617 bn and its fall in 2007 Q3, which steepened in 2008. In fact, issuance of securitisations in 2008 was less than half that in 2006. The main reason for this decline was the crisis of confidence which hit structured finance and securitisation when major deficiencies in the assessment (credit rating) and transparency of these financial instruments came to light. The chart shows that mortgages have clearly been the main underlying asset in securitisations worldwide and, among them, residential mortgages are the predominant individual asset.

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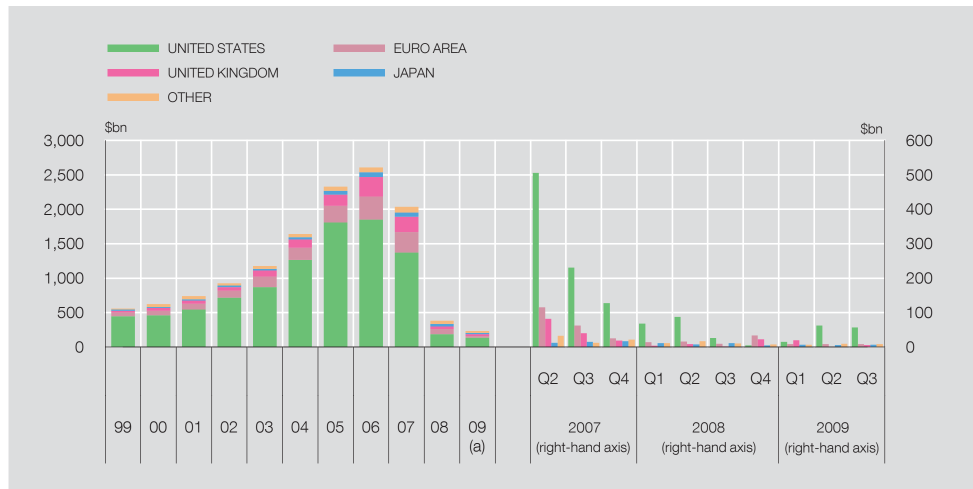
4. Cash flow CDOs are included here as securitisations for two reasons: firstly their fundamental characteristic is the specific use of "securitisation techniques" to transform a set of assets into new securities; and secondly, several statistical sources include cash flow CDOs under asset-backed securities.

SECURITISATIONS PLACED ON INTERNATIONAL MARKETS (EXCLUDING US AGENCIES) BY REGION

CHART 3

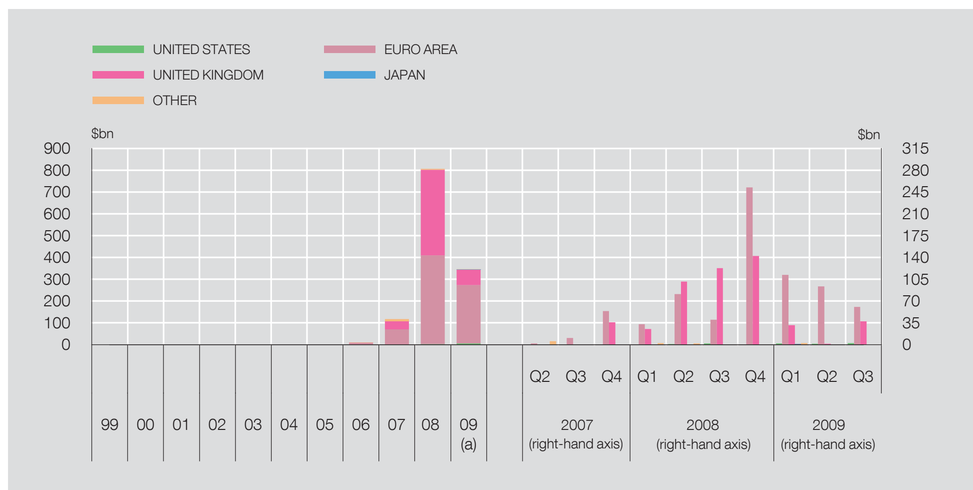


SOURCE: Dealogic.

a. 2009 data to 30 September.

RETAINED SECURITISATIONS WORLDWIDE (EXCLUDING US AGENCIES) BY REGION

CHART 4



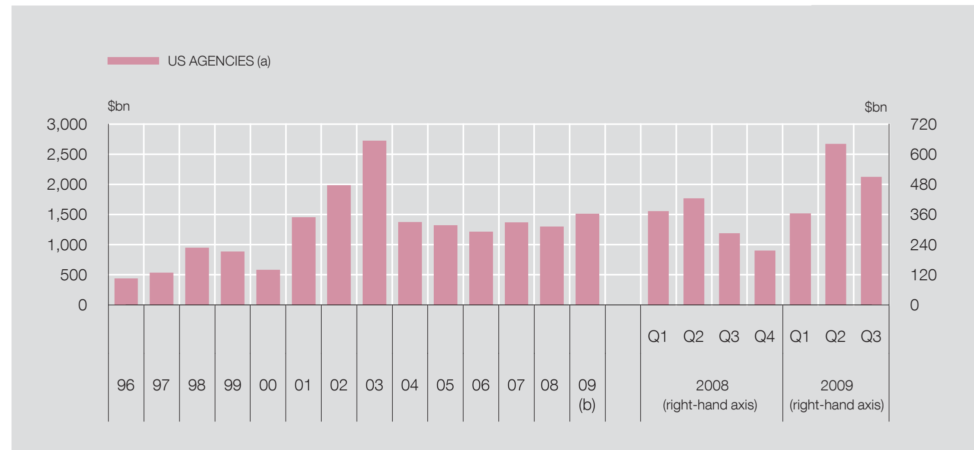
SOURCE: Dealogic.

a. 2009 data to 30 September.

In the context of the financial crisis and the authorities' response to it, the distinction between securitisations placed on markets and securitisations retained by originators became important. As can be observed in Chart 3, the financial crisis especially affected public placement of securitisations in all countries, but particularly those originated in the United States. Retained securitisations have seen extraordinary growth in the last two years in the euro area and in the United Kingdom, due to their acceptance as collateral in central bank liquidity-providing operations, as a result of the financial crisis (see Chart 4). These developments represented a fundamental change in the structure of international securitisation markets.

Chart 5 shows changes in the volume of mortgage securitisations issued by US agencies (Fannie Mae and Freddie Mac). Although they fell due to the financial crisis by approximately

MORTGAGE SECURITISATIONS ISSUED BY US AGENCIES CHART 5



SOURCE: SIFMA.

a. Includes issues by Ginnie Mae, Fannie Mae and Freddie Mac.
b. 2009 data to 30 September.

5% in 2008 to $1,300 bn in 2008, this figure is slightly higher than all other securitisations in the world, which amounted to $1,188 bn.

Lastly, the data underline that during 2009 Q2 and Q3 international securitisation activity recovered from its previous lows, due to the improvement of securitisations placed in the markets. Retained securitisations fell considerably in 2009 Q2 and stabilised in Q3, partly in response to lower collateral requirements in central bank liquidity providing operations. The recovery centred on the United States (see Chart 3) and was linked to the commencement of the Federal Reserve's credit support program called the Term Asset-Backed Securities Loan Facility (TALF). This programme was set up to provide liquidity for credit and consumer ABS issues and, subsequently, for certain CMBSs. Furthermore, the issuance of RMBSs in the United States (which are not included in TALF) was considerable in 2009 Q2 and Q3, due to the growth of issuance by agencies (see Chart 5). This increase was a consequence of sharp growth of mortgage securitisations originated under Federal Housing Administration (FHA) programmes and related to mortgage financing [SIFMA (2009)]. Issuance in the United States of private-label MBSs remained very weak.

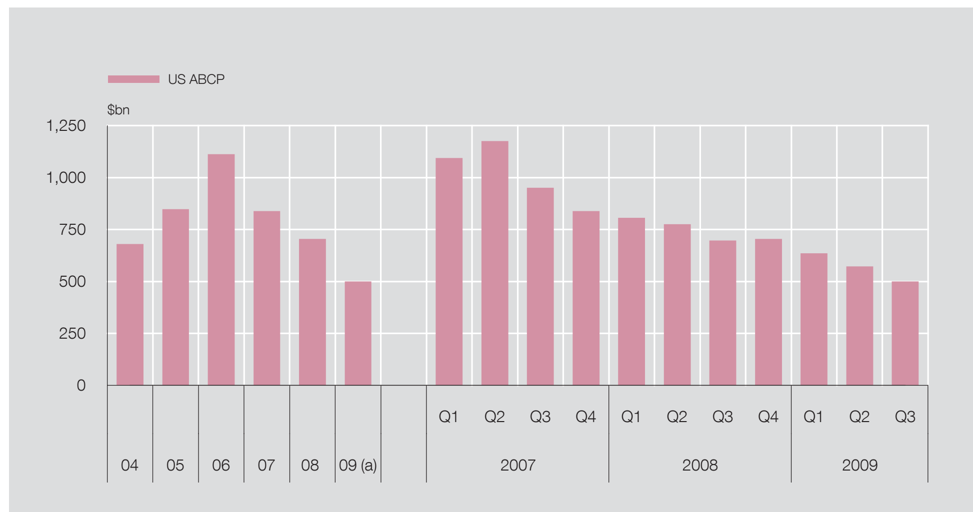
Asset-backed commercial paper (ABCP)

Asset-backed commercial paper (ABCP) is a short-term secured fixed-income instrument (commercial paper or CP) issued via conduits (which include structured investment vehicles, or SIVs) to finance longer-term investments in securities, such as MBSs and CDOs. These securities can be considered the collateral underlying the ABCP issued. In other words, they are the "asset-backed" component of ABCP.

Chart 6 shows that the ABCP market grew rapidly from 2004 in the US and, similarly, in Europe. This growth was closely related to the boom in the mortgage markets in general and to that in the US mortgage market in particular. According to some estimates, the expansion of mortgage ABCP issuance has accounted for half of commercial paper market growth in recent years [Mizen (2008)].

The ABCP market was also at the epicentre of the financial crisis, since ABCP conduits had invested substantially in complex financial instruments such as ABSs and CDOs, and their exposure to complex mortgage-backed financial instruments grew rapidly to an estimated

US ABCP MARKET (OUTSTANDING BALANCES) CHART 6



SOURCES: SIFMA and Federal Reserve System.

a. 2009 data to 30 September.

$300 bn [BIS (2007)]. In August 2007, when pressure from the US subprime mortgage markets spread to the structured finance products directly or indirectly related to those markets, it became increasingly difficult for ABCP issuers to find investors willing to buy these securities, even for short periods of time. Hence ABCP programmes faced significant financing problems and had to turn to banks for back-up credit lines, which subsequently caused liquidity constraints in the banking sector. Further into the crisis, banks had to rescue ABCP conduits and absorb their assets into their balance sheets, which fuelled the spread of the crisis from the structured finance markets to the banking sector. ABCP issuance in the United States in 2009 Q3 generally remained well below the record highs of 2006 (see Chart 6).

Credit derivatives in structured finance: complex collateralised debt obligations (CDOs)

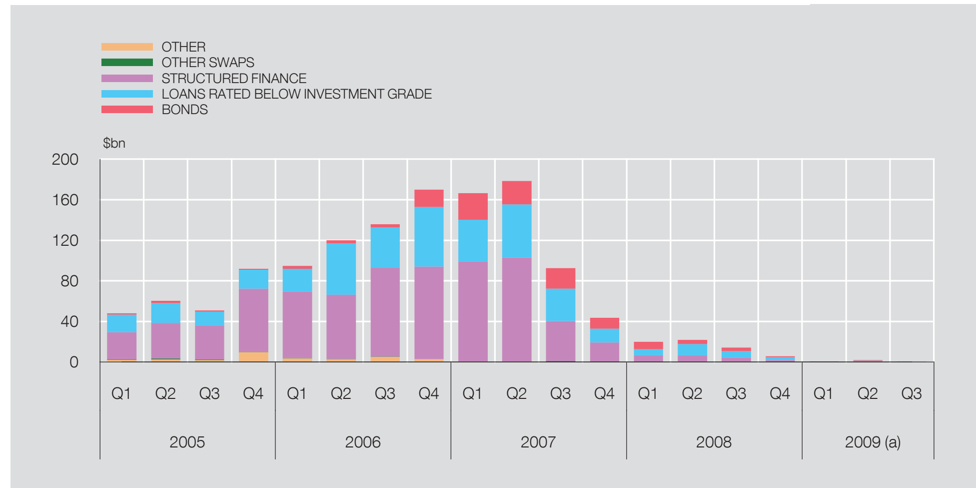
CDOs transform high-risk assets such as loans, mortgages, bonds and asset-backed securities into a new security. This is done as follows. A number of debt contracts are grouped together in a SPE/SPV (see preceding section). The CDO liabilities are divided into tranches of different credit quality and different levels of subordination, as in the case of asset-backed securities. The investors in the tranches of a CDO assume the ultimate exposure to the credit risk associated with the underlying reference entities.

Of the structured finance instruments, those most affected during the financial crisis were collateralised debt obligations (CDOs), and of these the hardest-hit segment was structured CDOs (which essentially consist in securitising other securitisations). For example, structured CDOs may be collateralised by an MBS (and then called collateralised mortgage obligations or CMOs) or even by other CDOs, and then denoted CDO^2.

Structured CDO issues (“structured finance” in Chart 7) increased rapidly between 2005 Q4 and 2007 Q2, in tandem with the rapid growth of the US subprime mortgage markets, since considerable volumes of subprime RMBSs were used to collateralise these CDOs. The estimates show that the collateral of nearly 50% of highly rated structured CDOs was, in fact, subprime mortgage-backed securities; in the case of lower rated asset-backed structured CDOs, this percentage was as high as 77% [BIS (2008a)]. When the financial crisis broke out, the issuance of structured CDOs collapsed and has not yet recovered. Indeed, many analysts do not expect this market segment to recover in the near future.

CDO ISSUANCE WORLDWIDE BY COLLATERAL

CHART 7

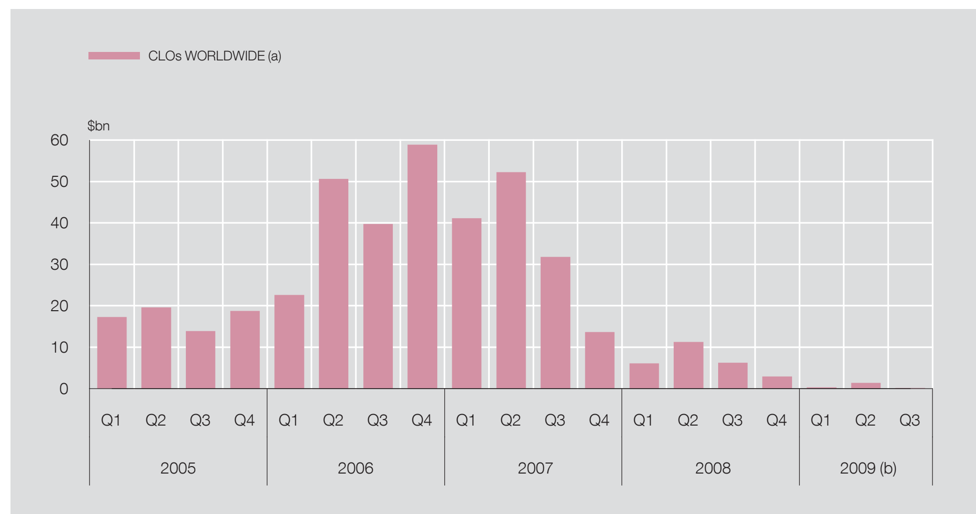


SOURCE: SIFMA.

a. 2009 data to 30 September.

CLO ISSUANCE WORLDWIDE

CHART 8



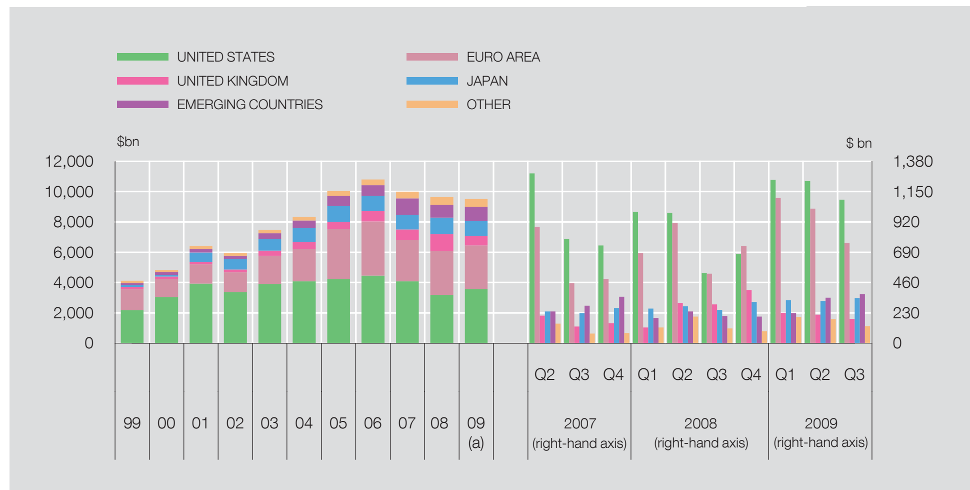
SOURCE: SIFMA.

a. Including CDOs collateralised by loans rated below investment grade.
b. 2009 data to 30 September.

When the problems started in the US subprime mortgage markets in 2007, the CDOs based on tranches of mortgage-backed securities linked to the subprime market were also negatively affected, and their credit spreads widened spectacularly, giving rise to enormous losses for investors. Among the investors were the main originators which had retained some of the more highly rated CDO tranches on their balance sheets. The subsequent seizing-up of the markets for these products made pricing even more difficult and investors could not calculate their losses. This added to the growing uncertainty in the international debt markets and caused the financial crisis to spread to other financial market segments. Thus CDO issuance came to a complete halt worldwide and at end-2008 the CDO market or, more specifically, that for structured CDOs, had practically ceased to exist.

BOND ISSUANCE WORLDWIDE BY REGION

CHART 9



SOURCE: Dealogic.

a. 2009 data to 30 September.

Another important segment of CDO markets worldwide is formed by collateralised leveraged obligations (CLOs), which are based on the transformation of loans, such as syndicated loans, into a new security. CLOs grew rapidly between 2004 and 2007 on the back of surging leveraged buy-outs by private equity firms in that period. CLOs played a key role in this trend by acting as financing instruments (see Chart 8): the loans rated below investment grade (frequently syndicated loans) used to finance the leveraged buy-outs were restructured into highly rated CLOs and could thus be placed with a much broader investor base [BIS (2008b), Benmelech and Dlugosz (2009a), Benmelech et al. (2009)]. In this respect, CLOs were also key to the growth of the syndicated loan market. As with structured CDOs, the issuance of CLOs declined considerably in 2007 and 2008, and has not yet recovered.

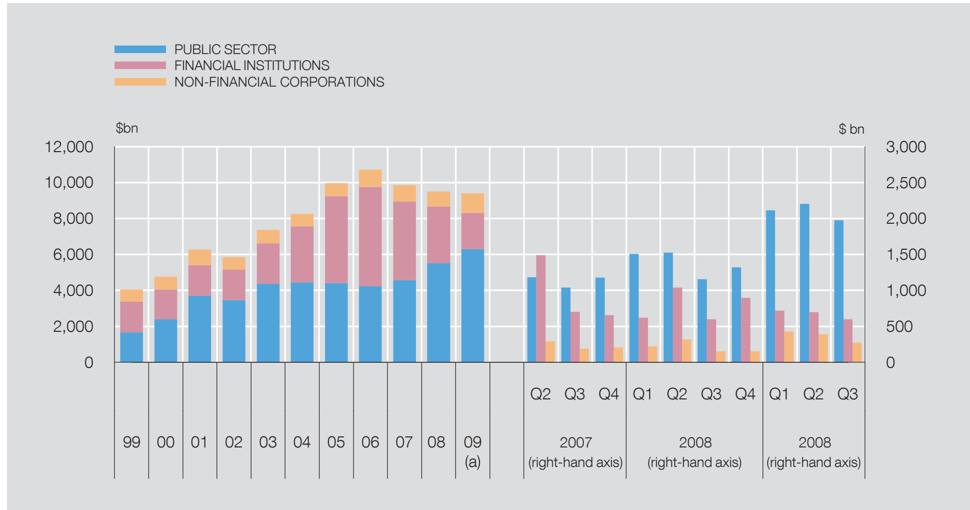
International bond markets versus structured finance markets

It is of interest to compare developments in the structured finance markets and in the more traditional bond markets. Total gross bond issuance worldwide increased gradually over the last 10 years to more than $10 trillion in 2006, but it declined in 2007 and 2008, albeit in a much lower proportion than securitisations did (see Chart 9). The breakdown by issuer shows that the financial crisis brought a reduction in issuance by non-financial corporations, particularly in 2008 Q3 and 2008 Q4 (see Chart 10). Access to the international private fixed-income markets became more difficult, particularly for riskier companies or those with rankings below investment grade. Issuance by financial institutions was very high in 2008 Q4 due to the adoption of government programmes to support fixed-income issues by credit institutions in various countries (see Chart 11).

Bond issues on the international markets rose sharply in the first nine months of 2009, posting record highs for similar periods of time ($9.5 trillion). This was due above all to vigorous issuance by government as a result of its increased borrowing. Gross issuance by non-financial corporations in the first nine months of 2009 was $1.1 trillion, an unprecedented figure nearly 1.6 times the amount issued in the same period of 2008, when the crisis hit private fixed-income markets. These issues were partly a consequence of the banking sector's restrictive lending policy worldwide and of a contraction in bank credit which was particularly marked in certain major economies in 2009 Q3. Moreover, investors' appetite for risk improved in 2009, stimulating a "search for returns" and spurring the issuance of private fixed-income securities to tap the strong investor demand. 2009 saw two major trends in securities issuance:

BOND ISSUANCE WORLDWIDE BY TYPE OF ISSUER

CHART 10

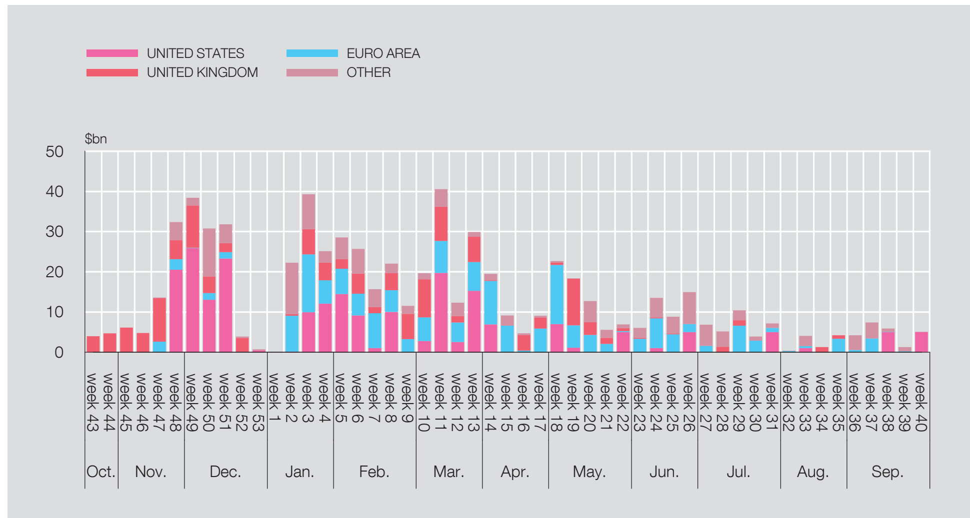


SOURCE: Dealogic.

a. 2009 data to 30 September.

WORLDWIDE ISSUANCE OF GOVERNMENT-GUARANTEED BANK DEBT

CHART 11



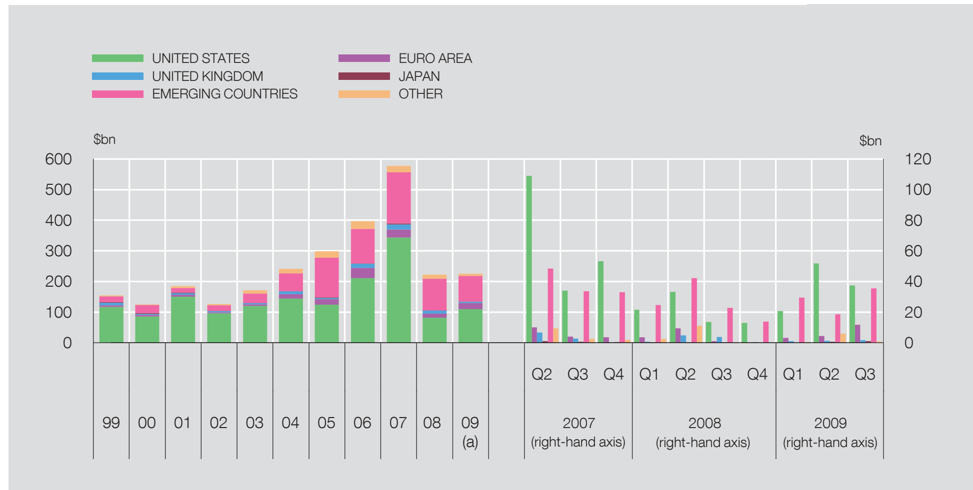
SOURCE: Dealogic.

— A marked recovery in issuance activity in the high-yield bond market (bonds rated below investment grade, or junk bonds), driven by the step-up in issuance seen particularly in the United States (see Chart 12).

— A sharp reduction in government guaranteed bank debt. Bank debt issued without a government guarantee grew substantially with respect to that guaranteed by the government, particularly in the United States. This converted the market for government-guaranteed issues into a niche market (see Chart 11). This was related to the Federal Reserve's criteria for decoupling from government financial support, under which banks are required to be able to demonstrate their ability to access the debt markets without assistance from the State.

HIGH-YIELD BOND ISSUANCE

CHART 12

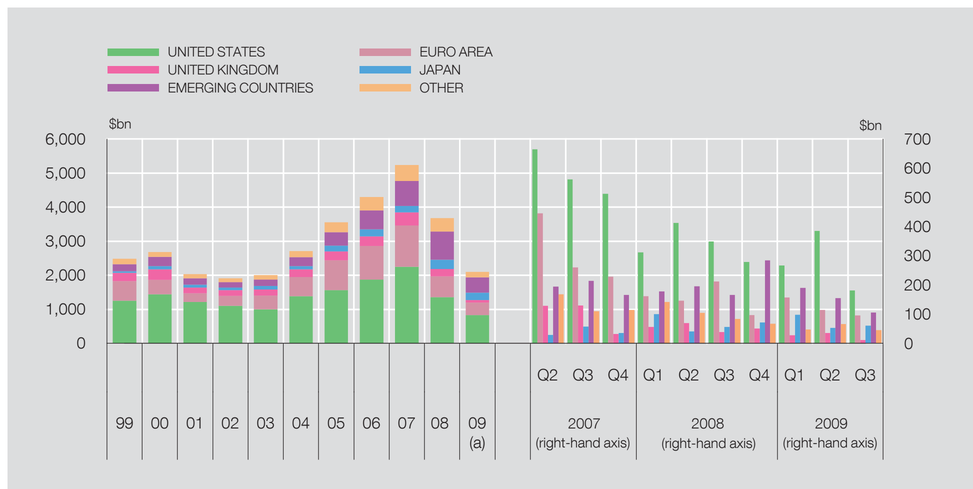


SOURCE: Dealogic.

a. 2009 data to 30 September.

SYNDICATED LOAN ISSUANCE WORLDWIDE BY REGION

CHART 13



SOURCE: Dialogic.

a. 2009 data to 30 September.

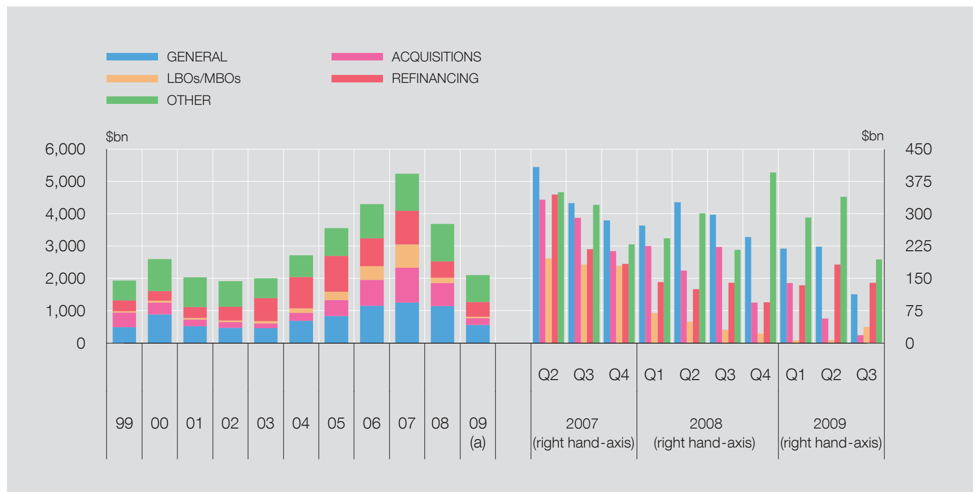
International syndicated loan markets

Syndicated loans are agreements between a group of banks to grant loans to a specific borrower [Gadanecz (2004)]. The syndicated loan market is one of the most international segments of credit markets and a highly significant source of financing in the world. Syndicated loans are commonly used as bridge financing, as interim financing in anticipation of large private fixed-income issues and in the financing of mergers and acquisitions and leveraged buy-outs (including the acquisition of firms by management, or MBOs). A major segment of international syndicated loan markets is the leveraged loan market. Leveraged loans are generally considered to be instruments with a rating below investment grade, although the specific definitions of the various data providers usually differ.

Syndicated loans have become a significant segment of the international debt markets in the last 10 years (see Chart 13). The grew particularly from 2004 because they played a basic role in financing the strong growth of M&As and of leveraged buy-outs (see Chart 14). The use of

SYNDICATED LOAN ISSUANCE WORLDWIDE BY PURPOSE

CHART 14

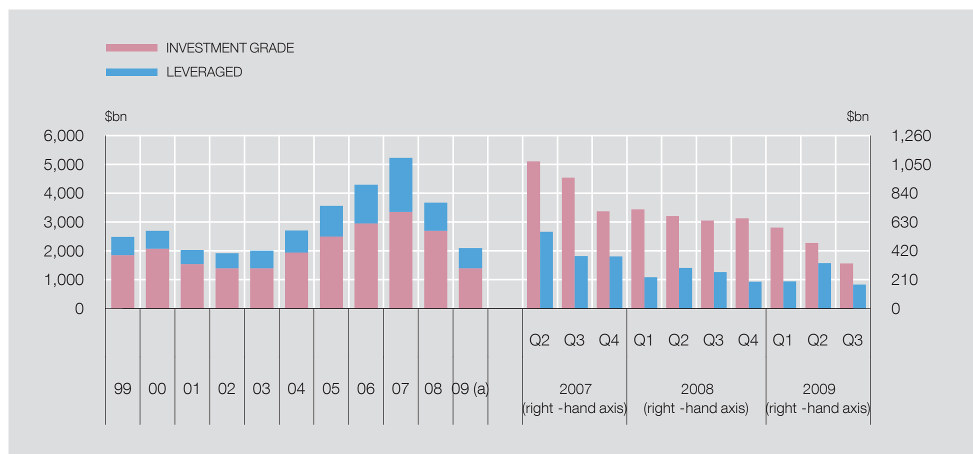


SOURCE: Dealogic.

a. 2009 data to 30 September.

SYNDICATED LOAN ISSUANCE WORLDWIDE BY RATING

CHART 15



SOURCE: Dealogic.

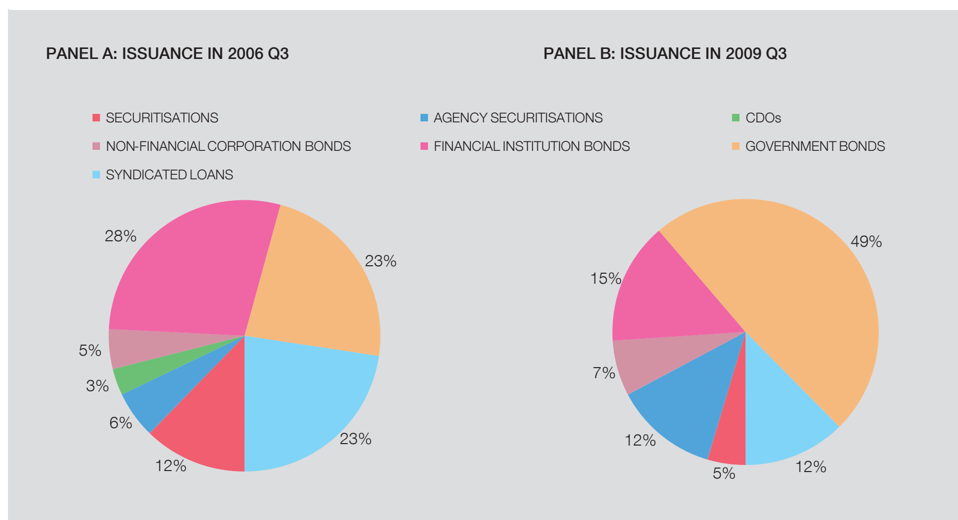
a. 2009 data to 30 September.

syndicated loans in leveraged buy-outs gave rise to strong growth of leveraged loans (see Chart 15), which provided the collateral for the rapidly growing CLO market (described elsewhere).

In these circumstances the international syndicated loan market was hit particularly hard by the financial crisis and issuance underwent a drastic fall which continued in 2009. Indeed, in 2009 Q3 the total number of syndicated loans granted worldwide dropped to the lowest level since 2004 Q1. The factors behind this fall were the restrictive credit standards applied by banks active in syndicated lending, the ongoing process of deleveraging in the world banking sector and the issuance of bonds by non-financial corporations insofar as these are an alternative fixed-income instrument to syndicated loans. Despite the scant issuance in syndicated loan markets, a significant development was the recovery in 2009 of issuance activity in the riskiest segment of the international syndicated loan markets, namely leveraged loans. This

SIZE AND COMPOSITION OF INTERNATIONAL DEBT MARKETS

CHART 16



SOURCES: Dealogic, SIFMA, Freddie Mac, Fannie Mae and Ginnie Mae.

recovery can be explained by the improvement in the general market climate and by the increasing appetite for risk, which had a beneficial effect on issuance in other segments of the international debt markets with a higher risk level.

Conclusions

The 2007-2009 financial crisis had a strong impact on issuance activity in the international debt markets and prompted significant adjustments in their structure. The financial instruments most closely related to the build-up and subsequent abrupt correction of some of the financial excesses, e.g. those related to the high-risk mortgage boom in the United States and those linked to corporate acquisitions with leveraged finance, were the ones hardest hit by the crisis and those where its effects have persisted most. These products include most notably CDOs, ABCP and syndicated loans.

By contrast, the impact of the crisis on the bond markets was much more moderate, although it depended strongly on the type of issuer. Thus issues by financial institutions dropped substantially despite government support in the form of guarantees, while non-financial corporations were more immune, partly because they were forced to issue bonds to compensate for the constraints on loan financing. Meanwhile, government bond issuance multiplied as a result of the sharp increase in borrowing needs and the high demand for low-risk securities.

These developments led to a shift in the issue structure in favour of the government bond markets and at the expense of the structured finance and syndicated loan markets. By way of a summary, Chart 16 shows the composition of international debt market issues in 2009 Q3 and in the same quarter of 2006, just before the crisis broke out in summer 2007. The percentage of bonds rose sharply from 56% in 2006 to 70% in 2009, basically due to higher government issuance, which represented nearly half of the total gross issuance on world debt markets. Also, the share accounted for by non-financial corporation bonds rose significantly (up from 5% to 7%), while that of financial institution bonds dropped markedly (down from 28% to 15%). Lastly, the percentages of securitisations and of syndicated loans decreased sharply from 12% to 5% and from 23% to 12%, respectively.

Contrary to what might be expected, the size of the world debt markets did not contract significantly. Despite the weakness of the structured finance markets, total debt market issuance

recovered strongly to $13.5 trillion up to September, with an unprecedented level of issuance on the international bond markets. This recovery, however, does not reflect a normalisation of financial conditions, since the steep increase in issuance is highly influenced by the expansion of government bond offerings and the rerouting of corporate financing from bank credit to debt securities under circumstances which favour demand for both types of instrument.

Lastly, it bears repeating that the financial crisis was closely linked to the rapid growth of specific segments of the international structured finance markets and the subsequent loss of confidence in them. This serves as a reminder that, although financial innovation can improve the efficiency of services and of financial markets and the access to them, it can also pose risks, especially when applied at an ever-faster pace in an environment of abundant liquidity worldwide and without sufficient checks that it works properly. A fitting observation in this respect was made by Charles Calomiris, who noted that the deepest financial crises tend to occur when rapid growth of untested financial innovations coincides with financial markets in expansion [Calomiris (2008)].

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