

# US Sub-Prime

## - Its impact on the Global Credit Market



September 2007

Low interest rates and rising house prices in the US encouraged mortgage companies to lend to sub-prime borrowers. However, by 2006, sub-prime borrowing accounted for around a fifth of all new mortgages, totalling over \$600bn in value. These borrowers are now struggling to make their monthly mortgage payments and many are losing their homes. This is expected to have an impact on US growth. In addition, the securitisation of these mortgages and the high level of leverage involved, means that the impact on financial markets is magnified up to 100 times. Who is to blame?

### How did the sub-prime problem get started?

When the 'dotcom' bubble burst at the start of this decade, it brought in its wake a recession in the US and a three year bear market in equities. During that time, the central bank in the US, the Federal Reserve, cut interest rates repeatedly, in an attempt to stimulate economic activity. The key policy making rate of interest, the Fed Funds rate, fell to just 1%. This drop in official interest rates also had an impact on mortgage rates. The rate of interest charged on a typical 30 year mortgage rate fell to just below 5%. This made debt more attractive, and people borrowed to invest in property. The real estate market began to surge.

Every market needs new buyers if activity is to be maintained. However, as the housing market went from strength to strength, the number of suitable new buyers began to wane. So, with house

prices rising so strongly and interest rates being so low, some lenders began to relax their standards. These mortgage providers lent more, on a loan to value basis, than would have been the case historically, and began to issue mortgages to borrowers who would have been excluded previously. Many of these new borrowers were classified as 'sub-prime'.

### What is a sub-prime borrower?

The term 'sub-prime' describes the credit status of a borrower. By definition, this means having a very poor credit history - missing loan repayments in the last year, having assets repossessed in the last four years, or having gone bankrupt in the last seven years. This resulting low credit score makes it difficult to get access to credit. However, sometimes this credit history is due to temporary or extraordinary factors - such as illness, loss

### Contact

**Shona Dobbie**

Head of Research Centre

Alliance Trust PLC, Meadow House,  
64 Reform Street, Dundee DD1 1TJ

**Tel** +44 (0)1382 201700

**Fax** +44 (0)1382 225133

**Email** [contact@alliancetrust.co.uk](mailto:contact@alliancetrust.co.uk)

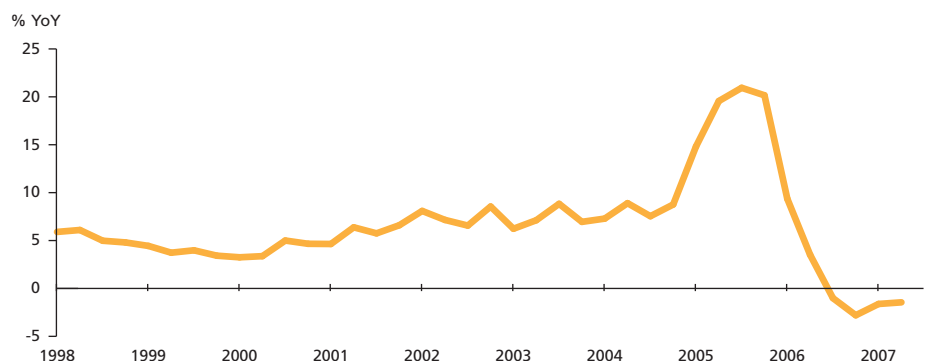
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### US house prices - National Association of Realtors

Source: EcoWin



of employment, or a messy divorce with negative financial implications.

Sub-prime borrowing allows people who have been economically disadvantaged to obtain the credit they need to get back on their feet. The lenders charge a higher rate of interest to compensate for the increased level of risk associated with these loans. The borrower accepts this condition, expecting to be able to refinance the loan at a lower rate of interest, once their credit score improves.

Sub-prime borrowing traditionally accounted for less than 10% of the market. However, as more and more people clamored to get onto the property market, the number of sub-prime borrowers increased rapidly. Mortgage providers believed the default risk was minimal while interest rates were so low. As house prices rose sharply, some mortgage providers tried to grab market share by offering products attractive to borrowers with limited resources. These included mortgages with high loan to value ratios, interest only products and 'teaser rates'. A teaser rate allows borrowers pay a low and fixed rate of interest, often two years, before resetting at a higher variable rate for the remainder of the mortgage period. Mortgage providers often assessed applicants only on their ability to pay the initial reduced rate of interest. These 'teaser rate' products would be a critical factor in the subsequent crisis in sub-prime borrowing.

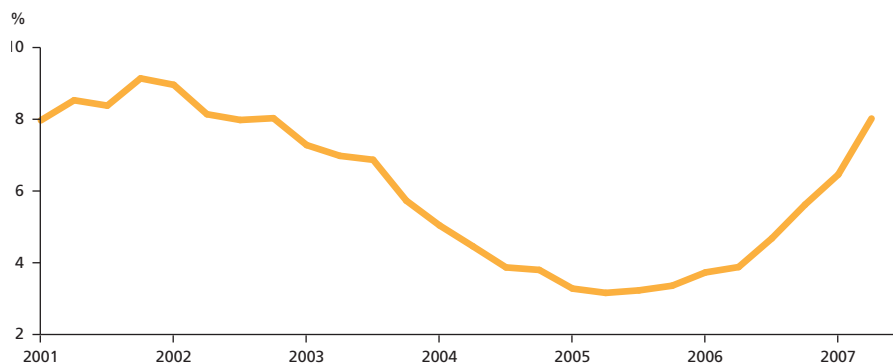
### Why did it go wrong?

The relaxation of lending standards resulted in the proportion of sub-prime lending more than doubling. By 2006, sub-prime accounted for a fifth of all new mortgages in the US. However, the viability of sub-prime lending relied on two critical factors, that is, that house prices continued to rise and interest rates remained low.

Once the US recession was over and employment, incomes, confidence and demand had recovered, the Federal Reserve began to tighten monetary policy, to keep inflation in check. The Fed Funds rate was raised 17 times between June 2004 and June 2006, taking it from just 1% to 5.25%. The real estate market peaked in June 2005, after which higher interest rates began to take their toll. Demand for property softened, and price growth slowed. In some areas, where

### Sub-prime Adjustable Rate Mortgages in Foreclosure

Source: EcoWin



demand was particularly weak, house prices began to fall. Sub-prime borrowers with mortgages due for reset began to struggle to meet the higher payments required.

Many of these borrowers had not been aware of the extent to which their monthly payments would increase when their mortgages were reset. Many mortgages moved from a fixed rate well below the market rate of interest, to a variable rate well above the market rate. In some of the worst cases, the new rate of interest charged was as much as 5% above the existing market rate. This had been built into the original mortgage agreement to compensate the lender for the loss it was making on the initial teaser rate and for taking on the higher credit risk of a sub-prime borrower.

By 2006, the situation was serious. Sub-prime borrowers who had taken out mortgages in 2004 were facing resets and facing new rates of interest as high as 10%. For some of these borrowers the monthly payment increased by over 80%. Even those who had entered contracts which capped the annual increase in rates were facing an increase in payments of over 30%. Not surprisingly, many sub-prime borrowers couldn't cope with the new terms. Missed payments accelerated and the incidence of default began to creep up. Recent estimates suggest that the rate of foreclosure among sub-prime borrowers is running at 8%, equivalent to one in every 12 loans.

The full scale of the problem has yet to be revealed. Initially, many commentators judged that the problem would be contained, because sub-prime mortgages have a total value of around \$600bn, which represents just a small proportion of the annual GDP of the US economy, which is in excess of \$13trn. So why are financial markets now so concerned that

the sub-prime problem is going to lead to a global credit crunch?

The current fears of the financial markets are based on concerns about the extent to which structured finance has left many financial institutions exposed, sometimes unknowingly, to sub-prime defaults. Historically, a rise in mortgage defaults resulted in the lending institutions having to write off bad debts and increase provisions. The scale of the problem was visible, the major participants would be hit, but the problem would be contained and overcome. However, this time, financial market participants find themselves facing potential losses which are far less transparent and, as yet, unquantifiable. This has produced fear and uncertainty in financial markets around the world.

### The Role of Structured Finance

A mortgage provider, which had committed its capital, would need to raise money before it could generate further mortgages. However, this provider might have been given a low credit rating because it was relatively small, operated in the sub-prime market, and was deemed vulnerable to a downturn in the housing market. Companies with higher credit ratings of AA or AAA would be able to borrow at much more favourable rates. But, through the process of securitisation, mortgage providers started to borrow more cheaply.

Mortgage providers had a valuable asset, the monthly interest payments due from borrowers over the lifetime of each mortgage. By selling the principal and prospective interest payments into a 'pool', they freed up capital which could then be used to create new loans. One of the best known ways of reducing risk

is to pool it, so that an increased number of participants each face a smaller degree of exposure. Although each individual mortgage going into the pool had some risk attached to it, the probability of total default was reduced, and a credit enhancement was achieved.

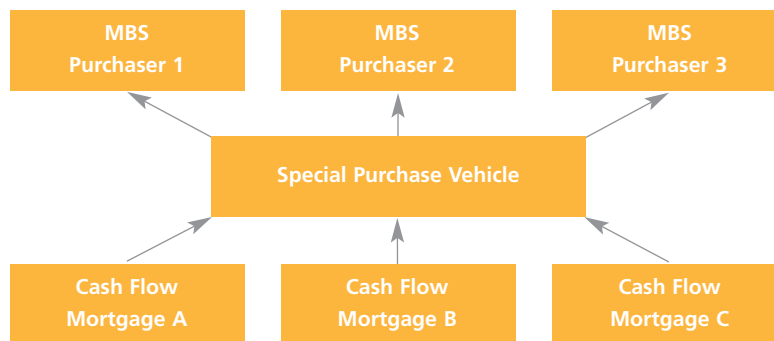
A key requirement in the process of securitisation is that the company buying a 'pooled' mortgage is not owned by the mortgage originator, otherwise the mortgage would remain on the balance sheet of the provider. So new entities, called 'special purchase vehicles' (SPVs) were created to securitise loans or other receivables, such as the future cash payments from a mortgage agreement. Mortgage loans were effectively transferred from the mortgage companies to these vehicles, and the SPV's raised the money to buy these assets by issuing securities to other investors. The performance of these securities would depend on the performance of the expected cash payments, and not on the performance of the mortgage originator. Because of this, the resulting securities regularly achieved higher credit ratings, effectively allowing 'B' rated mortgage companies to get access to funds on the favourable terms offered to the safest, 'triple A', rated borrowers. While bond yields were low, investors were seeking good rates of return and so the securities the SPV created were attractive due to their 'asset backed' or 'mortgage backed' nature, and because of their high credit rating.

### Mortgage Backed Securities

Mortgage backed securities (MBS) became extremely popular, due to the combination of low interest rates and the strong property market. By the end of 2004, these products represented 25% of the total asset-backed securities market, surpassing the market shares of securities backed by credit cards, automobiles and student loans. This occurred despite the fact that MBSs are notoriously difficult to value.

Most loans face two main risks, that is, the risk of rising interest rates and default. However, a MBS faces a third important risk, that of early redemption of the mortgage. This is called the 'prepayment risk'. The repayment of the mortgage principal is deemed to be a risk because it affects the future monthly cash flow underpinning a MBS. Prepayments are particularly popular

### Special Purchase Vehicles



when interest rates decline, as borrowers can then refinance at a lower rate, sometimes with another mortgage provider. However, prepayments can also prove popular during periods of strong economic growth, or increased levels of activity in the real estate market. The borrowers who make prepayments tend to be the most creditworthy, and so the underlying cash flow of a MBS becomes increasingly reliant on borrowers with poorer credit ratings, who cannot refinance. The uncertainty surrounding the risks to the monthly cash flow of an MBS makes it particularly difficult to value, and the prices produced are arguably 'theoretical' at best.

Despite these limitations, MBSs proved attractive to investors and the success of MBS products encouraged the creation of other ways of providing funding for portfolio investments in fixed income assets with high credit risks. The result was a rise in the use of structured finance and, in particular, the creation of products such as 'collateralised debt obligations'.

### Collateralised Debt Obligations

A collateralised debt obligation (CDO) is a sophisticated type of MBS. It is created by taking a portfolio of cash assets, frequently including MBSs, and transferring the ownership of these to a special purchase vehicle (SPV). This vehicle then structures the product into various tranches of debt and equity, working with the credit rating agencies to ensure that the desired ratings are achieved for each individual tranche.

The senior tranche of a CDO can often achieve a triple A rating, as it has the first right to the cash flow produced by the underlying portfolio, and carries the

lowest risk of loss. The mezzanine tranches are given lower credit ratings, as losses are applied in reverse order of seniority. The lowest tranche, named the 'equity tranche' is generally unrated. CDO's are designed on the basis of holding a portfolio of high yielding cash flow assets, but issuing liabilities with a lower yield. The difference between the yields of the assets and liabilities known as the 'excess spread', is paid to the equity investors after costs have been deducted. This must be an attractive proposition as the success of a CDO relies on being able to attract investors to the junior debt and equity tranches. If the underlying portfolio of a CDO performs well, the equity tranche investors can earn returns in excess of 10%. However, even a small number of defaults among the mortgage borrowers can cause equity investors to lose their entire investment. Unsurprisingly, this tranche has been referred to as 'toxic waste'.

### Sub-prime meltdown

By 2006, sub-prime mortgages represented 20% of the market and had a total value of \$600bn. We now know that over 80% of these mortgages were turned into highly rated mortgage backed securities. The remainder, were used to create CDOs, many of which were also given triple A ratings.

As investors chased higher returns leveraging, or gearing, became increasingly popular. An investor starting with \$1,000 of equity could easily leverage this into \$3,000 of debt, to put into an investment fund. The fund could leverage this cash inflow a further three to four times, placing the resulting \$10,000 with a hedge fund, which invested heavily in the higher risk junior tranches of a CDO which was already

leveraged, by up to ten times. Through this process, the initial equity of \$1,000 becomes part of a chain of leverage amounting to \$100,000, resulting in an overall leverage ratio of 100 to 1. This ratio is so high that even a small decline in the price of the CDO could cause the whole chain of leverage to unravel quickly, with catastrophic results. Vulnerability was increased by the fact that the CDOs were frequently underpinned by MBSs, and these remained almost impossible to price correctly.

The increasing number of defaults from sub-prime mortgage holders began to impact the cash flows underlying MBS and CDO products. Banks and investment funds holding CDOs found it increasingly difficult to value their holdings, and were further hindered by the fact that CDOs do not trade actively. News of further problems among sub-prime borrowers quickly raised fears that the worst was yet to come.

The global nature of financial markets means that problems stemming from sub-prime defaults are not limited to the US. High levels of exposure have been reported already in Europe, Australia, China and the UK and a variety of mortgage companies, investment funds, hedge funds, and banks have all admitted to problems. Fear and mistrust escalated among participants in the global financial market, leading to speculation that the sub-prime crisis could lead ultimately to a credit market crunch.

### Credit Market Crunch?

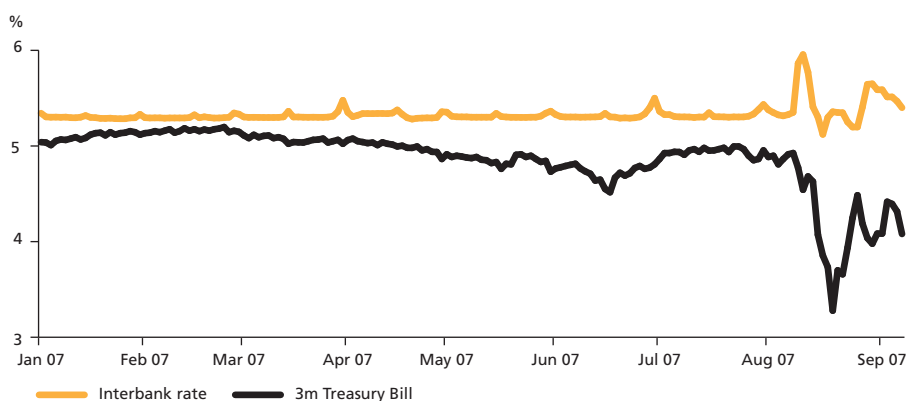
Investors had flocked to buy MBSs and CDOs, enticed by their high credit ratings and elevated yields. But, as the true impact of defaults among sub-prime borrowers started to emerge, investors became distrustful of the high credit ratings attached to securities.

Cash and government bonds were the only financial assets which investors trusted.

Lack of transparency meant that no-one could be sure who had exposure to sub-prime and banks stopped trusting each other. The inter-bank rates of interest, at which banks lend to each other, shot up well above the levels targeted by the central banks, indicating that banks

### US Interbank Rate & Treasury Bill

Source: EcoWin



would only lend to each other at prohibitively high rates of interest. Even at those levels, activity was low, raising fears lack of confidence was causing credit markets to freeze.

Credit markets play a vital role providing the short-term liquidity required for economies to run smoothly, and so central banks had to take action to prevent this credit squeeze from developing into a full-scale credit crunch, in which even companies and households with good credit ratings cannot access credit. This soon impacts both economic activity and growth.

The European Central Bank (ECB) was first to step in, taking action when Europe's interbank rate soared to 4.7%, well in excess of the target rate of 4%. It attempted to calm fears, by providing liquidity to the market at a much lower rate of interest. The Bank of Japan and the Federal Reserve followed suit, while the Bank of England continued its usual practice of offering funds at a penalty rate of interest, 1% above the base rate. Although the actions of central banks restored some confidence to financial markets, investors continued to pile into the safe haven of government bonds. The yield on the 3-month Treasury Bill in the US fell to 1.75% below the Fed Funds target rate – indicating the market's need for a cut in interest rates. The Federal Reserve responded by cutting its discount rate, the rate at which it lends to the banking system. This raised speculation that it would soon follow this with a cut in the Fed Funds rate.

The role of the Federal Reserve is to keep economic growth at a reasonable level and to control inflation. It should, therefore, cut its policy rate of interest

only if it believes the health of the economy is truly threatened by events in credit markets. Otherwise a cut in interest rates signals that financial players who take risks will be bailed out, possibly encouraging even greater levels of risk taking in the future. This is known as 'moral hazard'

### Who's to Blame?

As the turmoil in the credit market emerged, participants began to search for the culprit - but is any one party to blame? Borrowers who were previously excluded from property ownership believed that they could become homeowners, and took on substantial mortgages in their frenzy to get onto the property ladder. Mortgage lenders believed the risk on sub-prime mortgages was reduced and were willing to create more and more loans, with attractive teaser rates, in their pursuit of market share. Investors buying securitised cash flows appear to have been unconcerned about the risk surrounding mortgage backed securities and the difficulty in pricing these products. The rating agencies gave good credit ratings to cash flow products, even though these were based on higher risk mortgages. Finally, hedge funds and other investors chasing yield ignored the risks of investing in the junior and equity tranches of structured credit products. With hindsight, a whole range of financial market participants had relaxed their attitudes to both risk and leverage. Time will tell whether these attitudes now reverse. A change in the appetite for risk could have long term implications for both economies and financial markets.