

Issue 4 October 2010

the **sci**  
structured finance  
magazine



# The road to reform

Looking at proposed changes for the GSEs

Life markets  
Association

Asian structured  
products

Issuance  
data

Including the  
**2010 Guide**  
to Pricing and Valuation



# The SCI Pricing, Trading & Risk Management Seminar

New York, November 4th 2010 • London, November 24th 2010

This conference will focus on the key pricing and risk management issues for those involved in structured credit & ABS, as well as examining the opportunities in distressed assets and a discussion on how the markets should evolve. Other highlights include case studies and presentations on methodologies for workouts and the valuation of ABS and CDOs.

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## New York Venue:

Bayard's, India House, One Hanover Square, New York, NY 10004

## London Venue:

Kent House, Rutland Gardens, Knightsbridge, London SW7 1BX

## Confirmed speakers as of October 1st:

### New York

**Brian Lancaster**, Head of MBS, CMBS and ABS Strategies  
Royal Bank of Scotland  
**Christopher Skardon**, Gorelick Brothers Capital  
**John Uhlein**, Grenadier Capital  
**Paul Watterson**, Schulte Roth & Zabel  
**Vincent Matsui**, EIM USA  
**Bill Sharon**, SORMS  
**Eugene Yeboah** **Brandon Dunn**, Rochdale Securities  
**Alberto Gallo**, Goldman Sachs  
**John Pluta**, Declaration Management & Research  
**Sara Bonesteel**, Prudential Fixed Income Management  
**Joyce DeLucca**, Kingsland Capital Management  
**John Joshi**, CapitalFusionPartners

### London

**Shamez Alibhai**, Cheyne Capital  
**Zeshan Ashiq**, Shooters Hill Capital Partners  
**Greg Branch**, SCIO Capital  
**Chandrajit Chakraborty**, Pearl Diver Capital  
**Sean Dawson**, Citadel Investment Group  
**Colin Fleury**, Henderson Global Investors  
**Rob Ford**, TwentyFour Asset Management  
**Saul Greenberg**, SCIO Capital  
**Dagmar Kent Kershaw**, Intermediate Capital Group  
**David Matson**, IKB Fund Management  
**Miguel Ramos-Fuentenebro**, GSO Capital Partners  
**Paul Rivlin**, Palatium Investment Management

## Agenda (subject to change)

- 08.30 Chairman's Introduction
- 08.45 Keynote speaker, followed by Q&A
- 09.15 Distressed Investment Strategies  
*Opportunities across all structured credit and ABS asset classes*
- 10.15 Risk Management  
*Identifying and managing risk in structured credit and ABS portfolios – the key practices and strategies*
- 11.15 Break: Coffee & Networking
- 11.30 Workouts and Restructuring
- 12.15 Price Discovery and Transparency
- 13.00 Lunch
- 14.00 Secondary Markets: Pricing, Valuation & Trading  
*Trading and pricing issues in the ABS, MBS, CDO and CLO secondary markets*
- 15.00 Pricing & Valuation Techniques  
*A case study approach to pricing a portfolio*
- 16.00 Break
- 16.15 Supplying Demand: Re-building Investor Confidence  
*What do investors really want from the securitisation markets and how can it be supplied?*  
*How can the market offer both simpler and more transparent structures and still offer attractive returns? A buy- and sell side perspective*
- 17.15 Close

# Contents



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## 2 The Interview

### Liquidity by Association

**Guy Coughlan**, spokesperson for the **Life & Longevity Markets Association** (LLMA), chair of its Technical Committee and md and global head of pension asset liability management at J.P. Morgan, discusses the origins and aims of the Association



## 5 ABS

### The road to reform

A look at the plans to reform GSEs and, as a consequence, the **US mortgage-backed securities** market



## 10 Wholesale Structured Products

### Demand dynamics

**Francois de Supervielle**, head of institutional investors, and **Pierre Trécourt**, deputy head of structuring group, cross-asset solutions at Société Générale Hong Kong, discuss the market for institutional structured products now and in the future in the Asia Pacific region



## The 2010 Guide to Pricing and Valuation

### ii European RMBS

The valuation applications of loan-level data by **Mike Li**, Dynamic Credit Partners Europe



### x Derivatives

Close outs: valuations and other issues by **David Ellis**, **Sarah Cannon** and **Hugo Watson Brown** of Navigant Capital Market Advisers



### xv Structured credit & MBS

Application of advanced Monte Carlo methods to valuations by **Dan Rosen**, R<sup>2</sup> Financial Technologies



### xxiv Structured finance

Q&A with **David Pagliaro** and **Peter Jones** of S&P Valuation & Risk Strategies

## 13 Data

ABS, CDOs and natural catastrophe bonds issued over the last three months

# Liquidity

**Guy Coughlan**, spokesperson for the **Life & Longevity Markets Association (LLMA)**, chair of its Technical Committee and md and global head of pension asset liability management at J.P. Morgan, discusses the origins and aims of the Association

**Q: What is the Life & Longevity Markets Association?**

**A:** The LLMA has been established by major market participants as a not-for-profit venture in order to promote a liquid traded market in longevity and mortality-related risk. We believe that the LLMA's work will bring benefits to pension plans, insurers and reinsurers by bringing structure to an embryonic marketplace and capital markets investors through the growth of a new and uncorrelated asset class.

Such a marketplace would permit new and flexible solutions to those with longevity and mortality exposures. It will also allow pension funds (and others with significant financial risk from longevity) to secure their members' benefits for the long term, helping to develop much-needed stability in retirement systems.

To date almost all longevity capacity has been provided by the insurance and reinsurance markets. However, given the vast size of global pension liabilities, it is clear that there is insufficient capacity in these markets to absorb a substantial portion of this risk. It is our belief that the capital markets will have an appetite for assets like these that are not correlated with their other investments and hence we have set up the LLMA to facilitate the evolution of the market.

**Q: What is the Association's scope?**

**A:** The primary focus of the LLMA is macro-life related longevity and mortality risk rather than micro-life (i.e. life settlements). In the short term, the LLMA will focus on the UK market for longevity and mortality, but may later expand its horizons to other countries. Clearly the standards and best practice we develop are likely to be broadly applicable across all countries.

**Q: Who is involved?**

**A:** Current members of the LLMA are AXA, Deutsche Bank, J.P. Morgan, Legal & General, Morgan Stanley, Pension Corporation, Prudential, RBS, Swiss Re and UBS. Additional members are initially being accepted on an institutional level and are likely to include banks and (re)insurers currently participating, or with plans to participate, in the mortality and longevity markets.

We have a number of firms that are at various stages of discussions about membership. I think it's fair to say that, like everything these days, there's a certain amount of process that needs to be gone through to on-board new members, so it does take some time. But we are hoping that we can expand membership significantly over the course of this year and next.

# by Association

**Q: How did the LLMA come about?**

**A:** J.P. Morgan and others started talking about the idea of trying to be more coordinated in terms of getting the market for longevity risk transfer established. By that we had in mind developing a common index and establishing best practices through pooling the various lessons we had learned from developing other kinds of markets and our experiences in this one.

That began with a number of exploratory discussions two years ago and evolved from there. It was then the middle of last year that the core group of founding members got to a point where we felt we could launch the Association as a legal entity and the LLMA came into being in November last year.

We then really kicked off the work of the Association proper at the beginning of this year and since then have been contributing to various work streams with the aim of publishing

output or product over the course of this year. We were clear that we wanted to make a quick impact and demonstrate that we are an Association geared to the practical side of the business and intended to make things happen rather than just being a discussion forum.

**Q: What are those work streams?**

**A:** The main one is the Technical Committee, which I chair and is made of four sub-streams. There's also a work stream around documentation, which has been coordinating with ISDA. Then there are work streams around the governance of the Association and one looking at accessibility issues – essentially communicating the output of the Association to the market at large.

**Q: Can you give some more detail on the Technical Committee sub-streams?**

**A:** The first is around product and collateral and is about standardising

product definitions and addressing collateral issues and so on. The second is on data and indices, which is fairly self explanatory – essentially it created



Guy Coughlan, spokesperson,  
Life & Longevity Markets Association

New framework

The Life & Longevity Markets Association (LLMA) has developed a framework for developing, producing and publishing longevity indices and has published it for industry consultation. The purpose of the framework is to provide both a standard conceptual basis and standard guidelines for index methodology to enable market participants to create and maintain longevity indices of different kinds – both public and private – in different markets.

The LLMA believes that this kind of standardisation will help to promote its objective of encouraging the development of a liquid traded market in longevity risk transfer. Such standardisation should encourage much needed consistency in the complex area of longevity risk transfer, thereby providing greater comfort to first-time counterparties and reducing the time spent on due diligence for these transactions.

The LLMA Longevity Index Framework has been designed to facilitate the development of longevity indices for different pools of lives, including but not limited to:

- Longevity indices for the national populations of countries
- Longevity indices for populations of annuitants
- Longevity indices for populations of pensioners
- Longevity indices for customised pools of lives.

As such, the framework can be used to create customised indices for specific annuity portfolios and specific pension plans, in order to facilitate customised risk transfer and hedging transactions.

Two key elements in the LLMA Longevity Index Framework that are presented in the consultation document are a set of longevity index principles and a default longevity index methodology.

The ten index principles – which fall under the headings of tradability, transparency, robustness, objectivity, simplicity, clear governance, timeliness, continuity, consistency and universality – lay out the important characteristics necessary for a longevity index to be successful and relevant in the market

for longevity risk transfer. The default index methodology offers guidelines for creating both public and proprietary longevity indices consistent with these index principles.

The purpose behind the default methodology is to provide a template that market participants can use to develop credible, robust customised longevity indices that facilitate longevity transactions. In this respect, LLMA encourages standardisation but not, it says, to the point of being overly prescriptive. The Association acknowledges that this default methodology will not be the most appropriate for every situation, but it should nonetheless serve as a credible starting point for developing and customising longevity indices.

The consultation period on the proposed framework, which can be downloaded at [www.llma.org](http://www.llma.org), runs until 4 October 2010. Once the framework is finalised, the LLMA intends to publish longevity indices based on the framework.

the longevity index framework we published in August (see box for more).

Third there is a valuation and risk management sub-stream. That's more about coming up with a standardised pricing methodology. But not with the purpose of calculating the prices at which deals will change hands; rather, with the aim developing a standard pricing mechanism that is useful from a communication and standardisation perspective.

The closest analogy to that is perhaps the Black-Scholes model – in the options markets everyone knows the Black-Scholes model and uses it for coming up with implied volatilities, but no-one really uses it as a pricing tool to do real trades. The other side of that sub-stream is the development of a standardised risk management framework that would help to quantify longevity risk and longevity basis risk.

The fourth sub-stream is centred around market infrastructure and addressing issues, such as central clearing and the potential exchange listing of longevity contracts. Obviously,

there hasn't been a great deal of progress here yet as these aspects of the market are still at a very early stage of development.

**Q: What products to you expect to roll out in the near term?**

**A:** First and foremost there will be the publication of the final index framework document. That will then enable us to launch the LLMA Longevity Index.

Then, we have plans for output around product definitions and the valuation work stream. Unfortunately,

there's not much more I can say at this stage about these things until we are closer to finalising them.

**Q: Are there longer-term aims for the LLMA?**

**A:** In the short term, the work we already have under way – particularly around the Technical Committee work streams – is taking up a lot of time and energy. But longer term I think we'll be able to think about the more strategic things that we offer to help the market with once the basics are out there. [SCI](#)

**About the interviewee**

**Guy Coughlan** is an md in J.P. Morgan's pension solutions group. Since joining J.P. Morgan in 1994, he has been involved in advising pension funds, corporations and insurers on strategic risk management, asset-liability management and capital structure. He led the development of J.P. Morgan's LifeMetrics longevity index and longevity risk management platform.

Coughlan was involved in implementing the very first capital markets hedges of longevity risk in 2008. He currently chairs the Technical Committee of the Life & Longevity Markets Association (LLMA).

Coughlan holds a D.Phil. in Theoretical Physics from Oxford University and an MBA from Henley Business School.



## A look at the plans to reform GSEs and, as a consequence, the **US mortgage-backed securities** market

**T**he US House Financial Services subcommittee on capital markets met on 15 September to discuss, among other things, the future of Fannie Mae and Freddie Mac. The move marks the latest (at press time) step on what is expected to be a long and difficult road to reforming the country's housing markets, at the centre of which are the GSEs.

Comments made by Michael Barr, assistant secretary for Financial Reform, and Edward Demarco, acting director of the Federal Housing Finance Agency, at the subcommittee hearing indicate that each believe that a privatised conforming market can exist without a government guarantee. Absent a government pool policy, MBS analysts at Wells Fargo – for one – believe that the most likely structure for the GSEs will consequently be a cooperative model, as put forward by economists at the Federal Reserve.

The Wells Fargo analysts further suggest that there is a 50%-75% probability that Fannie Mae and Freddie Mac will be liquidated as part of their rehabilitation. They suggest that a

viable framework for liquidation would involve both outstanding GSE debentures and MBS continuing to enjoy a full-faith and credit guarantee.

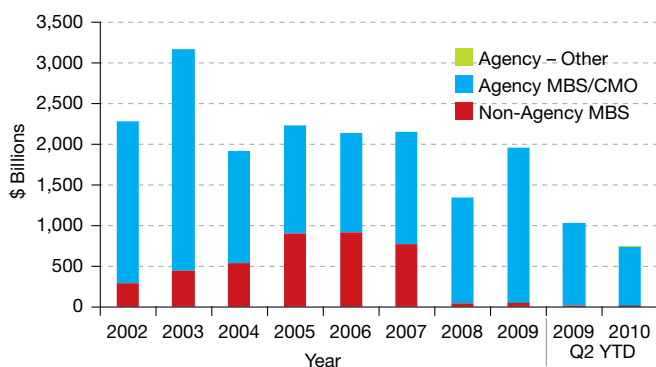
However, they point out that liquidation may result in a two-tier conventional MBS market. “To avoid a prolonged period of a two-tier conforming market, we believe that policymakers may repudiate terms of the GSE’s trusts and debentures. We assign a less than 10% probability of repudiation versus a run-off strategy.”

The analysts add: “Structural questions aside, we continue to believe that a self-insuring conforming takeout will likely increase mortgage rates by at least 15bp-20bp and reduce ‘up-front’ proceeds...by as much as 3.5 points, inclusive of borrower paid points. With the only government MBS guarantee, GNMA MBS will benefit from wider primary secondary spreads and, in a sense, the market will ‘pay’ guarantee premium.”

Strenuous debate among market participants on the future of the GSEs emerged after the Federal Housing Finance Agency (FHFA) proposed rules on the conservatorship and receivership

Chart 1

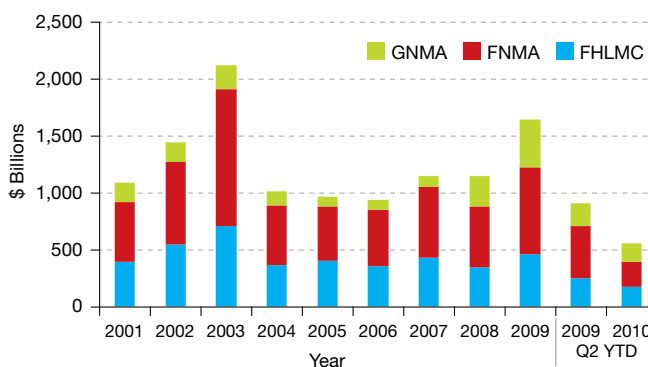
Issuance of Mortgage-Related Securities



Source: Federal Agencies, Thomson Reuters via SIFMA Research Quarterly

Chart 2

Issuance of Agency Mortgage-Backed Securities\*



\*Agency issuance of MBS & CMOs on net exposure  
Source: GNMA, FNMA, FHLMC via SIFMA Research Quarterly

operations of Fannie Mae, Freddie Mac and the Federal Home Loan Banks on 6 July. The rules were open to comment 60 days after being published in the Federal Register.

Similar to the provisions in the FDIC’s rules, the FHFA rules seek to address the status and priority of claims, the relationships among various classes of creditors and equity holders, as well as the priorities for contract parties and other claimants under conservatorships or receiverships.

It specifically clarifies that all claims arising from an equity interest in a regulated entity in receivership would be given the same treatment as the interests of shareholders. It also points out “that the powers of the conservator or receiver include continuing the missions of a regulated entity and ensuring that the operations of the regulated entity foster liquid efficient, competitive and resilient national housing finance markets”.

**Three concerns**

The Mortgage Bankers Association (MBA) subsequently filed a comment letter with the FHFA regarding its proposals, indicating that it has three primary concerns. First, the proposal appears overly theoretical in its approach, according to the association. It notes, for example, that the proposals speak in generalities about what the FHFA would do in resolving claims among competing claimants.

In the current situation with respect to the conservatorship of Fannie and Freddie, the claimants on their assets are known now, the MBA says. It suggests that the FHFA revise the proposals to include as much specificity as possible, such as identifying how the Agency will deal with each specific class if the firms are put into receivership.

Second, according to the MBA, the proposal sheds no light on what would ultimately trigger placing the GSEs into receivership. Fannie and Freddie have

already moved well beyond the point where any other financial institution would have been put into receivership, the association notes. The FHFA should thus state clearly the degree to which the continued operation of the firms under an FHFA conservatorship benefits existing shareholders and/or increases costs to taxpayers and whether accelerating the timetable for putting the firms into receivership would reduce taxpayer expense.

Finally, the FHFA should specify its goals in receivership. For example, the FDIC follows a receivership policy of least-cost resolution, in which the failed institution is sold whole or piecemeal. MBA believes the FHFA should articulate its own receivership policy, such as whether it will follow a least-cost model or a different strategy, whereby the direct return to the taxpayers might be lower but the overall benefit would come in using the assets of the GSEs to promote the development of a new, competitive secondary market structure.

The MBA stresses that its comments are not meant to promote any specific course of action for the FHFA; rather, they are meant to illustrate the types of issues its needs to address as openly and quickly as possible, so that market participants understand what could potentially change in the near future. “Past operating practices and norms do not provide an adequate guide for two reasons,” the association explains. “First, this is a unique situation with little historical precedent. Second, nearly every action FHFA and the enterprises take would

“The operations of the regulated entity foster liquid efficient, competitive and resilient national housing finance markets”

have a financial impact on counterparties and different creditors.”

**Consensus forming**

The US Treasury’s August conference on the future of housing finance nevertheless appeared to establish some form of consensus on the future of the GSEs. According to ABS analysts at Deutsche Bank, consensus has formed around four issues. First, the MBS guarantee business should be re-launched, backed by catastrophe insurance from the US government.

Second, the portfolio investment business needs to end, except for limited warehousing of residential and multi-family loans before securitisation. Third, the GSEs should be restructured as co-ops, capitalised by the same originators that need securitisation. And finally, an MBS guarantee and cashflow should be designed to fit the TBA pass-through market.

The Deutsche Bank analysts note that reaching a consensus is the easy part, however, with tougher issues – such as the types of loans guaranteed by the new GSEs, the capital required and the costs of the government insurance – all set to prove far more testing.

Investors are keen for the standardisation of MBS and TBA liquidity to be preserved, which the analysts indicate would mean adding new GSEs without changing Fannie and Freddie. They suggest that past rivalry has kept Fannie and Freddie from matching each other’s pass-through structures, but rehabilitation may change that.

“In a distressed market, we think policymakers are very reluctant to try to take away what is effectively working in the market”

With a receptive market and uniform government insurance backing the programmes, the analysts believe the securities market might treat the programmes as fungible for TBA trading, which could create a far more liquid MBS market.

However, based on the imposition of declining portfolio limits (down by 10% per year) on the GSEs by Congress, MBS analysts at Bank of America Merrill Lynch indicate it is unlikely that Fannie and Freddie will be part of the framework for the longer-term future, despite their current importance. Nevertheless, they agree that housing finance reform is likely to be a slow process as the housing and financial crises have exposed several flaws in the system, which will take years to address.

The BAML analysts believe that the conference is no more than a first step in the Treasury’s plan for housing finance reform by early 2011 and so is unlikely to

impact the MBS market in the near term. Indeed, they suggest that housing finance reform will not actually be ready for implementation until after most of the mortgages currently outstanding have been extinguished – a wait of between five and 10 years.

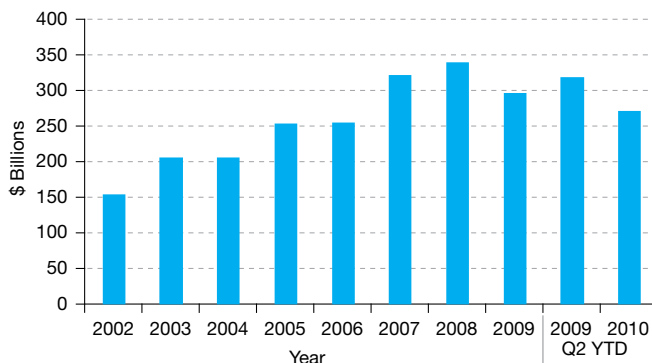
**Firm grasp**

It seems clear that the US government’s firm grasp on Fannie and Freddie is unlikely to loosen anytime soon. But whether that remains at arm’s length or not is open for debate.

“When you look at the liquidity function the GSEs apply to the market, in a distressed market, we think policymakers are very reluctant to try to take away what is effectively working in the market,” said Ken Bruce, director of specialty financial services at BAML, on a conference call in August. He expects the government will still run the GSEs, with policymakers

**Chart 3**

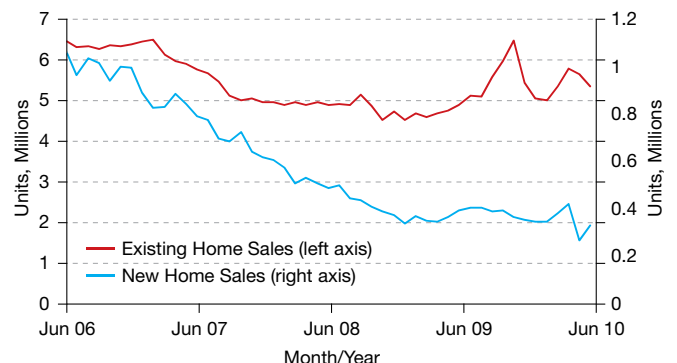
Average Daily Trading Volume of Agency Mortgage-Backed Securities



Source: Federal Reserve Bank of NY via SIFMA Research Quarterly

**Chart 4**

New and Existing Home Sales, Seasonally Adjusted



Source: US Census Bureau, National Association of Realtors via SIFMA Research Quarterly

## New GSE housing goals established

The Federal Housing Finance Agency (FHFA) at the beginning of September sent a final rule to the Federal Register establishing new housing goals for Fannie Mae and Freddie Mac for 2010-2011. The final rule establishes three single-family, owner-occupied home purchase mortgage goals for low-income families, very low-income families and families living in geographical areas with lower-income populations, areas with high concentrations of minority residents and federally-declared disaster areas.

The home purchase and refinance goals are expressed as minimum goal-qualifying mortgage shares of home purchase or refinance mortgages

acquired by the GSEs. The final rule sets a prospective or benchmark measure, as well as a retrospective market-based measure to assess each enterprise's performance relative to the actual goal-qualifying share of the primary mortgage market.

The final rule also prohibits housing goals credit for purchases of mortgages in private-label securities, including CMBS.

The FHFA stresses that it doesn't intend for the enterprises to undertake economically adverse or high-risk activities in support of the goals, nor does it intend for their state of conservatorship to be a justification for withdrawing support from these market segments.

determining what level of subsidy they will provide.

Further, Bruce anticipated that the government guarantee on the GSEs would likely remain. "The administration will look to pursue a structure that really tries to retain the valuable liquidity features of the government-backed MBS market."

David Min, associate director for financial markets policy at the Center for American Progress (CAP), agrees. "We had something close to a private market in this country prior to 1930s, but what happens is the tail risk is too long for private capital to really come in and fill the housing needs of the country," he told SCI in August.

From solely government-run institutions to cooperatives and utilities, the future of the GSEs could take many forms. Staff members at the Federal Reserve Bank of New York maintain that a "private lender cooperative utility may provide the best overall solution", according to a paper released in August. Since cooperatives typically seek to provide a service to their members, with losses

and gains shared, it would seem to be a plausible scenario.

They suggest each member should be required to provide equity capital to the cooperative. Specifically, members' contributions to the mutualised loss pool would depend on the volume of mortgages securitised.

Only members would be eligible, however, to sell mortgages to the securitisation cooperative. It goes without saying that each member would hold an equity stake in the coop.

#### Public utilities?

According to one MBS investor that backs the co-op idea, the GSEs should be designed as more of a public utility; for instance, like an electricity company. "The easiest way to transfer risk is to make it more like a utility, which is why electricity doesn't cost that much a month," he says. "With Fannie and Freddie, there was way too much of the subsidy going to the shareholders and not to the homeowners."

But not all are in favour of the co-op or utility plan. "I'm not sure if a cooperative-based entity that buys insurance from the government is the right answer or whether it has its own set of problems. For example, does it tend to limit the number of participants in the mortgage market, since you have to buy into this cooperative in order to get the insurance. That would seem to put more systemic risk on those entities that can afford to do it," notes Jeremy Diamond, md of Annaly Capital Management.

Min also questions the co-op model's membership design. "They are good for some purposes and bad for others. The inherent member-owned structure tends to be pro-cyclical if those members are banks or other financial institutions. A co-op structure is less likely to have a lot of losses, but it strikes me as a poor public policy structure," he adds.

Talk has also emerged about combining Fannie and Freddie into one entity. Such a combination could help ease the financial burden somewhat, since both are in dire need of reform. In early August, Freddie Mac asked for an additional US\$1.8bn from the US Treasury, which was on top of asking for an additional US\$10.6bn last May.

With or without any combination of the entities, there will be an intense revamp of the GSEs' portfolios, which are likely to be very curtailed or limited. As the MBS investor notes, the GSEs should have either no portfolio or some sort of backstop portfolio.

Underwriting is also a crucial area of reform. "Underwriting standards (and whatever replaces the current housing system, if indeed there is a replacement) have to be at first and foremost part of the incentives that are set up. Clearly there was a disincentive to good underwriting during the bubble years," Diamond notes.

But many market participants believe that the US housing system is still salvageable. "The misalignment of incentives led to a lot of the problems that we are dealing with now," says Diamond. "But if you can correct those incentives in some way, you will go a very long way to a housing finance system that is stable and equitable and protects the tax payer."

#### One-year window

Moody's suggested in a July ResiLandscape publication that any progress on

"A private lender cooperative utility may provide the best overall solution"

GSE reform is unlikely until at least after the November elections, leaving a one-year window before the presidential election cycle begins. Should Congress defer GSE reform to after the next presidential election, the rating agency says reform legislation in 2013 will take the form of modest change rather than extensive restructuring. GSE performance and the housing market should both have improved by that time, which will limit the urgency of reform.

It is expected that there will still be a role for 30-year fixed rate mortgages, which the government will want to keep available and will have to be involved with, as Moody's says banks do not want to fund interest rate risk associated with such mortgages. The agency states that the level of support that GSEs give will be important in keeping mortgage rates down and mortgages available.

An extreme scenario could see the government provide an outright guarantee of debt issued by any financial institution that qualifies as a GSE, according to Moody's. The depletion of the capital of the GSEs would be the sole event triggering the government guarantee. The agency says this scenario could see many companies becoming GSEs, potentially distributing mortgage credit exposure more fully, which would reduce systemic risk.

SIFMA agrees that without the benefit of government support, mortgage credit would be both less available and more expensive. "The mortgage finance industry impacts multiple aspects of the economy in the US," Tim Ryan, SIFMA president and ceo said in a July statement. "While recognising that there is no single right answer to GSE reform, it is critical that, in addressing this complex

"While recognising that there is no single right answer to GSE reform, it is critical that the benefits to consumers and the economy be preserved"

task, the benefits to consumers and the economy which are created under the current system be preserved. We encourage policymakers to fix what's broken without dismantling the aspects that have provided efficient, cost-effective lending and benefits to our economy for the last 30 years."

SIFMA noted in the statement that the issues for policymakers to consider include: how liquid secondary markets for loans and MBS would be; the breadth of products that would be offered to consumers; the capacity of lenders to extend credit; whether national lending markets could be sustained or if regional pricing differentials would reappear; and, ultimately, the cost and affordability of credit to consumers. Accordingly, policymakers need to determine what they want from the mortgage markets before they can address what to do with the GSEs or the broader infrastructure of mortgage finance, the association said.

SIFMA stressed that the TBA market is the key to a successful, liquid, affordable and national mortgage market, as well as ensuring a sufficient level of

capital is available to banks to lend. Some form of an explicit government guarantee on MBS will be required to maintain the liquidity of the TBA MBS markets, according to the association. There are a number of permutations of a guarantee, but ultimately a government insurance wrap of the MBS that stands behind any private sector insurance or other corporate guarantees, as a catastrophic backstop, may be the most efficient means to achieve this goal.

The association further noted that while portfolios are necessary at some level for purely operational reasons (assuming GSEs or similar entities exist), moving beyond this operational level presents a number of challenges and choices for policymakers. If there is a goal to provide a mechanism to smooth out volatility of mortgage rates, portfolios are one way to accomplish this.

Finally, SIFMA said it believes that the government must clearly state its intentions with respect to legacy GSE issues prior to and during any transition. Bifurcation of markets into pre- and post-reform markets should be avoided. [S&P](#)



# Demand dynamics

**Francois de Supervielle**, head of institutional investors, and **Pierre Trécourt**, deputy head of structuring group, cross-asset solutions at Société Générale Hong Kong, discuss the market for institutional structured products now and in the future in the Asia Pacific region

**C**ompared to 2006 and 2007, the structured products business is – as with many other areas of finance – much reduced now. However, we appear to be past our most difficult years of 2008 and 2009.

A reasonable portion of 2009 structured business was the result of legacy positions in credit and rates being unwound or restructured. In the last 12 months we have witnessed new money being deployed in the structured market once again, this is very encouraging.

The market has changed dramatically: yield curves in many countries are so low that it becomes unsustainable for institutional investors such as pension funds and insurance companies to continue buying local government bonds. Indeed, they are taking a negative carry position by doing so.

Considering structured products for a portion of a portfolio can be meaningful in the context of the current low yield environment. They can also be used as a good tool to control the volatility of a portfolio as well as optimising the usage of capital.



“The majority of Asian investors focusing on structured products for yield enhancement are interested in the interest rate space”

products will certainly make sense as part of their asset allocation strategy.

### Diversification

The way we have seen structured products used in Asia for diversification purposes has tended to be by firms investing small parts of their portfolios in foreign assets and then looking to get some protection on the downside. Typically, they have done this by buying capital protection products and we continue to see this strategy being undertaken.

Increasingly, though, we are seeing clients looking to slightly change the risk profile of their investments and wanting to either maximise upside or to capture alpha in markets to which they are not currently invested in. For those targeting absolute returns, the focus is likely to be structures referencing alternative asset classes such as hedge funds, whereas those looking to new markets tend to be more commodities focused. For a lot of clients, commodities are not seen as an asset linked to any specific economy – it’s a global asset class and the only issue for many people is finding the right way to access it.

### Yield enhancement

The majority of Asian investors focusing on structured products for yield enhancement are interested in the interest rate space. A different range of underlying is preferred like the usual USD rates with or without quanto versions or some local interest rate, such as Korean Won interest rates.

In this case, investors take a specific view. On duration, for example, by buying callable products or a view on the potential inversion of the curve by buying a CMS 10 years minus 2 years or CMS

30 years minus 10 years, say, or a range accrual where the investor doesn’t expect the short-term rate to rise above a barrier of 5%.

### Beyond rates

Fixed income constitutes the bulk of Asian investors’ assets and therefore the majority of their interest in structured products is in instruments with a fixed income underlying. But there are other sectors, aside from the aforementioned hedge fund and commodity asset classes, that are also generating interest.

For example, notwithstanding all that has happened, credit is still generating interest. We are perhaps back to business volumes seen ten years ago, but the more straightforward products such as CLNs and first-to-default products are still proving popular. At the same time, some clients are looking to match specific needs with products such as quanto CDS. For those with duration issues and for those looking for zero coupon investments, tailor-made coupon structures are available.

However, Asian investors are reticent about taking diversified exposure to US or European credit, as they used to in the past. Since the crisis, they have become very much focused on domestic and regional credits.

On the other hand, we are seeing some appetite for distressed debt, recovery stories and regulatory capital solutions, but customers would be looking for high yield investments. They are no longer interested in diversified exposure for diversification’s sake and a few basis points outperformance. If double-digit returns are not on offer, investor interest is almost non-existent – risk must be adequately rewarded.

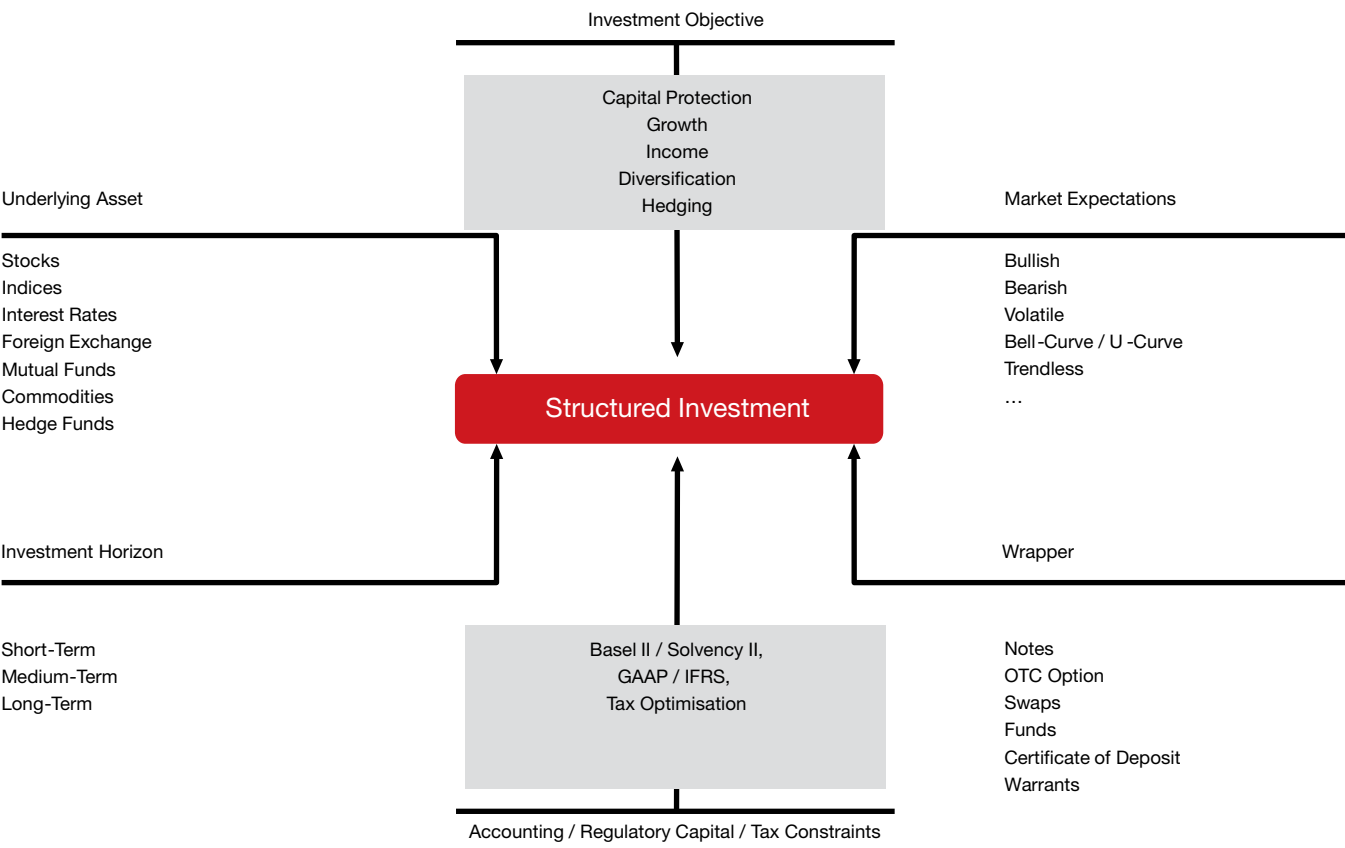
Properly structured and understood, they are certainly of great relevance in a portfolio management exercise.

Société Générale has never retreated from the structured product business and it remains a core part of our strategy. Given our close and long-standing involvement in the market and the current environment, we are reasonably confident that there will be a natural tendency from the institutional investor base to come back to this market.

This return is unlikely to happen as a massive surge, but instead it will be a gradual move because institutions do not typically change their approach in a matter of weeks. But for diversification and yield enhancement purposes, structured

Chart 1

Structured Products – Customisable to Investors’ Objectives



Source: Société Générale

We are also seeing good traction on hybrid products, where we combine different asset classes into one structure. Interest rates and FX, and credit and FX are two particularly successful combinations.

Structures based on equities are popular in Asia for the retail market, but

institutions have been so far very cautious in this area. The current risk aversion and poor equity performance could be an explanation for this reticence.

However, there is a trend globally towards the optimisation of regulatory capital for banks and insurance companies.

Even small amounts of equity exposure can now be extremely costly in terms of regulatory capital and that should incentivise institutions into looking more closely at structured solutions.

**Long-term hope**

Longer term, our hopes for the market are even more positive if the two major potential markets in the region – China and India – can be opened up to structured products. Both countries have essentially been closed to structured products for the past two years after local firms suffered losses on the instruments during the crisis.

Since then, regulators have restricted the use of both local currency and dollar-based products. We continue to follow the two markets closely and there are regular changes being made and moves towards more liberalisation. When the transition is complete, Asia will regain his significant role in the global structured products business. [SCI](#)

“Longer term, our hopes for the market are even more positive if the two major potential markets in the region – China and India – can be opened up to structured products”

### European RMBS

The valuation applications of  
loan-level data

**Dynamic Credit Partners Europe**

### Derivatives

Close outs: valuations and other issues

**Navigant Capital Market Advisers**

### Structured credit & MBS

Application of advanced Monte Carlo  
methods to valuations

**R<sup>2</sup> Financial Technologies**

### Structured finance

Q&A

**S&P Valuation & Risk Strategies**



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- Consumer Loans
- SME & Leveraged Loans



## Structured Credit

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- CMBS
- Consumer ABS
- CDO/CLO
- Esoteric ABS



## Structured Rates

- Interest Rate Swaps
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# The valuation applications of loan-level data

By Mike Li, Dynamic Credit Partners Europe

In light of the turmoil in the mortgage-backed securities and greater structured credit markets in the past few years, it isn't surprising that investors and regulators are demanding more disclosure and transparency about such products. Whether this refers to the additional disclosure regarding representations and warranties on the underlying collateral pool, or the disclosure of the role played by third parties, the pressure on arrangers/underwriters is more intense than it has been in years past. In our article for the 2009 SCI Guide to Pricing & Valuation – 'European RMBS: Key Considerations in Valuations' – we touched upon a common disclosure issue for investors in the European residential mortgage-backed securities (RMBS) markets: the fact that collateral-level data is typically only available on an aggregated basis and the quality of that data is inconsistent from deal to deal.

The issue of loan-level data, which has been a headline topic at many industry conferences and in the marketplace, historically has been unaddressed in the European RMBS markets. Unlike in the United States, where non-Agency mortgage loan disclosure for investors has been fairly transparent, loans tapes have not commonly provided by issuers in Europe due to privacy and competitive concerns, while overall strong loan performance (and bank

support for their issuance programmes) mitigated investor need for this information. As a result, while US RMBS can be analysed at the loan-level due to the availability of such data, for all practical purposes, European RMBS can only be run at the pool level.

Events in recent years have, however, highlighted the need for change in order to restore investor confidence and to revive the European RMBS market. While we acknowledge that better loan transparency doesn't necessarily translate into better credit performance, or more accurate valuations and analysis for all parties involved, we firmly believe that investors who understand how to interpret this information are better able to understand the risks of the most credit-sensitive and underperforming types of mortgages, and consequently avoid the troughs in volatility and even profit from distressed markets.

In order to demonstrate this, we review two 2007-vintage UK non-conforming RMBS issuances, RMACS 2007-NS1 and NGATE 2007-2, to first discuss some important details that are overlooked when collateral data is aggregated and secondly, the effects of risk-layering, being the non-linear increase in default risk as loans are exposed to additional risk factors. As with many investors looking to value a bond, one first may look to Bloomberg

Figure 1

	RMACS 2007-NS1		NGATE 2007-2	
Issuer	RMAC SECURITIES PLC		NEWGATE FUNDING PLC	
Loan Originator	GMAC-RFC		Mortgages 1 Limited	
Maturity	12/6/44		15/12/50	
Issuance Date	27/6/07		13/6/07	
Date	September-07	June-10	September-07	June-10
Balance (£mm)	511.27	381.68	443.15	347.40
Pool Factor	0.974	0.727	0.985	0.772
# of Loans	4,884	3,633	3,847	3,054
Delinq 30 days	4.40%	2.99%	10.11%	6.32%
Delinq 60 days	2.22%	3.12%	4.45%	4.08%
Delinq 90 days	2.55%	24.57%	4.04%	26.55%
Foreclosure/REO	0.06%	0.55%	0.00%	1.26%
Cumulative Loss	0.00%	2.03%	0.00%	2.25%
Excess Spread	1.44%	0.00%	1.57%	0.00%
Reserve Fund (£mm)	5.78	4.05	3.15	1.93

Source: Bloomberg

to find the performance statistics for these two deals from September 2007 and June 2010, which are presented in **Figure 1**.

From this information, we can see that the loans in both pools have amortised by about 20% and are performing fairly poorly, with loans that are 90 or more days delinquent comprising well over 20% of the current collateral in both cases, and NGATE 2007-2 performing slightly worse than RMACS 2007-NS1. However, this does not provide any insight on why the delinquency rate is so high, and more importantly, it doesn't provide any indication of the likely performance of the pools in the future. To gain more insight into the risks of each deal, the next step of the valuation process will be to look at the historical and recent trustee (remittance) reports (again, as most investors do) in order to get a sense of the average characteristics of the mortgages in the pools.

In **Figure 2**, the first two rows contain selected information available for RMACS 2007-NS1 from the [trustee] reports as of September 2007 and the most recent report from June 2010. We chose September 2007 as the starting point because that was the first date a loan tape was available, on which we will elaborate later in this piece. At first glance, the average characteristics of the collateral appear to be relatively unchanged between September 2007 and June 2010, with the weighted average loan original LTV increasing slightly from 75.5% to 76.0%, the percentage of credit impaired loans (loans where the borrower had prior county court

judgments made against them) decreasing from 22.5% to 21.9%, and the percentage of self-employed borrowers and loans that were used to refinance an existing mortgage (and possibly consolidate other debt) increasing slightly. The percentage of Right-to-Buy loans (loans extended to tenants of social housing, who generally have lower incomes and have exercised an option to purchase their home at a discounted price) decreased from 8.1% to 0%.

This information seems to imply that on average the riskiness of the collateral is about the same or even slightly improved. However, this does not help in any detailed way to explain why the loans in RMACS 2007-NS1 are performing so poorly and it remains unclear whether the loan delinquencies and defaults will continue to increase at the same pace, slow down, or even accelerate. It is at this point where most analysts run into a wall, as for most European RMBS transactions there is simply no more data available.

### Available data

Fortunately in this case, investors do have access to loan-level data for many UK non-conforming deals, many of which started providing loan-level data in 2007. However, it must be noted that in order to work with the loan-level data, a significant database infrastructure and sophisticated data management process is needed. For example, Dynamic Credit specifically built analytic systems and data management processes to analyse loan-level information,

Figure 2

	Loan Balance (£mm)	Weighted Average Loan Origination Date	Weighted Average LTV (At Loan Origination)	Credit Impaired (Any CCJs)	Self-Employed	Refinance (Includes Debt Consolidation)	Right-to-Buy	Self-Certified	Reversionary Margin
September 2007	494.0	NA	75.5%	22.5%	36.2%	66.3%	8.1%	NA	NA
June 2010	381.7	NA	76.0%	21.9%	36.3%	66.9%	0.0%	NA	NA
Current	272.2	15/8/06	74.7%	18.7%	NA	64.9%	8.0%	54.7%	2.51
Paid Off	72.1	15/9/05	68.4%	20.6%	NA	62.1%	7.1%	54.3%	2.63
Performing	344.3	6/6/06	73.4%	19.1%	NA	64.3%	7.8%	54.6%	2.54
Delinquent	120.8	29/10/06	78.6%	29.0%	NA	71.6%	7.2%	68.8%	2.93
Defaulted	29.8	2/12/06	77.4%	35.3%	NA	68.0%	15.2%	62.6%	3.57
Underperforming	150.6	4/11/06	78.3%	30.3%	NA	70.9%	8.8%	67.6%	3.06

Source: Loan Tapes, Trustee Report, Dynamic Credit Partners Europe

Figure 3

	Loan Balance (£mm)	Weighted Average Loan Origination Date	Weighted Average LTV (At Loan Origination)	Credit Impaired (Any CCJs)	Self-Employed	Refinance (Includes Debt Consolidation)	Right-to-Buy	Self-Certified	Reversionary Margin
September 2007	444.0	NA	NA	NA	NA	NA	NA	NA	NA
June 2010	348.4	NA	NA	NA	NA	NA	NA	NA	NA
Current	221.5	23/2/07	77.7%	16.1%	32.8%	57.7%	NA	54.6%	2.91
Paid Off	55.2	17/2/07	71.3%	15.0%	36.0%	64.8%	NA	61.0%	2.84
Performing	276.7	22/2/07	76.4%	15.9%	33.5%	59.1%	NA	55.9%	2.90
Delinquent	134.2	21/2/07	80.1%	22.2%	43.8%	63.6%	NA	65.3%	3.22
Defaulted	32.2	9/2/07	85.4%	28.5%	53.7%	53.9%	NA	66.9%	3.58
Underperforming	166.4	19/2/07	81.1%	23.4%	45.7%	61.7%	NA	65.6%	3.29

Source: Loan Tapes, Trustee Report, Dynamic Credit Partners Europe

which is currently only widely available for UK non-conforming transactions, to address the need of its clients that typically do not have the infrastructure for this type of detailed analysis.

Keeping in mind that not all loans in the pool are exactly the same, the logical next step would be to use the loan-level data to separate the loans in the pool that are still current from those loans that are in some form of delinquency in order to analyse the differences between them. Using this information, we should be able to see what type of loans are more likely to end up in delinquency, which would provide some insight into the possible future default rate of loans that are still performing. However, to avoid the skew coming from survivorship bias, we must also include the loans that have already either paid off or defaulted and are no longer in the pool as of June 2010. In addition, in order to keep the comparisons consistent, we must compare the balances of each loan as of the same date in order to adjust for any loans that have paid down in the past three years. After making these adjustments, we can then separate the loans that are still current or that have already paid off into a 'performing' group and the loans that are currently delinquent or that have already defaulted into an 'underperforming group'. Selected results of this analysis are also presented in **Figure 2**.

From the results, it becomes clear, though not surprisingly, that it is not the average loan that defaults, but rather the higher risk loans as defined in almost every risk category. The loans that underperformed had an average LTV 4.9 percentage points higher, an average loan origination date 5 months later (a sign that underwriting standards deteriorated over time), and underperformers had a greater percentage of credit impaired (11.2%), refinancing (6.6%), right-to-buy (1.0%), and self-certified, or income non-verified (13.0%) loans. Self-employment status, which is also known to be a significant risk factor, was not available at the loan level. Perhaps the most telling statistic is the average reversionary margin (the margin over a base rate that a loan resets to after the initial discounted or fixed rate period), which can be considered a measure of the loan originator's assessment of the credit risk associated with the particular loan. While the margin is already 20% higher than the pool average for the underperforming loans as a group, the margin is 40% higher for loans that have already defaulted.

### Useful information

This provides some insight into the useful information that is lost when loan data is aggregated (for the delinquent loans) or

completely removed (for the defaulted loans which are no longer reported by the servicer). It also highlights the importance of determining whether a group of loans has a modest distribution of 'average' loans to the overall pool, or is 'barbelled' with a mix of higher and lower risk loans, as the expected default rate should be different! This is a starting point for reassessing how investors should view the potential losses in a pool and why it can be dangerous to apply similar assumptions to different securitisations, even if their average mortgage characteristics are the same. This type of analysis also would be particularly important when assessing loan quality and relative value between multiple transactions.

Next, we analyse the NGATE 2007-2 loan pool in **Figure 3** to confirm that these findings holds true for another transaction as well. One thing to note in particular, considering our central issue of disclosure, or more specifically the lack of disclosure, is the fact that the trustee does not provide information on average characteristics other than simply the amount and number of current and delinquent loans; the additional risk factors must be calculated manually via the loan tapes, which adds an additional analytic burden for investors.

Looking at the results, it remains clear that higher risk loans have higher default rates. The loans that underperformed had higher average LTVs (5.1%), a greater percentage of credit impaired (7.5%), self-employed (12.2%), refinancing (2.6%), and self-certified loans (9.7%). In this deal, loan-level data regarding right-to-buy status was not provided. Once again, the average reversionary margin is 13% higher than the pool average for the underperforming loans and 23% higher for loans that have already defaulted. One interesting observation is that the average loan origination date is almost exactly the same, possibly indicating that underwriting standards in during late 2006 and 2007 were likely equally poor when compared to loans underwritten prior to that period. This is also corroborated by the fact that loan performance in NGATE 2007-2 is indeed worse than in RMACS 2007-NS1, which has an average loan origination date seven months earlier (even though both deals were issued in 2007).

Another reason why we chose NGATE 2007-2 is the fact that the loan-level data includes sufficient information to calculate the average debt-to-income (DTI) and loan-to-income (LTI) of the loans. DTI measures the borrower's ability to make the monthly mortgage payments, while LTI measures the size of the loan versus the borrower's income. While both are measures of the borrower's

Figure 4

	Average Income	Average Loan Size	Average Income (Self-Employed)	Average Income (Self-Certified)	Average DTI	Average LTI
All Loans	<b>£55,330.42</b>	£116,512.66	£51,821.93	£49,502.75	24	3.29x
Current	£51,535.46	£111,682.89	£48,416.04	£44,168.21	24	3.35x
Paid Off	£43,490.68	£96,668.62	£42,228.27	£38,819.87	25	3.26x
<b>Total</b>	<b>£49,930.47</b>	<b>£108,687.43</b>	<b>£47,181.54</b>	<b>£43,101.18</b>	<b>24</b>	<b>3.33x</b>
Delinquent	£63,938.06	£126,224.00	£58,831.55	£61,125.10	23	3.17x
Defaulted	£65,860.11	£143,281.32	£62,484.25	£56,076.61	25	3.47x
<b>Total</b>	<b>£64,310.06</b>	<b>£129,525.32</b>	<b>£59,538.50</b>	<b>£60,148.00</b>	<b>24</b>	<b>3.23x</b>

Source: Loan Tapes, Dynamic Credit Partners Europe

ability to pay, LTI is generally a better measure of ability to pay over the life of the mortgage as the mortgage payments change over time due to fluctuations in interest rates and the expiry of discounted payment periods.

For the same buckets of current, delinquent, paid off, and defaulted loans, we compared the average loan size, income (as a whole, as well as separately for self-employed and self-certified borrowers), with the average DTI and LTI, presented in **Figure 4**.

As first glance, something very strange appears – the average DTI and LTI of the performing and underperforming loans is almost the same, with underperforming loans coming out slightly better with regard to this metric. This seems contrary to our argument that higher risk loans have higher default rates. After all, common sense dictates that borrowers with a lower ability to pay should default more often. However, since we have access to the loan tapes, we can examine whether this relationship remains valid or whether something is being misinterpreted.

After cross-referencing the average DTI and LTI with the average income and loan balances, the reason for this apparent inconsistency becomes clear. The underperforming loans have a 20% higher average loan balance than the performing loans, while the defaulted loans have almost a 50% higher loan balance. This is due to the fact that borrowers with larger loan balances have much less flexibility in the event of a disruption to their income (e.g. loss of employment, development of health issues, divorce, etc.) and thus have higher default rates. In addition, due to the DTI and LTI requirements of loan originators, only borrowers with higher incomes would be granted larger loan balances, resulting in the similar DTI and LTI figures. This is clearly shown by the fact that while the annual income of underperforming self-certified borrowers is £4,818 (8.7%) higher than the average income for the pool, performing self-certified borrowers actually earned £12,229 (22.1%) less than the average (and probably more honest about their income when applying for the mortgage).

Figure 5

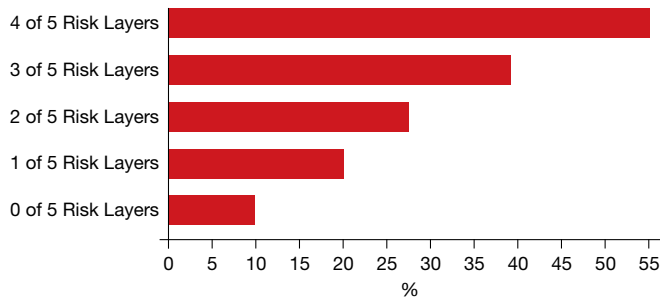
Risk Order - Highest to Lowest	Risk Layering					Borrowers in Payment Difficulties (%)		
	Credit Impaired	LTV >= 80	Self-Employed	Debt Consolidation	Right-to-Buy	Possession	Arrears (any) or Possession	Arrears >= 3 Months or Possession
<b>1</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>No</b>	<b>21.40%</b>	<b>42.40%</b>	<b>33.10%</b>
2	Yes	Yes	No	No	Yes	17.00%	35.90%	28.30%
3	Yes	No	Yes	No	Yes	16.40%	32.00%	22.70%
4	Yes	Yes	No	Yes	No	16.30%	35.50%	25.20%
5	Yes	Yes	Yes	No	Yes	15.80%	40.60%	30.60%
6	Yes	No	No	No	Yes	15.50%	30.00%	22.50%
7	Yes	No	Yes	Yes	No	13.80%	33.80%	22.90%
8	Yes	Yes	Yes	No	No	13.60%	38.40%	27.70%
9	Yes	No	No	Yes	No	10.70%	26.70%	17.90%
10	Yes	Yes	No	No	No	9.40%	29.30%	19.60%
11	Yes	No	Yes	No	No	6.40%	32.30%	19.70%
12	Yes	No	No	No	No	4.80%	21.20%	12.50%
13	No	Yes	Yes	No	Yes	4.80%	25.70%	14.50%
14	No	Yes	No	No	Yes	4.40%	16.30%	10.10%
15	No	Yes	Yes	Yes	No	3.80%	19.90%	11.10%
16	No	Yes	Yes	No	No	3.00%	14.50%	8.70%
17	No	No	Yes	No	Yes	3.00%	13.90%	7.50%
18	No	Yes	No	Yes	No	2.10%	12.10%	6.20%
19	No	No	Yes	Yes	No	1.30%	11.60%	5.30%
20	No	Yes	No	No	No	1.10%	6.10%	3.30%
21	No	No	No	No	Yes	0.90%	7.30%	3.50%
22	No	No	No	Yes	No	0.40%	5.30%	2.00%
23	No	No	Yes	No	No	0.40%	6.00%	2.50%
<b>24</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>0.10%</b>	<b>2.50%</b>	<b>0.60%</b>

Source: FSA

Figure 6

Risk Order - Highest to Lowest	Risk Layering					NGATE 07-2 Concentration (% of 3,888 Loans)	Arrears >= 3 Months or Possession (% of Total Pool)	Arrears >= 3 Months or Possession (% of Risk Group)
	Credit Impaired	LTV >= 80	Self-Employed	Debt Consolidation	Right-to-Buy			
1	Yes	Yes	Yes	Yes	No	2.42%	1.33%	55.07%
2	Yes	Yes	No	No	Yes	0.00%	NA	NA
3	Yes	No	Yes	No	Yes	0.00%	NA	NA
4	Yes	Yes	No	Yes	No	3.15%	1.16%	36.68%
5	Yes	Yes	Yes	No	Yes	0.00%	NA	NA
6	Yes	No	No	No	Yes	0.00%	NA	NA
7	Yes	No	Yes	Yes	No	3.71%	1.25%	33.73%
8	Yes	Yes	Yes	No	No	1.19%	0.58%	48.54%
9	Yes	No	No	Yes	No	3.41%	1.22%	35.65%
10	Yes	Yes	No	No	No	3.41%	1.02%	30.07%
11	Yes	No	Yes	No	No	0.63%	0.16%	25.94%
12	Yes	No	No	No	No	0.85%	0.11%	13.14%
13	No	Yes	Yes	No	Yes	0.00%	NA	NA
14	No	Yes	No	No	Yes	0.00%	NA	NA
15	No	Yes	Yes	Yes	No	8.28%	3.39%	40.98%
16	No	Yes	Yes	No	No	8.27%	2.85%	34.50%
17	No	No	Yes	No	Yes	0.00%	NA	NA
18	No	Yes	No	Yes	No	12.16%	3.21%	26.41%
19	No	No	Yes	Yes	No	11.17%	2.26%	20.26%
20	No	Yes	No	No	No	16.84%	4.35%	25.82%
21	No	No	No	No	Yes	0.00%	NA	NA
22	No	No	No	Yes	No	16.17%	2.68%	16.61%
23	No	No	Yes	No	No	3.10%	0.32%	10.22%
24	No	No	No	No	No	5.24%	0.52%	9.97%
						100.00%	26.43%	

Default Rate of Risk Layers



Source: Loan Tapes, Dynamic Credit Partners Europe

Once again, this reminds us that any data, when misinterpreted, can be misleading and that it is important to try to understand both the context in which information is presented and the methods used to derive the given information. This is only possible when an investor has access to the underlying data to corroborate any analysis presented by a third party (whether it is the servicer or even another analyst within the investor firm). It also brings us to our second point: that loan-level data allows us to view the effects of risk-layering, or the non-linear increase in risk when a loan contains a combination of risk factors, on the probability of default.

**Loan stratifications**

It is important to differentiate between simple loan stratifications (such as those provided in trustee reports) and the risk layering that is possible with loan tapes. While loan stratifications provide a one dimensional view of the collateral pool across various risk factors, it does not allow the investor to see whether loans have a combination

of several risk factors, which can dramatically increase the probability of default. **Figure 5** shows a table in the 2010 FSA Mortgage Market Review which compares risk layering across five categories (credit impaired, LTV>=80, self-employment, debt consolidation, and right-to-buy) with the percentage of borrowers with those characteristics that ended up having payment difficulties. We focus on one of the FSA’s definitions of payment difficulties: loans that are in arrears >= 3 Months (i.e. the borrower is 90 or more days delinquent) and properties that have already been taken into possession by the bank due to a borrower default. We prefer this metric as it includes serious delinquencies (loans that are likely to default), but not early delinquencies, which tend to be common amongst lower quality borrowers who tend to have more issues managing their cash flow or may simply forget or skip the mortgage payment in a given month. The loans used for the FSA analysis were all originated between April 1, 2005 and March 31, 2009 and measured if the loans were experiencing payment difficulties as of August 1, 2009.

As described by the FSA, the five strongest predictors of financial difficulties (excluding self-certified income) were:

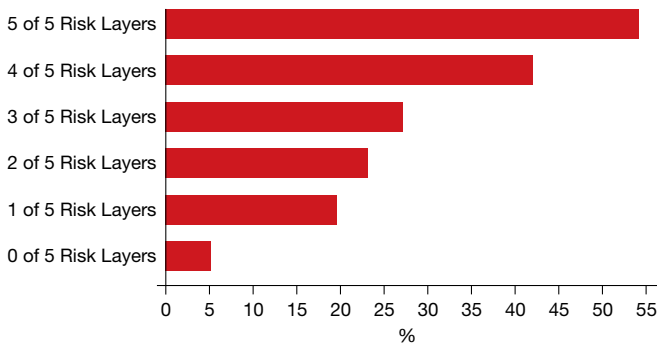
- an impaired credit history of the borrower
- higher LTVs (in this case, LTV >= 80%)
- self-employment
- a remortgage for debt consolidation
- when a social tenant exercised the right-to-buy option

As we can see from the results, the default rate of loans does indeed increase significantly between loans with no risk factors and those with many risk factors, with the lowest rate of ‘Arrears >= 3 Months or Possession’ at 0.60% for risk group 24, which has no risk

Figure 7

Risk Order - Highest to Lowest	Risk Layering					NGATE 07-2 Concentration (% of 3,888 Loans)	Arrears >= 3 Months or Possession (% of Total Pool)	Arrears >= 3 Months or Possession (% of Risk Group)
	Credit Impaired	LTV >= 80	Self-Employed	Debt Consolidation	Self-Certified			
1	Yes	Yes	Yes	Yes	No	0.09%	0.08%	86.45%
2	Yes	Yes	Yes	No	Yes	0.90%	0.51%	57.28%
3	Yes	Yes	Yes	Yes	Yes	2.32%	1.26%	54.26%
4	No	Yes	Yes	No	No	2.28%	1.09%	47.81%
5	No	Yes	Yes	Yes	Yes	7.67%	3.33%	43.40%
6	Yes	Yes	No	Yes	Yes	2.01%	0.82%	40.81%
7	Yes	No	No	Yes	No	1.55%	0.58%	37.34%
8	Yes	Yes	No	No	Yes	0.88%	0.31%	35.39%
9	Yes	No	Yes	Yes	Yes	3.32%	1.16%	35.02%
10	Yes	No	No	Yes	Yes	1.96%	0.64%	32.63%
11	Yes	No	Yes	No	Yes	0.49%	0.15%	31.29%
12	No	Yes	No	Yes	Yes	6.70%	2.08%	31.03%
13	No	Yes	Yes	No	Yes	5.88%	1.76%	29.99%
14	Yes	No	Yes	Yes	No	0.30%	0.09%	29.83%
15	Yes	Yes	No	Yes	No	1.16%	0.34%	28.99%
16	Yes	Yes	No	No	No	2.53%	0.71%	28.22%
17	No	Yes	No	No	No	12.33%	3.18%	25.82%
18	No	Yes	No	No	Yes	4.62%	1.16%	25.21%
19	Yes	Yes	Yes	No	No	0.29%	0.06%	21.84%
20	No	No	Yes	Yes	Yes	9.58%	2.07%	21.62%
21	No	Yes	No	Yes	No	5.58%	1.13%	20.31%
22	No	No	No	Yes	Yes	8.08%	1.54%	19.05%
23	Yes	No	No	No	Yes	0.28%	0.05%	18.43%
24	No	No	Yes	Yes	No	1.26%	0.19%	15.24%
25	No	No	No	No	Yes	2.53%	0.37%	14.76%
26	No	No	No	Yes	No	8.42%	1.15%	13.60%
27	No	No	Yes	No	No	0.47%	0.06%	12.95%
28	No	Yes	Yes	Yes	No	0.49%	0.06%	12.66%
29	No	No	Yes	No	Yes	2.53%	0.26%	10.11%
30	Yes	No	No	No	No	0.60%	0.06%	9.89%
31	Yes	No	Yes	No	No	0.10%	0.01%	8.93%
32	No	No	No	No	No	2.82%	0.15%	5.32%
						<b>100.00%</b>	<b>26.43%</b>	

Default Rate of Risk Layers



Source: Loan Tapes, Dynamic Credit Partners Europe

factors, and the highest at 33.10% for Risk Order group 1, which has all of the risk factors (except for right-to-buy). However, the FSA study is not directly comparable with the performance of non-conforming loans as the FSA includes all FSA regulated mortgage contracts, which consists of far more prime mortgages than non-conforming loans. It is beneficial to view the rate of payment difficulties for NGATE 2007-2 for loans that fit the same risk-layers used by the FSA to see if and how the non-linear increase in default rates as a result of risk-layering applies to a non-conforming transaction.

In addition, since the FSA study does not include self-certified loans or consider loans that entered payment difficulties after August 2009, the study does not directly address the effects of risk-layering on non-conforming loans to the present day. In **Figure 6**, we calculate the cumulative default rate for NGATE 2007-2 across the same risk-layers and Risk Order used in the FSA analysis, using ‘Arrears>=3 Months or Possession’ as the measure of expected cumulative defaults (as a note, we assumed that none of the loans were right-to-buy as the NGATE 2007-2 servicer does not provide this information; we believe the impact of this factor is minimal as right-to-buy loans only comprised 2.5% of the original portfolio).

As we can see from the results, the default rate of non-conforming loans tends to be much higher in general and also increases significantly as the number of risk factors increase, with a default rate range between 10% and 55%. Next we are going to look at the default rates for the transaction when we replace right-to-buy with self-certification as a risk layer.

As shown in the results in **Figure 7**, while the number of risk combinations that exist increases with the introduction of self-certification, it is still clear that more risk factors results in a higher probability of default. The Risk Order was resorted to in order of highest to lowest rate of payment difficulties and an interesting thing to note is that the highest default rate of any risk group increases from 55% to 86% (albeit for a small amount of loans).

From this type of analysis, investors can create representative lines, or 'replines', as they are known in the modelling community, of these risk factors (sometimes referred to as 'buckets') that can replicate the diverging performance of different groups of mortgages. We point out that this analysis can become increasingly more complex as one increases the number of risk factors and groupings of non-binary risk characteristics that are analysed to the point where each loan is represented by its own repline and individual loan default risk is assessed. However, given the lack of such functionality in most commonly used third-party modelling systems and the efficiency of using risk groupings, it is ideal for most investors to conduct their analysis using a limited number of replines. However, the act of balancing efficiency (with the most efficient, and common, practice being the use of a single repline) with the accuracy of the analysis (e.g., running a bank credit risk model) is more of an art than a science.

Regardless of how it is implemented, the analysis above demonstrates the importance of incorporating loan-level data

to more carefully interpret data and analyse default risk when valuing RMBS, particularly when the underlying mortgages are not as homogeneous as they appear to be in the initial disclosure, the rating agency presale report or periodic trustee reports. Although loan-level data is still not available for the vast majority of European RMBS transactions, continuing investor and regulator demands for additional disclosure may hopefully address this in the near future. While the sample analysis in this article provided by Dynamic Credit was conducted using a very limited data set, it highlights the insufficiency of the information currently being provided, but nevertheless the depth of analysis that can be achieved when detailed and uniform loan tapes are made available. In the end, investors, regulators, rating agencies, originators, and arrangers/underwriters can all agree that increased transparency leads to higher quality valuations, which in turn increases investor knowledge of and interest in European RMBS, leading it to become a more mainstream investable fixed income asset class. ●

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## Notes

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*“The growing influence and importance of hedge funds in global financial markets brings with it challenges and risks. Important among these is the difficulty in valuing complex, illiquid financial instruments.”*

IOSCO, Principles for the Valuation of Hedge Fund Portfolios, March 2007

*“Particularly for trading activities, a robust valuation framework is vital when assessing solvency. Current valuation practices can undermine confidence in reported capital resources.”*

Financial Services Authority, DP 10/4: The prudential regime for trading activities, August 2010



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# Close outs: valuations and other issues

By David Ellis, Sarah Cannon and Hugo Watson Brown of Navigant Capital Market Advisers

*"... without an appropriate valuation mechanism, all the available capital in the world is unlikely to end the toxic asset conundrum."*<sup>1</sup>

**T**his article discusses the valuation challenges as a consequence of early termination of OTC derivative contracts, in the aftermath of the Lehman bankruptcy. Both the 1992 and 2002 Master ISDA<sup>2</sup> Agreements provide guidance on determining the early termination amount. The overriding requirement is for the non-defaulting entity to have behaved commercially reasonably. Many market participants now agree that disputes arising out of defaults by large scale banks were not anticipated by these documents.

When both parties to an OTC contract are market makers, the standpoint for judging commercially reasonable behaviour is different from when a market maker is dealing with a defaulted corporate. For example, a dealer that continuously hedges its risk exposure may not unwind or replace all derivative contracts with a defaulted counterparty. Instead it will tend to hedge the net risk across maturities with multiple dealers through the interbank market (e.g. a book that is long USDJPY option volatility at an FX strike level of 90 and short volatility at 70 will likely execute a risk reversal to hedge rather than put on a series of option trades). This will reduce bid/offer spreads considerably and raises the question as to whether the dealer can reasonably charge individual bid/offer spreads on each contract, when it has only suffered a smaller spread itself across the portfolio.

Furthermore, when thousands of derivative trades between the two entities need to be settled, a number of practical valuation issues emerge. These revolve around the models used by both parties to value trades, the market data used, the adjustments (such as set off, netting, funding charges, credit value adjustments (CVA) – see **Box 1**, etc).

## **Close out on early termination and ISDA master agreements**

Close out, the process initiated by the insolvency of one party to an ISDA agreement, consists of three steps (i) termination of obligations under the contract (ii) computation of the market values of replacement contracts and (iii) the aggregation or netting of positive and negative replacement costs into a payable or receivable.

Most OTC derivatives transactions and structured product financings rely on some version of the ISDA Master Agreement. The two basic Master Agreements, issued in 1992 and 2002 respectively, use different approaches to determine close out valuations and while these may be 'legally robust' they are difficult to implement in periods of financial market upheaval.

Under the 1992 ISDA Agreement, parties generally select one of two payment measures to determine early termination payments: 'Loss' and 'Market Quotation'. Loss requires a party to determine its losses (or gains) incurred from terminating or re-establishing related hedge positions using trading data, dealer quotations and internal models. Market Quotation requires a party

**Box 1: CVA Adjustments**

CVA is an internal credit charge that dealers have to pay for taking the risk that their derivative counterparties may default while owing them money. E.g. if the NPV of a swap is \$100 and the CVA is \$5, then the “risky” NPV is \$95. In other words, the desk executing the swap pays \$95 for a stream of cash flows worth \$100 at the risk free rate. The executing desk would need to transfer \$5 to the bank’s CVA desk giving a cost to the executing desk of \$100 (\$95+\$5). The \$5 can be used to hedge against the counterparty risk through a combination of market and credit instruments or simply used as a reserve. If the mark to market of the swap increases to \$110 and therefore the credit charge increases to \$5.50, the CVA dealer might need to adjust their credit hedges.

to seek quotations from four leading dealers in the relevant market for the amount that would be payable upon entering into replacement transactions.

The problem with Market Quotation is that although it works well with isolated incidents of default, at times of stress dealers may be reluctant to quote as they are too busy managing their own risk. Where quotes are received, often there may be a large range in the prices which may not make the averaging process produce a sensible result.

*“Firms should recognise that ... dealer quotes may not reflect prices at which transactions could occur, especially during periods of low liquidity. Firms should devote the analytical resources necessary to checking valuations made on such bases and make adjustments when deemed appropriate.”<sup>3</sup>*

This is especially true for illiquid and complex derivative instruments, whose valuation depends upon intricate modelling and data assumptions peculiar to the counterparty quoting. This was, to some extent, foreseen by the drafters of the 1992 Master Agreement who provided that, even if a market value had been obtained, it was still possible to default to Loss if, in the opinion of the non-defaulting party making the calculation, Market Quotation did not “produce a commercially reasonable result”.

This reading of the 1992 Master Agreement opens the possibility of ignoring Market Quotation entirely and moving directly to Loss, especially when market dislocations render the harvesting of quotes difficult. However, in 2008, ISDA stated that the requirement to obtain Market Quotations should not be ignored just because of the failure of a major dealer<sup>4</sup>, pointing out that the wording was flexible and allowed for quotes to be obtained “on or as soon as reasonably practical after the relevant Early Termination Event”. Accordingly, a party calculating a close out value by using internal pricing systems for transactions under a Master Agreement, where Market Quotation had been opted for, could be challenged<sup>5</sup>.

The calculation of Loss must be in “good faith”, but the 1992 ISDA Master Agreement gives little guidance on what standards are required to keep the faith. In practice, the analysis provided by the Courts for both Market Quotation and Loss seems to push the concepts closer together<sup>6</sup>. In *ANZ v Societe Generale*<sup>7</sup>, it was

held that Loss and Market Quotation have comparable aims and both can be used to investigate each other’s results. In *Peregrine v Robinson*<sup>8</sup>, the principle that Market Quotation and Loss should produce similar results was also upheld and any significant difference between the two (in this case Market Quotation showing a significantly smaller replacement value than Loss) should be taken as a sign that Market Quotation was not producing a “commercial reasonable result”<sup>9</sup>.

Over time, it seemed likely that the Courts would iron out some of the apparent tensions between Market Quotation and Loss. However it was considered within the industry that the lack of transparency and objectivity<sup>10</sup> meant that Loss was in need of revision and generally the choice between Market Quotation and Loss seemed artificial.

The 2002 Master ISDA removed the concepts of Market Quotation and Loss, replacing them with the concept of “Close-out Amount”. This is defined as the losses/costs or gains of the non-defaulting party that would be “realised under then prevailing circumstances....in replacing, or in providing ...the economic equivalent of (a) the material terms of the Terminated Transaction....and (b) the option rights of the parties in respect of that Terminated Transaction...”. This provides the non-defaulting party with greater flexibility in its calculations with a requirement to be objective and transparent. Practically, it combines elements from both the Market Quotation and Loss measures from the 1992 ISDA.

This approach does not require that quotations be obtained from dealers. However, the non-defaulting party must take into consideration any third-party market quotations and relevant market data, unless it reasonably believes in good faith that such quotations or data are not readily available or would not produce a commercially reasonable result. Calculation of Close-out Amount can also include (without duplication) the cost of terminating or re-establishing a hedge associated with the transactions which have been terminated.

It is clear that the 2002 wording is considerably richer in detail than the 1992 wording and provides more flexibility to the non-defaulting counterparty. That said, even with the 2002 ISDA, the question of what constitutes reasonable commercial behaviour has been subject to considerable scrutiny in recent disputes.

**Valuation issues**

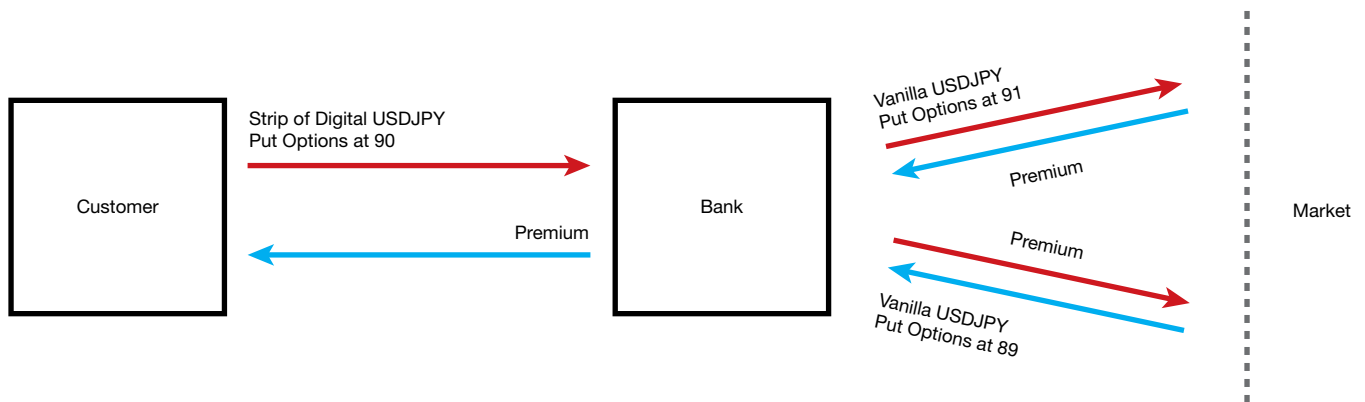
Vanilla derivative contracts can normally be valued and verified using market accepted models and reliable third party vendor price and data systems such as Bloomberg.

However, if the bankruptcy occurs during a stressed time (e.g. September 2008 - March 2009 when Lehman and a number of other major financial institutions, hedge funds and structured investment vehicles had defaulted), even vanilla instruments can be disputed since bid/offer spreads widen and quoted market data may be considered to give an unreliable reflection of where the market actually traded.

Both sides are likely to seek the maximum value in their favour, which can sometimes lead to extreme differences. This was seen in the wake of the Lehman bankruptcy:

*“In the week before Lehman filed for bankruptcy it was owed \$2.3bn by the counterparties to derivatives trades. Three weeks later the banks claimed Lehman owed them \$25bn plus guaranteed claims of \$25bn. ‘How does that make sense?’ said Daniel*

**Figure 1: Digital Put Option Schematic**



Source: NCMA

*Ehrmann, co-head of derivatives at LBHI and a managing director of Alvarez and Marsal.*<sup>11</sup>

**Vanilla products**

It is relatively easy to price vanilla instruments, such as interest rates swaps or vanilla options, based on liquid markets e.g. a 5 Year USD Fixed Floating swap or a 5 Year Credit Default Swap (CDS) on the iTraxx. Nevertheless, differences do arise and some of the reasons are outlined below.

- (i) *Bid/Offer Spreads*<sup>12</sup>. In times of market stress, spreads on the instruments that determine the value of derivative contracts can be magnified, e.g. spreads on USDEUR volatility widen beyond 5 years.
- (ii) *Credit Adjustments*. Most banks today will adjust the NPV of a traded derivative in the OTC markets with a CVA. This is a complicated area and there is significant disparity amongst banks on how they apply the CVA charge. Most banks only account for the risk of a counterparty default although some banks will incorporate their own default risk into their CVA pricing. The CVA on ‘own credit risk’ may be hedged through selling CDS on a range of financial indices (as a proxy for a bank selling protection on itself). Should the counterparty default, the question arises as to whether gains or losses on hedging instruments should be included in a claim following default.

CVA is particularly relevant if the non-defaulting party replaces the defaulting party’s position with another bank. The CVA charged by the replacement bank could also find its way into the calculation of the close out amount.

- (iii) *Funding costs*. Unlike in the period before 2007 (when funding for most major banks was being priced at LIBOR), banks now have different cost of funds depending on their respective credit curves. Following a default, if the non-defaulting bank has to make a large upfront payment to secure a replacement contract, it may charge the defaulting party an increased amount to compensate it for its cost of funding. As this cost of funding is not visible to counterparties, it is difficult to corroborate in disputes.
- (iv) *Netting*. Where a portfolio of instruments is closed out, the question may arise as to whether a bid/offer spread should be applied to each component part of the trade, each trade or the portfolio of trades? E.g. if an options book is closed out, the bid/off spread could be applied to the net ‘vega’ or on the vega of the largest option component<sup>13</sup>.

**Exotic products**

If derivative contracts are both illiquid and complex, then determining their value is difficult and differences of opinion are likely to arise. Exotic products have payoffs which cannot be exactly replicated using standard market instruments and risk attributes that cannot be directly observed in the market.

These issues are illustrated in the following example. A bank buys a strip of digital put options on USDJPY from a customer based on a notional of USD 10m. Should USDJPY trade at 90 or below, the customer would pay a fixed amount to the bank.

A schematic of the trade is in **Figure 1** above.

If the bank then defaults, the customer would calculate the amounts payable under the close out process. The customer could use the Black Scholes function, available on platforms such as

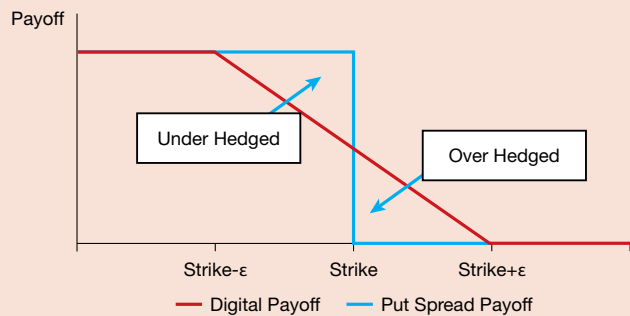


**Box 2: Digital Put Payoff**

A put option will increase in value as the price of an asset falls below the strike price. A digital put option pays a fixed amount if the asset is below the strike at maturity and zero if the asset is above the strike at maturity. A pricing model is required to compute a theoretical value, and different models can produce different prices.

The diagram below illustrates the payoff of the two strategies. The replication of the digital payoff through a put spread means that the trader is under-hedged when the asset is between strike  $- \epsilon$  and strike, and over-hedged when the asset is between strike and strike  $+ \epsilon$ . The smaller the  $\epsilon$ , the more accurate the hedge, although the notional required to hedge will increase by a factor of  $1/2\epsilon^{14}$ .

The Black Scholes price of the digital option will be equal to the replication cost of a put spread when there is no volatility skew in the market; i.e. where volatility is priced evenly across all strike prices.



Source: NCMA

When there is a volatility skew, as exists in the USDJPY market, the replication cost of a digital is not equal to the Black Scholes price as the market maker is buying and selling volatility at different levels.

Bloomberg, to price the digital option and might obtain a value of say, USD 1m owed to the bank.

The bank, however, has valued the same option as a receivable of USD 1.5mm. On further investigation, it transpires that the bank has replicated the pay off of the digital option as a put spread (i.e. by selling a strip of vanilla USDJPY put options at a strike of 91 and buying a strip of vanilla USDJPY puts at 89 as shown in **Figure 1**). In practice, dealers would most likely hedge digital options with put spreads (see Box 2). The customer has used a volatility input with respect to one strike only because of the constraints of the Black Scholes function. However, the put spread has two strikes and each may have a different volatility. It follows that the bank will compute a different value for the digital than the customer.

Another example of an exotic trade is a ‘worst of’ FX option of say, USDJPY, GBPUSD and BRLEUR<sup>15</sup>.

On the option expiry date, the option buyer receives the payout of the worst performing option in the basket. In our example, since the option buyer will receive the payoff on the greatest percentage decline of USDJPY, GBPUSD or BRLEUR, it follows that, as the correlation between the exchange rates decreases, the variation in the exchange rates will increase and the ‘worst of’ option will be worth more to the buyer. The buyer of this option is short correlation i.e. it will make money as correlation decreases. In a bespoke, illiquid market, pricing of the ‘worst of’ option is subject to the same complications as the vanilla trades, but these issues are compounded by:

- (i) Model Differences: Market participants will run proprietary stochastic volatility models to value the ‘worst of’ option. If two parties value an instrument using





different models, it is unlikely that they will agree on the valuation.

- (ii) **Model Inputs:** A key consideration in the pricing of a ‘worst of’ option is correlation. The price that any model returns is sensitive to the assumption of the correlation parameter. For the worst of option with the currency pairs, USDJPY, GBPUSD and BRLEUR, three correlation parameters are required. In the absence of market levels or historical data, these inputs are either backed out of the pricing of similar complex instruments or set at levels suitable for the risk tolerance of the overall trading book. Small differences in these inputs can sometimes produce large differences in valuations (see Box 3). In addition, the choice of market instruments that the stochastic model is calibrated to may add to variations in pricing. One party may calibrate the model to 25 and 50 delta options, whereas the second party may calibrate to 10, 25 and 50 delta options. If there is a significant skew in the volatility surfaces, pricing differences between the parties may be amplified.

### Conclusion

Valuation disputes are most likely to arise when the assets underlying the derivative transactions are illiquid and complex. The ability to reconstruct market data for the period surrounding the close out date is crucial; this data represents the building blocks from which the valuation is built. The scope of the data reconstruction depends on the nature of the asset being valued. The ability

### Box 3: Impact of Correlation Assumptions on ‘Worst of’ Option

#### Correlation Assumptions

Market Maker X derives the implied correlations from the cross exchange rate volatilities quoted in the market to obtain a valuation of USD 500k.

	Premium
Market Maker X	500,000
Market Maker Y	400,000
Market Maker Z	650,000

Source: NCMA

Market Makers Y and Z take a different view on the correlation. Market Maker Y believes correlation is higher than the cross FX rates imply, while Market Maker Z believes correlation is lower.

The correlation assumptions lead to a range of USD 250k difference in pricing between parties.

to marry the reconstructed market data with the right model and a reasonable set of assumptions will minimise the incidence and degree of valuation disputes.

In the wake of the valuation disputes that have arisen, it is likely that ISDA are likely to introduce further guidance on how to determine the early termination amounts. Regulators have also pressured banks to move large chunks of the OTC market to be cleared through Central Clearing Counterparties where trades are margined daily. This will increase the cost to traditional users of derivatives and may in fact reduce demand. ●

### Notes

<sup>1</sup> Former Treasury Secretary Hank Paulson, quoted in ‘Valuing Toxic Assets: The Weak Link in Geithner’s Plan’, The Daily Telegraph, 23 March 2009.

<sup>2</sup> International Swaps and Derivatives Association.

<sup>3</sup> Institute of International Finance, ‘Report of the IIF Committee on Market Best Practices: Principles of Conduct and Best Practice Recommendations (Financial Services Industry Response to the Market Turmoil of 2007-2008)’, p. 93.

<sup>4</sup> ISDA 2008, ‘Market Quotations under the 1992 ISDA Master Agreement’.

<sup>5</sup> Dr Rupert Macey-Dare, ‘1992 ISDA Master Agreement, Analysing Market Quotation, Set off and Loss’, April 2010.

<sup>6</sup> These cases are summarised in Dr Rupert Macey-Dare, ISDA Valuation Cases, Draft Working Paper, July 2010.

<sup>7</sup> Australia and New Zealand Banking Ltd v Societe Generale, EWCA, Civ 44 (17 February 2000).

<sup>8</sup> Peregrine Fixed Income Ltd v Robinson Department Store Public Co Ltd, EWHC, Commercial 99 (18 May 2000).

<sup>9</sup> Note also that market quotations can also be used when calculating Loss.

<sup>10</sup> Page 267, Paul Harding, ‘Mastering the ISDA Master Agreements (1992 and 2002)’, 2010 FT Prentice Hall.

<sup>11</sup> Anousha Sakoui, ‘Lehman seeks to expose ‘silly’ claims’, Financial Times, 11 January 2010.

<sup>12</sup> It was held in *Enron Finance Pty Ltd (in Liquidation) v Integral Energy Australia*, NSWSC 753, 3 September 2002 that correct bid/offer spreads should be included in close out valuations.

<sup>13</sup> The option vega is a measure of the change in value of an option due to a change in volatility.

<sup>14</sup> Page 142, Chapter 5.5, Antonio Castagna, ‘FX Options and Smile Risk’, 2010 John Wiley & Sons Ltd.

<sup>15</sup> Page 135, Chapter 22, Frans de Weert, ‘Exotic Options Trading’, 2008 John Wiley & Sons Ltd.

# Application of advanced Monte Carlo methods to valuations

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*“... firms that performed better... had established, before the turmoil began, rigorous internal processes... and consequently had developed in-house expertise to conduct independent assessments... In contrast, firms that faced more significant challenges... generally lacked relevant internal valuation models and sometimes relied too passively on external views of credit risk from rating agencies and pricing services to determine values for their exposures.”*

Senior Supervisors Group: ‘Observations on Risk Management Practices during the Recent Market Turbulence’

**T**he role played by the mispricing of structured credit securities in the lead-up to the recent financial meltdown leaves little doubt that the development of better methods for pricing, hedging, and risk management of these instruments is an important priority. The modelling of these products presents significant challenges for industry participants today, given the complexity of their structures and underlying risks (market, credit and liquidity).

Historically, many investors have in the past generally relied on external valuations, or on simple models based on credit ratings and on top-down views of the collateral. These black-box approaches have resulted in a lack of price transparency and limited risk capabilities (risk measures, stress testing, concentration risk, etc.). During the housing and credit boom of the decade before the credit crisis, these instruments generally performed well. There was a widespread perception that their risks were small and contained. This view proved to be wrong and costly.

In this paper we discuss the practical application of advanced, second-generation, Monte Carlo methods for pricing and measuring the risk of structured credit portfolios. In particular, we apply the well-established *implied factor model* methodology (Rosen and Saunders 2009, Nedeljovic et al 2010a and 2010b) to value MBS and CLO structures.

## Valuation of structured finance instruments

Pricing methods for structured finance instruments can be essentially divided into two classes: *bond models* (single-scenario) and *stochastic* methods. In addition, practitioners commonly use a third approach, the *Net Asset Value*, NAV (or *collateral market value*) method to monitor these investments.

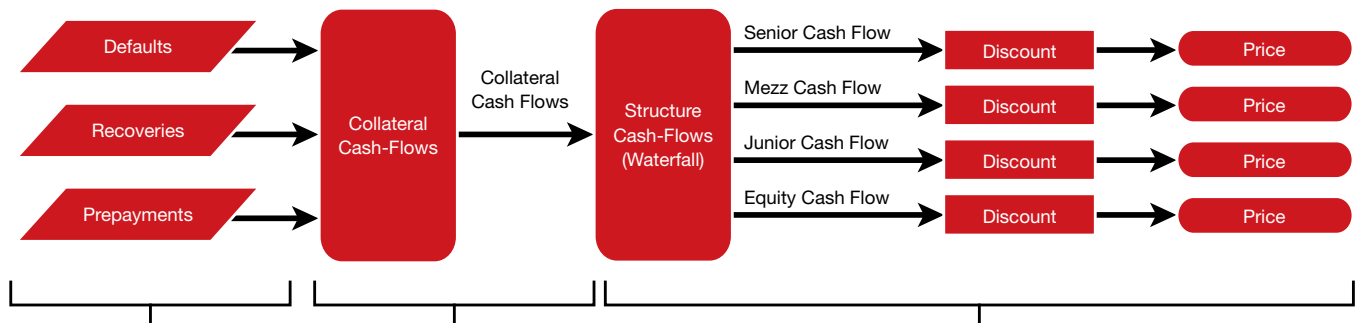
### Bond models

The predominant pricing framework, widely used by dealers and investors, is based on basic bond models and matrix pricing, where the yields of these securities are expressed in a similar way to those of typical corporate bonds. These models have two key characteristics:

- They employ a *single-scenario* for valuation; i.e. they assume a deterministic stream of cash-flows;
- They generally *rely on credit ratings* as determinants of yields (spreads) and risk.

A bond model is a simple ‘price-yield’ calculator. A single scenario is used to produce the stream of cash-flows from the

**Figure 1:** Cash-flow waterfall and pricing



collateral and then the structure. The price of the security is given by the sum of its discounted cash-flows, computed using an appropriate spread, which reflects the riskiness of the structure. Comparable spread matrices are constructed based on several instrument characteristics (ratings, asset class, geography, vintage, etc.).

**Figure 1** depicts the four steps of the bond-pricing approach:

1. *Scenario definition.* A scenario contains the vectors of default, prepayment and recovery rates, as well as interest rates and other factors as necessary. Modelling assumptions are made either at the loan-level or the pool-level.
2. *Collateral Cash-flows.* Under the scenario, the collateral cash-flows are modelled in detail, or are ‘proxied’ when the information is not available.
3. *Waterfall Cash-flows.* The instrument’s cash-flows are obtained, from the collateral cash-flows and a detailed definition of the waterfall. If the detailed waterfall is not available then it is approximated.<sup>2</sup>
4. *Net present value (NPV).* The structure’s cash-flows are discounted applying the appropriate discount rates composed of the (risk-free) interest rates and the spread.

Bond pricing models allow comparative pricing of ‘similar’ instruments by:

- Providing standards for generating ‘representative’ cash-flows based on consistent scenario assumptions; and
- Applying discount spreads (premiums) to instruments, based on similar ‘risk characteristics’.

In the case of a corporate bond, the spread essentially captures the default (and recovery) risk of the issuer, as well as perhaps liquidity. For structured credit instruments, the spread embeds all the risks not modelled beyond the deterministic scenario:

- Credit risk of the underlying pool (default and recovery);
- Volatility and correlations of the cash-flows of the underlying loans (resulting from default and prepayment);
- Non-linearities and embedded optionality of the instrument’s waterfall.

Practitioners have sometimes extended the method using several scenarios, where the final price is obtained by weighting the prices in each scenario, generally in an ad-hoc way. In addition,

the single-scenario approach provides a useful stress-testing framework, since it allows exploration of the price impact of different assumptions on spreads and collateral behaviour.

**Net Asset Value (NAV)**

Under the NAV approach, the underlying collateral is first marked-to-market (MtM)<sup>3</sup>. The analyst can then compute various ‘coverage ratios’ reflecting how this collateral’s MtM covers the different bonds in the structure (if it were to be liquidated). Then, for example, the price of an equity tranche of a CLO reflects the market value of its reference assets (net of the CLO’s debt and other liabilities) divided by the notional amount of equity issued. For debt tranches, dealers use formulas involving the ratio of equity over debt, which roughly expresses the amount of over-collateralisation in the structure. As it is related to liquidation values, this method is generally used more as a monitoring and stress testing tool, and less as a method to provide MtM values for the structures.

**Stochastic models and Monte Carlo**

Option-theoretic approaches based on stochastic models are standard valuation techniques for derivatives. The practical application of these models to value structured credit products is less than a decade old, and is now best industry practice for corporate synthetic CDOs. Since they have simple, standardised waterfalls that can be readily modelled, these instruments are analytically tractable. Also, the models can be more objectively calibrated to observable indices and tranches (e.g. CDX or iTraxx).<sup>4</sup>

Given the complexity of the collateral and their waterfall structures, the valuation of other structured credit instruments (ABS, CLO, cash CDOs, etc.) is more involved and computationally intensive. The underlying risk profiles are also more complex; in addition to default and recovery risks, there is prepayment and potentially other market risks.

Finally, standardised calibration is also more difficult, due to illiquidity and lack of reference instruments. Thus, the pricing of these instruments generally requires the use Monte Carlo (MC) methods. While MC methods have been commonly applied to capture interest rate risk (and prepayment) for agency MBS, their application to model jointly default, prepayment and recoveries is fairly new.

These techniques are conceptually simple, and can be seen as a sophisticated extension of the single-scenario methodology, where:

- A sample of scenarios (typically large) is generated, each of them containing detailed vectors (default, prepayment and

**Table 1:** ABX.HE.06-1 Calibration on 24/02/06

Component	Market Price	Prior Price	Prior Error	Model Price	Model Error	Tranche Correlation
AAA	100.31	84.91	15.35%	100.37	0.06%	5.82%
AA	100.34	66.29	33.94%	100.30	0.04%	3.51%
A	100.32	57.89	42.29%	100.19	0.13%	2.78%
BBB	100.32	52.37	47.79%	99.32	1.00%	3.17%
BBB-	100.64	52.98	47.35%	101.23	0.59%	4.36%

Source: Nedeljovic et al (2010b)

recovery rates), interest rates and other factors. Scenarios are generated from a well-defined stochastic joint process for the factors.

- Under each scenario, cash-flows are generated for every security and a *conditional net present value (NPV)* is obtained by discounting them applying the risk-free rate.
- The final value is given by averaging the conditional NPVs over all the scenarios.

The parameters of the processes used to generate the scenarios should be ideally calibrated to market prices, where available (e.g. based on indices such as the iTraxx, CDX, LCDX, ABX, CMBX) or to a standard set of market quotes for representative, more liquid instruments.

### Implied factor models and weighted Monte Carlo methods

*Implied factor models* are powerful tools to model structured credit instruments, which can achieve consistent valuations across different portfolios and specifically model bespoke portfolios.<sup>5</sup> In this approach, a set of *systematic factors* is used to drive the joint credit and prepayment within the underlying portfolio. Using *weighted Monte Carlo* techniques, the calibration of the model searches for an optimal joint distribution of the factors, such that the market prices of a set of reference securities (such as index tranches) are matched, possibly within allowable error limits.

In contrast to a bond model, this approach captures explicitly the non-linear cash-flow structure of the security over many scenarios, and prices consistently all tranches on the same collateral, as well as instrument across collateral pools of different credit quality. Some important features of this approach include:

- It is a structured, multi-scenario approach;
- It effectively combines advances in credit portfolio models, Monte Carlo methods and CDO analytics;
- It explicitly models the key risks: credit (default, LGD, spread), prepayment and market risk, as well as their interactions;
- It is a portfolio risk-based approach where correlations and concentration risks are explicitly modelled;
- It can be implemented as an ‘arbitrage-free’ approach, and can also be complemented with liquidity premiums, and subjective views;
- Through the use of common systematic scenarios, it provides consistent valuation of deals based on the same collateral pool, as well as across different pools and even asset classes;
- It naturally provides sensitivities to various risks, as well as hedge ratios;

- It is computationally efficient, by effectively reusing the expensive cash-flow simulation in each scenario.

A detailed description of the methodology and its application to CDOs, CLOs and ABS structures is given in Rosen and Saunders (2009), and Nedeljovic et al (2010a, 2010b). The next section presents two examples for pricing ABS and CLOs.

### Example – ABS

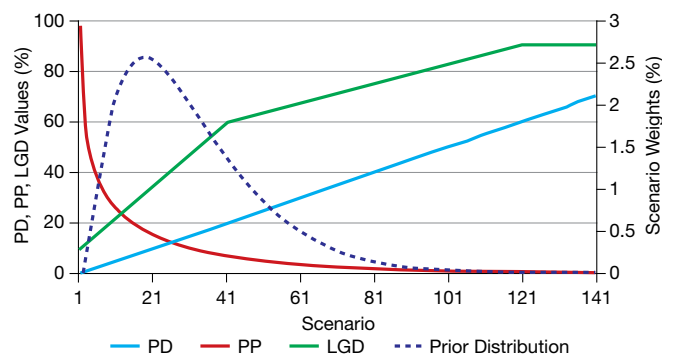
In this section we present an example, where a simple implied factor model is calibrated to the quoted prices of the ABX.HE indices, and then an RMBS structure is consistently priced.<sup>6</sup> As we show, even a simple model performs actually quite well before and even after the crisis.

For illustration purposes, we use a simple single-factor model.<sup>7</sup> A systematic factor drives the economy, where in bad states the PDs and LGDs increase, and prepayments decrease. In good states of the economy, the contrary occurs. We also assume homogeneous credit parameters for a given pool.

However, the detailed pool and cash-flow waterfall is modelled and simulated in each scenario. In practice, it is advisable to use a more robust model, with detailed bottom-up analysis of default, prepayment and severity of the pool. In addition, a more complex factor models can be employed in practice, which accounts for risk concentrations (see Rosen and Saunders 2009).

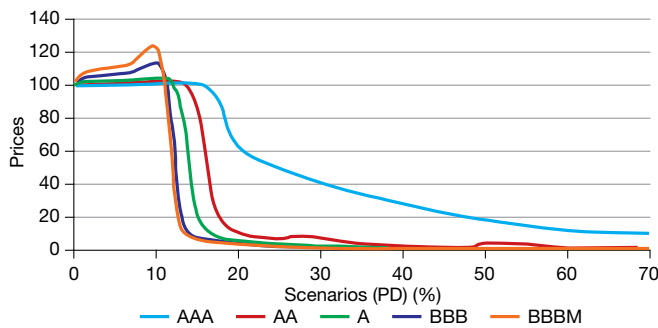
**Figure 2** shows the conditional PDs, PPs and LGDs under a set of 141 scenarios (indexed on the horizontal axis). The prior density of the systematic factor is assumed standard Normal, and this gives the scenario probabilities which can be read from the right vertical axis. Implicit in the scenarios is a positive correlation between defaults and LGDs, and a negative correlation between defaults and prepayments.

**Figure 2:** Prior Model and Scenarios



Source: Nedeljovic et al (2010b)

**Figure 3:** Present Value of ABX.HE.06-1 Indices Across Factor Scenarios (24/02/06)

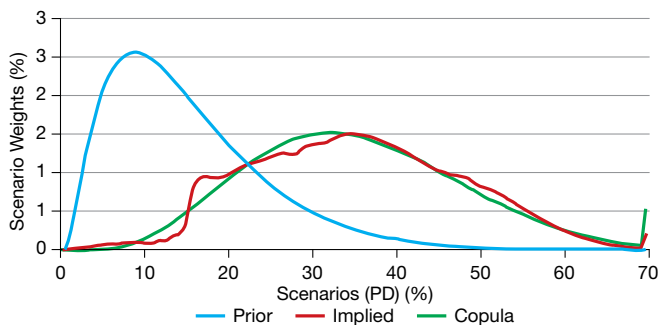


Source: Nedeljovic et al (2010b)

We first calibrate the model to the ABX ABX.HE.06-1 index series on February 24, 2006, before the onset of the credit crisis. The market prices for the five indices in the series (labelled by their original rating) are given in the second column of **Table 1**. **Figure 3** gives the PV of the cash-flows of each component of the series under the factor scenarios.<sup>8</sup> Most tranches experience a ‘threshold effect’ where their values drop precipitously within a few scenarios.

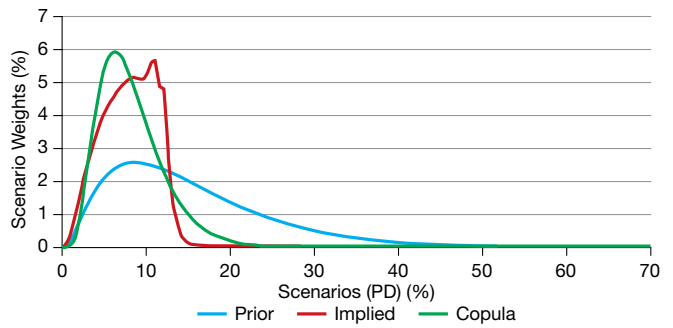
**Table 1** gives the results of the factor model calibration to the ABX.HE.06-1 prices. The column labelled “Prior Price” gives the value of the index under the prior distribution (standard normal systematic factor), where all index components are priced at a discount and errors are quite significant. The calibrated implied fac-

**Figure 5:** Factor distributions (in PDs) for the ABX.HE.06-1 (12/01/10)



Source: Nedeljovic et al (2010b)

**Figure 4:** Factor distributions (in PDs) for the ABX.HE.06-1 (24/02/06)



Source: Nedeljovic et al (2010b)

tor model achieves a very close match to the market prices. The table also presents the implied tranche correlations for a Gaussian copula model. These correlations are generally low, consistent with empirical default correlations of retail obligors, when compared to corporates.

**Figure 4** gives the implied factor distribution, and compares it with the prior distribution, as well as a closest copula. The implied distribution results in a mean PD of just above 8% and a standard deviation of 4%. With the benefit of hindsight, we can interpret these results as an indication that the market was under-pricing the default risk of subprime RMBS before the crisis.

We calibrate the model also on January 12, 2010 (a date we, perhaps optimistically, refer to as “after the crisis”). **Figure 5** presents the implied distributions and **Table 2** present some calibration results.

The model matches index prices closely. In this case, the implied distribution has become far more risky (with mean implied PDs of 35%, and standard deviation of 13%). However in general we find that calibration becomes more difficult in the later stages of the crisis and the post-crisis period (while errors are small for the 06-1 index, this is not true for all indices).

We now demonstrate the pricing of a senior tranche of an RMBS issued in the first half of 2007, which does not have a liquid price. **Figure 6** plots the PV of its cash-flows over the systematic scenarios, together with the implied distributions of various ABX indices on January 12, 2010. The scenario cash-flows for the RMBS already account for the instruments’ and collateral characteristics and waterfall.

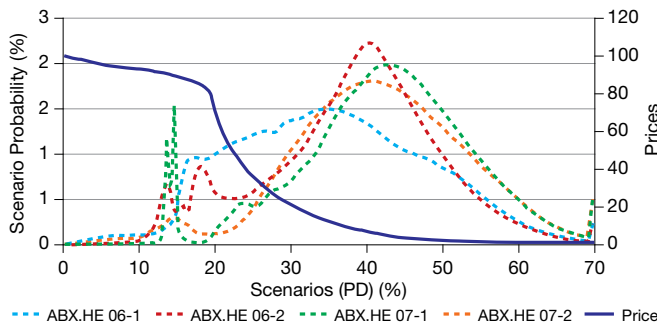
While not trading at this date, the RMBS has a ‘dealer quote’ of 23.25 (Source: Lehman Live). From **Figure 6**, we see that the single

**Table 2:** ABX.HE.06-1 Calibration on 12/01/10

Component	Market Price	Prior Price	Prior Error	Model Price	Model Error	Closest Copula Price	Closest Copula Error	Tranche Correlation
PENAAA	88.21	98.83	12.04%	87.16	1.19%	87.22	1.12%	7.08%
AAA	81.94	98.78	20.55%	82.14	0.25%	82.47	0.65%	12.80%
AA	34.74	88.58	154.97%	34.75	0.04%	34.94	0.57%	11.20%
A	10.44	72.37	593.20%	10.44	0.01%	10.01	4.14%	11.86%
BBB	4.50	74.97	1556.06%	4.51	0.30%	4.93	9.65%	10.98%
BBB-	4.50	80.99	1699.74%	4.50	0.08%	4.06	3.61%	11.28%

Source: Nedeljovic et al (2010b)

**Figure 6:** Present Value of RMBS Across Factor Scenarios (12/01/10)



Source: Nedeljovic et al (2010b)

scenario that comes closest to matching this quote represents a default probability of 29% (with a 4% prepayment and 67% severity).

The underlying detailed credit model, and choice of comparable index, can have an impact on the RMBS price. In particular, we stress that bottom-up modelling, based on detailed collateral information, is vital for pricing of structured finance products. As we do not use a full bottom-up approach in this exercise, we wish to select a comparable index, through the examination of the underlying pools. The closest comparable is the ABX 07-2 series.<sup>9</sup>

**Table 3** shows the prices of the RMBS calculated using the implied factor distribution of each ABX series. Based on the 07-2 series' factor distribution, the price of the RMBS should be around 12-13 dollars. The dealer quote is almost twice this value, somewhat surprisingly close to that from the 06-1 factor distribution, which has much better quality collateral. There are several explanations for this price discrepancy. First, during this period, market participants (and RMBS holders in particular) were somewhat reluctant to mark down the prices of MBS because of the consequent write-down losses suffered. Second, there is a general lack of liquidity in the market, giving rise to large errors in the quotes (for both indices, and RMBS). Third, the simplistic homogeneous pool assumptions are a potential source of model error. A more robust, detailed bottom-up, prior model can be used leveraging pool level performance information for the RMBS and the indices.

### Example – CLO

We demonstrate the application of the Monte Carlo approach to price CLO structures.<sup>10</sup> The model is calibrated to the CDX high-yield and LCDX indices. We use again a single-factor model to drive defaults, prepayments and LGDs. In this case, however,

**Table 3:** RMBS Prices Calculated with Various Factor Distributions

	Price
Market	23.25
Implied distribution	
ABX.HE.06-1	24.28
ABX.HE.06-2	18.31
ABX.HE.07-1	11.60
ABX.HE.07-2	12.20

Source: Nedeljovic et al (2010b)

we do not assume homogeneous pools. The model requires risk-neutral PDs and prepayment rates for each name, their average LGDs, and factor loadings, as well as the implied systematic factor distribution.<sup>11</sup>

We calibrate the implied factor models for the LCDX and CDX high-yield 5-year indices.

**Table 4** presents the model spreads and market quotes for the calibrated models on August 7, 2008. The model provides good matching of market quotes and stable distributions through time. Note also that while the super-senior tranches have not been part of the calibration, the model does a good job valuing them out-of-sample, particularly for the LCDX.\*

We test the model throughout a 3-month period, and find good matching of prices throughout. **Figure 7** presents the implied factor distributions for the LCDX index over the three-month period.

Finally, we consider two synthetic CLOs, which provide credit protection on cash CLO deals in the market (**Table 5**). The maturity of the deals as well as all single-name CDS is set to February 24, 2019.

The first CLO is a junior mezzanine tranche on a portfolio with 177 high yield names (389 loans). The second CLO is an equity tranche on a high-yield portfolio, with 279 names (661 loans). There is a total of 456 different names across the two CLOs, with 51 names common to both. **Figure 8** summarises the credit quality of the CLOs and contrasts them to the LCDX.

**Table 5:** Summary of CLOs Analysed in the Examples

	CLO ONE	CLO TWO
Number of Assets	389	661
Termination Date	25/7/2016	24/2/2019
Tranche Size as % of Collateral	3.50%	7.16%
Attachment Point	5.22%	0.00%

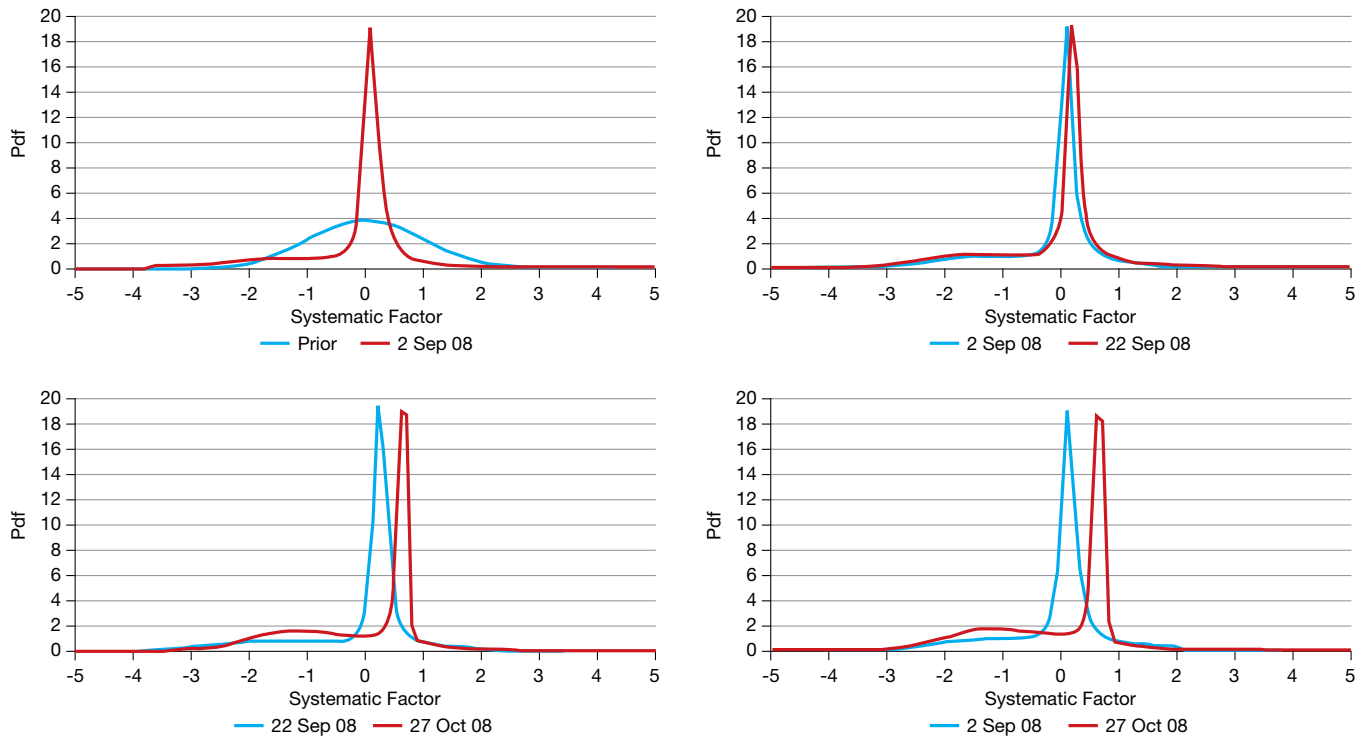
Source: Nedeljovic et al (2010a)

**Table 4:** Market Quotes and Model Prices

Calibration to LCDX Market Quotes				Calibration to CDX.HY Market Quotes			
	Market Quote	Model	Rel. Error		Market Quote	Model	Rel. Error
Index	407	407	0.00%	Index	716	716	0.00%
0-5% Tranche	83.25%	83.34%	0.11%	0-10% Tranche	90.15%	90.77%	0.69%
5-8% Tranche	60.75%	60.29%	0.75%	10-15% Tranche	72.05%	73.23%	1.64%
8-12% Tranche	1,018	1,025	0.73%	15-25% Tranche	1,270	1,276	0.41%
12-15% Tranche	661	666	0.90%	25-35% Tranche	656	660	0.54%
15-100% Tranche	176	176	0.13%	35-100% Tranche	194	205	5.32%

Source: Nedeljovic et al (2010a)

**Figure 7: Implied Systematic Factor Distributions for LCDX.NA**



Source: Nedeljovic et al (2010a)

**Table 6** gives the pricing of the CLOs, as well as on a CDO-squared, which provides protection on losses that exceed 10% on the pool consisting of the two CLOs. The par spread makes the mark-to-market for each structure equal to zero at inception. We also calculate the price as an upfront percent of tranche notional (with zero spread).

In addition to pricing, the Monte Carlo approach provides the complete implied loss distributions for the underlying portfolios as well as the instruments at any point in the future. These can be used to compute implied risk statistics, such as probabilities that CLO tranches will suffer default losses, or be wiped out.<sup>12</sup> **Figure 9** shows the five-year probability distributions for the CLOs and CLO-squared portfolios, with their respective attachment and detachment points. **Table 7** presents various risk statistics calculated from these implied (risk-neutral) distributions. Prices imply over a 90% chance for each of the CLOs to suffer losses in the following five years. The expected severities (conditional on a credit loss) are over 96%. There is also over 85% chance of having each of the CLOs wiped out over five years.

**Concluding remarks**

Full-scale scale Monte-Carlo approaches for valuing structured credit products have only been considered recently, and seem computationally demanding owing to the requirements of simulating the performance of underlying collateral and the cash-flow waterfall. In particular, the weighted Monte Carlo methodology provides a practical solution, which effectively models the intertwined market and credit risks in these structures. In this paper, we have presented practical examples for CLO and RMBS portfolios, but the methodology

**Table 7: Risk Statistics**

	Expected Portfolio Loss	Expected Tranche Loss	Probability of Loss	Expected Severity	Probability of 100% Loss
CLO 1	26.0%	89.6%	92.2%	97.21%	85.1%
CLO 2	26.7%	93.3%	96.1%	97.08%	89.0%
CLO Squared	91.5%	91.1%	95.5%	96.31%	82.8%

Source: Nedeljovic et al (2010a)

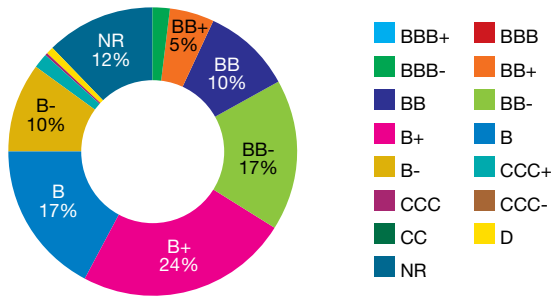
**Table 6: Pricing on August 7, 2008**

CLO Pricing Report							
Deal Name	Attachment Point	Detachment Point	Tranche Notional (million)	Expected PV Protection (million)	Expected PV Premium (100% Spread)	Par Spread (bps)	Equivalent Upfront
CLO ONE	5.22%	8.72%	12.49	9.63	38.57	2,498	77.15%
CLO TWO	0.00%	7.16%	40.49	34.81	85.08	4,901	85.95%
CLO Squared	10.00%	100.00%	47.68	39.54	107.18	3,689	82.93%

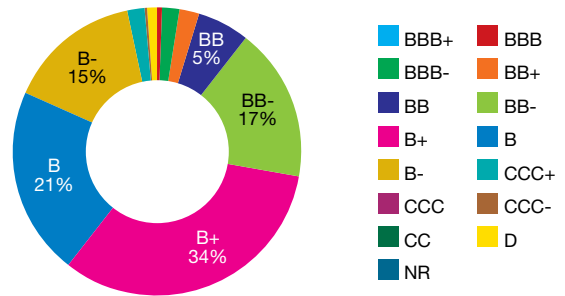
Source: Nedeljovic et al (2010a)

**Figure 8:** Analysis of the Credit Quality of the Collateral of the Two CLOs

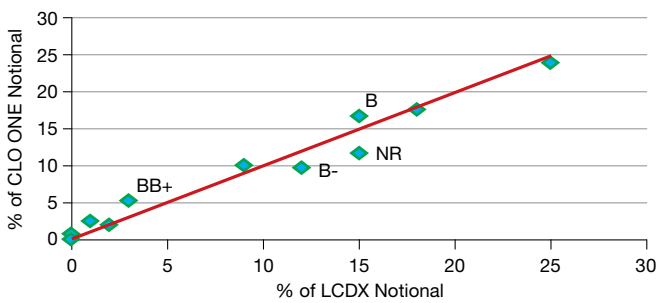
CLO ONE Credit Rating Composition



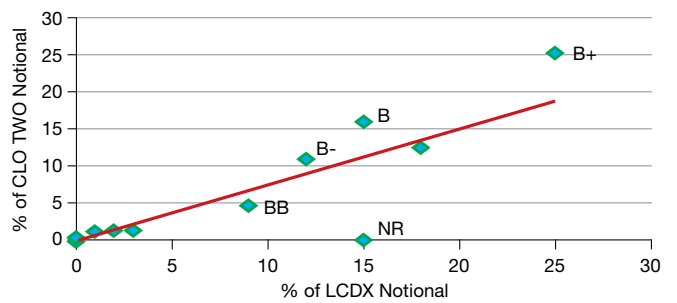
CLO TWO Credit Rating Composition



Credit Rating Concentration CLO ONE and LCDX



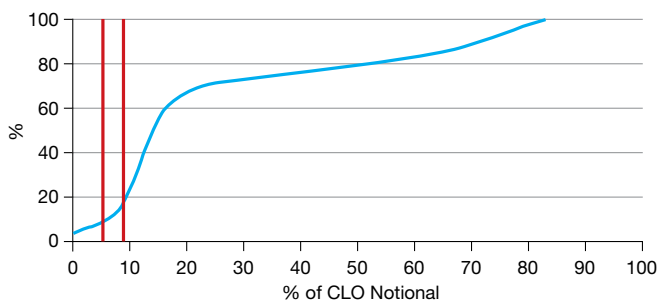
Credit Rating Concentration CLO TWO and LCDX



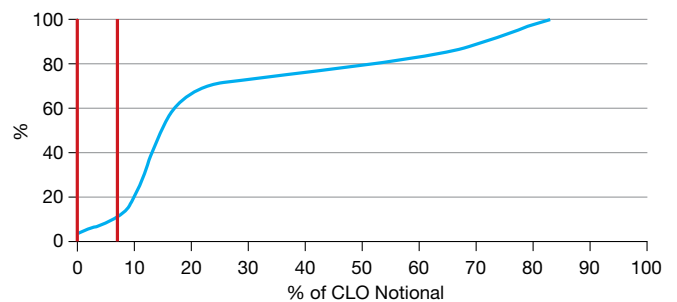
Source: Nedeljovic et al (2010a)

**Figure 9:** Loss Distributions for the CLO and CLO-Squared Portfolios

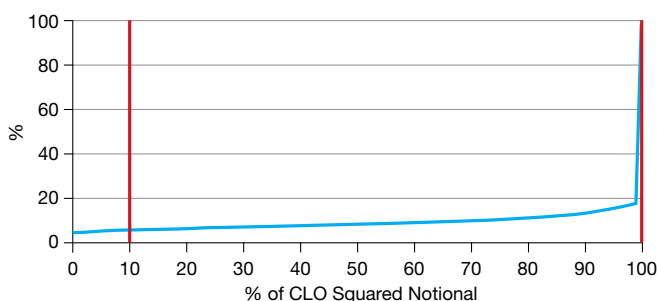
CDF of CLO ONE Default Losses



CDF of CLO TWO Default Losses at Five Years



CDF of CLO Squared Losses at Five Years



Source: Nedeljovic et al (2010a)

can be generally applied to other instruments including CDOs, CMBS, etc. We have also shown that even simple model parameterisations perform quite well before and through the credit crisis. Indeed, we can observe the onset of the subprime crisis through the evolution of the implied systematic factor distribution in time.

One of the major advantages of the weighted Monte Carlo approach is its flexibility. It facilitates a complete and consistent bottom up approach to determining prices of illiquid instruments. The resulting prices effectively incorporate observed market prices, fundamental credit information, as well as other expert views. In this manner, structured credit valuations are more sensitive to risk concentrations, and more consistent with information provided by the market and possible risk scenarios.

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## Notes

- <sup>1</sup> Thanks to David Saunders and Jovan Nedeljkovic for working with the author on the methodology and examples. Also thanks to Benoit Fleury for many helpful comments and suggestions.
- <sup>2</sup> The cash-flows for CDOs backed by ABS involve an additional level of complexity. First one computes the detailed pool cash-flows for each underlying ABS; then the cash-flow waterfall of each ABS bond; and finally the overall CDO cash-flow waterfall.
- <sup>3</sup> This type of model is more generally applied to CLOs, CBOs, and CDOs with underlying ABS, which have observable, or quoted, market values for the underlying collateral.
- <sup>4</sup> The prevailing synthetic CDO models are based on the Gaussian copula model (Li, 2000), with the use of base correlations (McGinty and Ahluwalia, 2004) and other extensions. In spite of its well-documented deficiencies, this framework is widely used, given its tractability and appeal for quoting prices in terms of correlations. In particular, the pricing of bespoke portfolios is problematic, with the use of ad-hoc mapping models to relate their prices to traded indices (St. Pierre et al., 2004).
- <sup>5</sup> The first such model was the 'Implied Copula Model' (Hull and White 2006), which is a top-down approach. Several others have followed including the 'Implied Factor Model' of Rosen and Saunders (2009), Nedeljkovic et al (2010a), and (2010b) and references cited there.
- <sup>6</sup> See Nedeljkovic et al (2010b) for the full exercise, including calibration of multiple indices and the performance of the model through the crisis.
- <sup>7</sup> We use as a prior model, a single-factor Gaussian copula for defaults and prepayments; severities are also stochastic and correlated. The 'asset correlation'  $\rho$  is set to be 0.15 (the value in the Basel Accord, BCBS, 2006). The annual default and prepayment probabilities are  $PD = 0.15$   $PP = 0.135$ . The average LGD is 45%, with this chosen to have a value of 60% at a PD level of 20% (empirically observed levels) and a minimum and maximum levels of 10% and 90% (reasonable bounds).
- <sup>8</sup> The detailed cash-flow generation under each scenario is done using Intex. As is common practice, and consistent to available funding, discounting is done using LIBOR rates.
- <sup>9</sup> This vintage comes nearest to matching the RMBS based on FICO and LTV statistics. Its 30-day delinquency rate is significantly below those of any of the ABX indices (closest to the 06-2), while the 60-day RMBS delinquency is significantly higher than those of the ABX indices (closest to those of the 07-1 and 07-2 rolls). At 43%, the 90-day delinquency rate of the RMBS is twice that of the closest ABX index roll (the 07-1 series). The mean age is also closest to the most recent index roll (07-2).
- <sup>10</sup> The example is drawn from Nedeljkovic et al (2010a). The paper further demonstrates the stability of various risk metrics, hedge ratios and sensitivity analytics, with respect to model assumptions, and tests the calibration and performance of the model over a period of highly volatile markets.
- <sup>11</sup> Since individual name spreads are not available, we assign (risk-neutral) PDs for each name based on their rating. We use five-year index spreads and assume a constant hazard rate. Similarly, prepayment rates are defined also by rating (where a good quality obligor is more likely to prepay than a lower rated obligor).
- \* Average LGDs are set to 60% for all names, and we assume stochastic LGDs driven by the systematic factor, allowing for a natural positive correlation between defaults and LGDs. Finally, for simplicity, we assume an asset correlation for all names at 50%.
- <sup>12</sup> These are implied (risk-neutral) probabilities, based on available market prices.
- <sup>13</sup> International Institute of Finance.
- <sup>14</sup> Technical Committee of the International Organization of Securities Commissions.

Surveillance Valuations  
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# Q&A

David Pagliaro, EMEA regional director of fixed income solutions, and Peter Jones, co-head of global valuations, of S&P Valuation & Risk Strategies, discuss their firm, their clients needs and the European structured finance market

**Q: To start off, please give us an introduction to S&P's new Valuation & Risk Strategies group**

**Peter Jones:** S&P Valuation and Risk Strategies (VRS) aims to be the market-leading provider of credit-driven risk analysis for global financial professionals through the provision of market intelligence and analytic insight. VRS's broad suite of offerings is intended to help structured finance investors with risk mitigation, cost control and – in many cases – with alpha generation. Following the onset of the recent credit crisis, the majority of investors we talk to have been calling for enhanced data and research capabilities that integrate with cross-asset analytics.

To address this, VRS has developed an analytic discipline that moves beyond traditional notions of risk management,

static benchmarking and probability of default metrics to create a comprehensive, cross-asset view of credit quality. VRS enables investors to examine their portfolios with a greater level of granularity than has previously been possible.

**David Pagliaro:** Our approach is driven by particular market segments' needs, whether they are asset managers, financial institutions or corporates. But one lesson all market participants seem to have learned through the crisis is the importance of a more robust approach to assessing risk and value in portfolios.

Indeed, fundamental asset quality has been the great equaliser in fixed income markets. Investors now recognise the need for new and innovative methods of analysis that build on the lessons of the crisis and seek to identify the relationship between risk and price



David Pagliaro, S&P Valuation & Risk Strategies

for all credits in all types of market conditions. The aim of VRS is to leverage S&P's considerable experience in the credit markets and combine it with new and innovative analytic methodologies to supplement investors' traditional sources of information by providing robust valuation and risk intelligence.

**Q: Can you give us an example of organisations using your services?**

**Pagliaro:** We have recently been working with a number of large European financial institutions and regulators to implement risk management capabilities in line with upcoming regulatory and due diligence requirements. For example, one of Europe's largest central banks recently approached VRS, looking for three capabilities: robust and rounded data sets that covered their universe of transactions, a complete cash flow model library covering both ABS and covered bonds, and a suite of analytics that included the ability to stress test counterparty defaults. With support from our IT and data operations, VRS has now developed a custom solution for the client based around the data and analytics services of the ABSXchange application.

**Q: How would you summarise the outlook for the European structured finance market today?**

**Jones:** Clearly the global economy and financial markets have been through turbulent times since mid-2007. However, over the three-year period since the beginning of the recent crisis, European structured finance has proved resilient. Research from the S&P ratings group (entitled Transition study: three years on – European structured finance cumulative default rate since mid-2007 only 0.65%) reveals that only €12.2bn of notes – from a total original outstanding of €1,863bn – defaulted over the past three

years (mid-2007 to mid-2010), resulting in a cumulative default rate of just 0.65%.

Although certain sectors have been particularly affected by the credit crisis, issuance within consumer auto loans and, to a lesser extent, credit cards has remained resilient. Indeed, credit performance has differed considerably between asset classes since mid-2007 with transactions backed by granular pools of loans to consumers generally outperforming those backed by less granular pools of corporate credit risk.

European consumer asset classes – the combination of residential mortgage-backed securities (RMBS), consumer asset-backed securities (ABS), and most structured covered bonds – have shown a cumulative default rate of only 0.04% from mid-2007 to mid-2010, and a cumulative downgrade rate of only 4.3%. By contrast, corporate asset classes – CDOs, CMBS, and corporate securitisations – have seen a cumulative default rate of 1.44% and a downgrade rate of 34.3%. CMBS in particular has experienced a recent spike in defaults, due to restructurings and interest shortfalls.

**Pagliaro:** It is also worth noting that during the course of 2010 in Europe the proportion of publicly-placed transactions has been growing. Overall, we expect new issuance within certain asset classes to experience slow and uneven growth – but positive growth none-the-less. As such, the market for robust data sets – including fundamental deal performance data and market derived data – and advanced analytics will remain dynamic. Furthermore, while ABS/ CLO issuance globally has declined dramatically since 2007 – by over 80% in total – investors still hold trillions of dollars of ABS/CLO securities and require the tools to monitor, value and trade in them.



Peter Jones, S&P Valuation & Risk Strategies

**Q: What are the current drivers behind investors' data and analytics requirements?**

**Jones:** Regulation is really the driving force right now in the market. New regulation and new rules, including Capital Requirements Directive Two (CRD2) and Three in the EU, and rules by the Securities Exchange Commission, the European Central Bank (ECB) and the Bank of England (BoE), are stimulating the need for risk transparency. CRD2, for example, which comes into force in 2011, seeks to improve risk management for securitised transactions.

Meanwhile, the ECB and the BoE are defining those improved risk management techniques through specific due diligence and transparency requirements. These requirements will include the provision of loan level data, cash flow models and the supporting deal documentation. Increased capital and disclosure requirements will also influence what types of deals are issued. Indeed, while all the new rules are still being implemented and evaluated, the securitisation market will continue to evolve.

**Pagliaro:** Not all the rules are finalised but the implications are clear – investors will be expected to perform their own credit and cash flow analysis. In order to do this in compliance with the requirements of the new regulatory regime, investors will need access to loan level data on an ongoing basis; they will need to undertake their own stress testing using their own assumption sets and independent cash flow models; and they will need to have a thorough understanding of structural features including waterfalls, deal triggers, and the like.

**Q: How do your offerings help investors meet these new requirements?**

**Pagliaro:** In terms of trading in the more illiquid securities, buyers and sellers typically source different models and data, including

proprietary, internal sources as well as third party suppliers such as ABSXchange. Most European sell-side organisations currently use ABSXchange in their trading operations – and with uptake now growing on the buy-side this shared data and model utility provides both parties with unprecedented levels of transparency. Indeed, VRS's structured finance offering is supported by a robust data and modelling organisation that acquires, cleans and processes data for Standard & Poor's across RMBS (US, EMEA, Australia), UK master trusts, CMBS (US, EMEA), CLOs (US, EMEA) and all other ABS sectors.

**Jones:** Our core capabilities are centred around the growing coverage on S&P's Global Credit Portal and ABSXchange platforms. We have been able to expand geographical data coverage to include more regional and local content and we have broadened the asset class coverage both within traditional rated fixed income sectors as well as with other un-rated entities. VRS has also been able to invest in advanced analytics and tools, predominantly through our ABSXchange service.

**Pagliaro:** We distinguish ourselves from other service providers with a focus on data and analytic precision, client support, platform performance and reliability. And due to all the recent investment in the business, we now have a unique proposition for investors – indeed, we are aware of no one else in the market that has anything like the same breadth and depth of offerings.

VRS offers investors a comprehensive library of structured finance models and data sets, deal level and portfolio level cash flow analytics, and counterparty analytics via the ABSXchange application. For an ABS or CLO investor who needs a comprehensive analytics solution to support their investment workflow, our structured finance capabilities will provide them with all Standard & Poor's research, comprehensive fundamental and market performance data, market-leading analytics to generate assumption sets and cash flow projections. ●





## ABS issued in June 2010

Date	Issue	Class	Size (m)	Spread	WAL	M/S&P/F	Arranger	Originator	Type	Market
30/06/10	CarMax Auto Owner Trust 2010-2	A-1	\$147	1	0.35	NR/A-1+/F-1+	JPM/BOA		Auto prime	US
		A-2	\$120	20	0.99	NR/AAA/AAA				
		A-3	\$249	35	2.2	NR/AAA/AAA				
		A-4	\$82	45	3.65	NR/AAA/AAA				
		B	\$43.88	225	4.02	NR/A/A				
C	\$8.13	350	4.02	NR/BBB/BBB+						
30/06/10	SLM Student Loan Trust 2010-C	A-1	\$451	1mL165	0.99	Aaa/AAA/NR	BOA/BCG/CS/R	Sallie Mae	Stdnt loans	US
		A-2	\$209.38	1mL265	3.51	Aaa/AAA/NR				
		A-3	\$300		5.84	Aaa/AAA/NR				
		A-4	\$335		9	Aaa/AAA/NR				
		A-5	\$406		12.82	Aaa/AAA/NR				
30/06/10	Tesco Property Finance 3	A	£960	165/gilts	22.45	Aaa/A-/A-	GS/HSBC	Tesco	CMBS	UK
28/06/10	TAL Advantage 2010-1	A	\$197		5.1	NR/A/NR	WF		Containers	US
25/06/10	Penates Funding 3	A-1	€2,250	3mE90	1.85	NR/AAA/AAA		Dexia Bank Belgium	Prime RMBS	Europe
		A-2	€3,195	3mE110	4.06	NR/AAA/AAA				
		B	€555		4.06					
		C	€60		4.06					
24/06/10	Globaldrive Auto Receivables 2010-A	A	€474	1mE160	2.19	Aaa/AAA/NR	DB/HSBC/RBOS		Auto prime	Europe
		B	€28	1mE250	3.7	A2/A/NR				
		C	€27							
24/06/10	Hermes XV	A	€1,500	3mE130	4.16	Aaa/NR/AAA	Deutsche Bank	SNS	RMBS	Europe
		B	€9.75	emE60	4.83	AA3/NR/AA+				
		C	€43.65	3mE110	4.83	A3/NR/A				
		D	€38.65	3mE180	4.83	Ba1/NR/BBB+				
		E	€26.10	3mE975	4.83	Ba3/NR/BB				
18/06/10	Ally Auto Trust 2010-2	A-1	\$250	4	0.26	P-1/NR/F-1+	JPM/DB/RBS	Ally Bank	Auto prime	US
		A-2	\$257	15	0.99	Aaa/NR/NR				
		A-3	\$448	25	2.2	Aaa/NR/NR				
		A-4	\$182.8	40	3.56	Aaa/NR/NR				
		B	\$34.7		4.13	Aa3/NR/AA+				
C	\$28.4		4.14	A1/NR/AA-						
18/06/10	Santander Drive Auto 2010-A	A-1	\$287				JPM/DB/RBS		Auto non-prime	US
		A-2	\$411	63	0.99	NR/AAA/NR				
		A-3	\$220	68	2.25	NR/AAA/NR				
		A-4	\$119	88	3.11	NR/AAA/NR				
17/06/10	Educational Funding of the South 2010-1	A-1	\$151.8	3mL85	5	NR/AAA/AAA	MS		Stdnt loans	US
		A-2	\$76.1		13.23	NR/AAA/AAA				
17/06/10	GE Capital Credit Card Master No 2010-3	A	\$500	75	2.98	Aaa/NR/AAA	BCG/CITG	GE Money Bank	Credit cards	US
15/06/10	NZF Mortgages Series 2010-1 Trust	A1	NZ\$87.8	175	2.7	NR/AAA/NR	Westpac		RMBS	Asia Pacific
		A2	NZ\$9.1	260	2.7	NR/AAA/NR				
		B	NZ\$2.5		5	NR/AA-/NR				
		C	NZ\$0.6		5					
11/06/10	Silverleaf Timeshare Loan Back 2010-A	A	\$73.9	400	2.2	NR/A/NR	UBS/BBT		Timeshare	US
		B	\$28.1		2.2	NR/BBB/NR				
		C	\$49.5		2.2	NR/BB/NR				
		A1	\$340	0	0.35	P1/A1+/F1+	BAML/CITG/CS		Auto prime	US
		A2	\$240	EDSF15	0.99	Aaa/AAA/AAA				
A3	\$481	EDSF20	1.99	Aaa/AAA/AAA						
A4	\$191	30	3.28	Aaa/AAA/AAA						
10/06/10	Chrysler Financial Auto Securit... 2008-B	B	\$90.3	300	1.83	Baa1/BBB/BBB			Auto prime	US
02/06/10	Penarth Master Issuer 2010-1	A1	£100	85		Aaa/AAA/AAA		Bank of Scotland	Credit cards	Europe
		A2	£500	1mL85		Aaa/AAA/AAA				
		B	£200	1mL100		Aa2/A/A+				
		C	£228	1mL150		Baa1/BBB+/NR				
		D	£240	1mL160		NR/NR/NR				

## ABS issued in July 2010

Date	Issue	Class	Size (m)	Spread	WAL	M/S&P/F	Arranger	Originator	Type	Market
30/07/10	Citadel 2010-II	A	€990.65	3mE 120		NR/AAA/AAA	BNP Paribas	Van Lanschot Bankiers	RMBS	Europe
		B	€84.55	3mE		NR/AAA/AAA				
		C	€136.70	3mE		NR/A-/BBB				
		D	€31.10	3mE		NR/NR/NR				
		E	€12.45	3mE		NR/NR/NR				
29/07/10	New York City Tax Lien 2010-A	A	\$73.43	115 EDSF	1.25	Aaa/AAA/NR	JPM	New York City	Tax liens	US
		A	€208.46	3mE 110	1.08	Aaa/AAA/NR	WestLB AG	Banif Banco	Consumer loans	Europe
		B	€174.04	3mE 250	3.86	NR/NR/NR				
C	€28.69			NR/NR/NR						
Compartment Belgian Lion RMBS 2	A1	€3,000.00	3mE 175			NA/NA/NA		ING Bank NV	RMBS	Europe
	A2	€1,205.25	3mE 200			NA/NA/NA				
	B	€532.75	3mE 230			NA/NA/NA				
28/07/10	Nelnet Student Loan Trust 2010-3	A-1	\$378.30	3mL 78	4.28	Aaa/AAA/NR	BCG	Nelnet	Student loans	US
27/07/10	Ford Credit Auto Owner Trust 2010-B	A-1	\$353.00	L-Int 0	0.28	P-1/NR/F-1+	BOA/BNP/DB/GS/Wells	Ford	Auto loans	US
		A-2	\$273.30	EDSF 12	0.97	AaaNR//AAA				
		A-3	\$473.40	EDSF 15	1.97	AaaNR//AAA				
		A-4	\$192.84	Swap -Int 25	3.23	AaaNR//AAA				
		B	\$40.81	Swap -Int 90	4.12	Aa1/NR/AA				
C	\$27.21		4.20	Aa2/NR/A						
D	\$27.21		4.20	A1/NR/BBB						

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Continued...

## ABS issued in July 2010

26/07/10	Foncaixa Hipotecario 11 FTA	A	€6,110.00	3mE 80	6.6	Aaa/AAA/NR		La Caixa	RMBS	Europe
		B	€97.50	3mE 125	14.14	A1/AA/NR				
		C	€592.50	3mE 175	14.14	B1/A/NR				
23/07/10	MBS Bancaja 7 FTA	A	€472.50	3mE 30	3.92	Aaa/NA/NA	Bancaja	Bancaja	RMBS	Europe
		B	€402.50	3mE 70	15.48	Caa/NA/NA				
20/07/10	Fosse Master Issuer 2010-3	A1	£1,250	3mL 152	2.98	Aaa/AAA/AAA	JPM	Alliance & Leicester	RMBS	UK
		A2	£1,250	3mL 163	4.49	Aaa/AAA/AAA				
		A3	£1,000	3mL 168	5.72	Aaa/AAA/AAA				
19/07/10	Fastnet Securities 8 Ltd	A1	€483.00	1.25% fixed		Aaa/NR/AAA	Irish Life Permanent	Irish Life Permanent	RMBS	Europe
		A2	€483.00	1.25% fixed		Aaa/NR/AAA				
		A3	€483.00	1.25% fixed		Aaa/NR/AAA				
		B	€651.00	0.50% fixed		NR/NR/NR				
	SC Germany Auto 10-1	A	€567.00	1mE 105	1.77	Aaa/AAA/AAA	Natixis/WestLB	Santander	Auto ABS	Europe
		B	€33.00	1mE 150	4	A3 /A/A				
16/07/10	Bella Trust Series 2010-1	A2	A\$606	165 BBSW	1.5	Aaa/NR/AAA	JPM/NAB/BOS	Capital Finance Australia	Auto loans	Australia
	Hertz Vehicle Financings 2010-1	A1	\$225	130	3.38	Aaa/NR/NR	DB/CAI/CITG	Hertz Vehicle Financing	Auto fleet	US
		A2	\$350	175	5.38	Aaa/NR/NR				
		A3	\$100	225	7.38	Aaa/NR/NR				
		B1	\$34.56	375	3.38	Baa2/NR/NR				
		B2	\$49.92	375	5.38	Baa2/NR/NR				
		B3	\$15.36	400	7.38	Baa2/NR/NR				
	Sierra Timeshare Receivables Funding 2010-2	A	\$286.09	275	2.81	NR/A/A	RBS/CS/DB	Wyndham Worldwide	Time share	US
		B	\$63.91	425	2.81	NR/B/B				
15/07/10	Louisiana Public Facilities Authority 2010-EGSL	A1	\$97	30.00	3	Aaa/AAA/AAA		Louisiana Public Facilities Authority	Stranded asset	US
		A2	\$60	70.00	7	Aaa/AAA/AAA				
		A3	\$87	95.00	10.40	Aaa/AAA/AAA				
	Louisiana Public Facilities Authority 2010-ELL	A1	\$112	25	2.00	Aaa/AAA/AAA	JPM/CITG	Louisiana Public Facilities Authority	Stranded asset	US
		A2	\$111	50	5.00	Aaa/AAA/AAA				
		A3	\$121	73	8.00	Aaa/AAA/AAA				
		A4	\$124	85	10.90	Aaa/AAA/AAA				
14/07/10	Toyota Auto Receivables Owner Trust 2010-B	A1	\$613.80		0.33	P-1/A-1+/NR	DB/BNP/RBS/GS/CITG	Toyota	Auto loans	US
		A2	\$434.30	13	0.95	Aaa/AAA/NR				
		A3	\$587.80	18	1.85	Aaa/AAA/NR				
		A4	\$114.10	88	2.90	Aaa/AAA/NR				
	Pearl Mortgage Backed Securities 4	A	€931	3m E90		Aaa/NR/NR	SNS Bank	SNS Bank	RMBS	Europe
		B	€69	3m E90		Baa1/NR/NR				
13/07/10	SLM Private Education Loan Trust 2010-B	A1	\$303.00	1mL 192	0.90	Aaa/AAA/NR	BCG/BOA/CS	SLM	Private student loans	US
		A2	\$274.00	1mL	4.92	Aaa/AAA/NR				
		A3	\$292.00	1mL	10.33	Aaa/AAA/NR				
12/07/10	Bankinter Fondo de Titulizacio 20	A	€1,650	3m E30	8.63	Aaa/AAA/NR	Bankinter	Bankinter	RMBS	Europe
09/07/10	SMART Trust 2010-1US	A-1	\$92.00		0.36	P-1/NR/F-1+	JPM/MBL/RBS	Macquarie	Auto lease	US
		A-2	\$148.00	90	1.13	Aaa/NR/AAA				
		A-3A	\$50		2.11	Aaa/NR/AAA				
		A-3B	\$95.00	110	2.11	Aaa/NR/AAA				
		A-4	\$115.00	150	3.3	Aaa/NR/AAA				
07/07/10	Cars Alliance Auto Loans Germany 2010-1	A	€873	1mE 115	1.78	Aaa/AAA/NR	CAL/SG-CIB	RCI Banque	Auto prime	Europe
		B	€28		2.34	Aa2/A/NR				
		C	€99		2.45	NR/NR/NR				
06/07/10	Consum.it Securitisation Italy 2010-1	A	€1,710	2.3% fixed	2.6	Aaa/NR/AAA	BMPS	Monte dei Paschi di Siena	Consumer loans	Europe
		B	€540	2.9% fixed	4.1	Aa3/NR/A-				
		C	€750	4.2% fixed	6.3	Caa2/NR/NR				
		D	€123							
02/07/10	SMHL Securitisation Fund 2010-2E	A1	US\$335	3mL120	1.54	NR/AAA/AAA	CBA/CS/MBL/NA	Members Equity Bank	RMBS	Australia/US
		A2	A\$363	105 BBSW	1.56	NR/AAA/AAA				
		A3	A\$383.3	110 BBSW	5.68	NR/AAA/AAA				
	Citadel 2010-1	A1	€247.40	3mE 110		NR/AAA/AAA	BNP Paribas	Van Lanschot Bankiers	RMBS	Europe
		A2	€753.35	3mE 140		NR/AAA/AAA				
		B	€75.45			NR/NR/AAA				
		C	€129.90			NR/BBB/A-				
		D	€30.90			NR/NR/NR				
		E	€12.40			NR/NR/NR				
	Hipototta No.11	A	€1,760	3mE 20		NR/AAA/AAA	Banco Santander	Banco Santander Totta	RMBS	Europe
		B	€240	3mE 60		NR/BBB+/BBB+				
		C	€40			NR/NR/NR				
	Bank of America Student Loan Trust 2010-1	A	\$1,231	3mL80	4.99	Aaa/AAA/NR	BOA/CS	BOA	Student loans	US
	Saecure 7	A	€1,018	3mE135	4.31	Aaa/AAA/AAA	JPM	AEGON	RMBS	Europe
		B	€22	3mE170	5.15	Aa1/AA+/AA				
		C	€17	3mE200	5.15	Aa1/AA/NR				
		D	€22	3mE250	5.15	Aa3/A/NR				
		E	€22	3mE350	5.15	A3/NR/NR				
		F	€11	3mE450	5.15	Ba2/NR/NR				
	Westlake Automobile Receivables Trust 2010-1	A	\$100		0.59	NR/AAA/NR	HEX	Westlake Services	Auto non prime	US
		B	\$20		1.81	NR/A/NR				
01/07/10	FTA Santander Consumer Spain Auto 2010-1	A	€493.5	3mE70	1.83	Aaa/NR/AAA	Santander Central Hispano Group	Santander Central Hispano Group	Auto loans	Europe
		B	€57	3mE120	4.62	Aa2/NR/A+				
		C	€49.5	3mE150	5.29	Baa2/NR/BBB+				
		D	€88.5		5.29	Ca/NR/NR				
	SLC Student Loan Trust 2010-1	A-1	\$855	3mL88	5.26	Aaa/AAA/AAA	CITG/CS	Student Loan Corp	Student loans	US
	World Financial Network Credit Card	A	\$355.5	195	4.94	NR/AAA/AAA	BCG/BOA	World Financial Network	Credit cards	US
	Master Note Trust 2010-A	B	\$21.38	320	4.94	NR/AAA/A+		National Bank		
		C	\$16.88		4.94	NR/AAA/AA				
		M	\$56.25	489	4.94	NR/BBB/BBB				

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## ABS issued in August 2010

Date	Issue	Class	Size (m)	Spread	WAL	M/S&P/F	Arranger	Originator	Type	Market
27/08/10	Chagoi 2010-1	A	€1,455.90	1mE+180	4	Aaa/AAA/NR	CAI	Credit Agricole Consumer Finance Nederland BV	Consumer loans	Europe
		B	€970.60	1mE+300	4					
		C	€52.20	1mE+600	4					
	Edgbaston RMBS 2010-1 (retained)	A-1	£603.00	1mL+165		Aaa/-/AAA	Lloyds TSB	Bank of Scotland	BTL	UK
		A-2	£603.00	170		Aaa/-/AAA				
		A-3	£1,810.00	200		Aaa/-/AAA				
		B	£558.00			A2/-/AA-				
		C	£149.00							
25/08/10	Penarth Master Issuer 2010-2	A3	€250	1mE+78	3	Aaa/AAA/AAA	Lloyds TSB	Bank of Scotland	Credit cards	UK
20/08/10	Yapi Kredi DPR Finance Company 2010-1	A	€93.60	3mL+64		Baa1/BBB/NR	STC, UBM	Yapi Kredi Bankasi	DPR	Turkey
		B	€6.40	3mL+64		Baa1/BBB/NR				
		C	€190.70	3mE+64		Baa1/BBB/NR				
		D	€31.40	3mE+60		Baa1/BBB/NR				
		E	€84.90	3mL+60		Baa1/BBB/NR				
	SVO 2010-A VOI Mortgage	A	\$256.00	265	2.87	NR/A/NR/	CS/JPM/RBS/BCG/DB	Starwood	Timeshare	US
B	\$24.00	375	2.87	NR/BBB/NR						
19/08/10	Ally Master Owner Trust 2010-4	A	\$500.00	1mL+107	4.98	Aaa/NR/AAA	CITG/DB/JPM	Ally Financial	Floorplan	US
		B	\$48.26			Aa2/NR/AA				
		C	\$36.68			A2/NR/A				
	Hyundai Auto Receivables Trust 2010-B	A-1	\$267.00	-1	0.3	P-1/A-1+	BOA/BCG/SG	Hyundai	Prime auto loans	US
		A-2	\$267.00	15	0.99	Aaa/AAA/NR				
		A-3	\$419.00	23	2.35	Aaa/AAA/NR				
		A-4	\$218.30	35	3.92	Aaa/AAA/NR				
	Santander Drive Auto 2010-2	A-1	\$271.70	9	0.2	NR/A-1+/NR	CS/JPM/WF	Santander	Non-prime auto loans	US
		A-2	\$376.60	55	0.9	NR/AAA/NR				
		A-3	\$80.67	65	1.77	NR/AAA/NR				
		B	\$115.61	150	2.29	NR/AA/NR				
		C	\$157.35	290	3.14	NR/A/NR				
	DMPL VI	A	€653.10	3mE+126	4.19	Aaa/AAA/NR	DB/RBS/JPM	Achmea Group	RMBS	Europe
		B	€4.18	3mE+50		NR/NR/NR				
		M (ret'd)	€38.00	3mE+126		NR/NR/NR				
18/08/10	SLM Student Loan Trust 2010-2	A	\$738.00	1mL+50	4.25	Aaa/AAA/NR	BoA, RBS		FFELP student loans	US
		B	\$22.38	1mL+90	8.75	A3/A				
	Series 2010-2 REDS Trust	A1	\$960m	100	1.5	Aaa/AAA/NR	DB, NAB, RBS	Bank of Queensland	RMBS	Australia
		A2	\$497m	100	6.2	Aaa/AAA/NR				
		AB		1.6						
		B1								
		B2								
16/8/10	Akbank Remittance Trust Securitisation 2010	Series 24	\$79.00	3mL+110	4.8	Baa1/NR/NR	Standard Chartered Bank, WestLB, Wells Fargo	Akbank	DPR	Turkey
		Series 25	\$75.00	3mL+165	3.7	Baa1/NR/NR				
		Series 26	\$150.00	3mL+195	5.8	Baa1/NR/NR				
		Series 26	\$165.00	3mL+55		Baa1/NR/NR				
		Series 28	\$394.00	3mL+90	4.8	Baa1/NR/NR				
13/08/10	Vornado DP Trust 2010	A-1	\$140.00	110	5.5	NR/AAA/AAA	JPM/CITG/DB	Vornado	CMBS	US
		A-2FX	\$304.30	120	10.1	NR/AAA/AAA				
		A-2FL	\$60.00	135	10.1	NR/AAA/AAA				
		B	\$38.70	195	10.1	NR/AA/AA				
		C	\$57.00	250	10.1	NR/A/A				
		D	\$60.00	360	10.1	NR/BBB-/BBB-				
12/08/10	Maestrale 3 (retained)	A	€217.00	3mE+175	2.5	Aaa/NR/AAA	RBS	Commercio e Finanza Leasing e Factoring	Leases	Europe
		P5	€217.00							
	Ally Auto Receivables Trust 2010-3	A-1	\$219.00	0	0.28	P-1/A-1+	RBS/CITG/UBS	Ally Financial	Prime auto loans	US
		A-2	\$397.00	1mL+10	1.29	Aaa/AAA/NR				
		A-3	\$262.00	20	2.6	Aaa/AAA/NR				
		A-4	\$162.74	30	3.71	Aaa/AAA/NR				
		B	\$27.12	90	4.16	Aa2/AA+				
		C	\$22.60	130	4.16	A1/AA-/NR				
	AmeriCredit Auto Receivables Trust 2010-B	A-1	\$36.80	5	0.18	P-1/A-1+/NR	RBS (co-managers: CS, DB, JP)		Non-prime auto loans	US
		A-2	\$69.00	70	0.099	Aa3/AAA/NR				
		A-3	\$94.20	150	2.93	Aa3/AAA/NR				
11/08/10	Entergy Arkansas Restoration Funding 2010-A	A-1	\$124.10	55	5.45	Aaa/AAA/AAA	MS	Entergy	Stranded asset	US
10/08/10	Liberty PRIME Series 2010-1	A1	\$85	100	0.8	NR/AAA/AAA	CS/NAB/DB	Liberty Financial	RMBS	Australia
		A2	\$90	125	3.3	NR/AAA/AAA				
		AB	\$10.4	165	4	NR/AAA/AAA				
		B				NR/AA/AA				
		C				NR/A/A				
		D			NR/BBB/BBB					
		E			NR/BB/BB					
	Pontormo Mortgages 2010-1	A	€187.90			Aaa/NR/NR	Banca Akros	BCC Fornacette, BCC di Castagneto Carducci, Banca Popolare di Lajatico	RMBS	Europe
		B-1	€82.74							
		B-2	€42.18							
		B-3	€41.73							
09/08/10	American Home Mortgage Advance Trust 2010-ADV1	A-1	\$200.00		2	NR/AAA/AAA	DB/RBS	American Home Mortgage Servicing	Servicing advances	US
		B-1	\$50.00			2				
06/08/10	Douro Mortgages No. 5 (retained)	A	€1,099	3mE+20	8.4	NR/NR/AAA	BNPP	Banco BPI	RMBS	Europe
		B	€301	3mE+0	20.7					
		C	€21							
05/08/10	Brazos Student Loan Finance Corp 2010A	A1	\$189.90	3mL 90	5.47	Aaa/NR/AAA	CITG	Brazos	Student loans	US
04/08/10	CNH Equipment Trust 2010-B GSMS 2010-C1	A1	\$232.00	125	4.96	Aaa/NR/NR/AAA (DBRS)	BCG/BNPP (Co-Mgrs: CITG, CA, Rabo, SG) GS/Citi	CNH	Equipment	US
		A2	\$410.62	135	9.86	Aaa/NR/NR/AAA				
		B	\$27.60	190	9.9	Aa2/NR/NR/AAA				
		C	\$35.48	265	9.9	A2/NR/NR/AA				
		D	\$35.48	400	9.9	Baa3/NR/NR/BBB				
	JG Wentworth Receivables 2010-2	A	\$97.19	180	6.76	Aaa/NR/NR	UBS	JG Wentworth	Receivables	US
		B	\$8.91	475	9.35	A1/NR/NR				
02/08/10	Citadel 2010-II (retained)	A	€1,305.68	3mE+120		NR/AAA/AAA	BNPP	F.van Lanschot Bankiers	RMBS	Europe
		B	€111.44	3mE		NR/AAA/NR				
		C	€180.17	3mE		NR/A-/BBB				
		D	€40.99	3mE		NR/NR/NR				
		E	€16.41	3mE		NR/NR/NR				

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## CDOs issued in June 2010

Date	Issue	Class	Size (m)	Spread	WAL	M/S&P/F	Arranger	Manager/Originator	Collateral	Type	Market
22/06/10	Pelican SME 2010-1	A	€577.5	3mE60	3.07	NR/NR/AAA	JPM	Caixa Economica	SME loans	Bal Sheet	Euro
		B	€472.5	3mE100							
		C	€7	3mE150							
		PS	€31.5								
		V	€117.00	3mE80							
15/06/10	Craft 2010-2	A	€80.00		6			Synthetic	Arbitrage	Euro	
13/06/10	Craft 2010-1	A	€90		8			Cash	Bal Sheet	US	
04/06/10	Liston Funding 2010-1	A	\$80	3mL24	3.7	Aaa/AAA/NR	BOA		Cash, loans	Bal Sheet	US
		B	\$19.64	3mL24							

## CDOs issued in July 2010

Date	Issue	Class	Size (m)	Spread	WAL	M/S&P/F	Arranger	Manager/Originator	Collateral	Type	Market
29/07/10	ICO Mediacion AyT II	A	€14,864.70	6mE 30	2.31	Aaa/NR/AAA	ICO	Spanish bank consortium	Loans	Bal sheet	Europe
		B	€8,000.00							CLO	
20/07/10	BBVA Empresas 4 FTA	A	€1,700.00	3mE+30	2.88	Aaa/AAA/NR	BBVA	BBVA	SME loans	Bal sheet	Europe
19/07/10	Sandown Gold 2010-1	A-1A	£350m	3mL+175	3.00	Aaa/NR/AAA	Lloyds TSB	LLT	SME loans	Bal sheet	UK/Europe
		A-1B	€235m	3mE+150	3.00	Aaa/NR/AAA				CLO	
		A-2	€60m	50	6.90	Aaa/NR/AAA					
		B	£110m	180	8.80	Aa3					
		C	£55.68m	185	11.4	Baa2					
		S	€95.10			NR/NR/NR					
16/07/10	Golub Capital BDC 2010-1	A1	\$174m	L+240		Aaa/AAA/NR	Wells Fargo	Golub Capital	Mid-market loans	Bal sheet	US
		B1/sub	\$126m			NR/NR/NR				CLO	

## CDOs issued in August 2010

Date	Issue	Class	Size (m)	Spread	WAL	M/S&P/F	Arranger	Manager/Originator	Collateral	Type	Market
17/08/10	ICG EOS Loan Fund I	A	€790.70	3mE+110	3.9	Aaa/NR/AAA	RBS	ICM/RBS	Leveraged loans	Cashflow	Euro
		B	€49.50	3mE+150							
		S-Pref	€514.62	3mE+500							
		S-Sub	€57.18								
11/08/10	Heta Funding 2010-1	A	€990.00	3mL+160		Aaa/NR/NR	BCG	Barclays	SME loans	Cashflow	Euro
		B	€520.00								

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## Natural catastrophe bonds issued in 2009 and to 31 August 2010

## 2010

SPV	Sponsor	Tranche amount	Coupon	Rating	Peril
Shore Re	Munich Re	Class A \$96m	TMM+700bp	BB (S&P)	US hurricane
Merna Re III	State Farm	\$250m	TMM+405bp	NR	US multi-peril
Residential Re 2010	United Services Automobile Association	Class 1 \$162.5m	TMM+660bp	BB (S&P)	US hurricane, earthquake, thunderstorm, windstorm & California wildfire
		Class 2 \$72.5m	TMM+890bp	B+ (S&P)	
		Class 3 \$52.5m	TMM+1300bp	B- (S&P)	
		Class 4 \$117.5m	TMM+1300bp	NR	
Blue Fin Series 3	Allianz	Class A \$90m Class B \$60m	TMM+1400bp TMM+925bp	B- (S&P) BB (S&P)	US hurricane and earthquake
Eos Wind	Munich Re	Class A \$50m Class B \$30m	TMM+680bp TMM+650bp	Ba3 (M) Ba3 (M)	US hurricane US hurricane & Euro wind
Caesur Re II	Nationwide Mutual	Class A \$185m	TMM+650bp	BB+ (S&P)	US hurricane and quake
Lodestone Re	National Union Fire Ins of Pittsburgh	Class A \$175m Class B \$250m	TMM+625bp TMM+825bp	BB (S&P) BB (S&P)	US hurricane and earthquake
Johnston Re	Munich Re	Class A \$200m Class B \$105m	TMM+625bp* TMM+650bp	BB (S&P) BB (S&P)	US hurricane (North Carolina)
Ibis Re II	Assurant	Class A \$90m Class B \$60m	TMM+620bp TMM+925bp	BB (S&P) B+ (S&P)	US hurricane
Merna Re II	State Farm F&C	\$350m	TMM+365bp	BB+ (S&P)	US earthquake
Successor X - Series 2010-1	Swiss Re	II-CN3 \$45m	TMM+975bp	B- (S&P)	North Atlantic hurricane, Euro windstorm, Cal and Japan quake
		II-CL3 \$35m	undisclosed	NR	
		II-BY3 \$40m	undisclosed	NR	
Foundation III	Hartford Fire	\$180m	TMM+575bp	BB+ (S&P)	US hurricane

\*Increasing to TMM+700bp for the second and third annual risk periods

## 2009

SPV	Sponsor	Tranche amount	Coupon	Rating	Peril
Lakeside Re II	Zurich American	\$225m	TMM+775bp	BB- (S&P)	California earthquake
Redwood XI	Swiss Re	\$150m	TMM+625bp	B1 (M)	California earthquake
Longpoint Re II	Travelers	Class A \$250m	TMM+540bp	BB+ (S&P)	US hurricane
		Class B \$250m	TMM+540bp	BB+ (S&P)	
Atlas VI	SCOR	175m	Euribor+950bp	BB- (S&P)	Euro wind & Japan quake
Successor X	Swiss Re	\$50m	\$6m discount	B- (S&P)	North Atlantic hurricane, European windstorm and California earthquake
		\$50m	undisclosed		
		\$50m	undisclosed		
		\$50m	undisclosed		
Montana Re	Flagstone Re	Class A \$100m Class B \$75M	3mL+975bp 3mL+1325bp	BB- (S&P) B- (S&P)	US hurricane US hurricane & quake
MultiCat Mexico 2009	Swiss Re for Agroasemex and FONDEN	Class A \$140m	TMM+1150bp	B (S&P)	Mexican quake
		Class B \$50m	TMM+1025bp	B (S&P)	Pacific hurricane
		Class C \$50m	TMM+1025bp	B (S&P)	Pacific hurricane
		Class D \$50m	TMM+1025bp	BB- (S&P)	Atlantic hurricane
Parkton Re	Swiss Re	\$200m	TMM+1050bp	B+ (S&P)	N Carolina hurricane
Eurus II	Hannover Re	1150m	Euribor+675bp	BB (S&P)	Euro & UK wind
Ianus Capital	Munich Re	150m	Euribor+900bp	B2 (M)	Euro wind & Turkey quake
Calabash Re III	Ace Insurance	Class A \$86M	6mL+1525bp	BB- (S&P)	US hurricane & quake
		Class B \$14m	6mL+550bp	BB+ (S&P)	US quake
Residential Re 2009	USAA	Class 1 \$70M	3mL+1300bp	BB- (S&P)	US hurricane, quake and storm
		Class 2 \$60m	3mL+1700bp	B- (S&P)	
		Class 4 \$120m	3mL+1250bp	BB- (S&P)	
Successor II 2009	Swiss Re	\$60m	undisclosed	n/a	North Atlantic hurricane and California quake
Ibis Re	Assurant operating companies	Class A \$75m	3mL+1025bp	BB (S&P)	US hurricane
		Class B \$75m	3mL+1425bp	BB- (S&P)	
Blue Fin (Series 2)	Allianz Argos	\$180m	3mL+1350bp	BB- (S&P)	US quake & hurricane
Mystic Re II (Series 2009-1)	Liberty Mutual	2009-1 \$225m	3mL+1200bp	BB (S&P)	US quake & hurricane
East Lane III	Chubb	Class A \$150m	TMM+1025bp	BB (S&P)	Florida hurricane
Atlas V	SCOR	Series 1 \$50m	3mL+1450bp	B+ (S&P)	US quake & US/Puerto Rico hurricane
		Series 2 \$100m	3mL+1150bp	B+ (S&P)	
		Series 3 \$50m	3mL+1250bp	B (S&P)	

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