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Quantitative Assessment of Securitisation Deals

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Foreword

The golden period of the structured finance market reached a climax on the cusp of 2006–2007. Until this point, volumes increased year on year and the market deepened in substance with the introduction of new formats and additional complexities. There was a feel good factor that the structured market provided limitless possibilities for financial institutions to extend credit in developed countries. As a result of this trend, banks extended their business models to loans originated with the purpose of being repackaged and resold. Previously the banks' main source of income was provided by intermediation fees rather than interest rate differentials. Banks had traditionally originated loans to hold them until maturity, earning an interest differential between lending and funding costs; now, banks were originating loans with the intention of packaging them and off-loading them to final investors.[1]

All That Glitters is Not Gold

The Enron crisis in 2001 highlighted two fundamental issues in accounting standards:

- the consequences of mark-to-market valuation on the balance sheet; and
- the use of special purpose vehicles as a means of deconsolidating financial results.[2]

Despite revised accounting standards implemented by the International Accounting Standard Board post-Enron—adopted by European listed companies

[1] This practice was most prevalent in the US, but it was also emerging in some major banks in Europe.

[2] Accounting practice in the post-Enron era: The implications for financial statements in the property industry, by Andrew Holt and Timothy Eccles, Henry Stewart Publications 1473–1894, Briefings in Real Estate Finance, vol. 2, no. 4, pp. 326–340 (http://www.property-solutions.co.uk/files/Property%20Solutions/Post_Enron_Era_Implications.pdf).

from 2005—the recent financial crisis has highlighted that measures taken at the time proved to be insufficient. In reaction to the financial crisis, which started in 2007, bank regulators developed new global standards referred to as "Basel III":

> Basel III is comprised of the following building blocks, which were agreed and issued by the Committee and its governing body between July 2009 and September 2010:
>
> - higher quality of capital, with a focus on common equity, and higher levels of capital to ensure banks can better absorb the types of losses like those associated with this past crisis;
> - better coverage of risk, especially for capital market activities;
> - an internationally harmonized leverage ratio to constrain excessive risk taking and to serve as a backstop to the risk-based capital measure, with a view to migrating to a Pillar 1 treatment based on appropriate review and calibration;
> - capital buffers, which should be built up in good times so that they can be drawn down in periods of stress;
> - minimum global liquidity standards to improve banks' resilience to acute short term stress and to improve longer term funding; and
> - stronger standards for supervision, public disclosures and risk management.[3]

Sparking Off the Financial Crisis

Shortage of liquidity resulting from a general lack of confidence was cited by many as one of the main causes of the crisis. Indeed, three main events (the subprime collapse, the Lehman default and the non-monitored Greek budget deficit—provoking a more general sovereign crisis) triggered a general loss of confidence in the quality of specific asset classes (ABS, banks, sovereigns). This led to a sharp fall in asset prices and subsequent large losses on banks' balance sheets.

Following the impact of the mark-to-market exercise on the balance sheet, a debate started in 2008 on how to redefine fair value:

> Enormous losses reported by financial institutions on sub-prime assets have led to vigorous debate over the appropriateness of fair-value or mark-to-market accounting. The banking industry and US lawmakers have pushed to suspend or ease fair-value accounting rules, believing that revising the rules could lower the intensity of the credit squeeze. Critics of the proposed changes argue that any gains from divorcing the value of assets from their true market price would be illusory and simply mask huge losses in asset values.[4]

These specific comments are for banks only, owing to their particular economic function, whereas for other investors accounting rules are less controversial.

In favour of the use of mark-to-market (or fair value) to evaluate assets or liabilities for banks, it is argued that book value does not capture the evolution of

[3] The Basel Committee's response to the financial crisis: report to the G20 (http://www.bis.org/publ/bcbs179.htm).

[4] Recent changes to fair-value accounting under US GAAP and IFRS, Freshfields Bruckhaus Deringer LLP, January 2009 (http://www.freshfields.com/en/global/).

asset quality which could trigger unpredictable sudden realised losses. It can be argued that impairment and provisioning can mitigate that risk to some extent, but they have the disadvantage of subjectivity which leaves room for possible abuse or false representation of the economic reality.

Although it captures current values, mark-to-market has the distinct disadvantage of overweighting large swings in prices, preventing financial institutions from playing their countercyclical function in the economy. In fact, market prices are not always good predictors of the underlying quality of an asset as they capture supplementary fundamental components, namely:

- market sentiment (general confidence in the market or in a company);
- liquidity (the degree to which it is possible to trade or sell an asset or a liability in order to monetise it);
- intrinsic value (value derived from the underlying components).

Market Sentiment

Increased volatility levels in intraday and daily prices have dominated the last few years and particularly the last few months; in the past, volatility was related more to risky assets, but the recent crisis has shown that sovereign debt is no longer shielded from it. The stock price plunge cannot be solely attributed to reduced economic growth (increased sovereign debt and the absence of credible reforms), and it is proposed hereafter that the situation is more complex.

Take the case of Siemens, whose equity price fell approximately 30 % over the past 2 months, with a quarter of the price drop taking place between 26/7 and 10/8 alone. Such a sharp fall cannot be linked to a simple change in the intrinsic quality of the company; the same trend can be observed also for Allianz (different sector) and many other large corporates. The change in general economic conditions is certainly an important contributing factor in the significant loss of value of these companies, but is probably insufficient to explain the large drop in value.

Applied to the world of structured finance, an AAA note price change should be limited to the probability of a downgrade. However, the subprime crisis saw significant levels of AAA rated notes trading at a price of 30 or 40 (effectively their recovery rate or even less). This could imply that the rating is not properly assessing the underlying quality of the notes; however, the large majority of AAA notes met capital and interest repayments on time thereby avoiding losses in the years following the start of the crisis.[5]

This suggests that the traded price reflected a lack of confidence in the instrument and was not connected to the value of the specific note or of its underlying assets.

[5] In Europe, the default rate of structured finance deals (excluding covered bonds) since 2007 has been 1.29 versus 9.66 % in the US. (Source: S&P).

Liquidity

The financial crisis and in particular the Lehman default brought the importance of liquidity to the forefront of the financial arena: liquidity must be a primary concern for banks to ensure solvency. Until recently, it was assumed that assets could be freely traded at a price in the secondary market. The reality is quite different in that investors may choose not to buy certain assets regardless of the price if they perceive the risk as being too high; conversely, certain assets—perceived as being too risky—might be impossible to sell.[6] Furthermore, the risk acceptance threshold during times of economic crisis is much lower than in times of boom, as was highlighted by the 2007 situation.

In reaction to the liquidity crisis of 2007, the interest swap market extrapolated liquidity premia from risk-free rates. Before 2007, entering into an interest rate swap against a 3-month EURIBOR or against a 6-month EURIBOR was equivalent, in financial terms.[7] Since 2007 access to the interbank market has become increasingly difficult for banks. Certain longer tenors have become too expensive or are even unavailable to most financial intermediaries; costs have also increased significantly. As a reminder, an interbank rate represents the average cost of funding for a bank of medium quality; however, post-crisis funding levels for banks have been consistently higher than the reference interbank rate.

What has been the reason behind such a historical change? In the money market, trades on long tenors have dried up or, in other words, the depo market has become much more illiquid; only secured transactions have become feasible, at the cost of utilising good collateral. In order to transact, a counterparty might request a premium to compensate for the fact that the money becomes unavailable for a certain period of time. Consequently, the cost of giving up the availability of the money generates an additional cost: the liquidity premium.

The only rate which represents an instrument without a liquidity premium is the EONIA,[8] i.e., the overnight rate. Consequently, any other tenor exceeding the overnight period trades at a premium. In the EUR swap market, this has led to

[6] This principle applies also to collateral, which today is widely used to obtain short-term funding. In fact, it is becoming apparent that the liquidity of collateral is an important risk factor which influences the definition of appropriate haircuts to protect creditors. The same principle applies to the collateral posted in the refinancing operations of the ECB.

[7] It is recalled that a standard interest rate swap (see http://stats.oecd.org/glossary/detail.asp?ID=1426) is a derivative contract according to which oneparty pays a fixed rate in exchange for receiving a floating rate. The floating rate (in EUR) is calculated as a spread plus a reference index. For EUR the reference index is EURIBOR (EUR Interbank Offered Rate: see OECD glossary definition: http://stats.oecd.org/glossary/detail.asp?ID=3072). The EURIBOR is calculated for different tenors from one month to one year. Before the crisis, counterparties might have requested a small spread (0.25/0.50 bp) for the change of reference period more as an intermediary compensation than for economic reasons.

[8] See OECD glossary definition: http://stats.oecd.org/glossary/detail.asp?ID=3054.

fixed rates being quoted against the EONIA[9]—as opposed to the previous reference of a 6-month EURIBOR—and the creation of the Overnight Index Swap (OIS).

During 2007 and 2008, the spread between swaps against the overnight rate and the LIBOR/EURIBOR standard references widened significantly:

> … the LIBOR-OIS spread has been the summary indicator showing the "illiquidity waves" that severely impaired money markets in 2007 and 2008.[10]

Trading practice has therefore evolved so that all tenors trade at a premium against OIS to capture the unavailability cost, or, in other words, the cost of not having access to unlimited liquidity in a given instrument.

In the structured finance universe, the crisis saw the number of investors interested in buying notes shrink to such an extent that it was virtually impossible for an asset holder to dispose of a structured note. For such cases, prices automatically incorporated a liquidity discount which significantly reduced the value of the asset. During the subprime crisis, therefore, prices fell not solely because of the rise in default probabilities but also as a result of the loss of value of the notes as the liquidity discount grew to unprecedented levels

Intrinsic Value

Although the intrinsic value of an asset may not be the best representation of its sale price, it has the advantage of being less subject to externals and gives an indication of how the asset quality changes over time.

Applying this theory to the housing sector, there is a potentially large difference between construction cost and sale price. This difference is determined by factors such as location and demand. The belief that a previously cheap area could have value in the future (even though this may be unfounded) influences buyers' criteria and willingness to pay a premium, whereas the value of the house, in terms of construction costs, is more stable.

A similar argument can be applied to ratings. During the crisis, many observers criticised rating companies, stating that ratings did not take into account the crisis. Rating actions are usually taken with delay when the market falls significantly and therefore prices are in fact considered as an initial indicator of distress. Indeed, in the wake of September 11, the rating agencies were tardy in their action to

[9] A swap where a fixed rate is exchanged against the EONIA is an OIS.

[10] See The LIBOR-OIS Spread as a Summary Indicator, by Rajdeep Sengupta and Yu Man Tam, Economic Synopses, Federal Reserve Bank of St. Louis, 2008, no. 25, (http://research.stlouisfed.org/publications/es/08/ES0825.pdf).

downgrade airline companies despite the fact that business significantly shrank and equity prices tumbled.[11]

Market sentiment as expressed by equity prices can be a representation of the increased associated credit risk of a company, (volatility being a measure of the uncertainty of a firm's value). This, however, does not apply to the structured finance universe where price volatility cannot be immediately correlated to the quality of the underlying assets. Therefore, any rating action triggered by sharp market movements is not easily justified.

S&P defines ratings on the basis of the capacity of a company or a bond to survive stress scenarios:

> The scenario for a particular rating category reflects a level of stress that issuers or obligations rated in that category should, in our view, be able to withstand without defaulting. That does not mean that rated credits would not be expected to suffer downgrades. On the contrary, we believe that the occurrence of stress conditions that might be characterized as "substantial", "severe", or "extreme" likely would produce large numbers of downgrades of rated issuers and obligations. The scenarios do not represent a guarantee that rated entities will not default in those or similar scenarios.[12]

An asset, therefore, which survives an extreme stress scenario (the subprime crisis for example) can be considered deserving of the highest rating. It would be unreasonable, however, to claim that during the time of stress the price does not show volatility.

In a similar fashion, the intrinsic price of a structured note should take into account the present value of the cash flows weighted by their probability to be paid in time and in full. This price will naturally change as a function of varying probabilities and it represents the value an investor would be expected to receive if it were a buy and hold investment.

The intrinsic value is often defined as mark-to-model; however, this definition underlines the dependency of the price on the model used and is often associated with the uncertainty of the parameters of the model. The difficulty therefore in deriving the intrinsic value of a structured note lies in finding the appropriate approach to extracting a price from different models to ensure that it is somewhat "model independent".

Considering that models depend on the determination of input parameter values, it is vital to understand how each parameter affects the derived price in order to provide insight into how reasonable the price indication is. Techniques of

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[11] Following September 11, Moody's decided to acquire KMV on the ground that their rating analysis needed revision in order to include price movements as an element to be considered in assessing the credit risk of a company. "In Merton's KMV, the methodology uses the value of the equity, the volatility of equity and several other observable to obtain the value of the firm's asset and volatility, in which are both non-observables." (See Default Forecasting in KMV, by Yuqian (Steven) Lu, University of Oxford, 2008: http://eprints.maths.ox.ac.uk/713/1/Default_Forecasting_in_KMV_S_Lu.pdf.).

[12] Understanding Standard & Poor's Rating Definitions, S&P Ratings Direct, June 2009, Annex IV (http://www.standardandpoors.com).

sensitivity analysis or principal component analysis are useful tools to identify critical parameters. When the values of critical parameters can be ascertained with precision based on investors' characteristics, it is possible to derive a good approximation of the intrinsic value.

By defining the assumptions under which a price is calculated—despite it being impossible to eliminate all subjectivity—it is at least possible to quantify under which conditions a price was calculated. This approach informs investors of the true meaning of the price associated with the asset. Having taken into account the main assumptions and risk appetite, the calculated price gives the probability-weighted value of the investment. Using the same assumptions, it is possible to proceed to a comparison of different assets allowing consistent investment decisions.

From an accounting point of view, the use of the intrinsic value as defined above could ensure a more transparent approach to asset valuation which offers a high level of consistency across different asset classes. The intrinsic value of course needs to be adjusted by an appropriate liquidity premium component and a market sentiment component should a disposal price be required.

Market Developments

The financial crisis, and in particular the subprime and Lehman crises, has had significant consequences for the structured market. Investors' confidence in this market has plummeted. Limited amounts of newly originated notes were placed in the market[13] which lead to a sharp reduction in the credit appetite of financial intermediaries and generated a credit crunch in the economy.

Both practitioners and financial experts share the widely held opinion that economic recovery cannot be easily achieved if the structured market is not properly revitalised. The credit cycle is even more dependent on banks being able to originate new credit if the sovereign crisis is taken into account (with the related public budget reduction). Since banks require appropriate capitalisation and risk controls, newly originated loans need to be properly distributed across the financial system.

This debate has been spearheaded in recent years by the European Financial Services Round Table (EFR)[14] and the Association for Financial Markets in Europe (AFME)[15] who have stimulated a technical discussion among the most

[13] The most important exception was the volume of ABSs issued with the purpose of using them as collateral in the ECB's refinancing operations.

[14] A round table organisation of Chairmen and Chief Executives of Europe's leading banks and insurance companies

[15] Membership of AFME is open to all participants in the wholesale financial markets (banks, corporate finance advisors, and brokers as well as service providers and professional advisors, such as law firms).

important banks and insurance companies and their associations in Europe with the aim of finding ways to revitalise the ABS market. Institutions, such as the European Central Bank, the European Investment Bank Group and the Bank of England have participated in the discussions as observers with the purpose of providing an institutional point of view at the expert and senior level. The initiative (called PCS—Prime Collateralised Securities) is presently in its final phase and is expected to produce its first operation early next year. Deals abiding by the principles laid down in the protocol of PCS, will receive a quality label from an independent third party confirming that all required criteria have been met.

The main pillars of the initiative are: simplicity, quality, transparency and liquidity. In other words, investors' confidence can be regained only if the ABS market can offer instruments which are simple to analyse and evaluate and their origination quality of which meets[16] high standards. Investors additionally require transparency and liquidity in the instruments which shall be ensured throughout their whole lifetime.

Transparency, and liquidity in particular, are essential for permitting the development of a secondary market.[17] Investors need to be reassured that the instruments they purchase can be disposed of at reasonable prices. The determination of reasonable prices represents, therefore, the most important challenge for this market.

Great efforts have been made to improve the transparency of the market. Information on ABS notes will be provided to a centralised platform according to standardised criteria in order to facilitate investors' decisions as well as appropriate services offered by specialised vendors.

If transparency, simplicity and high quality standards are fundamental principles serving as foundation blocks for the ABS market, there still remains additional conceptual work to be carried out on liquidity (and therefore the determination of appropriate valuations) with the aim of providing a shared pricing methodology.

The research described in this book can be considered as a contribution to this fundamental effort and aspires to offer a thought-provoking view on a viable future methodology.

Education ranks high on the European Investment Bank's agenda. It is a key contributor to the Lisbon Strategy and underpins its activity in fostering social cohesion and promoting innovation. In parallel to its lending activity in this sector, the Bank has developed the EIB-Universities Research Action to channel its institutional support to higher education and academic research. The Action is designed to respond in a consistent way to requests coming from European universities—notably for financial assistance but also for research input. It also

[16] The initiative does not intend to replace the credit analysis provided by rating agencies, but rather to ensure that the origination process abides by predefined quality standards

[17] The functioning of the secondary market (in terms of trading venues, repo market, valuation models, bond indices etc.) will be reviewed in the second stage of the initiative.

facilitates the academic and research work of the Bank's staff. The EIB supports university research by means of the EIBURS program (supports research on topics of major interest to the Bank), the STAREBEI (supports joint interests of university centres and EIB staff, providing traineeship to researchers), and the University Network Sponsorship Mechanism (sponsors university networks with characteristics relevant to the EIB Group's objectives).The EIB Treasury Department proposed the topic of "Quantitative analysis and analytical methods to price securitisation deals" in 2006 under the EIBURS grant program, prior to the start of the crisis. It was hardly expected at that time that securitisation could be the cause of a worldwide crisis, even if there were critics of securitisation and in particular of "originate to distribute" techniques. The research project was received by EURANDOM, Eindhoven University of Technology, and resulted in a 3-year collaboration between EIB and EURANDOM. Research on the topic became understandably very timely and the results will contribute to a better understanding of the strengths and weaknesses of securitisation.

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