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ANIMAL FIGURES & ALPHABET SOUP

Understanding the Fat-tails of
Asset Backed Securities

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Acknowledgement

INSOL is pleased to present an interesting and very readable technical paper titled “Animal Figures and Alphabet Soup”: Understanding the Fat Tails of Asset Backed Securities” written by Sebastián Miralles. This is the 6th paper under this series.

Fat tails are statistical irregularities, in which very low and high values are more frequent than a normal distribution predicts. Some real life statistical series demonstrate occurrences of low and high values that are greater than theoretically expected by a normal distribution. These irregular occurrences or extreme events are described as “fat tails.” To put it simply, fat tails are seen when strange things are more common than normally expected, and when events stray too widely from the average.

Fat tails are an important concept for modelling returns and estimating risk and therefore reinforce the idea that past results do not guarantee future results.

Asset Backed Security, **(**A.B.S**)** describes finance structures where the underlying obligation and the source of interest and capital repayment is generated from the cash flow from a particular financial asset or pool of assets or from the predetermined proceeds from the disposal of such assets.

This paper provides a good understanding of what asset backed securities are; their benefits and dangers, and in particular legal issues that may arise when considering and managing such securities.

INSOL would like to thank Sebastián Miralles for writing this paper on this very interesting topic. Our members will no doubt find the information extremely useful.

ANIMAL FIGURES & ALPHABET SOUP

Understanding the Fat-tails of Asset Backed Securities

By: Sebastián Miralles

On March of 2007 I presented what at the time appeared to be an aggressive entry for the Richard Turton award. It involved an assessment of the then theoretical dangers lurking in the structure of Collateralized Debt Obligations in light of the rising home foreclosure rates. One year later, with $312 billion[1] fallout in confirmed write-downs and possibly another $700-$900 billion[2] in the works, the ideas espoused no longer seem out of the ordinary, but have rather come to gain pressing relevancy. Though the financial press has done a conscious effort to educate investors, it remains a complex matter whose diverse interacting elements are seldom presented. This paper seeks to help INSOL members by consolidating a general understanding of the structure of Asset Backed Securities ("ABS's"), their benefits, their dangers, and the key issues going forward.

Asset backed securities are indeed complex, but in the end it is simply a pooling of rights

A lawyer, accountant or normal human being first jumping into the subject of ABS's will soon find himself sinking neck deep in an alphabet soup of acronyms (eg. CMBS, MBS, CDO's, CDS's, CPDO's, and much more). These acronyms represent the fruits of two decades of financial engineering at the hands of well caffeinated Phd's. However, for our purposes these distinctions unnecessarily obscure the nature of ABS's[3].

On a basic level, an asset backed security is an issue that pools the rights to a series of liens. It usually consists of a holding trust, also known as a special investment vehicle (SIV) that is setup by an originating entity to hold a specific type of cash flow generating assets. The purpose of the trust is to pool the cash flows and split them up amongst the holders of the trust according to contractually based

[1] As of April 28, 2008. These figures only encompass all asset losses from reporting banks and securities firms. This may exclude relevant numbers from hedge funds, insurance firms. Asset backed securities are not necessarily reported separately from other losses.
"Subprime bank losses reach $312 billion with RBS". Bloomberg. April 28, 2008
[2] Final estimates on losses are very tentative and are in the author's opinion more likely to be on the top side of estimates than on the low end. Unfortunately as explained in this article, the nature of ABS makes prediction of final losses an archane art.
"Goldman sees credit losses totaling $1.2 trillion". Reuters. March 26, 2008.
"Containing Risk Systemic Risks and Restoring Financial Soundness". IMF Global Financial Stability Report. April 2008.
[3] For the purpose of this paper, we shall simply refer to all securitized assets as asset backed securities. As a side bar, the eager reader will be able to find a short definition of the most frequently used terms used regarding the subject matter.

formulas. These now pooled cash flows are then packaged into securities that can be sold to investors through a broker. In many cases, these trusts will also have an established servicer and/or administrator to collect the payments on behalf of the security holders. The importance of this servicer will vary depending on the amount of active management he may have in the collection process.

The underlying assets are usually debt obligations of small monetary amounts that contain characteristics that generate unpredictable payment schedules. The combination of small principal and payment uncertainty make them unacceptable for institutional investors. This lack of acceptability for institutional investors reduces liquidity and increases the cost for the borrowers. However, by pooling the securities, the law of large numbers takes hold and the combined cash flows become much more predictable, thus making these obligations an acceptable asset for institutional investors. This results in lower borrowing costs and greater efficiency for the market as a whole. The complexities arise from:

- The type of underlying liens
- The way these cash flows are pooled
- The way these flows are carved up & valued

Underlying obligations can have very diverse origins; everything from a home mortgage to a credit card receivable to a levered buyout loan. In fact, it is this variety that generates the fore-mentioned alphabet soup that usually denotes the asset being securitized (see sidebar). The unifying factor is that unpredictability of cash flows that may take many forms. This is best exemplified in mortgage backed securities (MBS's) where debtors have the option of prepaying their mortgages (known as prepayment risk) when interest rates are favorable to them.

Because the cash flows from the trust are now predictable, these can now be split amongst the owners of the trust. However, financial engineers quickly realized that it is not necessary to share these payments evenly. Instead, these can be split according to the risk/return characteristics desired; the resulting splits are known as tranches.

Some acronyms:

Credit Default Swap (CDS) – Product that is structured to payout in case an issue defaults. Value is shown by iTraxx & CDX indexes

Collateralized Debt Obligation (CDO) - Any product that structures credit risk into tranches

Mortgage Backed Securities (MBS) – ABS where the underlying are residential mortgages

Commercial mortgage-backed securities (CMBS) – An MBS based on commercial property

Constant Proportion Debt Obligation (CPDO) – Heavily leveraged ABS that sells CDS to invest in a risk free asset and guarantee cash flow

Collateralized bond obligations *(CBO) - ABS where the underlying are corporate bonds*

Asset-backed credit default swaps (ABCDS) - A CDS whose underlying is another ABS

CDO square (CDO^2) – A CDO or ABS that is uses as an underlying another ABS. This greatly enhances the possibility of a modeling error. There are also CDO^3, etc. Each new step increases susceptibility to modeling risk

Synthetic CDO – CDO that attempts to replicate another asset by using CDS's as underlying that gain it exposure to a particular sector

Source: Elisa Parisi-Capone. "Structured Finance Glossary – Making Sense of the Alphabet Soup" January 7, 2008. RGEMonitor

The process of establishing these tranches is based on actuarial estimations and is extremely complex. It requires statistical models that for the most part are based on past market performance to predict such things as default rates, prepayments, liquidity risk, counterparty risk, etc. In the case of subprime mortgages, these tranches were often times saddled with junk bond ratings. To correct this, the firm structuring the MBS would use internal and external credit enhancement. In some cases the process was so complex that rating agencies themselves were hired as consultants to help structure the products and enhancements in a way that would be acceptable for awarding investment grade status to some or all the tranches.

Thus, depending on the resulting structure and covenants some of the resulting tranches can be quite secure. This is how even subprime mortgages can be converted into AAA instruments. The other less secure tranches were often bought by hedge funds, who believed they had sufficient expertise to value properly the underlying and its enhancements.

Credit Enhancement

Internal enhancements:

- *Debt covenants & seniority of cash flows*
- *Excess collateral*
- *Reserve account*
- *Excess spread*

External enhancements:

- *Bond insurance/surety bonds*
- *Wrapped securities*
- *Letter of credit*
- *Implicit guarantee*
- *Explicit guarantee*

The black swan in the soup. Risk is not linear

As was shown, the value of any one ABS is dependent on the inputs used to set a value to it. Unfortunately, for the most part these values are assumed to occur in structured randomness, namely with a normal bell curve distribution.[4] This means things do vary, but only in predictable ways that resemble the immediate past. This holds quite well for the steady state economic conditions as were prevalent some years back when ABS were being structured. However, when the economy shifts the statistical models fail as they did not account for highly improbable events, also known as fat tails[5]. At this point, the correlations, and distributions that form the basis for the prepayment, default and other assumptions break-down. When this occurs the value of the tranches begins to fluctuate. Some of the less secure tranches find that the expected cash flows do not materialize and the ABS may become "broken". Thus the valuation and risk control methodologies that were supposed to protect bondholders become useless in the face of this shift in market conditions. This is at the center of the current crisis surrounding asset backed securities.

Giving the interlocking nature of ABS, each new default adds pressure on related securities such as CDS's, and further causes the statistical valuation models to shift, largely altering the value of the

[4] More on this can be found in Nassim Nicholas Taleb's book The Black Swam, the impact of the highly improbable and in Fooled by Randomness, *the hidden role of chance in life and in the markets*.

[5] Some advanced methodologies such as GARCH try to use modified statistical models to account for these fat-tails. Their success in doing so has been mixed; the improbable is simply hard to model because it defies our current conception of market reality.

security. The effect compounds in the financial version of a bullwhip effect[6] and causes significant increases in volatility and price reductions as risk is increased and cascades down to other assets. Ultimately this means the extent and effect of this crisis cannot be adequately determined. Suffice it to say that there are currently $692 trillion in derivative contracts outstanding, 58 trillion of which are CDS's.[7]

Some legal issues that may arise

Asset backed securities present unique legal constructions that may generate legal issues that must be considered when valuing or managing them. Some of these include:

- **Conflicts of interest between servicer and originator.** Many times the originator of an ABS is also the servicer or trustee in the special purpose vehicle. The trustee has certain degrees of legal leeway for exchanging underperforming securities and even renegotiating payment terms if favorable to the trust. However, oversight of this fiduciary duty may be complex due to opaque structures and limited reporting requirements. This generates the potential for abuse and self-service.

- **Dependence on ratings.** ABS's are especially sensitive to the effects of rating opinions of rating agencies. Unfortunately, the rules for rating these instruments are somewhat of a black box, making it hard to model the fair value of the security. This opens the door for possible litigation. For example, many institutional funds may not hold below investment grade securities and any rating change could result in massive sell-off and unexpected losses.

- **Difficulty documenting ownership title.** ABS are mostly originated by entities others than those that packaged, sold and much less hold the issue now. In the case of MBS's this usually implies a small mortgage origination firm that subsequently sold the mortgage to a broker who in turn sold it to an investment bank to securitize it and which in turn brought it to the market where it may have exchanged hands frequently as would a stock. Unfortunately, ABS's do not transfer ownership as stocks do. At the end of the day, the product is still a series of mortgages whose title must be endorsed and whose supporting documentation must be transferred physically. This process is not clear cut as many originators were small, went out of business, and there was a pervasive air of lax documentation compliance. There is a theme emerging that many ABS's lack sufficient documentation to allow lawyers to foreclose on property[8]. The implications add a legal risk dimension that is not considered in mainstream valuation models, and should be included in any distressed debt due diligence procedure.

[6] The bullwhip effect refers to a phenomenon in logistics management where small seemingly unimportant changes in demand can cause large ripple effect down extended supply chains.
[7] "BIS Quarterly Review". Basel International Settlement Bank. June 2008.
[8] "Foreclosures Hit a Snag for Lenders" New York Times. November 15, 2007

- **Walkouts.** Regarding MBS's again an open question remains regarding how mortgage debtors shall react when faced with negative equity; when they owe more than their houses are worth. The effects on housing prices have been extremely varied world-wide depending on the particularities of each property market, but with real and continuing declines of 25% in property value in the United States the incentive for borrowers to "turn in the keys" is getting higher[9]. The risk of this happening is not likely to be linear, but rather would present an inflection point when homeowners reach negative equity. Monetary could be significant; almost $3 trillion in mortgages could enter negative equity this year and general foreclosures in the United States are up 65 percent as of May.[10]

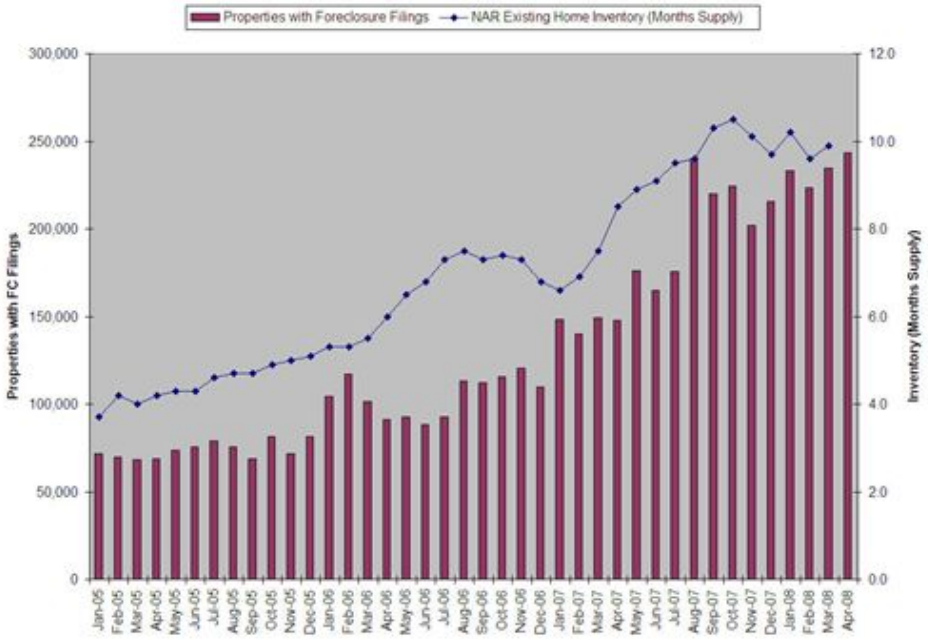

Figure 1 - Evolution Foreclosures USA. (Realty Trac 2008)

Usually, a walk-out necessitates a forced auction of the property (sheriff auction). Assuming negative equity means that the debt is not fully settled and leaves lien holders with little immediate recourse for the remainder except for costly litigation. This may last years and may involve monitoring the financial status of the debtor with the hope of recouping losses. This is the field day scenario for trial lawyers. Though foreclosures are up, it is hard to know how many people will resort to this so called "jingle mail".

[9] "Existing Home Sales Probably Decreased: U.S. Economy Preview". Bloomberg. May 18, 2008
10 "U.S. Borrowers Abandon Mortgages as Prices Decline, WSJ Says". Bloomberg &
"Foreclosure activity increases 4 percent in April" RealtyTrac Inc. May 14, 2008

- **Maintaining foreclosed properties.** In many countries holders of liens are legally obligated to maintain in good state the foreclosed properties. While not easily quantifiable, this cost includes the necessary improvements for getting the property ready for sale, as well as the administrative fees to manage this process. In worst case scenarios these expenses could be prolonged and would affect MBS through greatly increased service expenses.

- **Liabilities of consultants and rating agencies.** A thorny issue that is gaining increasing attention is the possible liability of consultants and rating agencies who helped structure and sell these products. Specifically in the case of rating agencies, there is an apparent conflict of interest arising from the act of helping structure and of rating the same issue. This conflict was not proscribed by legislation or regulatory bodies, so criminal liability is likely limited. Civil litigation would have to be established on a case by case basis, with the burden of proof residing with affected stakeholders in the securities. This process promises to be costly and time consuming for all parties.

  Litigation against financial advisors and sell-side individuals that suggested including these assets in secure portfolios will also be dealt with on a case-by-case basis. It must be proven that fraudulent advice was willfully given, investment mandates violated, information withheld, and/or criminal negligence executed. Additionally, the buyer would have to prove a certain lack of sophistication for properly understanding the risks involved; this would be a challenge given ABS's are generally targeted to larger institutional investors.

- **Maintaining control of trust.** The trusts that manage SIV's have a fiduciary duty to the beneficiaries, but maintain certain independence and are usually directly or indirectly run by the investment bank that originated the ABS. In the case of MBS's the trust can legally renegotiate the conditions of a mortgage in case it is deemed advantageous for the bondholders. What the limits on this are is not altogether clear, and there is potential for conflict of interest that could harm bondholders. Indeed the US Secretary of the Treasury, Henry Paulson, has actively lobbied for this solution through the Hope Now initiative.[11] A position similarly echoed by Silvio Berlusconi across the Atlantic.[12] If political pressure induces servicers to focus on alleviating the subprime crisis over protecting bondholders, this could become a fertile ground for litigation.

[11] "HP-599". US Treasury Press Room.
[12] "Berlusconi Mortgage Interest Relief Decree May Hurt Bondholders". May 27, 2008. Bloomberg

- **Possible monoline bankruptcy and litigation.** Several of the main bond insuring firms (AMBIAC, MBIA, ACA, etc.) have recently been downgraded and are faced with the specter of looming bankruptcy. This lowers the value of the bonds they insure, given the disappearance of the external enhancement that was previously assumed. In the event of massive defaults and monoline bankruptcies, litigation would surely result over seniority of claims to the remaining assets of the monolines.

Conclusion

Asset backed securities are complex products that can be understood as a well intentioned attempt to pool uncertainty in an effort to make it more predictable and ultimately reduce the cost of lending to riskier clients. This attempt has backfired. The assumptions and static models that were believed infallible now show themselves to be little more than intellectual exercises. The effect of this intellectual fallacy is already leaving behind it a wake of legal, financial and regulatory issues that will take years to sort. The world is left wondering how much exactly this mistake will cost.