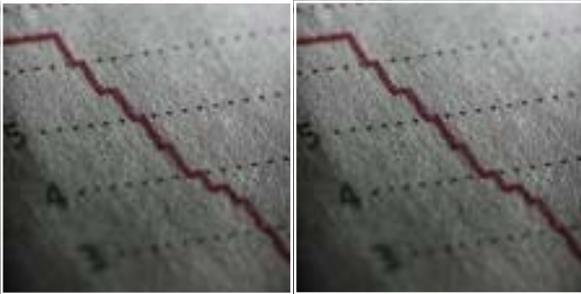


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A Banker's Perspective on the Financial Crisis

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Summary

During the last several years Robert Amzallag as Senior Fellow at CIRANO has taken an active interest in the research and transfer activities undertaken by the Finance Group. He has suggested initiatives that would be relevant to the financial industry in Montreal, particularly in derivative products and concerning practical issues in governance at the director's level. As the former President and CEO at BNP Paribas (Canada), Mr. Amzallag is certainly well placed to offer insightful commentary on the financial crisis that has preoccupied us over the last several months.

Mr. Amzallag's presentation combines a retrospective analysis of root causes of the crisis followed by some thoughts on what's to come. As to causes, he isolates three trends that have been gathering force over several decades. These include the erosion of certain stabilizing factors, particularly in the credit market, that has led to extreme concentrations of risk. Looking to the future, Mr. Amzallag cautiously explores the consequences of several scenarios or responses to the crisis. The first two represent the pursuit of policies reflecting established political sensibilities involving different degrees of government intervention. The third represents a more thoughtful re-appraisal of the different functions that the key players—governments, central banks,

regulators and financial institutions —should pursue and should be left to pursue.

We have also invited CIRANO Fellow Michel Magnan, Professor of Accounting at Concordia's John Molson School of Business to present an overview of the controversy surrounding *marking to market*, an issue highlighted by Mr. Amzallag as an important aspect of the crisis. Professor Michel Magnan takes up the technical but crucial issue of whether fair-value accounting [FVA] was an inadvertent messenger of the financial crisis or was an actual contributor to the crisis. The point is far from academic.

By way of appendices to these presentations, the Finance Group has prepared a graphic tool that permits the time-series presentation of key financial indicators against the historical background of the crisis. As well, we have prepared a primer on structured products, including synthetic CDOs, that have played a lead role in the current crisis. This presentation leads naturally to the software module developed at CIRANO that explores the risk management dimensions of these products.

Bryan Campbell
Vice-President, Finance Group

A Banker's Perspective on the Financial Crisis

Robert Amzallag

FIRST

What Caused the 2007- 2008-2009 Financial crisis?

The current financial crisis has reached frightening proportions. The fear is a consequence, not only of the vast sums of money involved nor of news of the number of large and reputable institutions that appear to be ailing, but also the result of the lack of understanding of its real causes.

Central bankers, finance ministers and treasury secretaries of the most important nations are at a loss to explain what happened and how we got to the current debacle. This is clearly not reassuring.

In the end politicians – and of course an army of lawyers – will demand that the ‘bad guys’ who created this mess be found and brought to justice. They will no doubt accuse greedy bankers and their reckless traders, the current US administration or Congress, hedge funds, etc.... Legislation and court cases will follow to appease the public. The magnitude of the problem, however, and the far-reaching effects of any remedial action require more than ever a sober analysis of the causes of the current crisis, if future economic prosperity is to be preserved.

Like many major crisis, the 2008 financial meltdown is the consequence of several trends that have developed over several decades and then converged to create a powerful and unexpected storm.

The following observations were prepared in December 2008. There is always the worry that any remarks regarding ongoing events may be proved incorrect or seem irrelevant before the computer file is even saved. None the less, this particular risk should be taken: we will need to craft some policies to avoid any repetition of the current situation, and we certainly need to have some sense of what caused the crisis before sensible remedies are advanced. Accordingly, my text is organized in two parts, one retrospective while the second looks ahead. Comments are welcome. Please direct them to robert.amzallag@cirano.qc.ca

In this current crisis, three main trends can be identified

First Trend: The Rise of Risk Measurement through Statistical Methods

In the late 1970s the notion of Value at Risk (VaR, in what follows) was created as a measure of market risks. As the number of financial instruments expanded and networks grew, global banks – Bankers Trust was the first one to address the problem – realised that giving each dealer a separate trading limit for each pair of currencies or traded instrument in each of their branches around the world would quickly overwhelm their capacity to consolidate and measure the aggregate risk engendered by such decentralization. The banks needed a new methodology in order to achieve a global view of their risks.

The VaR, a measure of the maximum loss to be expected within a certain probability from any given trading position, finally emerged as a powerful consolidating concept. Maximum probable future loss- in a statistical sense- could now be measured for each trader, dealing room, market activity and even for the whole institution. Moreover, such consolidation had the beneficial effect of reducing the capital required to cover the risk of open positions.

Then, when the time came to consolidate the total VaRs within an institution, it was quickly realised that some markets were largely correlated and some almost not. A more accurate assessment of the consolidated VaR needed to take this into account. As an extreme example, if a bank is long for the same amount in two different instruments that always move in opposite directions, clearly the total VaR is not the sum of each VaR but can be netted out to zero. Financial institutions convinced their regulators to take this mitigating factor into account further reducing the capital allocated to these activities.

However, a major difficulty quickly surfaced: future risk is a consequence of future price fluctuations which cannot reliably be predicted. A solution to this problem had to be found in order to salvage this powerful concept. At this point, professionals, academics and regulators took an unfortunate and dangerous leap of faith: they agreed that certain future events – such as price fluctuations, volatility, correlation between markets, and even

liquidity could be characterized using past behaviour and that by considering past series, we will know - within a chosen probability – the range of market movements.

Under normal conditions, the system worked so well that it was adopted by regulators, rating agencies and, as we shall see later, extended to measuring the credit risks in a bank's loan portfolio.

Indeed, these models kept operators away from dangerous and illiquid markets, which had in the past, experienced highly volatile behaviour. Most VaR models picked up these anomalies and steered institutions away from them by estimating high potential losses.

Through these models, steadier markets appeared as less risky. As a consequence, the size of the amounts traded was allowed to increase with the blessing of rating agencies and regulators who used the same models.

As more money was directed to these markets, price bubbles grew, returns increased, but VaR models that were based on long-term time series were only marginally affected by the recent rise in prices, masking the actual risk, while making these markets look even more attractive.

When the bubble finally burst, financial institutions were faced with a catastrophic (Black Swan) event, that had never before appeared in the time series of their models. They were no longer dealing with the tail end of statistical curves based on past data, but with a complete shift of the curve itself to a new area that they could not identify. In other words, the situation had changed so much that the data previously used in their models had become irrelevant.

Then, as an inevitable a flight to quality took place, pockets of illiquidity were created, other markets were affected, shifting the correlation factors between markets, on which these models had relied heavily to reduce aggregate risk.

In the end, financial institutions faced vastly larger losses than they estimated and remained profoundly uncertain as to where and how far these uncharted currents will take them. This incertitude often led to a decision to withdraw brutally from these markets, further worsening the

Financial institutions faced vastly larger losses than they estimated.

situation. The Far East crisis of 1998 and the LTCM debacle that followed are good examples of this pattern and should have alerted regulators to the simple fact that because economic history does not repeat itself, their modelling based on past data series was in times of instability, irreparably flawed. In hindsight this underlying assumption represents an egregious error of staggering proportions.

Second Trend: The Rise of Short-Term 'ism'

This trend has its roots in the 1970's when the Carter administration, followed by his successors, pursued a vigorous policy of deregulation in response to a stagnating industrial sector. The policy was a success in terms of restructuring the US industrial base, making it more competitive and creating the conditions for strong economic development. However, at the same time, tossed aside were several long-term stabilizing factors, such as life long careers in one company, loyalty to the firm, stable shareholding etc....

Under the threat of being acquired and broken up by raiders, it became a necessity for managements to deliver ever increasing profits quickly and predictably in order to sustain their companies stock prices. The time horizon for CEOs was gradually reduced until it became the next quarter's results. This hunt for short-term profits also promoted changes in compensation from fixed salaries based on long-term performance to a culture of pay for performance, with its large bonuses and stock options linked to short-term performance.

It was then a matter of time before the financial sector had to match these conditions to attract talent ready to take on increased risks. The formidable profits realised at first by venture capitalists then by hedge funds and private equity funds seemed to confirm the value of this approach in the financial sector. Soon, banks, which traditionally were an anchor of stability and prudence, were led by their managements to chase ever increasing short-term profits.

During the same period, globalisation spread its wings with mostly positive effects. Poverty retreated, especially in Asia, as global wealth increased. However, as US industrial jobs were shipped abroad and the notion of a long-term career with one company faded, the way to wealth - or at least

comfortable retirement for individuals as encouraged by the defined contribution retirement plans - implied short-term speculation. As individuals started to follow the path of industry and finance, the trend was greatly accelerated by the startling growth of the internet both in terms of providing investment opportunities, tools of money management and spreading information.

Short term economic decisions based on market sentiment took over from this point on.

Third Trend: Stabilizing Factors Disappear

As long as the above mentioned weaknesses were confined to market activities, the problems remained manageable. The stock market rebounded from the 1987 crash: in 1998, the Far East crisis remained regional and did not pose a systemic risk to the world's banks.

Indeed, until the 1990s, the credit market remained an anchor of stability. Although some individual banks were quite leveraged, the market as a whole was well funded by stable customer deposits. Each bank had teams of seasoned commercial bankers and experienced risk managers who kept losses manageable in normal economic circumstances. The diversity of these lending and risk teams assured that any mistake made by one institution was not reproduced by the others and did not spread to the entire market. A stable global environment for credit activities was then maintained creating a general confidence in the interbank market. The outside auditing firms were happy to trust these seasoned teams and left to bank's management the decisions about how much to provide for bad debts, while leaving the value of performing loans at face value (rather than applying the mark-to-market rules used in trading activities). This attitude allowed bankers to support clients in times of passing difficulty, providing thus the long-term stability that borrowers needed. Lending activity was a good provider of revenue, but was not conducive to rapid earning expansion. Bank managements in search of growth generally turned their attention to market and investment activities, thus preserving the strategic role of stable lending.

In the early 90s things started to change and an unstoppable march to the present crisis began. The serious real estate crisis of those years which

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almost destroyed large institutions – such as Citibank – convinced banks that keeping such assets on their balance sheets was no longer advisable. They started ‘securitizing’ loans that they originated and selling them outside the banking industry to investors. A very active and liquid market quickly developed for these products. Related instruments became more complex as loans were aggregated in different ways to offer a wide selection of returns and risk rating to cover the needs of investors. This approach was particularly true for mortgage loans. Subsequently, banks decided that another way to protect themselves was risk insurance, and they created the credit default swap (‘CDS’) market which became attractive for insurance companies.

All these ways of getting rid of on-balance sheet loans rapidly created a dangerous trend. Bank managements learned that lending could be a profitable high-growth activity, provided that the loans were rapidly removed from the balance sheet. The traditional partnership with clients was then destroyed when their loans were sold as securities and ended up in the hands of non-banking institutions, such as pension funds, fund managers and high net worth individuals. Clients gradually became aware that the loyalty that they had traditionally shown to their bank had become pointless.

As credits became market instruments, a price was attached to them. Accountants then decided that some loans should be marked to market, introducing volatility into the banks loan portfolios and in their results. They acted in a deluded sense of conservative rigour and overlooked the fact that an efficient mark to market requires the availability of continuous pricing that in turn implies liquidity, namely a market in which the securitized loans could be bought and sold readily, just as FX and other money market instruments can be.

Perhaps the most dangerous consequence was the concentration of risk assessment. In order to create a market for loan instruments or ‘CDS’, it was clear that a unique and common measure of the underlying risk should be used by all the participants. The finance industry had then to rely entirely on rating agencies. The beneficial influence of dispersed, experienced individual bank risk departments waned in favour of a centralized – and external from the banks - assessment of risks by major rating agencies. Any mistake in modeling or judgement had subsequently far-reaching ‘systemic’ effects, a dramatic departure from the past.

It is important to underscore the fundamental responsibility of these agencies that provided the favourable ratings of the securitized instruments. Based on these ratings, the models assessed credits quality in terms of probability of default estimated for each rating through historical data – the same mistake as in the FX and short-term market models – without any consideration of the fact that the lending process itself had fundamentally changed with the elimination of individual bank credit assessments.

At this juncture, the only thing that could have prevented a crisis in the US was a steady Federal Reserve policy and vigilant regulatory oversight. Unfortunately, since the 90s, the Fed itself had been infected by the short-term approach. While reassured by the benign inflation, supported by global imports from low-cost manufacturing regions and an information-technology induced rise in productivity, the Fed concentrated on its second mission to promote economic growth. Its board of governors adopted a short-term accommodating monetary policy, accentuating the growth periods and effectively countering any economic downturn.

The stage was now ready for a major crisis to happen; and it did occur in the following sequence:

After the internet bubble burst and the attack of 9/11, interest rates were brought way down to counter a deep recession;

- Investors, large and small, turned their attention to the real estate market that appeared more secure and was now affordable in view of low interest rates;
- Banks packaged huge amount of mortgage loans into CDOs and sold them;
- The rating agencies gave favourable ratings to these new types of securities;
- Based on these ratings and models rooted in past experience that implied low default probabilities, CDOs were bought in large quantities by banks, insurance companies and all sort of investors that

Any mistake in modeling or judgement had subsequently far-reaching ‘systemic’ effects, a dramatic departure from the past.

were new to this field had little notion of the liquidity and counterparty risks they were assuming;

- When mortgage defaults began rising and real estate prices started going down – a normal occurrence for any market - the price of the securitized mortgage loans went down as well – an abnormal (Black Swan) occurrence viewed from the traditional lending experience;
- The overleveraging of the investment banks and the off-balance sheet Enron-like vehicles created by several large commercial banks made them very vulnerable to a systemic loss of confidence and loss of liquidity;
- The enormous quantity of the securitized paper sold into the bond markets posed a catastrophic systemic risk;
- Moreover as everyone steered clear of this type of paper, liquidity suddenly dried up: to everyone surprise! No liquidity meant no market price, and therefore a further mark down;
- As losses piled up, banks got suspicious of each other and the interbank lending market – let alone client lending– came to a stand still;
- The new accounting rules required a mark to market of these assets creating losses for financial institutions, a situation that translated into a loss of capital on the balance sheets of the banks;
- Central banks and governments were obliged to step in, further alarming the markets and accelerating the failures of banks;
- Once Lehman Brothers was allowed to fail causing a default of more than [\$500] billion, trading ground to a halt in the short-term money markets and interbank lending;
- In view of the enormity of the securitized paper sold into the bond markets, the situation turned into the catastrophe in which we find ourselves to day.

And Now What's Next?

So far we have examined the causes of the financial crisis. It is important to understand how the present situation developed in order to correct past excesses but does it really help in predicting the future?

Many commentators have analysed previous crisis in great detail to find some kind of pattern that would help them forecast what will happen this time around. This would be a worthy endeavour if it had any chance to succeed. However, the vast range of – sometimes contradicting – outcomes proposed does not give much confidence in their conclusions.

Indeed, as we argued in the previous section, the past is not a reliable guide to future economic events. It is also clear by now that we are in completely uncharted territory. In this unsettled and fast changing environment, it becomes impossible to make a single definite prediction. Nevertheless, it is feasible to explore different scenarios and their possible consequences.

We have selected three very different possibilities. They each represent an extreme situation that will probably not happen as such. However, they each lead to well-defined outcomes. As such, they could be relevant in assessing the future state of affairs when we emerge from the present confusion and a clearer course of events starts to correlate with one of the three scenarios.

First scenario: A Quick and Painless Rebound

Although in these depressed times this scenario seems implausible, there is actually a reasonable chance that it might happen. Central banks have injected huge amounts of cash into the world's banking systems, Governments have panicked and begun to give away hundreds of billions of tax payer money to the financial sector precisely in the hope of restoring previous conditions. Meanwhile, professional investors have pulled money out of equity markets into cash and treasury bills or

equivalent. The consequence is that enormous liquidity is waiting on the sidelines.

This creates an unstable equilibrium and a minor set of good news could trigger an unpredictably large stock market buying spree.

Soon stock prices rush forward, short-term operators and hedge funds jump on the bandwagon pushing prices even higher. Then other markets recover as well and even if we do not reach pre-crisis levels, a sizeable recovery in assets prices occurs.

And then the
good old days
will be back.

When confidence returns and everyone feels better, the present consumption paralysis vanishes. Governments recoup, to a certain extent, their bailout investments. The pressure on politicians to intervene lessens. On this scenario, the only sector that takes time to recover is real estate. The main reason is that after such a major crisis, the conservative influence of risk departments in banks will be greatly enhanced. They will be in a position to impose very strict criteria for new mortgage lending, that they perceive wrongly as the main and perhaps only cause of past troubles. As they fight the last war's battles, they will restrict mortgage lending and slow down the real estate market for a while longer.

Nevertheless, as the recovery progresses, all markets participants will want to revert quickly to business as usual and restore previous conditions, before permanent, structural damage is done to their industry. This is true of course of banks, hedge funds and the like. But it is also true of all parties who benefit from a vibrant financial sector and are threatened by any fundamental changes: namely, lawyers, accountants, rating agencies and even regulators (The Fed, to take an example, mentioned recently that they would like to see the mortgage securitization market recover soon).

And then the good old days will be back. Or will they?

It is clear that this scenario does not address any of the problems that caused this crisis in the first place. It might even reinforce confidence in short-term fixes in what is perceived as an ever growing economy. Meanwhile, the same mistaken methodologies and policies would remain embedded in economic and political decisions.

Moreover, as market operators escape disaster, regulators, rating agencies and accounting firms will not feel any pressure to adjust their models and will consider the crisis as a freak event.

It is then easy to see that financial crises will recur, perhaps more frequently. Worse, as central banks inject greater amounts of liquidity each time around without reining in liquidity in good times, in order to avoid a healthy market correction, inflation will take off. This could be through increases of asset prices as has recently occurred or via a rapid rise of consumer prices affecting the inflation index. As interest rates rise and the bond market dips (as what happened during the 70s), downturns will increase in magnitude and create situations even more serious than the present one and this could very well lead to the second scenario. Whichever way, long-term effects will affect seriously the world economy.

Second Scenario: Governments Spread their Wings

At the other end of the spectrum can be found a completely different scenario.

There is no quick rebound. The economy is seriously affected and lingers in a state of recession. The usual remedies, such as injecting liquidity, lowering interest rates and taxes do not appear to work. Governments, after having invested too much in bail outs of the financial and some industrial sectors, lack additional borrowing power to conduct a serious Keynesian stimulus policy.

Most leaders worldwide and their advisors consider, after looking at recent downturns, that the ongoing one should not last more than two years. They seem totally unprepared for a much longer recession.

Consequently, as unemployment mounts, markets collapse, pensions vanish and millions are forced into poverty, politicians will be under enormous pressure to 'do something'. As each government scrambles to save its own economy, it will dedicate whatever resources it has to self-preservation rather than in a concerted effort to help the world economy. International solidarity will gradually break down. As a matter of fact, several recent events point in this direction, such as the Great Britain/Iceland dispute over deposits gathered by Icelandic banks from UK

There is no quick rebound.

residents, or the promises by US presidential candidates to review NAFTA in order to protect workers' jobs in the US.

The temptation for governments to interfere with the financial system will become great, even to the extent perhaps of launching commissions to identify the factors responsible for the crash; as in 1987 when futures (a product never mentioned in the present crisis) were singled out as the main culprit of that crash.

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countries.

Initially, the obvious scapegoats would be markets operators, such as hedge funds, bank trading rooms and short sellers. As they get targeted, these indispensable contributors to maintaining market liquidity will reduce their activities, further compounding the market collapse. Longer term, innovation in all areas will suffer as the financial risk takers that have been instrumental in promoting progress through funding of start ups will be in retreat.

Then, as these measures fail, lenders will become the next scapegoats to finger. Governments, having advanced large sums of money to banks, often becoming their largest shareholder, will be tempted to dictate lending policies. As a matter of fact, some European governments have already started to complain loudly about the restrictive credit and mortgage policies of the financial institutions they have helped. When, inevitably as a result of this interference, the quality of loan portfolios deteriorate, so will the credit ratings of the banks. As counterparties, they will be considered only as good as the support they get from their respective government. A similar situation prevailed with banks in communist countries in the 1970s and 1980s.

And this is where the main danger lies: governments will be fronting for the financial system of their respective countries. Then they will become themselves the main victims of the next confidence crisis; right at the point when their uncontrolled bail out programs will have depleted the last of their borrowing capacity.

Then who will governments turn to for help?

Certainly not the international institutions - IMF, World Bank – who have very limited means compared to the enormous scale of the financial

bailouts we are witnessing. Certainly not to other countries that will have reverted by then to extreme financial protectionism.

In reality there will be no one to turn to.

Carried to its logical end, this scenario leads to a full-fledged depression with potentially more serious down side consequences than we have ever experienced. In that respect, the current situation of Iceland represents a warning shot that should be considered carefully

This scenario leads to a full-fledged depression.

Third scenario: The Balanced Approach

As a consequence of our analysis, the most constructive way out of the present crisis seems to lie in a progressive and balanced return to a proper risk /reward structure in the economy. However, this transition has to be conducted in a responsible manner by all participants within their own spheres of competence, without destroying the risk taking culture that has brought innovation and progress to the whole economy.

1. Governments

First and foremost, our leaders should avoid giving the impression that they are panicking, and are simply throwing billions of taxpayer money at every economic bush fire. In fact, politicians will have to be extremely patient and recognize that any scenario that does not include a quick rebound implies a somewhat protracted recession.

Governments will have to resist political pressure and save their bailout firepower for use only in cases that represent extreme systemic risk for the economy. Once bailouts are made, such investments should remain passive and resold as soon as favourable market conditions return.

Meanwhile, it will be much more important for them to sustain the economy through demand stimulus policies.

In previous post war economic crises, consumers –mostly US consumers– saved the world from economic collapse. This time around, they have been panicked by the authorities’ inability to control the crisis. They are heavily indebted and seem to no longer have either the will or the capacity to come to the rescue. Meanwhile, as their sales collapse, businesses are

clearly in no position to pick up the slack either. In fact they will rapidly curtail their investments and lay off staff as it is already clearly apparent.

The only solution then is for governments to become ‘the spenders of last resort’. However, policies of either throwing money at the private sector which is in survival mode, or of putting cash in the pockets of individuals via tax rebates who won’t spend, simply won’t suffice. Governments must start buying goods and services urgently if they want to avoid the economy going into a tail spin.

Sizeable long-term investment projects, particularly in the areas of advanced infrastructure and energy, a classic Keynesian approach, have to be launched right away. Upgrading aging infrastructure is badly needed in many countries. Transforming our way of life away from an oil-based society is now an ecological must. These types of useful investments will not only create jobs and restore confidence but also lead to long-term economic viability, a much needed counterweight to the short term ‘ism’ of recent years.

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2. Central Banks

Central Banks have the responsibility to fight inflation. Surprisingly, prices of assets that affect economic decisions of households (such as real estate or stock market holdings) have never been included in the formula for inflation.

If this had been the case, the level of interest rates would have risen, long before several potentially dangerous financial bubbles could have reached a system-threatening size. One way or another, Central Banks need to identify these bubbles and to act early to restrain them.

3. Regulators

Regulators have a pivotal role to play. For one thing, having a proper risk/reward policy requires proper risk measurement. It will be the regulators urgent responsibility to coordinate a review of current risk models with academics and market participants. As far as market risk is concerned, clearly the methodology used to conduct stress tests has to be modified to include an analysis of the behaviour of markets under extreme conditions.

Beyond that, regulators will have to curb excesses in financial institutions that induced excessive and often irresponsible risk taking. These include: large remuneration given to traders without accountability for subsequent losses; blind faith in rating agencies' reduced reliance on traditional and experienced credit risk departments.

Meanwhile, regulators should also resist pressure to create new rules that will directly interfere with the functioning and risk appetite of institutions. They should, as advocated in the UK, impose extra capital requirements for risky policies instead of simply ruling them out completely. This approach will deter some institutions from taking undue risks and solidify the capital of the ones prepared to take them. More importantly, it will preserve a healthy risk culture so important to support innovation.

Finally, regulation should extend to key service providers such as legal firms, auditing firms and rating agencies to make sure that they act in an ethical manner and within the confines of their demonstrated competence.

4. Financial Institutions

There are clearly many measures that financial institutions will have to take. It is not the purpose of this presentation to describe them in detail but two points seem particularly important.

The first one concerns risk management. It is obvious that all financial institutions will undertake a profound revision of their approach to risk. In doing so, they will need first to clearly separate market risk and credit risk not only in terms of risk appetite, capital allocation but also in setting up their risk departments in a way that will recognize the two different type of skills that are required. Market risk supervisors should be familiar with the appropriate statistical approach but also be imaginative as they will have to reconsider their models and improve them to incorporate the possibility of future crises of a type never seen before. Credit facilities (they represent 70% of bank losses historically) on the other hand should be recognized as long-term commitments and managed by experienced bankers with old-fashioned prudence.

At the same time, managements should also be careful to preserve the risk appetite of their institution even in the face of mounting losses: this is the indispensable ingredient of future progress. They should therefore be

Credit facilities should be recognized as long-term commitments and managed by experienced bankers.

careful to state clearly their risk policy and keep their risk professionals within the confines of their responsibilities.

The second point concerns the quality of staff. Financial institutions should resist the new ‘politically correct’ attitude of vigorously restraining remuneration and bonuses below market levels. Indeed, if the financial sector becomes less competitive in attracting talent, financial innovation will suffer and so will economic progress as a whole in the long run. Of course, bonuses have to be more risk- and time-weighted in the future in order to ensure that employee contributions create quality earnings. However, the industry as a whole should remain competitive and attractive for talented young professionals.

5. Directors

In recent years, it has been very difficult for directors to keep up with the ever increasing sophistication – or even complication – of financial products. The understanding of the statistical methods underlying the risk measurement and the adequacy of the stress tests does not come with experience but requires appropriate training. The losses suffered by financial institutions but also other companies that have invested in this type of products show that managements were not sufficiently challenged by their board. Evidently, this crisis has come as a surprise to all parties involved including managements, professionals and operators and therefore directors were not in any better position to anticipate it.

However, and in view of their personal responsibilities, directors will have from now on to learn more about modern risk management in order to identify and probe financial risks early.

As described, these scenarios are extreme and it will be very surprising that any of them develops in its pure form for the following reasons:

The magnitude of the present market retreat makes the first scenario difficult to imagine.

The second one which seems to have the most pull right now is also the most dangerous and the hope is that politicians in well-balanced democracies will resist it in time.

As for the third scenario, it is a long-term and complex process that require inspired and serene leadership, patience as well as political courage; undoubtedly a very unusual mix nowadays.

However, the trends that will no doubt soon become evident will indicate the future path of events. If they somewhat align with one of these scenarios, it will be possible to a certain extent to foretell the type of consequences to be expected. At this stage, the fear is that a continuing quick deterioration of the economy takes us along the path of the second scenario.

The hope is that some of the measures already taken create a moderate rebound in the markets. As the threat of immediate collapse recedes, it will create the necessary conditions for a more balanced interaction between the various participants: financial industry, regulators, governments that will lead through some trial and error to a solution approaching the third scenario. Then, after an inevitable recession, most of the structural shortcomings that created this crisis would be corrected giving rise to a new start provided that, as President Mitterrand once said “One leaves time to time”.

“One leaves time to time”.

Appendix 1
www.cirano.qc.ca/cec
CIRANO Finance Group



Financial Crisis 2008-2009

Chronology

The CIRANO Finance Groupe has prepared an interactive application that permits the user to chart various financial and economic time series against the backdrop of the major events of the past year. The application can be found at the above address and is available to all.

The user may choose among 24 series grouped according to various categories: Stock Market Indices, Stock Market Volatility, Corporate Credit Indices, Housing, Interest Rates Inflation. Up to three series may be chosen for display, and the axes for each series appear at the right, left and middle of the display in the order the series is chosen. A series may be removed and replaced with another. The user may also choose the desired time frame for display in one of two ways. The period may be chosen directly by selecting one of the options available at the top of the graph; alternatively, a period may be chosen by dragging the vertical borders of the bottom display.

Historical events are indicated by boxed letters within the display. The user may click on a letter to be directed to the event in question that is displayed with date on the right. An associated pop up [available for some events] gives a short description of the event with a link to a news source. Data will be added on a regular basis.

Updated to: December 9, 2008

Commentary

In trying to organize an economic framework for assessing the events of the past year, we have found a number of commentaries to be particularly useful. These are organized around several themes. A short account of the article is given along with a link to the web site where the complete article may be accessed. This initiative is very much a work in progress and will be revised from time to time.

Launch date: January 12, 2009

Appendix 2

Fair Value Accounting and the Financial Crisis: Messenger or Contributor?

Michel Magnan

Abstract

Did fair value accounting play a role in the current financial crisis? This appendix explores the issue. Fair value accounting implies that assets and liabilities get measured and reflected on a firm's financial statements at their market value, or close substitutes. Extensive academic research done over the past 20 years shows that financial statements that reflect the market values of assets or liabilities provide information that is relevant to investors. In other context, fair value accounting is just a messenger carrying bad news. In contrast, there is also another research stream which is quite critical of the perceived merits of fair value accounting, and which worries about how it undermines what constitutes the core of financial reporting. More specifically, it is argued that fair value accounting is difficult to verify, may be based on unreliable assumptions or hypotheses and provides management with too much discretion into the preparation of financial statements. Hence, according to this view, fair value accounting is not necessarily a neutral or unbiased messenger. Moreover, fair value accounting creates a circular dynamic in financial reporting, with markets providing the input for the measurement of many assets, thus affecting reported earnings which are then used by analysts and investors to assess a firm's market value. If markets become volatile, as has been the case in recent months, reported earnings also become more volatile, thus feeding investors apprehensions. Therefore, since fair value accounting is associated with more volatile and less conservative financial statements and, it may have allowed managers to delay the day of recognition as well as distorted investors and regulators' perceptions of financial performance and stability at the end of the financial bubble. However, once the economic pendulum swung back, fair value accounting may have magnified their views as to the severity of the current financial crisis, hence accelerating some negative trends.

Introduction

Despite its almost universal adoption by accounting standard setters, the merits of fair value accounting continue to generate intense and passionate debates among academics, businesspeople, regulators or investors. A surprising element underlying these debates is the apparent irreconcilable positions adopted by participants in favour or against fair value accounting. However, the current financial crisis has significantly raised the level and stakes in that discussion, with fair value accounting increasingly being under attack. For instance, the U.S. Congress recently mandated the Securities and Exchange Commission to investigate and report on fair value accounting's contribution to the financial crisis. In reaction, some standard setters such as the Canada's Accounting Standards Board, the Financial Accounting Standard Board and the International Accounting Standard Board have recently introduced temporary provisions waiving some aspects of fair value accounting for financial institutions.

The purpose of the Appendix is to provide additional insights into the role played by fair value accounting in the financial crisis. Since the crisis is still ongoing, there is no direct or formal empirical evidence about such role, which may be perceived, actual or potential. However, by analyzing the conceptual and empirical foundations of fair value accounting, it may be possible to draw some inferences and to assess if and how fair value accounting underlies some of the recent turmoil in financial markets. In that regard, the Appendix aims to achieve the following objectives. First, I intend to provide a brief overview of fair value accounting, including its impact on financial statements. The overview includes a summary of the opposite viewpoints on the merits of fair value accounting. Second, I present and discuss the theoretical and empirical underpinnings of fair value accounting. Thirdly, I analyze the measurement and valuation challenges that arise from the use of fair value accounting. Finally, on the basis of the above analyses, I sketch a tentative framework to understand fair value accounting's role and potential contribution to the financial crisis. While fair value accounting can conceptually apply to all aspects of a firm's financial statements, I will purposefully focus on its application to financial instruments and financial institutions.

Context

Fair value is defined as the price at which an asset could be exchanged in a current transaction between knowledgeable, willing parties.¹ For liabilities, fair value is defined as the amount that would be paid to transfer the liability to a new debtor. Under fair value accounting (FVA), assets and liabilities are categorized according to the level of judgment (subjectivity) associated with the inputs to measure their fair value, with three (3) levels being considered. At level 1, financial instruments are measured and reported on a firm's balance sheet and income statement at their market value, which typically reflects the quoted prices for identical assets or liabilities in active markets. It is assumed that the quoted price for an identical asset or liability in an active market provides the most reliable fair value measurement because it is directly observable to the market (« mark-to-market »). However, if valuation inputs are observable, either directly or indirectly, but do not qualify as Level 1 inputs, the Level 2 fair value assessment of a financial instrument will reflect a) quoted prices for similar financial instruments in active markets, b) quoted prices for identical or similar financial instruments in markets that are not active, c) inputs other than quoted prices but which are observable (e.g., yield curve) or d) correlated prices. Finally, certain financial instruments which, for example, are customized or have no market, will be valued by a reporting entity on the basis of assumptions that presumably reflect market participants' views and assessments (e.g., private placement investments, unique derivative products, etc.). Such valuation is deemed to be derived from Level 3 inputs and is commonly referred as "mark-to-model" since it is often the outcome of a mathematical modelling exercise with various assumptions about economic, market or firm-specific conditions.² In all cases, any unrealized gain (or loss) on financial instruments held by an institution translates into an increase (decrease) in its stockholders' equity and, consequently, an improvement (deterioration) in its capitalization ratios.³

¹Financial Accounting Standards Board. 2006. Financial Accounting Standard 157 - *Fair Value Measurements*. Norwalk, CT.

² For more details, see FAS 157 and FAS 159 - *The Fair Value Option for Financial Assets and Financial Liabilities*.

³ Currently, while all unrealized gains or losses on financial instruments do affect a firm's stockholders' equity, they do not necessarily directly affect its reported net earnings. Some gains or losses may flow through an intermediate performance measure which is labelled *Other comprehensive income* and which is distinct from reported net earnings.

Detractors, among them David Dodge, the former Governor of the Bank of Canada, argue vehemently that FVA has accelerated and amplified the current financial crisis.⁴ Their argument can be summarized as follows. Starting in 2007, the drop in the price of many types of financial instruments led financial institutions to mark down the asset values reported on their balance sheets, thus weakening their capitalization ratios (let's think about the first write-offs following the start of the subprime crisis). To improve their financial profile and to enhance their safety zone with respect to regulatory capital requirements, these institutions started to sell securities or close down positions on some financial instruments in markets that were increasingly shallow as a result of the emergence of a liquidity crisis. These sales magnified the downdraft in quoted prices, thus bringing additional devaluations, etc. Along these lines, William Isaac, former Chairman of the U.S. Federal Deposit Insurance Corporation, argues that "mark-to-market accounting has been extremely and needlessly destructive of bank capital in the past year and is a major cause of the current credit crisis and economic downturn".⁵

However, FVA can count on broad support from the accounting profession, standard setters and regulators. For instance, in a recent speech, Nick Le Pan, Canada's former Superintendent of Financial Institutions, argued that FVA is only a messenger and should not be criticized for merely reflecting the poor underlying economic outlook.⁶ Barbara Roper, from the Consumer Federation of America, argues that sound accounting principles, such as FVA, led to the exposure of underlying problem assets. In her view, FVA provides more accurate, timely and comparable information to investors than any other accounting alternative.

⁴ See McFarland, J. and J. Partridge. 2008. Mark-to-market' accounting rules fuel debate. The Globe and Mail – Report on Business. November 20.

⁵ Jeffrey, G. 2008. Mark market debate down as a draw. The Bottom Line, December, p. 27.

⁶ McFarland, J. and J. Partridge. Idem.

Theoretical and Empirical Foundations Underlying FVA

FVA's theoretical and empirical premises are relatively solid. In fact, it is one of the few accounting standard that can be traced back directly to accounting-based scientific research. More specifically, there is consistent empirical evidence, accumulated over the past 20 years, that a firm's stock price is more closely associated with the market value of its underlying financial or real assets than with their historical cost, i.e., their purchase price plus related expenses.⁷ The superior relevance of market-derived values is even more obvious in the case of financial derivatives which historical cost is often close to zero but which market value can fluctuate widely.⁸ In other words, fair values, or marked to market values, have been found to be more relevant indicators of firm value than traditional historical cost-based figures.⁹

An interesting early study on the relevance and implications from FVA was performed by Bernard, Merton and Palepu (1995). For many years, Denmark's accounting standard-setting and banking regulatory authorities have relied on mark-to-market valuation for the assets of their commercial banks.¹⁰ Bernard, Merton and Palepu find that Danish banks' book values, which reflect mark-to-market valuations, seem to provide more reliable information to investors than historical cost-based figures then provided by U.S. banks. Moreover, they do not find evidence that Danish bank

⁷ See, among many papers, Barth, M E, W H Beaver and W R Landsman. 2001. The relevance of the value relevance literature for accounting standard setting: another view. *Journal of Accounting and Economics* 31, pp 77–104; Landsman, W.R. 2006. Fair Value Accounting for Financial Instruments: Some Implications for Bank Regulation. Bank for International Settlements Paper.

⁸ Venkatachalam, M. 1996. Value-relevance of banks' derivatives disclosures. *Journal of Accounting and Economics* 22, pp 327–55.

⁹ While studies take many different forms, the most widely used approach closely resembles the following (simplified version of a regression):

$$\text{Price}_{it} = \beta_0 + \beta_1 \text{Assets(at costs)}_{it} + \beta_2 \text{Liabilities}_{it} + \beta_3 \text{Unrealized Gain(Loss)}_{it}$$

Where i represents a specific firm, and t , a given year-end. Variables are measured in \$, in \$ per share, or standardized by proxies for firm size. Price equals a firm's stock market price while both Assets and Liabilities are as on the balance sheet (consistent with Generally Accepted Accounting Principles). Unrealized Gains(Losses) reflect the difference between an asset market value (according to FVA) and its book value (according to GAAP). FVA-measured information is deemed to be more relevant for investors if results from the regression model show that β_3 is positive and statistically significant.

¹⁰ Bernard, V., R. Merton, and K. Palepu (1995). Mark-to-Market Accounting for Banks and Thrifts: Lessons from the Danish Experience. *Journal of Accounting Research* 33 (Spring), 1-32.

executives manipulate mark-to-market numbers to circumvent regulatory capital ratios. However, they also point out that that the Danish and U.S. capital markets are not quite similar and that their findings may not completely hold in a U.S. setting.

On the basis of these empirical findings, many accounting professors have actively lobbied standard setters such as the Financial Accounting Standards Board to 1) introduce FVA into financial statements, initially through footnote disclosure, 2) gradually reduce the relative scope of historical cost-derived assets and liabilities in financial reporting and, 3) modify the conceptual framework underlying standard setting to state more clearly that the primary goal of financial reporting is to provide information that is relevant to investors (presumably, stock market investors) and that, as such, FVA should be emphasized over historical cost¹¹ Academic research's influence over the standard setting process has been greatly enhanced by the involvement of many leading accounting professors favouring FVA into the decision-making process of standard setters or regulators such as the FASB or the SEC.¹² In that regard, it is important to note that there is currently a joint project between FASB and the IASB to adopt a unique conceptual framework for accounting standard-setting. The draft framework, which should be adopted within the next year, clearly states that the main purpose of financial reporting is to provide information that is relevant for investors, with emphasis on market values and cash flow forecasts as the most critical drivers underlying financial reporting.¹³

¹¹ For instance, as early as 2000, the Financial Accounting Standards Committee of the American Accounting Association stated that “..The Committee generally supports the FASB position that financial instruments be reported in the financial statements at fair value...”(Wahlen, J., J.R. Boatsman, R.H. Herz, G. J. Jonas, K.G. Palepu, S.G. Ryan, K. Schipper, C.M. Schrand, D.J. Skinner. 2000. Response to the FASB Preliminary Views: Reporting Financial Instruments and Certain Related Assets and Liabilities at Fair Value. *Accounting Horizons* 14(4), 501-508).

¹² For instance, a leading proponent of FVA, Katherine Schipper, from Duke University (formerly a professor at the University of Chicago) and former President of the American Accounting Association, was a member of the FASB between 2001 and 2006. One of the researchers who pioneered empirical work on FVA, Mary Barth, a professor at Stanford University (formerly at Harvard University) is currently a member of the International Accounting Standards Board and was previously involved in the American Institute of Certified Public Accountants and FASB.

¹³ Financial Accounting Standards Board. 2008. Conceptual Framework for Financial Reporting: The Objective of Financial Reporting and Qualitative Characteristics and Constraints of Decision-Useful Financial Reporting Information. Exposure-Draft.

Measurement and Valuation Challenges

Despite its many tangible or perceived benefits to investors, the adoption and use of FVA undermines several critical foundations of financial reporting to which we have become accustomed. More specifically, the implementation of FVA explicitly confirms the primacy of financial markets and of investors in the determination of accounting standards. Essentially, the broader social issues and implications arising from accounting standards for stakeholders beyond investors are assumed away.

The potential danger of relying on capital markets-based findings to directly prescribe accounting standard has been highlighted more than 30 years ago by Gonedes and Dopuch (1974).¹⁴ Following a first wave of capital markets-based studies that mapped their findings directly into standard-setting issues, Gonedes and Dopuch explain that observing an empirical relation between accounting amounts and equity prices or returns does not provide sufficient evidence about the desirability or effects of a particular standard, even if markets are informational efficient. Their conclusion rests on the fact that accounting standards are essentially a public good. Therefore, standard setters' mandate and responsibility is to develop standards after making the appropriate social welfare trade-offs, which do involve more parties than just investors. Hence, deciding about a particular accounting standard requires that social preferences be specified. From a different perspective, Holthausen and Watts (2001) put forward the argument that the value-relevance literature has little to say about standard-setting issues.¹⁵ In their view, without an underlying theory that explains, predicts and links accounting, standard setting, and valuation, value-relevance studies simply report associations.

Other conceptual foundations of traditional financial reporting are also set aside to effectively implement FVA. On one hand, emphasis on value relevance implies that accounting conservatism a remnant of the past. Within a conservatism perspective, financial statements anticipate bad news, i.e., before a transaction is actually done or concluded: hence, an asset is written down if it is deemed that it has suffered a permanent

¹⁴ Gonedes, N., and Dopuch, N. (1974). 'Capital market equilibrium, information production, and selecting accounting techniques: Theoretical framework and review of empirical work'. *Journal of Accounting Research*, 12: 48–129.

¹⁵ Holthausen, R.W., R.L. Watts. 2001. The relevance of the value-relevance literature for financial accounting standard setting. *Journal of Accounting & Economics* 31 (1-3), 3-75.

impairment or if expected economic conditions suggest that the firm will not be able to recover its value. Moreover, such write-down is permanent, i.e., the asset will not be re-evaluated upward in the future even if economic conditions change in the meantime. Still within a conservatism perspective, financial statements will only reflect good news if there is an arms' length transaction: the impact of any appreciation in the value of an asset or of the signature of a new contract will be reflected on a firm's financial statements only the asset is actually sold. In contrast, within a FVA perspective, both realized and unrealized losses and gains are recognized on financial statements. Moreover, assets that have been marked down can be re-evaluated upward. As an accounting principle, conservatism traces its roots back to the financial scandals that marked the early twentieth century. Interestingly, some of the firms involved in these scandals were actually using variants of FVA.¹⁶ The Enron case also illustrates the potential negative consequences from dropping conservatism and replacing it with mark-to-market accounting, with management strategically selecting bid or ask prices to value its energy contracts. Enron was a key market-maker or, sometimes, the only market-maker, in some markets, thus facilitating managerial discretion.¹⁷

Reliability as well as verifiability are other financial statements qualities that may be severely undermined by the use of FVA. In light of its emphasis on investor relevance, FVA heavily relies on the estimation of future cash flows or on market-based values. However, as we all know, it is impossible to know the future: one can validate only the rigour and reasonableness of hypotheses and assumptions underlying a forecast. From that standpoint, even market values are essentially forecasts of expected future cash flows. Such a situation provides a striking contrast to historical cost, for which it is possible to verify exactly what is an asset's purchase price, as well as related acquisition costs. Furthermore, in the case of financial instruments that are not traded on an organized market, their valuation for financial reporting purposes relies on numerous assertions by management, assumptions about the appropriate benchmarks or markets, or the reasonableness of a valuation model inputs. Some recent studies show that

¹⁶ For example, see Flesher, D. L. and T. Flesher, 1986, Ivar Kreuger's contribution to U.S. financial reporting, *The Accounting Review* 61 (3): 421-434. Cudahy, R.D. and W.D. Henderson. 2005. From Insull To Enron: Corporate (Re)Regulation After The Rise And Fall Of Two Energy Icons. *Energy Law Journal* 26 (1), 35-110.

FVA provides corporate managers with greater discretion in the measurement and recognition of assets and liabilities, thus potentially undermining their reliability. For instance, focusing on accounting for stock options, Aboody, Barth, and Kasznik (2004) find that managers select valuation model parameters to strategically manage estimates of disclosed employee stock option fair values. Their finding raises the broader question of whether managers will behave similarly when selecting model parameters for fair value estimates of other financial instruments.¹⁸

FVA implicitly assumes that, at the end of each reporting period, an entity sells its assets or settles its liabilities at market or model-estimated prices at that same time. A liquidation balance sheet is not prepared very differently. However, such a view contradicts the going concern assumption which essentially states that a firm is expected to continue its operations for the medium to long term. The going concern assumption is needed for the preparation of regular and consistent financial statements as it underlies the reported values of many other assets and liabilities beyond financial instruments.

By emphasizing market- or model-based measurement, the use of FVA also affects the relative role of accountants in the preparation of financial statements. While historical cost-based financial statements are squarely under the control of accountants, FVA-derived assets and liabilities often require the expertise of other professionals such as actuaries, valuation experts or financial engineers, with accountants being more likely to play a secondary role, e.g., verifying underlying assumptions, hypotheses, etc.

FVA and the Financial Crisis: Some Thoughts

It is still too early to conclude on FVA's role in the current financial crisis: not all data is available, additional analyses must be completed and all its consequences cannot be observed. However, relying on prior research findings and on available data, it is possible to draw some inferences about the contribution of FVA to the financial crisis.

¹⁷ Weil, R. 2001. After Enron, "mark to market" accounting gets scrutiny. *Wall Street Journal* (December 4).

¹⁸ Aboody, D., Mary E. Barth, and Ron kasznik. 2004. Firms' voluntary recognition of stock-based compensation expense. *Journal of Accounting Research* 42(2), 123-150.

More Volatile Financial Results

Most prior research shows that the adoption of FVA translates into more volatile financial results (earnings).¹⁹ Hence, financial markets' extreme volatility over the past two years has contributed to raise financial institutions' volatility, potentially amplifying the perception by investors, regulators and governments as to the seriousness of the crisis. More practically, the drop in reported earnings is even more dramatic in light of the record earnings reported in prior years, with FVA pushing down earnings in the current period but boosting earnings in prior years. Two examples illustrate the potential impact of FVA on the volatility of reported earnings.

Crédit Suisse: Within the context of the subprime crisis, the stock market value of most financial institutions depends extensively upon investors' assessment of their direct and indirect exposure to subprime-related loans or derivatives. The valuation information disclosed by financial institutions that evolve in the same markets largely influences such an assessment, with more recent market quotes driving such valuation. In that regard, the saga surrounding Crédit Suisse's release of its 2007 earnings is quite enlightening. On February 12, 2008, Crédit Suisse reports record income from continuous operations of 8.5 billion Swiss Francs. On February 19, 2008, Crédit Suisse announces that some additional control processes have led to the repricing of certain asset-backed positions in its Structured Credit Trading business, with the current total fair value reduction of these positions being reduced by an estimated \$U.S. 2.85 billion. Finally, on March 20, 2008, Crédit Suisse reports that its 2007 operating income has been revised downward by 1.18 billion Swiss Francs (789 million Swiss Francs after tax), close to a 10% difference with the initially reported figure. The Crédit Suisse story illustrates the difficulty of pinning down the fair value of many assets when the underlying valuation methodology is complex and subject to shifting hypotheses and assumptions about the future. Crédit Suisse's experience also shows that reported results for a given period may be subject to a wide margin of error, or discretion, or even restated.

¹⁹ For example, Barth, Landsman and Wahlen (1995) show that fair value-based measures of net income are more volatile than historical cost-based measures (Barth, Mary E, Landsman, Wayne R, Wahlen, James M.1995. Fair value accounting: Effects on banks' earnings volatility, regulatory capital, and value of contractual cash flows. *Journal of Banking & Finance* 19 (3-4), 577-605).

Lehman Brothers: In its last reported financial statements before it went bankrupt, Lehman Brothers reported a loss of \$U.S. 2.4 billion for the first six months ended May 31, 2008 (vs. a net income of \$U.S. 2.4 billion for the first six months ended May 31, 2007). The shift of \$U.S. 4.8 billion in net income is largely driven by a dramatic fall of \$U.S. 8.5 billion in Lehman's revenues from principal transactions, which include realized and unrealized gains or losses from financial instruments and other inventory positions owned. A significant portion of the downward shift in principal transactions revenues is actually explained by unrealized losses of \$U.S. 1.6 billion in the first semester of 2008 vs. unrealized gains of \$U.S. 200 million in the first semester of 2007. Thus, accounting at fair value for some financial assets amplified Lehman's downward earnings performance.

Hence, it can be put forward that FVA, through its magnifying impact on earnings volatility, may have contributed to aggravate investors', regulators' and governments' perceptions with respect to the severity of the crisis, itself characterized by record volatility in the prices of many securities and goods.

On a related note, the increased volatility brought forward by FVA is conducive to the use of equity-based compensation, especially stock options, which value is then enhanced (according to the Black-Scholes model, volatility is one of the key inputs in option valuation). Prior research suggests that there is a strong association between performance volatility and the use of stock options.²⁰ Through FVA, the outcomes from aggressive risk-taking in investment and financing strategies will directly flow into reported earnings, thus further leveraging the potential gains to be derived from stock options and other incentives. Many financial institutions involved in the current crisis made extensive use of stock options and other incentives, allowing unrealized gains on assets to be converted into cold hard cash.

Does FVA Reflect Underlying Business Performance or Allow Financial Institutions to Delay the Day of Recognition?

Some of the fiercest critics of FVA argue that, far from enhancing transparency and relevant financial reporting, it actually provides corporate

²⁰ See, for example, Magnan, Michel. 2006. Les options sur actions : création de richesse pour les actionnaires ou enrichissement des dirigeants au détriment des actionnaires ? *Finance-contrôle-strategie* 9(3): 221-235.

managements with ways to avoid the day of recognition and to delay asset impairments. In other words, the adoption FVA undermines financial statements' conservatism and leads to changes in managerial behaviour. For instance, Ross Watts (Massachusetts Institute of Technology) argues that the elimination of conservatism brought by FVA leads to the capitalization of unverifiable future cash flows unto the balance sheet.^{21 22} Such unverifiability and managerial opportunities to make strategic valuation choices introduce significant noise into the financial reporting process that may be costly to investors. Moreover, by moving firms away from transaction-based accounting, FVA is contradicting SEC efforts to tighten revenue measurement and recognition standards to ensure that only completed sales transactions get reported into the financial statements and affect earnings.²³ Experience shows that, until the advent of SAB 101, several firms had applied aggressive revenue recognition criteria that dramatically boosted reported earnings and growth rates. Earnings restatements following the enactment of SAB 101 were often sizable and led to significant stock price falls, even if reported cash flows were not affected. In other words, conservative accounting provides information that is useful beyond the estimated cash flows from a particular contract and protects investors and creditors from managerial opportunism. The case of Lehman Brothers illustrates Ross' argument. As of November 30, 2007, 75.1% of assets measured at fair value were measured according to Level 2 or Level 3 inputs. In other words, the large majority of assets supposedly valued at fair value were not valued on the basis of directly observable quoted prices. By May 31, 2008, that proportion had increased to 81.7% of assets measured at fair value, suggesting that barely 18% of assets supposedly valued according to FVA were "marked to market". Further empirical work as well as the liquidation of Lehman Brothers will provide additional evidence regarding the extent to which its assets may

²¹ Watts, Ross. 2003. Conservatism in accounting part I: Explanations and Implications. *Accounting Horizons* 17(3), 207-221.

²² There is empirical evidence that effective auditing of FVA derived numbers requires very specialized valuation knowledge which may be difficult for auditors to gain and maintain (Martin, R.D., J.S. Rich, T.J. Wilks. 2006. Auditing Fair Value Measurements: A Synthesis of Relevant Research. *Accounting Horizons* 20(3), 287-303.

²³ For instance, in 1999, the Securities and Exchange Commission issued Staff Accounting Bulletin 101 - Revenue Recognition in Financial Statements which prescribes specific criteria to indicate when a transaction has been concluded, thus considerably reducing managerial discretion in the recognition of revenues. In contrast, fair value accounting does not rely on the conclusion of a transaction to estimate the value of an financial asset or contract.

have been overstated or purposely shifted into Levels 2 or 3 to hide developing losses and give management more discretion. At the very least, its actions suggest that FVA reporting may work well for investors when assets trade in deep and efficient markets but may become less transparent when market conditions become more difficult or less liquid. On that note, it is telling that Lehman Brothers was an early adopter of both SFAS 157 (Fair Value Measurements) and SFAS 159 (Option for fair value measurement), deciding to implement their provisions in the first quarter of its 2007 fiscal year.

The Lehman case, as well as many others, raises the issue of FVA applicability as it is being extended from instruments traded in liquid and organized markets to credit-type instruments that are often securitized and which are not quite transparent about their underlying assets. The valuation of these credit-type instruments is made difficult by the lack of direct information, with heavy reliance on credit rating agencies' opinions. Moreover, the market for these instruments is not as deep and liquid than traditional instruments such as bonds, equities or foreign currencies. It does appear that markets were not as efficient as they should have been in assessing the value of these structured investment vehicles or securitized pools of assets and may have relied too much on the judgment of parties such as credit rating agencies which themselves had partial information and were facing some potential conflicts of interests (since they charged fees to render opinions on specific securities).

Accounting and the Market: Mirrors Facing Each Other

The integration of market values on corporate balance sheets mandated by accounting standard setters contrasts with the trend by many analysts and sophisticated investors to use financial statement data to gauge whether a firm's stock market value has moved away from its fundamental or "intrinsic value."²⁴ These divergent trends raise a fundamental question as to the grounding of financial statements. More specifically, MacIntosh, Shearer, Thornton and Welker argue that the market uses accounting earnings, along with other information, to value firms' stock and other

²⁴ See, for example, Lee, C., Myers, J., & Swaminathan, B. (1999). What is the intrinsic value of the DOW? *Journal of Finance* (forthcoming). Lee, M.C., J. Myers, and B. Swaminathan. 1999. What is the intrinsic value of the Dow? *The Journal of Finance* 54(5), 1693-1741.

securities.²⁵ However, the prices of many of these securities underlie derivatives' prices, which then find their way into financial statements through FVA, thus completing a circular sequence! As MacIntosh et al. say: “*Companies' earnings determine security prices, which determine derivative prices, which determine companies' earnings. In short, neither the accounting sign nor the financial market sign appear to be grounded in any external reality. Instead, each model appeals to the other model for the only “reality check” available.*”

Lehman Brothers' equity-based compensation illustrates the self-referential sequence that FVA introduces into financial reporting and stock market prices. In 2007, Lehman granted close to 39,000,000 deferred share units to its executives and employees. On the basis of the firm's quoted stock price on the dates at which these grants were made, the overall value of the grant was around \$2.7 billion. Since 2006, SFAS 123 has mandated the measurement and recognition of equity-based compensation at fair value, using an amortization method for grants that have a long-term vesting period, bringing Lehman Brothers' expense for equity-based compensation in 2007 to \$1.8 billion, close to 25% of earnings before income taxes and equity-based compensation expenses. Hence, on the one hand, the amount reflected as an expense by Lehman on its financial statements reflects the current quoted price of its stock at grant date. On the other hand, investors rely on Lehman's reported earnings to assess its prospects and value its stocks. The chain of decisions exactly matches the above quote from MacIntosh et al. In addition to equity-based compensation, a significant proportion of Lehman Brothers' assets were stocks and stock-based derivatives (more than a third of its FVA assets). Since shares traded on a stock market are all affected to a varying degree by the same secular trends and fluctuations, one can argue that Lehman Brothers earnings and its stock price were mutual reflections of one another, possibly detached from underlying real operations. Such a conclusion can probably be extended to many financial institutions deeply involved in the current crisis or engulfed by it.

Interface between Financial Reporting and Regulatory Capital

One key criticism against FVA is that its use in the current crisis has led to a reduction in the value of financial institutions' assets, which translated

²⁵ MacIntosh, N.B., T. Shearer, D.B. Thornton, M. Welker. 2000. Accounting as simulacrum and hyperreality: Perspectives on Income and Capital. *Accounting, Organizations and Society* 25(1), 13-60.

into a severe shrinking of their capital ratios, forcing them to deleverage and sell further assets at distressed prices, thus feeding the downward spiral. However, in that scenario, the issue is not necessarily the accounting itself but how financial regulators use accounting information. In other words, FVA-based financial reporting is only the messenger that a firm's solvency is undermined by its financial strategies or lending practices, but it is up to regulators to figure out how to use such information.²⁶

Messenger or Contributor?

The above discussion suggests that assigning a messenger role to accounting potentially downplays its actual importance and relevance to the current crisis since the message is not neutral but conditioned by accounting standards. However, two issues arise from the use of FVA-derived information in regulatory oversight. First, FVA information is highly volatile and unstable. For example, according to FVA, the wild fluctuations of the stock market over the past few weeks, with many daily closings showing gains or losses from the preceding day of between 5-10%, imply similar fluctuations in any stock market-based assets. Hence, a firm may be solvent one day (assuming a large stock market gain), insolvent the next two days (assuming large stock market losses), and solvent again on the fourth day! While informative, is FVA-based financial reporting useful to regulators in planning and timing their interventions? The answer is that FVA information alone is probably necessary but is not sufficient. Other performance and risk metrics are needed to identify the targets of regulatory actions. A similar argument can be used to justify that FVA information is not sufficient for long term governance purposes as it is not stable enough and difficult to verify. In some sense, the reliance on FVA-based information may have two opposite implications regarding the length and severity of the current crisis. On one hand, the discretion underlying FVA figures have allowed managers to delay the day of recognition when underlying subprime assets started to unravel. Moreover, the additional volatility that it introduces into financial statements may have amplified the impression of financial performance and stability in the bubble period. On the other hand, once the values of underlying assets started crashing, FVA

²⁶ For instance, Irene Wiecek from the University of Toronto argues that "...the credit crisis is not the fault of accounting. It is the fault of overly lenient lending practices". On top of that, she says there was a lack of oversight and regulation in this area" (G. Jeffrey, 2008).

induced balance sheet realignments and recapitalizations may have further magnified the crisis.²⁷

Second, some argue that FVA values are actually a red herring and that the real issue is the quality of the accompanying disclosure.²⁸ For example, Susan Schmidt, a former governor of the Federal Reserve Board and bank CFO argues that the focus should be on disclosure so that everyone, regulators and investors alike, understand the drivers behind fair value estimates. Actually, FVA derived can be deceptive: up until close to the crisis, both Lehman Brothers and AIG appeared solvent and sufficiently capitalized, with significant portions of their balance sheet relying on FVA. However, what the FVA point estimate values did not tell was the extent of the downfall risk both firms were facing if events did not evolve according to expectations, Lehman because of its exposure to collateralized debt obligations and AIG because of its exposure to credit-default swaps. Looking at both firms' financial statements before the crisis, it would have been difficult to assess the potential magnitude of losses to be incurred because of these exposures. Hence, it can be ventured that FVA without adequate additional disclosure is neither fair nor a good reflection of value that is at risk.

Conclusion

The purpose of the appendix was to briefly present fair value accounting, its origins, application and implications for financial reporting as well as its potential role during the current financial crisis. While no definite

²⁷ In that regard, it may be useful to note that other accounting standards beyond FVA may have played a role in the willingness of financial institutions to embark on a subprime asset growth strategy. One such standard relates to the recognition of gains upon the securitization of pools of assets ("sale accounting"). Essentially, under certain conditions, accounting practices allow for the accelerated recognition of gains upon the securitization of long-term assets, even if cash flows are spread out over many years. For instance, it has been reported that it was popular for banks that issued Collateralized Debt Obligations and similar instruments to retain the super-senior tranche and, at the same time, buy Credit Default Swaps from third parties. Since the cash portion held by the bank paid a higher spread than the cost to insure the bond, the bank was allowed to report upfront the amount of the difference to be realized over the life of the contract (Otherwise called a negative-basis trade). Earlier in 2008, AIG, the failed insurance giant, was forced by its auditor, PriceWaterhouseCoopers, to stop this practice as it was deemed that under current market conditions, it was impossible to reliably quantify the spread differential. For AIG, the shift in accounting practice translated into billions of dollars in write-offs (Credit Investment News, February 18, 2008, pp. 1 and 10).

²⁸ Leone, M. 2008. Fair Value: It's the Disclosure, Stupid. CFO.com. November, 20.

conclusion can be reached at this early stage, there is reason to believe that fair value accounting is more than just a messenger carrying bad news and, therefore, may have contributed to the acceleration of the crisis, especially in the financial sector. While the relevance of fair value accounting for investors cannot be questioned, its other qualities (or weaknesses) may have been overlooked by standard setters and regulators.

Fair value accounting for financial instruments is part of a broader trend in accounting standard setting to move away from “accounting” toward estimating expected future cash flows and incorporating into financial statements, i.e., “forecounting”.²⁹ The trend undermines decades if not centuries of accounting practices and concepts such as conservatism and verifiability and requires a completely set of valuation skills and knowledge from accountants. The current crisis constitutes the first serious challenge to this trend, and to fair value accounting in particular, and is likely to generate abundant empirical research over the next few years which will allow us to better assess the pros and cons of fair value accounting.

However, if not fair value accounting, what else? Standard-setters, and many accounting academics, argue that there is no alternative measurement or reporting model.³⁰ For instance, Barth (2007, p. 12), a member of the International Accounting Standards Board, argues that “*Although opponents of more comprehensive use of fair value have some legitimate concerns, standard setters are unaware of a plausible alternative.*” In contrast, Watts (2003, p. 219) argues that accounting standard setters should focus on accountants’ core competence, i.e., “*...providing verifiable conservative information that market participants can use both as inputs in their own valuation and as calibration for their own and others’ unverifiable information*”³¹ As such, I would argue that the debate is at two levels: Barth is talking about the measurement of a final output while Watts refers to the validity of the various measurement inputs, the output being of some importance but mostly in terms of providing financial statement users and other stakeholders to adapt, modify or “test-drive” the resulting output. Beyond fair values, measurement assumptions and hypotheses are probably more

²⁹ Magnan, Michel; Cormier, Denis. 2005. From Accounting to “Forecounting”. *Canadian Accounting Perspectives* 4(2): 243-257.

³⁰ Barth, Mary. 2007. Standard-Setting Measurement Issues and the Relevance of Research. *Accounting and Business Research*, Special Issue, 7-15.

³¹ Watts, R.L. 2003. Open citation.

critical since they allow users to reconstruct the reality according to their own priors.

However, underlying the debate, one must not lose sight that various financial and economic interests are at play – additional powers for standard setters, additional business for providers of accounting and valuation services, increased uncertainty about their bonuses for managers and executives, etc. Hence, viewpoints and arguments from interested parties must be reframed accordingly.

The debate goes further than accounting and financial reporting and deals with the essence of what accountants are expected to contribute to society and, implicitly, what competences and skills they must possess to deliver in that regard. One may surmise that current accounting standards, such as those relating to fair value, probably overstretch accountants' capabilities and prior learning and obscure other informational needs by investors and other interested stakeholders.

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Appendix 3

Collateralized Debt Obligations: A Primer

CIRANO Finance Group

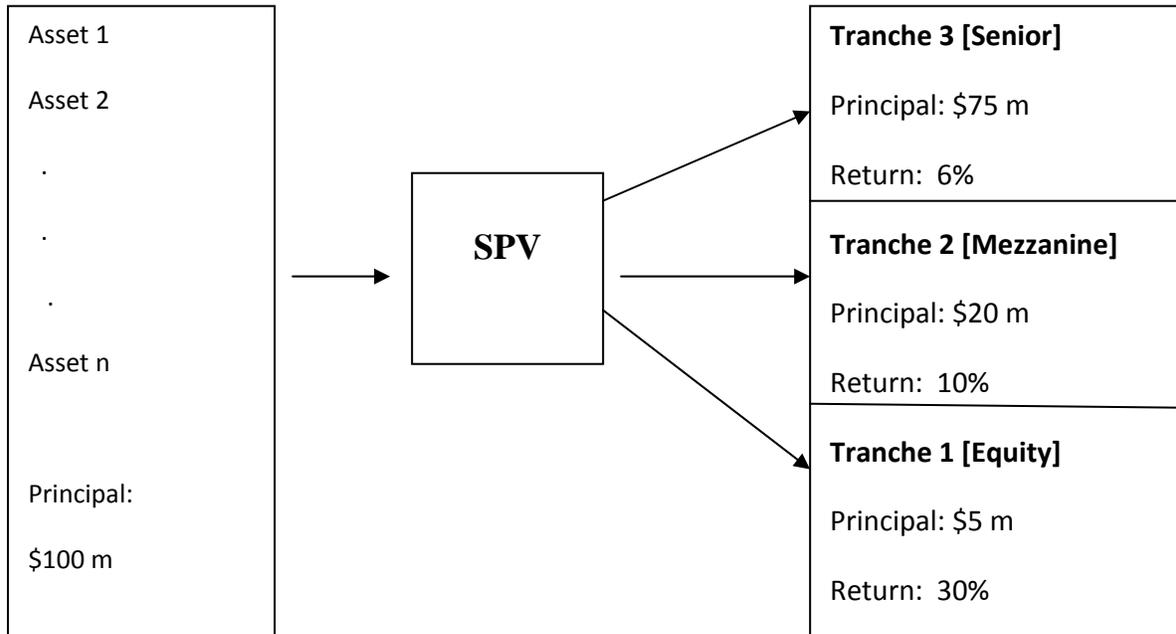
Among the *dramatis personae* of the current financial crisis, financial instruments known as collateralized debt obligations [CDOs] certainly have a leading role and, indeed for many, represent the major villain in the tragedy. The reality is that for many years these instruments have had a useful function in financial markets and it is important to understand the structure and role of these instruments before condemning them out of hand. Accordingly, in this section, we review the main features of cash CDOs and synthetic CDOs. Both instruments attempt to mitigate credit risk, albeit in different ways. The former are associated with the housing pricing bubble; the latter, for example, are at the center of the ABCP [asset-backed commercial paper] crisis that has affected several Montreal financial institutions.

The primary objective in what follows is to make as clear as possible the structure of cash CDOs and synthetic CDOs in order to indicate what contributions these instruments make in managing credit risk while at the same time pointing to potential weaknesses and pitfalls in using the instruments. It should be stressed that, in contrast to the material presented in Appendix I, the discussion focuses entirely on the financial structure of these instruments and makes little attempt to give an empirical account of their actual market impact.

This section also contains an account of work CIRANO has undertaken on CDOs.

Cash CDOs: Metamorphosis of Debt Quality?

Consider a bank with a portfolio of mortgage loans that it wishes to remove from its balance sheet: it may wish to free up capital that otherwise would be needed to cover the risk exposure associated with these loans. It would issue a CDO with the following structure that effectively transfers the risk to investors willing to invest in the CDO.

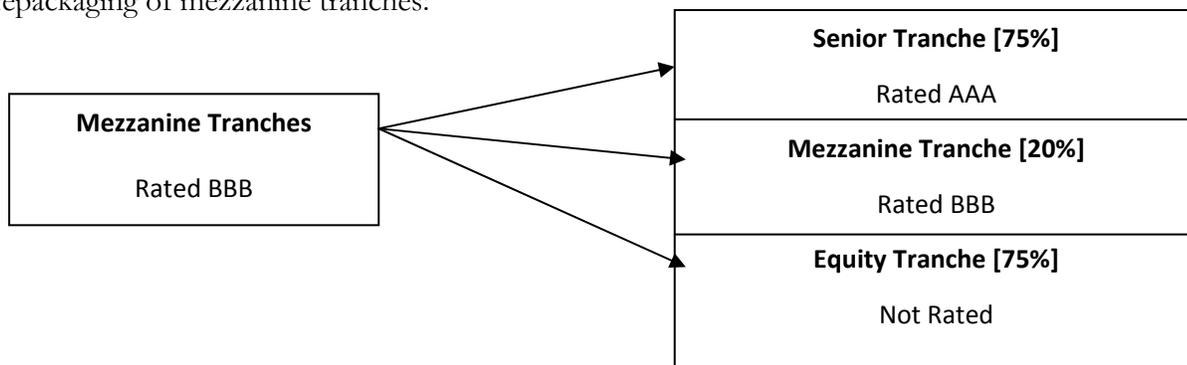


A third party plays an essential function in the CDO—the Special Purpose Vehicle [SPV]— which is a legal entity that has been created expressly for this CDO transaction. Originally established by the bank, it is run separately with separate management and no legal ties. In sum, the SPV buys the loans from the bank and issues the CDO; its assets are the risky debt it has purchased from the bank and its liabilities are the CDO notes it sells to investors.

CDO notes are grouped into Tranches; in the simplified example presented above there are three Tranches. Here we follow closely the nice presentation by John Hull that can be found on his Web page, <http://www.rotman.utoronto.ca/~hull/DownloadablePublications/CreditCrunch.pdf>. The cash flows from the mortgages are passed on to the holders of the CDO notes as follows: Tranche 3 is paid first according to the promised return [6%], then Tranche 2 [at 10%], and only then does

Tranche 1 receive the promised return [30%]. The higher return obtained by the less senior tranches reflects the risk held by the tranches. The Equity Tranche bears the first 5% of losses on the underlying portfolio; the Mezzanine Tranche the next 20% losses. Only losses beyond 25% are borne by the Senior Tranche.

The SPV is set up so that the Senior Tranche is rated AAA and, accordingly is highly sought after. The Equity Tranche is held by the originating bank or sold to a hedge fund. The Mezzanine Tranche proves a tougher sell, a challenge that led to the creation of what is called a Mezz CDO. Here the idea is to create a portfolio of mezzanine tranches which are in turn structured into a hierarchy of tranches. So we have a repackaging of mezzanine tranches:



The Mezz CDO is structured so that the Senior Tranche is rated AAA [further credit enhancements may be involved]. As a consequence, the total of AAA instruments is now 90% of the original portfolio of mortgages [the original 75% plus 75% of 20%].

But it should be apparent that as presented above the losses to the Senior Tranche of the Mezz CDO will be 100% when there are more than 25% losses on the original portfolio of mortgages; after all, they are constructed from BBB loans that bear all losses up to 25%. Indeed, with losses to the mortgage portfolio of 20%, the Senior Tranche of the Mezz CDO still bears a significant portion of the losses, 66.7% in fact [the Mezzanine Tranche of the CDO bears 15% or $\frac{3}{4}$ of the loss; of this 75%, the Equity Tranche of the Mezz CDO bears 5% and the Mezzanine Tranche 20%, so the Senior Tranche bears 50% of the loss].

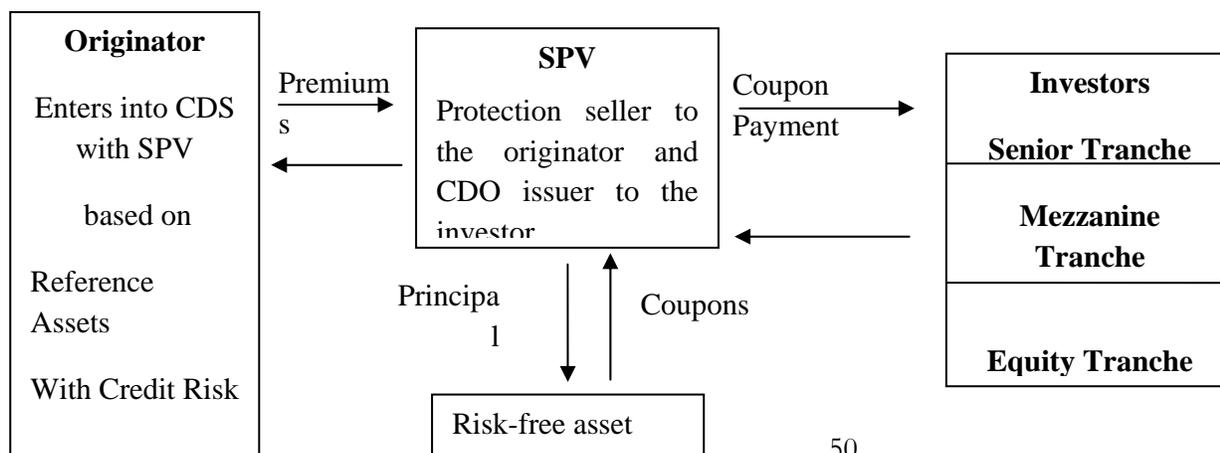
So the procedure of turning BBB obligations into AAA is a form of alchemy. The correct pricing of the Mezz CDO Senior tranches is a

complicated affair involving important assumptions concerning default rates and correlations. In retrospect, it is perhaps surprising that there was such a significant market for these products. Hull in his paper cites an example where Merrill Lynch agreed to sell \$30.6 billion of Mezz CDOs that had been previously rated AAA to Lone Star Funds for as little as 22 cents on the dollar [and financed 75% of the purchase price!].

Synthetic CDOs: Mark-to-Market Imbroglia

A fundamental credit derivative instrument is the CDS [credit derivative swap]. The swap involves the exchange of two payments: the buyer of credit protection pays regular premiums to the seller of protection in exchange for a payment made by the seller in the event of a credit event [eg, default] involving a reference asset [eg, a specific company]. The CDS is written to cover against the possibility that the reference asset defaults on its obligation. The comparison with insurance coverage is immediate.

The combination of CDSs with the CDO structure described in the previous section characterizes what is called the synthetic CDO; synthetic because the credit risk although effectively hedged against is not truly removed from the originator's balance sheet. The originating financial institution bundles various CDSs and enters into a contract with the SPV whereby premiums are paid the SPV in return for protection for all credit losses originating from the underlying reference entities. The SPV then uses the contract as collateral to issue the CDO notes structured as tranches with different rates of return according to the tranche. The tranches are examined by rating agencies receiving appropriate ratings given their characteristics. Super-senior tranches are so called because their expected rate of loss is significantly lower than the rate of loss associated with AAA rating. Owing to this relatively low risk, the Super-senior tranche offers the potential investor a low risk premium, a situation that led financial engineers to develop the notion of the LSS CDO [the leveraged Super-senior CDO].



In a LSS the investor's actual cash participation is less than the notional amount. Since coupon payments remain based on the notional amount, the effective return on the investment may be considerably higher [as much as ten times]. Otherwise put, the LSS tranche receives the benefit of the cash flows allocated to the full super senior tranche, thus allowing it to pay a considerably higher spread. Accordingly, it is not surprising that there was broad participation in the Super-senior market. Indeed, LSS CDOs have become the largest single class in the Canadian ABCP market. As at September 2007, the Canadian ABCP affected by the credit crisis totaled a notional of \$26 billion of synthetic CDOs, \$17.4 billion of the underlying these assets were LSSs.

To make these points more concrete, suppose that in a standard super senior transaction, the investor has a cash participation of \$1000. The super-senior tranche offers potential investor a low risk premium of 12 bps [basis points]. By leveraging the 12bps premium of a super senior tranche by a factor of 10, LSS transaction provides outsized yield for an investor's portfolio AAA portfolio. In this 10x leverage example, the investor would fund 10% (essentially on margin) of the super senior tranche notional. Effectively, the investor's cash participation is \$100 and the premium offered is 12bps based on a notional of \$1000. In other words, the premium is 120bps for invested cash of \$100.

However, this implicit leverage comes at a price. In order to deal with the possibility that the SPV runs short of funds needed to pay the originator in case of defaults, the SPV can call on the LSS investors for cash injections, much as in a margin call in the traditional investment context. Accordingly, built into the CDO agreement is a specification of the conditions that trigger such calls for capital from the investors. The triggers are based on either (a) the market value of the Super-Senior Tranche or (b) collateral losses exceeding a threshold. Since the practical implications of these two approaches for LSS investors are considerable and important, a closer look is needed. But it must first be noted that if the trigger, however defined, is breached, investors have a choice between partially deleveraging the transaction by posting additional margin/funding or walking away from the transaction at the current mark-to-market value.

Typically, LSS with mark-to-market triggers are based on a daily pricing of the super senior tranche itself. However, the non-transparency of the

super senior tranche market is problematic and mark-to-market pricing may not be directly available. In such circumstances, models are used to price the LSS and the triggers are computed using what may be termed a mark-to-model procedure. Of course, the issue of which model to implement immediately arises. Using a model would be fine if there was a standard model. Even though there has been very significant convergence in pricing methodologies of Credit Default Swaps in recent years, some subjectivity still remains in the process of mark-to-market valuation. Each counterparty in the transaction has his own model and, moreover, may not even be willing to provide details concerning the application of these models as they are proprietary and are used for internal pricing and trading. In this context, it is quite challenging for the investor to monitor accurately the status of the investment and to assess the likelihood of breaching the trigger.

By contrast, portfolio loss triggers are based on actual losses experienced by the underlying portfolio. As there is no spread component in this type of structure, the risk here is entirely credit-based and involves the investor taking a view on the timing of default that would be experienced over the life of the transaction. The loss trigger structure offers the investor a clear and observable trigger that can be monitored with no subjectivity. The main benefit of the loss trigger mechanism is that the LSS will deleverage or unwind only if there are actual defaults. Spread volatility, demand technicalities and liquidity issues do not have an impact on early unwinding or deleveraging.

For the counterparty, however, the loss trigger is far from a perfect proxy. Namely, the biggest risk not captured by the loss trigger is the market value decline caused by the widening market spread. In other words, protection sellers in average are asking for higher Credit Default Swaps premiums to protect against the default of companies. Subsequently, those who sold a protection through LSSs before the credit crisis, are effectively long a basket of names, may have experienced a significant market value decline of their trade. Effectively, it would cost them higher premiums to close non maturing transactions. On the other hand, in a situation where there is a spread blow-up but very few defaults, the protection buyer through LSSs gets no protection even though the market value of the LSS has changed significantly.

An alternative trigger mechanism is based on the level of weighted-average spread associated with the reference entities in the CDO portfolio and the actual number of defaults of the underlying names. It is usually specified via a spread-loss trigger matrix where one axis indicates the remaining time to maturity and other references the losses experienced in the portfolio. At any time, if the combination of portfolio average spread and time to maturity exceeds the levels in the matrix, the situation would trigger a margin call.

In 2008, CIRANO conducted a quantitative study to assess the impact of changing margin triggers from mark-to-market triggers to spread-loss triggers that rely on independent standardized index spreads relative to treasury bonds. A typical LSS transaction in a conduit was analyzed and stress-tests were conducted. The study concluded that a transparent trigger should be based on a non-volatile measure; hence a pure loss trigger is the more desirable than the mark-to-market trigger. The study also concluded that a more effective trade-off among transparency, stability, and unwind likelihood is provided by the spread-loss trigger. CIRANO has emphasized that in case of replacement of mark-to-market triggers with spread-loss triggers, it is crucial that for each individual LSS in the Canadian ABCP (or the Master Asset that will replace the current ABCP), the spread triggers should be set at or slightly above the levels consistent with AAA rating. Setting the new triggers at AAA breakeven level will decrease the likelihood to have recourse to funding facilities due to margin calls.

Recently [December 2008], the federal government in conjunction with three provinces and other parties, will provide a total of \$4.45 billion in financial backstops to support a restructuring plan for a massive slice of this country's commercial paper market. In effect, the government will be responsible for responding to the margin calls.

CIRANO CDO Module

Working with a partner, CIRANO has developed software that has the following functionality. For further information, contact Bryan Campbell at CIRANO.

CDO Valuation and Risk measurement

Monte Carlo simulation has been the most popular method for CDO valuation. It is flexible and relatively simple to implement. The major disadvantage is that Monte Carlo simulation can be resource intensive for large CDOs. In recent years non-Monte Carlo methods, also known as quasi-analytic or semi-analytic methods, have become more and more popular. They are more efficient than Monte Carlo simulation for certain types of synthetic CDOs, particularly, standardized tranches, where a one-factor copula model is used to model the credit correlation of reference entities. The CIRANO module incorporates quasi-analytic method-based tools to value synthetic CDOs for standard and non-standard tranches.

Default Correlation Calibration and sensitivity analysis

Under a one-factor copula model with a constant factor loading, the default correlation of the credits in a reference pool is captured by a single asset correlation. The CIRANO module produces the base correlation surface using different mapping techniques on liquid standard synthetic CDOs. It provides also a variety of sensitivity measures (Delta, Gamma, Theta, Value –On-Default, etc.). The valuation framework allows for Internal Rating of the CDO transactions implied from real time Market quotes or from Mark-to-Model valuations.

Hedging strategies in a distressed Market

A key feature of the CIRANO platform is that it provides an advanced hedging toolbox. Effectively, it offers the user the possibility of defining, analyzing and backtesting customized or automatic hedging strategies.

BCP LSSs monitoring on daily basis

Based on real-time quotes of Credit Default Swaps and standard synthetic CDO tranches, the CIRANO module performs detailed end-of-day Mark-to-Market valuation of the underlying ABCP LSS transactions. The module was used in an important model validation exercise conducted with asset providers in the Canadian ABCP conduit (Merill Lynch, Deutsche Bank, Barclays) to avoid valuation discrepancies.

This site provides an introductory illustration of the CIRANO module covering the themes discussed above.

*Valuation and risk measurement
of a standard CDO*



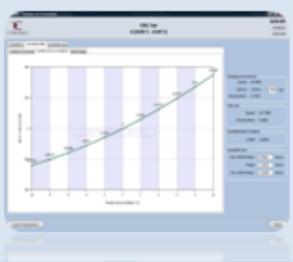
CDO risk concentration



*Mapping a Bespoke Tranche
base correlation*



*Mark-to-Market sensitivity analysis
to variation in correlations*



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