

Advanced Financial Risk Management:

**Tools and Techniques for Integrated Credit Risk, Market Risk, Liquidity Risk
and Interest Rate Risk Management**

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Donald R. van Deventer

Kenji Imai

Mark Mesler

Part 5: Portfolio Strategy and Risk Management

Chapter 41:

Shareholder value creation and destruction

“Risk management is the discipline that clearly shows management the risks and returns of every major strategic decision at both the institutional level and the transaction level. Moreover, the risk management discipline shows how to change strategy in order to bring the risk return trade-off into line with the best long and short-term interests of the institution.”

In Chapter 1, we began this book with the preceding definition of risk management. In the 39 chapters after that, we have showed, step-by-step, how to take advantage of existing financial and information technology to achieve these objectives. The 2007 to 2010 credit crisis has been the venue for the greatest mass destruction of shareholder value in the financial services industry in North America and Europe since the Great Depression. How can a serious and highly skilled risk manager help insure that his or her financial institution is back on track, pursuing best practice risk-adjusted shareholder valuation creation? That is the subject of this chapter. There are three keys to success, which we cover in turn:

1. Do no harm
2. Measure the need to change
3. Master the politics and exposition of risk management

Do No Harm

In the Introduction, we related the biggest mistakes and fallacies in the risk management discipline. The human tendency to repeat these mistakes is pervasive, and perhaps the biggest part of one's career as a best practice risk management is to prevent these mistakes from happening. In other words, as a risk management, to ensure that the risk managers of the firm "do no harm" like the shareholder value destruction we have all witnessed in 2007 to 2010. For that reason, we re-emphasize the importance of "outing" those who are about to make these common mistakes:

- If it hasn't happened to me yet, It won't happen to me, even if it's happened to someone else
- Silo risk management allows my firm to choose the "best of breed" risk model for our silo.
- I don't care what's wrong with the model. Everyone else is using it.
- I don't care what's wrong with the assumptions. Everyone else is using them
- Mathematical models are superior to computer simulations
- Big North American and European banks are more sophisticated than other banks around the world and we want to manage risk like they do
- Goldman says they do it this way and that must be right

If none of the largest financial institutions in Europe and the United States had made these mistakes, the credit crisis of 2007 to 2010 would not have happened.

Measure the need to change

Having resolved to do no harm, a risk manager at a financial services firm which has survived the crisis (either as a public firm or as an institution that has been at least temporarily nationalized), the next step is to measure the "need to change." In other words, we need to ask "how good or bad is the current risk infrastructure of the firm and what do we need to do to fix it?" Surprisingly, risk managers at a number of firms that survived only through the largesse of the taxpayers suffer from hallucinations that manifest themselves in statements like "no risk system could have prevented what happened to my firm" or "all models failed in the credit crisis." A financial services firm CEO who hears such statements should immediately dismiss the speaker, who is an ignorant fool incapable of protecting the shareholders' (and the CEO's) interests.

In the wake of the credit crisis of 2006-2010, it is more obvious to the management, boards, and shareholders of major financial institutions that the legacy silo approach to risk management systems and risk management organization was simply ineffective in preventing the failure of some of the world's most prominent financial institutions. A fully integrated enterprise risk management capability, which combines credit risk, market risk, asset and liability management, liquidity risk, performance management, and capital allocation, exists today. This integrated enterprise risk management technology operates at the individual transaction level to assess risk accurately from the bottom up for every organizational unit and for the firm as a whole. This section presents a simple 10 point quiz that indicates whether the firm's existing primary risk system is capable of playing this role. In short, we are measuring the "need to change."

1. Is your primary risk system capable of simulating default/no default for every reference name on the balance sheet at the transaction level for all types of reference names (consumer, non-public firm, public firms, sub-sovereigns and sovereigns)?

Yes
No

2. Is your primary risk system capable of simulating random movements in default probabilities for every reference name as a function of time and any user-defined macro-economic factors, like home prices, stock index levels, interest rates, unemployment, growth in gross-domestic product, foreign exchange rates, gasoline prices and oil prices?

Yes
No

3. Is your primary risk management system capable of calculating a default-adjusted market value for every asset and liability, on balance sheet or off balance sheet, at the transaction level, regardless of whether that transaction is traded (i.e. has an ISIN or CUSIP number) or non-traded?

Yes
No

4. Is your primary risk system capable of calculating these market values at a large (up to 99,999 for example) user-defined set of future dates in a random interest rate environment where interest rates are driven by 6 or more risk factors (the minimum number of interest rate risk factors required by the Basel market risk rules)?

Yes
No

5. Is your primary risk system capable of calculating cash flows produced by every transaction in every scenario for every one of the user-defined cash flow periods for liquidity risk assessment?

Yes
No

6. Is your primary risk system capable of calculating GAAP interest income, interest expense and amortization (if any) for every transaction in every scenario for every one of the user-defined accounting periods?

Yes
No

7. Is your primary risk system capable of a dynamic Monte Carlo simulation of alternative value-at-risk measures, recognizing that the balance sheet is constantly evolving instead of being static (the legacy VAR assumption)?

Yes

No

8. Is your primary risk system capable of aggregating these calculations to produce (for every user-defined business unit, portfolio subset, and for the institution as a whole) the mark to market value of the organization, its GAAP net income, its GAAP balance sheet, its dynamic value at risk, and its aggregate net cash flow? (Note: These calculations should be available in every scenario in every user-defined period)

Yes

No

9. Is your primary risk system capable of predicting the probability that the institution will fail to meet its target capital levels (whether on a regulatory or mark to market basis) in every one of the user defined calculation periods?

Yes

No

10. Is your primary risk system capable of calculating the probability of default of the institution in any one of the user defined calculation periods?

Yes

No

Rating Your Primary Risk System

A firm's primary risk system can be ranked by how many of the ten questions above were answered with a "yes." The ranks are as follows:

5 or

Less Unacceptable. The primary risk system is not capable of meeting even a limited number of the objectives now demanded as part of regulatory capital guidelines and stress tests, and it would not meet the basic corporate governance standards at a sophisticated organization.

6-7 Good. The primary risk system being used is not bad, but substantial improvements to the risk system are necessary and these improvements are likely to be time consuming and costly with no guarantee of success.

8-9 Very good. The primary risk system being used is close to the state of the art.

10 Congratulations. You are using a state of the art risk management system.

This ranking of risk systems cuts to the heart of what distinguishes integrated enterprise risk management best practice from legacy silo risk applications. There are hundreds of other questions

that can be added to this list. For assistance in preparing a request for proposal that will clearly identify a state of the art risk system, please contact our colleagues at info@kamakuraco.com.

Master the Politics and Exposition of Risk Management: Shareholder Value Creation

Each of the authors works closely with major hedge funds and other institutional investors on a daily basis. Their objectives from a risk management perspective are ruthlessly simple: Given equivalent levels of risk, which bond should I go long and which bond should I go short? Day after day, if they do this skillfully, their mark-to-market returns versus their benchmark will be revealed to clients and potential clients each month. All will be able to see clearly whether the hedge funds are achieving their objectives.

Of all of the financial institutions that the authors have worked with, hedge funds have the greatest sense of urgency and the greatest link between their success in achieving best practice in risk management and their personal compensation. Their own shareholder value created is manifestly clear—the excess of their management fees in excess of costs.

Among major traditional financial institutions, there are some very clear ‘stars’ and some rapid progress being made.

At a recent gathering of 20 senior risk managers (just prior to the 2007 to 2010 credit crisis), nineteen of the twenty members surveyed reported that their institution was regularly using mark-to-market technology to quantify their interest rate risk using the techniques like those we outlined in Chapters 6 through 10. Thirty years ago, perhaps only one or two of the institutions surveyed would have given the same answer, with the others relying primarily on the simulation of financial accrual-based net income as their primary focus for risk management effects. That focus, while clearly of interest to the CEO and Wall Street analysts, was certainly not good enough to prevent the \$1 trillion collapse of the savings and loan industry from rising rates in the 1980s and 1990s. In that sense, in the last 30 years, much progress has been made.

At the same time, the survey of the risk managers gathered at that session was striking in a ‘so close but oh so far’ sense. When the risk managers marked-to-market the balance sheet of their organizations, much to our surprise, most of them used only a single yield curve (usually the LIBOR curve, occasionally the risk-free curve) to calculate the market value of every obligation on this balance sheet. The choice of the Libor-swap curve is particularly ironic in the wake of the 2011-2012 Libor manipulation scandal. The institutions completely ignored credit risk in the mark to market process, and that lack of preparation says a lot about the destruction of shareholder value in the credit crisis. In most large financial institutions, the interest rate risk system is the “primary risk system” because it alone holds information on most of the assets and liabilities of the firm. In a sense, the risk managers were universally admitting that their firms failed the 10 point quiz of the previous section. Many of them are moving rapidly now to fix the problem.

Clearly, no hedge fund manager would last long by marking-to-market the present value of an IBM bond with present value factors from the LIBOR curve. It makes no sense in either theory or

practice to use only one yield curve if your mandate is to create shareholder value on a risk-adjusted basis.

The survey response indicates that almost all of the risk managers surveyed were still 'held prisoner' in a tightly compartmentalized 'interest rate risk management' box that falls far short of the risk management definition above. Their interest was not in the mark-to-market calculation per se, but the sensitivity of the mark-to-market calculation to changes in the level of interest rates as captured by the single yield curve.

With a bit of fine-tuning of policies and procedures and with better risk management software, the institutions surveyed could have been achieving a lot more value for their shareholders using the full complement of tools and techniques in this book, not just the interest rate analytics of Chapters 6 through 11. We can see from the examples of fund managers, hedge funds, insurance companies, banks and securities firms exactly what to do. From a senior management perspective, we need to demand the same accuracy and insights from a total balance sheet perspective that we do on the trading floor on a transaction-by-transaction basis.

Using modern integrated risk management technology in a daily production environment, management can achieve this objective at a fraction of the cost of running the disparate systems for compartmentalized risk management that we outlined in Chapter 40. Many of the world's best financial institutions have already taken this approach, and they are very successfully exploiting their peers whose risk management practices remain bogged down in the approaches used in the 1980s and early 1990s. In the next section, we summarize what senior management of these institutions can see on a daily basis that their peers cannot yet perceive.

Daily Management Reporting of Total Risk

A state of the art set of integrated risk management reports would contain the following information on the institution's risk and shareholder value added:

- Default probabilities for the institution compared to target default probabilities:
 - Derived from historical defaults
 - Derived from bond prices
 - Derived from credit derivatives prices (if and only if based on actual trades)
- Default probabilities for the five most important competitors of the institution.
- Default probabilities for the ten largest mark-to-market credit exposures of the institution.
- Sensitivity of all of these default probabilities to changes in:
 - the economy via a stock price index like the S&P 500
 - home prices
 - commercial real estate prices
 - interest rates
 - foreign exchange rates
 - oil prices
 - other commodity prices
- Cost of the Jarrow-Merton put option that would eliminate all of the institution's
 - interest rate risk

- o liquidity risk
- o credit risk
- o total risk
- Sensitivity of the Jarrow-Merton put option for each of the objectives above with respect to changes in:
 - o the economy via a stock price index like the S&P 500
 - o home prices
 - o commercial real estate prices
 - o interest rates
 - o foreign exchange rates
 - o oil prices
 - o other commodity prices
- Year-to-date shareholder value creation for the institution's
 - o ten largest business units
 - o ten most important product units
 - o ten most important geographical units

on these bases:

- o Daily mark-to-market of the relevant portfolio versus a risk-free benchmark with identical interest rate characteristics.
- o Financial accounting basis using matched maturity transfer pricing versus the appropriate yield curve (risk-free yield curve for assets, the institution's marginal cost of funds for liabilities).
- Probability of not meeting net income targets for each of the next five years
- Probability of needing 'excessive' provisions for loan losses in each of the next five years
- Probability of missing managerial target capital ratios in each of the next five years.
- Probability of missing regulatory capital ratios in each of the next five years.

Among the readers of this book, there are probably many who would like to have this information and don't have it. It is available today, and many of your competitors already have access to it. Getting this information for your own institution simply involves going through the IT process that we outlined in Chapter 40. The Federal Deposit Insurance Corporation, through its Loss Distribution Model, announced on December 10 2003 that it is already going through the process of generating information just like this for every financial institution in the U.S. with deposit insurance. Similarly, the Office of the Comptroller of the Currency has made it public that it is using the reduced form probability approach of Chapter 16 to evaluate the risk of every publicly held banking firm in the United States, the public firms they lend to, and 183 sovereign entities. If the regulators already have information like this about your institution, how can you not be looking at it as well?

Moving from Common Practice to Best Practice

In Chapters 1 and 2, the authors related how long it took for commonly accepted risk management tools of today to become accepted as 'conventional wisdom'. In the case of many management tools, this has taken two or three decades, but the pace of innovation is increasing rapidly because competition in the financial services industry is rapidly intensifying and the consequences of being wrong have been devastating for many large financial services firms, their shareholders, and their

CEOs as we saw in 2007 to 2010. Note that the first reduced form credit model was introduced only in 1995 (by Jarrow-Turnbull), that it was first offered commercially in 2002, and that the FDIC had already adopted the technology on the largest portfolio of credit insurance in the world by 2003. Black and Scholes would have been ecstatic if their options model was as widely adopted in twice that time.

Financial institutions face many barriers to innovation. As a group, the employees of financial institutions (including the authors in their prior lives) are a conservative group. Of these conservative people, risk managers tend to be super conservative. Within the group of risk managers, one risk expert likes to categorize the breed as being either 'place keepers' or 'bomb throwers'. Place keepers maintain the risk management discipline using existing technology with modest innovation. Bomb throwers want to make great leaps forward.

For this reason, the people involved in risk management play a critical role in the pace of innovation. For various levels of management, there are some simple ways of moving from common practice to best practice, because the regulatory agencies are moving in that direction rapidly, as the FDIC Loss Distribution Model shows. We summarize each in turn.

The Senior Management Perspective

Senior managers in major financial institutions should be able to readily access the daily risk reports that we outlined above—they should be demanded from staff.

For an institution with a traditional risk management structure and software infrastructure, the cost of these reports is literally negative. By gradually eliminating all of the six types of vendors discussed in Chapter 40, there will be cash left over even after an enterprise wide risk management solution has been put in place. The shareholder value created from this process will be very large but even from a short-term dollars and sense perspective it simply reduces the direct and indirect cost of risk management and provides much clearer strategic insights.

The Middle Management Perspective

Middle managers are the key to success of every financial institution from a shareholder value-added perspective. They have both the hands on knowledge of the working level and the strategic perspective of senior management.

What if senior management is pushing to move from common practice to best practice, but the working level doesn't have the knowledge or skill set to get there? The answer is simple—replaces the working level with better people. If you need some recommendations, please contact us at info@kamakuraco.com.

More likely, the working level will be interested if pushed and a change in risk vendors will provide a welcome challenge and a well-justified sense of contribution to the well-being of the organization.

What if senior management is the barrier? It is so ironic that you need a license to drive a car, but you don't need a license to be president of a major financial institution. The personality of the CEO of a financial institution has a tremendous impact on shareholder value creation and risk management best practice. How can a CEO not want to know the risk that his own institution will

default? Especially if the regulators, shareholders, and rating agencies are all looking at those numbers? The quotations in the Introduction showed how many of the world's largest financial institutions were run by CEOs who had little hands on knowledge of their own business. It's not likely that CEOs of little knowledge will be occupying the CEO chairs in the near future.

When, in spite of the CEO casualty rate of 2007 to 2010, the CEO has little or no interest in risk management, there is still a way forward. With luck, a little pushing will create the interest, at least somewhere on the senior risk management committee. If not, just wait—your time will come in the senior spot and you will be able to change things quickly. Worst case, you can use cost reduction as the rationale for putting an enterprise wide risk management infrastructure in place. If the cost reduction benefits are not apparent, you are not talking to the right vendors.

The Working Level Perspective

As the authors related early in this book, the working level has the longest wait before they can make a major impact on how the institution looks at risk-adjusted shareholder value creation and destruction. One of us tried to sell the mark-to-market risk management concept that is now standard at the major banks around the world for three years at a major bank without success. When faced with that kind of barrier, what should you do as a working level staffer?

One of the most effective motivators for senior management is to prove to them that they are at risk of no longer achieving common practice in risk management, let alone best practice. Peer bank actions are the most effective of convincing people that the financial institution is being left behind. Another opportunity to effect change comes in the aftermath of a crisis in either the financial markets you operate in (like the 2007 to 2010 credit crisis or like Korea after the 1997-1998 Asia crisis), or at the institution where you work after a risk management 'incident'. Being part of the solution is very good for your career.

Many times, unfortunately, the messenger who conveys the message that a crisis is coming is not welcomed before the fact and not thanked afterwards when they prove to be right. This is a situation to be avoided at all costs. When you find yourself employed by a financial institution that lacks the institutional will to create risk-adjusted shareholder value with the best tools available, quit! The firm is destined to be acquired or get in to trouble, so why sit around and wait for it to happen, ruining your own reputation as a risk manager? If you need any proof, the blog-a-sphere is filled with tales of risk managers who raised the red flag of warning at their firms but stuck around to be the fall guys.

Getting Help to Create Shareholder Value

The tools and techniques in this book are fully implemented and in place at some of the most sophisticated financial institutions around the world. The concepts are tried and true, although in some cases they are being applied in different ways from the ways they might have been used before.

Since the techniques are already at work, getting help to speed your own implementation of these ideas is as simple as sending us an e-mail at info@kamakuraco.com . We look forward to hearing from you, and we thank you for making it all the way to the last sentence of this book.

Postscript

This chapter was written during the Tanabata Festival in Sendai, Japan, in August 2012. We write in the memory of those whose lives were lost in the great earthquake and tsunami of March 11, 2011 and in honor of those who celebrate the lives of their lost loved ones.