

Preface

I think that the concept of the Crouhy, Galai and Mark book on **The Essentials of Risk Management** is brilliant. In my career as an academic and in investment management, I found that there is too large a separation between the technocrats who build risk-management models and systems and those who should be using them. In addition, the model builders seem to me to be too far from economics, understanding what risk management can and cannot do and how to structure the risk management problem. Crouhy, Galai and Mark bridge that gap. They bring the academic research together with applications and implementation. If risk-management model builders come to appreciate the economics underlying the models, they would be better prepared to build risk-management tools that have real value for banks and other entities. And, as the authors bring up time and again, board members of corporations must also become as familiar with the models and their underlying economics to ask the correct follow-on questions.

First, risk management is often described as being an independent activity of the firm, different from generating returns. Second, most macro and micro models in economics start from a framework of certainty and add an error term, a risk term to represent uncertainty. When describing predicted actions that arise from these models, the error or uncertainty term disappears because the modelers assume that its best to take expectations as their best guess as to future outcomes.

In both cases, however, this is incorrect. Risk management is part of an optimization program, the tradeoffs between risk and return. As described in the book, the three tools of risk management are (a) reserves, (b) diversification, and (c) insurance. With greater reserves against adverse outcomes, the risk of the firm or the bank is reduced. However, greater reserves imply lower returns. And, what is the dynamics of the reserve. For example, if a bank needs capital or liquidity reserves to shield it against shock, is the reserve static or can it be used and how is it to be used at time of shock. If it is a reserve that must always be at a static level, it is not a reserve at all. These are important optimization and planning questions under uncertainty. With more diversification, the bank reduces idiosyncratic risks and retains systematic risks, which it might also transfer to the market.

Diversification has benefits. But, if a bank earns profits because its clients want particular services such as mortgages, it might want to concentrate and make money by taking on additional idiosyncratic risk, for it is not possible to diversify away all risks and still earn abnormal profits. The bank must respond to its client's demands and, as a result, take on idiosyncratic risks. And, the same is true of insurance. Unlike car insurance, wherein, say, the value of the car is knowable over the year, and the amount of the insurance is easy to ascertain, as the book describes, the bank might not know how much insurance and when it might need the insurance. Nor, does it know the dynamics of the insurance plan as prices change in the market.

That is why risk management is integrated into an optimization system where there always are tradeoffs between risk and return. To ignore risk considerations is inappropriate; to concentrate on risk is inappropriate. The boards of banks or corporations are responsible to understand and challenge the optimization problem. Likewise, modelers must also understand the economic tradeoffs. Prior to the financial crisis of 2008, many banks organized their risk management activities in line and not circle form. That is, the risk department was separate and below the production department. The risk management systems of the future must be designed such that the optimization problem is the center focus. This involves deciding on the level of capital employed not only for working capital, or physical investment capital, or human capital but also the amount of risk capital in deciding on the profitability of various business lines and how they coordinate with each other.

Risk management involves measurement and model building. This book provides us with a description of the many of the problems in building models and in providing the inputs to the models. But, once the senior management and the modelers understand the issues, they will change their focus and address the modeling and measurement issues. For example, there are three major problems in the model building/data provision or calibration of the model framework: (1) using historical data to calibrate the model, (2) assuming the spatial relationships will remain unchanged, such as how particular assets are grouped together into clusters or how clusters move together, and, (3) assuming that once the model is built and calibrated that others don't

reverse engineer the model and its calibration and game against those using the model. There are myriad examples and applications of each of these, or these in combination with each other in this book. For example, the rating agencies used historical data to calibrate the likelihood of declines in housing price such that homeowners would default on their mortgages. Unfortunately they used too short a time period and assumed incorrectly that the best prediction of the future would be provided from these short-period data inputs. And, they assumed that homeowners default on their mortgages randomly while ignoring the possibility that the independent clusters of possible mortgage defaults that they assumed existed would become one cluster during a crisis such as the 2008 financial crisis. Moreover, once they provided their ratings on complicated mortgage structured products, market participants reverse engineered how they rated mortgage products and gamed against them by putting lower and lower quality mortgages into structures to pass just the ratings level that they wanted to attain. These three lessons are pervasive in risk management and are illustrated brilliantly in one form or the other over and over in this book.

There are decisions that should be made, in part, proactively and decisions that should be made, in part, reactively. Risk management includes an understanding of how to plan to respond to changes in the opportunity set and to changes in the costs of adjusting assets and to financing activities. There is a value in planning for uncertainty. Ignoring risk might supply large short-term profits but at the expense of survivorship of the business for not setting aside sufficient risk capital threatens survivorship of the business. And understanding includes evaluating the returns and risks of embedded and explicit options.

All risk management systems require a careful combination of academic modeling and research with practical applications. Academic research highlighted in this book has made a major contribution to risk management techniques. Practice must be aware of the underlying assumptions of these models and in what situations they apply or don't apply and adjust them accordingly. Practical applications include understanding data issues in providing inputs to these risk models and in calibrating them consistent with underlying economics. The 2008 crisis highlighted once again the importance of risk management. I

believe that all board members must become as conversant in risk management as in return generation. That will become a prerequisite for board participation. This book highlights the importance of these issues.

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