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CHAPTER 4

Ineffective Risk Management in Banking: Bold Ignorance or Gross Negligence?

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An analysis of the subprime crisis highlights that numerous factors and hazards were not exactly unforeseeable. So, why did financial institutions not act or react much earlier? Why have outdated valuation and portfolio optimization models not been abandoned? Have regulatory frameworks such as Basel II been useful? What was learned from this recent crisis as well as earlier financial crises? This chapter is an attempt to provide qualified answers to these questions. The authors demonstrate that a combination of organizational and market-driven corrective steps are called for including a reorientation of incentive systems, truly living up to what is called for in corporate governance, establishing enhanced risk methodology, and impeding the use of risk methodological approaches, which have demonstrably been proven wrong.

4.1 INTRODUCTION

A thorough analysis of the subprime crisis triggers and their consequential effect on the financial sector and ultimately on the world economy highlights that numerous factors and hazards were not exactly unforeseeable. Hence, inter alia, the following questions can and should be raised:

1. Why did financial institutions not act or at least react much earlier?
2. Have regulatory frameworks such as Basel II been useful or have they added to the problems at hand?
3. Why did regulatory agencies not react and act much earlier?
4. Why have valuation and portfolio optimization models that are based on perfect capital market theories not been abandoned many years ago?

5. Why were corporate governance frameworks effectively ignored?
6. How far has poor risk communication added insult to injury?
7. Were the extensive state guarantees and loans truly necessary?
8. What truly are the lessons learned from this recent crisis as well as from earlier financial crises?

This chapter is an attempt to provide qualified answers to these questions, without overemphasizing the theoretical foundation and the extensive empirical background research in the field, the details of which may be provided on request to interested patricians and researchers. Some readers may be surprised to learn how long some rather significant defects and inefficiencies in banks' risk management systems have remained uncompensated and how far value was hence destroyed irresponsibly by those who should have known better. Moreover, it is demonstrated that a combination of organizational and market-driven corrective steps are called for, including but not limited to a reorientation of incentive systems, truly living up to what is called for in corporate governance, and rendering it compulsory to use at least those aspects of enhanced risk methodology that have been established for numerous years, while on the other hand impeding the use of risk methodological approaches that have demonstrably been proven wrong.

4.2 REVIEW OF CRISIS COVERAGE IN MEDIA AND BUSINESS JOURNALS

For a more in-depth appreciation of the inherent inefficiencies of risk management systems in banks, it is appropriate to first briefly reflect on the recent subprime crisis and the direct and indirect effects it had on the world economy. To set the stage we should summarize a variety of facts and interpretations from the recent media coverage, given that the subprime crisis and its consequential effects happened too recently to have enjoyed a sufficiently widespread coverage in academic literature. In fact, the book in which this chapter is published has a good chance of being one of the first edited books on the recent banking crisis.

As the media have demonstrated, a few fundamental aspects have been misinterpreted in North America and elsewhere. Reportedly, the boom in the United States property market in the early and mid-2000, caused

overconfidence and rather biased interpretations of property prices. Banks started to issue mortgage bonds for private and commercial properties for 100% of the purchase price, or even more. Mortgage financiers started to offer structures such as 100% financing including transfer fees, and in some cases allowed that the repayment of funds was only going to start with a delay of several months after having taken occupation of the property. Needless to say, this equated the financing of well in excess of 100% of the original market price of the property.

A distinct misconception was the belief that property investments are safe and secure, and always on the rise. Historically this may have been the case, as is evidenced by the fact that neither the burst of the new economy bubble nor the various energy crises truly affected the property market by orders of magnitude. The most recent banking crisis has shown, however, that property prices are not necessarily uncorrelated. As the media reported, changing interest rates and certain changes in the economic climate triggered the increased number of defaulting borrowers. Free-falling property market prices then led to the observation made by more home owners that it was possibly easier to simply vacate the property and hand it back to the bank than to pay off a mortgage bond that by far exceeded the true value on the market. With more and more home owners copying that pattern, and commercial property becoming more speculative and less profitable due to lower occupation rates, a downward spiral evolved with a much higher magnitude of impact on the world economy than would be have been expected from the singular set of event or stress factors—the mortgage loan crisis—in the United States, as shown in Figure 4.1.

Falling property prices alone could not have had the ripple effect that has been observed across the globe in recent months. The problem at hand was more complex. A fundamental issue, which was discussed quite openly in the media, related to the fact that banks had started to combine the traditional mortgage bond financing business with more sophisticated capital market transactions. This issue of mortgage bond financing, which has been somewhat simplified for this chapter, was no longer the business of simply issuing funds to a borrower, refinancing this on the capital market with the inherently better rating that a bank possesses, and living off the difference between the bank's refinancing rate and the borrower's mortgage bond interest conditions. Rather, the lending was repackaged into longer term asset-backed securitization (ABS). These were sold to conduits, which were then refinanced through commercial papers. These

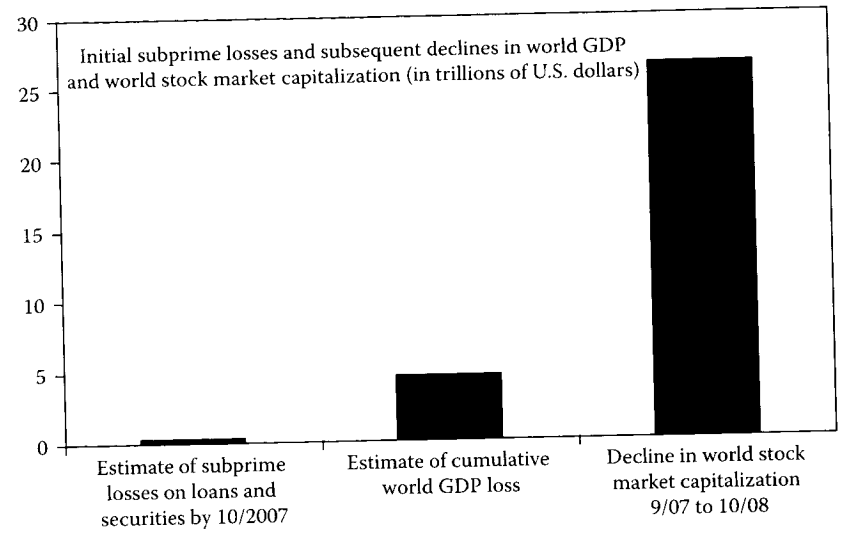

FIGURE 4.1 Initial subprime losses and subsequent declines in world GDP and world stock market in trillions of U.S. dollars. (From Blanchard, O., The crisis: Basis mechanisms, and appropriate policies. Working Paper 09-01. Massachusetts Institute of Technology (MIT)—Department of Economics; National Bureau of Economic Research (NBER), Cambridge, MA, 2008. With permission.)

commercial papers, asset backed, were perceived to be very secure investments, inter alia given that the financial system had earlier survived such shocks as 9/11. Liquidity risk was at the same time perceived to be close to zero and was secured by a liquidity line that in most cases was well underdimensioned. In some cases, this coincided with a lack of diversification in the business model, as the case of Bear Stearns indicates (Figure 4.2).

To make things worse, even more financial products (i.e., certificates and the like) were restructured, in most cases reflecting derivative structures, which, it is fair to say, were not truly understood by the large majority of investors. Not understanding risk profiles implies that risk management systems become unproductive or even counterproductive. In turn, when operating without effective risk monitoring and analysis systems, organizations became overextended, overleveraged, and undercapitalized without even knowing what they are really in for. It is analogous to flying in bad weather without radar.

Government intervention, and in some cases the lack of government intervention, rendered things worse as the case of Lehman Brothers may indicate. The reported financial losses of almost $100 billion in 1 year as

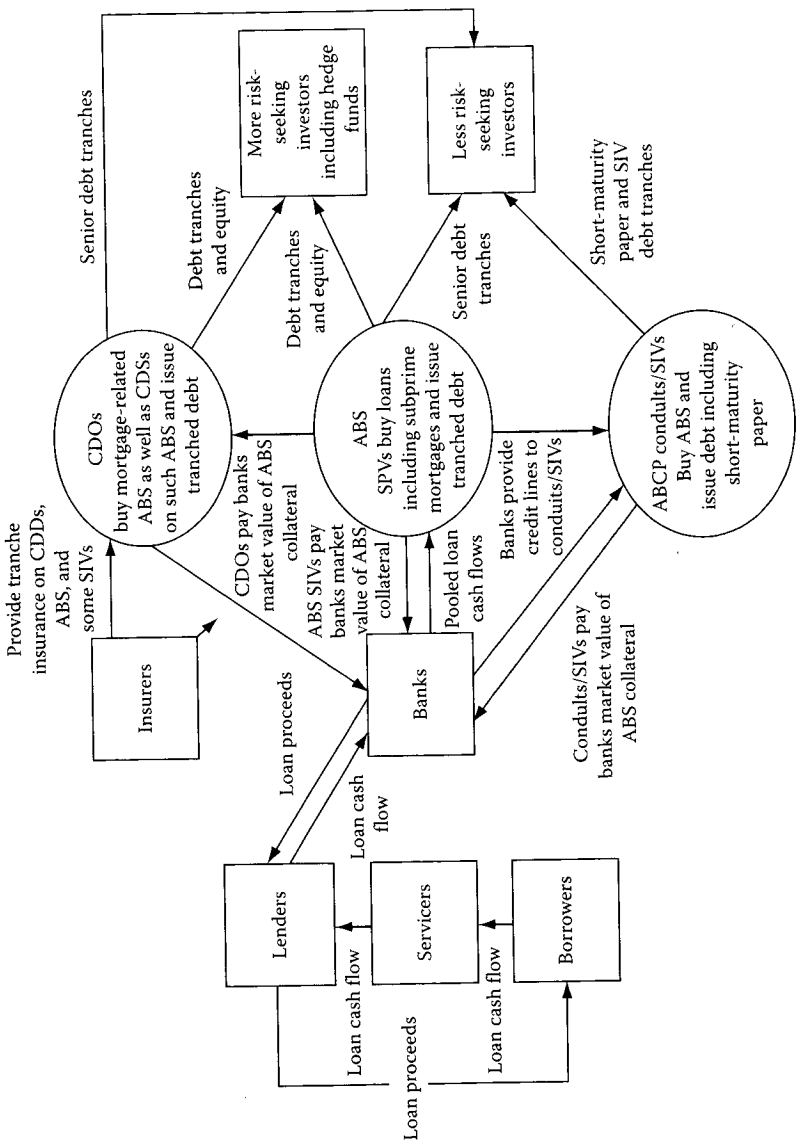

FIGURE 4.2 Mortgage market flows and risk exposure. ABS, asset-backed securities; ABCP, asset-backed commercial paper; CDO, collateralized debt obligations; CDS, credit default swap; SIV, structured investment vehicle; SPV, special purpose vehicle. (From International Monetary Fund, *Global Financial Stability Report*, Washington, DC, 2007, p. 11. With permission.)

the case of AIG reflects (including the astonishing 2008 fourth quarter loss in excess of $67 billion that was apparently caused by credit insurance payments that had been negotiated to secure CDOs) certainly exceeds the order of magnitude that almost any financial analyst would have ever expected, or that a risk radar system would have assumed as a shock scenario. And the reader may be aware that these tremendous losses were incurred in spite of the U.S. government's cash injections to AIG totaling some $150 billion throughout 2008.

Incidentally, the abovementioned case example of Lehman Brothers indicates that even further misconceptions and crisis amalgamating factors must have prevailed. Some of these have been also identified in common literature and have been discussed in the media. One such aspect is related to the level of independence of larger banks and the impact that their failure might have at home and abroad. The media have speculated that the U.S. government decided not to intervene in the failure of Lehman Brothers because a significant part of their involvement and in particular their liabilities were outside the United States. Reportedly, at least within the United States, the U.S. economy appears to have been interpreted for many years as being largely independent, thereby not taking cognizance of the fact that the U.S. contribution to the worldwide gross domestic product had declined to the current level of approximately 27%, as reported by the World Bank.

Hence a much higher degree of interaction between the U.S. economy and those of other parts of the world has evolved than had historically been assumed. Furthermore, investments in certificates and similarly structured financial products were perceived to be as safe as investments in other investment vehicles such as mutual funds, stocks, and bonds, this in spite of the fact that certificates in most cases simply are a structured loan that is provided to the issuer of the certificate, usually backed and secured by a minute portion of the investment vehicle. At the same time, savings deposits were believed to be safe and commodity prices were believed to be on the increase from now until eternity. And yet another fundamental error was the belief that very large banks would survive, no matter what happens, and that neither the U.S. real estate price slumps nor the banking crisis would have a significant effect on other industry sectors such as automotive, transport, electronics, and retail.

Another severe misconception is related to the United States' financial reporting standards, which were for many years believed to be superior to those implemented elsewhere because they enabled financial institutions

to reflect unrealized profits fast, and of course derive attractive personal bonus payments in upward markets. The rather detrimental and crisis-accelerating effects of such standards in a downward-oriented market were ignored or not appreciated. It appears that more than a few of the former proponents of the current financial reporting standards are now calling for different solutions, which would enable them to in some regards reflect the valuation of market values as they will be achievable over the medium to longer term, in particular when it is clearly not their intention or when there is no other good reason to have to dispose of a currently undervalued asset in a hurry.

Recent media coverage provides insight into the fact that shocks to the financial system have been there before, many times in the last 100 years. The issue seems to be, however, that in 2008, a combination of two shocks coincided, the one of a banking bubble triggered in turn by a property price bubble, and that of a serious deterioration of investor confidence. It is fair to say that the implications to the financial system are rather far-reaching because these coincide with other effects that have the tendency to make things worse, these including but not limited to rating agencies who tend to overextrapolate upward and downward trends, an international financial reporting system that tends to drive investors and other players in the financial market toward short-termism, and significantly overextended and cash-strapped governments. The new liquidity crisis which has evolved in recent months and weeks is clearly of an extent that most active players in the financial market and most governments had never expected. By now, refinancing has become very expensive, and the volume of funds that is loaned to the private sector has dropped sharply. Banks had to raise their equity positions in order not to be penalized by business analysts with a downgrading of the rating, a crisis-enhancing strategy which coincided with the raising of minimum requirements in order to qualify for financing, and the hesitation or nonpreparedness of bureaucrats to engage in any decision at all. Governments provided guarantees to the major players in the financial market, thereby in some cases jeopardizing the stability and the rating of their own currencies. Speculation on defaulting governments has recently added to the lack of investor confidence, as the cases of Iceland, the Baltic States, Hungary, and other countries in Eastern Europe may indicate. As *The Economist* reported in its February 29, 2009 edition, the biggest risk in the emerging world today comes not from sovereign borrowing, but from the debts of firms and banks. As foreign

If one green bottle should accidentally fall...

Country	Current-account as % of GDP*	Short-term debt as % of reserves*	Banks' loan/ deposit ratio	Overall risk ranking†
South Africa	−10.4	81	1.09	17
Hungary	−4.3	79	1.30	16
Poland	−8.0	38	1.03	14 =
South Korea	1.3	102	1.30	14 =
Mexico	−2.5	39	0.93	12 =
Pakistan	−7.8	27	0.99	12 =
Brazil	−1.5	22	1.36	10 =
Turkey	−2.3	70	0.83	10 =
Russia	1.5	28	1.51	9
Argentina	0.2	63	0.74	8
Venezuela	0.8	58	0.75	7
Indonesia	1.2	88	0.62	6
Thailand	0.3	17	0.88	5
India	−2.4	9	0.74	4
Taiwan	7.9	26	0.87	3
Malaysia	11.3	15	0.72	2
China	5.2	7	0.68	1

Sources: HSBC; Economist Intelligence Unit *2009 Forecast † Higher score implies higher risk

FIGURE 4.3 Current economic liquidity indicators. (From N.N., Domino theory, *The Economist*, Feb. 29, 2009. With permission.)

capital dries up, they will find it harder to refinance maturing debts or to raise new loans. Figure 4.3 introduces three indicators to judge how vulnerable economies are to the global credit crunch. Among the countries in the table, Pakistan, South Africa, and Poland are tipped to run current-account deficits of 8% or more of GDP this year—the size of Thailand's deficit before its crisis in 1997.

Based on the background research that was published by *The Economist*, in contrast, the Asian emerging markets generally look the safest, the main exception being South Korea, which, thanks to its large short-term foreign debts and highly leveraged banks, is deemed to be as risky as Poland. Vietnam, though not included in the table, reportedly scores high on the risk rating too. It is worth mentioning that the overall score in the table only ranks countries' relative risks. To assess the absolute risk of a

crisis, one needs to estimate external-financing needs (defined as the sum of the current-account balance and the stock of short-term debt) over the next 12 months. As reported by *The Economist*, UBS has reportedly calculated the gap between this and the stock of foreign-exchange reserves for 45 countries. While only 16 of these countries have a financing "gap," all others reflect reserves that are more than sufficient to cover a year's worth of payments, even if there were no new capital inflows (Figure 4.4). Virtually all of those 16 countries are in Central and Eastern Europe. Luckily, most emerging economies' large reserves will help to keep them out of danger. However, the longer the credit crunch continues, the more those reserves will start to dwindle. Further speculation on what the next shock to the financial system will be, and when this will likely occur (e.g., a commodity crisis or a significant change in inflation rates) adds insult to injury. The insurance broker AON reflected in its 2009 political risk map (see www.aon.com) that sovereign default risk is exceptionally high in numerous countries (i.e., the list being topped by Zimbabwe, Kyrgyzstan, and 11 other countries considered rather critical) and that numerous countries are particularly vulnerable to a commodity crunch.

Reportedly, the financial crisis is now quite clearly visible in other market sectors too, and may reach an overall impact that goes well beyond the losses that were experienced by banks. Beyond financial institutions, the automotive sector appears to have been the first to experience the shock, as the recent negotiations between the large automotive manufacturers and the U.S. government demonstrate. The fast reaction is no surprise given the level of sophistication that is inherent in the optimized just-in-time management approaches and the rather complex logistics networks in that sector. But it appears that cross-sector economic forecasts and in particular unemployment figures are recognizing now that the impact of the financial crisis will be far greater than had been assumed just a few weeks ago.

Of course, the rather significant deterioration of value in the order of trillions of dollars has provided opportunities too. Governments investing in financial market participants, while their stock is traded extremely low, may have found a means to reduce overall government debt by orders of magnitude in the medium to long term. Investment bankers specialized in the field of mergers and acquisitions have become busy, given that more and more organizations are unable to pay their debt (as assessed in conformity with the rather counterproductive financial reporting standards),

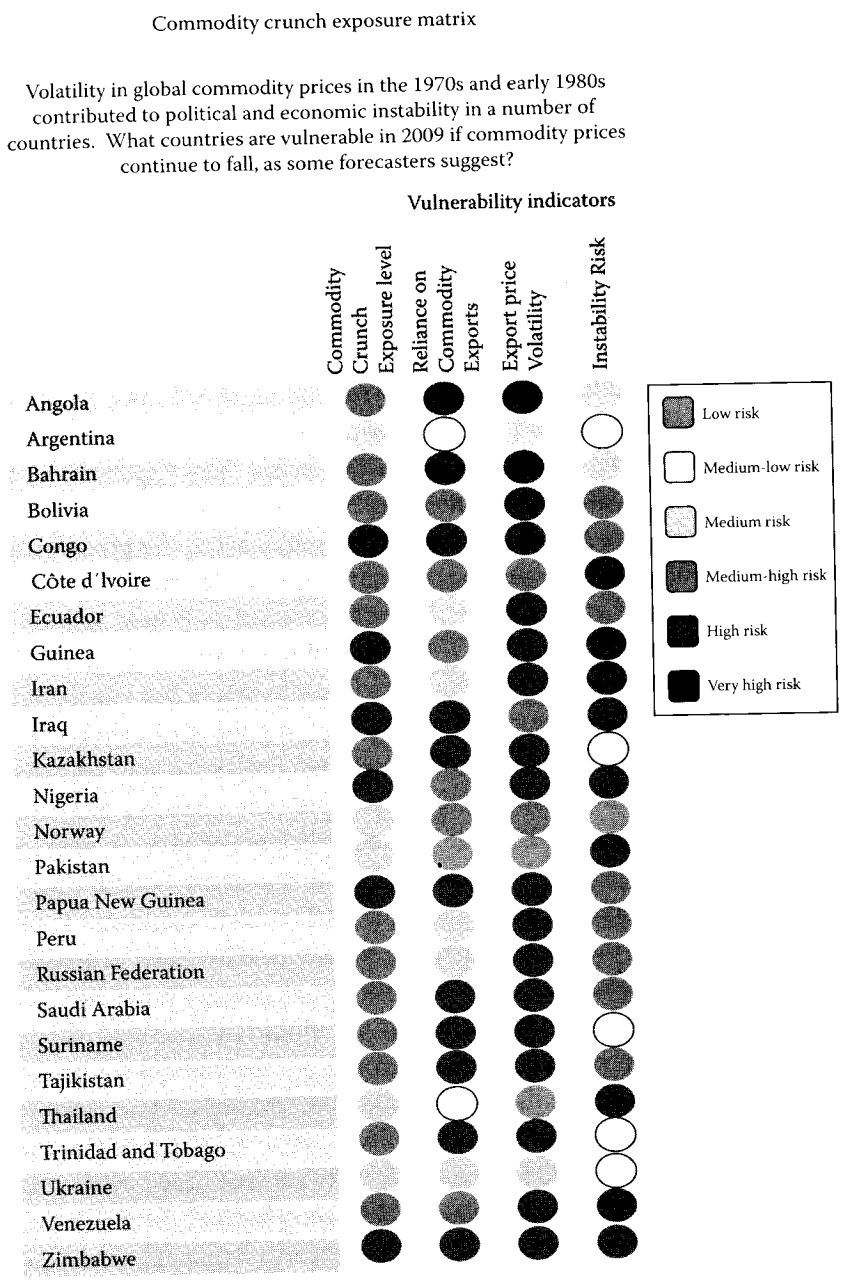

FIGURE 4.4 Commodity crunch matrix. (Extracted from AON's 2009 political risk map, see www.aon.com. With permission.)

or given that for whatever reasons their credit lines have been terminated now seek a suitable purchaser instead of going into liquidation.

Needless to say, while this chapter was written, the end of the financial crisis was and is not foreseeable. Some media are speculating whether investment bankers and those working to support their glory might currently engage in overly restrictive lending practices in order to overcompensate their loss of reputation in society at large, this being in spite of their remarkable financial wealth. Certain signs are presently visible, though, and are discussed in the media that some sectors might have managed themselves out of the crisis, particularly in the United States, as long as (other) banks and large economically relevant corporate organizations obtain sufficient guarantees and bridging finance from their governments to survive the short term. Hence, the U.S. banks may have experienced the worst parts of the 2008/2009 financial crisis and now have reasons to look forward to a brighter future; a trend which may have to be proven over time to be paralleled in other countries.

4.3 A CLOSER LOOK AT MODERN RISK MANAGEMENT SYSTEMS

It is fair to say that many if not most players in the financial market were taken by surprise. The severity of impact and the consequential ripple effects clearly were underestimated by most players in the financial market, and beyond. A good test of the true effectiveness of the risk management systems that were employed, would be to compare financial market participants' forecasts for the year 2008, with the rather significant losses, in some cases, that were experienced at year-end. Any unexplained gap reflects a defect or inadequacy of the risk management system that was employed. A slightly more sophisticated test would be to check whether the integration of certain additional assumptions and model features, to reflect the learning results from the 2008/2009 financial crisis, and the re-simulation of the figures that should have been calculated as the 2008 budget, in combination reflects the impact of what truly happened.

Be this as it may, the objective of the following sections is to provide a discussion of further factors, beyond media coverage, that can be demonstrated to have had an effect on organizations performance in the recent banking crisis. While this discussion is not exhaustive and all-encompassing, it does provide food for thought and sensible concepts and ideas on what to improve in the not so distant future. The reader is advised to paint his or her own picture of whether the severity of failures of risk

management systems, and the rather long time which has passed since these effects were first detected, must result in the summary conclusion that some players in the market have been grossly negligent as opposed to having been just boldly ignorant.

4.3.1 Lending Practices

Even the superficial coverage that the subprime crisis and its consequential ripple effects have enjoyed in the media, has demonstrated that banks' lending practices have been problematic. Markets can go up, and down, and an upward or downward move can have an implication on property price regimes. The same applies to the field of vehicle financing, which—as is visible in the media—pushes car sales by means of offering discounts and financing mechanisms that, as it appears in some cases currently, are worse than the practices that had been prevalent in property financing. Some countries reportedly are now struggling to provide sufficient spare for the (temporary) storage of repossessed cars.

Unless banks are keen on experiencing similar or even worse financial crises again, lending practices need to be scrutinized to be limited to a realistically achievable residual value of the property, assuming that a borrower defaults and that backup pledges or guarantees at that stage cannot be realized or liquidated in the near future.

It is conceivable too that the way in which individuals or companies are rated, is in need for improvement. In particular, it is questionable how good pledged securities depots, personal guarantees, etc., truly are in periods of economic downswing, and whether common haircuts are sensibly calibrated. As the discussion below on liquidity risk outlines, it has been common knowledge for many years that if an asset must be sold in a hurry, the realizable market value may be far less than the one to be achieved if time is not an issue.

While banks and regulatory agencies will need to ensure that credit practices will need to become a little more robust and restrictive, both governments and regulatory agencies will need to ensure that lending practices will not become as overly restrictive as the case has been in many countries in recent weeks. Refinancing has become rather expensive, which renders lending less profitable and ultimately leads to an increase in lending rates to be passed on to borrowers, a good recipe to enforcing the downside impact of a recession. At the same time, while jobs in the banking industry are being slashed by the thousands, bank branch staff, credit specialists, and some of the many bureaucrats in the financial systems have become

overly sensitive in order to certainly make no mistake ever, thereby possibly overcompensating their fear that they might loose their jobs too at some stage. Needless to say, in the interest of most people and organizations, this downward spiral needs to be stopped; the sooner the better.

4.3.2 Ineffective Operational Risk Management

Widely published case examples such as the recent trading scandal at the Société Générale have demonstrated that operational risk management systems can be rather ineffective, in spite of the fact that regulatory regimes such as the recent transformation of Basel II into European Community legislative and regulatory frameworks for banking had attempted to address such organizational defects rather intensely. Needless to say, a more stringent and robust real-life implementation of corporate governance is called for, in combination with the enhanced market discipline and the more proactive involvement of regulatory agencies as is called for under the second and third pillars of Basel II (Figure 4.5).

And as submitted elsewhere, real-life implementation should start with the focusing of risk management strategies (Figure 4.6), not like the commonly observable "tail wagging the dog" (Kross 2006).

In addition, it appears that known facts and scientific evidence on risk-taking behavior has not been reflected as boldly as it should have in the said regulatory framework commonly referred to as Basel II and its respective transformations into local-level regulatory frameworks on banking supervision. To mention an example, Shapira in his 1995 book on the managerial perspective of risk-taking behavior, demonstrated that individuals and managers quite consistently deviate in their risk-taking behavior as a function of perceived success or failure. While the tendency to take risk is relatively low, as decision makers experience a little success, a little failure or simply a break-even, risk-taking behavior increases rather considerably when considerable or significant success is experienced (i.e., decision makers are prepared to bet). Moreover, as things evolve toward the negative side, that is, considerable failure is experienced, personal risk taking increases tremendously, far higher than on the positive side. Rather significant discrepancies evolve between what decision makers believe they would do, versus what others would do, versus what they should do.

Needless to say, risk management systems and their ability to cope with subjective estimates and personal judgment need to be sufficiently robust to be able to compensate the negative extremes. Given that control mechanisms in the banking sector already are rather stringent, and procedural,

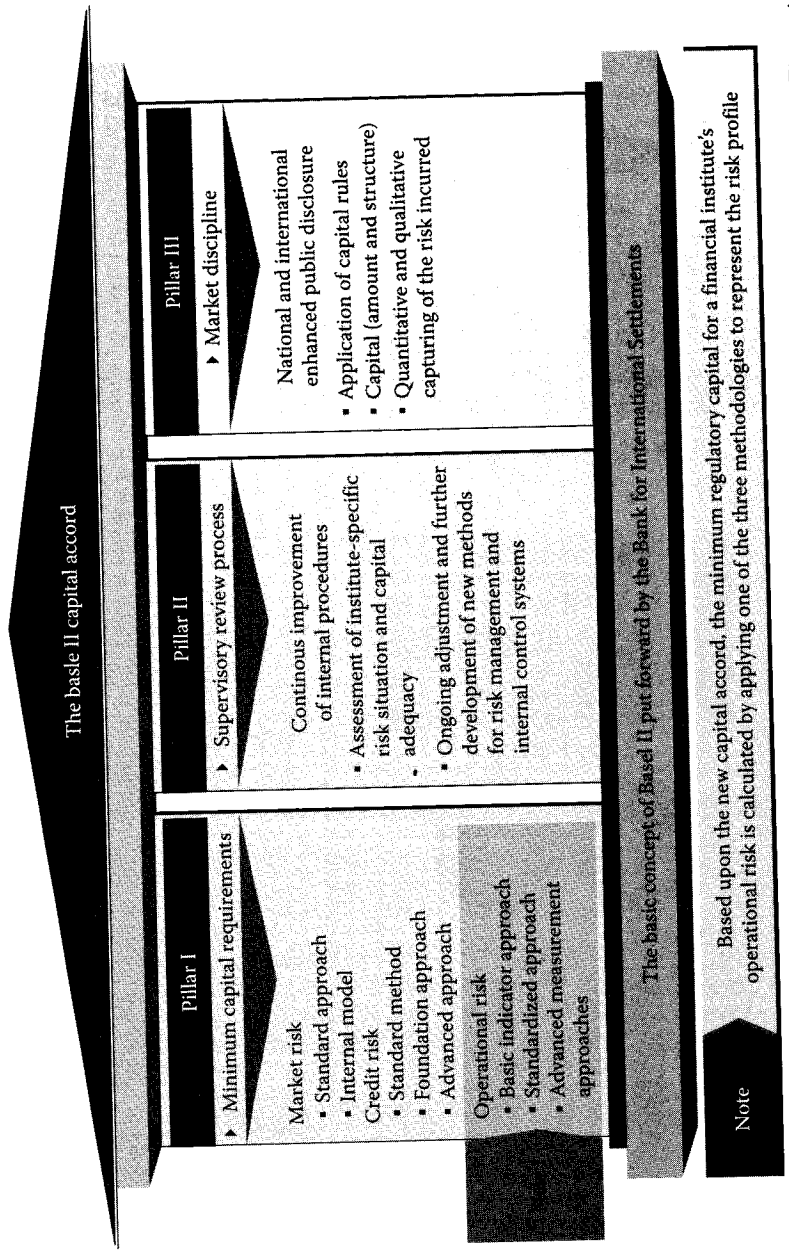

FIGURE 4.5 The Basel II framework. (Redrawn from Kross, W., *Organized Opportunities: Risk Management in Financial Services Operations*. Wiley-VCH: Weinheim, Germany, 2006.)

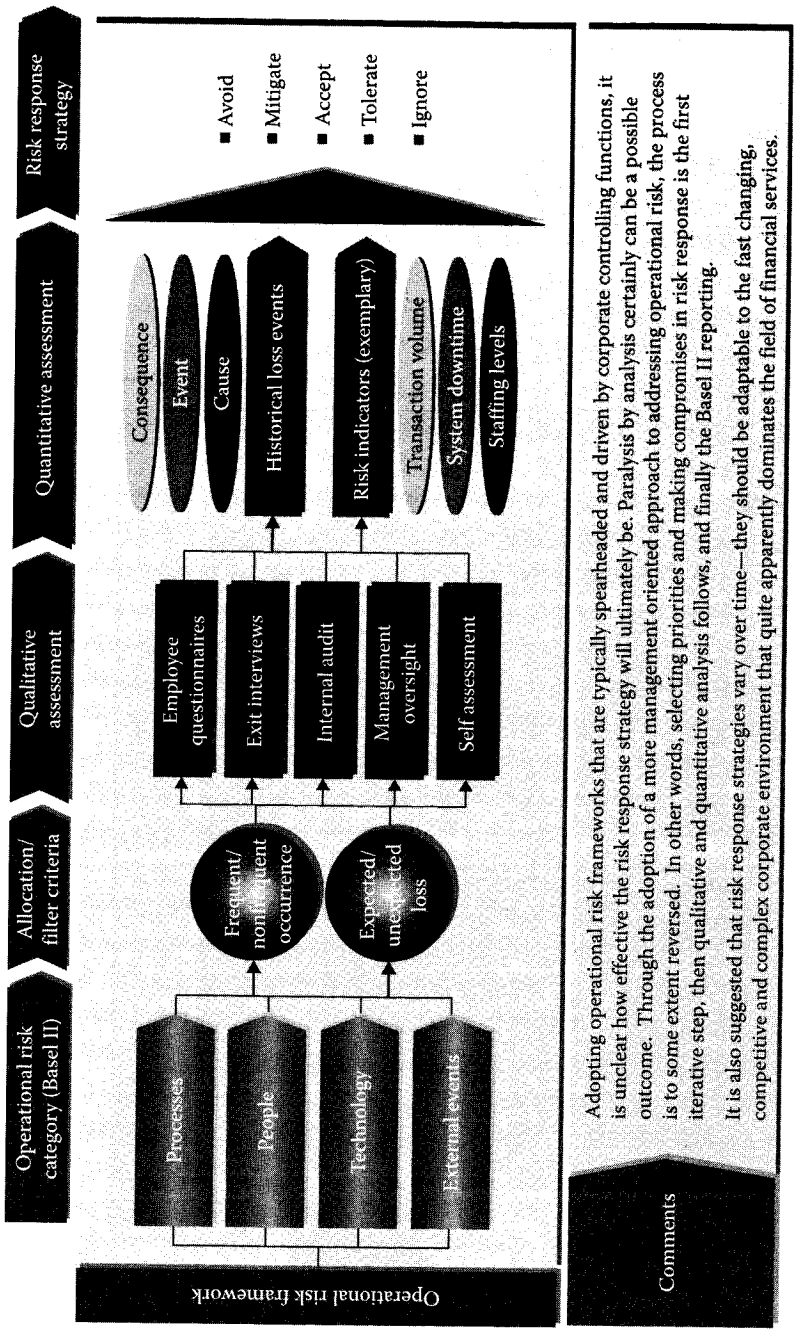

FIGURE 4.6 Traditional approach to implementing Basel II OpRisk. (Redrawn from Kross, W., "Integrating management" into "OpRisk management". In: Gregoriou, G. N. (Ed.), *Operational Risk Toward Basel III*. John Wiley & Sons: New York, 2009.)

it is submitted that adding more elements of control to this environment should not be the predominant mechanism to achieve the desired results. Rather, a cultural alignment of decision makers is called for, which in all likelihood can only be achieved if reward and recognition systems take cognizance of risk factors in addition to being linked to the key indicators of sales volume and profitability. Risk-adjusted performance should be rewarded, an element that unfortunately is not even reflected in the bulk of real-life implementation of balanced scorecards (Figure 4.7).

4.3.3 Appropriate Measures of Risk

It has been recognized for a long time that risk can be described using a diversity of key indicators and risk measures (Figure 4.8). Similarly, it has been recognized that defining risk as the volatility in future cash flows, is an inappropriate and incomplete reflection of what truly needs to be addressed in risk management.

While it is recognized that modern banks do employ a number of approaches to measuring risk and assessing the likelihood of failure, it is submitted that there is room for improvement as Berger and Gleissner demonstrated in 2006 for German publicly traded corporations. When estimating the market risk inherent in securities, for example, or employing the Markowitz approach to asset portfolio optimization, volatility is the predominant risk key indicator while on the other hand certain downside risk indicators such as the value-at-risk (VaR), the conditional VaR, the deviation VaR or what is commonly referred to as the maximum drawdown are widely ignored. In fact, such downside risk metrics are easier to understand intuitively, than volatility is. At the same time, it is submitted that sensible key indicators to measure risk must take into consideration what clearly is at risk, and how this risk could best be described. For example, for ABS transactions, it likely is inappropriate to simply reflect the extrapolated volatility of historic cash flows over the last 250 days, if on the other hand credit risk is a predominant factor in the overall future performance.

The earlier notion that banks and investors were faced with a lack of transparency and with rather limited capabilities to assess the true nature of risk factors inherent in structured and exotic financial products raises some further fundamental concerns. In particular, it appears that key risk indicators were assessed at a level that was far too abstract and too high-level to serve the truly intended purpose. Also, the number of key performance indicators used was very small (Figure 4.9).

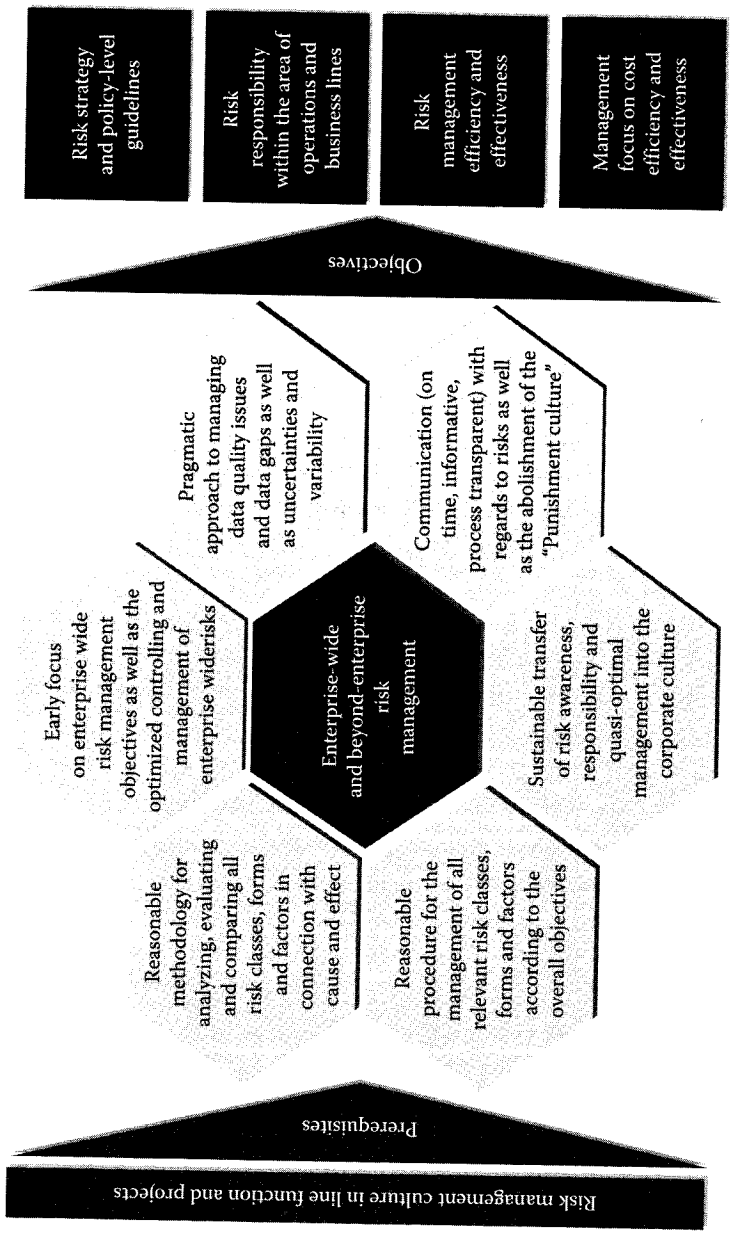

FIGURE 4.7 Reflecting soft factors in enterprise risk management. (Redrawn from Kross, W., *Organized Opportunities: Risk Management in Financial Services Operations*. Wiley-VCH: Weinheim, Germany, 2006.)

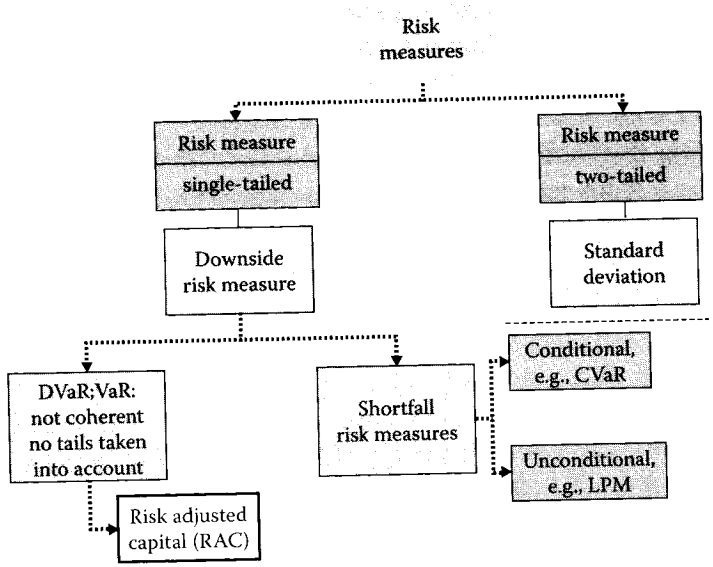

FIGURE 4.8 Risk metrics.

The wealth of funds and hedge funds that evolved in recent years has further augmented this set of problems. Instead of simply investing in stocks or bonds, rather significant volumes of money were invested into intermediary structures. In turn, to assess the level of risk inherent in a fund, performance analyses and risk valuation approaches were typically focused on the last 250 days' performance as opposed to the inherent risk profiles of those stocks and bonds investments (and synthetic, intermediary, or derivative structures), which were the results of asset portfolio management optimization within the fund. This coincided with performance and risk-reporting standards which were minimal compared to the level of effort that a bank has to engage in. To render things worse, some funds decided to invest in yet other funds, which in turn made it nearly impossible for investors to perform drill-down analyses into the truly underlying risk factors. It has been widely discussed in the media that most if not all larger players in the investment banking arena, and beyond, directly or indirectly overinvested in the U.S. property market which had been performing so well for years—without truly recognizing the extent of their exposures.

As a "lesson learned" from the recent financial crisis, it is submitted that in future, risk metrics must take into consideration what truly is at risk, and what the major risk drivers are and will be. A simple extrapolation

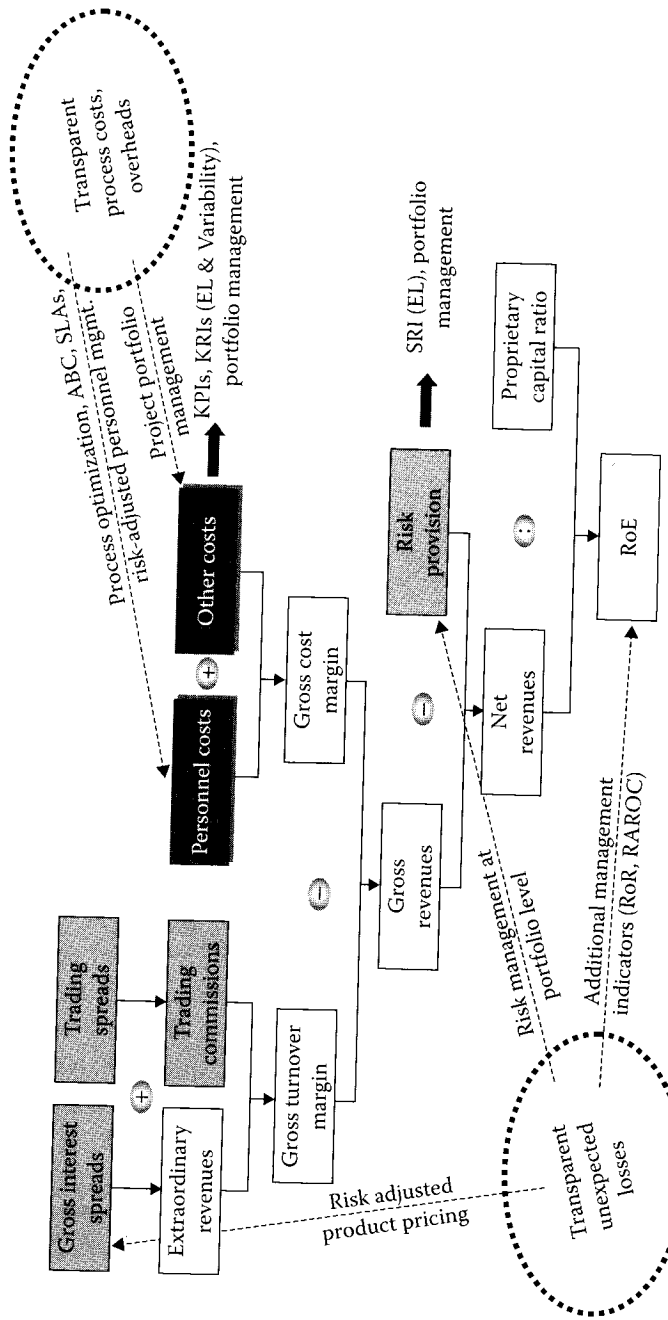

FIGURE 4.9 Introducing sensible key risk indicators and OpRisk management measures. (Redrawn from Kross, W., *Organized Opportunities: Risk Management in Financial Services Operations*. Wiley-VCH: Weinheim, Germany, 2006.)

of the past 250 days' volatility appears not to have been a good indicator of risk. Additional risk metrics are required including but not limited to the VaR, or what is commonly referred as the maximum drawdown. Economic models are required to truly explain what the impact of individual risk factors (with their inherent uncertainty) and their interaction will mean for future performance (Kross and Gleissner 2009).

4.3.4 Meta Risk

As submitted earlier, risk should not be ignored if, in spite of the inherent regulatory constraints, return on investment is the main focus. The above sections have highlighted that certain things can go wrong in the way in which risk is identified, analyzed, quantified, evaluated, and managed. Clearly, a failure in quantifying risk appropriately and reflecting the right assumptions, both relevant factors in the so-called meta risk, are issues that can no longer be neglected.

To highlight what the extent of model errors can be, recent analyses demonstrated that by means of employing a normal distribution to the stock exchange crash of 1987, one is dealing with an event that might only happen once in 10^{87} years. Empirical observations have demonstrated, however, that such crashes can happen once in 38 years (see Romeike and Heinecke 2008). Moreover, the recent financial crisis in combination with the extent of the financial downturn after 9/11 leaves room to the interpretation that rather extreme shock events, such as these recent stock market crashes, might be on the increase. Also, Chopra and Ziemba in 1993 (based on empirical evidence) found that estimation errors in the expected values of assets are of approximately 10-fold importance when compared to the respective variances, which in turn reflect double the effect of errors in correlations. Implicitly this demonstrates why the expected returns of an investment portfolio are quite relevant when the investor reflects a relatively low or moderate risk aversion. However, with increasing risk tolerance and decreasing risk aversion the sensitivity of individual assets within a portfolio increases.

It has been submitted by numerous authors that far too many risk management systems in practice place too little emphasis on the empirical evidence that the extent of risk in itself is volatile (i.e., GARCH process) and that it reflects extreme market readjustments (i.e., crashes), which are rather poorly incorporated in the standard distribution-based approaches to measuring risk that are predominant in the financial sector today. It is submitted that the rather overdue adoption of more enhanced approaches

to describing risk has not been realized in practice to the extent that it should have. The reader may be aware of the fact that recent empirical evidence has inter alia provided the basis for more appropriate risk distribution functions, which in effect are a combination of normal or lognormal distributions, and Pareto distributions, for capital market data in the extreme regions that are commonly referred to as "fat tails."

With respect to the various uncertainty factors that should be reflected in a modern risk management system, one usually distinguishes estimation errors in input parameters (i.e., regression analyses of historic data), parameter uncertainty (i.e., coefficients of quantitative prognosis and regression analysis models), and uncertainty inherent in the prognoses (i.e., the qualitative assumptions in the prognoses obtained from asset managers or business analysts). Of course, only exclusively future-oriented simulation techniques will suffice to quantify risk at the portfolio level while historical simulation will likely prove to be increasingly inadequate and misleading.

One further aspect of meta risks applies to the time horizon for which risk quantification models are suitable. It has long been recognized that common practice (e.g., the Markowitz approach for Portfolio Optimization) employs single period models. In other words, usually these were originally conceived to provide forecasts for a period of maximum 1 year. In practice, however, these models have been applied to derive recommendations and support decisions for long-term investment strategies. Whether or not such models have been enhanced to include the effect of dividend reinvestments and the like plays a minor role in this regard. Much more important is the fact that such models usually reflect stable correlations, stable investment environments, and static circumstances, which in the true sense cannot be extrapolated from now until eternity.

4.3.5 Compensating the Inappropriate "Perfect Capital Market" Hypothesis

While the above discussions on the implication for risk management have considered the environment in which operational risk management was performed, it has long been recognized that a number of methodological errors have existed and have not been corrected in most real-life organizations to this day. One fundamental issue relates to the fact that the valuation models that are applied in practice rely on the perfect capital market hypothesis. This observation is still valid inter alia for the capital asset pricing model (CAPM), the Markowitz portfolio optimization approach,

the arbitrage pricing theory (APT), and several other established valuation paradigms and approaches. The problem is the capital market is not perfect. Anomalies exist and these in fact drive financial market participants' performance. Information advantages exist, which differentiate the bearers of such privileged information and those who can benefit from such information or speculation thereon from other capital market participants. Liquidation costs, taxes, transaction costs, and other factors play a role too, as has been obvious for decades.

At the same time, the recent financial crisis and its consequential effects are a clear indication that many players in the financial market underestimated what is commonly referred to as liquidity risk. This can of course imply an upside and a downside. The downside is simply explained when considering the scenario of having to sell a property or an investment in a private entity at rather short notice. The shorter the permissible time span, the lower the realizable price, but there can be an upside too. Liquid assets that are currently valued on a mark-to-market basis to assess the volatility range over a maximum 24 h, could potentially be valued significantly higher if the current owner of these liquid assets or financial products does not intend to sell them within the next 24 h.

It has furthermore been known too for years if not decades that one of the most important factors in financial risk management are the correlations between individual investment targets and their respective risk/return profiles. Adding to the abovementioned observation on the perfect capital market hypothesis which in itself has been a problem, it is submitted that the way in which correlations are reflected in today's valuation models is largely incorrect. While it is recognized that some players in the financial market do assess and adjust correlations regularly to reflect current knowledge, typically, correlations are reflected in a risk system once and forever, as a single value between −1 and +1, and are deemed to be stable from now to eternity. The recent financial crisis is a good case example to demonstrate that correlations in real life are unstable and uncertain. Correlations and the portfolio diversion effects that are calculated on this basis, may of course be more or less stable in stable upward markets. However, on the other hand, correlations between most securities tend to approach +1 in shock scenarios similar to the one that was experienced in the recent financial crisis.

It is submitted that in order to address these problems sensibly and suitably, it is necessary to recognize that it will no longer be possible to ignore unsystematic risk all together. Moreover, the risk profiles of

organizations and hence those factors that should be reflected in the weighted average cost of capital (WACC) must reflect the true focus, the extent, and the quality of risk management systems. Today's software applications render it realistically achievable to reflect correlations as an uncertain variable that is influenced by outside factors and trends, and that evolves over time as a result of certain economic factors, the interdependencies of which are largely understood. It is submitted that in future, the reflection of correlations as a stable and certain parameter can no longer be accepted by regulatory agencies as an appropriate means of measuring market or credit risk at portfolio level. And of course, the various underlying assumptions in such approaches as Markowitz-type portfolio optimization, CAPM, and APT must be corrected and compensated as a matter of urgency.

4.3.6 Compensating the Impact of Rating Agencies and Financial Reporting

In recent months, the media have rather clearly highlighted that rating agencies have contributed strongly to the financial crisis and in some cases clearly misrepresented asset valuations and the extrapolation of historical upward or downward trends. It has been submitted that rating agencies must start taking into consideration what truly is at risk in an organization, and what the range of possible impacts of such risk factors could be. It has long been submitted, and was explained in the context of the CAPM model further above, that simply using a capital market derived beta factor to express risk is a gross misrepresentation given that unsystematic risk has been proven for decades to play a role. Unsystematic risk cannot be fully compensated through diversification; anomalies exist and in fact are what drives extraordinary returns on investment.

It is submitted that rating agencies will need to adopt empirical evidence in the field of risk research that was gained in the last three decades, and inter alia adopt more enhanced economic forecast models to avoid the overemphasized and overextended extrapolation of upward and downward trends. Qualifying statements on risk/return profiles should complement recommendations on historic or future over- and under-performance. It should be taken into consideration in such qualifying statements that the so-called momentum effect often does not exist as a standalone effect. For example, some economic research has demonstrated that historical over-performers may under-perform at some stage in the future, while on the other hand

historical under-performance is compensated with turnaround strategies that in turn yield considerable over-performance at some stage in the future.

Needless to say, the above observations for rating agencies are of similar validity for the development, implementation, and calibration of internal rating models, as they are applied more and more often in larger banks at this point in time. Rather than simply extrapolating historic trends, forecasts of future performance need to be explained on the basis of robust and sensible economic models as opposed to being assessed on the basis of some historic figures that bear little if any relevance in future (Kross and Gleissner 2009).

It has been recognized too and was mentioned earlier in this chapter that the international financial reporting standards (IFRS) are rather problematic in many regards. Briefly, the IFRS currently are a rather rigid mixed model which combines a mark-to-market valuation approaches as prescribed for capital market instruments and liquid assets, with the amortized residual values for certain illiquid assets such as fixed property. This was an attractive model for those who wanted to reflect current potentials quickly, and reflect the impacts of unrealized profits from certain capital market instruments as quickly as possible in their quarterly or annual reports. While this approach does not sound overly problematic at first sight, it is logical that problems occur when an investment in illiquid assets such as fixed property (e.g., an office building) is refinanced through capital market instruments and financial derivatives that have to be valued mark-to-market. Depending on market trends, a rather volatile balance sheet can evolve, which in turn might yield the observation by business analysts who assess organizations' risk positions based on historic volatility, that the organization is performing in a more volatile environment than it truly is. As an interim compensation in the absence of tangible market data for illiquid assets, it was agreed that hedge accounting relationships are defined under which the refinancing of certain objects with derivatives are treated as one unit as long as certain correlation corridors (i.e., 80%–125%) are demonstrated not to have been exceeded. Needless to say, such analyses can be rather complicated when structured financial products are involved, and the compromise is fairly weak.

To add to the above, in recent months, the IFRS have been observed to have been more problematic than had been recognized earlier on. In particular it has now been proven that through the mark-to-market approach, investors and analysts have been driven toward an unhealthy

level of short-termism. Tremendous asset value write-downs had to be reflected in financial institutions' financial statements, which effectively reflect the assumption for the respective assets that the financial institutions have to dispose of them at short notice. Particularly when assets are valued lowly, however, it makes very little sense to dispose of them, unless of course certain liquidity gaps cannot be covered through other means. These, however, as the media reported, were in contrast resolved via government guarantees. In other words, for financial reporting purposes, many investments in financial instruments had to be cut down to an entirely unrealistic value, far below the true value that will ultimately be realized when they are truly disposed of. It remains to be seen whether the mark-to-market approach, due to its crisis-enhancing effects, will be abolished all together or whether yet another set of compromises will be invented.

4.4 PROBLEMS AND SOLUTIONS

The above discussion has highlighted quite clearly that in the field of applied risk management in financial institutions, rather significant flaws remained uncompensated. It is hoped that the following discussion of methodological approaches and true solutions to the problems at hand will be used as guidance both by practitioners and academia.

4.4.1 Management on the Basis of Sensible Key Risk Indicators

First and foremost, it is appropriate and well overdue that the overall approach to addressing risk is looked at rather critically. A sufficient number of fatal flaws have been highlighted in this chapter, and further issues such as the explicit decision not to include strategic risk as a relevant factor under the Basel II framework have been identified as being quite problematic. Adding the "management perspective" and rendering OpRisk initiatives operationally manageable—to if possible generate net value and competitive advantages from successfully implemented OpRisk management investments—is not a trivial undertaking, particularly when the initiative was originally conceived for regulatory compliance or risk-controlling purposes only. Numerous interlayered aspects need to be taken into consideration, and a rather complex overall master plan needs to be followed, which reflects that OpRisk management initiatives must ultimately cope with what is commonly referred to as major-scale, cultural change in an organization. It is suggested that at least the following topics need to be addressed:

- Scope, target, and the generic approach to methodology, limits, and risk retention
- Responsibility allocation, that is, the definition of risk owners/managers vs. risk controlling and process models for the line/project organization
- Implementation of a temporary central risk management function to enhance envisaged/planned/targeted/anticipated cultural change
- Setting up an OpRisk management implementation project, coping with known and unknown implementation challenges, and raising management effectiveness priorities above documentation priorities
- Moderated interviews to identify the delta between responsibilities and capabilities and functional authority, to define and negotiate escalation triggers, to provide training as needed, and to design reporting and escalation mechanisms
- A documented conclusion that risk owner responsibilities can (once trained and integrated into a reporting and escalation process structure) from now on be "lived"

Neither of these success-critical factors is explicitly mentioned in the framework referred to as Basel II, or the support documentation that was provided by the Bank for International Settlements or the regional and local-level regulatory agencies who worked on the transformation into local-level laws and regulations. The results in terms of enabled, efficient, and effective risk management, with an independent risk-controlling function, furthermore needs to be both manageable over the short, medium, and long term with respect to the explicit efforts to be undertaken by each individual and team, and with respect to the data and key indicators, which are collected and analyzed to support risk-based decision making. A horror vision commonly voiced by several larger banks in Europe highlights that capturing and collecting several 10,000 data points on a daily basis, quality-enhancing them and maintaining them over a period of 10–30 years, certainly is not manageable realistically.

Taking into consideration that any financial institution has implemented risk management in the one or other way already, it is hence appropriate to introduce a graphical flowchart of sensible steps for the reorientation and refocusing operational risk management (Figure 4.10)—thereby

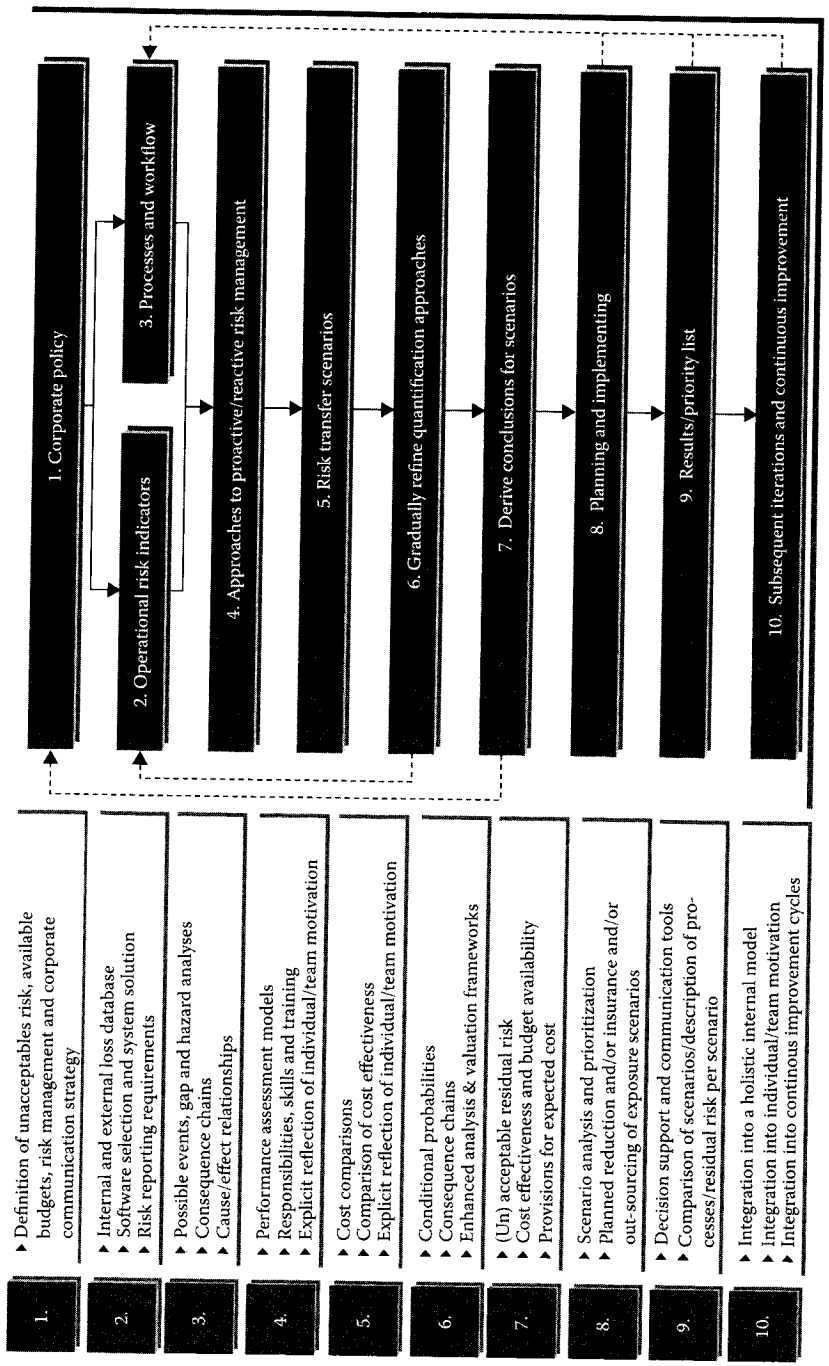

FIGURE 4.10 Recommended approach to refocusing OpRisk management. (Redrawn from Kross, W., *Organized Opportunities: Risk Management in Financial Services Operations*. Wiley-VCH: Weinheim, Germany, 2006.)

focusing on the management perspective instead of just brainless regulatory compliance reporting.

The above discussions on appropriate measures of risk, and on the treatment of meta risk factors, do not need to be repeated here except to say that volatility as the predominant measure of risk does not suffice. Downside risk measures such as the VaR, the conditional VaR, the deviation VaR, or what is commonly referred to as the maximum drawdown, as well as "safety first" approaches should be used as complementary approaches. Of course, the perfect capital market assumption and the various abovementioned features that go along with it must from now onward be treated as being outdated, wrong, and in the true sense unnecessary given today's computing power of enhanced simulation modeling software. At the same time, parameters need to be identified and assessed to describe the true risk aversion of an investor in order to derive optimized suggestions and recommendations for the structuring of investment portfolios and the reflection of residual risk restrictions (i.e., safety-first approach, guaranteed return, and portfolio insurance concepts).

As discussed elsewhere, risk management should conceptually be shifted from the predominant regulatory compliance focus toward a true value-based management. Besides the more cultural issues mentioned above, on the technical level, this calls for risk management practices that eventually support the management with better risk information. To be able to fulfill this task, especially the role of risk modeling and aggregation must be emphasized (Figure 4.11).

Risk factors affecting overall goals should all be systematically identified and then evaluated. Nowadays it is common to evaluate risk using binomial distributions for outcomes, that is, a standardized and analytically robust function to capture exactly quantified consequences. As is seen in practice, however, risk in most cases cannot be modeled using just one possible outcome, but rather to reflect a range of possible outcomes. This implies that besides the commonly used normal distribution in models, and the binomial distribution for event-driven risks, alternative distributions must be taken into consideration. This includes triangular distributions, Pareto distributions, or even uniform distributions. Closely linked to this, risk exposures should be derived from an aggregation of risk factors with the help of simulation techniques, rather than continuing to rely on the commonly established approaches such as variance–covariance models, which are based on normal distributions. Also, correlations between risk factors have to be analyzed individually, and reflected explicitly.

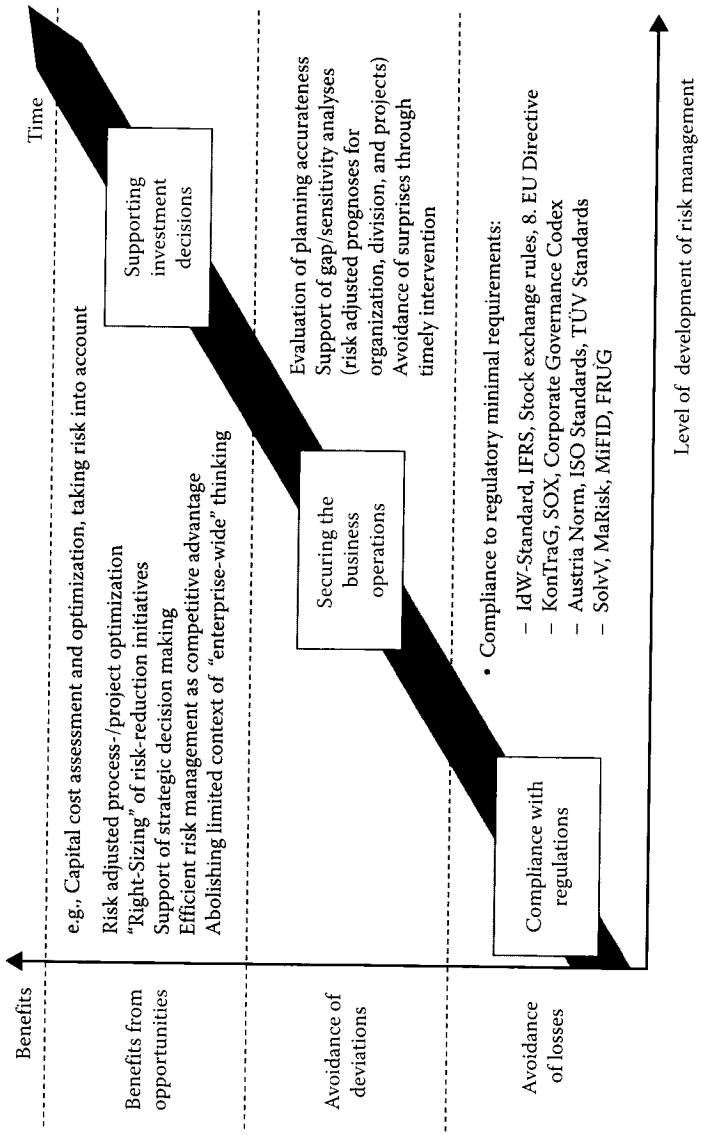

FIGURE 4.11 Refocusing the goal and objectives of risk management.

This calls for economic models to map interrelationships of economic factors and commonly used key indicators, as a robust prognosis.

The most suitable risk aggregation procedure—and the most flexible one—is the simulation of individual (and combined) risk factors using Monte Carlo simulation. Such a simulation technique uses random numbers to derive modeling results (and respective inherent sensitivities) such as the distribution of earnings before taxes, as displayed in Figure 4.12.

A separate discussion that was published elsewhere, furthermore demonstrates that insurance coverage had historically been somewhat neglected in real-life OpRisk initiatives, partially due to the fact that the early versions of the Basel II framework did not accept insurance as a permissible means of minimum regulatory capital reduction. Moreover, proponents of the CAPM to date believe that insurance implies no net value generation, given that only capital market-related aspects captured in the beta factor truly count in the description of the risk position of an enterprise. Change is bound to happen in this regard too, however, for good reasons. Higher exposures to risk generally reduce the enterprise value due to a higher need for (expensive) proprietary capital. Hence it is sensible to specifically

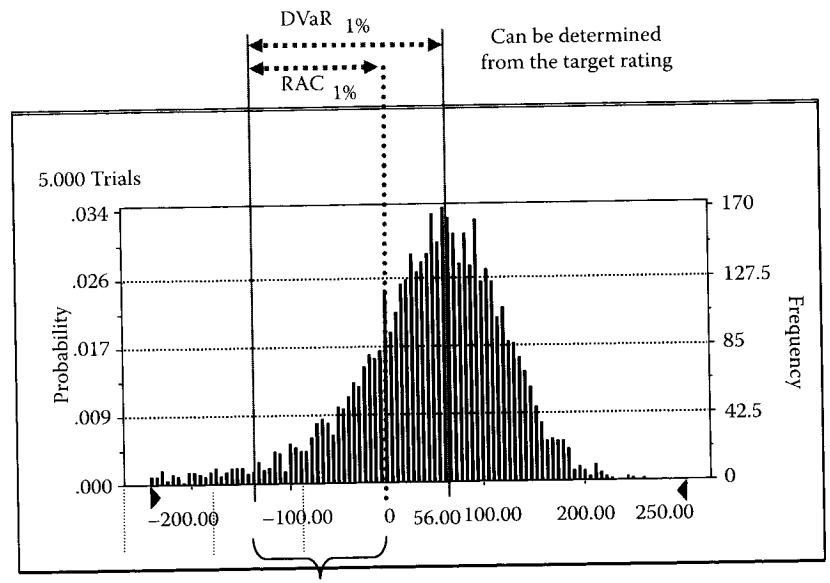

FIGURE 4.12 Sample output of a Monte Carlo simulation.
... and to assess the risk adjusted capital (RAC) and the certainty of the planning.
DVaR = deviation value at risk
RAC = risk adjusted capital
(Courtesy of FutureValue Group AG, Leinfelden-Echterdingen, Stetten, Germany.)

work on risk transfer strategies that reduce the overall risk position efficiently and effectively, for example, as demonstrated through a reduction of the total cost of risk (TCOR). Insurance and other risk transfer mechanisms are, therefore, no longer understood as a cost factor that simply adds no conceivable value to the value of an enterprise (because it does not affect the beta factor), but rather as a set of suitable instruments that can (through a reduction of the proprietary capital required) deliver a positive net contribution to the enterprise value. In turn, the optimization of the residual risk position of an enterprise through appropriately designed and implemented risk transfer mechanisms permits the focusing on the true core business of the enterprise, and the devotion of proprietary capital to those initiatives that best enforce the core strategy and the sustained competitive advantages of the enterprise (Kross and Gleissner 2009).

4.4.2 Enhanced Approaches to Asset Portfolio Risk Management

Performance is often defined and measured in a way that does not truly reflect the risk perception of an investor, as the above confirms. Additional complementary performance measures are required (e.g., the Modigliani–Modigliani measure), and further metrics and key risk and performance indicators will likely prove to be sensible. This in turn yields the comparability of alternative portfolio allocations with their respective risk/return profiles and sensitivities. Moreover, investment portfolios are usually structured and optimized with the focus of 1 year only. Stochastic, dynamic models as well as stochastic processes for the description for risk/return profiles are required. Information on short-term and long-term investment goals are required as an input in order to derive rules for the adoption of portfolio planning, in addition to portfolio structure recommendations. Further intelligent portfolio securitization mechanisms such as time invariant portfolio protection (TIPP) could be used.

Illiquid assets are usually neglected in portfolio optimization, which in turn leads to a suboptimal allocation of funds in liquid asset classes. The integration of simulation-based valuation approaches is required, in which the respective risk/return profiles of illiquid assets are described. Typically, this would be done by means of calculating a stock vs. bond mix that reflects the expected value of future cash flows and the expected risk inherent in future cash flows. Further risk/return key indicators may be required, in addition to or complementary to market prices. These may include revenue, capital turnover, EBIT margin, debt ratio, etc. The introduction of the risk/return profiles of illiquid assets in turn yields a better

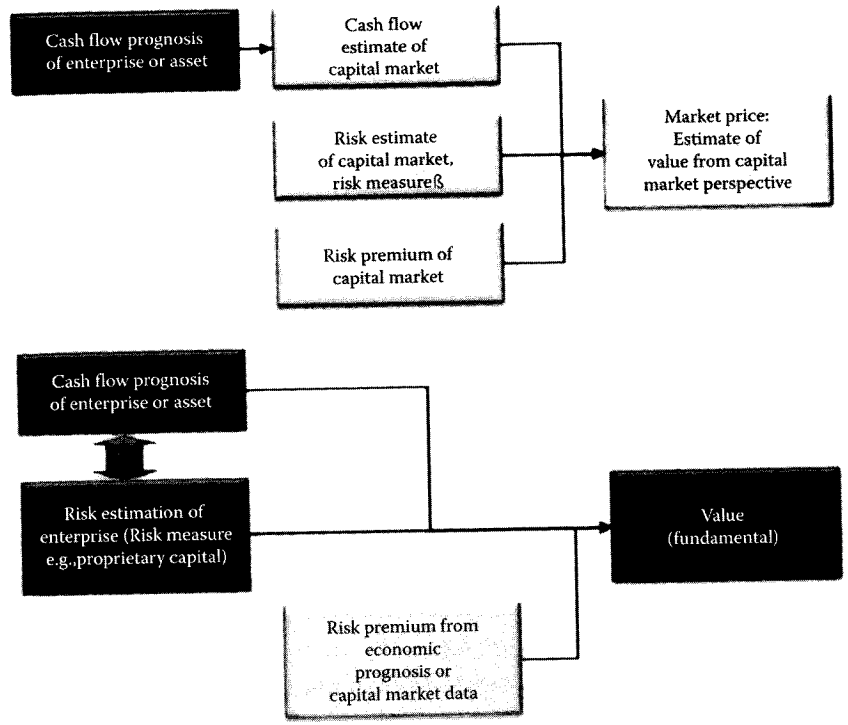

FIGURE 4.13 Traditional vs. sensible approaches to quantifying enterprise risk positions. (From Gleissner, W. and Wolfrum, M. Cost of capital and valuation with imperfect diversification and unsystematic risks, Finexpert publications, available at http://www.finexpert.info/fileadmin/user_upload/downloads/pdf/notes_members/Gleissner_2009_Cost_of_Capital_and_Valuation_an_finexpert_260109.pdf, 2009.)

understanding of the true value drivers and valuation changes in the overall investment portfolio (Figure 4.13).

Traditionally, correlations have captured the interrelationships between historic investment returns, but did not explain them economically. An economic model is required to explain the interrelationships of economic factors and commonly used key indicators. Stochastic processes as described above need to be defined for future expected performance and interest, share and bond investment, inflation, and economic growth. Causal interdependencies need to be defined. The result is a future-oriented explanation of risk and return profiles of individual assets and asset classes as well as the (uncertain) correlation of these asset classes. This in turn enables the analysis of the impact of special crisis scenarios, for example, the modeling

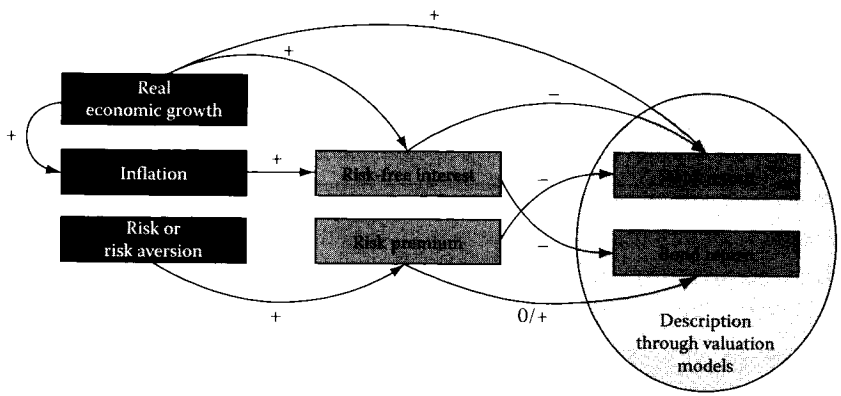

FIGURE 4.14 Reflecting the relevance of economic indicators for asset performance. (Courtesy of FutureValue Group AG, Leinfelden-Echterdingen, Stetten, Germany.)

of a banking crisis in combination with an oil price crisis and a loss of investor confidence crisis (Figure 4.14).

Hence it is fair to say that asset portfolio management will likely experience some rather significant changes in the not-so-distant future. Now as in the future, the objective is to optimize the asset allocation across asset classes in order to benefit from diversion effects (i.e., reduce the impact of unsystematic risk factors) and to yield a near-optimum investment strategy based on a given investor's risk tolerance, which may vary over time. But almost everything else will change. Asset portfolio management will need to explicitly identify and compensate the effects of extreme negative crises and shocks to the system. The predominant key risk indicator will be the probability and the extent of losses (e.g., expected shortfall). Given that risk and return are not freely interchangeable; restrictions need to apply with respect to the maximum risk-bearing capacity and the ability to cover capital requirements with third party equity or debt.

Robust, context-dependent prognoses suitable for longer term investment decisions and the respective (uncertain) correlations between the expected risk and return profiles of individual assets and asset classes will need to be derived from economic forecasting models. Uncertainty will need to be reflected to describe the likely inherent extents of estimation errors, prognosis errors, model errors, and in particular the impact of subjective estimates and decisions inherent in each of these. The optimal asset portfolio allocation will also need to reflect the extent and the

characteristics of illiquid assets and asset classes (e.g., immovable property, investment holdings in non-listed companies, etc.), which requires specific risk and return valuation know-how that has historically not been used by practitioners in the field of asset portfolio management. Portfolio insurance strategies can in some cases be used to (temporarily) optimize risk/return profiles of investment portfolios, whereby of course a procyclical investment behavior should be avoided through a thorough observation of fundamental valuation levels. And capital market anomalies such as the abovementioned "momentum effect" and short-term value anomalies exist, and should be explicitly incorporated in the above.

4.5 RECOMMENDATIONS AND OUTLOOK

As described in this chapter, initiating an OpRisk management initiative without reinventing the wheel is a complex undertaking with numerous inherent challenges. The far-reaching ripple effects of the recent financial crisis demonstrate, however, that major change in the positioning, realization, and operation of risk management systems is urgently called for (Kross et al. 2009). As the findings presented in this chapter reflect, however, a rather large body of knowledge and experience has evolved in recent years, which renders most of the key steps manageable predictably. Lessons learned have been published to an increasing extent in recent years, and generic frameworks and fairly capable standard software solutions are starting to make risk managers' lives easier.

Implementing risk management systems does not necessarily imply that a tremendous amount of money is wasted. Of course this would be the typical expectation of a decision maker, who has historically invested in risk-reporting systems such as the ones required under Basel II. To provide some further insight into the reasons why one would truly be able to derive net value from such initiatives, an analogy is appropriate, which refers to a model first put forward by Kerzner (2000), who is often referred to as one of the leading thinkers and practitioners in the field of project management. Kerzner's model introduced the observation that knowledge workers' intensive drive for increasing levels of maturity cannot be the ultimate solution. In the context of products introduced into a market, maturity may be the stage from which onward everything goes downhill. Rather, Kerzner submitted, top management should start to recognize their knowledge workers willingness to change, and provide further direction to develop their project management competencies beyond maturity, to excellence. The following graphical representation was modified in that

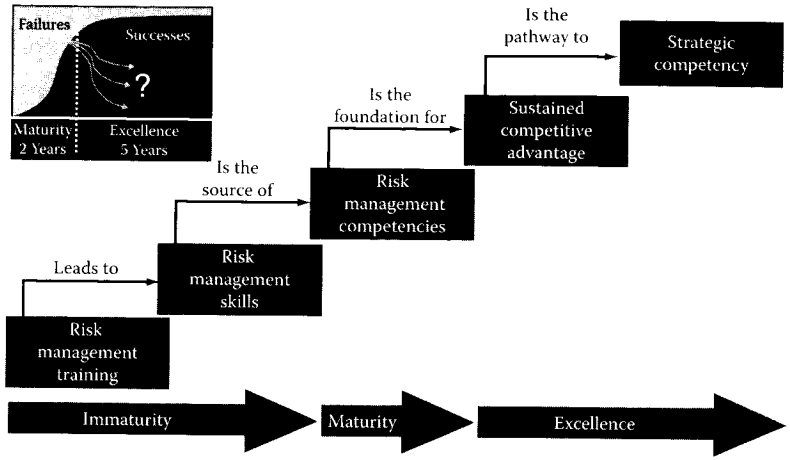

FIGURE 4.15 Migrating from maturity to OpRisk management excellence.

Kerzner's expression "project" was replaced by the word "risk," which follows the inherent feeling (in the absence of tangible scientific evidence) that the same reference model is similarly valid for the evolution of risk management maturity and the further net benefits and competitive advantages, if risk management excellence were to be established (Figure 4.15).

Kerzner was able to substantiate in his publications and presentations that working toward project management maturity helps in reducing the likelihood of failure, which is usually achieved by and large with in a time period of 1–2 years. Of course this is a value proposition on its own. The link to strategy crafting and to the development of competitive advantages through excellent project management would introduce a more complex set of opportunities, which may not be as easy to capture. It could hence be an interesting research project at postgraduate level to assess in how far Kerzner's model is truly convertible to the field of operational risk management, and the tracking of which key indicators would best help to substantiate for deductive thinkers that advanced levels of operational risk management, evolving far beyond regulatory compliance, have the potential to add substantial levels of net value to an organization.

Hence reflecting back to the objectives of this chapter, as formulated in the introduction, it is appropriate to conclude that a thorough analysis of the subprime crisis triggers and its consequential effect on the financial sector and ultimately on the world economy highlights that numerous factors and hazards were not exactly unforeseeable. Financial institutions, and regulatory agencies for that matter, could and should have reacted much earlier.

Commonly practiced valuation and portfolio optimization models that are based on perfect capital market theories, should have been abandoned many years ago. Regulatory frameworks such as Basel II have not truly helped, and in some regard have been misleading, inter alia through the separate treatment of risk factors that cannot truly be treated separately.

The much more significant problem seems to be, however, that the way in which the implementation of Basel II and similar regulatory frameworks in real-life organizations has driven the net impact into a much more negative spectrum, while on the other hand the promises of vs. the net result derived from corporate governance frameworks left a lot to be desired. Risk communication strategies were everything but well organized or well implemented, and added to the losses in investor confidence. A combination of organizational and market-driven corrective steps are called for, including but not limited to a reorientation of incentive systems, truly living up to what is called for in corporate governance, rendering it compulsory to use at least those aspects of enhanced risk methodology which have been established for numerous years, while on the other hand impeding the use of risk methodological approaches, which have demonstrably been proven wrong. And whatever the various players in the financial market truly learned from this financial crisis remains to be seen.

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