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CHAPTER 14

OpRisk Insurance as a Net Value Generator

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ABSTRACT

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 Capital Asset Pricing Model (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 happening, however, for good reasons. This chapter presents why and how the understanding of and the traditional approaches to OpRisk management can and should be enhanced to better reflect what truly counts in operational and enterprise risk management; and in how far insurance can play a role. In presenting the findings, we also demonstrate that in the real world, with a limited risk-bearing capacity, the reduction of risk-adjusted capital and the consequential decrease of the cost of capital through operational risk transfer mechanisms cannot be explained with the CAPM.

14.1 INTRODUCTION

Historically, the integration of insurance solutions into enterprise-wide or beyond-enterprise risk management frameworks left a lot to be desired. The introduction of operational risk (OpRisk) as a new set of risk factors to be addressed under the new Basel Capital Accord, commonly referred to as Basel II, did not help either, at least during the early stages. This was largely due to the fact that the early versions of the Basel II framework did not permit insurance solutions as a means of regulatory capital reduction for OpRisk. However, during the same period the corporate risk controlling, accounting and regulatory reporting functions (i.e., usually not the risk owners or risk managers) within financial institutions spearheaded Basel II compliance initiatives.

The framework has changed however since its early versions were published more than half a dozen years ago. It is hence warranted to look at the (potential) role of insurance solutions again, this time with a broader perspective, and at the same time to eliminate some of the remaining conceptual obstacles. This chapter serves as an initiative that, it is hoped, will trigger much further discussion between researchers and practitioners in the rather complex and all-encompassing field of OpRisk management.

14.2 TREATMENT OF INSURANCE CONCEPTS UNDER BASEL II'S OPRISK CATEGORY

Early versions of the Basel II framework reflected a rather rudimentary understanding of what operational risk (OpRisk) can entail and what OpRisk management could or should encompass.[1] In a nutshell, early versions merely mentioned that minimum regulatory capital in lieu of OpRisk has to be calculated using one of several possible approaches, that OpRisk regulatory capital will be added to the amount provided in lieu of market and credit risk, and that market discipline and the involvement of regulatory authorities will be enhanced. Subsequent iterations of the Basel II framework gradually enhanced the coverage of OpRisk management facets in terms of permissible choices and related prerequisites (e.g., minimum standards to be addressed in order to be permitted to use one of the more advanced measurement approaches), temporary compromises (e.g., partial use, or staged recognition over time of regulatory capital reduction hair cuts through the employment of the more advanced approaches), and permissible risk transfer mechanisms. The latter has remained somewhat restrictive, as becomes

apparent in the current wording of Basel II, which for the ease of understanding is quoted:

> *677. Under the AMA [i.e., the advanced measurement approaches], a bank will be allowed to recognise the risk mitigating impact of insurance in the measures of operational risk used for regulatory minimum capital requirements. The recognition of insurance mitigation will be limited to 20% of the total operational risk capital charge calculated under the AMA.*
>
> *678. A bank's ability to take advantage of such risk mitigation will depend on compliance with the following criteria:*
>
> - *The insurance provider has a minimum claims paying ability rating of A (or equivalent).*
> - *The insurance policy must have an initial term of no less than one year. For policies with a residual term of less than one year, the bank must make appropriate haircuts reflecting the declining residual term of the policy, up to a full 100% haircut for policies with a residual term of 90 days or less.*
> - *The insurance policy has a minimum notice period for cancellation of 90 days.*
> - *The insurance policy has no exclusions or limitations triggered by supervisory actions or, in the case of a failed bank, that preclude the bank, receiver or liquidator from recovering for damages suffered or expenses incurred by the bank, except in respect of events occurring after the initiation of receivership or liquidation proceedings in respect of the bank, provided that the insurance policy may exclude any fine, penalty, or punitive damages resulting from supervisory actions.*
> - *The risk mitigation calculations must reflect the bank's insurance coverage in a manner that is transparent in its relationship to, and consistent with, the actual likelihood and impact of loss used in the bank's overall determination of its operational risk capital.*
> - *The insurance is provided by a third-party entity. In the case of insurance through captives and affiliates, the exposure has to be laid off to an independent third-party entity, for example through re-insurance, that meets the eligibility criteria.*
> - *The framework for recognising insurance is well reasoned and documented.*
> - *The bank discloses a description of its use of insurance for the purpose of mitigating operational risk.*

679. A bank's methodology for recognising insurance under the AMA also needs to capture the following elements through appropriate discounts or haircuts in the amount of insurance recognition:

- *The residual term of a policy, where less than one year, as noted above;*
- *A policy's cancellation terms, where less than one year; and*
- *The uncertainty of payment as well as mismatches in coverage of insurance policies.*

Strangely enough, several truly sensitive aspects of insurance concepts and insurance products, in particular the extent of the coverage and implicit or explicit exclusions based on the specific wording, and risk retention mechanisms (e.g., business interruption insurance kicks in after 30 days and not instantly, or the insurance only kicks in after the first $1 million in losses is exceeded) are not explicitly addressed here. Neither are the insurance coverage mechanisms of suppliers and services providers, which in today's business environment can play a rather significant impact on a financial institution's sustainable success and on the survival in critical situations. Last but not least, the Basel II framework does not explicitly address the typical inherent differences between the risk quantification and risk pricing approaches typically chosen by a financial institution that would be regulated under Basel II and the risk pricing and coverage structuring approaches of an insurance company. Even a layman will recognize that these conceptual gaps are not trivial and that some further modifications, adjustments, and additions are warranted. These in turn might help to adjust the detailed conceptual design and wording of forthcoming regulatory standards, such as Solvency II.

When reflecting on insurance as a distinct case example, it is hence appropriate to conclude that Basel II considers just fragments of what is a more or less encompassing and integral operational risk management framework (see Figure 14.1).

14.3 A MORE ENCOMPASSING VIEW ON INSURANCE CONCEPTS FOR OPRISK MANAGEMENT

The rather constrained perspective of Basel II seems to have contributed to the poor understanding of what insurance concepts can address in OpRisk management and which issues and problems can be solved with risk transfer mechanisms such as insurance. An important prerequisite to the

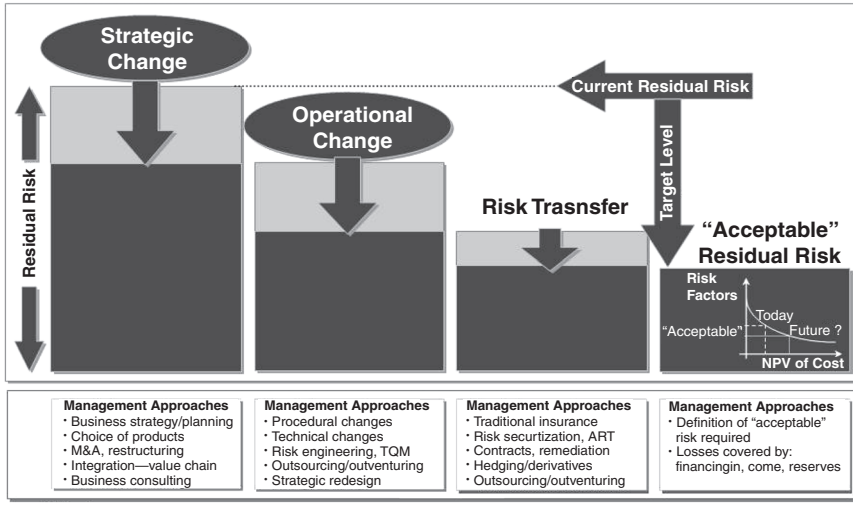

FIGURE 14.1 Overall Scope of OpRisk Management

improvement of the current status is the understanding that contrary to what Figure 14.1 shows, a risk position is not static. Michael Porter's famous five forces model provides a good generic understanding of what can happen to the competitive position of an organization unless appropriate steps are taken. Today's economic climate in the financial services sector is furthermore known to be rather significantly affected by corporate workforce downsizing initiatives, which, as some authors have submitted, has in some cases evolved to becoming a replacement for strategy (see Kross 2006). In particular, the risk position of a financial institution will change significantly if the current level of the so-called economic value added is elevated. Whether it is done as a systematic boost of the current business's profitability (e.g., marketing campaigns, cost-cutting), a reduction of the total cost of risk (e.g., risk management optimization efforts), and/or increases in turnover, for example, a result of an intensified core business or diversification (e.g., by means of mergers and acquisitions).

Moreover, the problem at hand usually entails that risk factors are interrelated and positively or negatively correlated. Figure 14.2 fosters a better understanding of risk factors in a networked world. Needless to say, the Basel II approach can be considered somewhat naive when looking at the resulting implications. A tremendous breadth and depth of risk transfer solutions is conceivable and needed. The only problem is that only a limited number of standardized risk transfer solutions have evolved to date.

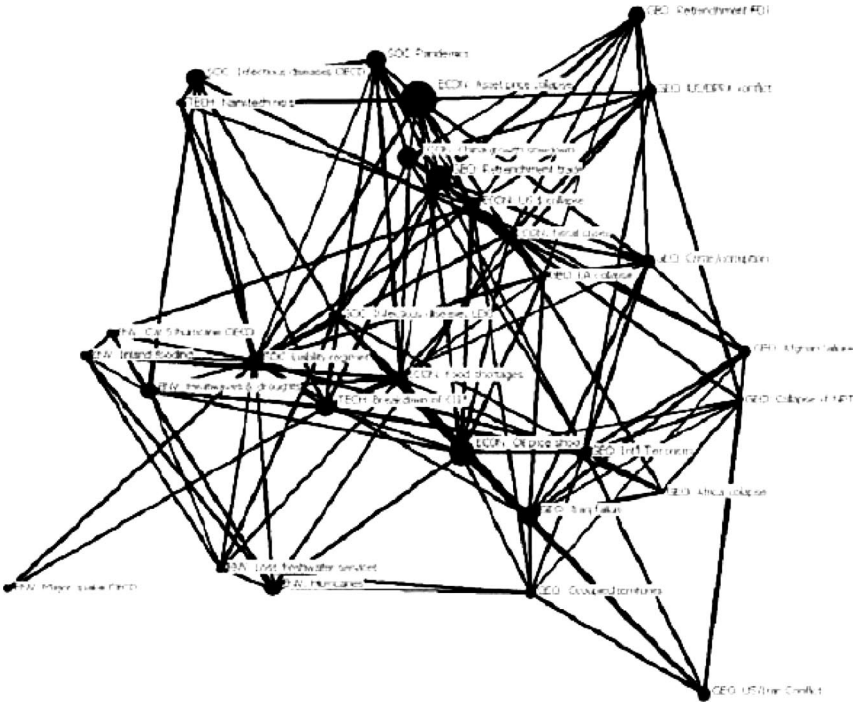

FIGURE 14.2 Risk Factors in a Networked World
Note: The sizes of the nodes in the social networking diagram indicate the assessment of the risk itself. The thickness of lines represent strength of correlation, while proximity of the nodes represents similarity of correlations.
Source: Witold Henisz, Associate Professor of Management, The Wharton School, University of Pennsylvania, USA, based on expert assessments of correlation (October 2007).

Hence in most cases a combination of operational management approaches with risk transfer mechanisms is a suitable choice for a risk manager (see Figure 14.3 for an exemplary reflection).

A further remaining challenge for the proponents of insurance concepts has been the misunderstanding that based on the Capital Asset Pricing Model (CAPM), operational risk can be considered diversifiable in a perfectly functioning capital market. Hence due to their inherent costs, insurance concepts cannot possibly add net value to an organization. Perhaps the next discussion will help to compensate for or possibly eliminate this argument.

According to the well-known approach of Modigliani and Miller (1958), there is no necessity for operational risk management, because this—like changes of the debt ratio—does not have any effect on the enterprise

Risk issue	Risk Mitigation			Crisis Communications	Risk Transfer
Natural Disaster	Business Continuity Management				Property All Risks/Business Interruption
Terrorism	Security Risk Management	Business Continuity Management			Terrorism, Kidnap, and Ransom
Fraud and Corruption	Background Screening	Business Intelligence and Investigation			Fidelity Guarantee, Trade Credit
Ethical Risk	Social Accountability	Health and Safety	Environmental		Environmental and Employers' Liability
Infrastructure Risk	IT Security	Business Continuity Management			Business Interruption
Quality and Counterfeiting	Business Intelligence and Investigation	Product Risk/Recall			Legal Expense
Pandemics	Business Continuity Management				(Business Interruption)
Regulatory Risk	Regulatory Research	Business Intelligence and Investigation			Political Risk

FIGURE 14.3 Typical Insurance Solution Covering Individual/Combined Risk Factors

value. Both in the Capital Asset Pricing Model (see Sharpe 1964; Lintner 1965; Mossin 1966) and in the Arbitrage Pricing Theory (see Ross 1976), the expected net yields (capital-cost-rates) are described only in their dependence on systematic risks, derived from diversification and arbitrage considerations.

But to the contrary, when reflecting market imperfections like information asymmetries or bankruptcy costs, the added value of corporate risk management can be distinctly identified. For a better understanding, these topics need to be looked at:

- Costs of transaction (see, e.g., Fite and Pfleiderer 1995)
- Costs of financial distress (see, e.g., Warner 1977; Levi and Serçu 1991)
- Agency costs (see, e.g., Fite and Pfleiderer 1995; Schnabel and Roumi 1989)
- Equilibrium of investment demand and available liquidity (see Froot, Scharfstein, and Stein 1994)

These various models and conceptual approaches deliver good reasons for the relevance and the potential value contribution of risk management initiatives. However, they offer no comprehensive, full-fledged approach with whose support the gap between individual risk factors and risk mastering procedures, on the hand, and the capital cost rates and the enterprise value, on the other hand, can be eliminated. What is needed is a solution

representing risk-oriented mechanisms for the determination of capital costs. It is submitted that these can be predicted in a simulation-based analysis of the business planning figures and the risk factors connected with the planning, as represented further later in this chapter. But first, some explanations follow on the more recent developments of the capital market theory and the core elements of a new theoretical foundation.

14.3.1 Advancements to the Acceptance of Efficient Markets

The first set of related aspects, the advance to the acceptance of efficient markets, includes as the more recent findings first and foremost the so-called real option models. These show a positive effect of risk taking on the market value of one's own capital funds (at expense of the outside lenders or investors) (see, e.g., Culp 2002). Also, advances of the CAPM, such as the M CAPM, which is based on an option-theoretical basis and uses a Black Scholes option pricing approach (see Black/Scholes 1973; Sharpe 1977), are relevant here.

Both of these advances consider both systematic and unsystematic risks. This applies similarly to the rating prognosis, which has a close relationship with risk management, as can be seen by reflecting on the Merton approach (1974), which also considers the total risk position (asset volatility). Further research results show that the expected net yield can be explained by the dependence of other risk metrics than the beta factor. Here the work of Fama and French (1992), according to which the expected net yield is dependent on business size and the ratio of book value and market price, is relevant.

14.3.2 Explanation Approaches under the Hypothesis of Inefficient Markets

Inefficient markets may provide a justification for risk management initiatives. The behavioral finance theory gained some special publicity in this context, as it offers an understanding of the reasons for deviations of share prices from their fundamental values (see, e.g., Barberis, Shleifer, and Wishny 1989; Shefrin 2000; Shleifer 2000).

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Contrary to the behavioral finance theory, which is based on methodological individualism, is the "New Finance" approach (Haugen 2000, 2004). New Finance proceeds from an appreciation of the implications of inefficient capital markets and looks for indicators that can help quantify prognoses on future share yields. Here market inefficiencies are used as perspectives for a net worth increasing enterprises risk management given that risk-reducing activities of an enterprise cannot similarly be copied by their shareholders. Besides, management can learn something from an analysis of

capital market information (as a derivative of the beta factor) as opposed to the risk profile of its own enterprise. This approach rejects a microeconomic or psychological basis, which would have encompassed an appreciation of the uniqueness of individuals as well as the dynamics of the interactions that are indicated as reasons for this procedure (see, e.g., Haugen 2004).

Empirical research that has focused on systematic errors in analysts' forecasts is an additional indication of the necessity to collect the relevant information internally and to consider the potential impacts of risks (see La Porta 1996).

14.3.3 Approaches on the Basis of Internal Risk Information

Under efficient and inefficient approaches, the expected net yields are derived from capital market information, which is however interpreted just partially (as with Fama and French) as a set of risk factors. The expected net yields are the basis for the calculation of capital cost rates, which in turn affect investment decisions. A direct effect of risk management activities on capital cost rates and enterprise value is hence not immediately recognizable in either case, simply because there is no reference to proprietary enterprise risk factors.

A third approach for the justification of an inherent value contribution through risk management, which is more precisely described in chapter paper, aims at the direct derivative of capital cost rates from proprietary information on the company's own risk factors and current and likely future risk positions. The total extent of risk relevant in inefficient markets for the enterprise value is determined by means of an aggregation of respective impacts of individual risk factors in the context of the business planning (see Gleißner 2002). Moreover, it is suggested that capital market information is not needed for the determination of the risk position (e.g., in the sense of a beta factor), but only for the regulation of risk premiums for certain risks or factors of risk.

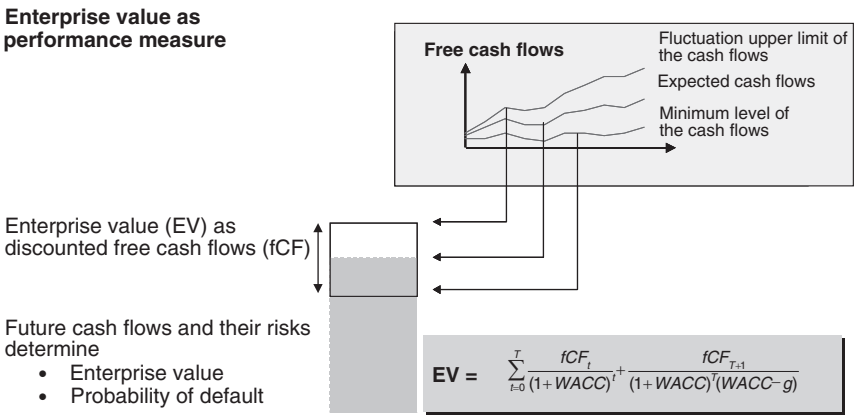
14.4 RISK, COST OF CAPITAL, AND SHAREHOLDER VALUE

On the stock exchange, the entire expected future earnings of a company are expressed in its stock price or the so-called goodwill. It seems sensible to use shareholder value, which comprises the company's entire future prospects, rather than its latest profits as per the published financial accounting data as a yardstick for assessing a company's success and the gross or net contribution of individual entrepreneurial activities. This approach, which is commonly

known as the shareholder value concept (see Rappaport 1986) involves looking at a company from the perspective of an investor who is merely interested in increasing the value of his or her capital investment—the "enterprise"—similar to a shareholder expecting an increase in stock prices. The shareholder value of an enterprise depends on two company-specific factors: the expected earnings and risks. As capital investors are generally risk-averse, they are prepared to give a higher rating to a high-risk enterprise than to a low-risk enterprise only if the earnings are disproportionally higher.

It is useful to base the valuation of an enterprise on its so-called free cash flow, the funds that can be distributed to equity suppliers and third-party lenders. It can be calculated as a corporate key indicator (i.e., before the deduction of interest expenses), as the operating result after any taxes that are due payable by the company, plus adjustments for noncash items (particularly depreciation), minus investments in tangible assets and working capital (accounts receivable from product and service delivery and performance, and stock). This takes account of the fact that a certain portion of profits has to stay within the company for investment purposes, in order to ensure sustainable earnings over the medium to long term.

Mathematically, the shareholder value of a company is defined as the present value of all future free cash flows less the value of debt (see Figure 14.4). Given that, the value of a company can be increased through the reduction of risks that affect the cost of capital (i.e., risk-adjusted rate of interest).



Clear success measurement, comprehensiveness, future orientation, and the inclusion of risks are the advantages of a value-based management

FIGURE 14.4 Enterprise Value

14.4.1 Enterprise Value and Capital Costs in Efficient Markets

A business segment or an investment can make a positive contribution to the goodwill of a company only if its returns are greater than its risk-adjusted cost of capital. The contribution of a corporate activity to the company's value can be described through the economic value added (EVA), which depends on the difference between returns and cost of capital:

$$\text{EVA} = \text{capital employed} * (\text{yield} - \text{capital cost rate})$$

An investment or a business segment is financed through either equity capital (EC) or loan capital (LC). Consequentially, the cost of capital is the weighted average value of cost of loan capital CL (loan interest) and the cost of equity capital CE, whereby the tax rate T expresses the tax benefits of the loaned capital. Instead of the cost of capital, practitioners and academics generally refer to the weighted average cost of capital (WACC):

$$\text{WACC} = (1 - \text{T}) * \text{LC} * \text{CL} + \text{EC} * \text{CE}$$

Of course, the equity requirements of a business segment—and thus the cost of capital and the EVA—depend on the inherent risk. If a company has several business segments that are exposed to differing risk factors over time, it is possible to determine the required equity capital (EC) (i.e., the risk-covering potential) of each business segment with the extent of the risk (RAC), and then derive its cost of capital and value contribution (EVA). One way of determining the cost of equity capital CE is through Sharpe's Capital Asset Pricing Model (CAPM):

$$\text{CE} = \text{E}_\text{O} + (\text{E}_\text{m} - \text{E}_\text{O}) * \beta$$

where β = systematic risk—the effects of all non–company-specific influences on profitability (such as economic and interest developments)
ß arises from the quotient of the covariance between the net yield of a share and the variance of the market net yield
E_O = risk-free interest rate
E_m = average market interest for a risk-prone capital investment, such as shares

This approach is amplified and enhanced next.

Here, only systematic risk is regarded as relevant for the cost of capital, as it cannot be removed through diversification (i.e., the consolidation of

different projects or investments in a portfolio) thus resulting in counteractive and compensatory effects of certain individual risk factors. Bowman (1979) provided a theoretical basis for empirical research into the relationship between risk and financial (accounting) variables. He demonstrated that there is a theoretical relationship between systematic risk (beta) and a firm's leverage and accounting beta. He furthermore submitted that systematic risk is not a function of earnings volatility, growth, size, or dividend policy.

However, the existence of bankruptcy costs, agency costs, the asymmetric distribution of information, and the limited access of individual companies to capital markets data show that even idiosyncratic risk factors are relevant to a company's value (see Froot et al. 1994; Pritsch and Hommel 1997). Also, equity capital and loan capital are used at market values; however, we do not have perfect efficient markets (see Haugen 2002; Schleifer 2000).

14.5 MODEL CRITICISM

Obviously, the risk-dependent capital cost rates (WACC) rely on the true extent of risk in a company and therefore on the level of planning security with respect to the future yield of the cash flows that are consolidated into the assessment of a company's value.[2] A risk analysis should provide at least this tangible information. The frequent detour of specifying the capital cost rates by means of using primarily information from capital market (like beta factors) instead of internal enterprise data simply because these are readily available is hardly convincing. Among the theoretical and empirical criticisms of the Capital Asset Pricing Model (CAPM)[3] and similar approaches for the derivation of capital cost rates, one assumption stands out: The CAPM assumes efficient capital markets, which implies most importantly that all capital market participants can estimate the risk position of the enterprise just like management can. This assumption surely is not stable at all. Moreover, it is considered appropriate to assume that an enterprise can estimate its risk position and the possible changes of its risk position by means of planned activities much better than other capital market participants or analysts can (i.e., information asymmetry).[4]

Therefore, enterprises should derive the capital cost rates for their worth-oriented control systems based on an explicit reflection of the impact of risk management. This would solve two problems: enterprise value (i.e., discounted free cash flow) or EVA[5] is calculated on the basis of the capital cost rates, which reflect the actual risk position of the firm; and through the capital cost rates the insights of risk management activities or mechanisms are directly integrated into business decisions. This actually

enables the weighting of expected yields and associated risks as they are truly inherent in important decisions.

Thus, the logical chain becomes directly apparent: A reduction of the level of risk (e.g., by means of an insurance contract) affects the level of equity capital required for the coverage of losses. Thus the capital cost rate is reduced. Proprietary capital is of course expensive. Following this approach, each action step can be judged either by means of quantifying its respective effects on the expected yields or on the basis of the effects on the inherent level of risk and thus (via the capital cost rates) the effects on the enterprise value. For the reasons specified earlier (e.g., insufficient diversification), unsystematic risks are hence relevant too.

14.5.1 Deriving Realistic Cost of Capital Rates

As reality hence shows,[6] there is a need to employ methods that take into account the idiosyncratic risks and the impacts of inefficient markets. Whatever a company's individual (nonsystematic) risk factors and risk positions are, capital markets data only reflect systematic risks and not the value of a company's policy of coping with or reducing risks.[7] Obviously, the risk-adjusted cost of capital rates must be dependent on the risk exposure of a company (i.e., idiosyncratic risk); otherwise the cost of capital rates are incorrectly calculated (see, e.g., Amit and Wernerfelt 1990). But how can the required base information be gathered?

As stated, the risk aggregation at the portfolio or enterprise-wide level reflects the capital requirements of a company to cover at least the possible losses that follow as a consequence of the aggregated risks. As a result of the aggregation, using a capable system, one is able to estimate the capital requirements, expressed as risk-adjusted capital (RAC), for any given confidence level (i.e., commonly the 95% or 99% quantiles). These capital requirements can be seen as an expression of the risk position of a company. This figure can in turn be used to obtain the cost of capital rate, by inserting the data into the WACC formula. However, one can also replace Equity Capital with the Risk Adjusted Capital (as the equity capital needed to cover the risks). The known formula with EC being replaced by RAC looks like this:

$$\mathrm{WACC} = (1 - \mathrm{T}) * (\mathrm{LC} + \mathrm{EL} - \mathrm{RAC}) * \mathrm{CL} + \mathrm{RAC} * \mathrm{CE}$$

This formula clearly shows that the cost of capital rate is determined from the equity capital needed (RAC) to cover the risks. It can thus be said that—ceteris paribus—a company can reduce its cost of capital rate by reducing its risk exposure (e.g., by transferring risks). This is due to the fact

that a company with higher risks needs more equity capital to cover possible losses than a more risk-averse company would. The former also reflects a higher cost of capital rate, given that equity capital is more expensive than loan capital.

With the EVA concept, it is possible to assess the value of a company based on realistic cost of capital rates. This allows analysts and managers to better determine the goodwill of a company, by taking into account the current risk position. As higher risks will lead to a higher level of the RAC—and to an increase of the cost of capital rate (WACC)— these risks inherently require a higher profit rate in order to yield a positive impact on the goodwill of a company. Using this approach, both components are integrated to compensate the inefficiency of markets: the systematic (market) risk and the idiosyncratic (individual) risk.

14.5.2 Further Consequences of Inefficient Capital Markets

So which consequences and future challenges result from the considerations reflected on earlier in this chapter? The management of an enterprise should consider at least the next points if and when it operates in inefficient capital markets.

Because of asymmetrically distributed information, bankruptcy costs and psychological anomalies in the stock markets data as they reflect inherent risk levels, and the calculation mechanisms to derive the proprietary capital needed, the capital cost rates and the enterprise value (apart from the enterprise-independent risk premiums) should be calculated exclusively on the basis of proprietary data. Both systematic and unsystematic risk factors are relevant.

Investment decisions and financing conditions are dependent on each other. A reduction of the available cash flows limits the investment capabilities of an enterprise. A stabilization of the future cash flows through appropriately designed and implemented risk management initiatives helps management to realize more if not all lucrative investment choices (see Fazzari, Hubbard, and Petersen 1988; Froot et al. 1994).

The likelihood of an over- or an underestimation of capital market–share values when compared with their respective underlying values triggers the option of skillfully determining an appropriate timing for capital increases or share buy-back initiatives, to further enhance net enterprise value.

A performance measurement with EVA (or similar key performance indicators) must always consider the change in the capital costs as determined by the risk position of the enterprise. A risk-adjusted modification of the WACC calculation or the deviation from models like the CAPM will

lead to less distorted results regarding the true creation of net enterprise value.

14.5.3 Optimization of the Total Cost of Risk

A near-optimum solution for the risk management of an enterprise can be developed only when all relevant enterprise risk factors are considered in the development of a financial forecast. Only in so doing can all diversification and hedging effects be reflected. Any other approach would tend to neglect optionalities, lead to an over- or underestimation of the risk position, and hence cause inherently poor management decisions on the basis of distorted and incomplete information. When considering the net value generation potential of risk transfer and in particular insurance solutions, it is hence sensible to perform risk aggregation scenario simulations at the enterprise-wide level (i.e., with and without the impact of insurance).

In spite of the known advantages of such enterprise-wide approaches, it is commonly observable that, in practice, fragmented solutions are used to assess the impact of separated partial solutions. A predominant argument which that easily be understood as a killer phrase has been that this helps to reduce complexity. A rather common approach, which is suboptimal though, has been to attempt to optimize the so-called costs of risk or at least those portions that have already been quantified. This approach and a few modern enhancements are discussed next.

Fundamental to these approaches is the thought that only a discrete, defined portion of risk factors is looked at and optimized for the risk compensation solution that is implemented. This is a similar perspective to the one that a person might expect to see at an insurance company that considers insuring certain operational risk factors of an enterprise. In so doing, the enterprise conceives a "virtual captive" that is structured to cover the risk factors under consideration, thereby employing the required amount of capital that would be provided for the setup and implementation of such a virtual captive. The risk costs, commonly referred to as the total cost of risk (TCOR), which are calculated taking into consideration the required cost of capital, are the target of optimization and hence cost reduction initiatives. These risk costs can be understood as the (negative) value contribution of the considered risk factors. A TCOR optimization hence attempts to reduce the net cost of risks and related management measures in an enterprise in a transparent, comprehensible, and defensible manner—and to render the risk position of an enterprise more manageable. Employing this approach, it is possible to derive the optimum balance between risk retention and risk transfer within an overall risk management strategy. The result is an integrated, economically plausible insurance

management strategy that delivers a net value contribution to the enterprise at large.

14.6 ASSESSING THE TOTAL COST OF RISK

The calculation of the total cost of risk (TCOR) encompasses:

- A decision of which risk factors to include in the assessment
- An assessment of the respective cost factors that shall be reflected in the analysis

For the optimization of the value contribution of a risk transfer, it is then sensible to first consider those risk factors that are generally dispositive (i.e., that can be transferred to third parties). These may include inter alia the risks relating to physical assets and business interruptions, third-party liabilities, product recalls, technical processes and systems, and transport. If appropriate and warranted in the specific analysis, this list can be increased to include other relevant factors, such as interest risk, currency risk, and commodity price risk.

With respect to the cost factors, it is conceivable that the analysis would reflect the cost of internal control systems and organizational risk management measures (in particular preventive steps) as well as the costs of risk transfer, related external and internal services, the cost of administration and contract management, the costs of capital, any taxes and fees, implementation and maintenance costs, the cost of damage settlement if certain risk factors were to become reality, and the costs of those portions of the overall risk that are retained within the enterprise—including of course their respective marginal contribution to the overall cost of capital.

14.6.1 Managing the Total Cost of Risk

Once the TCOR is calculated, a variety of decisions and risk management measures are conceivable, including but not limited to these:

- The decision not to cover or to abolish coverage of certain risk factors in lieu of risk retention and hence proprietary coverage and/or the employment of operational or strategic risk management approaches (see Figure 14.1)
- Changes in the risk retention strategy (i.e., those portions of the various risk factors that the enterprise covers from its own reserves, operating cash flows, and financing if appropriate and necessary)

- The negotiation of insurance policies for the coverage of individual or combined risks
- Changes in insurance policies including but not limited to the change of the insurer or of insurance products and policy wordings
- Combinations of risk factors into packages and portfolios that are more easily negotiated with an insurance company (e.g. multiyear and multiline coverage, all risk policies, etc.) due to their inherent diversification effects
- Substitution of more traditional insurance concepts with alternative risk transfer solutions
- Changes in the contractual relationships with the outside world, perhaps in combination with flexible service-level agreements
- Investments into operational control systems to demonstrate the early recognition of risk factors becoming reality and to train effective responses to incurred risk
- Outsourcing or outventuring concepts, whether operational or simply related to the development and administration of insurance solutions

14.6.2 Optimizing Total Cost of Risk: A Phased Approach

The next generic procedure may be considered useful by practitioners who desire to optimize the approach to risk transfer for an enterprise.

Phase 1. **Perform risk analysis and risk aggregation.** The risk analysis serves to identify and quantify all relevant risk factors, whether on the basis of available data and/or moderated individual or group subjective assessments. With these data, the risk aggregation is performed through simulation, to describe the extent of residual risk and the required capital coverage as well as the uncertainty bandwidth of planning figures over time.

Phase 2. **Capture the risk inventory and risk management instruments.** In this phase, all risk management measures are systematically captured and assessed. For risk transfer mechanisms, it is necessary to capture specifically which risk factors are transferred for which respective costs and which level of risk retention has been assumed.

Phase 3. **Identify the risk response policy structuring.** Once all relevant risk factors are captured in the inventory and assessed, the enterprise needs to decide at the policy level which core risk factors definitely have to be carried from proprietary funds. For all other risk

factors, possible transfer mechanisms and risk transfer strategies are identified.

Phase 4. **Identify a valuation framework.** To be able to assess alternative strategies and the performance of risk transfer instruments, it is necessary to define an objective decision and performance analysis framework. This framework should be designed such that it explicitly emphasizes both the cost of risk transfer mechanisms and the different features, including of course any exclusions and the extent of risk retention.

Phase 5. **Decide on a suitable mix of instruments.** Once all alternatives and their respective performance and risk profiles are identified, it is possible to derive sensible near-optimum decisions on the structuring of risk transfer mechanisms. This implies that the enterprise does not choose simply the cheapest alternative(s) but rather the mix that best supports the enterprise's strategy and the net value generation. Of course, short-term compromises can be considered too. The TCOR is then calculated as the sum of individual net contributions to the overall risk position that is retained by the enterprise and the cost of risk transfer as indicated earlier.

Phase 6. **Implement the risk transfer strategy.** This final phase requires the details to be worked out, and the negotiation with interested risk bearers (i.e., insurers, banks, investors, contractual partners) with respect to the specific wording, and the time horizons of the respective risk transfer mechanisms. As indicated earlier, the "packaging" of risk factors and the specific definition of retained portions of risk, are the predominant factors which can yield rather lucrative commercial conditions in risk transfer contracts.

14.7 CONCLUSIONS, RECOMMENDATIONS, AND OUTLOOK FOR FURTHER RESEARCH

This chapter presents why the understanding of and the traditional approaches to OpRisk management can and should be enhanced to better reflect what truly counts in operational and enterprise risk management, and in how far insurance can play a role. In presenting our findings, we demonstrate why and how both the shortcomings of traditional valuation models such as the CAPM need to be compensated and why insurance concepts can be designed and how they can be analyzed and optimized to serve as an opportunity enabler and to truly add net value to an enterprise.

In particular, higher exposures to risk generally reduce the enterprise value, as was demonstrated in this chapter. Hence it is sensible to specifically work on risk transfer strategies that reduce the overall risk position

efficiently and effectively. Insurance and other risk transfer mechanisms should not be understood simply as cost factors that add no conceivable value to the value of an enterprise, 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.

NOTES

1. The web site of the Bank for International Settlements (www.bis.org) contains numerous related documents, ready to be downloaded. Sequencing them by time order shows fairly well how the understanding of operational risk and related transfer and management mechanisms have evolved over time.
2. Apart from the systematic (cross-firm) risks, there are quite good reasons and empirical vouchers for the importance of the idiosyncratic (company individual) risks in imperfect markets; see Amit and Wernerfeldt (1990).
3. For the CAPM approach and related model criticism, see Haugen (2002); Shleifer (2000); and Ulschmid (1994). For findings on the analysis of CAPM and of APT for the German stock market, see Fama and French (1992) Steiner and Uhlir (2000).
4. For value-oriented control systems, see Gleißner (2004) and the criticism of Hering (1999).
5. With respect to the economic value added concept, see Stern, Shiely, and Ross (2001).
6. For an overview of different forms of the derivation of capital rates, see Gleißner (2004), pp. 111–116; for an example of a concrete derivation of the capital costs for a company, see Gleißner and Berger (2004).
7. With respect to supplements for the meaning of unsystematic risks, see, for example, Goyal and Santa-Clara (2003). Considering partial rational reasons for a limited diversification in private portfolios too, this is more intuitively comprehensible in Hubbert (1998).

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