

Risk-Return-Management for Non-Finance-Businesses

Value Based Risk Reporting and Management Control of Business Units

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Abstract—Risk Management and Value Management are each extensively represented in literature. However, approaches dealing with their interconnections and concerning non-financial business units are scarce. For example, the allocation of risk limits to business units is mainly discussed in the banking or insurance sector in respect of financial risk measures such as the Value at Risk of assets. On the other hand, value based key figures such as EVA, CFA or CFROI, which are widespread in the industrial sector, are risk adjusted only on a highly aggregated level, e.g. by WACC on the enterprise or unit level. Therefore, this paper proposes a new approach based on downside risk measures for the allocation of risk limits to non-financial business units in regard to value-based management and for the risk reporting of value based, risk adjusted key figures.

Keywords- *downside risk; governance of business units; risk allocation; risk budgets; risk disclosure*

I. INTRODUCTION: SHORTCOMINGS IN EXTERNAL AND INTERNAL RISK REPORTING

In recent years, risk reporting requirements have continuously increased all over the world. The German Accounting Law Modernisation Act of 2009 (BilMoG), for example, requires all capital companies with securities quoted on an organised market to disclose key features of internal control and risk management systems with regard to the financial reporting process in the management report.

The BilMoG is in line with the previous German Control and Transparency in Business Act of 1998 (KonTraG), which as amendment law required middle- and large-sized corporations and groups to disclose risks of their future development, and the German Publication Transparency Act of 2002 (TransPuG), which pledges public companies to declare the conformity of company acting with the German Corporate Governance Code, which became effective in 2002. Among the key features of the Corporate Governance Code's with regard to risk are the Executive Board's commitment for a risk management system and its obligation to inform the Supervisory Board, which should create an Audit Committee dealing, amongst other things, with the company's risk management and its risk situation.

Risk reporting requirements following the US GAAP (Generally Accepted Accounting Principles) and the IFRS (International Financial Reporting Standards) focus on the disclosure of market risks, financial risks and contingencies and their management in the notes without mandating risk forecasts [1].

The US risk disclosure regime is in line with the Sarbanes-Oxley-Act, which aimed to improve financial reporting after a series of accounting scandals and became effective in 2002. It especially includes FRR (Financial Reporting Release) 48, SFAS (Statements of Financial Accounting Standards) 5, 131, and 133, FSP (Financial Accounting Standards Board Staff Position) SOP (Statement of Position) 94-6, and special SEC Regulations. The IFRS regime especially includes IFRS 37 and the IAS (International Accounting Standards) 1 and 37.

Contrary to the disclosure in the notes, the German Commercial Code § 289, I and § 315, I require a risk disclosure in the management report of the annual financial statement since 1998. This requirement is pointed out in more detail by the German Accounting Standard 5, which covers all categories of risk and the risk management process.

Risk disclosure has been thoroughly discussed in literature. For investors, information on risk is an influential variable of high importance when estimating the market value of a company [4]. However, in a recent study *Pérignon, and Smith* found by backtesting that historically simulated Value-at-Risk (VaR) disclosures of US and international commercial banks provide little information about real future volatility. Nevertheless, VaR remains the most widely used risk measure for disclosure, although it can hardly be used to accurately determine regulatory capital requirements and market risk charges [2].

Risk reporting of non-finance businesses has also been seen as insufficiently forecasting, quantifying and decision supporting [3][4], when analysing samples of Italian [5] and Canadian [6] stock traded companies. Additionally, descriptions of general risk management policies are considered dominating within a sample of UK annual reports, contrary to quantitative information gaps in the risk narratives [7]. In general, companies may have an incentive to underestimate risk measures to reduce their market risk surcharge [1][8]. Furthermore, risks are oftentimes reported on a highly aggregated level (e.g. VaR for

the company as a whole) instead of decomposing it to business units.

In lieu of their own assessment directly based on a company's risk disclosure investors could rely on external ratings. The quality of rating information depends at least on the methodological competence of the rating agency to accurately assess the probability of default and its independence, which increases with its willingness to downgrade [9]. Further, the limited transparency of rating agencies' decision-making and the way meanings of ratings are communicated are seen as major drawbacks from an unquestionable superiority of rating information [10]. In addition to that, a recent study provides evidence that ratings of the quality of a company's governance offered these days hardly contain predictive information content [11].

Whereas empirical findings support the assumption that investors and other stakeholders have to deplore risk intransparencies to some extent, they might be partially relieved, if they knew that managers' acting would be under full risk transparency at least. Nowadays, value-based performance metrics such as Economic Value Added (EVA), Cash Value Added (CVA) or EBITaC are predominately used in management control. They require risk hurdle rates, in the exemplary cases incorporated in the weighted average cost of capital (WACC). However, the required risk assessment is oftentimes rather vague and partially subjective. Support for this assumption can be found in these example statements of financial reports [12]:

- “As the concept is designed to be long-term, expectations of future developments in individual parameters are also factored in (note: the WACC).”
- “We differentiate between the costs of capital for the segments by adding beta factors to reflect their different business risks. (...): they are derived from an external peer-comparison and an internal management survey.”
- “(...) the WACC was lower than the previous year due to the sharp fall in base rates, which more than made up for higher risk premiums. As interest rates are expected to rise again, we nevertheless decided to maintain the WACC at its current figure (...).”

Therefore, some public companies already focus on more objective key figures and an increased transparency of value management [13]: “During the reporting year 2009, the calculation of the previously used key performance indicator EVA (...) was changed (note: to EBITaC) to ensure a more focused orientation towards (...) value drivers. In addition, the exclusive focus on balance sheet figures is intended to provide for increased comprehensibility.”

In general, highly aggregated value-orientated key performance indicators (KPI) allow for a gross judgement of risks taken from a market point of view, but they hardly provide support for operational management decisions. Further, the determination of risk adjusted cost of capital often depends on arbitrary and hardly comprehensible assumptions, e.g. a target-debt-equity-structure or estimated beta factors for business units. The risk-free rate of return, for example, and the market

premium of one single year vary between the annual reports of companies listed in the German Stock Index DAX. Therefore, deficiencies in external and internal risk reporting which endanger solid risk governance have to be ascertained.

To solve these shortcomings we suggest the introduction of a risk-limiting system for non-finance businesses and an enhanced obligatory risk disclosure in the management report. To do so, we summarize the principles of risk limiting and allocation in the banking sector shortly which we then use as a starting point for our discussion on their possible transfer to non-finance businesses, esp. producing companies. After that, some important aspects of risk assessment, aggregation and limiting will be discussed in detail.

II. RISK MANAGEMENT IN FINANCE BUSINESSES

The Basel Committee on Banking Supervision proposed the Basel II-framework in 2004, which has been enacted in the European Union with directives 2006/48/EC and 2006/49/EC [14]. It consists of three pillars: pillar 1 defines minimum capital requirements and will be revised by recommendations made in September 2010 (Basel III) [15]. Pillar 2 concerns a more qualitative approach to the adequacy of regulatory capital and risks taken (Internal Capital Adequacy Assessment Process, ICAAP) and the Supervisory Review Process (SRP). Pillar 3 discusses disclosure requirements. Quintessentially and of importance for this paper, ICAAP requires banks to apply or develop appropriate methods to identify, measure and manage all relevant risks and to ensure, that these risks are acceptable with regard to the bank's equity base. In this way, pillar 2 exceeds the requirements of pillar 1, because judging adequacy in this context highly depends on a detailed knowledge of the risks taken and a profound analysis of the methods and processes available for risk management. This may also become evident in the principle of proportionality, which requires the methods and processes implemented to be the more sophisticated, the higher the risks taken are [16].

The sound implementation of ICAAP is of material interest to all stakeholders, as the financial crises have shown the massive dangers of unstable financial systems.

When ICAAP is to be implemented, a risk strategy needs to be developed first. It has to be derived from the corporate strategy, which serves as a guardrail. The risk strategy must contain descriptions of all relevant risk categories and has to be explicit about their estimated and desired future development. It should then be approved by the entire management of the bank [16] [17].

To judge the adequacy of the overall risk taken by the bank, all material risks have to be identified, measured and then aggregated to a bank-wide risk measure. This measure then has to be compared with the risk coverage capital available. Obviously, the consistent definition of risk and risk coverage capital is of vital importance. Hidden reserves, for instance, may be considered as part of the risk coverage capital. As only the liquidation of the respective assets makes them available to cover losses, they can only be used in a liquidation scenario. The confidence level at which the different risk categories are measured, should be high, when thinking of a liquidation sce-

nario. Typical confidence levels found in practice are 99.5 % or even 99.9 % [18].

The singular proof of the bank’s risk bearing capability is important but not sufficient, for it offers no information about the bank’s ongoing ability to cover and manage the risks it has to face. Therefore, all material risks as well as the risk coverage capital have to be planned, managed and supervised within the bank’s controlling cycle. Again, the board of directors is responsible [19].

The validation of a sufficient risk bearing capability is doubtlessly fundamental and in many cases it is the number one reason to implement ICAAP. However, taking risk is also a question of the chances accompanying them, i.e. the estimated returns. ICAAP should be seen in this broader perspective and may be the motive to implement an integrated risk and return management. It is a prerequisite to a risk-oriented transformation and advancement in management culture and it will also be necessary to accomplish the risk strategy. There are two key elements that complement the ICAAP as an effective management tool: first, deducting risk limits and in consequence budgeting of these limits to business units, which ensure compliance with the bank-wide risk strategy in a decentralized environment as the operative tool. Second, the limits granted to the business units have to be accompanied with corresponding target earnings [20].

The overall risk the bank is willing to take has to be decomposed to limits for each risk category and business unit. As this decomposition is nothing but the formal expression of strategic decisions about business units and the risk categories these business units shall take, there is no automatic drill down of the overall bank limit. Typically, the process will be an iterative top-down/bottom-up planning [16].

Expressing the return in relation to the limiting factor (capital) allows for benchmarking of business units of different sizes and different business domains. Performance measures used in this context are return on risk adjusted capital (RORAC) or its value-oriented complement, the risk adjusted return on risk adjusted capital (RARORAC) [21].

Fig. 1 summarizes the process of proofing the adequacy of the banks risk capital compared to the risk taken. First, risk assessment identifies all material risks. Second, for each risk category the probability distributions have to be estimated and then aggregated to an overall risk distribution. If there is no sound proof of correlations between risk categories, the VaR-values of each risk category should simply be added, which

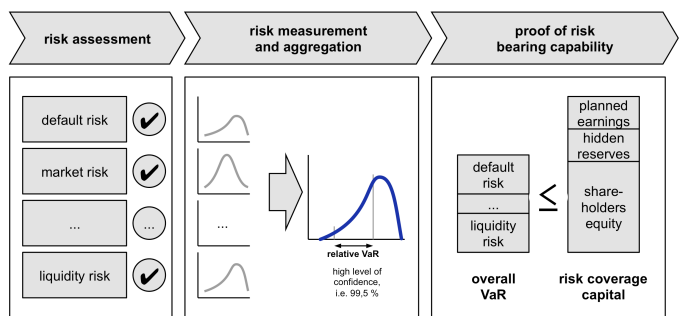


Figure 1. Proofing the risk bearing capability

complies with a conservative approach to risk management. Depending on the confidence level appropriate in context of risk strategy, it has to be proven, that the Value-at-Risk is smaller than risk coverage capital available.

III. ADAPTION OF RISK-MANAGEMENT-CONCEPTS FOR NON-FINANCE-BUSINESSES

The valuation of risks taken is an everyday task, not only for banks but also for any serious business. Judging the adequacy of risks already taken or planned is an important factor when a company is being rated, such as when asking for a new loan or when prolonging or extending loans already existing. In many cases the focal point there is the question, if the business looked into has enough equity to cope with one or more periods of negative results and if its liquidity position is solid and sound. The question not asked is, if the planned earnings justify the risks coming along with them.

However, this is done when measuring performance within value based management concepts, i.e. EVA, VA or EBITaC, which charge for risk adjusted capital costs that have to be covered in addition to all other costs [12][13]. **Fehler! Verweisquelle konnte nicht gefunden werden.** These concepts are well suited for the post calculation of a period or project, but do they help to manage the risks a business is facing? Accounting scandals indicate that the opposite is the case: when the management becomes aware of missing the targets, there is a tendency to take extra risk in the hope of compensating negative plan variances [23][24].

Analogous to regulatory requirements for banks, this leads to the necessity of limiting the risks a manager, a business unit or a company as a whole may take. Regulatory authorities in charge of supervising limit compliance could be the supervisory board or – with less detail – the shareholders through the annual shareholders meeting. Especially when talking about major decisions comprising severe risks, i.e. the decision to build one or more new plants, to enter new markets, to develop products new to the company, limitation constrains the management to focus on ventures with a good or excellent risk-return-relation.

The principle of proportionality also plays a significant role in risk management for non-finance-businesses. Smaller companies may rely themselves on suitable software solutions designed to offer a simple, yet effective approach to manage risks [25], however, the bigger businesses are, the more important the management and limitation of risks get, if only due to its pronounced principle-agent-setting.

Again, derivation of the risk strategy from the corporate strategy forms the starting point. The risk attitude made explicit in the risk strategy must be in accordance with the risk premium that is used to calculate interest yield when charging the cost of capital in a value oriented performance measurement. Historical indicators of risk, the beta-factor for instance, are irrelevant in this context. Only the projects planned and the risk they are accompanied with are of importance. It may be helpful to look at signal indicating higher risk than usual, i.e. when the business is expanding to new markets, is trying to bring more new products to market than commonplace or when major

mergers and acquisitions are being on the business' agenda in the near future [26].

To quantify risk an appropriate measure has to be defined. Downside or shortfall risks of the objective A with the density function $\varphi(A)$ measured by the s -ordered lower partial moment (LPM^s)

$$\text{LPM}^s(\bar{A}) = \int_{-\infty}^{\bar{A}} (A - \bar{A})^s \cdot \varphi(A) dA \quad (1)$$

may be a good point to start with [27], because they are explained easily. Dealing with an asset investment A_0 , for example, with risky future value A and setting $s = 0$, the reference point \bar{A} on the confidence level c can be determined using the inverse of the LPM function of zero order as follows:

$$\text{LPM}^0(\bar{A}) = 1 - c \Leftrightarrow \bar{A} = (\text{LPM}^0)^{-1}(1 - c). \quad (2)$$

Using (2) with an expected future value μ_A the well known and widely used VaR measure [2] is easily determined as relative VaR

$$\text{relative VaR} = \mu_A - \bar{A} \quad (3)$$

or absolute VaR

$$\text{absolute VaR} = A - \bar{A} \quad (4)$$

[28]. But dealing with non-finance businesses, should the LPM be calculated for profit, cash flow or something else? When focusing on profit, the so called Earnings-at-Risk (EaR) is defined as the difference between the profit planned and some worse result, which is expected with some very low probability [29]. Focusing on cash flow may be advantageous, because it is less susceptible to manipulation and Liquidity-at-Risk (LaR) is an important indicator for one of the most relevant risk categories: liquidity [30][31]. As earnings are of outstanding importance EaR is recommended as the key risk measure for most business units and the group level, LaR should be used as an additional performance measure for treasury.

To calculate EaR all material risk categories have to be analyzed. For each category its impact on earnings in a worse case has to be estimated. However, the confidence level chosen should be far below the high values used when analyzing risk with the liquidation scenario in mind. To manage Earnings-at-Risk, losses possible every few years are more important than some rare events happening every hundred or thousand years on average. A confidence level of 90 % or 95 % is recommended, which means that the risk capital allocated to cover EaR must at least be sufficient to compensate losses the company makes every 10 or 20 years.

Risk coverage capital available in this context consists of profits planned and possibly the earnings retained, as far as dissolving this equity component is in accordance to accounting principles. Capital reserve and share capital typically should not be considered, because these become only available when liquidating the company [32]. The percentage of retained earnings allocated for risk covering purposes expresses the companies' risk appetite. Another important factor is the maturity of the business, because start-ups typically have only small amounts of retained earnings, so that falling back to capital reserve and even share capital may be unavoidable, obviously showing the high risk investors are taking.

For purposes of risk management and control, risks and risk coverage capital have to be connected through the limitation process. The overall limit is derived from the risk strategy. It must be set at some point below the height of risk coverage capital available, 70 % for instance. This is done in account for risk categories, which have not been identified in the risk assessment process, or for categories, that are not properly measured.

The next step is to break down the overall limit to risk categories and business units resulting in a risk matrix with risk categories in its rows and business units in its columns. To decompose the limit, analyzing the risks the company had to face in its recent past provides useful insights. These historic risks have to be questioned with regard to their future relevance and they have to be replaced step by step by limits according to the risk strategy. Obviously, this process may be more or less time-consuming depending on the extent to which the new risk strategy is in line with the current situation.

Budgeting risk limits has to be accompanied by budgeting earnings. They are the reason, investors are giving money to the management, which allocates it to its decentralized business units.

As risk capital typically is the limiting factor, it is important to define a performance measure referring to this constraint resulting in risk oriented performance measures. The hurdle rate the business units have to master are directly dependent on the relation of the overall limit to equity, combined with the return on equity demanded by investors. To make an example, if the RoE demanded is 10 %, equity is € 200m and the limits allocated to all business units sum up to € 100m, the hurdle rate must be 20 % on the limits allocated to the business units.

Planning risks and limits requires planning the financial statement and especially the income statement. Estimating the possible variances of the income statement's main components is leading to estimates for the EaR. As income statement, balance sheet and cash flow statement are dependent calculations, optimizing simultaneously would be the approach theoretically correct. Due to its complexity a sequential approach is more appropriate, where the limits act as constraints that must not be hurt.

Fig. 2 summarizes the main facts relevant for the risk management process for non-financials. First, the overall risk limit is set in accordance to risk coverage capital available. Second, a target for the risk-orientated performance measure, RORAC in this case, has to be set. It is derived from the RoE-target and the proportion of equity to the overall risk limit. Then, the overall risk limit is allocated to risk categories and business units resulting in a risk matrix. The sum of each column results in the limit per business unit and their actual values respectively. The limits act as hard constraints, whereas the RORAC-Target should be exceeded, if possible.

IV. RISK REPORTING FOR NON-FINANCE-BUSINESSES

Effective risk management requires up to date information about the current risk situation and estimates about the development of the risks in the near future. Based on the principles of rolling forecasts it is suggested to report one past period and four future periods.

The risk report proposed in this article shows the limits per business unit and year. When comparing EaR with these limits, one has to be aware that EaR, understood as negative variances of planned earnings, become smaller and smaller the nearer the end of the fiscal year approaches. At the beginning of the year, almost all cost and revenue items are uncertain. When the year moves on, more and more transactions become completed, not bearing risk any more. Therefore, EaR for the period considered diminish naturally as the year goes on. It is therefore not intuitive to compare the remaining EaR with the limit granted for the whole period. Instead, one possible solution is to add actual variances of planned earnings with estimated EaR for the rest of the fiscal period. For Q2-Q4/2011 reports in Fig. 3 show remaining Earnings-at-Risk, for Q1/2012 the estimates for the whole year 2012 can be seen. Limit utilization is calculated by dividing the sum of actual variances of Q1/2011 (which cannot be seen in Fig. 3) and the estimates for quarters 2-4 for 2011 by the limit granted for 2011. The EaR-estimates for 2012 divided by planned limits for 2012 results in limit utilization estimates for 2012.

When limit utilization approaches 100 %, a yellow background indicates the stressful situation, red background indicates limit overruns. In any case, further investigation to the reasons for stresses or overruns has to be made. Using up-to-date analytical software, a drill down to the risk categories responsible for limit overruns could be the next step.

Risk reporting has to become an integral element of daily management reporting. Key risk figures, e.g. limit utilization per business unit, must be part of any management cockpit allowing a quick insight into potential problems.

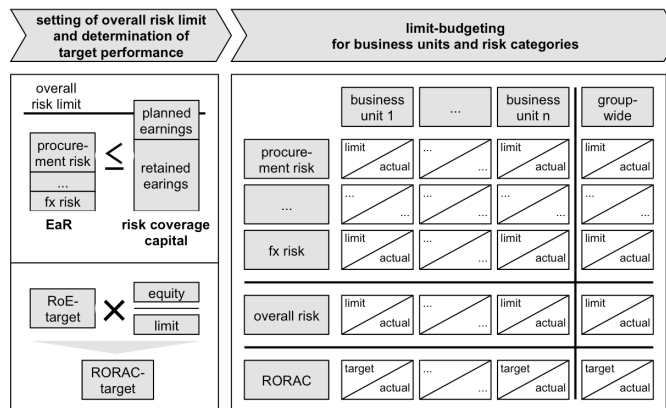


Figure 2. Determination of target performance and limit-budgeting-process

V. CONCLUSIONS

This paper proposed an approach for the allocation of downside risk limits to business units. Starting point was the company's overall risk limit, which has to be covered by the company's risk capital. Management decisions have to take into account the relation between the risk limit that is specific for a business unit and its expected performance, hence risk adjusted performance metrics such as RORAC have to be maximised.

Further, mandatory external reporting of downside risk oriented performance measures such as EaR was suggested on a rolling forecast base. Mandatory requirements were proposed, since there is sufficient empirical evidence that voluntary disclosure is – in spite of possible incentives to act in the opposite way – predominately qualitative and hardly comparable between companies due to large variations in the disclosure, e.g. [1][5][6][33].

However, the crucial point for non-finance businesses is the ability to measure risks, since performance risks are oftentimes or even predominately triggered by “soft” factors that can hardly be assessed which is mainly due to missing broad data bases for statistical analysis. Therefore, further research has to be done to answer the question, how risk calculation parameters can be estimated on a certain confidence level. This is important for external risk reporting, since investors need information about the reliability of the disclosure for decision making. The extent of challenges in risk aggregation may differ between industries, since individual-producing for example aggravates risk assessment compared to mass production.

To diminish the variance of external risk disclosure, tem-

Organizational Unit	2011	Q1 (actuals)			Q2 (estimates)			Q3 (estimates)			Q4 (estimates)			2012	Q1 (estimates)		
	Limit	EaR	util.	prev.	EaR	util.	prev.	EaR	util.	prev.	EaR	util.	prev.	Limit	EaR	util.	prev.
Business Unit 1	150	120	80%	75%	95	84%	70%	73	97%	75%	33	88%	80%	150	130	87%	80%
Business Unit 2	600	450	75%	76%	410	91%	80%	290	97%	80%	140	93%	85%	600	500	83%	75%
Business Unit 3	420	390	93%	80%	330	105%	85%	185	88%	83%	90	86%	85%	400	380	95%	93%
Business Unit 4	300	350	117%	105%	250	111%	106%	145	97%	99%	78	104%	90%	350	320	91%	117%
The No-Name-Company	1,470	1,310	89%	83%	1,085	98%	83%	693	94%	83%	341	93%	83%	1,500	1,330	89%	89%

Figure 3. Risk Reporting

plates generated by standard setters could be a helpful instrument. They should strictly be best practice oriented, for example, the UK Accounting Standards Board converted the Reporting Standard no. 1 named “The Operating and Financial Review” into a Reporting Standard on Best Practice in 2006 [4].

In either case, a consistent risk reporting of all companies with publication requirements, which uses standardised methods and decidedly focuses on the planned risk positions of the future business development and their coverage by risk capital instead of ex post disclosures of VaRs at the balance sheet date, would be valuable information for investors’ decisions. Certainly, such ex ante information has to exclude trade secrets and requires a sensitive determination in order to keep the right balance between being comprehensible and keeping business opportunities, which have not yet been fixed, secret at the same time.

Another strand of future research has to deal with risk dependencies of operating activities within one or between different non-financial business unit(s). Risk balancing requires a portfolio approach and the measurement of risk correlation as prerequisite for the risk aggregation. Since risk mitigation can be one objective of diversification strategies, the quantification of these risk diminishing effects is of major importance. But how to measure risk dependencies, if the single risk itself is hardly quantifiable?

Oftentimes, subjective estimates – in contrast to parametric or non-parametric methods like the predominately used historical simulation in the financial sector [2] – are the only solution. However, they are in opposition to the required objectivity of disclosure information. Business risk modelling could be the instrument of choice, but assumptions and implementation variants vary widely in literature. Also in this field, best practice templates and standardised toolboxes would decrease noises in the inter-company risk comparison and the probability of selection biases by investors and other stakeholders.

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