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Risk Appetite: An Axiomatic Approach

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Though most enterprise risk management (ERM) practitioners agree on the importance of a risk appetite framework (RAF), there is less alignment on its critical goals, implementation, and even relevant terminology.

This article avoids debate regarding terminology and, instead, illustrates a RAF with those elements most often regarded as best practice. As a motivation for the approach, a set of statements about preferred goals and methods will be taken to be true. These "axioms" will serve as a compass in our search for the ideal RAF and are as follows:

- A RAF includes *enterprise level* statements describing the preferred types and amounts of risk the company is willing to assume in pursuit of its business objectives.

- The above statements include limits, targets, tolerances, or constraints (collectively "limits" and/or "tolerances") relating to key profit, value, and solvency measures and relating to each high-level risk category in the risk taxonomy (e.g., risks categorized as financial, market, legal/regulatory, insurance, strategic, and operational).

- When appropriate, there are *line of business* (LOB) level statements to support the enterprise level statements.

- There exists a monitoring and reporting structure to measure actual exposures against the system of limits and tolerances at both the business unit and enterprise levels, detect/report any breaches, and trigger appropriate remediation.

- When feasible, quantitative methods are employed because they are objectively defined, leave less chance for misinterpretation, and aid in making the RAF operational.[1] An enterprise risk model capturing LOB correlations and interrelationships is necessary and we assume such a model is in place and can model prescribed scenarios or be run stochastically.

The financial planning process (the Plan) will drive the setting of certain limits and tolerances. In some cases, LOB level statements help set enterprise level statements. Such a bottom-up approach can be very effective; the term "cascading" should not force a preference for only top-down thinking or a specific logical sequence. LOB level constraints and the Plan process must play a central role in limit setting. This creates buy-in and avoids the creation of a RAF resulting in immediate and widespread non-compliance.

Other important elements include clear descriptions of roles and responsibilities, learning mechanisms, and the ability to review the RAF and evolve as needed. For concreteness, we use a hypothetical multi-line insurance company (the Company or We) to create our RAF.

LIMITS AND TOLERANCES AT THE ENTERPRISE LEVEL

The Board of Directors (the Board) and the Company's executive management (Management) agree on risk appetite statements for earnings, capital, and a measure of franchise value. Analysis of the Company's risk profile will help ensure that compliance with any proposed risk appetite statements is reasonable and attainable.

Risk appetite statements (denoted with "M" for *metric*) of the following form are desired:

- M_1: We are x% confident that the Plan (GAAP) earnings for the Company will not be missed by more than 15%; i.e., the estimated probability of achieving at least 85% of Plan earnings is x%.

- M_2: We are 85% confident that the Company's achieved return on equity (ROE) $\geq$ y%.

- M_3: The aggregate capital at the legal entities and the holding company is sufficient to cover all obligations and expenses, over a one year horizon, in any modeled scenario having greater than a 1 in 200 annual probability.

- M_4: The annual probability of a reduction in franchise value (e.g., present value of free cash flows) of 10% or more is at most z%.

The values of x, y, and z are yet to be determined. In pursuit of its business objectives, the Company's risk exposure preferences—in decreasing order—are insurance, strategic, market, legal/regulatory, and operational. This leads to the following risk appetite statements (denoted with "R" for *risk* type) which leverage the Company's modeling of (hypothetical) risk scenarios:

- R_1: For insurance risk scenarios with probability of at least 10% ("$p \geq .10$"), the worst impact to earnings is at most I_1% of Plan.

- R_2: For strategic risk scenarios with $p \geq .10$, the worst impact to earnings is at most I_2% of Plan.

- R_3: For market risk scenarios with $p \geq .10$, the worst impact to earnings is at most I_3% of Plan.

- R_4: For legal/regulatory risk scenarios with $p \geq .10$, the worst impact to earnings is at most $I_4\%$. of Plan.

- R_5: For operational risk scenarios with $p \geq .10$, the worst impact to earnings is at most $I_5\%$ of Plan.

The Company uses the Plan process and the risk inventory to parameterize I_1–I_5.

USE OF THE PLAN PROCESS IN THE SETTING OF LIMITS/TOLERANCES

Recall statement M_1: We are x% confident that Plan earnings for the Company will not be missed by more than 15%.

Ensuring this statement will be a central theme of the Plan process and we require that LOB forecasts have a degree of confidence. For each LOB, denoted LOB_1, LOB_2, ... the respective (dollar) earnings forecasts P_1, P_2, ... are such that:

LOB_x is 95% confident that it will not miss its Plan forecast by more than M% of P_x.

The use of a single value for M across the board reflects the view that a LOB with a higher expected (dollar level of) earnings should be permitted to have a larger potential dollar shortfall. The Plan process and the risk model use an iterative approach to determine the LOB forecasts P_1, P_2, ... and the value of M.

The Company examines a value of M = 15% but model simulation shows this tolerance at the LOBs only leads to the *enterprise level statement*:

"We are *86% confident* that the Plan earnings for the Company will not be missed by more than 15%."

The Company prefers to have a 90% confidence level for this statement. To "bump up" the 86% confidence to the desired 90% confidence we must tighten the earnings tolerance in each LOB. We gradually try smaller values of M such as 14%, 13%, etc., until we find what value gives the desired confidence at the enterprise level.

The Company eventually finds that 12% will produce the desired enterprise statement. However, it is necessary for one LOB to reduce its Plan forecast so that it can commit to its earnings confidence statement. This revision in the Plan forecast illustrates the iterative nature of the Plan/limit setting process. The fact that the limit setting is embedded in the Plan process creates a strong link between strategic planning and ERM while increasing buy-in. The Company has therefore determined the value for M as 12% and we have:

If:

Each LOB is 95% confident that it will not miss its own Plan earnings by more than 12%,

Then:

M_1: We are 90% confident that Plan earnings for the Company will not be missed by more than 15%.

The risk model, complete with equity modeling, can then be used to translate the LOB limits for earnings into LOB limits for ROE. The model is then used to determine what statement is implied at the enterprise level and results in a value of y of 12% in statement M_2. The finalized Plan, current risk inventory, and the model allow the parameter z, in statement M_4, to be determined as 5%.

Strategy discussion and the Plan process lead to revisions to the risk inventory/mitigations, which suggest the following parameters are attainable for statements R_1–R_5: $I_1 = 6\%$, $I_2 = 4\%$, $I_3 = 2.5\%$, $I_4 = 2\%$, and $I_5 = 1.5\%$. Note that R_1–R_5 help ensure the goal of statement M_1 though there is not a precise mathematical linkage. For example, if simultaneous events materialize in several of the risk classes, at impact values near those defined by I_1–I_6, their aggregate effect on earnings may well be less than 15% if there is not significant adverse interaction.

The statements M_3, M_4, and R_1–R_5 are not cascaded to the LOBs in any manner.

Regarding M_3, the risk model is used to determine the aggregate capital need, C, at the 99.5% confidence level to determine the (positive) risk buffer amount, to be help at the holding company, as the maximum of {0, C – total capital at operating companies}.[2]

MONITORING AND REPORTING FOR THE RAF

The fourth axiom stresses the importance for a formal monitoring and reporting system which measures actual exposures against the system of limits and tolerances at both the LOB and enterprise levels.

On at least a quarterly basis, the enterprise risk inventory is updated and the following risks and metrics are tracked, measured or assessed:

1. LOB level earnings to date and any shortfalls versus the LOB Plan forecasts

2. Achieved ROEs to date and any shortfalls versus the LOB Plan forecasts

3. The enterprise values for (1) and (2)

4. Projections reflecting (1)–(3) for the Plan time horizon and updated risks to that "reforecast" (reflected in the risk inventory)

5. The enterprise risk inventory and risk model are used to check a) the aggregate capital and risk buffer needs, and b) the annual probability of a reduction in franchise value of 10% or more

6. Separately and for each risk type, the risk scenarios with probability of at least 10% are identified and their impacts to LOB and enterprise earnings are estimated

7. Customized for each LOB, a) key risk indicators (KRIs) and key performance indicators (KPIs) relating to the metrics in M_1–M_4, and b) KRIs relating to specific sub-classes of the high-level risk categories used in R_1–R_5. This is a form of cascading, to the LOBs, of the statements R_1–R_5

Some of the quantities tracked in (7a) include drivers of earnings such as market penetration, sales levels, loss ratio, expense ratio, client and customer satisfaction, economic indicators, and reserve/capital projections.

In (7b) the Company makes use of metrics relating to granular risk types (falling underneath the main categories of R1–R5) such as adverse claims development, FX exposure, changes in distribution channels, business continuity preparedness measures, project status, IT systems implementation status, gain/loss of clients, cash on hand, portfolio duration, number of data loss incidents, current litigation docket, actual to targeted capital levels, and regulatory changes or ongoing examinations. The quantities described in (7) should, to the extent possible, be forward-looking risk measures rather than trailing indicators.

The ERM function works with the Company's subject matter experts to define a system of "traffic light indicators" which translate the observed numerical values in 1–7 above to Green, Amber, or Red (on the LOB and enterprise levels) and have the following meanings and triggered actions:

Green: the risk level is acceptable and regular monitoring continues (no special action required).

Amber: the risk may be at a level that is not acceptable and may require remediation; escalation (formal/documented reporting of the situation) is required to the ERM Committee (ERMC), who will make a formal recommendation for corrective action, to restore to Green rating, or possibly defer a decision regarding action during a period of continued monitoring.

Red: the risk has exceeded the allowable tolerance or limit, and escalation to the ERMC, Management, and/or the Board is required. Root cause analysis, describing the origin of the breach, is submitted by the relevant business and a path toward remediation, including time-frame, is set forth by the ERMC.

FINAL THOUGHTS

A RAF is rarely static and should be reviewed annually, when a breach occurs, or in the event of any significant change in the organization's risk profile.

The axioms described in this article leave room for a company to customize the RAF's key elements, including the metrics, the reporting/measuring process, and governance.

The Company's RAF design helps ensure the following core principles described by the North American CRO Council.[3]

- Establishing a comprehensive RAF should be approached in an iterative fashion.

- The RAF should reflect the "diverse interests of parties relevant in achieving company objectives."

- Compliance with the frameworks limits/tolerances should be realistic and attainable.

- The RAF should "identify and quantify risk preferences for material risks."

- Risk appetite statements and limits should be reviewed and possibly revised after significant events—and at least annually—by the Board.

It is also important to keep in mind that ERM in general—and limit/tolerance reporting in particular—is about *risk* and this implies *future* events must be the primary focus. Event databases are important but ERM must detect and communicate exposure to future events. As a result, limits and tolerances should make extensive use of risk identification and quantification processes so that the RAF can function, in part, as an early warning system rather than merely pointing to recent downside events.

A RAF, while only one component of a complete ERM framework, offers a chance for a clear link with strategy and can enable a company to "live and breathe" its risk-reward vision. ∎

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ENDNOTES

1 This statement and some of the other axioms are influenced by the paper "Developing the Risk Appetite Framework of a Life Insurance Business" from the Institute of Australian Actuaries.

2 Many insurance companies will also define target capital levels at their legal entities to help ensure a desired rating from S&P, AM Best, etc.

3 See the paper "Establishing and Embedding Risk Appetite: Practitioners' View" from the CRO Forum and the North American CRO Council.