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WHITE PAPER 3 OF 3

Designing a Comprehensive Risk Transfer Program with Stochastic Models

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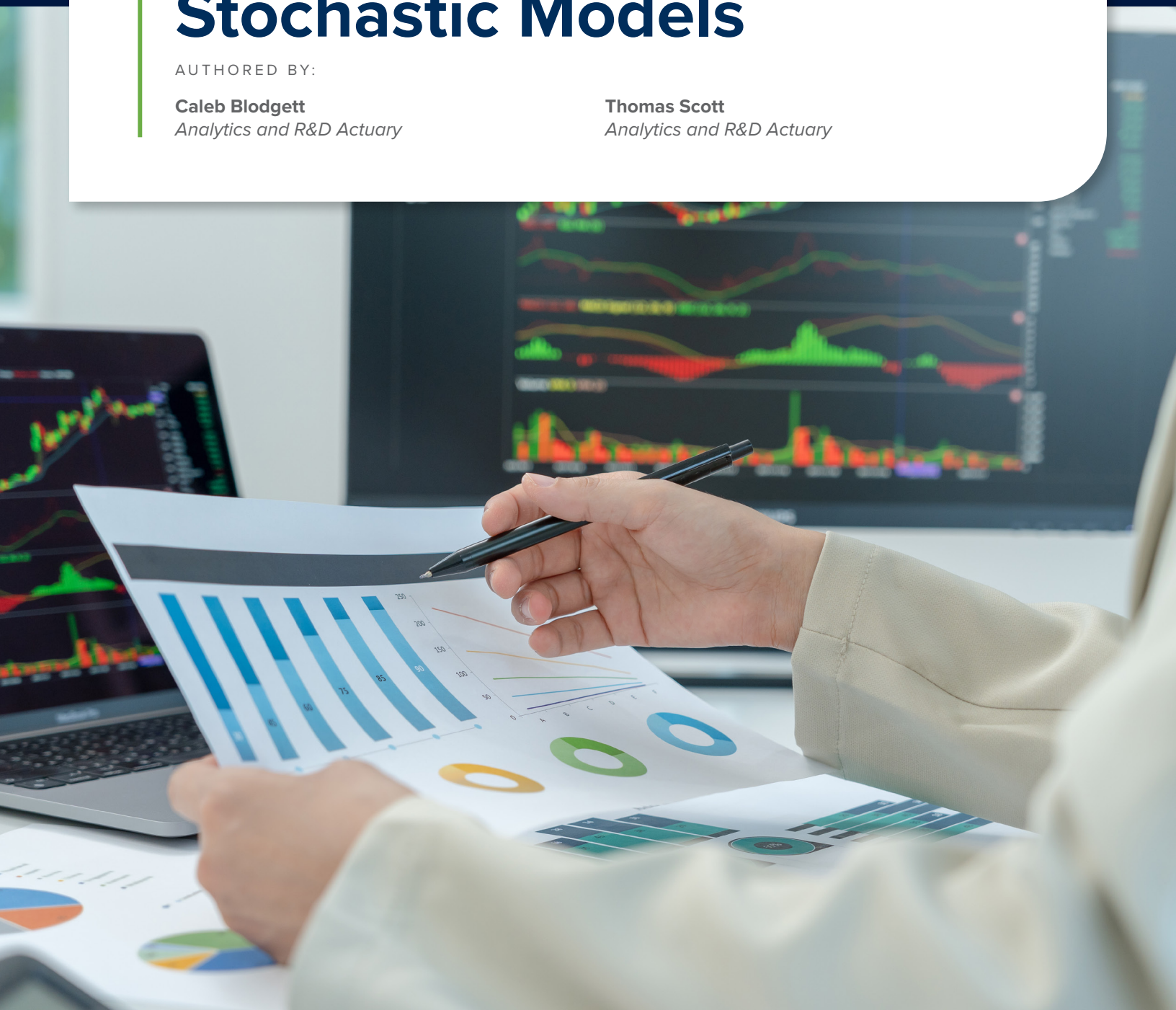

Building a Safety Net for XYZ

Understanding XYZ's Insurance Purchasing Motivations

Before any risk financing strategies are considered for Company XYZ, it's important to understand the motivations for using insurance as a potential solution. There are many reasons a firm may purchase property and casualty insurance to manage hazard risk, ranging from compliance requirements to optimizing the accounting treatment of losses. For extreme heavy-tailed risks such as D&O and cyber, volatility reduction is often the driving factor behind purchasing insurance, to help minimize the impact of large-scale cyber events, lawsuits and other hazard peril effects on prospective corporate earnings, liquidity and balance sheet strength.

The Strategies for Addressing Risk

Beyond these purchasing motivations, XYZ leadership has also expressed interest in exploring alternatives to traditional insurance to decrease its total cost of risk. In theory, several strategies exist to address any risk: avoid the risk entirely, control or mitigate the risk, accept or retain the risk and transfer or share the risk with a third party at cost. For cyber and D&O, some of these strategies are less applicable than others (avoiding may be altogether infeasible), and realistically, most firms engage in a combination of these strategies. For example, Company XYZ might hire an IT security consulting firm to control cyber risk (mitigate), retain a less volatile layer of risk in a captive insurer (accept) and buy insurance for the risk in excess of the captive layers (transfer).

We will assume that XYZ has already undertaken the highest-priority risk mitigation strategies, from implementing critical cybersecurity controls such as multi-factor authentication to setting up a structured compliance program that addresses all relevant laws and regulations. A robust modeling framework should be able to incorporate the impact of such controls on risk quantification.

From here, we will assess and quantify the options for retaining and transferring risk. We generate a set of potential risk financing options, each aligning with XYZ's insurance purchasing motivations and providing strategies with varying levels of risk transfer and retention. All available options are explored, from traditional insurance of varying limits and deductibles to various alternative risk financing mechanisms such as captive insurance.

Simplifying Assumptions

Our definition of the **Total Cost of Risk (TCOR)** includes only the expected retained loss and the premium costs for transferring that risk. While this provides a useful starting point for assessing risk financing options, occasionally this definition is incomplete and fuller consideration must be given to any additional costs and benefits that are material to a given strategy. Examples of adjustments could include claims management costs or other administrative fees, collateral costs, volatility charges, or potential cash flow benefits from self-insurance and other alternative risk financing mechanisms.

Each of these components could be incorporated into the TCOR equation for a more accurate comparison of risk financing strategies. For simplification, however, we exclude these complexities.

The Efficient Frontier

Using the model outputs from our prior white paper, *A Case Study Using Advanced Stochastic Modeling*, each option is evaluated quantitatively on the basis of both its cost (e.g., TCOR) and its risk (e.g., 99.6th Retained Loss Value-at-Risk). This produces the below chart from which we can derive XYZ's efficient frontier:

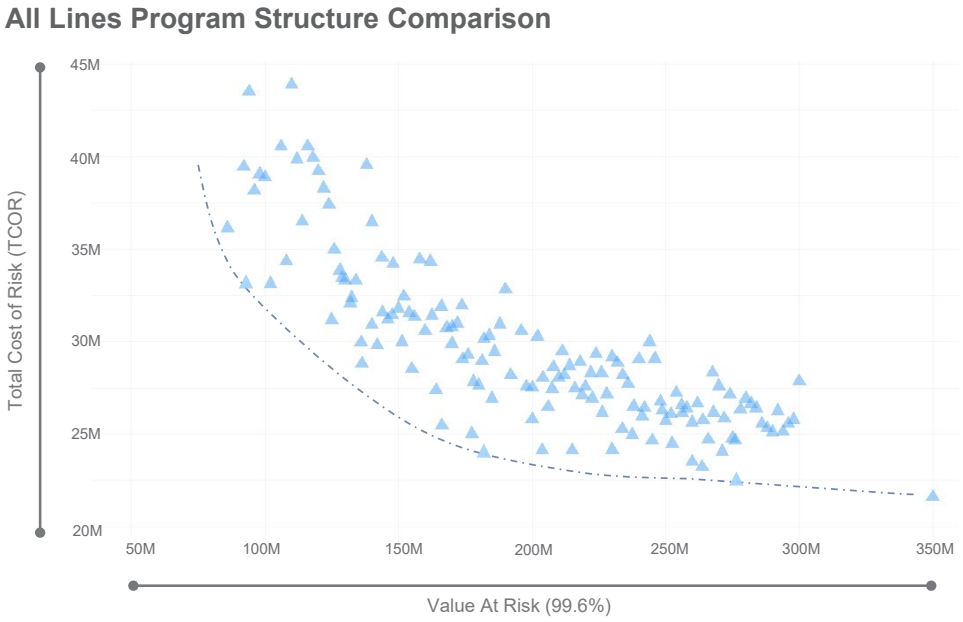

Figure 1: Program structure comparison for Company XYZ. Each data point compares a measure of expected costs (TCOR) to the associated risk (99.6 Value at Risk).

To simplify our evaluation, Company XYZ considers just three risk financing options – all falling on its generated efficient frontier – for its aggregate hazard risk once its current insurance program expires:

- Option 1 (Risk-Averse Approach): High amounts of risk transfer, e.g., low deductibles and/or higher limits
- Option 2 (High-Reward Approach): High amounts of risk retention, e.g., high deductibles and/or low limits
- Option 3 (Blended Strategy): Moderate risk retention and transfer

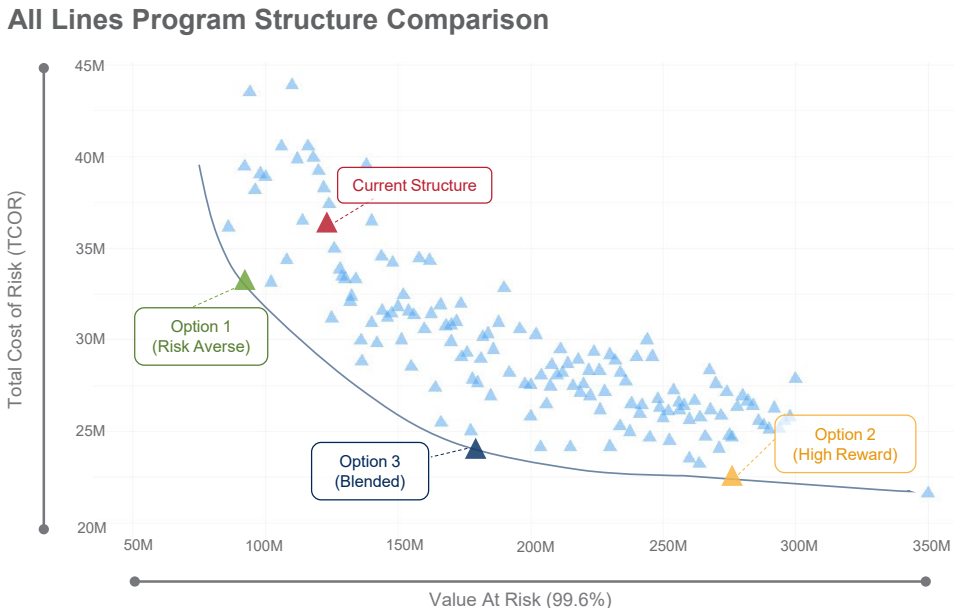

Figure 2: Program structures under consideration by Company XYZ.

Program Comparison

Which option should Company XYZ go with? Using our previously modeled outputs, let's compare each structure:

	Current Structure	Option 1 (Risk Adverse)	Option 2 (High Reward)	Option 3 (Blended)
Expected Retained Loss	$8.6M	$5.5M	$17.9M	$10.8M
+ Premium	$28.1M	$27.6M	$4.6M	$13.1M
Total Cost of Risk (TCOR)	$36.7M	$33.1M	$22.5M	$23.9M
@ Value at Risk (99.6%)	$122.2M	$91.0M	$278.9M	$179.8M

Table 1: Program Comparison Details.

Intuitively, these results make sense. The risk-averse option with the highest insurance amounts yields the highest TCOR, with the high-reward option being the lowest. While TCOR is an important component, the volatility of the risk must also be considered. A quick look at the 99.6th percentile reveals what a 1-in-250-year "bad" event would entail under each option. The risk manager, along with other key managerial stakeholders, must ask: how much risk is the firm willing to tolerate? How much reward (premium savings) is the firm willing to give up for a given reduction in risk and vice versa? Are the available risk-reward tradeoffs acceptable? The answers to these questions can be demonstrated by understanding and defining the hazard risk appetite.

Articulating Risk Appetite

Let us suppose that XYZ has conducted a financial analysis, considering varying levels of shock losses and their impacts on key financial metrics and industry benchmarks. Based on these findings, management determined their tolerance to be an earnings per share (EPS) drop somewhere between 20% to 25%. Through conversations with their insurance broker, this is translated into a clearly articulated risk appetite: a potential loss ranging between $170M to $190M, benchmarked against a 1-in-250-year event to represent an adverse and unlikely, but possible, scenario.

Of the three risk financing options under consideration for XYZ's restructuring, Option 3 (the blended strategy) aligns with its risk tolerance at the lowest cost. But what are the financial implications of transitioning from XYZ's current structure to Option 3? It's important to understand that there are two ways in which XYZ's current program is inefficient: first, in its risk-reward balance, and second, as a misalignment with XYZ's established risk appetite. We can quantify the TCOR inefficiencies of both components.

Risk Financing Cost Savings

1. Inefficient Risk-Reward Tradeoff

Any risk financing strategy subjects a firm to a certain degree of risk, which we've chosen to measure using the VaR(99.6%). As the efficient frontier chart shows, many other strategies subject Company XYZ to the same degree of risk as its current program but at varying levels of cost. This cost differential between strategies can result from a variety of sources, including but not limited to differing perceptions of risk or underwriting strategies among quoting carriers and varying insurer operational costs.

By moving to a strategy that falls on the efficient frontier (by definition, the set of risk financing options that reduces TCOR at a given risk level), XYZ reduces its risk financing costs with no additional assumption of risk. This is illustrated visually below:

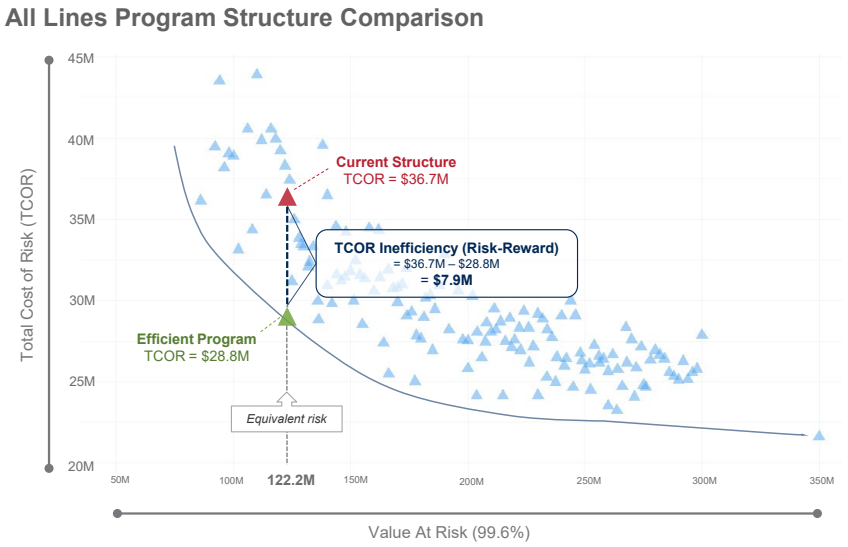

Figure 3: TCOR differences between XYZ's current structure and an efficient structure of equivalent risk.

2. Inefficient Alignment with XYZ's Risk Appetite

While all programs on the efficient frontier are indeed efficient, the curve's downward slope indicates that higher levels of retained risk, VaR (99.6%), correspond with lower costs. In a well-functioning insurance market, transferring risk typically increases a firm's TCOR, as insurance premiums often exceed the actual value of the transferred risk, including additional loads for capital charges, administrative overheads and underwriting profit margins. Particularly for emerging risks like cyber and at higher loss layers in large D&O towers, capital providers demand even higher margins to compensate for the additional risk.

By transferring risk in excess of what its risk tolerance would suggest, XYZ will find itself simply trading dollars with capital providers at disadvantageous rates: For every $1 of expected loss transferred, the cost to do so may be $1.30 or more. For a more financially efficient choice, it benefits XYZ to select a program in alignment with its risk tolerance. This is shown visually, moving along the efficient frontier to our selected strategy, Option 3:

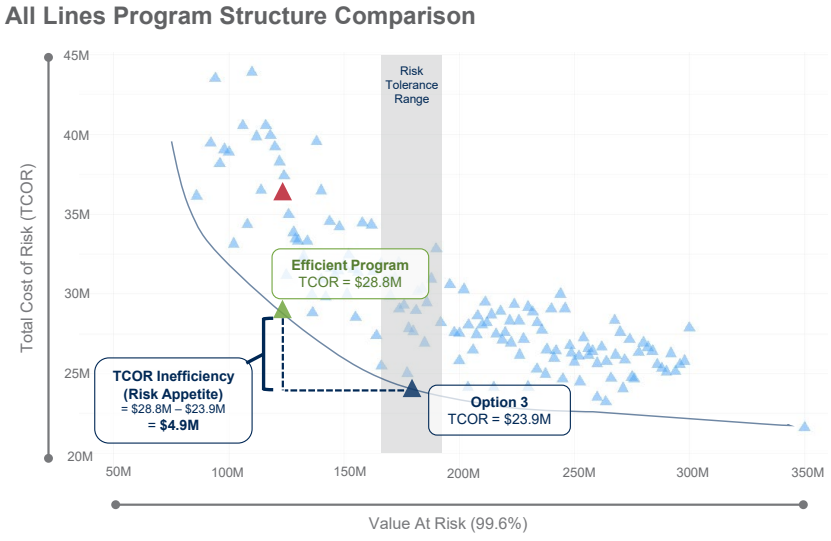

Figure 4: TCOR differences resulting from selecting an appropriate risk financing strategy in alignment with risk appetite.

Together, these two inefficiencies illustrate material risk financing savings:

Risk Financing Savings = TCOR Inefficiency (Risk-Reward) + TCOR Inefficiency (Risk Appetite)

= $7.9M + $4.9M = **$12.8M**

Of course, these savings can also be calculated by taking the difference in TCORs between the two program structures:

Risk Financing Savings = Current Structure TCOR – Option 3 (Blended) TCOR

= $36.7M - $23.9M = **$12.8M**

Given these substantial savings relative to its current structure and the alignment with its risk tolerance, Company XYZ ultimately selected Option 3 for its risk financing strategy. The other options could be eliminated due to either exceeding its risk appetite (Option 2 – High Reward) or an inefficient insurance transaction relative to the amount of risk that XYZ could bear (Option 1 – Risk Averse). As the case study demonstrated, selecting an optimal program structure along the efficient frontier requires the introduction of another variable: the company's risk tolerance. The techniques outlined in this white paper do not yield a "correct" strategy by themselves, but rather allow the firm to select an optimal solution in conjunction with its defined risk appetite. Armed with these analytical insights from their insurance broker and an understanding of their risk appetite, risk managers will be well-equipped to help develop a risk management strategy, communicate it to stakeholders and defend it confidently.

Conclusion

The case study illustrated for Company XYZ can be generalized to many companies and lines of business. Regardless of whether your company is a Fortune 500 company or a mid-size privately held firm with a significant hazard risk profile, quantifying exposures and defining risk appetite are essential to effective risk management. Using stochastic models to quantify a portfolio view of risk allows a firm to focus on maximizing enterprise value through a more efficient use of internal and external capital. Engaging with a Brown & Brown broker and their analytics team is a great way to apply these advanced analytics methods and help optimize your risk management strategy.

About the Author

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