Enterprise Risk Management and the Total Cost of Risk

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CREATIVE SOLUTIONS TO COMPLEX PROBLEMS

A Common ERM approach

- Identify risks
- Attempt to classify risks into high/low probability
- Attempt to classify risks into high/low severity
- Describe risk mitigation efforts
- Develop new risk mitigation strategies

Sample ERM Approach

	Risk Assesment (Unmitigated)		
Risk Category	Probability	Severity	Mitigation Efforts
Labor Disputes	High	High	Contract Negotiation
Currency Fluctuations	High	Medium	Currency Hedging
Workplace Accidents	High	Medium	Risk Controls/Insurance
Competitive Challenges	High	Medium	Research & Development
Supplier Failure	Low	High	Multiple Suppliers
Employee Dishonesty	Low	High	Internal Controls
Natural disaster	Low	High	Insurance
Terrorism	Low	High	Insurance
Serious Pandemic	Low	High	Administrative Policies/Procedures
Decreased demand for product	Medium	Medium	None
Increased Cost of Inputs	Medium	Low	None

This table illustrates what a typical summary from an ERM project at a manufacturer might look like.

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Different **risk categories**, often referred to as buckets, are **identified**.

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Serious Pandemic	**Low**	**High**	Administrative Policies/Procedures
Decreased demand for product	**Medium**	**Medium**	None
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Some **qualitative assessment** is made as to the **relative likelihood** and **potential damage** caused by the various categories.

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Current **mitigation efforts** for reducing the risk to the organization are **documented**, as well as additional items where current efforts are deemed inadequate.

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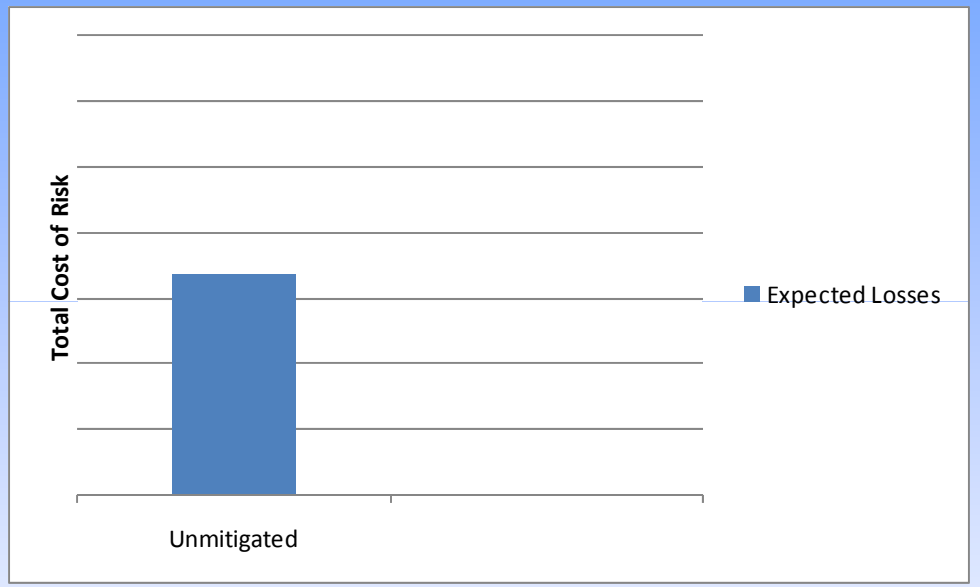
But are the mitigation efforts appropriate???

The Economics of Risk Mitigation

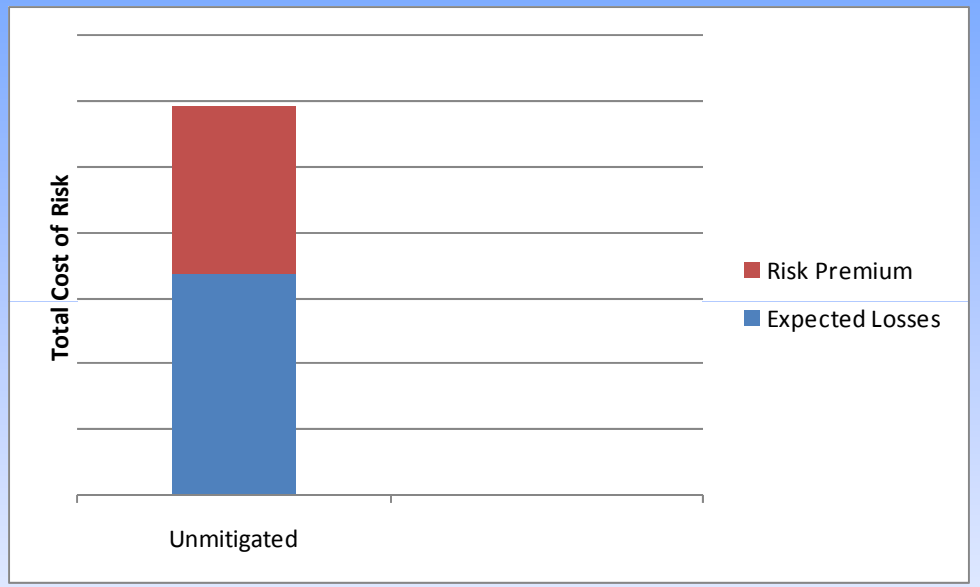
The first step to understanding risk mitigation is to quantify the **expected** loss from a particular event (i.e. probability multiplied by the financial impact)



The Economics of Risk Mitigation

The next step is to quantify risk aversion of the organization, specific to the risk category being considered. Let's refer to this amount as the **risk premium**.

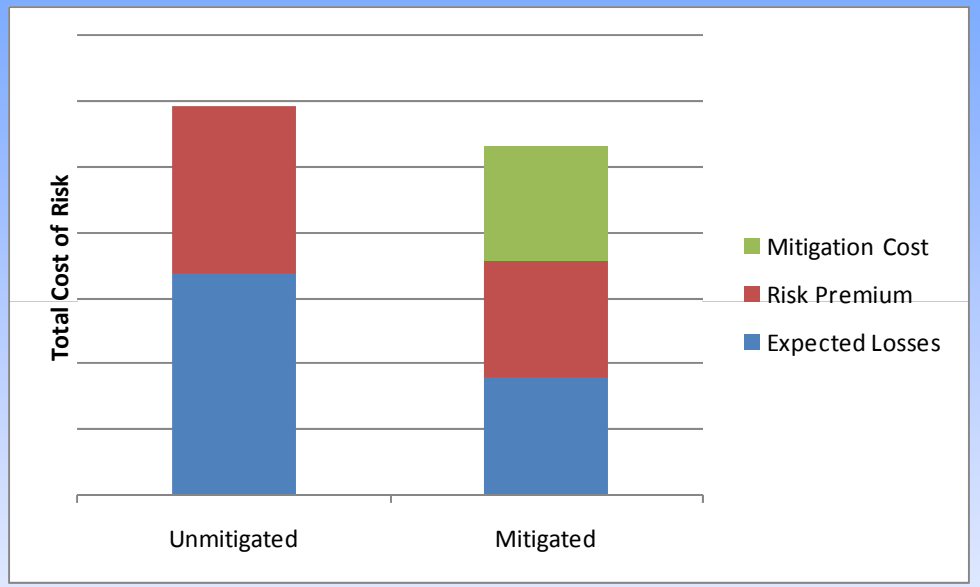
Taken together, the risk premium plus the expected losses, represent the total amount that the organization would be willing to give up in cash, to eliminate this risk.



The Economics of Risk Mitigation

Any mitigation strategy consists of three potential effects. It reduces expected losses, it reduces the risk premium, and it carries a cost.

If the new **total cost of risk** (net expected loss + net risk premium + mitigation cost) is less than without the mitigation strategy, the strategy **adds economic value**.

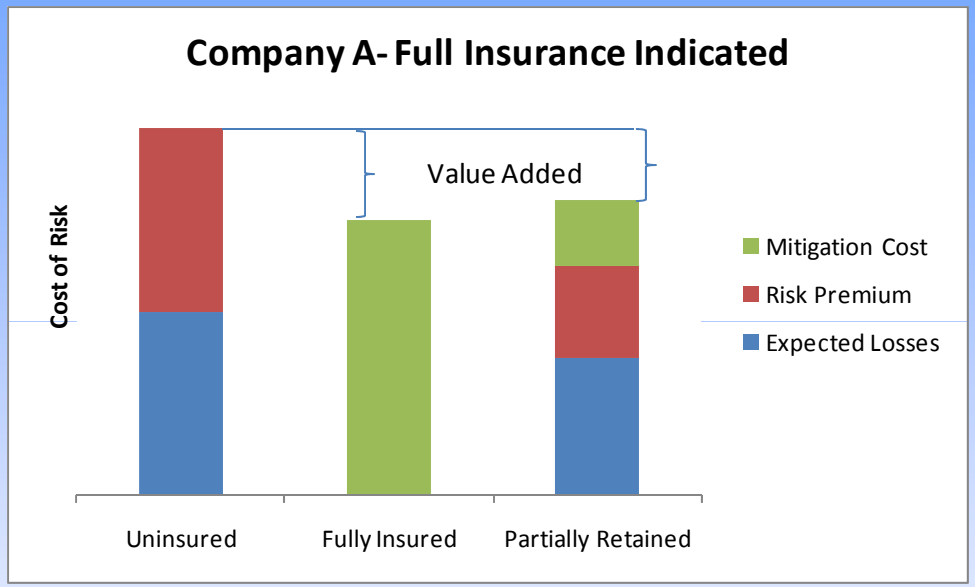


Comparison of Mitigation Strategies

In this example, we consider an insurable risk category.

The company not only has the option to insure or not to insure, but can also consider purchasing insurance in excess of self-insured smaller losses.

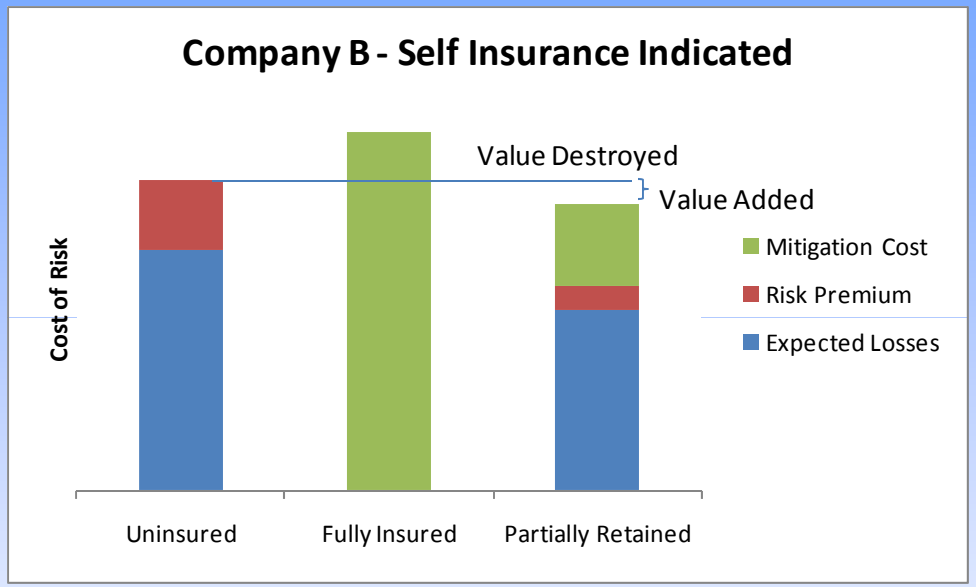
In this example, the risk premium is large relative to the expected loss, and the most economic value is created by fully insuring the risk.



Comparison of Mitigation Strategies

Let's assume there is a second company, with the same insurable risk, and the same expected losses, but the risk aversion is reduced, because the risk is more diversified against other operations of the company.

In this case, fully insuring the risk destroys economic value, while insuring only the larger losses creates economic value. The optimal retention is the one that maximizes economic value.



Quantification- Probability

- Start by ranking the risks subjectively. If multiple people are involved in the assessment, get their rankings separately, and then concentrate on the differences.
- Where established models exist for quantification, use them.
- Consider history where it is applicable.
- To make it easier to deal with small numbers, think in terms of the probability of occurrence over the next ten years.
- Use reference to other items on the list.

Quantification- Severity

- This will typically be easier than quantifying probability, as people can play out the scenario in their minds.
- Often it will be necessary to subdivide categories.
- The same sort of pre-quantification ranking can be useful.

Quantification- Mitigation Cost

- This is more straightforward than the either probability or severity quantification.
- In addition to cash out the door, do not forget to include internal costs such as time spent by employees as well as opportunity costs (ex. lost productivity as a result of added risk control procedure compliance).
- As noted earlier, there is usually more than one mitigation strategy to consider for a given risk category.

Quantification- Risk Premium

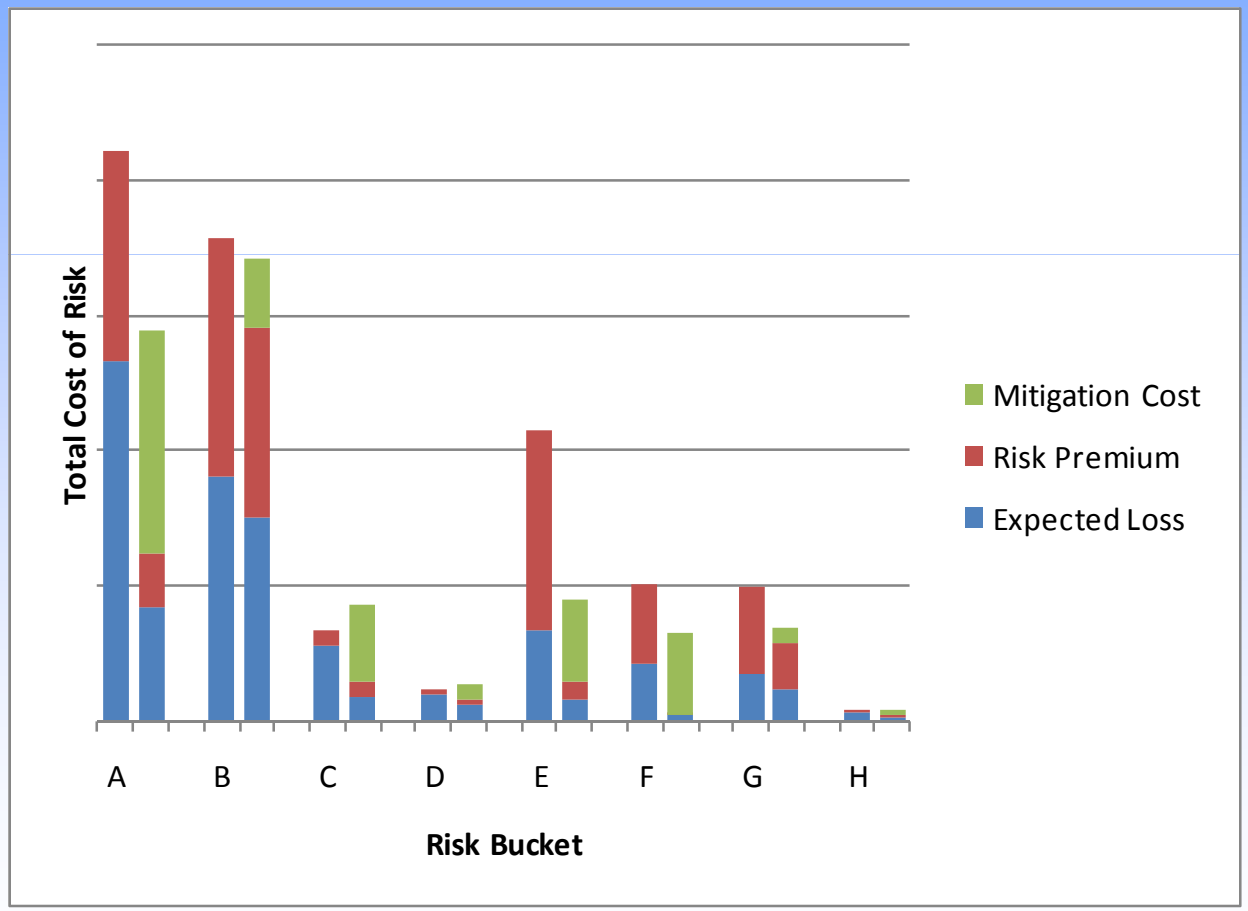
- Typically the most challenging to quantify, you might want to do it last.
- Should be considered on a marginal basis to the overall variability of the organization (i.e. reflect diversification).
- Can rely on probability and severity estimates (together with estimated correlation) for relative impact, but overall calibration tends to be more subjective.
- The calibration of risk premiums can be refined by considering the willingness to pay mitigation costs. (ex. We are willing to pay $X to eliminate the risk in category A. That means the risk premium for category A is at most $Y).

Quantification- General

- There is a general resistance to estimate highly uncertain amounts. But every time a risk mitigation action is taken, an **implicit estimate** has been made.
- Quantifying the estimate allows for greater discussion and debate, and also makes it less likely that inconsistent risk management decisions will be made.
- Remember the words of George E. P. Box, Statistician- **"Essentially, all models are wrong, but some are useful."**

Comparison of Risk Mitigation Activities

The different risk categories can be compared to each other graphically using this framework to consider the true gain or loss from potential mitigation efforts.



From a Management Exercise to True Risk Management

- **Most decisions** made at an organization have a potential impact not only on return, but also on risk.
- To do more than pay lip service to ERM, the results of an analysis should factor into decisions that are made on a **daily** basis, not just once a year or on an ad-hoc basis.
- Good **internal management reporting** should reflect the true cost of risk implicit in decisions made, as part of the total picture.
- This means where **bonuses and incentives** are paid to those in a position to affect risk, the true cost of risk should be included in the equation.

Timeliness of True ERM

Compensation committees should conduct and publish risk assessments of pay packages to ensure that they do not encourage imprudent risk-taking. At the same time, firms should explore how they can provide risk managers with the appropriate tools and authority to improve their effectiveness at managing the complex relationship between incentives and risk-taking.

Statement Issued by
U.S. Treasury Secretary Tim Geithner
on Compensation
June 10th, 2009

The Problem with Risk Constraints

- Often ERM is framed as follows: Maximize profits subject to a constraint on risk.
- Problems
  - Specification of the risk constraint
  - No guidance provided when risk constraint has not been reached (risk grows unfettered)

Lack of Guidance Example

- Two competing projects
  - One project has a 50% probability of generating a profit of $2 million and a 50% probability of breaking even
  - The other project has a 100% probability of generating a profit of $1 million
  - Neither project will result in the company exceeding its risk constraint
- The second project is clearly preferable, but no guidance is given by the risk constraint approach.
- In an ideal world, the choice between the two projects would be obvious. In reality, the two projects could be considered in completely disparate departments of the company, so that the fact that there even is a choice becomes obscured.
- A recognition of the additional risk in the first project as a cost in internal management reporting would avoid this problem.

The Problem with Risk Constraints

- Often ERM is framed as follows: Maximize profits subject to a constraint on risk.
- Problems
  - Specification of the risk constraint
  - No guidance provided when risk constraint has not been reached (risk grows unfettered)
  - By its very nature, such a system will tend towards the constraint.
  - As the constraint is arrived at (most likely exceeded), a shift from non-action to crisis mode could occur.

Risk Premium as a Function of Total Risk Measure

- Rather than a “cliff” type of constraint, consider using a risk premium as a function of some variable risk measure.
- Examples (Total Risk Load)
  - 0.1 * Standard Deviation(Company Results)
  - 0.2 * Company Value at Risk (5%)
- The guidance that is offered by a particular risk constraint can be tested, and if necessary, then recalibrated.
- As the risk level in the organization changes, the risk load involved with mitigation or other transactions would adjust gradually.

Key Points

- Translation of risk into a financial cost is an important tool for assessing and managing risk
- Subjective estimates of the costs of risk are OK. They help to focus discussion, reveal hidden lack of consensus, and frame decisions.
- Building the cost of risk into day to day management is possible, and has the potential to yield significant benefits.