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Risk Appetite

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RISK APPETITE IS a relatively new term that has arisen as the fields of financial and enterprise risk management have developed. Although sometimes equated with risk tolerance or risk threshold (Chapman 2006), risk appetite is much more complex than these alternatives. Risk tolerance and threshold imply that risk has only a negative or painful aspect and that there is a certain amount of risk that can be borne, and no more. Risk appetite recognizes that risk has a positive element as well, and not just a downside, so the decision about assuming risk involves much more than simply measuring potential negative results.

Risk is generated whenever there is uncertainty concerning an outcome. The range of potential outcomes in a risky situation can

- encompass only positive values (an unknown rate of return on an investment with a minimum guarantee),
- be only neutral or negative (the possibility of a liability claim),
- or be positive or negative (the return on an equity investment).

As long as the outcome is not known with certainty, risk is involved.



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Risk appetite functions much the same as your appetite for food. Right now you may be hungry for one type of food, but not another. You could never imagine eating much salt, mustard, Worcestershire sauce or other condiment separately, but in combination with other foods these seasonings make a dish much more appetizing. Taste is an important factor affecting your appetite for a particular food; some people enjoy certain tastes, whereas others cannot tolerate those same tastes. There are also negative elements of food that affect your interest in eating them—calories, cholesterol, transfat, additives. What you want to eat reflects your appetite as well as constraints on consumption.



Risk appetite reflects the multiple dimensions of risk in a very similar way. Companies have a taste for certain types of risk that others may avoid. This can be due to past favorable experience, specialized expertise or how a risk fits with other aspects of their operations. Few companies would be willing to accept the unlikely but possible loss of \$1 million in the event of liability claim to an individual in return for a payment of only a few hundred dollars, but to an insurance company with a large book of personal umbrella policies this risk could be welcome. A contract based on the future value of sugar would be avoided by most organizations, but large bakeries or other food processors might find this to be an effective way to reduce the uncertainty of future production costs, and sugarcane and sugar beet growers can find this contract an equally useful tool for hedging profits.

Risk appetite considers the entire probability density function (PDF) of a potential endeavor, as well as its effect on the shape of the PDF the organization. Consider a risk in which an organization pays \$3 million each year and loses it entirely 37 out of 38 years (approximately 97.4 percent of the time). However, there is a 1 in 38 chance that the organization will receive \$108 million as a payoff. The expected value of this investment is a negative \$157,895, or approximately -5.3 percent. This doesn't appear to be a very attractive investment opportunity for an organiza-

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tion. In fact, this is equivalent to playing roulette with 38 numbers (1-36 plus 0 and 00) and betting a single number with a payoff of 35 to 1, not something most organizations would do with their capital. However, the same odds could also apply to a catastrophe reinsurance treaty that pays off approximately once every 38 years. In this event an insurer may very well purchase this contract for \$3 million, despite its negative expected return and the 97.4 percent chance that it will receive nothing in return. By reducing the effect of a catastrophe on the company in the unlikely event that a major disaster occurs, this could be a useful investment.

Therefore, an organization’s risk appetite is based on the distribution of aggregate results of the organization considering all risks the organization faces—hazard, financial, operational and strategic. However, just as an appetite is not based on any one single factor, risk appetite is a function of multiple characteristics relating to this distribution. Some stockholders (such as hedge funds with their asymmetric compensation structure), and most option holders view the possibility of a large payoff that would significantly increase the stock price very positively, even if the expected value of the investment that may generate this large payoff is lower than alternative investments. Stockholders are also concerned about the expected value of the stock price, and that is influenced, at least in the short term, by whether reported earnings meet or exceed expectations. Some stockholders focus on the stock price in the short term (for example, mutual funds that report returns quarterly). Therefore, any risk that could impact earnings by enough to cause the stock price to drop in the short term would be a concern. Thus, a company might have a constraint on risk such as the chance of a decline in earnings of more than five cents a share has to be less than 10 percent. Other stockholders are more concerned with the long term outlook for the stock. For these investors, stock price volatility in the short run is acceptable if it improves the long term prospects. Other factors that go into the risk appetite from the point of view of stockholders would be the chance of a ratings downgrade, the chance of breaching bond covenants and the chance of bankruptcy.

Other stakeholders in a company would have additional considerations regarding risk appetite. In addition to the

chance of bankruptcy, bondholders are concerned about the extent of their losses in the event of a bankruptcy. They would be concerned about the chance of losing more than, for example, 20 percent of their investment or the chance of receiving nothing. Other creditors of a firm may only be concerned about the company’s short term viability so that payments for services rendered can be made. Salaried employees may not be concerned about the stock price, unless they hold company stock as part of a 401(k) plan, but they would be concerned about the possibility of layoffs at the firm. Employees who receive bonuses would be concerned about financial results impacting the level of bonuses. Long-term employees in companies with defined benefit pension plans would be concerned about any outcome that would lead the company to terminate this plan, preventing them from continuing to accrue benefits and increase their salary on which their pension will be based. Society at large could also be concerned about the risk appetite of an organization if a bankruptcy could shake confidence in an entire industry (such as a bank), has so much counterparty risk that bankruptcy could cause a domino effect (Bear Stearns), or could impact employment at many suppliers (General Motors).

There is no single value that can be used to determine a firm’s risk appetite. If it were, then stochastic dominance could be used to decide which risks to accept and which to avoid.¹ Risk appetite must consider the income statement for measuring the effect of a risk on earnings, the balance sheet for determining the impact of risk on key financial ratios, and even off balance sheet items that could affect an organization’s financial position.² Thus, risk appetite has multiple dimensions that are based on multiple sets of financial data.

Responsibility for sorting out all of the competing interests relating to the risk appetite nominally falls to the board of directors. However, the board faces significant hurdles in making this determination. The first hurdle

FOOTNOTES:

¹ See Bawa (1975) for a full explanation of stochastic dominance and D’Arcy and Gorvett (2004) for an insurance application.

² Off balance sheet items caused significant losses for Enron on energy futures and Citigroup and Merrill Lynch on collateralized debt obligations.

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would be a lack of expertise in making complex decisions under the level of uncertainty the risk appetite entails. As Enterprise Risk Management is an emerging field, there are no clear guidelines for making this determination, and the types of risks organizations face can be unfamiliar to many, if not all, directors. For example, Citigroup's foray into complex credit derivatives generated risks that evidently no directors fully understood. A second hurdle is that the board typically includes some inside directors who hold significant stock options. Based on the asymmetric payoffs of options, it would be in their best interest to accept investments that could produce large payoffs, even if that increased the risk of significant losses. A third hurdle is that the distribution of outcomes the firm faces cannot be displayed by a single distribution of any one of the financial documents that affects risk appetite. Even if a firm had a model that integrated all aspects of risk into a single measure, and then produced a distribution function for a particular financial variable based on multiple stochastic simulations using that model, the resulting pdf would not provide enough information for a board to use to determine the risk appetite. The model would produce results based on a single set of assumptions for a large number of parameters. For example, assumptions about interest rates, likelihood of default on bonds, expected growth in markets, loss frequency, and many other factors. However, if the expected values or the volatility of each were to change, such as interest rates were to become more volatile than the base case parameters indicated, then the results could be significantly different.

Given the complexity of the entire process and the potential conflicts of interest that board members reflect, there is a critical need for transparency about a firm's risk appetite. The optimal process for dealing with risk appetite would be for each organization to include the firm's selected risk appetite in published financial documents. Key elements that should be included in this report include what factors are used to determine the organization's risk appetite, what target levels apply and details about key parameters that go into the model.

Although some firms may object to providing this information to the public, either for competitive reasons or to prevent shareholders from knowing the risks the company is assuming, this reluctance could be dealt with in two

ways. Either regulators could require that this information be provided, or it could be optional. If optional, then companies failing to disclose this information may find their value adversely affected if shareholders consider this information to be important. Given recent events and the level of risk aversion investors are currently displaying, it is likely that failure to disclose a firm's risk appetite could lead to a significant market penalty.

An example of the information that should be disclosed is listed below. Use of a consistent format, by regulation or standards of practice, would be necessary to allow for meaningful comparisons to be made.

Our firm used a stochastic model to incorporate all of the significant measurable risks that we face. The key variables that affect results include interest rates, equity returns, GDP growth in the United States and Canada, and housing prices. The equations used to simulate these variables and the base case parameters are ...

Based on base case estimates for expected values and volatilities of key parameters, our risk appetite is as follows:

- 1. Expected return on capital is to exceed 10 percent over the risk free rate*
- 2. Chance of an increase in earnings per share of more than 50 percent is at least 10 percent*
- 3. Chance of a reduction in earnings more five cents a share is less than 25 percent*
- 4. Chance of a ratings downgrade is less than 10 percent*
- 5. Chance of failing to meet all current bond covenants is less than five percent*
- 6. Chance of bankruptcy is less than 0.5 percent*

Sensitivity analysis has been performed on all variables to determine the impact of deviations from the expected values. For those variables having a significant impact on results, a Delphi approach has been used to determine the highest likely values for those parameters, and the model has been rerun. The highest likely values for the parameters for which the model is most sensitive are...

Based on highest likely levels for expected values and volatilities of the critical parameters, our risk appetite is as follows:

1. *Expected return on capital is to exceed three percent over the risk free rate*
2. *Chance of an increase in earnings per share of more than 25 percent is at least one percent*
3. *Chance of a reduction in earnings more five cents a share is less than 50 percent*
4. *Chance of a ratings downgrade is less than 25 percent*
5. *Chance of failing to meet all bond covenants is less than 15 percent*
6. *Chance of bankruptcy is less than three percent*

Once this information is made public, stakeholders in the organization can either work to change any of the criteria with which they disagree or to terminate their stake in the organization. If any of the parameter estimates seemed unreasonable or were out of line with what other firms were using, then the market value of the firm would likely adjust to reflect a more appropriate level. Two obvious

arguments against providing this information are the complexity and cost. This process, once in place, would be no more complicated than the pension determinations required under ERISA for defined benefit plans. There is substantial literature that supports the beneficial effect for financial markets of disclosing pension obligations. For the cost objection, although it would be costly, it would likely be less costly, and much more beneficial, than the additional auditing requirements established by Sarbanes-Oxley, and, if these reporting requirements had been in place, they would have prevented the credit derivative debacles that investment banks experienced in recent years. Risk appetite is a critical and complex issue, and should not be left to the board of directors to determine in private, given the potential conflicts of interest. Only by full and consistent public disclosure of the choices a firm is making relating to risk, can adequate oversight be provided, and confidence in the financial markets restored. ♦

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