



Creating and using ratings for all risks

Summary

Risk has been measured using ever more complex mathematical and statistical methods. While these may be well suited for market risk or credit risk, other risk types do not lend themselves to such treatment. There are, however, simple ways to develop and use risk ratings for any type of risk, even for the hard ones like reputational risk, operational risk or business risk. These concepts are now in use in several institutions and are generally more successful than the attempts to force these risk types into the straightjacket of higher mathematics. It is argued that ratings (and more specifically the rating *models*) are not just nice to have, but are also necessary to develop those scenario's that the risk community expects so much from.

Dear Reader,

Rating agencies have become suspect partners in the eyes of many. Part of this is due to the blind faith that people had in their findings, not in the usefulness of ratings per se. Evidence of this is that the opposite sentiment, namely to do away with ratings, makes no sense at all. Rather, ratings and rating models just need to be used sensibly. If we acknowledge the characteristics of ratings, they can be used most profitably in areas where more sophisticated modeling is not available.

Black and white ratings

For all the bad press ratings get, they are still ubiquitous. Everything under sun seems to get a rating. Not only do investment products or credit card applications get rated, but so do restaurants, hotels, wine, movies, ability to play chess, and best companies to work for. The reason is obvious: ratings are very simple to interpret. A pleasant property is that rates are *relative* measures, on a scale that does not need to be quantitative. We know that a restaurant with two Michelin stars is superior to a restaurant with one, although the intrinsic value of the stars is undetermined. Many ratings are presented to us as a 'black box'. We have no idea what raw data goes into the formula, or even what the formula itself is. Sometimes, as in the case of Michelin stars, we do not even know what the output represents.

The ratings that come in a 'white box' (i.e. where we get to see the model, what data goes into it and what the formula itself is) are extremely useful for risk management purposes. Given this extra information, rates are also simple to apply. By applying, I do not mean the blind following of the outcome of the rating (as with the Michelin stars or the rating agency's rating for CDOs), but quite the reverse, using the rating *model* as a starting point for an *analysis* of risk.

Creating a simple rating

What makes a rating so attractive for those hard-to-measure risks, is that a rating scale can be created using diverse, non-linear, even qualitative data. Creating a rating model is an art and after creating a rating mechanism, it will need frequent refinement. The creation starts by defining the rating scale. Surprisingly, it does not really matter what scale we use at this stage. We can assign stars, numbers, colours, high-medium-low, purposefully obfuscating scales such as ranges from



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AAA to F, or anything else that takes our fancy. This feature makes it extremely useful for hard-to-measure risks¹; we do not need to worry about the dimension of our risk.

Once we have selected a scale (e.g. high-medium-low) for the dependent variable (say the amount of business risk), the next step is to gather data on a number of independent variables that are assumed to correlate with the degree of business risk. Note that there does not need to be a causal relation, it is enough that the data we gather is strongly correlated with the risk we wish to rate.

Note that these independent variables are typically much easier to quantify. In this case, e.g., historic wholesale prices, number of direct competitors in the area, levels of unemployment etc. Each of these variables can be associated with the level of business risk. A very simple way to do this would be to compute the simple correlation coefficient for each variable. The combination of all simple correlations can be used to narrowly determine the level of risk for any given combination.

Using the rating model: Scenario's and 'expert models' for everybody

Rating models that have been constructed this way serve a range of purposes beyond the easy quantification. They also allow for a simple tool building, developing scenario's and performing back tests. Still bypassing causality, we can build an engine that uses the basic observable data to compute the associated (unobserved) risk level. This can in turn be used as a starting point to create realistic scenario's which may be extrapolated beyond the observed range of the original risks. This is a hard problem for risk managers: developing realistic yet extreme scenario's that will get acceptance from the risk community: both within the firm and from the regulatory side. An acceptable rating model is a necessary requirement for answering both questions regarding scenario's. The scenario's can now be built to show *how* they differ from the observed relations and in what aspects they differ from the observed range of variables, irrespective of the chosen risk language.

A second use of rating models is as everyman's expert model. The simple correlations allow for decision trees that can be used without any special knowledge². These should be used in training settings for bank managers and boards about risk. It can help in *understanding* the risk and for discovering causality (or lack of it) for experts and non-experts.

Final remarks

Developing a white box rating model is one way to revive moribund risk disciplines. The good news is that it is feasible, it can be achieved cheaply as well as fast and has many uses.

¹ Note that the main rating agencies also use a fanciful combination of letters and symbols to rate a supposedly highly quantitative measure, namely credit risk. It implies that credit risk is in fact also a hard to quantify concept.

² Two excellent examples can be found at the website of the US Financial Industry Regulatory Authority FINRA. There, the simple characteristics of frauds have been turned into a so-called 'scam-meter' and a 'risk-meter' showing the general public whether they are likely to be tricked into an investment and what risk they run of being conned: <http://apps.finra.org/meters/1/scammeter.aspx> and <http://apps.finra.org/meters/1/riskmeter.aspx>