

Swiss Finance Institute Practitioner Roundups



Intrinsic Risk Measure: The More Direct Path to the Acceptance Set

Intrinsic risk measures use only internal resources, returning the smallest percentage of the currently held financial position that must be sold and reinvested in an eligible asset such that the resulting position becomes acceptable. This new approach incorporates the acquisition of necessary capital and yields a more direct path to the acceptance set.

Risk and the quantification of risk have always been and will always be an important part of our human existence. In the financial world, it is a central task to hold positions that satisfy certain acceptability criteria, whether they represent an investor's own preferences or are of a regulatory nature.

It was understood early that diversification plays a key role in the reduction of risk. Following the appearance of early value investing methodologies—including, for example, those of Benjamin Graham and Warren Buffett—Markowitz was one of the first to formalize the concept of diversification. In the mid 1990s, JP Morgan introduced “value-at-risk”, which went on to be used as a market risk capital requirement by the Basel Committee. This changed the nature and the application of risk measures in practice as risk could now be interpreted as an actual monetary amount.

“Most extensions to, and generalizations of, monetary risk measures have the same basic idea.”

In 1999, P. Artzner, F. Delbaen, J. Eber, and D. Heath axiomatized the term “coherent risk measures”, or more generally, “monetary risk measures”. The notion of acceptance sets allowed these authors to determine the meaning of “good” and “bad” positions. Monetary risk measures refine this differentiation and rank financial positions outside the acceptance set with respect to a specific distance from the set. Since then, many extensions and generalizations have been developed. But most of them have the same basic idea: Given an unacceptable position, several units of an accepted eligible asset are bought and added to make the overall position acceptable.

This hypothetical additional investment defines monetary risk measures: “The current cost of getting enough of this or these [commonly accepted] instrument(s) is a good candidate for a measure of risk of the initially unacceptable position” (Artzner, Delbaen, Eber, and Heath, 1999, p. 205). This seminal idea not only allows one to rank financial positions according to their risk, it also suggests a procedure via which an unacceptable position may be made acceptable. Referring to cash additivity, Artzner, Delbaen, Eber, and Heath (1999, Remark 2.7) claim that, “by insisting on references to cash and to time, [...] our approach goes much further than the interpretation [...] that ‘the main function

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The full paper can be found at <http://bit.ly/2hgFWLv>.

Key Words

Acceptance sets
Intrinsic risk measures
Monetary risk measures
Value-at-risk

of a risk measure is to properly rank risks.” However, in order to truly go beyond ranking risks and to apply this procedure, one must carry or raise the monetary amount suggested by the risk measure. This can be a difficult task in practice and it raises the question of to which extent this method is applicable and how the acquisition of additional capital can be incorporated into the risk measure.

“Monetary risk measures do not entirely account for the acquisition of capital.”

Artzner, Delbaen, Eber, and Heath (1999, p. 205) also propose another approach: “For an unacceptable risk [...] one remedy may be to alter the position.” The aim of this new research paper is to develop this thought and thus approach a new class of risk measures, which we will call intrinsic risk measures. These risk measures allow only the usage of the internal capital contained in the financial position. We propose using a pre-specified amount of available capital, the current value of the financial position, and investing it in an eligible asset.

This definition preserves standard properties such as monotonicity and quasi-convexity, which allows the ranking and comparison of financial positions. But it also has two simultaneous effects on the altered position. Firstly, selling parts of a position, we reduce the potential risk therein. Secondly, we invest the acquired capital in an eligible asset, which by definition has acceptable risk. So this methodology requires one to devote attention to the initial value of a position and its interplay with the desired eligible asset. It suggests a new way of shifting unacceptable positions toward the acceptance set. Selling part of the position and investing it in the eligible asset results in a convex combination of the two positions. This means that intrinsic risk measures are based directly on the diversification principle, instead of on a simple sum of assets.

“Intrinsic risk measures provide a more direct path toward acceptability.”

Another consequence is that the capital involved is bounded by the value of the initial position, and thus, infinite risk values never arise, in contrast to monetary risk measures. Moreover, the primary task of producing acceptable positions when working with acceptability criteria is emphasized and only unacceptable positions are altered.

Under conic acceptability criteria—that is, where acceptability is independent of a position’s size, as is implemented for example by value-at-risk or the expected shortfall framework—the intrinsic approach requires less capital in order to reach acceptability and at the same time yields financial positions with the same performance.

“Less nominal value is needed in the acceptability adjustment procedure and positions with the same performance are reached.”

Intrinsic risk measures allow us to extend the scope of applications, while concentrating on the primary objective of reaching acceptability starting from an unacceptable position.

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