



A COMPARATIVE ANALYSIS OF SOME RISK ADJUSTMENT RULES

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Introduction

- Risk adjustment of returns and performance measurement is of great interest to financial institutions around the world today.
- Risk adjustment process is meant to find a common measure that would enable to compare achieved results and risks taken of different portfolios of securities, structural units or even companies. Risk adjustment measures/rules can help to solve a number of practical problems, such as:
 - Business valuation,
 - Setting of financial goals and measurement the level of attainment of financial results,
 - Development and implementation of reward and motivation systems,
 - Making decisions of capital allocation, etc.

Introduction (cont.)

- The topic of risk adjustment has not extensively analyzed by researches in the context of banking sector. J.L. Treynor (Treynor, 1965), W.F. Sharpe (Sharpe, 1966) and M. Jensen (Jensen, 1968) were among the pioneers of this research field. Classical risk adjustment rules were reviewed and summarized by F.K. Reilly and K.C. Brown (Reilly et al., 1999), K. Dowd (Dowd, 1999; Dowd, 2000) also contributed to the field considerably.
- The application of RAROC measures in a banking sector was analyzed by Ch. Matten (Matten, 1996), M. Crouhy, D. Galai and R. Mark (Crouhy et al., 2000), and Ph. Jorion (Jorion, 2001).

Introduction (cont.)

- The aim of this presentation is to compare different risk adjustment rules, their key points and limitations/ weaknesses, and specific features of application, and also try to reveal the risk adjustment measure that can help to maximize the creation of shareholders value.
- The goals of the presentation are the following:
 - To present the concept of risk adjustment,
 - To perform the comparative analysis of risk adjustment rules, reveal their decision criteria, key points, advantages, limitations/weaknesses and specific features of application.

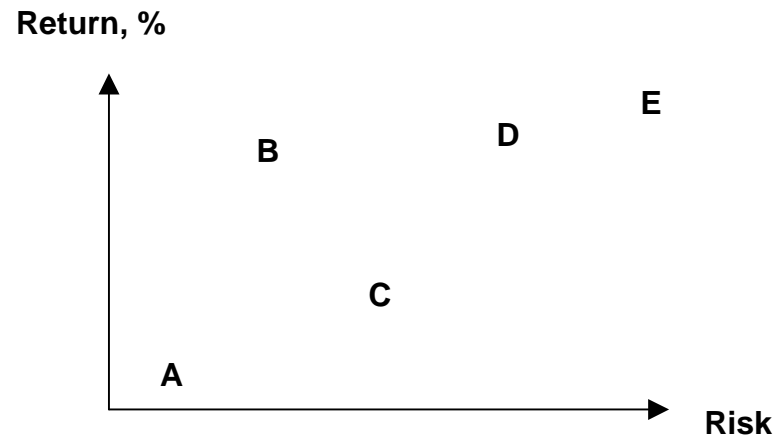
The concept of risk adjustment

- Management of financial institutions and their shareholders seek to see real picture of financial results because it is important what risks bearing certain financial results were or will be achieved.
- Financial results and risks taken are being combined through the concept of risk adjustment.

The concept of risk adjustment (cont.)

- Risk-adjusted measurement may have two aspects:
 - Measurement of alternative investment opportunities before decisions to invest are made.
 - Measurement of investment returns after decisions to invest are made, when the results of decisions are already clear.

The concept of risk adjustment (cont.)



By return	By risk	By risk-adjusted return
E	A	B
D	B	D
B	C	E
C	D	C
A	E	A

The need for risk adjustment and performance measurement

- Enables us to compare the returns associated with different level of risk.
- Guides management in allocating internal capital and setting position limits, and also in developing strategic plans.
- Helps in framing appropriate compensation rules.

Risk adjustment rules

Rule	Decision criterion/key points
Treydnor rule	Choose position with higher Treynor ratio, where Treynor ratio is ratio of risk premium to position over measure of risk expressed as beta of a specific position. Assumes completely diversified portfolio.
Sharpe rule	Choose position with higher Sharpe ratio, where Sharpe ratio is ratio of risk premium to position over measure of risk expressed as standard deviation of returns of a specific position.
Traditional Sharpe rule	Choose position with higher Sharpe ratio, where Sharpe ratio is ratio of difference between return to position and return to benchmark, over standard deviation of this difference.
Jensen rule	Choose position with positive regression intercept included in CAPM expression. The intercept will be positive when a portfolio manager achieves better returns than the aggregate market.

Risk adjustment rules (cont.)

Rule	Decision criterion/key points
Information rule	Choose position with higher information ratio, where information ratio is ratio of return to standard deviation of return.
Treynor-Black rule	Use Traditional Sharpe ratio squared.
Generalized Sharpe rule	Choose position with higher generalized Sharpe ratio, where generalized Sharpe Ratio is traditional Sharpe ratio applied to new position plus existing portfolio. Gives correct answer subject to some limitations.
RAROC	Choose position with highest ratio of return to Value at Risk.

Risk adjustment rules (cont.)

Rule	Advantages	Limitations/weaknesses
Treydor rule	<ul style="list-style-type: none">•The first to combine returns and risk of an aggregate market.	<ul style="list-style-type: none">• Subject to generic weaknesses of CAPM.• Assumes that an existing portfolio is fully diversified, hence, systematic risk is taken into account only.• Applies to mean-variance world.
Traditional Sharpe rule	<ul style="list-style-type: none">•Accounts for both, returns and the level of diversification of portfolio.	<ul style="list-style-type: none">• Subject to generic weaknesses of CAPM.• Assumes zero-correlations of candidate positions with existing portfolio.• Applies to mean-variance world.

Risk adjustment rules (cont.)

Rule	Advantages	Limitations/weaknesses
Jensen rule	-	<ul style="list-style-type: none">• Subject to generic weaknesses of CAPM.• Applies to mean-variance world.
Information rule	-	<ul style="list-style-type: none">• Subject to generic weaknesses of CAPM.• Misleading, because it does not account for the cost of funds.• Applies to mean-variance world.

Risk adjustment rules (cont.)

Rule	Advantages	Limitations/weaknesses
Treynor-Black rule	-	<ul style="list-style-type: none"> • Subject to generic weaknesses of CAPM. • Less informative than traditional Sharpe ratio, because squaring obscures information. • May be misleading. • Applies to mean-variance world.
Generalized Sharpe rule	<ul style="list-style-type: none"> • Accommodates any correlations of candidate positions with existing portfolio. 	<ul style="list-style-type: none"> • Subject to generic weaknesses of CAPM. • Applies to mean-variance world.
RAROC	<ul style="list-style-type: none"> • Captures basic features of any risk adjusting measure 	<ul style="list-style-type: none"> • Very biased towards safe positions. • May be misleading if portfolio includes relatively safe positions.

Conclusions

- While measuring returns of alternative investments *ex ante* or investments *ex post*, it is important to account not only for expected or achieved returns, but also for expected or taken the level of risk. This sort of analysis may be carried out using risk adjustment rules.
- All risk adjustment rules may be divided into two groups:
 - Rules based on Capital Assets Pricing Model, and
 - Rules based on RAROC type measures.

Conclusions (cont.)

- The RAROC approach in some cases may be misleading and may lead to misleading decisions that could conflict with shareholders value creation that is the main goal of any private financial institution.
- A generalized Sharpe rule seems to be superior to others.

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