

Efficient frontier

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Content

- 1 The set of admissible portfolios
- 2 Indifference curves
- 3 The set of efficient portfolios

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Shape of the set of admissible portfolios

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 - Wealth is defined

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 - **Assets are divisible without limits**

Indivisible assets

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- Variants of possible portfolios are determined/limited by *pseudo*-short sell

Two components portfolio - Basic concept

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$$\rightarrow w_2 = 1 - w_1$$

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A multi-component portfolio

Expansion to **three** assets ...

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Expansion to **three** assets ...

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$$r_1 = 3, r_2 = 4, r_3 = 5$$

$$\sigma_1 = 4, \sigma_2 = 5, \sigma_3 = 6$$

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, by

$$\rho_{1,2} = -1, \rho_{1,3} = 0, \rho_{2,3} = 1$$

3-assets Portfolio with varying proportions



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With the help of R ...

Combination of a risky and a risky-free assets

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- Properties of ICs:
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 - A rational investor prefers portfolios from higher IC

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- IC has a **convex** shape, which is given by the following axioms:
 - Axiom of **IN-SATURATION**
 - Axiom of **RISK AVERSION**
- All investors are **risk averse**, but the level of aversion is **individual**

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- Definition of the **effective** set:

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