4th NUS Workshop on Risk & Regulation
(4th R^2 Workshop)
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Motivation: Hotelling’s rule

Hotelling’s rule: In a deterministic and competitive market with constant marginal extraction costs, the net price of an exhaustible resource grows at the interest rate.
Figure: Three asset example: the portfolio weight of each asset as a function of uncertainty level.
\[ S \in [X_i, X_{i+1}], \quad (1) \]
The risk: financial system as a whole is susceptible to failures initiated by the characteristics of the system itself.

Local and global interaction channels:
- Direct liabilities, cross-holdings, fire sales and bankruptcy costs.
We analyze the impact of interaction channels through numerical case studies.

We provide a fully integrated model; this is missing in the literature so far.

El Karoui, Peng and Quenez (1997) for applications.

Examples:

\[ f_s(y, z) = r_s y + r_s z \]

\[ f_s(y, z) = r_s y + \theta_s z - (r_s - \theta_s) \]
Geometrically, the $V^2 R$ portfolio could be interpreted as follows:

$$x_{MVO} + \frac{1}{1+\kappa} (x_{MinV} - x_{MVO})$$

Figure: the shaded plane is the column space of the

Yang, Ahipasaoglu, and Chen (SUTD) Worst-Case and Sparse Portfolio