**EC371 Economic Analysis of Asset Prices**

**Decision Making under Uncertainty**
**Summary of the argument**

## State-Preference Analysis

- Investors take *actions* (choose portfolios) that have *consequences* (outcomes – 'terminal wealth'), the value of which is known only when the *state of the world* is revealed.
- The framework makes too few assumptions to enable the construction of portfolios.

## Expected Utility Hypothesis (EUH)

- EUH distinguishes between *beliefs* (about the which state will occur) and *preferences* (attitude to uncertainty).
- *Beliefs* are expressed using *probabilities*.
- *Preferences*: represented by a von Neumann-Morgenstern (Bernoulli) utility function.
- EUH asserts: investors choose portfolios to *maximize* the expected value of utility, subject to a wealth constraint.
- Portfolios that maximize expected utility satisfy *Fundamental Valuation Relationship*:

$$\mathrm{E}[(1+r_j)H] = 1, \quad \text{for every asset } j, \text{ and } H \text{ depends on preferences}$$

- *Behavioural alternatives* to the EUH have been proposed to remedy empirical weaknesses of the EUH.

## Mean-Variance Analysis (M-V)

- Assumes that investors maximize an objective function of the expectation ($\mu_P$, 'good') and the variance ($\sigma_P^2$, 'bad', or 'risk') of portfolio rates of return.
- M-V could be interpreted as a special case of EUH (with quadratic utility or Normally distributed returns).
- M-V allows two-step portfolio choice:
  1. for any $\mu_P$, minimize $\sigma_P^2$, which implies the portfolio *frontier*
  2. choose from among portfolios on the *frontier* to maximize the objective function.
- M-V is readily applicable in practice – but its application requires strong assumptions, which are sometimes (often?) empirically implausible.

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