The sustainability of mean-variance and mean-tracking error efficient portfolios

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Socially responsible investing (SRI), also known as sustainable, socially conscious, green or ethical investing, is any investment strategy which seeks to consider both financial return and social good.

- More than 12% of all professionally managed assets in the United States invested under the label of sustainable investment

- A 33 % increase in market share compared to 1995

- Quantitative approaches based on sustainability measures

How to measure sustainability?

- Standard approach:
  buy sustainability ratings of assets from external provider

- Data-driven approach: Eiris questionnaire with Q questions:

  How good is company's system for implementing its code of ethics?
  How many stakeholder issues have been allocated to board members?
  How good is the company's policy on equal opportunity and diversity issues?
  ...

- Dimension reduction from these Q ratings to one sustainability rating per asset, using PCA with positive loading

- Denote ϕ the vector with sustainability ratings and ω the portfolio weights

- Portfolio sustainability is weighted average of sustainability of underlying assets: $\omega'\phi$

Socially Responsible Investment (SRI)

- Research question:

  - What are the financial consequences of investing ethically?

- Previous research:

  - An indirect answer: focus on empirical comparison of existing sustainable and conventional funds (e.g. Bauer et al., 2005)
  - Research assuming single stock exclusion (Galema et al. (2008) and Herzel et al. (2011))

- Our research:

  - Mean-variance and mean-tracking error efficient portfolios
  - Constraint on average portfolio sustainability instead of single stock sustainability screening

Theoretical linear relation exists between the portfolio sustainability and the portfolio return of efficient portfolios
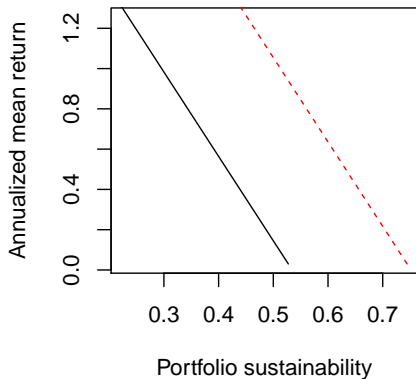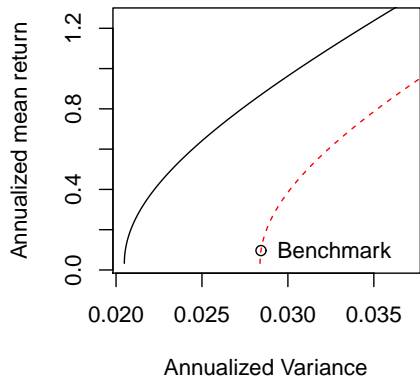
Sustainability constraints for efficient mean-variance and mean-tracking error portfolios

- Suppose an investor demands portfolio sustainability above a certain threshold, i.e. $\omega'\phi > \phi_0$

- We derive closed-form solutions for the optimal weights which are a function of: Mean return, covariance matrix and sustainability scores estimates

- Large covariance matrix estimated by shrinkage procedure from Ledoit and Wolf (2003, 2004)

- We assess the cost of the sustainability constraint for the investor:

  ▶ Foregone portfolio return for a given risk level

  ▶ Increased portfolio risk for a given target return
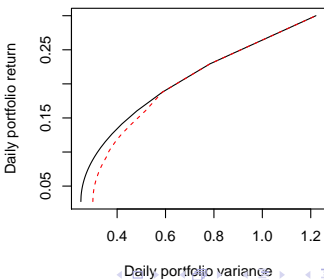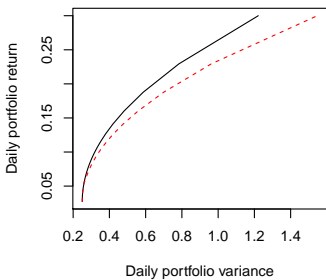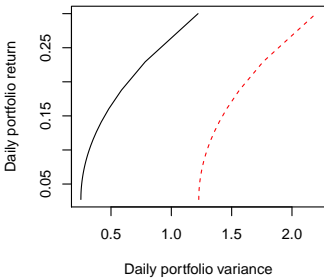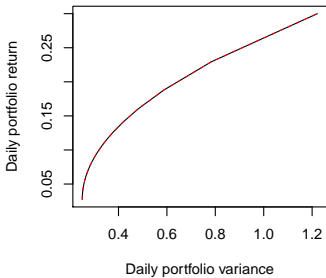
Conclusion on the sustainability of mean-variance and mean-tracking error portfolios

- Theoretically a linear relation exists between portfolio sustainability and portfolio return

- Empirically the slope of this linear relation is rarely significantly different from zero

- Impact of sustainability restriction on portfolio performance economically relatively small

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