Introduction

Motivation

- **Theory**: Diversify more at lower correlation (Markowitz, 1952) …so that correlation should be priced (Sharpe, 1964)
- **Empirical Findings**: Inconsistent with theory. Correlation neglect...
  - …in the lab, e.g., Kroll/Ley/rapport (1988): no diversification
  - …in the field, e.g., Benartzi/Thaler (2001): naive \( \frac{1}{3} \) diversification
  - …and in asset pricing, e.g., Fama/french (2004): \( \beta \) is not priced

→ Does dependence really not matter?

→ Idea: Maybe investors perceive dependence not as correlation or \( \beta \), but as comovement of frequent returns, or salient extreme returns?

Research Questions

Q1 Beliefs: How do investors perceive dependence?
Q2 Choice: How does perception of dependence affect investment decisions?
Q3 Market: Does perceived dependence influence stock returns?

Contribution

- Realistic, graphical presentation of information
- Keeping marginal distributions equal
- Varying dependence in extreme, infrequent vs. frequent, moderate returns
- Linking lab findings to historical returns

Experiments

Four Experiments Show...

- With realistic presentation of information, participants understand linear dependence and diversify more at low correlation.
- When comovement in frequent, moderate returns and extreme, infrequent returns varies separately, participants understand dependence in frequent returns and diversify more when it decreases, even if correlation increases.
- We report only one, representative experiment out of the four.

Experimental Design

- **Task**: Allocation decision for an endowment of €10,000 between assets 1 and 2.
- **Treatments**: Varying dependence between assets 1 and 2 within subjects (two rounds).
  - **Assets 1 and 2 have...**
    - expected returns of 5% and 4%, and equal higher moments (e.g., volatility)
  - Asset 2 is only attractive because it provides diversification benefits.
  - **Treatment 1**: Dependence in frequent, moderate (extreme, infrequent) returns positive (negative), correlation -0.21.
  - **Treatment 2**: Dependence in frequent, moderate (extreme, infrequent) returns negative (positive), correlation +0.21.
  - Rational Markowitz (1952) investor should diversify more in treatment 1.

Stimulus & Optimal Investment

Subjects sample 10 ten-year price paths. CRRA investor diversifies more in treatment 1.

Outcome Beliefs: Perceived Dependence

Given that stock 1’s price increases moderately,
I expect stock 2’s price to...

\[
\begin{array}{c|c|c|c|}
\text{Outcome} & \text{Market: Return Premium for Perceived Dependence} & \text{Beliefs: Perceived Dependence} & \text{Choice: Investment Decision} \\
\hline
\text{Baseline} & \text{Negative in treatment 2 at correlation +0.21} & \text{Positive in treatment 1 at correlation -0.21} & \text{Investors diversify more by +200 € when moderate dependence goes down, although correlation increases.}
\end{array}
\]

→ They understand frequent, moderate comovement.

From the Lab to Reality

Outcome Market: Return Premium for Perceived Dependence

Investors use frequency of comovement as a risk measure in the lab.
→ Is it priced in historical data? Strategy:
- CoMove Measure: Fraction of equally-signed stock and S&P 500 returns over last 36 months
  - …test whether stocks with high CoMove have higher returns
  - …controlling for \( \beta \)

Subjects diversify more by +200 € when moderate dependence goes down, although correlation increases.
→ This goes against predictions under common utility functions.
→ …but it is consistent with perceived dependence.
→ Diversification into asset 2 increases in risk aversion.

Conclusion

Summary and Link to Paper

- **Beliefs**: The frequency of comovement between returns drives beliefs about dependence, whereas infrequent extreme returns are not understood.
- **Choice**: Participants diversify more at high perceived dependence.
- **Market**: Historical US return premium for stocks with more frequent comovement with S&P 500.
- **Bottom line**: Perceived dependence matters for diversification decisions and stock prices (whereas correlation or \( \beta \) does not).