

Summary of *A quantity-based approach to constructing climate risk hedge portfolios*

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1. What are the research questions?

- The paper proposes a new quantity-based methodology to build portfolios that hedge the economic and financial risks from climate change.

2. Why are the research questions interesting?

- Our quantity-based approach exploits information on how mutual fund managers trade in response to idiosyncratic changes in their climate risk beliefs.
- The key advantage of the quantity-based approach is that it learns from rich cross-sectional trading responses rather than time-series price information, which is particularly limited in the case of newly emerging risks such as those from climate change.

3. What is the paper's contribution?

- Recent papers:
 - The existing approaches typically rely on the availability of a long time series.
- Extension:
 - The quantity-based approach uses cross-sectional information on investors' trading activity to identify which stocks to hold in the hedge portfolio.
- The quantity-based portfolios have superior out-of-sample hedge performance compared to portfolios constructed using existing alternative methods.

4. What hypotheses are tested in the paper?

- H1: This portfolio is expected to rise in price when aggregate climate risk materializes.
- H2: investors tend to buy insurance companies in response to belief shocks.

a) Do these hypotheses follow from and answer the research questions?

- Yes.

b) Do these hypotheses follow from theory? Explain logic of the hypotheses.

- H1: while idiosyncratic shocks only move quantities and not prices, the occurrence of an aggregate climate shock affects many investors. As long as investors respond to the aggregate climate risk shock similarly to how they respond to the idiosyncratic shock, the correlated shift in demand of many investors will move prices. Therefore, the hedge portfolio will rise in value when aggregate climate risks materialize
- H2: in a world with heightened climate risks, insurance companies may face increased profits due to higher demand for insurance.

5. Sample: comment on the appropriateness of the sample selection procedures.

- The paper uses the Thomson Reuters Mutual Fund Holdings S12 database to obtain a panel of portfolio holdings of U.S. mutual funds and combines the holdings data with fund characteristics from CRSP.
- They perform the analysis at the industry level, since the sparsity of the stock-level holding matrix would lead to very noisy estimates of stock-level exposures.

6. Comment on the appropriateness of variable definition and measurement.

- The paper defines Idiosyncratic Belief Shocks, Portfolio Changes, Climate Risk Hedge Portfolios, Climate News Series and Factor Exposures, the variable definitions and measurements in the study are well-constructed and appropriate for the research objectives.

7. Comment on the appropriateness of the regress/predict model specification.

- The model specifications in the study are generally appropriate for the research objectives and methodology. They allow for a rigorous analysis of how mutual fund managers' trading behavior responds to climate risk beliefs and the construction of hedge portfolios based on this behavior. The inclusion of robustness checks further strengthens the validity of the findings.

8. What difficulties arise in drawing inferences from the empirical work?

- Measuring idiosyncratic belief shocks accurately is challenging. The document uses local extreme heat events and changes in shareholder disclosures as proxies for these shocks. However, these measures may not fully capture all the nuances of how individual investors update their beliefs about climate risks.

9. Describe at least one publishable and feasible extension of this research.

- we can integrate ESG Scores and Climate Risk Hedging.