Prediction Markets for Climate Risks: A New Security for the Challenges to Come

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Abstract

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Contents

1 Introduction

General intro predictive markets.

Prediction market is generally implemented as a wager (or contract) that pays off if a particular outcome, taking a particular value y, occurs. Assuming that both the efficient markets hypothesis holds, and that the market acts as a risk-neutral representative trader, the price of the contract will be the best estimate of various parameters tied to the probability of that outcome [**?**].

Table 1: Contract Types: Estimating Uncertain Quantities or Probabilities

Contract	**Example**	**Details**	**Reveals market expectation of...**
Winner-takes-all	Outcome y: Level of initial unemployment claims (in thousands).	Contract costs p. Pays \$1 if and only if event y occurs. Bid according to the value of p.	Probability that outcome y occurs.
Index	Contract pays \$1 for every 1,000 initial unemployment claims.	Contract pays \$ y.	Mean value of outcome y: $E[y]$.
Spread	Contract pays even money if initial unemployment claims are greater than y^*	Contract cost \$ 1. Pays \$2 if $y \geq y^*$. Pays \$ 0 otherwise. Bid according to the value of y^*.	Median value of outcome y.

Notes: Adapted from Table 1 in Wolfers and Zitzewitz (2004).

Predictive markets have demonstrated their ability to aggregate dispersed information and improve forecasting accuracy in various domains. However, in the context of climate science, predictive markets remain underexplored. Traditional climate modeling faces key challenges:

- a lack of systematic assessment of forecasts, leading to information asymmetries, and
- the absence of direct financial incentives for accurate predictions.

This paper proposes climate predictive markets as a mechanism to enhance forecasting quality, incentivize expert participation, and improve societal preparedness for climate-related risks. We examine the potential benefits of climate predictive markets for two key stakeholders:

- Market Makers: What are the financial incentives for creating and maintaining such a market?
- Climate Experts (Smart Money): Can climate specialists leverage their knowledge profitably, and do they require the presence of less-informed participants to realize gains?

2 Prediction Markets for Probabilistic Forecasting

3 Using Prediction Markets as Hedging Instrument Strategy

References

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