



 Centre for Energy and Environmental Markets 



**The Copenhagen Prediction Market (COPPM)-
Lessons from a Field Experiment to Forecast Climate Change
Negotiations**

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Outline

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- What are Prediction Markets (PM)?
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- Copenhagen Prediction Market (COPPM) Rules
- COPPM Markets
- Results:
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 - Participant's characteristics
 - The Deadline market
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Motivation

- The outcome of climate negotiations can trigger billions of Dollars into mitigation and adaptation projects (e.g. turn over of global carbon market was 150\$ billions in 2010). It is based on the agreement of more than 100 governments.
- The aim of Copenhagen was a new international climate treaty, the successor of the Kyoto Protocol.
- Negotiation processes are complex (many issues) and very dynamic.
- Research questions: Can prediction markets play a useful role to create transparency and predict the outcomes of international climate negotiations?



Prediction Markets (PM)

- Wisdom of Crowds: A case in which the information needed to generate a forecast is held collectively, not by any single individual.
 - Aggregation problem: How can the collective information be aggregated into a forecast?
- How does it work?
 - A PM uses a competitive market to aggregate collective information.
 - Participants trade contracts whose payoff depends on the outcome of future events.
 - A specific market design allows share prices to be interpreted as the probability of the event occurring, thus it provides a forecast about the likelihood of an outcome and can change over time.
- Why Does This Work?
 - Markets are belief aggregators by nature.
 - Forecast is based on the marginal trader and as long he is motivated by profits rather than partisanship, prices will reflect the assessments of (unbiased) profit motive.





Copenhagen Climate Conference

- Climate Conference under United Framework Convention of Climate Change (UNFCCC)
- 2 weeks (7-19 December 2009) in Copenhagen
- Around 100 heads of state and 40.000 participants biggest international climate conference ever held
- Main issues to be decided:
 1. By how much would industrialized countries be willing to reduce their emissions of greenhouse gases?
 2. How much were major developing countries such as China and India willing to do in order to limit the growth of their emissions?
 3. How would the efforts of developing countries to reduce their emissions and adapt to the impacts of climate change going to be financed?
 4. How was that money going to be managed?



Copenhagen Prediction Market Rules

- Contract type:

China agrees to some type of binding climate action commitment (e.g. intensity target)

 - Event 1: Yes
 - Event 2: No
- Trading mechanism: Continuous Double Auction, prices and trading volumes were made public in real time to every one
- Incentives: Multi-Event Winner Take All market
 - Shares pay Experimental Dollars 100 if the Event occurs, E\$0 otherwise.
 - Participants can win a prize (offsetting of own emissions with gold standard Certified Emission Reductions sponsored by Baker&McKenzie)
- Participation: Open to anyone
- Operationalisation of Prediction Market:
 - Recruiting at COP15, internet based platform, questionnaire at the beginning

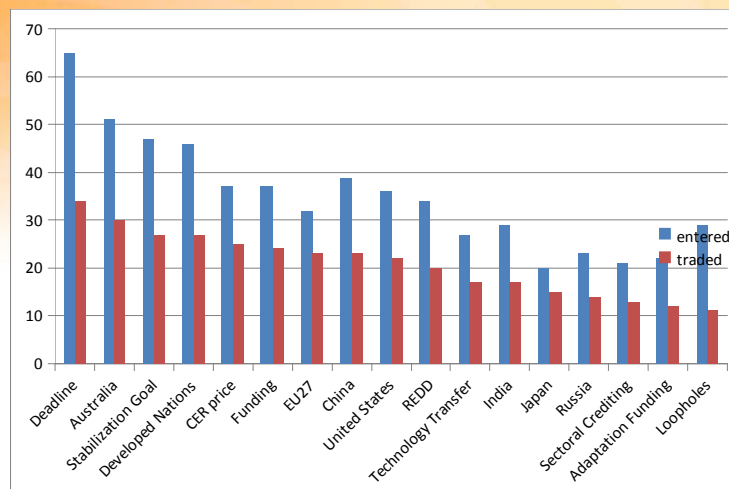


COPPM markets (examples out of 17 different markets)

- **Market 1:** Deadline set for achieving a legally binding agreement
- **Market 2:** The long-term stabilization goal in degrees Centigrade of warming and/or parts-per-million of CO₂ concentration.
- **Market 3:** Average annual funding committed by developed country governments to support climate change action (including mitigation and adaptation) in developing countries for the period 2010 through 2012.
- **Market 4:** Aggregate 2020 reduction target for developed nations (Annex I or equivalent, including the US) (1990 base year)
- **Market 8-12:** 2020 reduction target (1990 base year) for:
 - Australia, EU, Japan, Russia and US
- **Market 13 & 14:** China or India agrees to some type of binding climate action commitment (e.g. intensity target)



Number of traders on each market





Participation characteristics (%)

	Participants	Winners		Participants	Winners
Female	0.21	0.18	Australia	0.39	0.65
Male	0.68	0.76	USA	0.11	0.00
Not stated	0.11	0.06	Germany	0.09	0.06
Not at COP	0.65	0.94	Working	0.67	0.82
At COP	0.35	0.06	Student	0.16	0.06
<i>Of which:</i>			Not stated	0.17	0.12
<i>Governmental</i>	<i>0.15</i>	<i>1.00</i>			
<i>Non-Gov.</i>	<i>0.68</i>	<i>0.00</i>			

Characteristics of participants and traders of the COPPM in percent

Correct predictions of the COPPM

Market name		Outcome	Share traded highest at end of market
Market 1	Deadline for legally binding agreement	no deadline set	no deadline set
Market 7	Sectoral Crediting included in outcome	not included	not included
Market 8	2020 reduction target for Australia*	< 10%	< 10%
Market 9	2020 reduction target for the EU27 *	20% - 24%	20% - 24%
Market 11	2020 reduction target for Russia*	15% - 19%	15% - 19%
Market 12	2020 reduction target for the US*	0% - 4%	0% - 4%
Market 14	India agrees to some type of binding climate action commitment	no	no
Market 15	Institution of Adaptation Funding	new + existing fund	new + existing fund

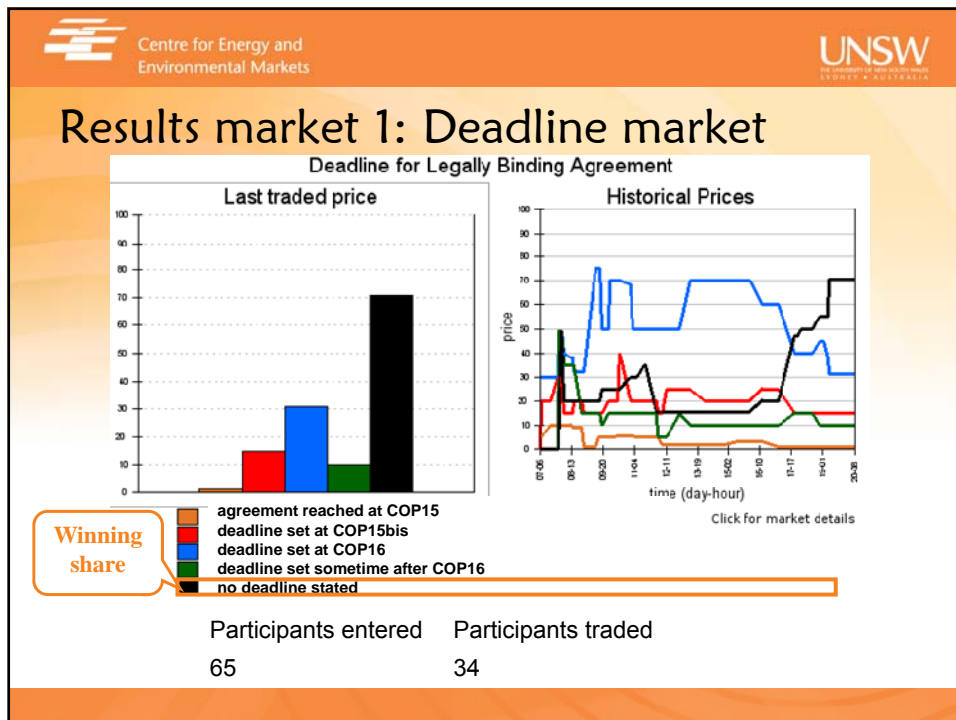




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Incorrect predictions of the COPPM

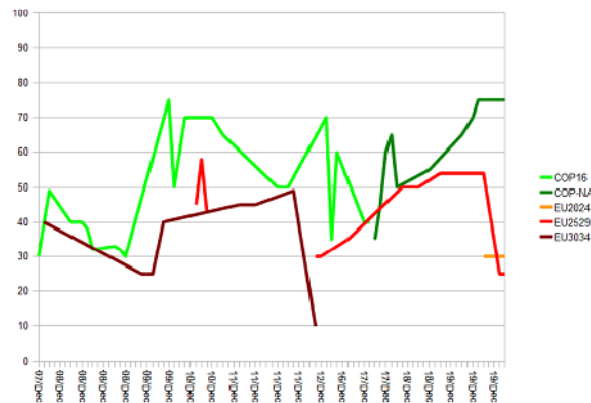
Market name		Outcome	Share traded highest at end of market
Market 2	Long-term stabilization goal	< 2 degrees	≥ 2 degrees
Market 3	Average annual funding through 2012	< USD 10 billion	10-14 USD 10 billion
Market 4	2020 reduction target* for developed nations	10% -14%	15% -19%
Market 5	Design of REDD mechanism	no conclusive decision	mix of public and private funding
Market 6	CER price	11.15 Euro	≥ 14 Euro
Market 10	2020 reduction target for the Japan	25% - 29%	20% - 24%
Market 16	Mechanism for technology cooperation	technology action plans	no technology action plans





Negotiations dynamics

Highest traded shares on the Deadline and EU27 markets





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