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Price efficiency in environmental markets – Lessons from Experiments

Baker McKenzie - Transition of trading schemes – Presented by
From state to national level – 12th August 2005 Karel Nolles

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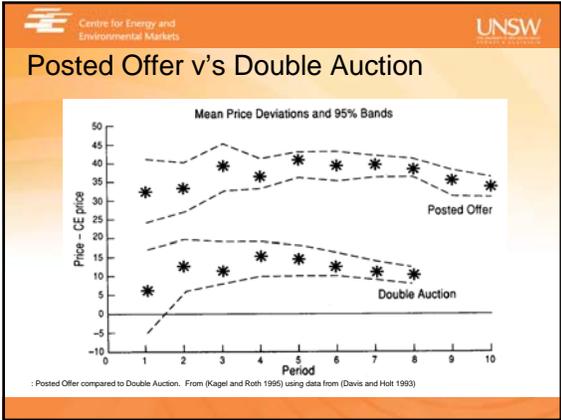
Presentation outline

- *Less focused on specific markets, more general in application*
- *Discusses current research that is not completed.*
- *Intended to be food for thought*
- *Discussion paper on the website.*

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Big policy stuff

- Using markets to drive least cost implementation of given goal. (Fix q , let p be determined).
- Seeking Allocative and Dynamic efficiency
 - Spot prices for managing efficient operation of today's plant
 - Forward prices for driving efficient investment
- Relationship between forward and spot prices depends on a number of things, including the market institution in each market.
- Stated policy goals are dependent on price being "correct" (meaning efficient).



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- ### Experimental Analysis of Institutions
- The experimental evidence is fairly clear that in cases where direct comparisons can be made, the efficiency of the market institutions descends as follows :
 - Double Auction (DA)
 - Discriminatory Call Markets and Sequential Markets
 - Clearing house (Uniform price to single seller)
 - Posted Offer (PO)
 - Negotiated Prices
 - Posted Offer with subsequent negotiation

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- ### Performance of market institutions
- Posted Offer slower to track changes in equilibrium.
 - Market Power much more easily implemented in PO and negotiated institutions than under DA.
 - DA requires some minimum volume of transactions to provide efficient price discovery.

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Exercising Market Power

- Factors that have been shown experimentally to facilitate collusion and the exercise of market power
 - Multi-period repetition with the same group of participants.
 - Communication between parties
 - The ability of parties to punish "deviation" from the collusive course.
 - The existence of vertically related markets
 - Significant market concentration.
 - Significant search or transaction costs.
 - Where a posted price or "by negotiation" institution is used. Particularly if the market is small.

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Other factors that may impact price in environmental markets

- Reputational Risk
 - Companies on the demand side view market as a regulatory exercise. Any small profits that might be realisable from trading are outweighed by the risk of being non-compliant
 - No experimental evidence at this point
- Low Perceived "Cost of Carry"
 - Where the traded instrument is perpetual, they appear to be viewed as having a low or zero "cost of carry".
 - Tendency for "buy and hold"
 - Some experimental evidence.

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Virginia NOx market

- Virginia NOx market had 100% grandfathering
- Very little trade occurring
- To allow for new entrants, 5% of each participants allocation clawed back and auctioned.
- Auctioned prices much higher than anticipated
 - Explosive growth in trading following the auctions.
 - Companies with large holdings suddenly realised the things had a value, and should be used or sold.

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Experimental Evidence of impact of Grandfathering

- Current CEEM experiments
- Two treatments:
 - Participants on supply side substantially grandfathered
 - Participants on supply side had to create/earn all "credits" to sell
- Prices in first institution consistently much higher.
 - No cost risk from not selling.
 - More willing to withhold.
- Grandfathering can cause prices to go up....
- Preliminary experimental results. (but consistent with Virginia ??)

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Example: Impact of form of demand side value induction (Asymmetric Information)

- Experiment has 10 participants, 5 retailers, 5 suppliers, all participants on each side of market of equal sizes.
- No banking/Borrowing
- "Hyper-competitive" environment. (1.5 suppliers at/above equilibrium price).

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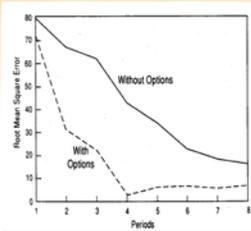
Case 1: Demand side induced value is private

Trial	Ask Price	Bid Price
1	50.00	38.00
2	50.00	45.00
3	50.00	48.00
4	50.00	48.00
5	50.00	48.00
6	50.00	35.00
7	50.00	35.00
8	50.00	35.00
9	50.00	35.00
10	50.00	35.00
11	50.00	50.00
12	50.00	50.00
13	50.00	50.00
14	50.00	50.00
15	50.00	50.00

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Impact of Forward Markets

- Both theory and experiments show that a well functioning forward market can make a dysfunctional spot market come to equilibrium
- Forward markets can REDUCE asset bubbles.
- Forward markets drive investments
 - Need to be seriously considered as part of the overall development of an environmental market.

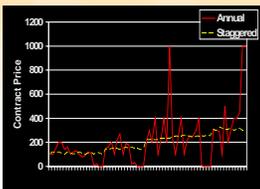


The graph plots Root Mean Square Error (Y-axis, 0 to 80) against Periods (X-axis, 1 to 8). The 'Without Options' series (solid line) starts at approximately 80 and decreases to about 15 by period 8. The 'With Options' series (dashed line) starts at approximately 80 and drops sharply to about 10 by period 4, remaining stable thereafter.

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Impact of the Instrument Design

- Annual Acquital dates
 - Tends to drive the action to the periods around those dates.
- Ishikida/Porter 2000 – experiments examining the RECLAIM market.



The graph plots Contract Price (Y-axis, 0 to 1200) against Periods (X-axis, 1 to 8). The 'Annual' series (solid line) shows high volatility with several peaks reaching up to 1000. The 'Staggered' series (dashed line) shows much lower volatility, staying mostly below 200.

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Price distortions from other factors

- Shared desire for non-market outcome
 - Eg: If participants know that current market will be used to set future baselines or policies
- Vertical market impacts
 - Use input market to manipulate competitive position in output market
- Participants may be able to tacitly collude to bring about inefficient pricing.
 - EU ETS ?

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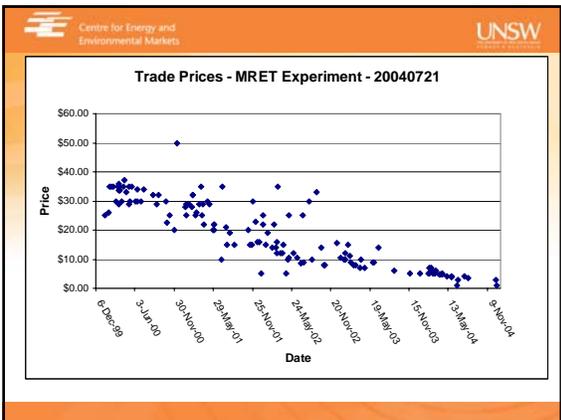
Relating all this to NGAS and MRET

- Small markets
- Highly concentrated
 - Single participant created 46% of 2003 NGACs.
 - Top 3 created 70%
- Repeated annual periods with stable cohorts
- Same participants also dealing in a vertically related market
- Anecdotal evidence of “buy and hold”
- Considerable grandfathering / non-additionality
 - over 95% of 2003 NGACs were generated by plant that was commissioned before the start of the scheme
- Institution is essentially posted-offer with bilateral negotiation
 - Institution most susceptible to poor price formation

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Some thoughts....

- MRET and NGAS markets, as well as other environmental markets, have characteristics that under experimental conditions result in prices consistently away from the “correct” ones.
- Particular market institutions, matched to the market characteristics may be required.
 - Possibly a NYSE style market with “specialists” could be appropriate?
- There is very little, if any, ongoing market monitoring and assessment as to market efficiency and performance.



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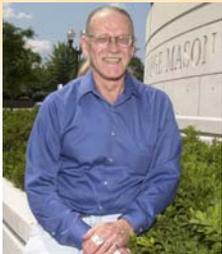
MRET Non-woodwaste RECs 2002 – 05 (AFMA Data)

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NGACs – spot & cal+3. AFMA Data

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- CEEM Conference
 - November 18
 - Vernon Smith & Dave Porter
- CEEM Energy Markets Forum
 - Probably November 17
- ASX – CSIRO
 - “Bureaucrat” workshops – early November
- It’s all on the website....





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Thankyou... and *questions*

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