



Can derivative trading create market power in
physical spot markets?

January 24, 2002

Bill Balson
Gordon Rausser

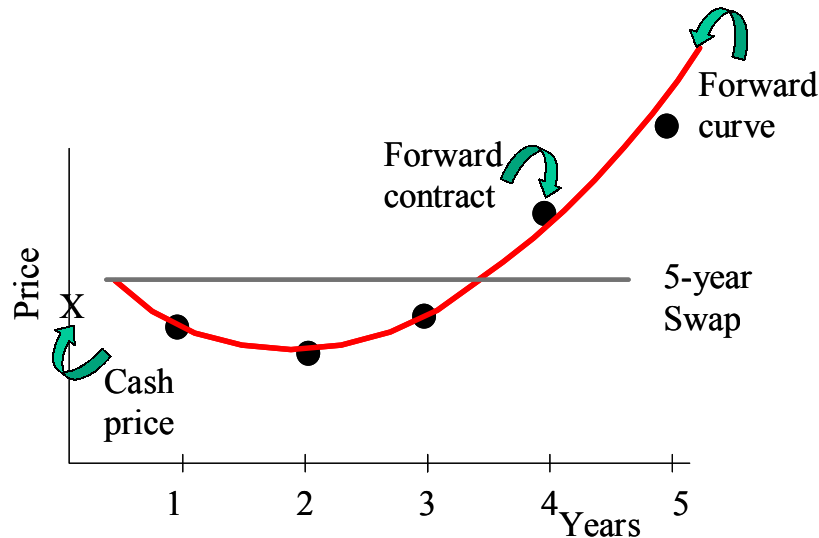
Questions

- How do trading activities interact with hard assets and real markets to create, extend, or limit market power?
- Can brokers and traders who deal only with derivative contracts exercise market power in the electricity market?
- Can traders exercise market power in the trading market?

Three different cases can be distinguished:

	Physical spot market	Derivative market	
		Illiquid	Liquid
Market Power?	Spot price affects derivatives	Corners & squeezes can cause forward price to affect spot	Expensive & risky to execute
Method	Withholding physical supply from the market	Take open position that requires more delivery than is available	Transitory effects, with little benefit in the spot
Prevention	Limits on physical market share	Limits on open positions (% physical)	Surveillance programs

A reliable forward curve is the critical input for all derivative pricing.



- Illiquid derivative market
 - cash price and forward price are related by models and trader expectations
 - swap pricing ties forward prices to cash prices
- Liquid derivative market
 - forward prices can co-evolve through separate market forces
 - market revealed forward prices
 - swap prices relatively unaffected by cash market

Physical and derivative markets have different purposes and pricing structures.

- Purposes of a physical spot market
 - Prompt delivery
 - Balance physical supply and demand
 - Bidding maximizes profit over delivery horizon
 - $B^* = \text{Max} \{p(B) \times v(B)\}$ (I.e. my bid is chosen to maximize the expected payoff)
- Purposes of forward and derivative markets
 - Future rights and obligations
 - Price discovery
 - Hedging
 - Balance flows of orders to buy and sell
 - Bidding maximizes expected changes in future prices
 - $B^* = \text{Min} \{B_m, B_f\}$ (I.e. my bid is the lesser of current market and my forecast)

Essential features of derivative markets do not have physical market analogs.

- Mark to market – the market value of the derivative is known at the end of each day
- Symmetry – the value of a swap can change either direction
- Margin – changes in market valuation can require immediate cash payments
- Leverage – financial contracts can have very high leverage ratios
- Volume – contract volumes can exceed physical volumes by 5-30 fold
- Replication - derivatives can be combined to replicate the financial outcomes of other derivatives
- No arbitrage – prices of any three derivatives must satisfy triangular equality of their value to avoid arbitrage

Derivative trading intended to manipulate spot prices would be excessively expensive relative to the benefits.

- Creates speculative position rather than balanced risk book
- Mark-to-market rules can trigger large loss
- Margin requirements can trigger immediate losses in seeking future payoffs
- Relative trading ratios mean more order flow in the futures is needed to impact market than in the spot market

What makes a well-functioning derivative market?

- Liquidity
 - High transactional volumes
 - Order flows and execution efficiency
- Price transparency
 - Immediate, public distribution of settlement prices
- Credit checking and margining
 - Mark to market and forward price risk
- Trader motivations
 - Traders who require immediacy
 - Hedging, book balancing
 - Traders who supply immediacy
 - Market makers
- Position limits
 - Prevent squeezes by limiting position sizes to % of supply

Essential activities of derivative trading may appear to be similar to manipulation.

- Delta hedging – practice of continuously rebalancing a portfolio to maintain low instantaneous price risk
 - buying as price increases, selling as price declines
- Volatility trading – practice of trading in the risk of future price changes
 - Sell a high priced option, delta hedge in the forward market, and buy back the option when volatility reverts
 - I.e. keeping a balanced risk book requires trader to continuously trade on both sides of the markets as price alternately advances and retreats