

Vertical Integration and Market Power in Electricity Markets

Seamus Hogan and Richard Meade

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Background

- Work on Reserve Generation
- Events of 2001
- Recent political musings on deintegration

Presentation Format

- Present a highly stylised model of vertical integration in the electricity industry
- Draw policy conclusions about competition policy *in the model*
- General discussion about relevance to actual New Zealand electricity market

What is the difference between a coulomb and a widget?

(That is, what makes the electricity industry unique)

- Geographical separation between production and consumption...
 - ...with energy loss in transmission
- Natural Monopoly for grid and line infrastructure
- Supply uncertainty

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So what makes this an *electricity*-sector model?

- We assume separation between a wholesale market and a retail market
 - The wholesale market is cleared by a uniform-price auction
 - The retail market is an oligopoly of price-setting, quantity-taking firms competing for consumers
- But, we assume away final users buying directly from the wholesale market

Model Set-Up

- Two stage game:
 - Retailers post prices for committed supply
 - In wholesale market generators make sealed bids to supply aggregated demand bids by retailers (price-inelastic), with single market-clearing price
- Generators overstate or understate their true supply curves by some constant scale factor

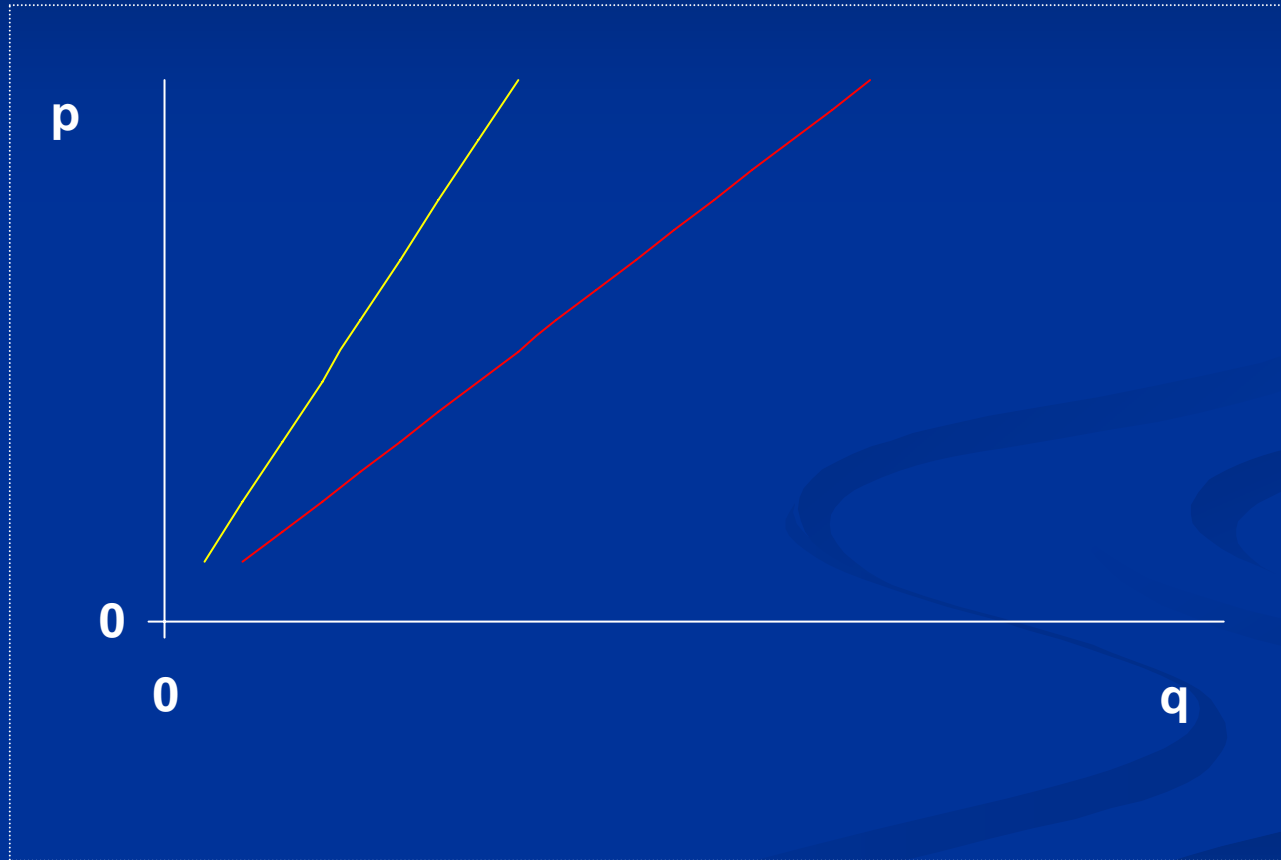
The Wholesale Market



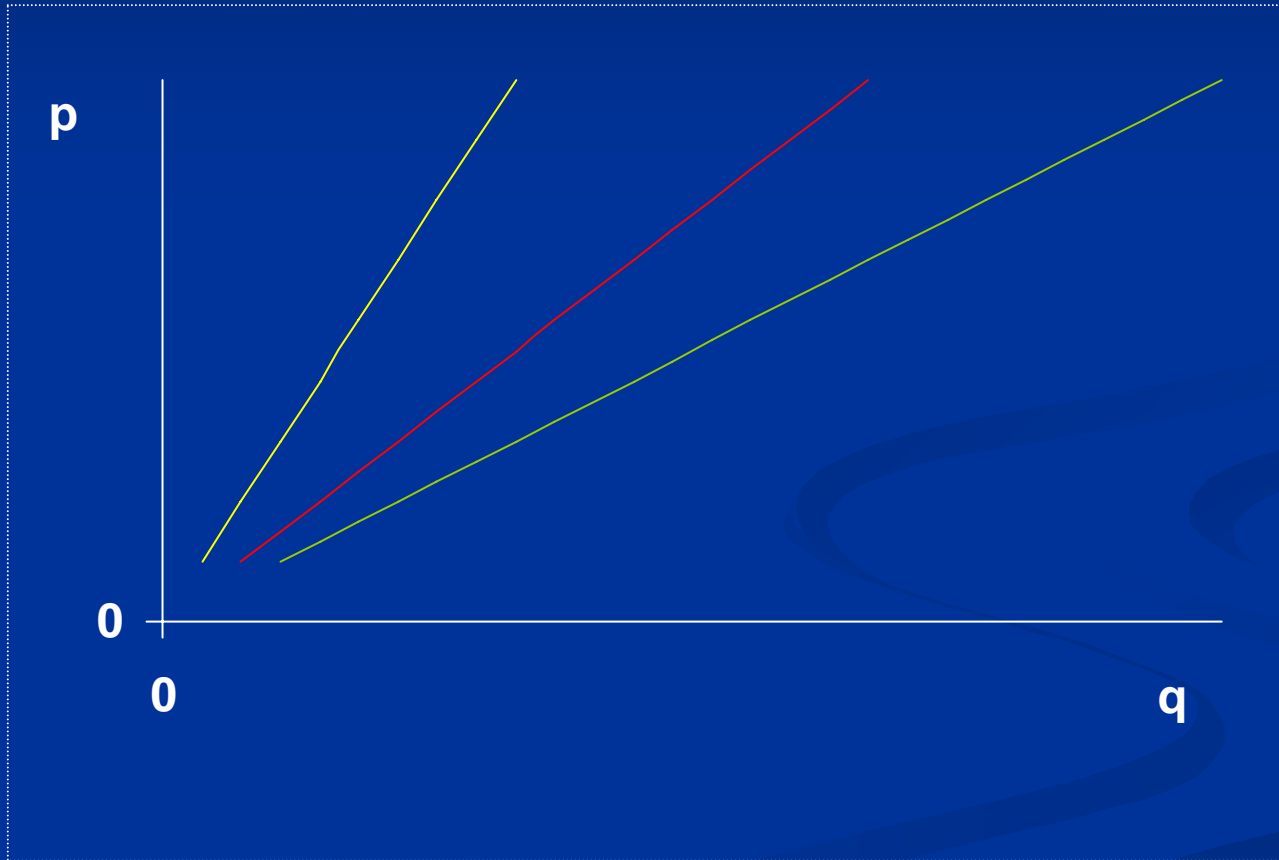
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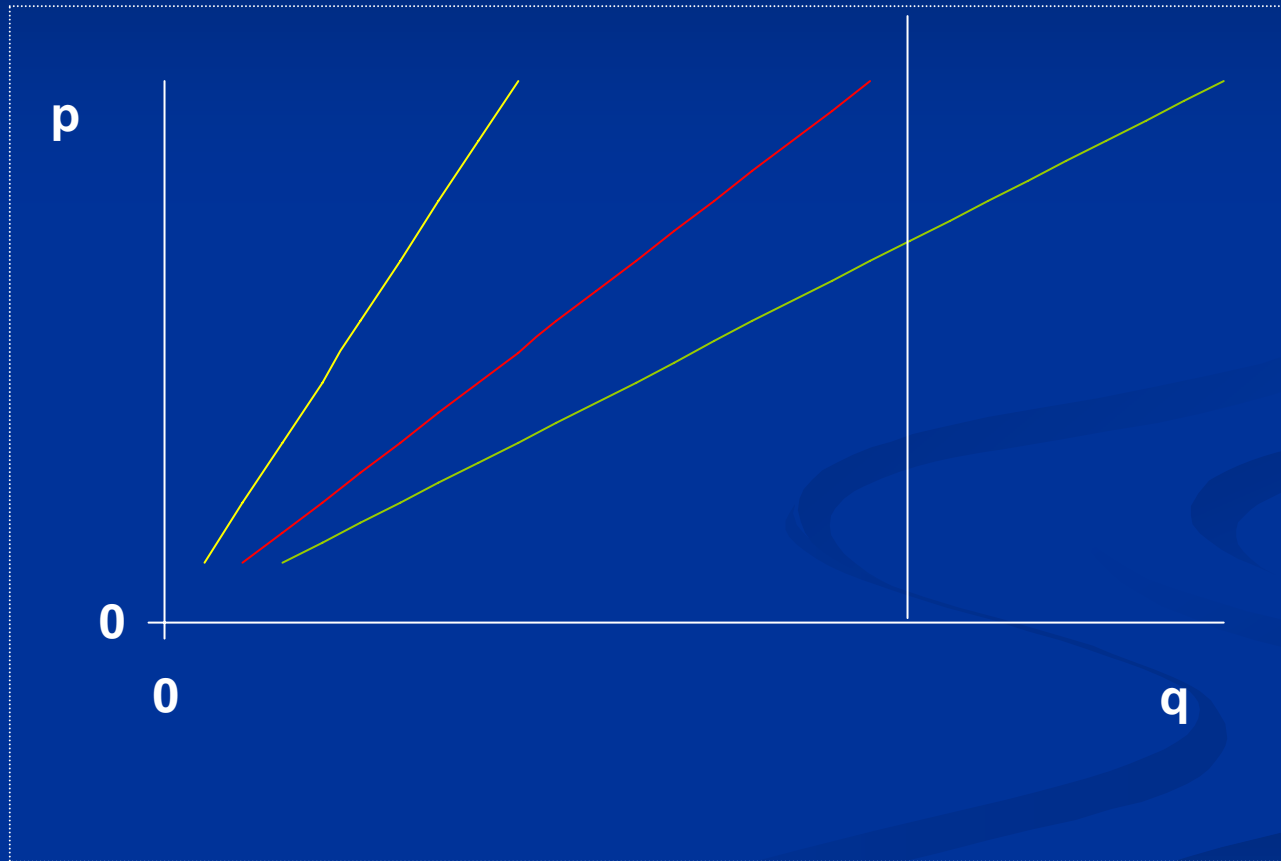
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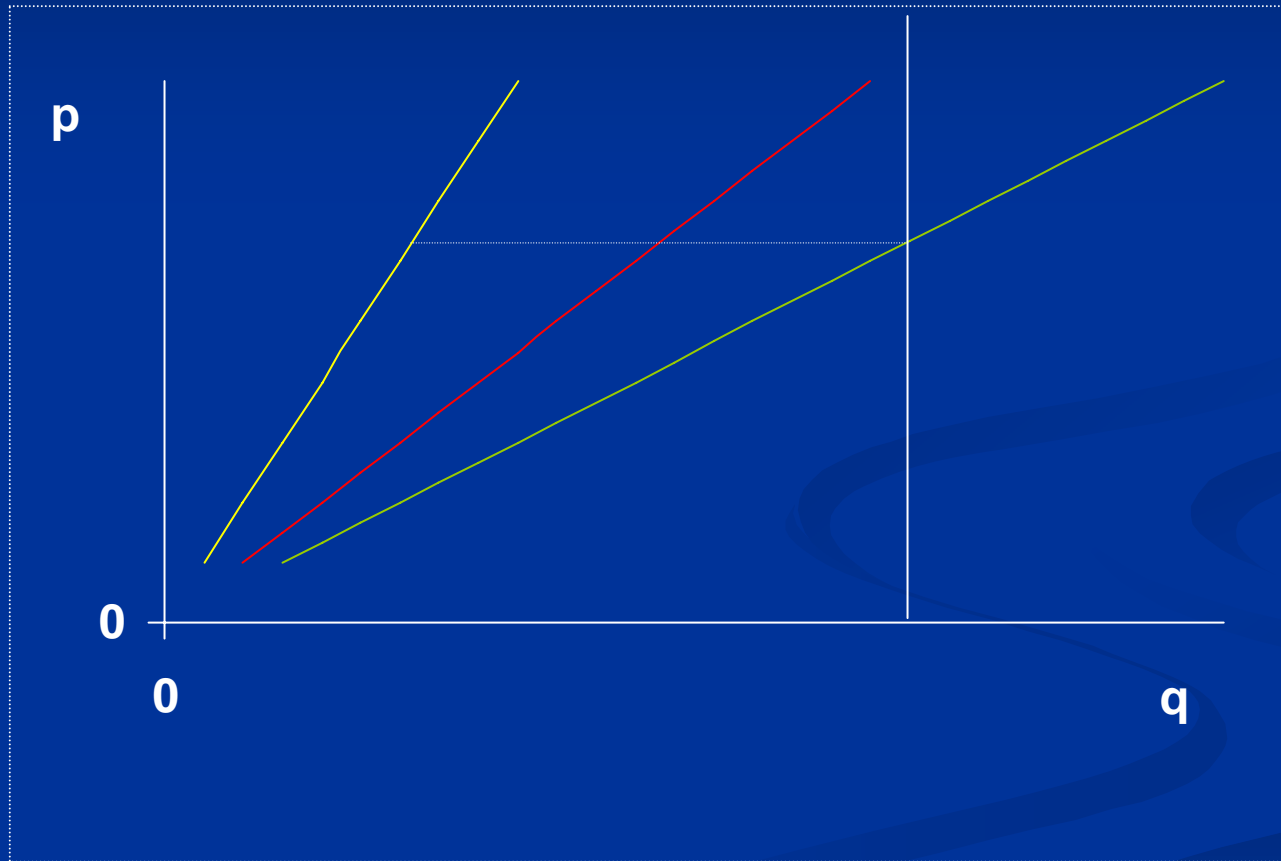
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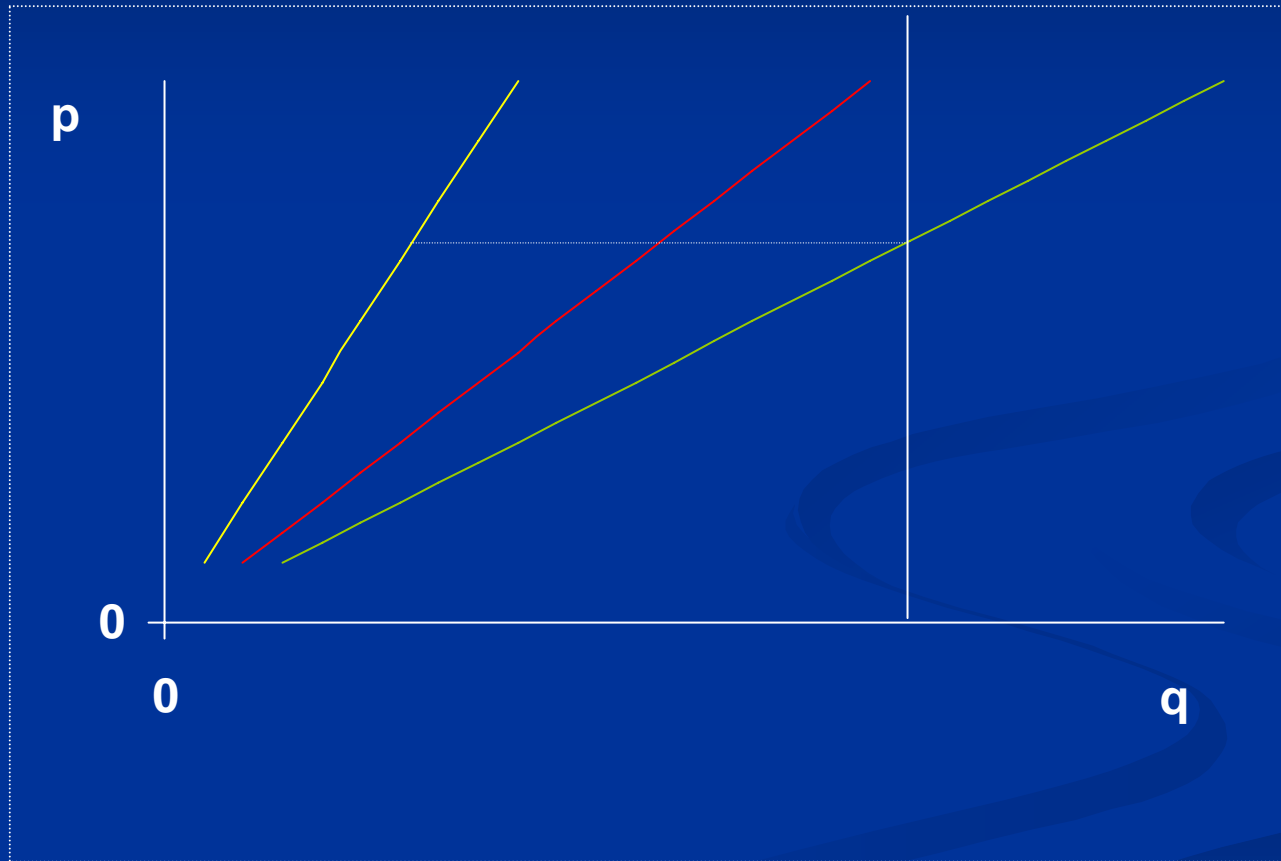
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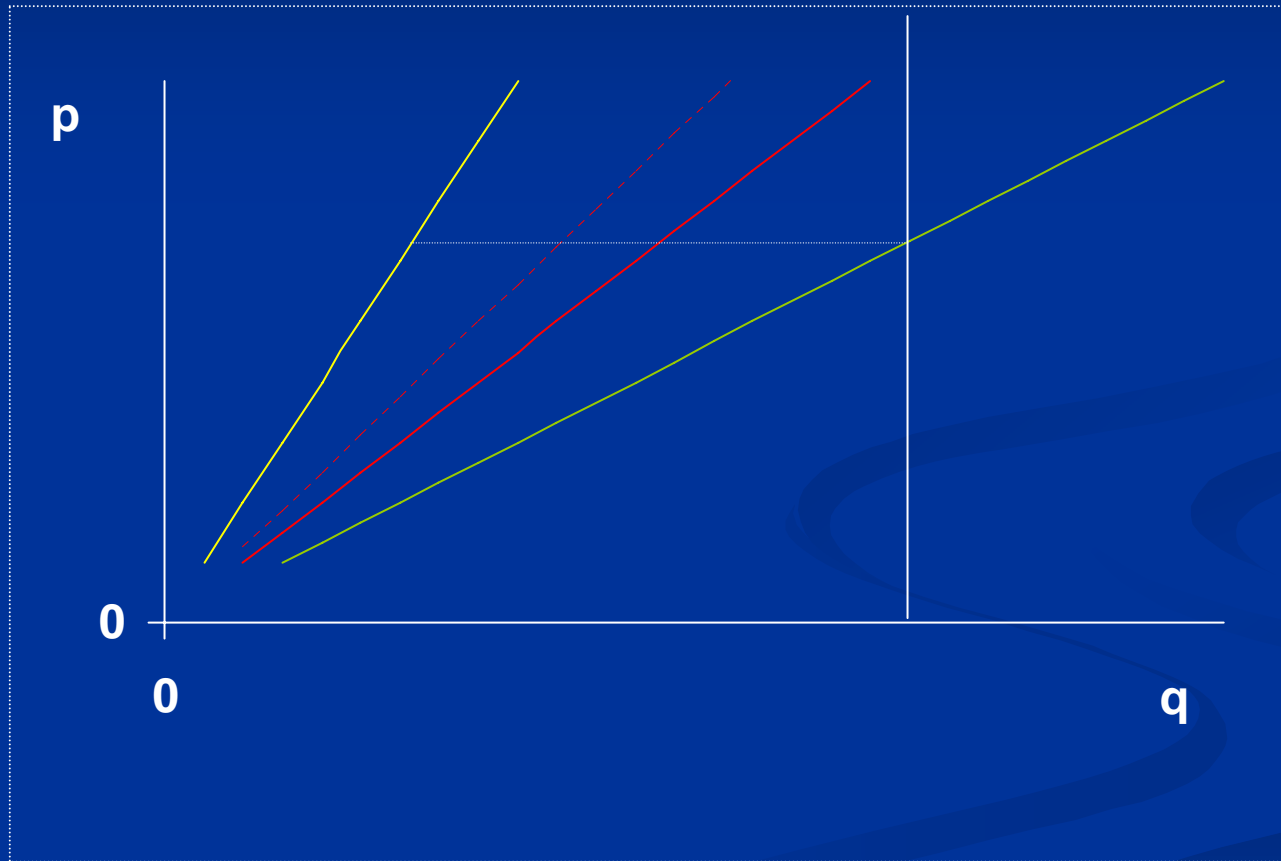
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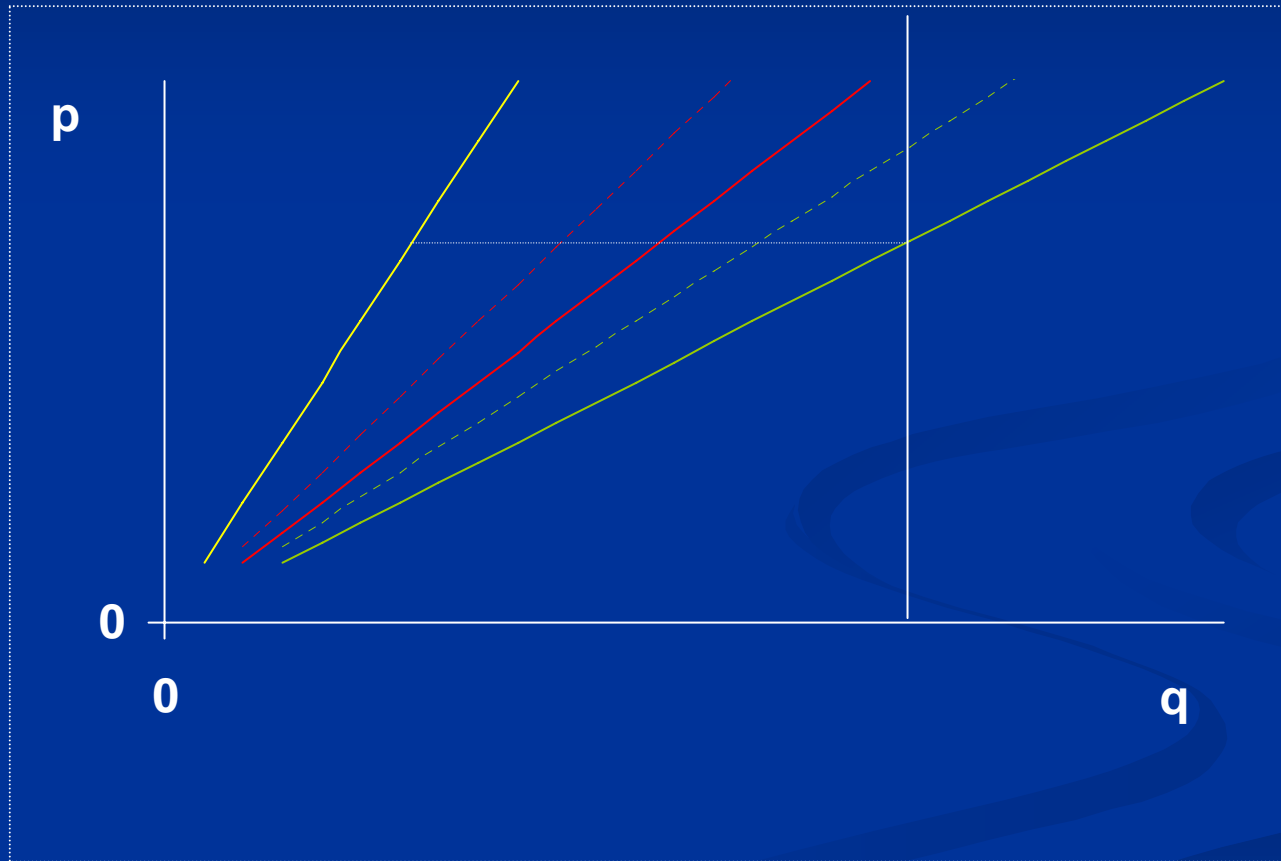
Consumer Exploitation



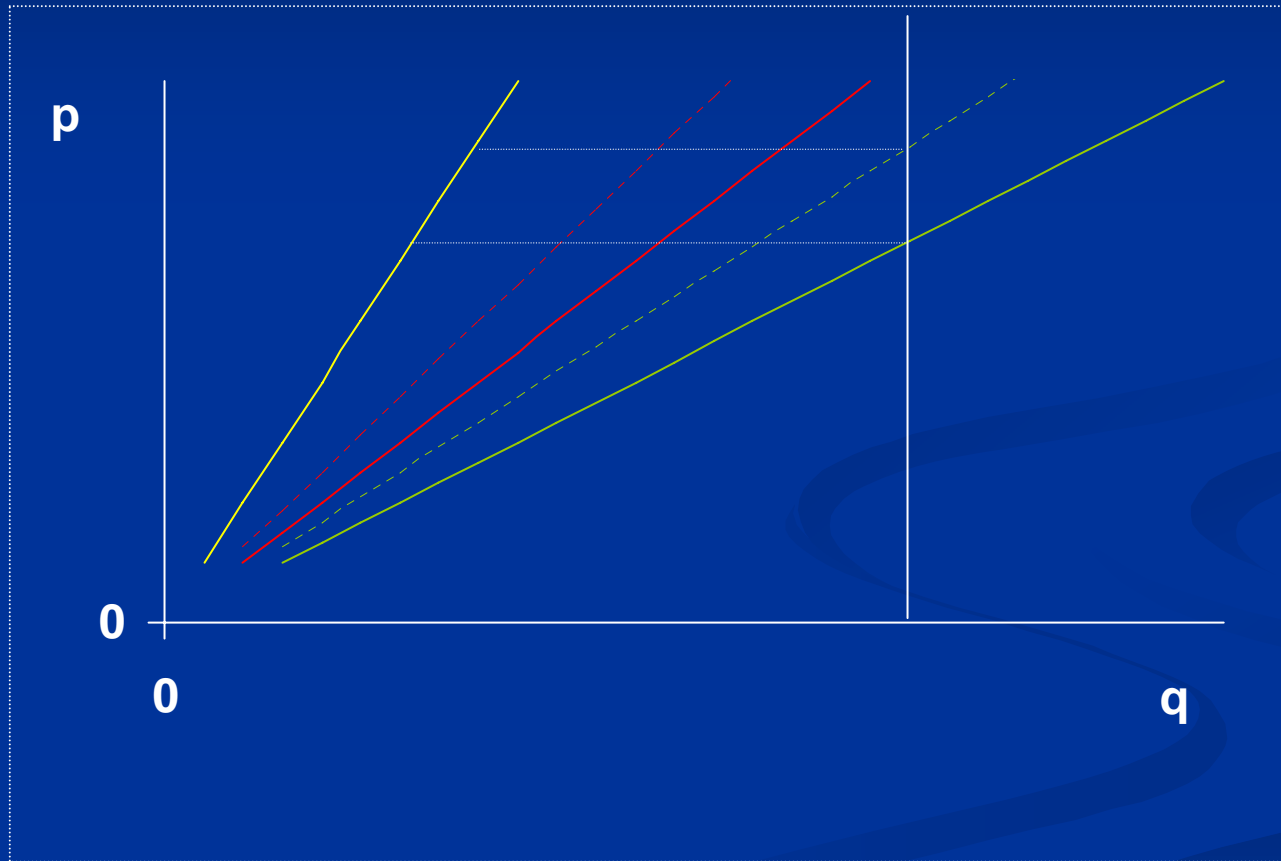
Consumer Exploitation



Consumer Exploitation



Consumer Exploitation



Main Result

- With vertical separation, it is always optimal for generation firms to overstate their true supply curves—that is, there is always monopoly power in the market.
- The incentive to overstate increases with each firm's share of total capacity

Vertical Integration

- With vertical integration, generation firms have an incentive to overstate their true supply curves to the extent that their wholesale market share exceeds their retail market share.
- If all generators' share of total generation capacity exactly equals their retail market share, there is a unique equilibrium with all generators truly reporting their supply curves.

Policy Discussion (within model)

- Base assumptions:
 - Firms are consumer-exploiting, profit maximisers
 - And quite right too!

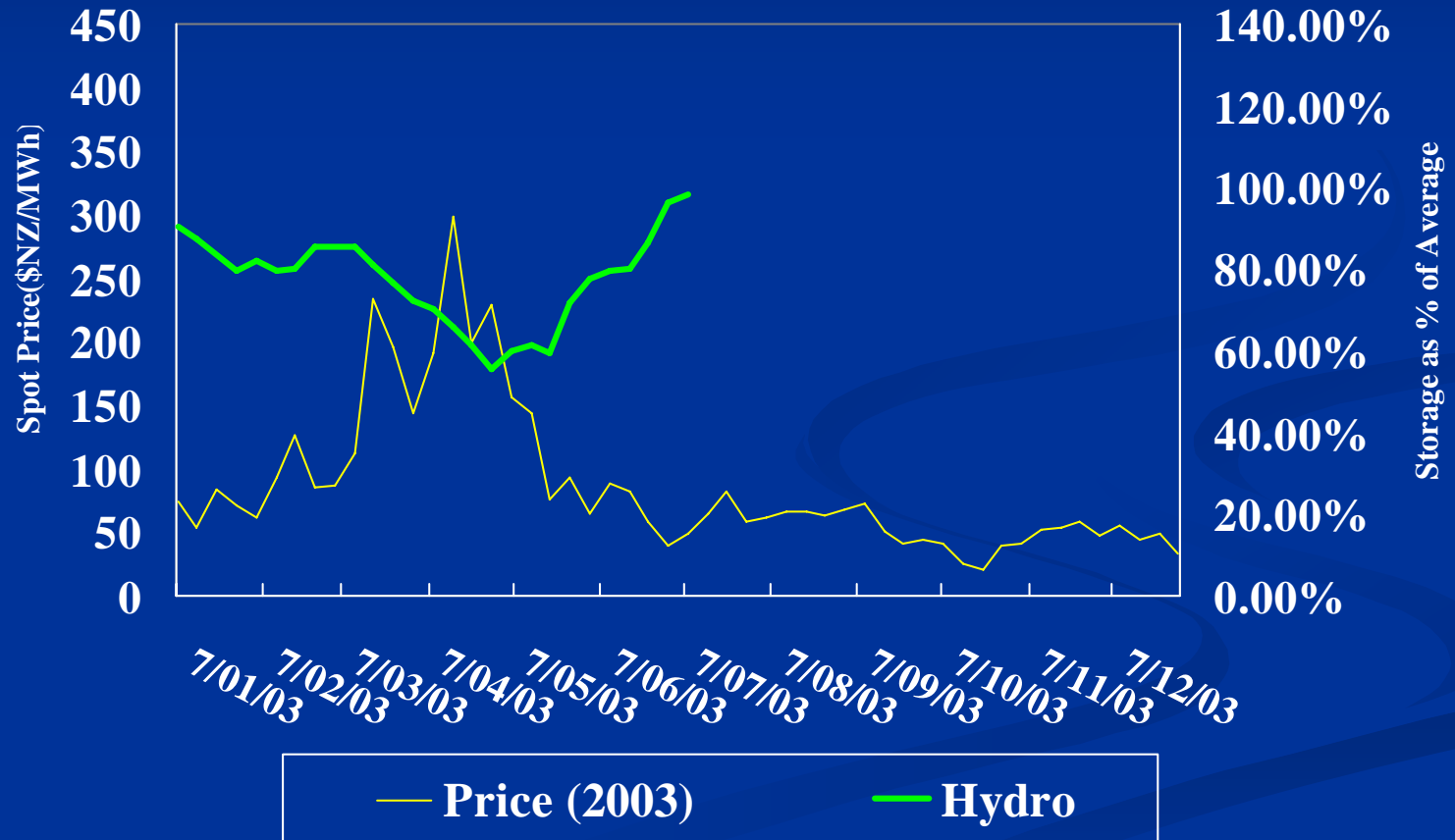
Policy Results:

- Competition requires atomistic markets
 - Or balanced integration
- Static optimisation looks like predatory pricing
- But such predation O.K.
- Given degree of monopoly in retail, same concentration at wholesale is probably good

Policy Speculations

- Market-share balance is possibly a natural dynamic outcome in the market
- Probably a good thing to have some wholesale-only generator balancing the final-use wholesale buyers
- Whirinaki possibly makes more sense as a daily extension of competition policy than as reserve generation vehicle

Hydro level vs. Prices 2003



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