Measuring and Mitigating Market Power in Utility Industries

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http://www.econ.cam.ac.uk/electricity

Dealing with market power in utilities

- Competition Law: e.g. telecoms
  - rule based approach favoured by EU
  - regulate: yes/no?
- UK License approach: e.g. ESI
  - pragmatic, flexible, MALC problematic
- US Utility Law approach
  - "just and reasonable" prices
  - powers to regulate can distort markets

Outline and examples

- EU electricity markets
- Mobile call termination
  - designing regulation to mimic competition
- Electricity wholesale markets
  - the problems of measuring market power
  - The Market Abuse Licence Condition (MALC)
  - The dynamics of mitigating market power

Politically acceptable electricity liberalisation requires:

- confidence in security of supply
- sustainably competitive outcomes
- absence of market abuse
- ability to mitigate market power
- credible regulation for efficient free entry and investment

These challenges remain in EU

Preconditions for ESI liberalisation

- rTPA + ownership unbundling: CEC ✔
- adequate and secure supply: CEC ✔
  - network adequate and reliable
  - production capacity adequate
  - security of supply of primary fuel
- power to regulate competition: CEC ✘

Competition policy for utilities

"competition where possible, regulate where not"

- Leave markets to competition legislation?
  - *Ex post*, penalties ⇒ legalistic, slow
  - dominance ~ 40+% of market
  - information collected only for case

⇒ need *ex ante* regulatory powers

- UK licences as useful model

Mitigating market power in US

- Federal Power Act 1935 requires prices that are 'just and reasonable'
- Selling at market-related prices requires:
  - utility and affiliates do not have market power
  - competitive prices are just and reasonable
  - ***can withdraw right if there is market power***
  - ***can re-impose cost-based prices caps***

Contrast with Europe

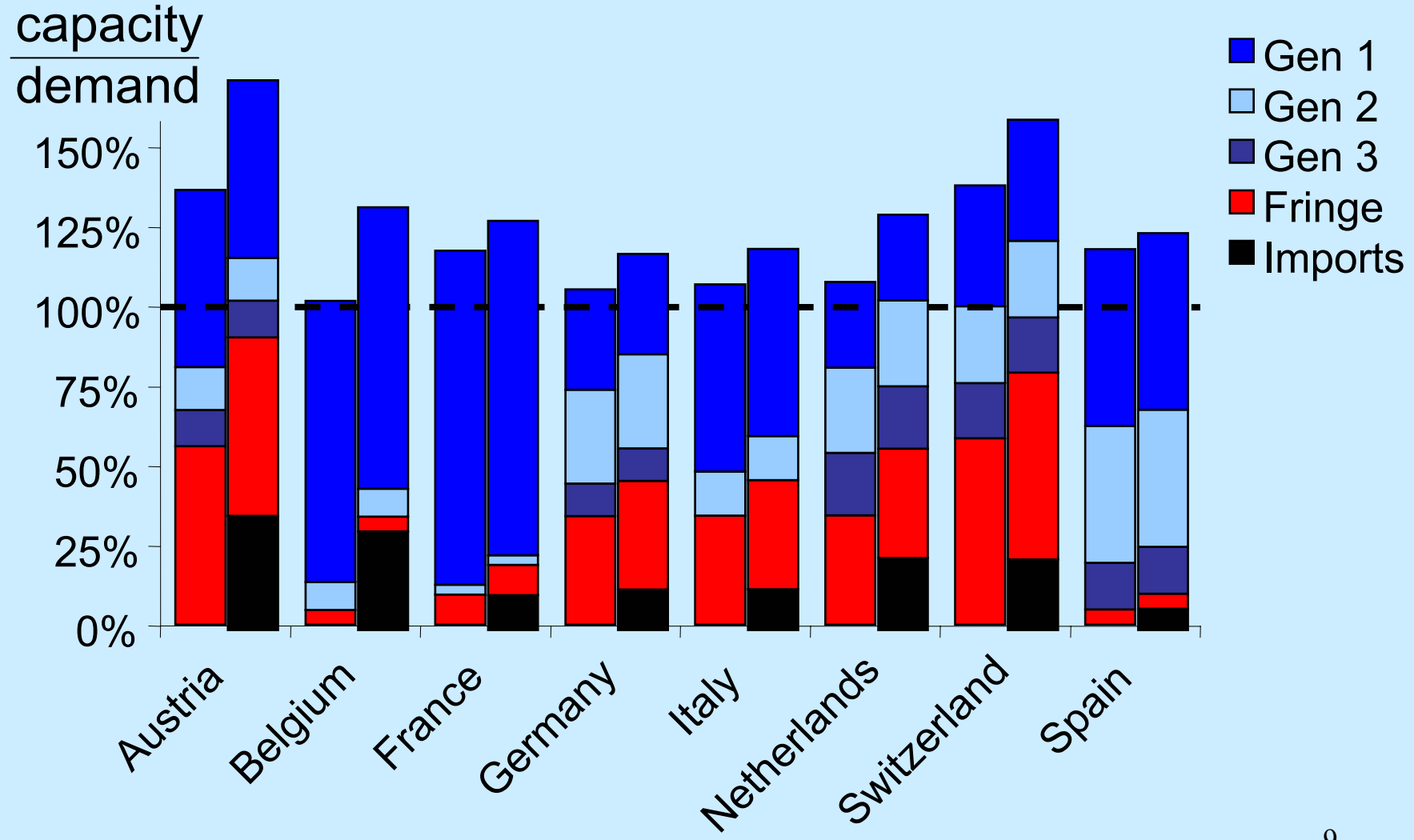
- no prior legislated cost-based regulation
- no concept of 'just and reasonable' prices
- little power to control wholesale prices
- often limited power to get information

$\Rightarrow$ weak market surveillance

– competitive tests derive from other markets

Generation companies have MP within countries

... and retain market power due to transmission constraints



Source: Remaining capacity and availability factor from UCTE Power Balance Forecasts 2002-2004, NTC from ETSO

Solutions?

- Auction design for interconnectors
  - legacy import auctions undesirable
  - efficient arbitrage mitigates importer power

  $\Rightarrow$ single price better than pay-as-bid
- Cross-border market integration
  - can reduce market power in both markets
- Increasing interconnection
  - more companies can access market
- Entry of IPPs based on gas

Competition law based approaches: the case of mobile phones

EC Communications Directives

- markets effectively competitive where no operator has Significant Market Power (SMP)
- NRAs can only impose ***ex ante*** regulation if
  - market review finds SMP that is likely to persist
- regulation must be
  - ***justified*** in relation to Directive's objectives
  - ***appropriate, necessary, proportionate***

Suggests regulation that mimics competition?

Significant Market Power- SMP

- defined to be equivalent to dominance:

  Undertaking deemed to have SMP if, alone or jointly with others, it has "the power to behave to an appreciable extent independently of competitors, customers and ultimately consumers." (Art. 14 , Directive 2002/21/EC)

Mobile termination as an example

Single dominance criteria

- ***Market shares*** not conclusive but
  - < 25% *presumptive* of no SMP
  - normally SMP requires > 40%
  - > 50% *presumptive* of SMP
- Allow for market shares that are: persistent, emerging, fluctuating, rapidly growing
- Barriers to and ease of entry
  - control of infrastructure, econs of scale/scope, VI

Regulating mobile termination

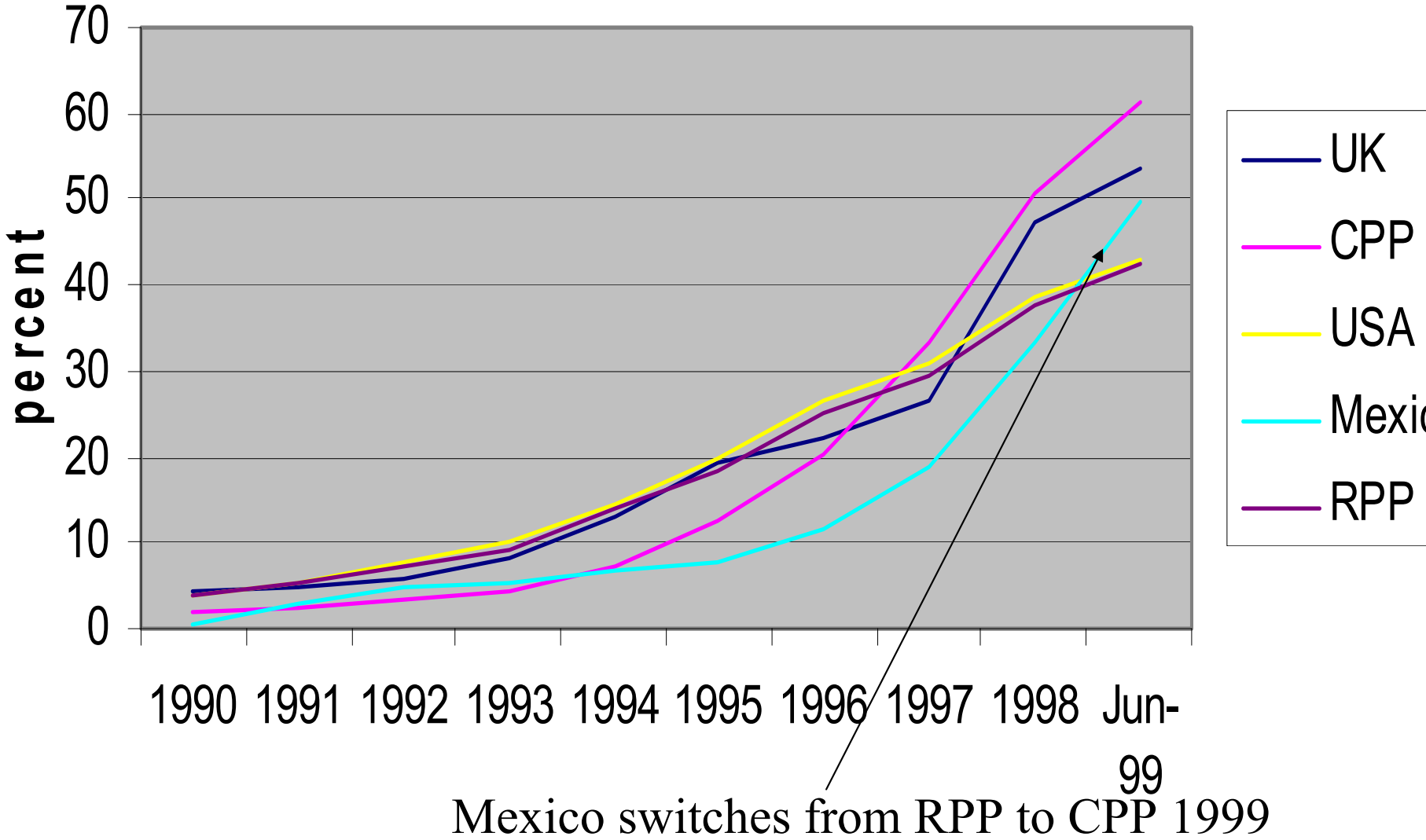
Oftel: Each MNO has SMP in the separate market for voice call termination on its network, and for 3 for wholesale 2G termination because:

- Calling Party Pays (and is insensitive to price)
- Each MNO has 100% of relevant market
- purchasers lack countervailing power
- charges persistently and significantly above cost

Whether to regulate termination

- Initially unregulated: dynamic market
- most MNOs not making profits
- mark-up on termination subsidises handsets
- contrast with receiving party pays (RPP)
  - where termination subject to competitive pressure
- CPP accelerates penetration compared to RPP
  - cross-subsidy addresses network externality

Mobile Subscribers as pecentage of access lines



Regulating termination charges

- Oftel: price control for 2G voice termination
  - EPMU on LRIC + network externality
- no ***ex ante*** regulation of 3G termination
  - emerging market, not yet profitable
  - 3G operators often use 2G termination
  - non-discrimination solves problem?
  - avoids issue of spectrum cost

Appealed to Competition Commission

Setting the termination charge

- To cover share of fixed and common costs
  - must "promote efficiency and sustainable competition and maximise consumer benefits" (Art 13, AD, 2002/19/EC)
- Access and call origination market effectively competitive

$\Rightarrow$ Ramsey mark-up(+externality) on LRIC

Not accepted by CC nor in Judicial Review

Ramsey pricing

- Constrained efficient solution
  - subject to breakeven, recovers F&C costs
  - competitive markets will Ramsey price
  - Ramsey price termination $\Rightarrow$ efficient outcome
  - termination less elastic $\Rightarrow$ markup > EPMU
- Oftel objections:
  - Access/origination not competitive
  - difficult; elasticities hard to estimate
  - "unfair" to fixed line callers

Making regulation more efficient

- Leveraging regulation into non-SMP markets?
- SMP in termination likely to remain

$\Rightarrow$ price control will need to be revisited

- other price controls rely on contentious theory/econometrics:
  - WACC based on CAPM + econometrics
  - benchmarked X-factors based on econometrics

Ramsey pricing mimics competitive outcome

Does the Competition Law approach work for ESI?

Collective dominance if:

- Market characteristics conducive to tacit coordination, ***and***
- Tacit coordination sustainable:
  - firms lack ability and incentive to deviate, given incentives for retaliation, and
  - Buyers, fringe firms, entrants cannot challenge tacit coordination

Collective dominance criteria

- Markets concentrated, transparent, mature
- Low elasticity of demand
- Homogenous product, similar costs, shares
- Little excess capacity, barriers to entry
- Excess pricing, profit
  - little response to cost fall, barriers to switching

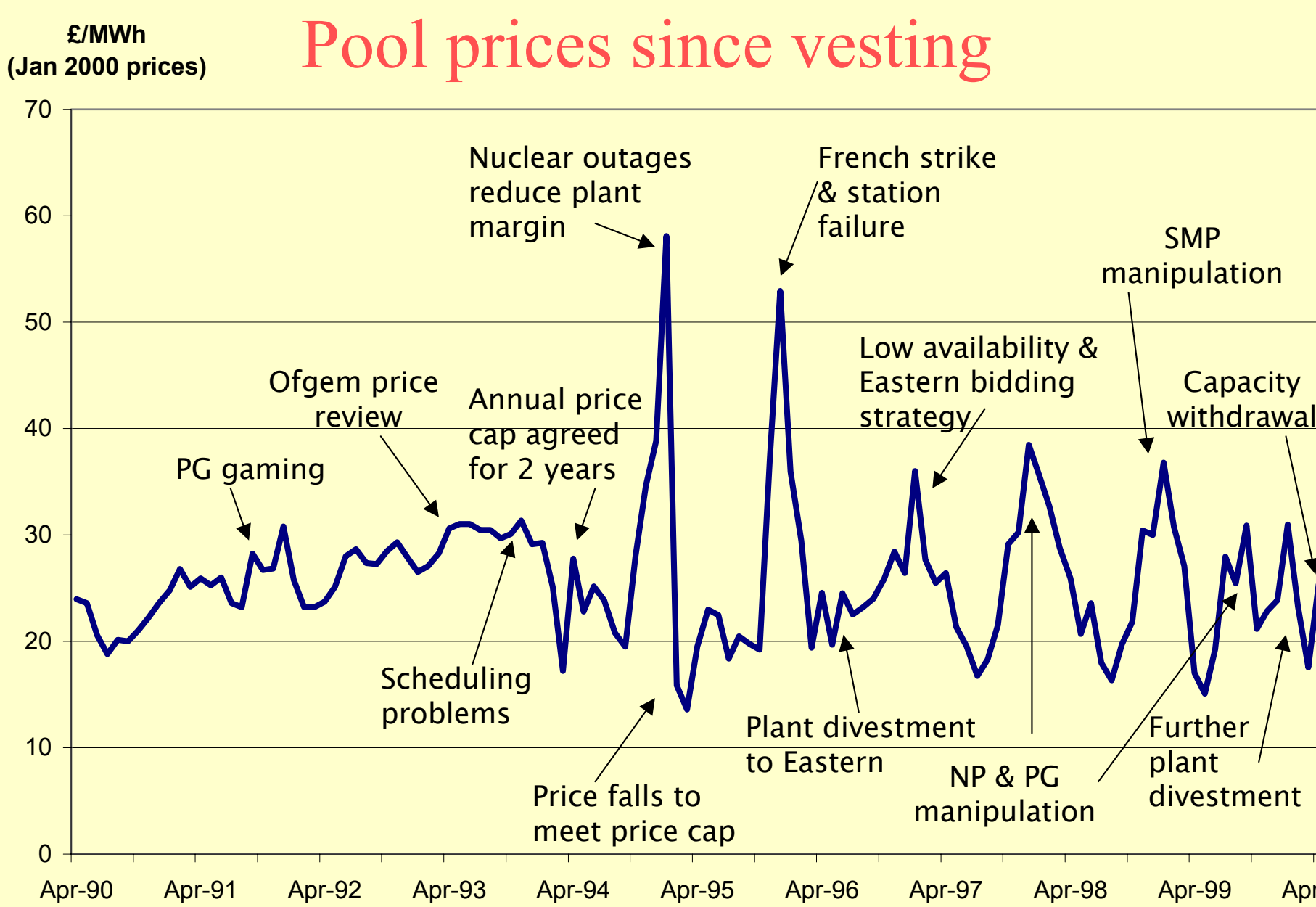
Electricity as a test case

Collective dominance: electricity

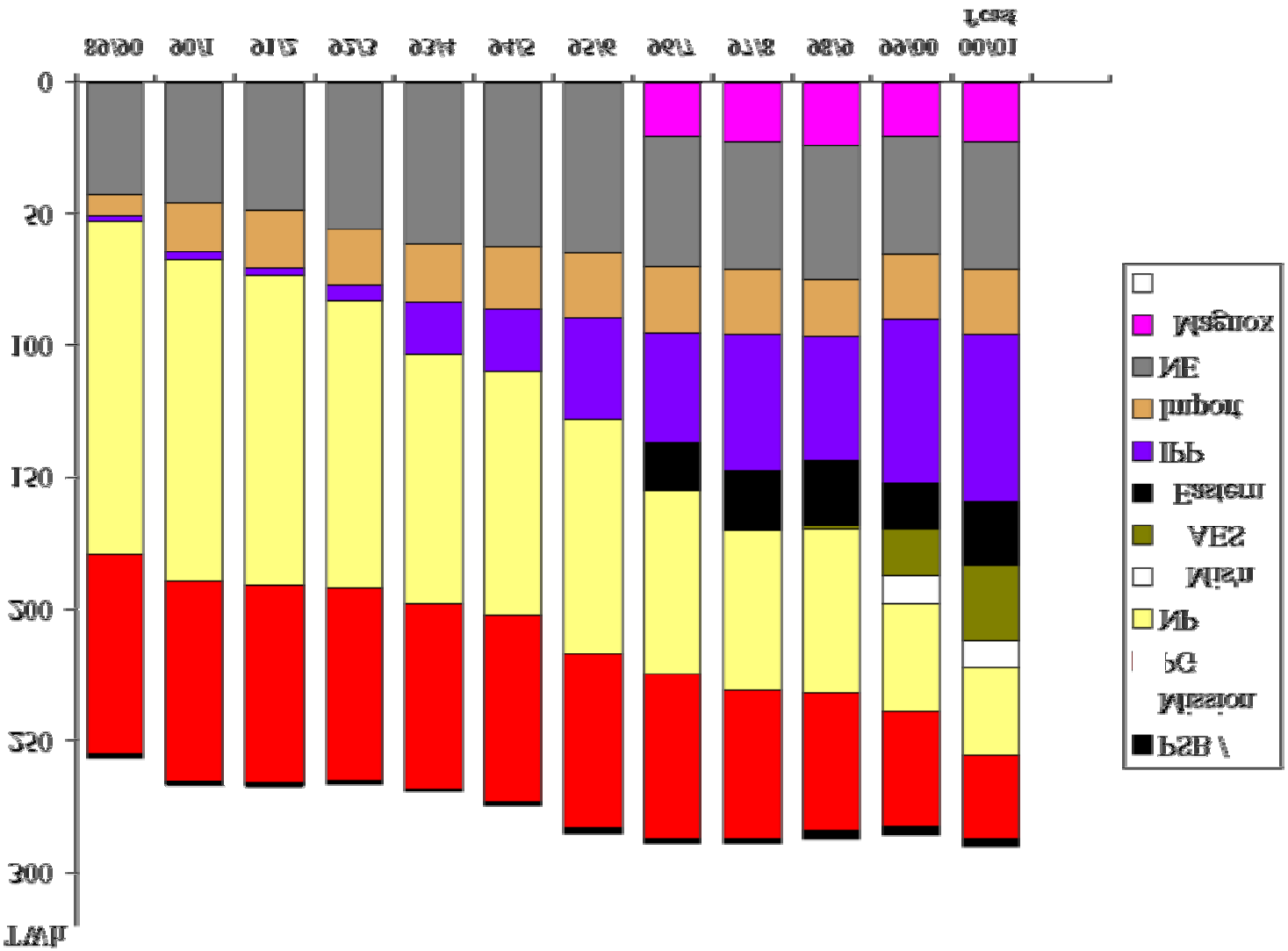
- 1990 restructuring of England &Wales ESI
  - unbundle G, T, D, S (supply)
  - create compulsory single-price gross Pool
  - flawed initial market structure
  - overgenerous price control on RECs

$\Rightarrow$ 12 years to structurally mitigate market power

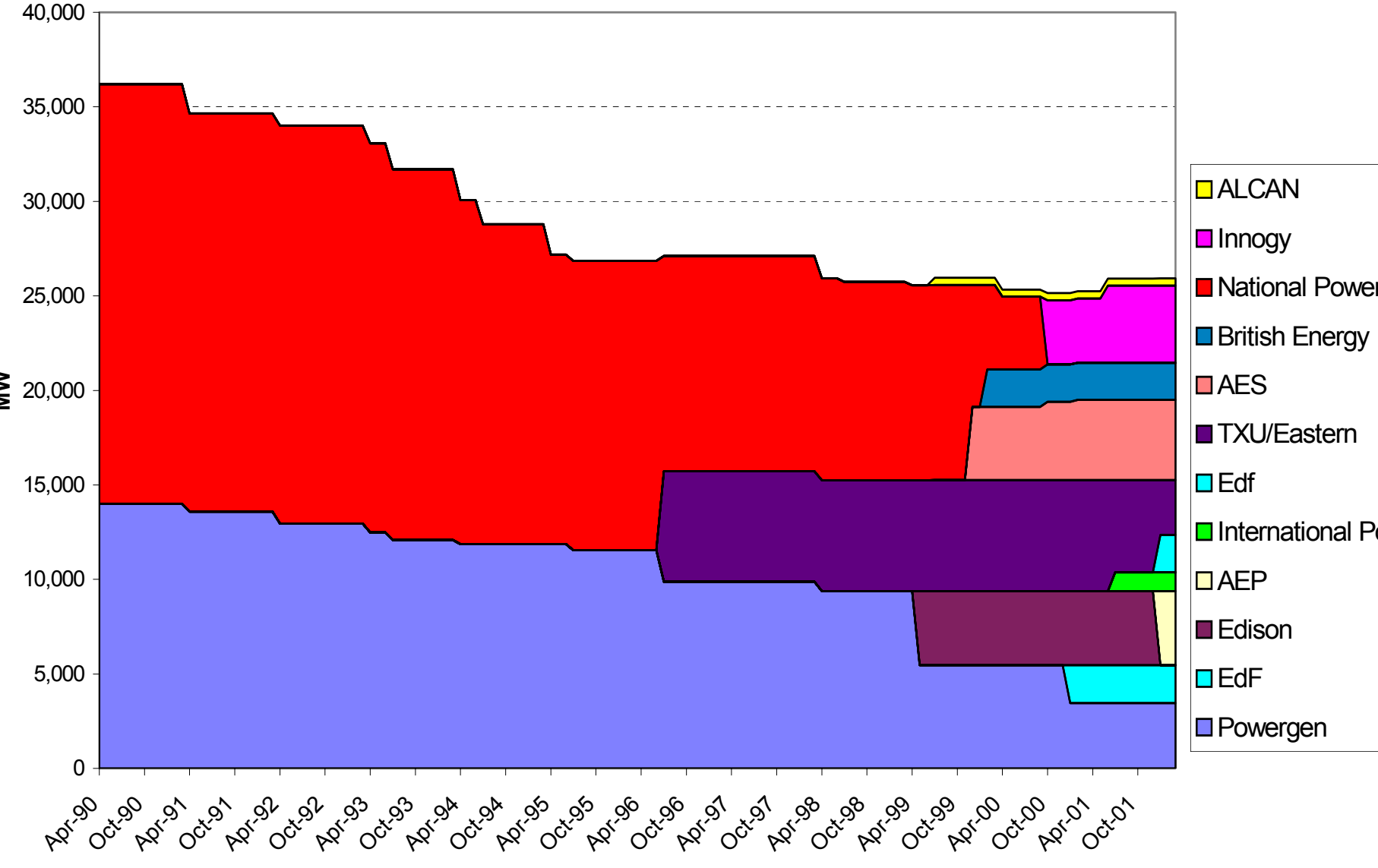
Pool prices since vesting



Generation in England and Wales



Capacity Ownership of Coal Generation 1990-2002



Source: John Bower (Oxford Institute for Energy Studies)

Collective dominance: the Pool

- Markets concentrated, transparent, mature
- Low elasticity of demand
- homogenous product, similar costs, shares
- little excess capacity, barriers to entry ?
- excess pricing, profit
  - little response to cost fall,
  - barriers to switching ??

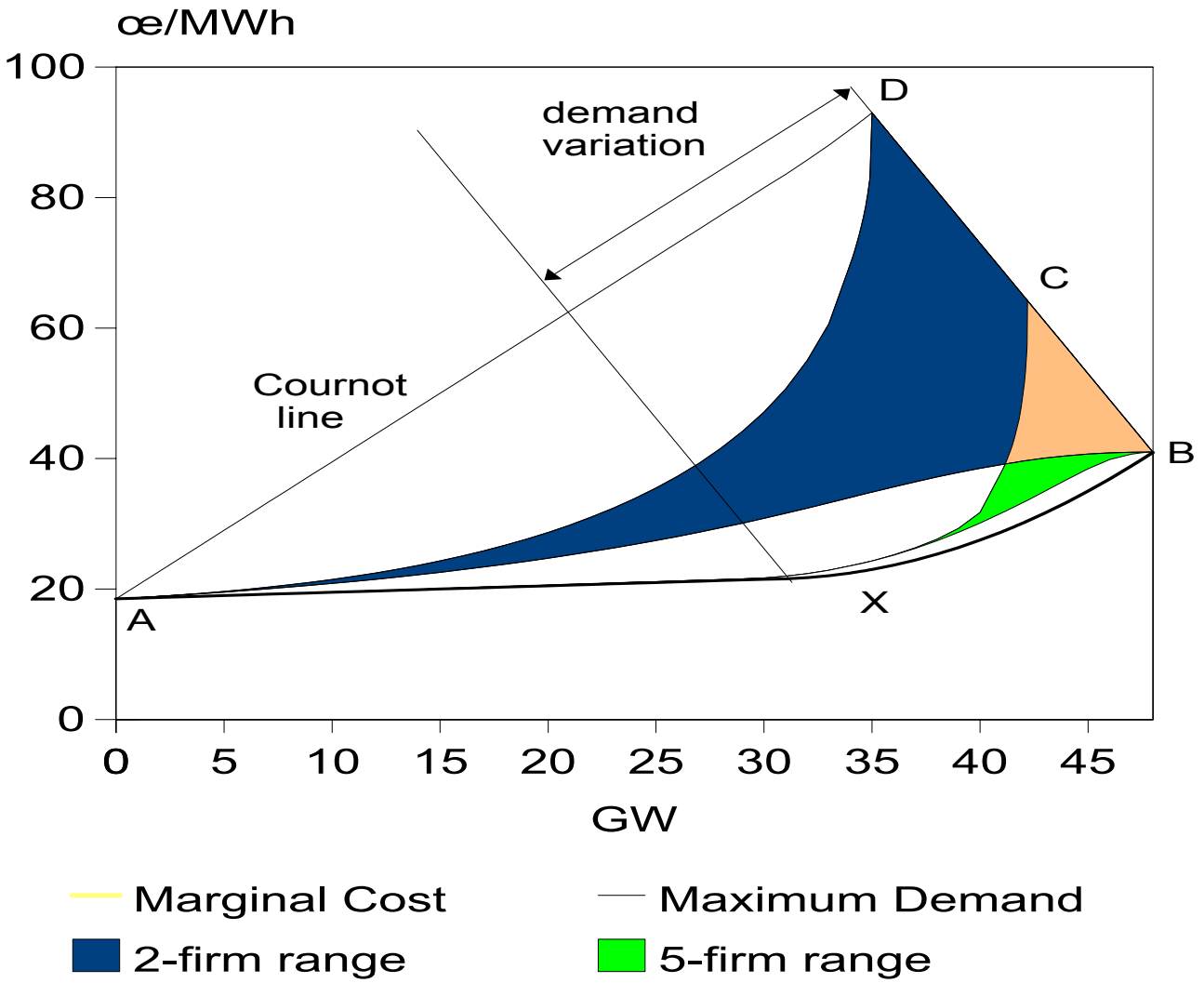
But how to measure market power?

Theory of electricity pricing

- Supply Function Equilibria
  - Green and Newbery (1992) *JPE*
- Cournot (by hour of day)
  - facing a fringe of competitive gencos
- Commercial software
  - captures non-convexities

Agree on general form of equilibrium

Feasible Supply Functions
Duopoly and Quintopoly

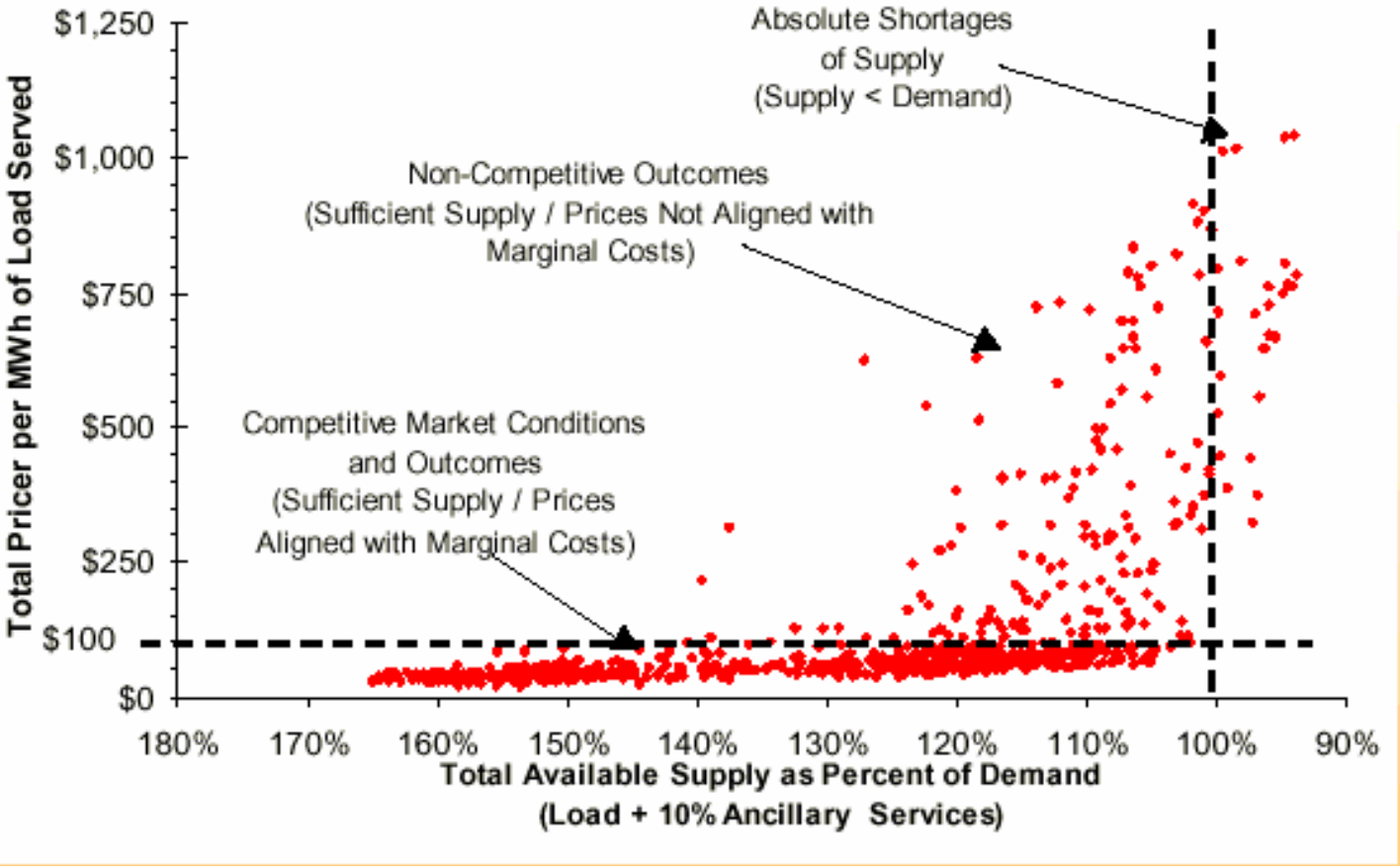


Calibrated for England 1990

Supply function equilibria

- Spare capacity $\Rightarrow$ Bertrand competition
- Tight capacity $\Rightarrow$ Cournot competition
- Spot competition for uncontracted output
- Entry determines average price
- Peak price depends on capacity

Scarcity or Market Power?



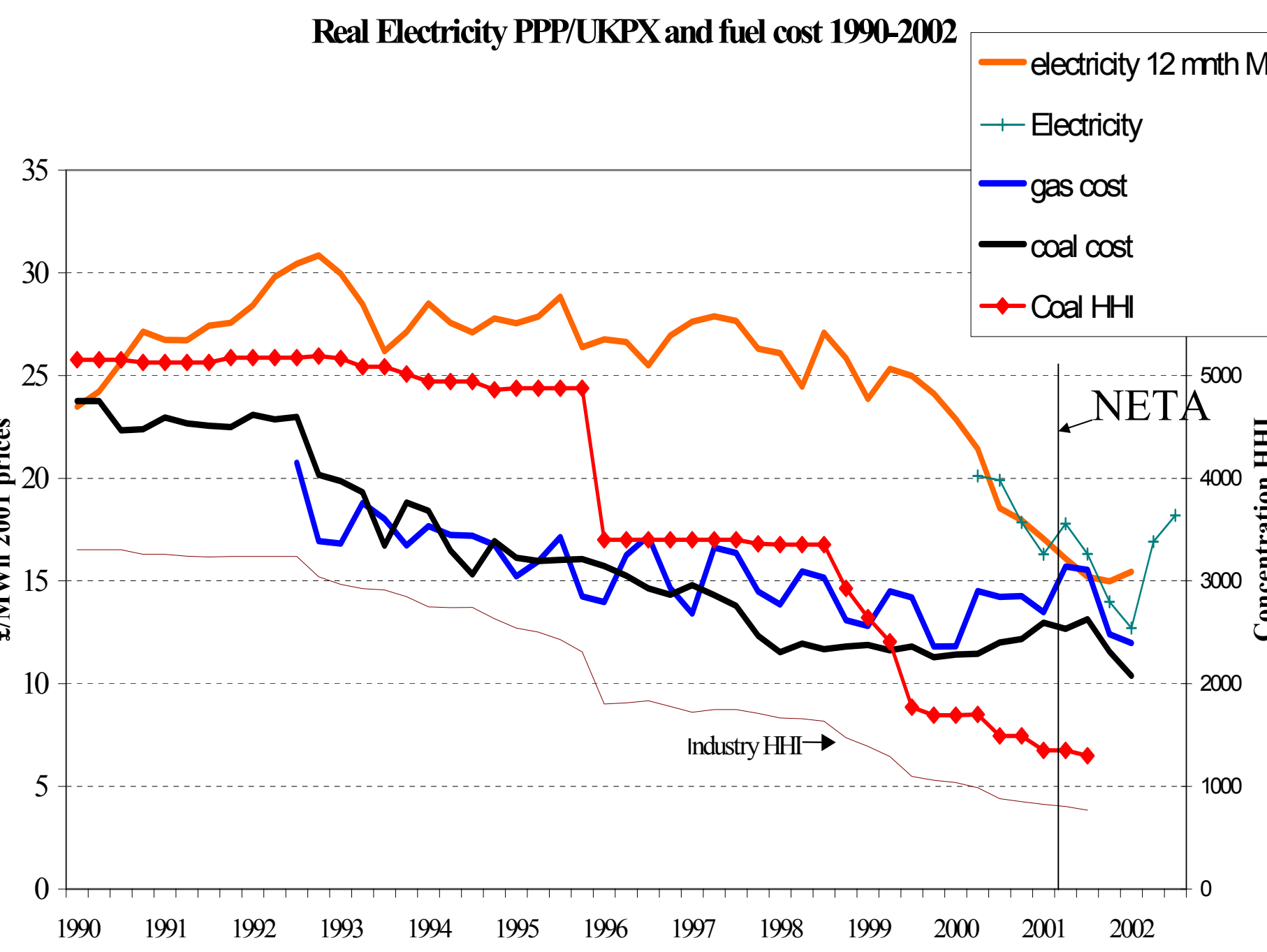
* Source: *Report on California Energy Market Issues and Performance: May-June, 2000*, Prepared by the Department of Market Analysis, August 10, 2000

Wholesale prices depend on:

- Number of competitive generators
- Short-run elasticity of demand
- Capacity relative to demand
- Contract coverage
- Entry conditions
- Demand uncertainty

Testing for collusion in a Pool

- Is each company's bid profit maximising against all other firms' bids?
- C.f. A Sweeting MIT (2001) of GB Pool:
  - 1990-94 bids too low for profit maximising
  - 1994-96 bid constrained by price cap
  - 1997-8 bids were profit maximising
  - 1999-2000 bids suggest tacit collusion - lower prices and higher outputs would increase profits


Real Electricity PPP/UKPX and fuel cost 1990-2002
electricity 12 mnth M
Electricity
gas cost
coal cost
Coal HHI
£/MWH 2001 prices
Concentration HHI
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Market Abuse Licence Condition

- Similar to prohibition of abuse of dominance
- defines SMP as "the ability to bring about, independently of any changes in market demand or cost conditions, a substantial change in wholesale electricity prices"
  - substantial = +5% for 30 days = £30 million
    = 0.4 % averaged over a year

MALC - 2

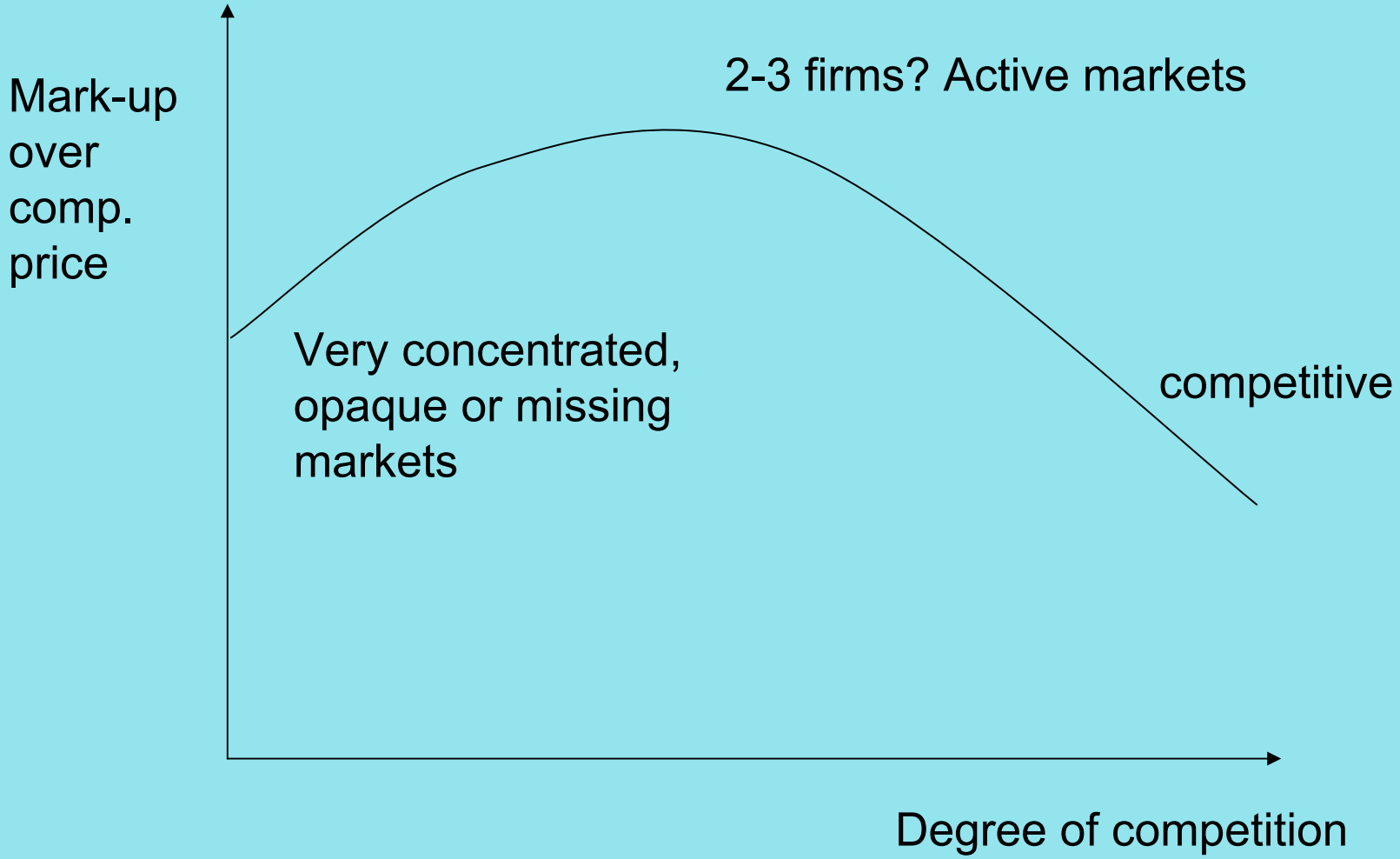
- CC *AES and British Energy* 2000:
  - Ofgem does not define relevant market
  - does not require that price change is profitable
  - CC does not believe Co.s have incentive
  - CC argues that the appropriate response to rule manipulation is to change the rules
  - CC "mindful of the disadvantages of a broad, effects-based prohibition"

Case dismissed

Evolution towards competition

- Market power is legal, *abuse* is not
  - concentrated markets constrained by this
  - less concentrated markets less constrained?
    - dominance "unlikely with less than 25% share"
    - difficulty of defining markets: cf MALC
    - very short term opportunity with non-storable output
- Intermediate concentration problematic?
- Highly competitive electricity insecure??

Evolution to a competitive market



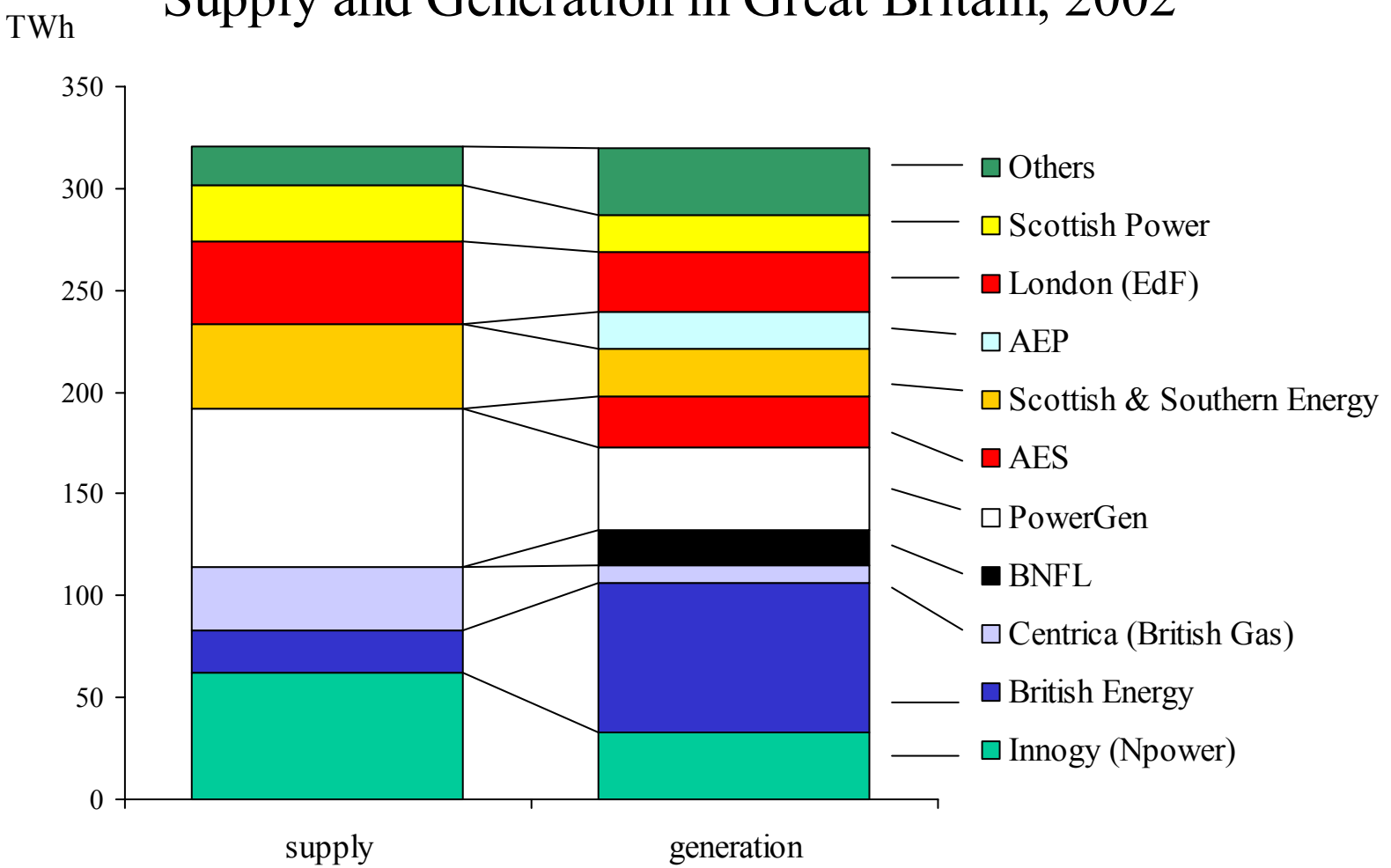
Bargaining for structural remedies

- PG & NP's bids for RECs referred to MMC
  - denied by Sec. of State
- dash for gas and more generators
- impending supply liberalisation
  - contracts shorter term, more competitive
- reform of trading arrangements threatened

$\Rightarrow$ wholesale market becomes more risky

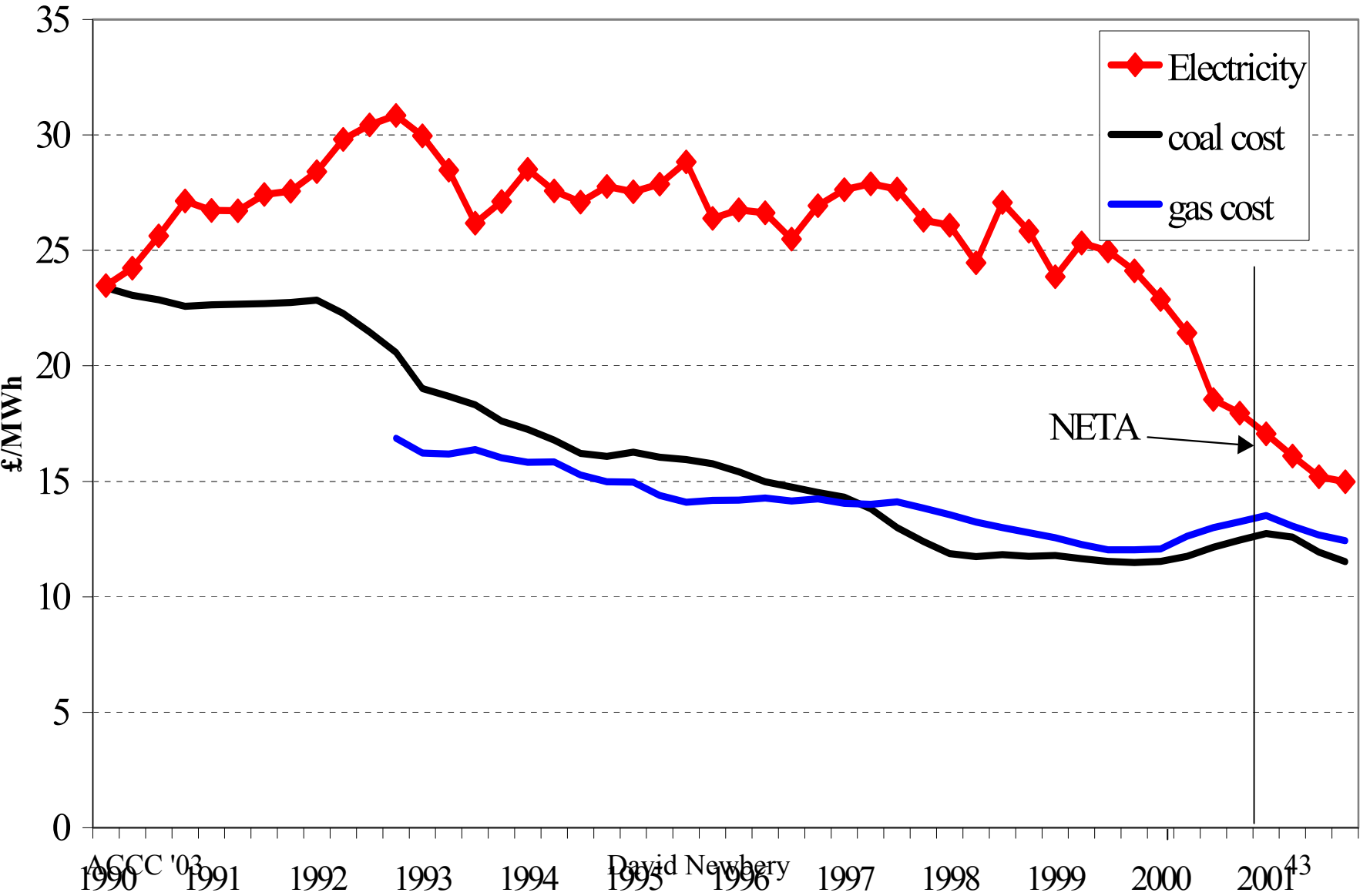
NP+PG trade horizontal for vertical integration

Supply and Generation in Great Britain, 2002



(2001/2 estimates, adjusted for the London/Seeboard, Innogy/Northern and PowerGen/TXU mergers) Source: R Green

Real electricity and fuel costs 1990-2002



Difficulties with US approach

- Re-regulation if prices not "just and reasonable"
- How then to encourage investment?
  - Peaking power may run a few hours/year
  - High prices needed to induce adequate reserves
  - threat of price caps leads to underinvestment
- Standard Market Design to force suppliers to contract ahead for capacity

Regulation to offset regulatory failure

Conclusions

- Competition Law - where markets are either competitive or need regulation
- Licences have advantages for imperfectly competitive markets
  - require market surveillance
  - mechanism to ensure adequate information
- Reducing the potential for tacit coordination may require structural reforms

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Acronyms-1

CC: Competition Commission

CEC: Commission of European Communities

EPMU: equi-proportional mark-up

ESI: Electricity supply industry

IPP: Independent Power Producer

LRIC: Long run incremental cost

MALC: market abuse licence condition

MNO: mobile network operator

MMC: Monopolies and Mergers Commission, now CC

Acronyms-2

NRA: National Regulatory Authority

NP: National Power

PG: PowerGen

REC: Regional Electricity (Distribution) Company

rTPA: regulated Third Party Access

SMP: Significant Market Power

WACC: weighted average cost of capital

2G, 2G: 2nd, 3rd generation mobile