Electricity Policy Research Group

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UNIVERSITY OF CAMBRIDGE

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

DIW Berlin

Spot trade or long term contracting a strategic perspective

Cambridge, December 2005

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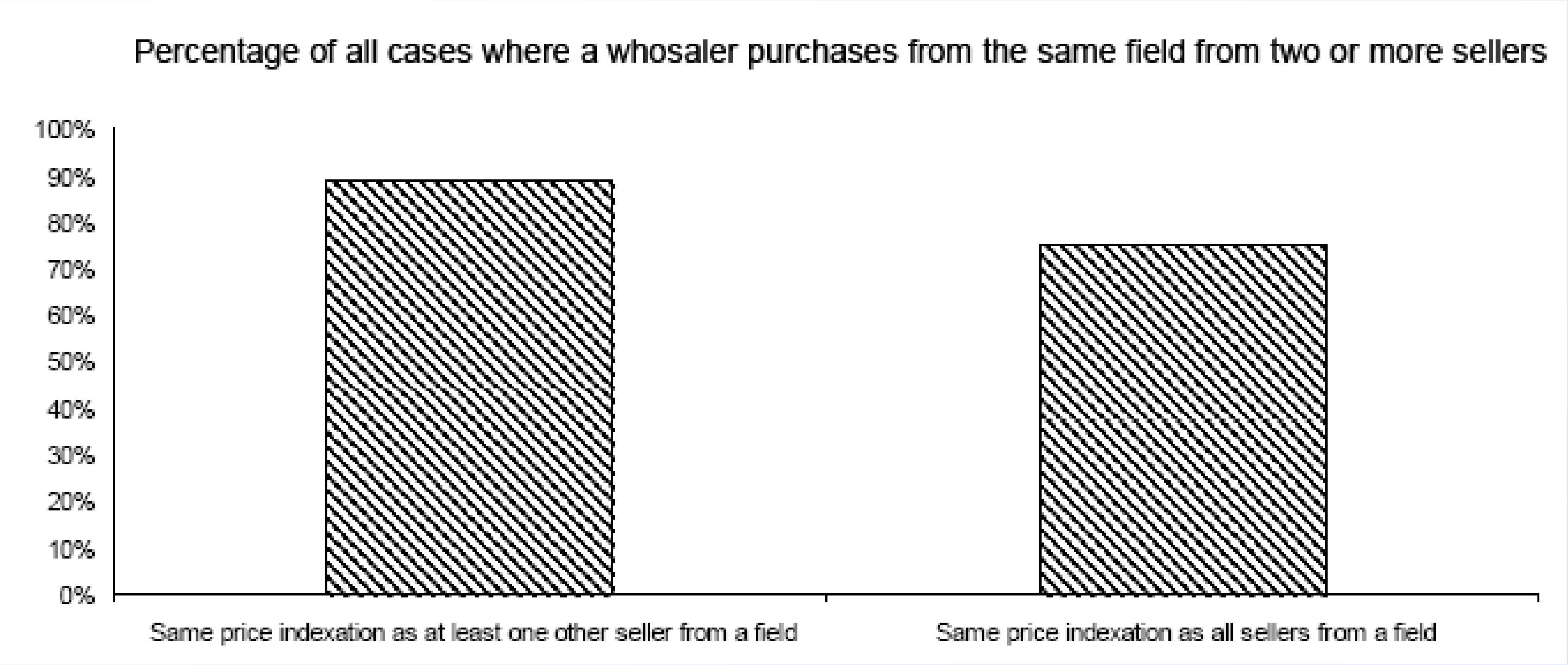
Based on Work with Christian von Hirschhausen

Do we need long-term contracts for gas producers?

- EU sector enquiry – are current LT contracts collusive?
  - No resell provisions



Source: Sector Inquiry of Commission

Do we need long-term contracts for gas producers?

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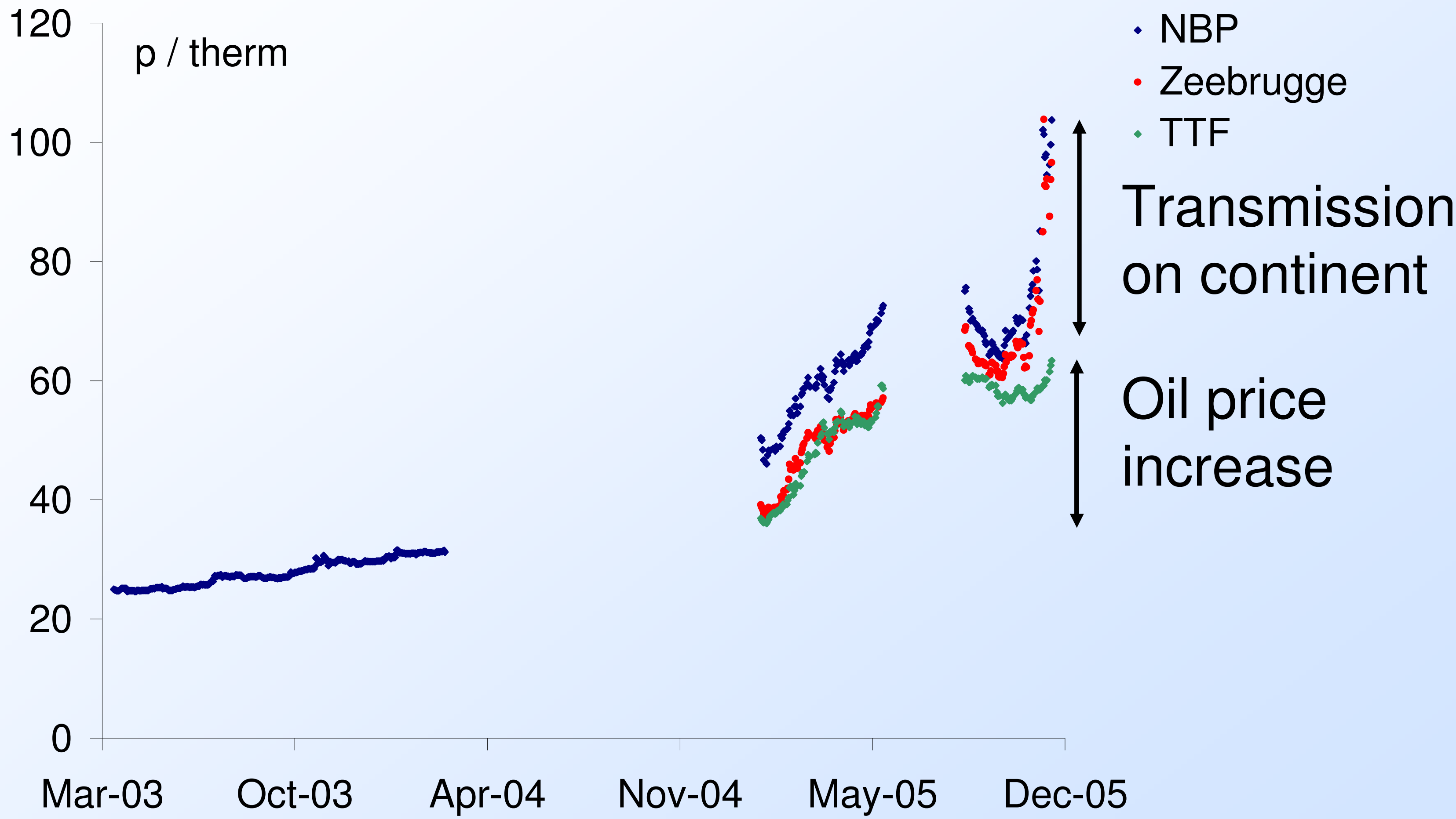
- Should we move to liquid spot trading?
  - UK forward prices failed to predict lower production

Forward prices failed to anticipate current price spike



Work with Anne Neumann

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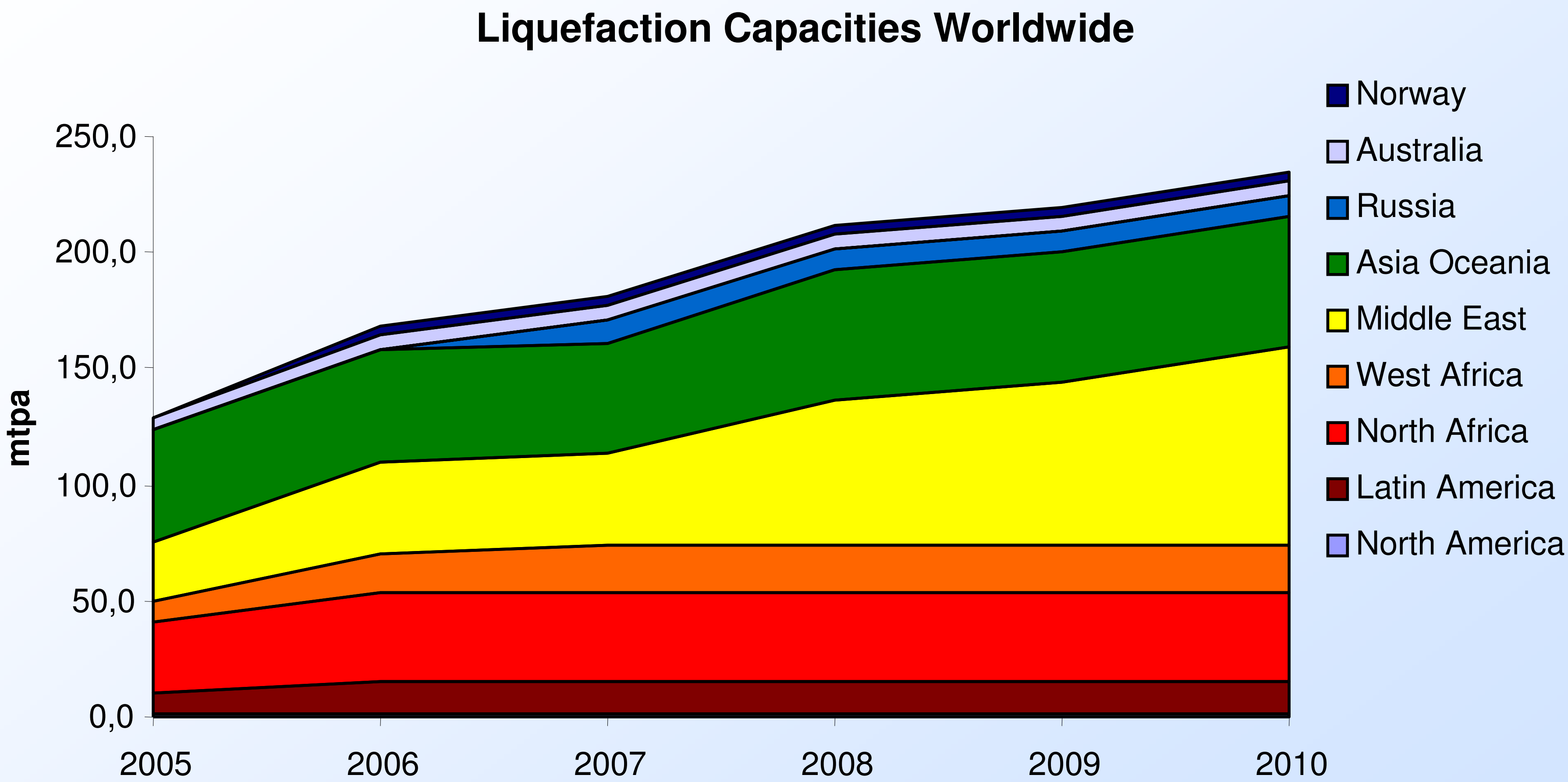
  - Russia – does Gasprom invest in production/T?
  - LNG terminals – but where are ships and gas?

…. and will we get all that LNG investment?

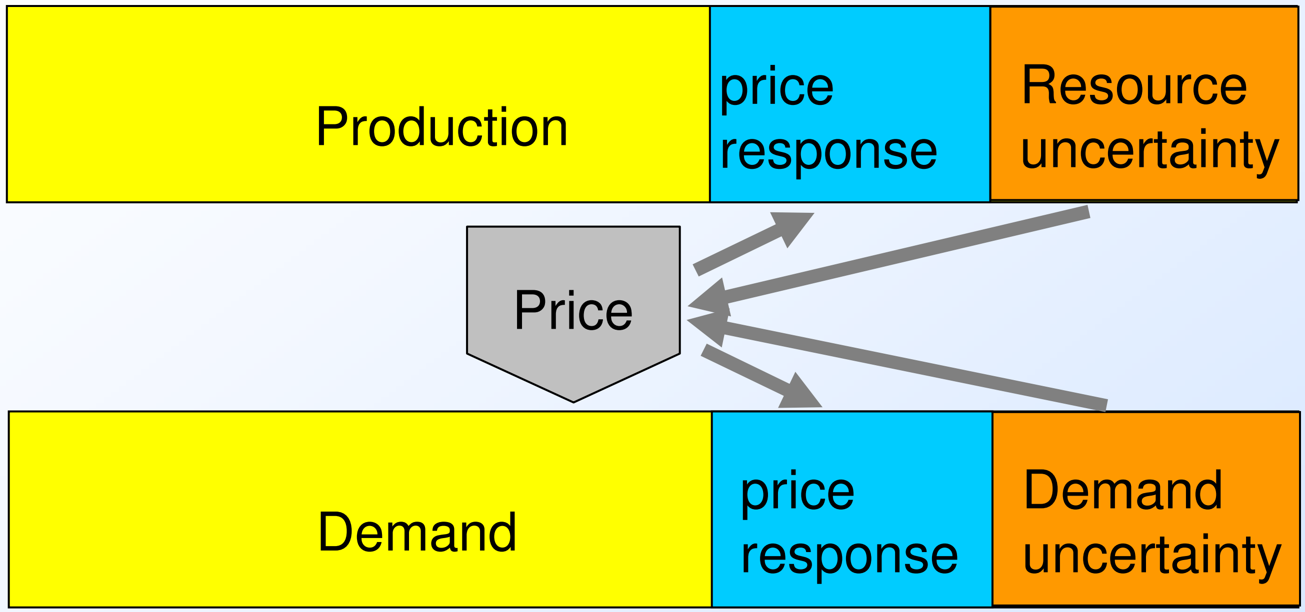


Source: Sophia Ruester

Do we need long-term contracts for gas producers?

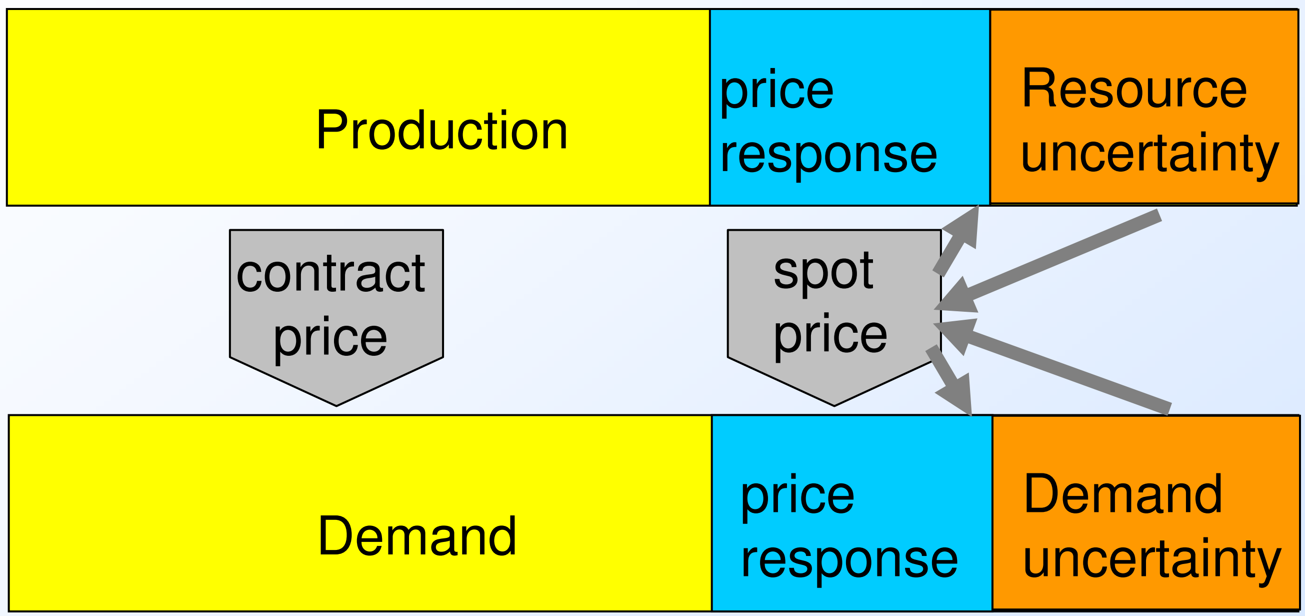
- EU sector enquiry – are current LT contracts collusive?
  - No resell provisions
- Should we move to liquid spot trading?
  - UK forward prices failed to predict lower production
  - Russia – does Gasprom invest in production/T?
  - LNG terminals – but where are ships and gas?
- Or should we move to transparent fixed price contracts?
  - Free resell, not restricting spot market liquidity
  - Producers don’t want to abandon successful cartel
  - Domestic retail competition constrains counter party

The benefits of spot trading



- Spot trading ensures efficient response to uncertainty
- But exposes all market participant to price volatility

combined with the benefits of long-term contracts



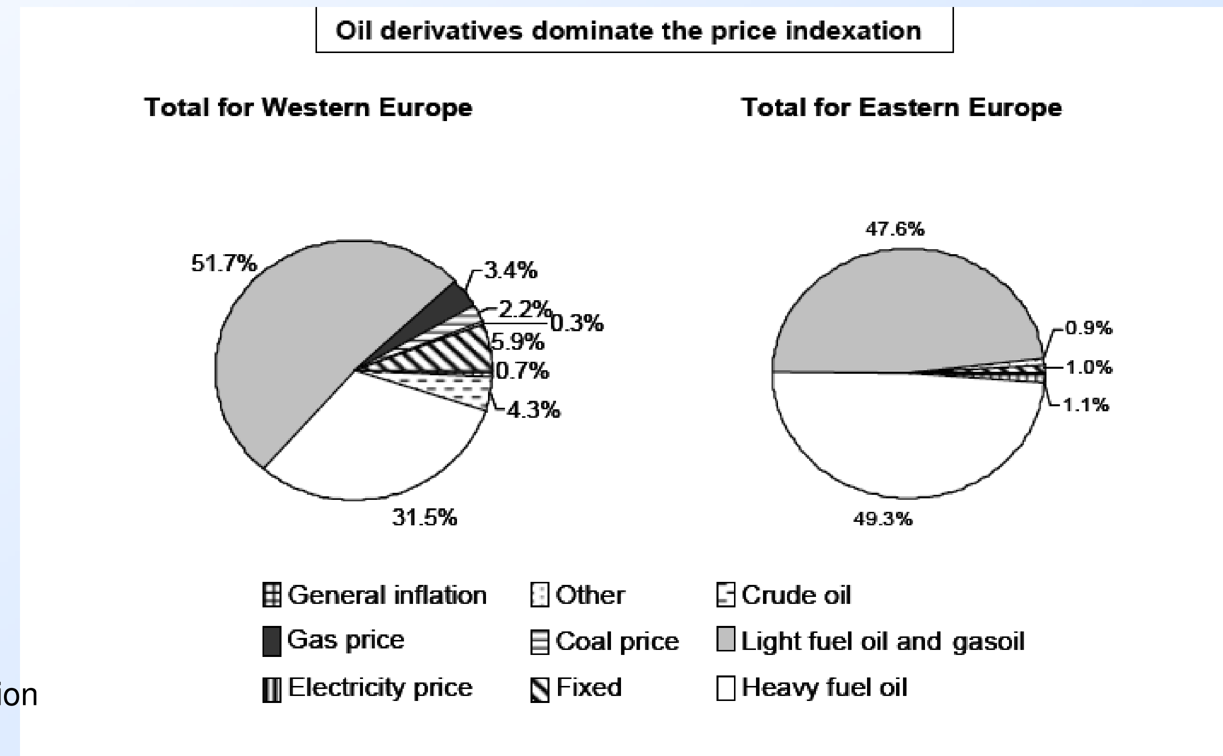
- Fixed price long-term contracts eliminate price volatility
- While retaining efficient re-allocation in spot market
  (assuming free resell etc.)

1. Benefit of LT contract: Hedging price risk

- Price risk difficult to hedge in financial markets
- Investors require higher rate of return on capital
  (limited risk appetite, regulatory risk)
- Increases production costs and expected gas price
- Consumers prefer stable energy bill if they do not sell output on markets linked to gas price
- Replicate LT by overlapping ST contracts ?

LT contract priced relative to oil

- Historically 15-20 year take or pay contracts
- With increasing regulatory uncertainty contract length decreased
- Historic oil price link



Source: Sector Inquiry of Commission

Future of oil price link?

- Remove oil price link today?
  - In power sector main substitute coal
  - Reduces revenue volatility for exporting/importing economies
- Retain oil price link?
  - If collusion among producers, likely to resist renegotiations
  - First moving electricity generator increases risk with fixed gas prices if electricity prices remain linked to volatile gas price
- Shift towards fixed pricing via S-curve?

2. Benefit of LT contract: Securing investment

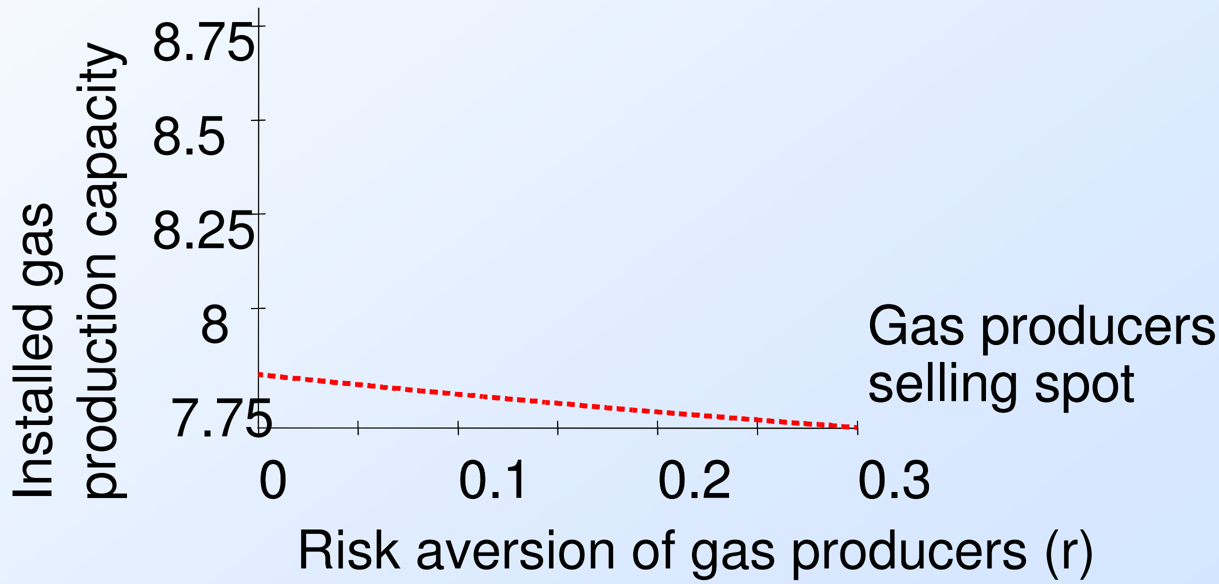
- Stable revenue streams facilitate financing

- Assume competitive market/spot sales:
  - downside risk is excess capacity and low prices
  - risk averse producers reduce investment
- Assume competitive market/LT sales
  - downside risk is failing to meet contract obligation
  - risk averse producers increase investment

Effect of uncertainty about future production

Assume:

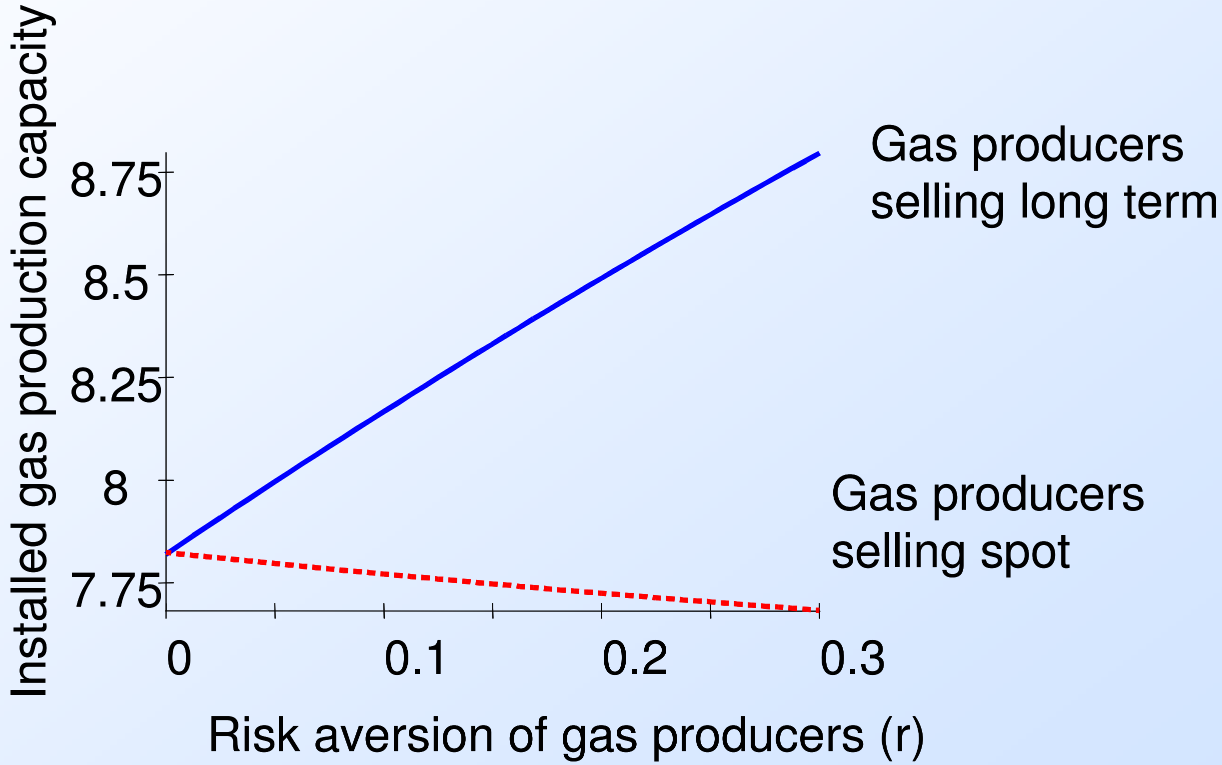
- Fixed investment costs c per unit of capacity
- Technology uncertainty can shift future output +/-15%
- Competitive market invests while profits are positive
- Risk averse investors weight losses (1+r) times profits



Contracting changes investment choices

Assume:

- Producers sell 95% of output with long-term contracts
- Then decide on investment in production
- Producers can sell or buy on spot market



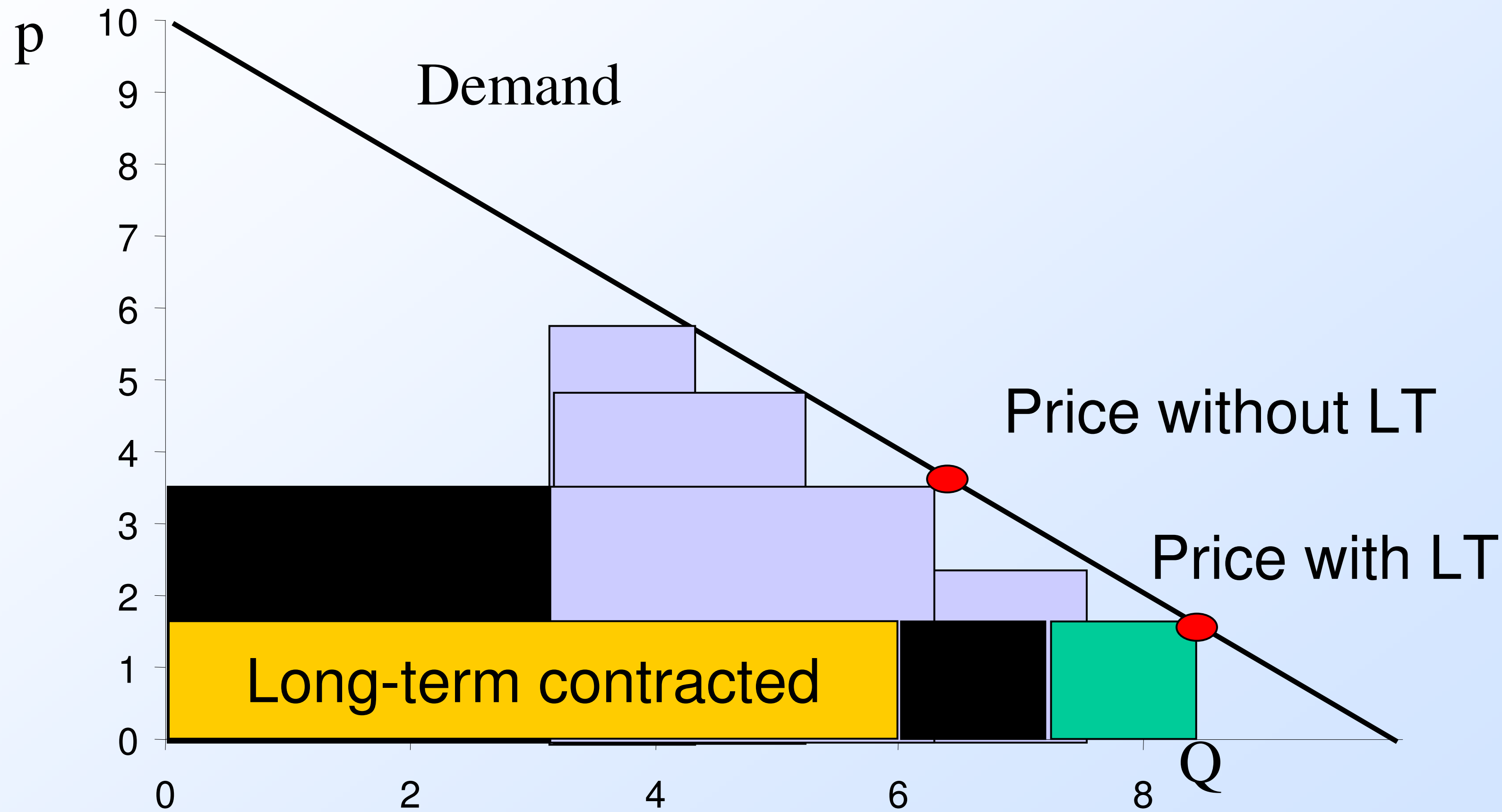
3. Benefit of LT contract: Revelation of information

- If most sales spot, producers signal excess supply
  - Prevents entry of competitors
  - Reduces investment
  - Increases future prices and revenues
- If most sales long term, producers signal short supply
  - Demand buys long-term contracts at high prices
- With long-term contracts
  - Demand/supply expectation revealed in contracting decision
- Without long-term contracts
  - Forward market reveals market expectations
  - But recent experience unsatisfactory

4. Benefit of LT contract: Reducing market power

- Strategic value for sellers
- Additional sales stage reduces MP

Long-term contracts commit producer to lower prices

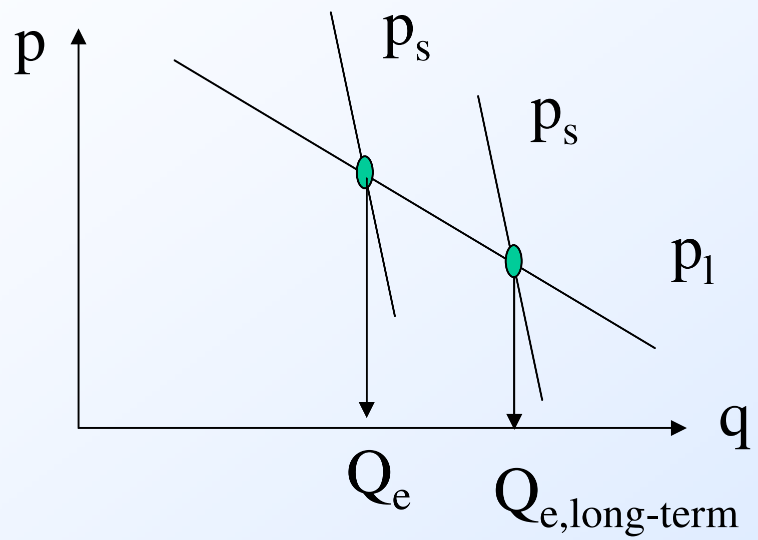


- Long-term contracts reduce prices
- In traditional models long-term contracts reduce producer profit

Neuhoff, K. and von Hirschhausen, C. (2005) ‘Long-term ve. Short-term Contracts; A European perspective on natural gas’, CWPE 0538 (EPRG 05)

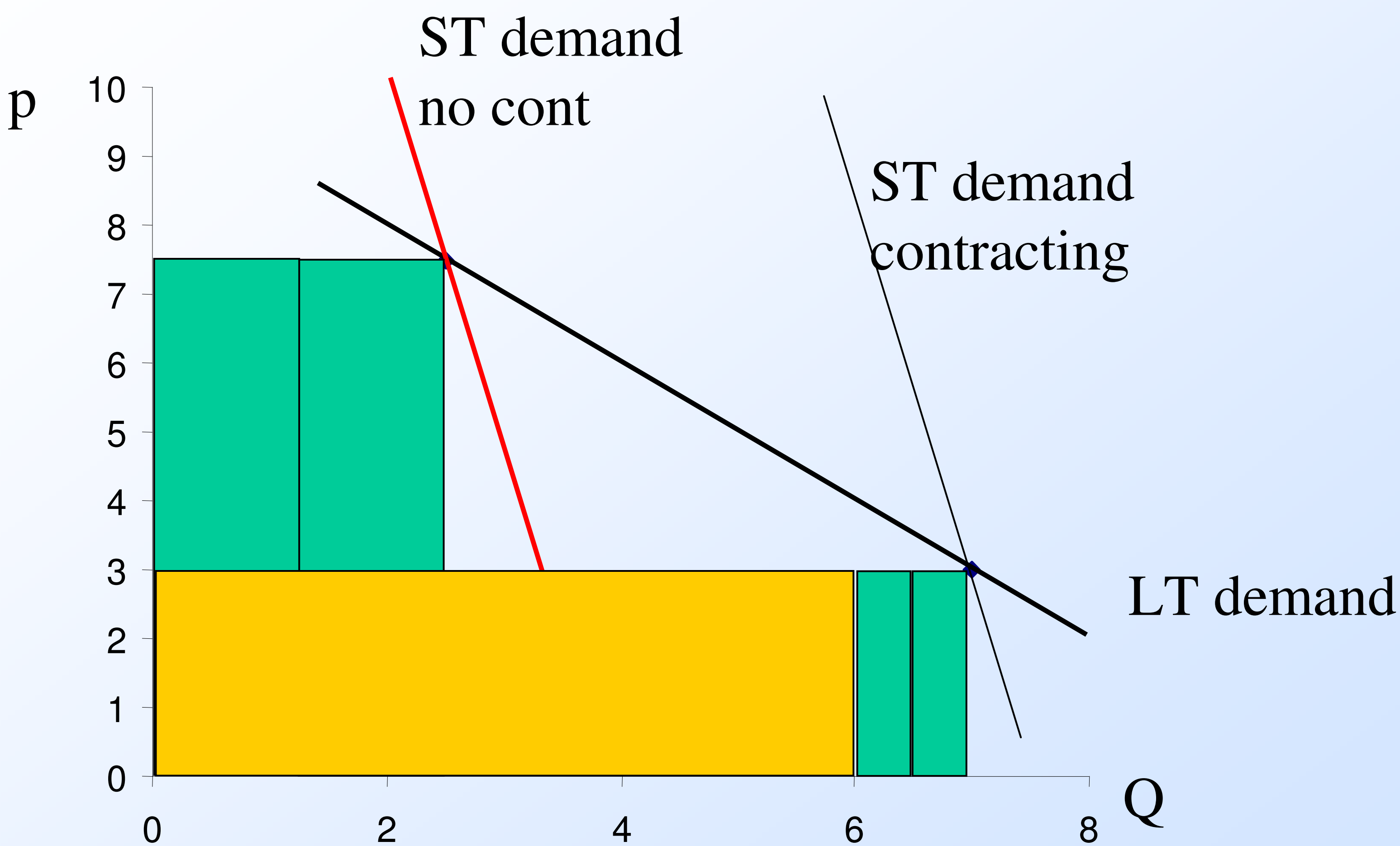
Demand more elastic short-term than long-term

- Fuel choice at time of investment decisive

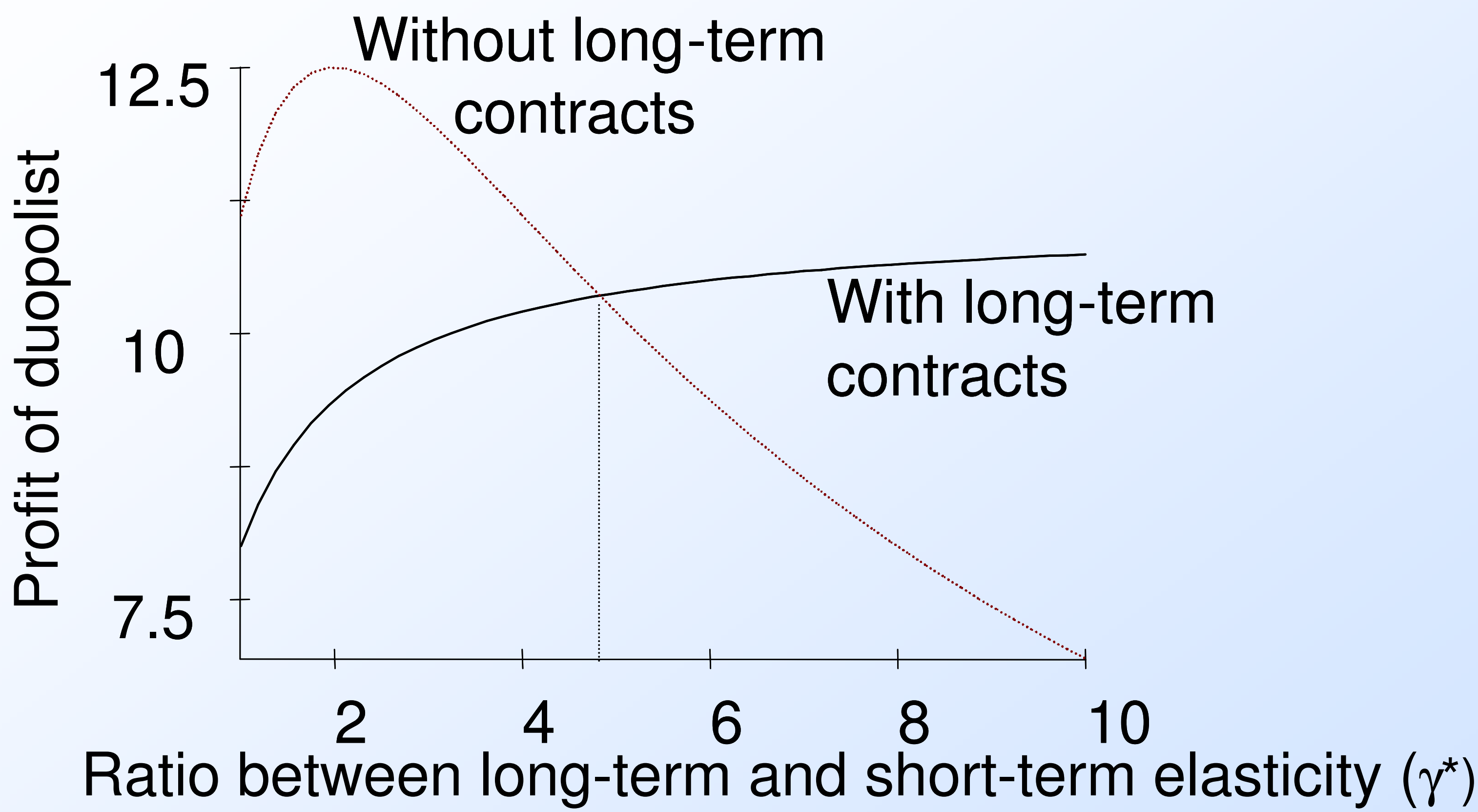


Rational Expectations, $P_l = P_S$

Investment/ output choice with rational expectations

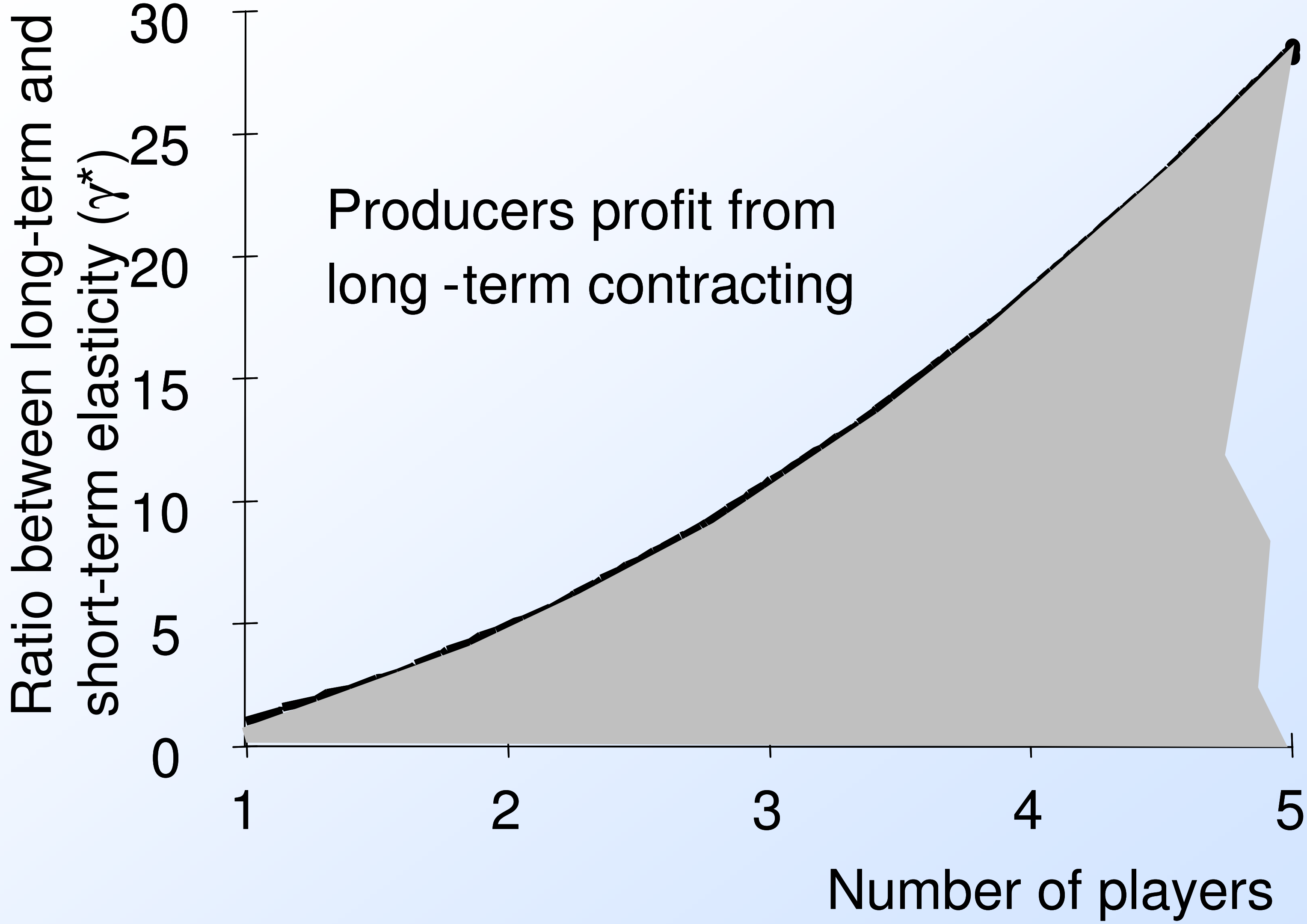


Producers' profits with(out) long-term contracts



γ^* ~ 5, corresponding to elasticity estimates by Al Sahlawi (1989) for industrial gas demand and Estrada and Fugleberg (1989)

When are producers better of with LT contracts?



Conclusions: Impact of high long-term elasticity

- Long-term contracting commits producer to lower spot prices
- Consumers always benefit from this strategic effect
- Lower price levels also increase long-term demand
- This creates benefits for producers
- With high market concentrations and significantly higher long-term than short-term demand elasticity producers can even profit from long-term contracts

5. Benefit of LT contracts: Bilateral components

- Short term trading costs vs. LT contracting costs?
- Address hold up problem if assets are dedicated

Drawback of LT contract:

- Creates additional opportunity for collusive behaviour
- If all demand/production covered entry difficult
  - Hence initial objection during liberalisation
  - Adjustment relative to LT position creates trade
  - Balance with benefit for investment of entrant

… and what I still don't understand

- Why not follow other sectors without LT contracting
  - refinery, aluminium, oil production, airlines
  - Would they be cheaper without LT contracting?
  - Is it more difficult to sign LT contracts ?
  - Do they receive other government support?
- Is counter party risk too big with fixed price contracts?

Institutional constraints on LT contracts

- If retail company buys on long-term contract
  - At times of low spot prices customers switch away
  - Retail company not credible counter party
- Option 1: LT retail contracts for domestic customers
  - Does it further reduce competition?
  - Does it create additional transaction costs?
  - Do customers care/internalise strategic effect?
- Option 2: Franchise for domestic customers
- Option 3: Only industrial customers buy LT
  - Volume too small for strategic effects?

Summary

- Current debate on LT contracts
  - Concerns raised by sector enquiry
  - Does cosy cartel prevent shift from oil-price link?
- Benefits of long-term contracts
  - Hedge price risk
  - Give right investment incentives
  - Reveal information
  - Mitigate market power
- LT contracting inconsistent with retail competition?