

RESOURCES

International Energy Resource Markets under Climate Constraints – Strategic Behavior and Carbon Leakage in Coal, Oil and Natural Gas Markets

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Natural gas: A lower-carbon transformation fuel

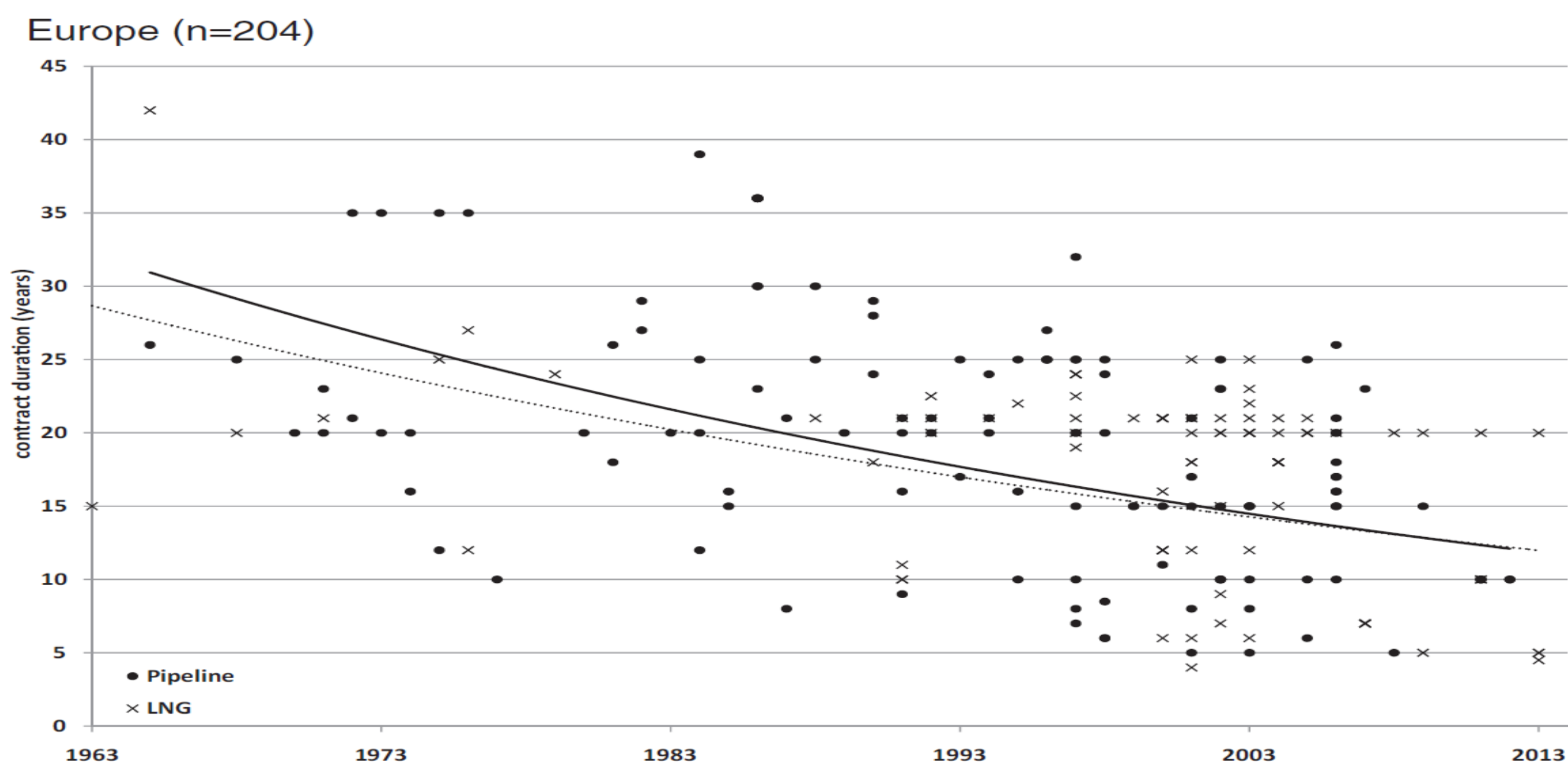


Figure: Trends in number and duration of long term supply contracts signed in Europe.: Source: Neumann, Hirschhausen 2015.

Long-term contract database and econometric analysis reveals an increasing flexibilization of natural gas supplies due to larger share of LNG. Increasing use of natural gas in emerging economies (espec. China) substitutes some of coal growth.

Endogenous shifts in OPEC market power

OPEC can exert market power only if the competitive fringe has little or no spare production capacity (e.g. in the boom until mid-2008)

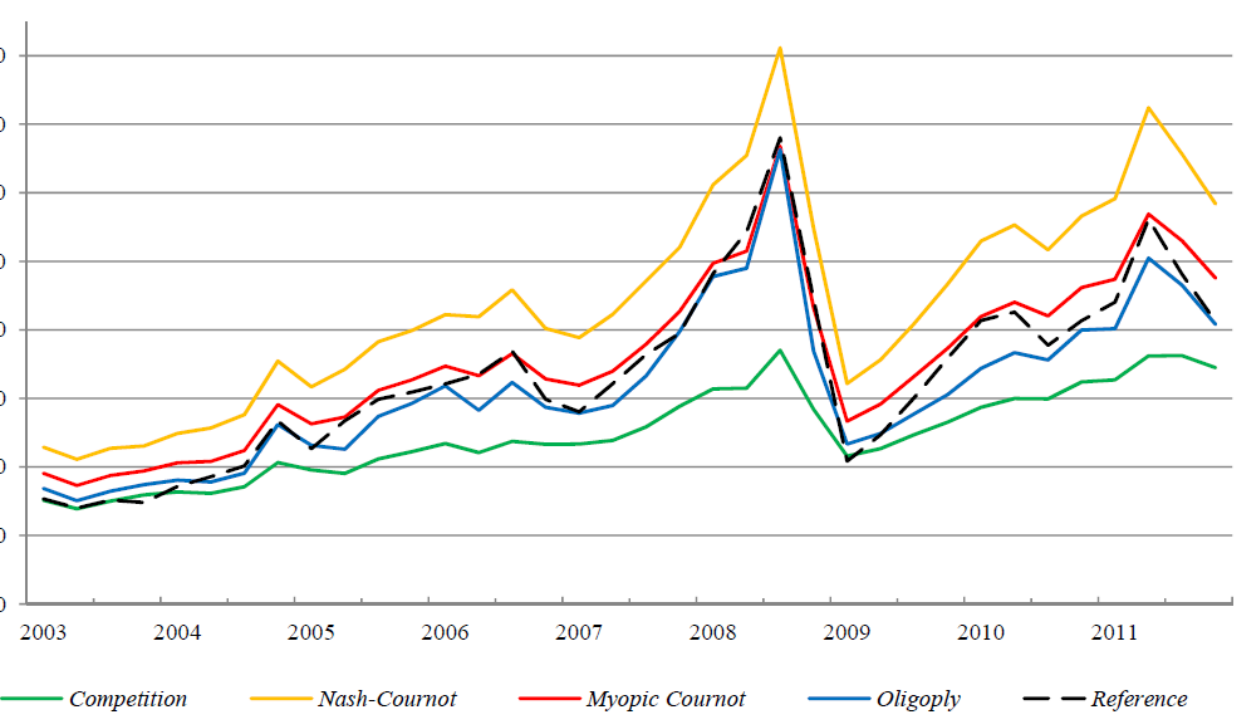


Figure: Equilibrium price by market power case, and reference (in US\$/bbl). Source: Huppmann 2013.

Main Findings and Conclusions

- Fossil resources continue to play a large role in the world's energy systems until 2050. Regional climate policies cannot mitigate the global upward trend due to large share of growing Asia.
- Supply-side climate policies require multilateral coordination in order to be effective.
- Fossil fuel consumers can use domestic renewables and energy efficiency strategically to increase security of supply and reduce GHG emissions.

Supply-side policies on the steam coal market: impact of an export tax

With a coalition, there is small leakage effect & large reduction in global consumption (on average 200 Mt CO₂ per year). Price increase due to export tax.

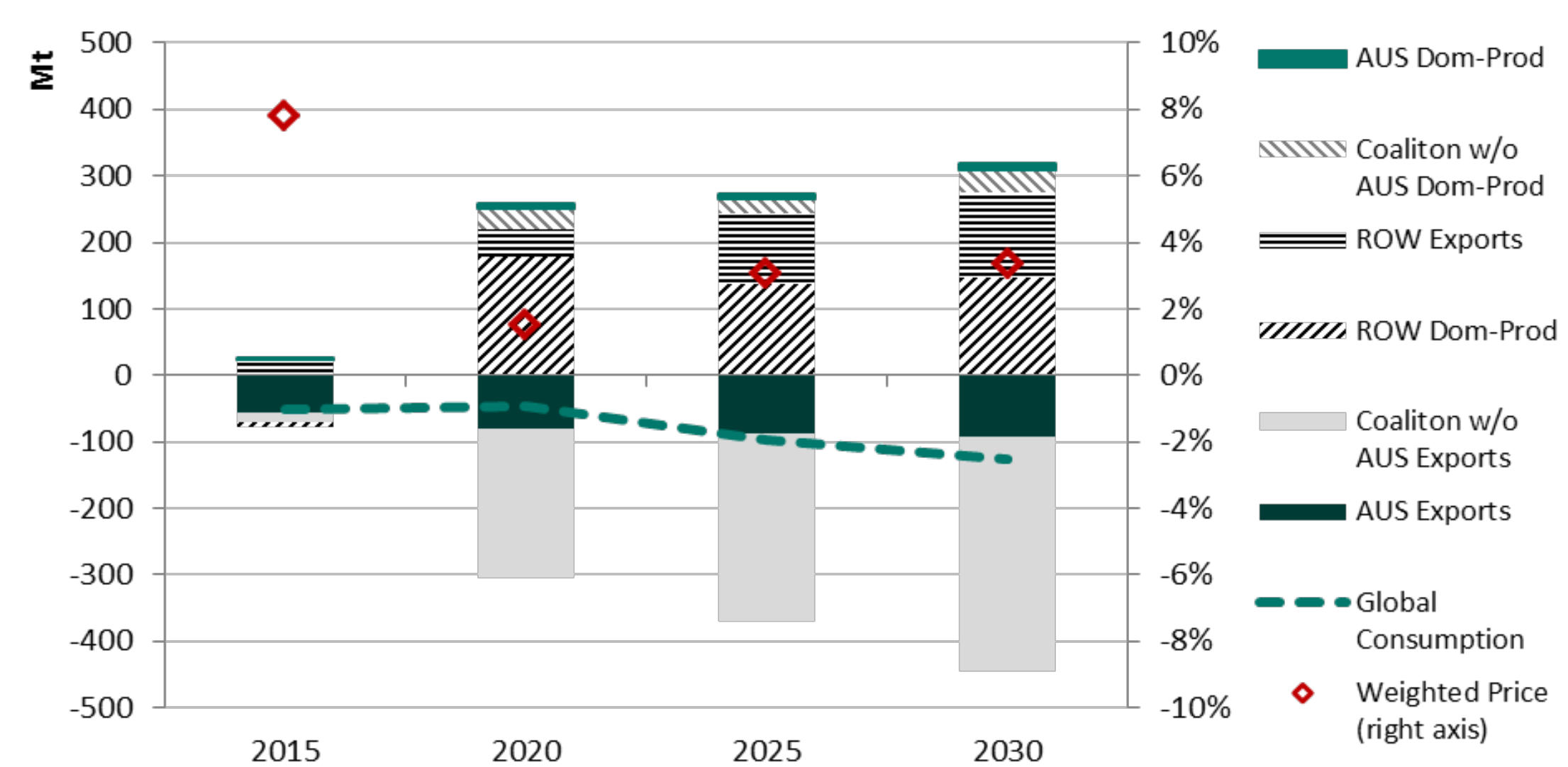


Figure: Change in production, export patterns and price due to export tax. Source: Richter et al. 2015.

Production tax consistently yields higher tax revenue than export tax, but disadvantages domestic consumers dependent on domestic production.

Selected Publications

P.M. Richter, R. Mendelevitch & F. Jotzo. "Market Power Rents and Climate Change Mitigation: A Rationale for Coal Taxes?". *DIW Discussion Paper 1471* (2015).

A. Neumann & C. von Hirschhausen. "Natural Gas: An Overview of a Lower-Carbon Transformation Fuel". *Review of Environmental Economics and Policy*. 9 (2015), 1, pp. 64-84.

F. Holz, P.M. Richter & R. Egging. "Global Perspective on the Future of Natural Gas: Resources, Trade, and Climate Constraints". *Review of Environmental Economics and Policy*. 9 (2015), 1, pp. 85-106.

M. Ponce & A. Neumann. "Elasticities of Supply for the US Natural Gas Market". *DIW Discussion Paper 1372* (2014).

D. Huppmann, Ruud Egging. "Market Power, Fuel Substitution and Infrastructure: A Large-Scale Equilibrium Model of Global Energy Markets". *Energy*. 75 (2014), pp. 483-500.

R. Mendelevitch. "The Role of CO₂-EOR for the Development of a CCTS Infrastructure in the North Sea Region: A Techno-Economic Model and Applications". *International Journal of Greenhouse Gas Control*. 20 (2014), pp. 132-159.

D. Huppmann. "Endogenous Shifts in OPEC Market Power: A Stackelberg Oligopoly with Fringe". *DIW Discussion Paper 1313* (2013).

C. Haftendorn, C. Kemfert & F. Holz. "What about Coal?: Interactions between Climate Policies and the Global Steam Coal Market until 2030". *Energy Policy*. 48 (2012), pp. 274-283.

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