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Economic Modelling of the Long-term Global Oil Price

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English summary

Crude oil is the leading fossil fuel in the global primary energy system. Its composition in the global energy profile will be key in determining the pace of the transition to a low carbon economy. Existing models that assess future oil supply usually capture only one side of the oil availability story. That is, they either focus more on economic aspects of oil depletion, emphasizing less the technical and geological aspects, or focus on the geological and technical ignoring the economic aspects. This thesis integrates these dimensions and develops a calibrated model that can be used to explore long-term developments on global oil markets.

Our results underpin the urgency for a comprehensive approach to jointly tackling peak oil and climate change. While energy efficiency remains central to lowering dependence on crude oil, we find that effectively addressing the transition to the low-carbon economy should also combine both carbon pricing and subsidies for alternatives. Carbon prices increase the cost-based price of oil in the short to medium term and give an incentive (above the effect of depletion on price) to switch towards cleaner technology. To enhance the supply of clean alternatives, immediate support to facilitate their future use is also necessary. We find that crude oil supply may plausibly stay at plateau, but start to decline by 2030. Considering the possibility for oil producers to hasten oil extraction because of anticipating climate policies (i.e., green paradox), we observe this effect to be quantitatively insignificant for concern.

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