

Relationship between Crude Oil Prices, Oil Exploration, and (Future) Oil Supply

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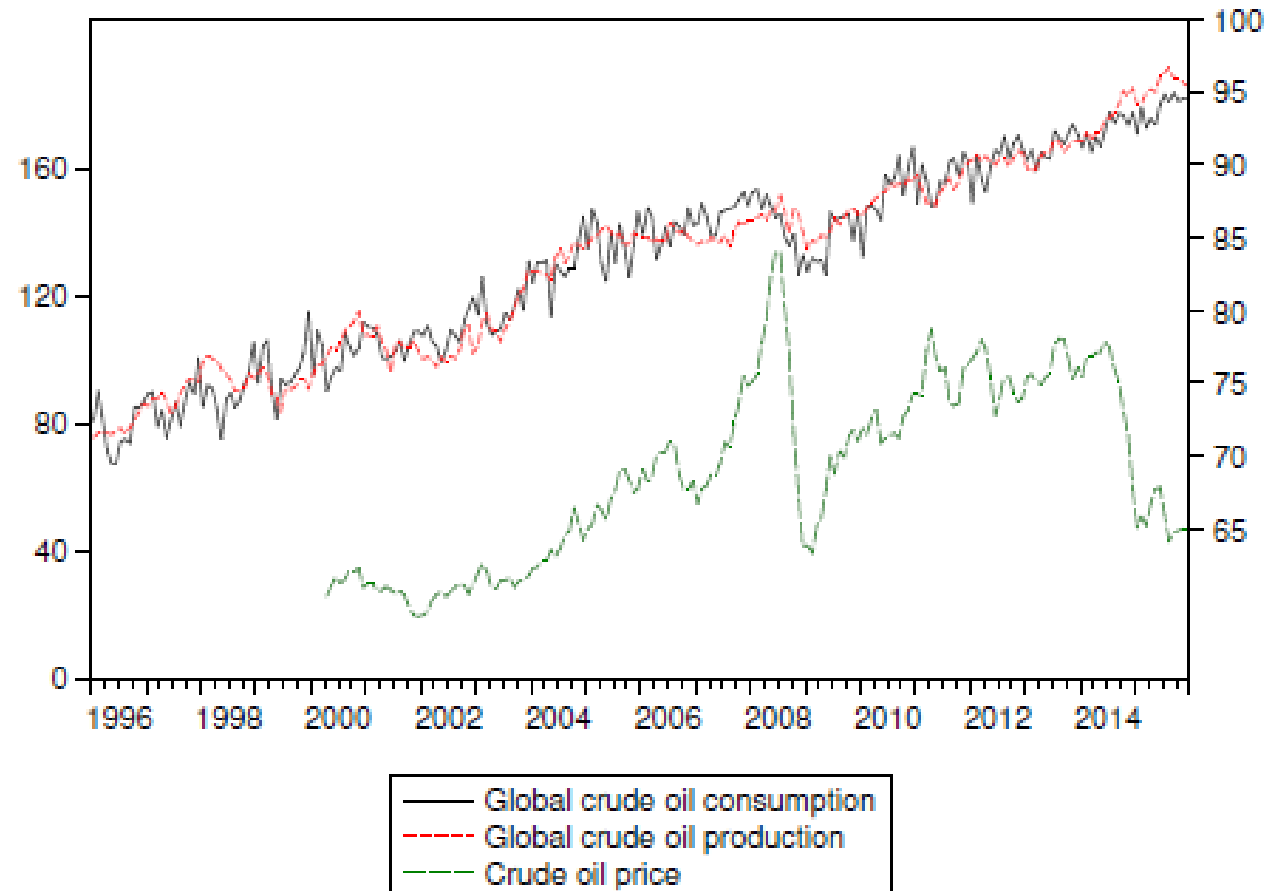
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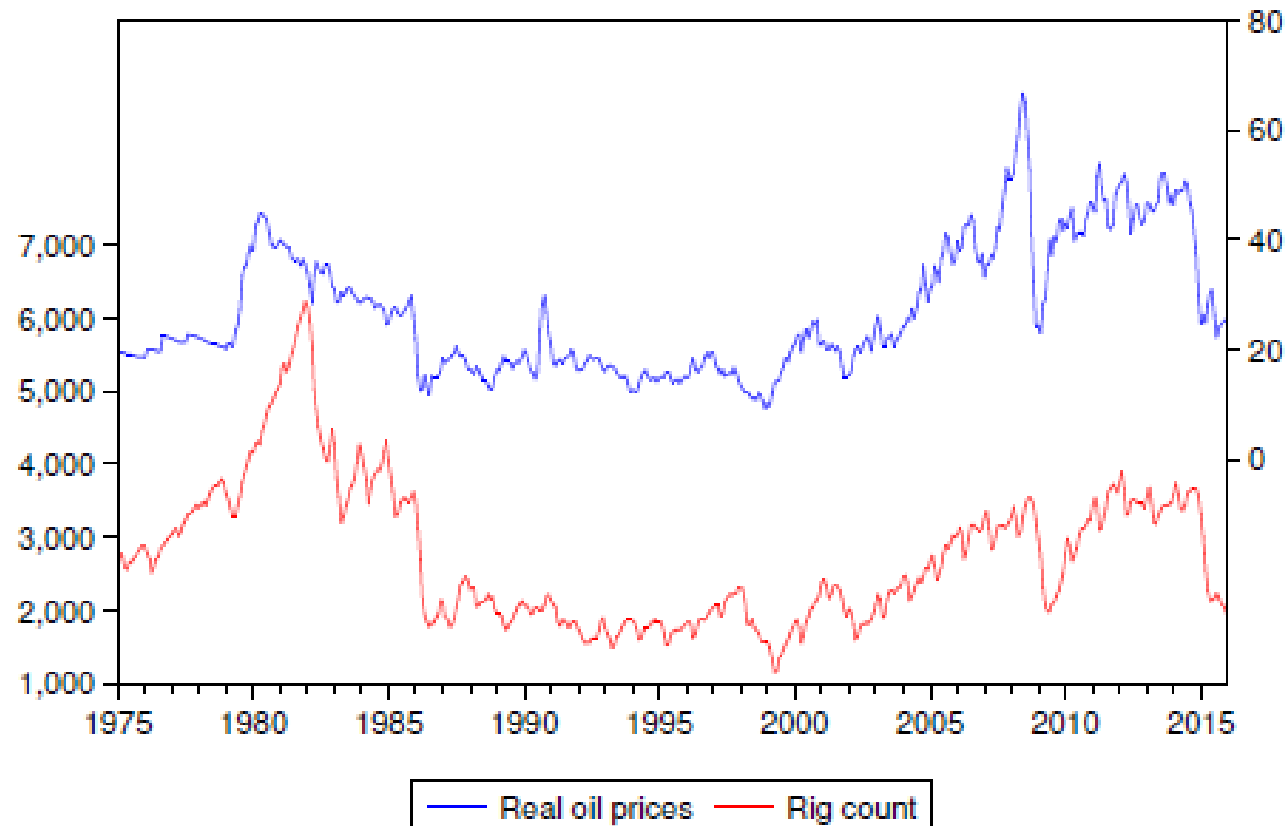
Crude Oil Consumption, Production, Nominal Prices



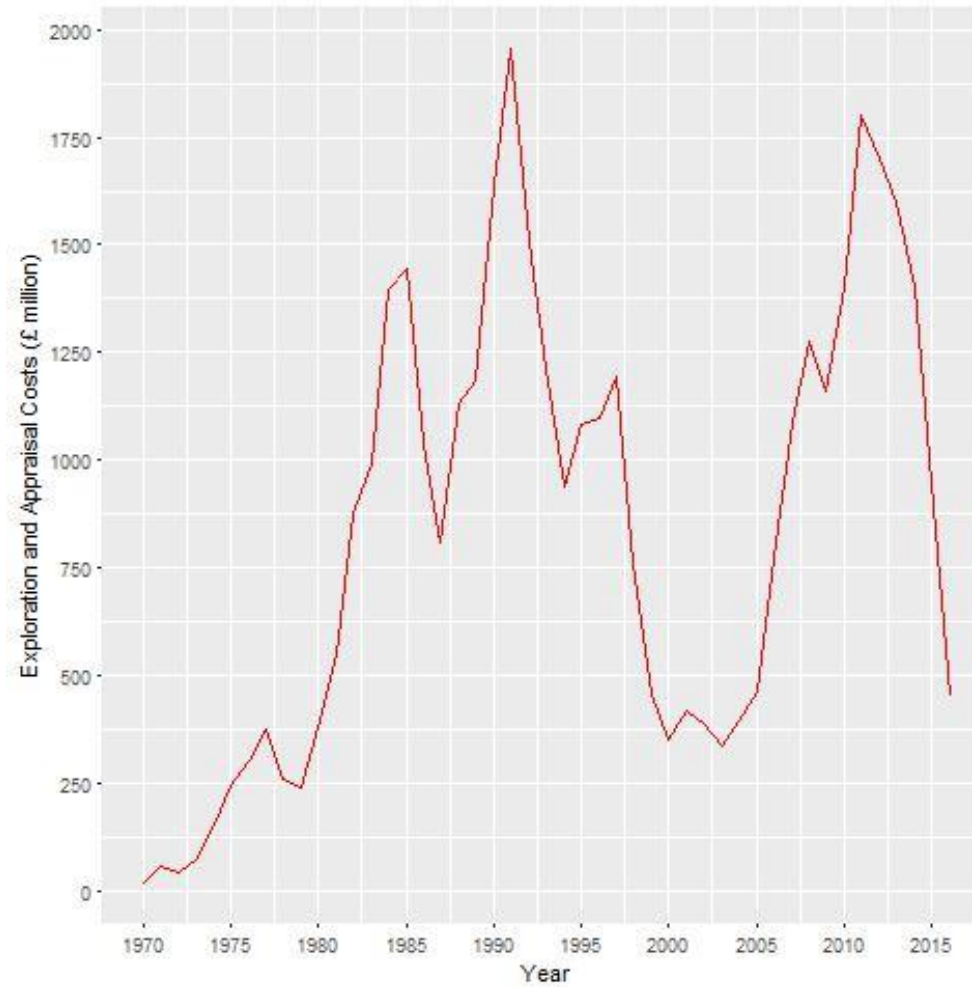
What is this project about?

- ❑ Crude oil prices show idiosyncratic behaviour
- ❑ Fundamental determinants: oil supply and oil demand
- ❑ Research question: relationship between oil price and oil supply?

Rig Count and Real Prices



UKCS: Exploration Expenses



Implications

- Exploratory effort determines oil discoveries
- Today's discoveries determine future supply
- Decline in (conventional) oil discoveries
- Effect on local/global production?

Recent Research

- ❑ Anderson et al (2018), “Hotelling under pressure”: Drilling activity rather than oil production is affected by oil prices changes
- ❑ Toews and Naumov (2015): significant relationship between oil prices and drilling activity
- ❑ Mauritzen (2016): no concurrent reaction of field-level production in NCS
- ❑ Cologni and Manera (2014): no reaction of oil production to changes in real oil prices (various countries)
- ❑ Parmer et al (2018), analysis of investments in NCS: strong effect of lagged oil prices

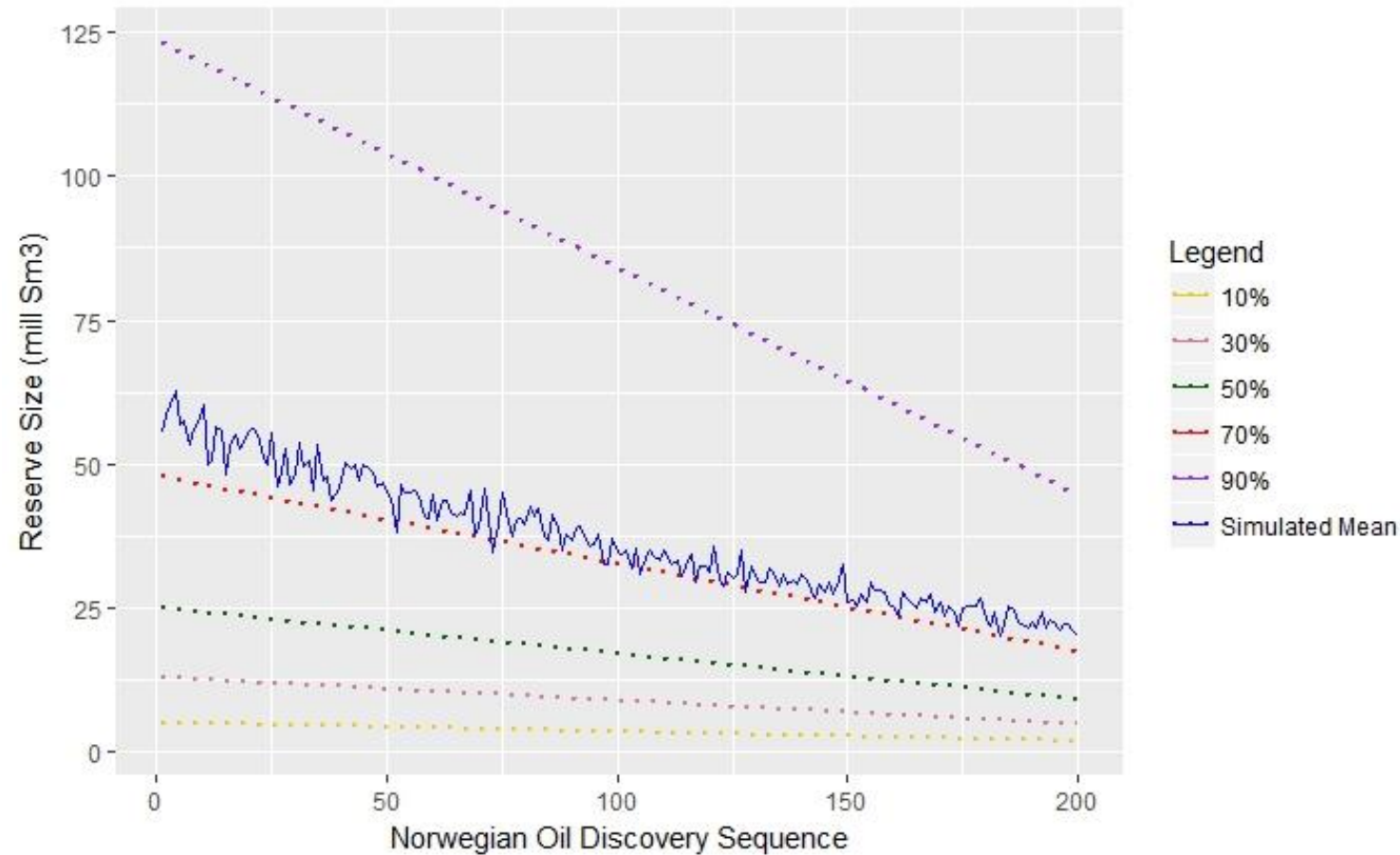
Project elements

- ❑ Quantify relationship between oil prices and drilling activity
 - Toews and Naumov (2015): 1% increase (decrease) in oil prices increases (decreases) global drilling activity by 1%
- ❑ Analyse relationship between drilling activity and discoveries
 - Smith (1980): Probabilistic model for oil discovery
- ❑ Forecast production from new discoveries and effect on global production
 - Long lags between discovery, approval for production and begin of production; geological features
 - Role of shale oil?
- ❑ Analysis on local/national level: understand effect on global oil price changes on (small) oil producing regions

Forecasting Oil Discoveries

- Smith (1980) estimates remaining reserves in an oil producing region and simulates sequence of discoveries
- Smith (1980) proposed probabilistic oil discovery model: by analysing the probability of the reserve discovery for the first 99 discoveries in North Sea
 - Data: 99 initial discoveries. Used to infer distribution of (future) discoveries.
 - Drawing without replacement
 - Forecast sequence of discoveries
 - Adjustment of distribution of discoveries
 - Monte Carlo Simulations
- Influence of exploratory effort on this sequence

Preliminary Analysis



Discussion

- ❑ Relationship between oil prices, oil exploration, and (future) oil production
- ❑ Oil exploration and oil discoveries
- ❑ Today's discoveries determine future supply
- ❑ Oil supply and demand have very different fundamental drivers
- ❑ Oil price responses to changes in demand and supply can be strong