Climate policy risk
Oil industry response and financial outcomes

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Climate policy risk
Oil industry response and financial outcomes

- Climate policy risk
  - Definition and demarcation
  - Market/price implications
- Oil industry response
  - Short term adjustment
  - Strategic re-direction
- Financial outcomes
  - Sketch of a research project
Climate policy risk

Physical risks and transition risks

- Climate change
- Climate policy
- World economy
- Labour markets
- Capital markets
- Energy markets


Climate policy risk

Market, price and valuation impact

- Climate policy
- Oil and gas
- Investment
- Valuations
- Stranded assets
- Capital markets
- Energy markets

Climate policy risk

Market and price implications

- Externality correction
  - Capturing the social cost of carbon
  - Global quota versus national tax

- Focus on demand-side measures
  - Higher prices for consumers
  - Lower prices for producers

EU CO₂ price assumptions by IEA scenario
(USD/tonne @2016 prices)

<table>
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<tr>
<th>Year</th>
<th>Current policies</th>
<th>New policies</th>
<th>Sustainable Development</th>
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<td></td>
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<td>2040</td>
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Oil industry response

The green paradox: Distortion of original policy intent

- Climate policies as announced expropriation

- Evidence
  - Opec strategy change 2014
  - Shale oil expansion
  - Exploration policies
Oil industry response
The green paradox: Emerging call for supply-side policies

- Front-load production
  - More myopic investment behaviour
  - Aversion to long-term projects
  - Focus on oil, and esp shale oil
- Bend the business framework
  - Community outreach
  - Energy analysis and dialogue
  - Stakeholder engagement

The emergence of shale oil...
... and the oil price
Oil industry response

Short-term reaction: Speed up production, push policies, buy time

- Front-load production
  - More myopic investment behavior
  - Aversion to long-term projects
  - Focus on oil, and esp shale oil

- Bend the business framework
  - Community outreach
  - Energy analysis and dialogue
  - Stakeholder engagement

The emergence of energy scenarios

IEA’s World Energy Outlook 2017

- New Policies Scenario
- Sustainable Development Scenario


Main points:
- Front-load production
- More myopic investment behavior
- Aversion to long-term projects
- Focus on oil, and esp shale oil
- Bend the business framework
- Community outreach
- Energy analysis and dialogue
- Stakeholder engagement
Oil industry response

Hits from Google searches

Oil industry response

Hits from Google searches (normalised)
Oil industry response

Climate risk exposure: demand outlook and price uncertainty

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Oil industry response

Strategic re-direction: Repositioning, readjustment, diversification

- Repositioning
  - Fossil fuel portfolio

- Readjustment
  - Focus on CO₂ intensity
  - Energy efficiency
  - Cost efficiency
  - New KPIs

- Diversification
  - Natural gas
  - Power generation
  - New renewable energy

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Oil industry response
Strategic re-direction: Repositioning, readjustment, diversification

Renewable interest
Oil majors’ deal count

Deal count
By technology (2002-2017)

Clean energy M&A JVs
By company (2014-2017)

Source: Bloomberg New Energy Finance.

Financial outcomes
Outline of an empirical research framework

Financial/performance indicators
- Investment
  - By activity
- Financial results
  - Earnings
  - Returns
- Valuation
  - Shareholder returns
  - Multiples

Climate policy risk indicators
- Product mix
  - Within fossil fuels
  - Out of fossil fuels
- GHG emissions
  - CO₂ intensity
  - Energy efficiency
- Governance
  - Strategy shift
  - CEO incentives

\[ y = f(R; x) \]

Control variables

Financial outcomes: Investment

Example: Tobin’s q with heterogeneous capital expenditure

- LHS: Investment rates by activity (maturity)
  - Oil, natural gas, renewables
  - (exploration, development, acquisitions)
  \[
  \left( \frac{I}{K} \right)_{ijt} = \alpha + \beta q_{it} + \gamma_i x_{it} + \eta_i + \zeta_j + \nu_t + \varepsilon_{it}
  \]

- RHS: market value to replacement value (q)
  - Control variables (x)
  - Dummies and residual


Financial outcomes: Valuation

Assessment of valuation relevance and impact

- LHS: Valuation multiples (V)
  - Ratio of value indicator to value driver
  - (P/E; P/BV; EV/Sales; EV/DACF)
  \[
  V_{it} = \alpha + \beta R_{it} + \gamma_i x_{it} + \eta_i + \nu_t + \varepsilon_{it}
  \]

- RHS: Climate risk indicators (R)
  - Product and activity mix
  - CO₂ emissions (intensity)
  - Energy efficiency
  - Renewables


Financial outcomes: Returns

The price of climate risk: Fama/French multifactor model of returns

- LHS: Stock market returns
  - Change in share price...
  - ... plus dividends
  \[ r_{lt} = \alpha + \sum_j \beta_j r_{jt} + \gamma_l x_{lt} + \eta_l + \nu_l + \varepsilon_{lt} \]

- RHS: Risk factors
  - Market risk
  - Company size
  - Growth factor
  - Climate risk ...
  \[ r_{jt} = r_{jt}^m - r_{jt}^f, \quad j = 1 \]
  \[ r_{jt} = r_{jt}^H - r_{jt}^L, \quad j = 2, \ldots, J \]


Climate policy risk: Figures in the making

Potential data sources

- Accounting data
  - Product mix
  - Revenue, cost and capex
  - Cash flow and earnings

- Financial reporting
  - Text analysis (SEC 10K, 20F)

- Indices and rankings
  - Stock market sustainability indices
  - Sustainability rankings

- Survey data
  - e.g., Carbon Disclosure Project

Climate-related financial disclosures
Core elements (not mandatory)