Changing Oil Market Fundamentals and the Implications for OPEC Strategy

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Overview

1. Introduction

2. Implications for OPEC

3. Dynamic optimization results

4. Conclusion
Since 1980s, “easy oil” running out. World becomes increasingly reliant on OPEC oil.

In this scenario:
- OPEC reserves become increasingly valuable
- OPEC benefits from strategically deferring production

Recent events → departure from conventional understanding.

Shale Boom: non-OPEC reserves not as scarce
Global economic & oil consumption outlook downgraded
Oil Industry: Conventional Wisdom

- Crude oil demand growth starting to be questioned
  - Climate Initiatives
    - Paris Climate Agreement
    - Keep it in the Ground
  - Weakening Economic Growth
    - “Risks to the global outlook remain tilted to the downside.”  IMF, Jan 2016
    - “Developing economies are catching up ever more slowly.”  - Economist, Jun 2016.
  - Advances in efficiency upcoming
    - improvement in fuel economy standards
    - improved logistics
Methodology

Results of our oil projections inform a model of OPEC strategy

- Solve for optimal OPEC production path in the face of a perfectly competitive fringe
- Adjust parameters to allow for deviations from conventional wisdom

1. **Increased fringe reserves** (Fracking)
2. **Negative oil demand growth** ("Peak Oil Consumption")
Implications for OPEC

Start with a model Cartel-Fringe (Salant 1976)

- **OPEC** operating as a perfectly cohesive cartel
- A *perfectly competitive fringe* of non-OPEC producers
- OPEC reserves > fringe reserves
- OPEC marginal costs < fringe marginal costs
Static model: OPEC vs Fringe

- Cartel enjoys market power, but diminished by the fringe
- Cartel faces residual demand curve (dashed) while fringe is active
- Cartel faces entire demand curve (solid) while fringe is absent
Dynamic Optimization: OPEC vs Fringe

- **Price:**
  - **Cartel w/ Fringe**
  - **Cartel Alone**

- **Stock:**
  - **Cartel w/ Fringe**
  - **Cartel Alone**

- **Quantity:**
  - **Cartel w/ Fringe**
  - **Cartel Alone**
Dynamic Optimization: Declining consumption outlook

- Price
- Stock
- Quantity

Constant Demand
Falling Demand

Student Version of MATLAB
Dynamic Optimization: Fracking Consequences

- Price
- Stock
- Quantity

**Low Fringe Reserves**

**High Fringe Reserves**

Student Version of MATLAB

Scheitrum (UCD)

Changing Oil Market

September 30, 2016
Dynamic optimization results

OPEC Freeze

- News chatter of “OPEC Freeze” (production pause)
- OPEC already at record production
- Markets do not seem to be responding
  “Oil Wavers as Doubts Grow Over OPEC Deal” - WSJ today
- Future work
Great uncertainty

Commonly available projections could be overestimating

Perception of consumption outlook materially affects production today
The End