Gas and Oil Cartels: A Game-theoretic Analysis

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Questions

- Could we see a gas cartel emerge in the near future?
- Moreover, will the major oil and gas producers collude across the oil and gas markets?
Gas cartel

Why are the questions relevant?

► There are only a small number of major producers in oil and gas;

► The oil prices have been going up;

► Russia seems to have an incentive to form a gas cartel:
  ◦ Currently facing competition from Qatar on the gas market;
  ◦ Can be squeezed on the oil market by Saudi Arabia.
Modeling challenges

▶ Need to consider both economic and geopolitical payoffs for the countries in different scenarios:

◊ Economic payoffs (costs or benefits);
◊ Geopolitical payoffs – How will a cartel affect Qatar and Saudi’s relationships with the US, or their standing in the region/world?

▶ The two markets are interconnected.
Our approach: game-theoretic analysis

- The players (countries) are rational; they do their best to advance their interests;
- The players maximize their total payoffs, taking into account both economic and geopolitical components;
- **Equilibrium (stable) outcome:** If one of the actors is better off from a different arrangement than forming a particular cartel, then we predict the cartel cannot be formed.
Model

- There are three players: \( R \), \( Q \), and \( S \):
  - \( R \) is a player in both oil and gas markets: \( R_O, R_G \);
  - \( Q \) is a player in the gas market;
  - \( S \) is a player in the oil market.

- We enumerate all possible coalitions that can be formed in the two markets;
- We eliminate the coalitions that are not stable (not an equilibrium);
- Thus, we answer the questions raised by examining whether a gas cartel is a stable outcome.
Preliminary analysis: all possible outcomes

1. Status quo: \{R_O, R_G\}, \{S\}, and \{Q\};
2. \{R_O, S\}, \{R_G, Q\}: two cartels in both markets;
3. \{R_O, S\}, \{R_G\}, \{Q\}: Russia forms a coalition with Saudi on oil;
4. \{R_O\}, \{S\}, \{R_G, Q\}: Russia forms a cartel with Qatar on gas;
5. \{R_O, R_G\}, \{S, Q\}: Russia is alone; Saudi and Qatar form a coalition over both oil and gas;
6. \{R_O, R_G, S, Q\}: Grand coalition over both oil and gas.
Preliminary analysis: non-stable outcomes

- Outcomes require collusion between Russia and Saudi are not stable; Saudi is better off going it alone because:
  - Has to share the power of setting oil price with Russia;
  - Risks losing special relationship with the US;
  - Consumer countries may move away from oil to gas.

- The outcome in which Saudi and Qatar form a coalition is not stable; Qatar is better off going it alone because:
  - Gives Saudi more power to interfere in Qatar’s internal affairs and block its regional interests;
  - Risks losing special relationship with the US;
  - Its power as an independent gas supplier is diluted.
Preliminary analysis: stable outcomes

1. Status quo: \( \{R_O, R_G\}, \{S\}, \text{and} \ \{Q\} \);
2. Gas cartel between Russia and Saudi: \( \{R_O\}, \{S\}, \{R_G, Q\} \);
3. Grand coalition: \( \{R_O, R_G, S, Q\} \).
A closer look: gas cartel unlikely

1. Russia forms a cartel with Qatar on gas:
   - Having both resources, Russia will have an incentive to use the cartel to advance its *overall* interests;
   - Qatar will be constrained on the gas market;
   - Qatar weakened geopolitically by losing its special relationship with the US.

2. Grand coalition over both oil and gas:
   - Saudi is doing well with oil; additional economic gains are relatively small compared with geopolitical costs;
   - Qatar cannot gain much more leverage on gas by having the cartel because there is an over-supply of gas in the world already; it risks losing special relationship with the US.
Price wars are also unlikely

In principle, all three can wage price wars, but

- Saudi was successful at waging a price war against Russia in the 80s, but today’s Russia is no longer an easy target.

- Qatar is already producing gas at a zero cost, and the status quo in the gas market is in effect a price war against Russia, which pushes Russia towards forming a gas cartel.

- Russia is constrained by domestic policies to increase productions quickly; and, given the richness of resources of Saudi and Qatar, it is not clear what goals Russia can achieve through this strategy.
Geopolitical factors: declining US influence in the ME

► Key to our analysis is the geopolitical payoffs of Saudi and Qatar, which might dominate their economic payoffs.

► The geopolitical payoffs are largely derived from their relationships with the US.

► If the US influence declines in the ME, the geopolitical payoffs decrease and new coalitions may form on the energy markets.

► Natural question: Is a decline in US influence likely?

  ◦ The US economic and military power strengths decline in absolute terms;
  ◦ Democratization in the ME;
  ◦ Hostile democratically elected governments in the ME.
Conclusion

- Gas cartel unlikely without significant shifts in geopolitical factors in the near future;
- Price wars in oil and gas unlikely;
- Given time, the political development in the ME has a potential to change the status quo, even leading to a gas cartel.