Experiment #4: OPEC Oil Production

In this experiment, you will be playing the role of one of the main member countries in OPEC. These countries correspond roughly to Saudi Arabia, Iran, Iraq, Kuwait, United Arab Emirates, Venezuela, and Nigeria. There is also production by the rest of the world (ROW). This game has at least 8 periods, to be played across two weeks. In each period, each of the member countries of OPEC choose their quantities. ROW chooses its quantity as a price taker in response to the price on the world market. The OPEC members may attempt to form a cartel and agree upon production quotas; however, there is no punishment mechanism (other than economic punishments through the oil market) for failure to adhere to the quotas. ROW never participates in the cartel and acts passively as a price taker.

As usual, your goal is to maximize total profit over the course of the game.

The experiment lasts for a random number of periods described below. In each period, a country must choose how much oil to produce for sale on the world market. The world market price adjusts (approximately) to clear the market given total production by OPEC and ROW. All information on production and costs are publicly available on the spreadsheet located in the handouts section of the course website. The actual production decisions made by each country are not public information. Players only see the price on the world market and the approximate world oil production.

Countries: To determine what country each team will represent, we will hold an open outcry auction with a minimum opening bid of $100 million. In open outcry the country is awarded to the highest bidder, who pays their bid. Your bid amount is deducted pro-rata in the first 8 periods from profits accrued to yield a net profit (or loss) figure for each period in the game. We will have two “markets” - one for each tribe - consisting of the seven member countries in each market. The markets are completely separate and do not interact with one another in any way - so you will be playing against teams from your own tribe in this game. The countries will be auctioned off in order of production capacity. Thus, Saudi Arabia in market Harsanyi will be auctioned first, followed by Saudi in market Vickrey, and so on.

Demand: Estimates of world demand for oil are also given in the spreadsheet. This information also includes an estimate of the supply curve of ROW in response to world oil prices. This information is believed to be quite accurate.

Production Costs: The only costs a country incurs in producing oil are the marginal costs of extraction. These costs are delineated in the spreadsheet.

Production Capacity: This is the maximum quantity you can produce in each period.
**Total Reserves:** This is the total amount of oil you have. If the game lasts an unexpectedly long time, it is possible that you could run out of oil. In practice, this has never happened in running the game.

**Profits:** In the first 8 periods per period profit is revenue - production cost - ⅛ of bid in initial country auction. In further periods per period profit is just revenue - production cost. Overall profit is the sum of per period profits across all periods played.

**End of game:** The game is certain to last for 8 periods. Prior to the start of period 9, there is a 10% chance that an important technological discovery (cold fusion) will wipe out all the economic value of oil production. Prior to the start of period 10, if the game goes that far, the chance of a breakthrough increases to 50% per period and remains at that level in perpetuity.

**Game Theory Survivor:** In this game teams will be playing against members of their own tribe. Thus it will be double elimination - one team will be voted out per tribe in each week. The highest scoring team within each tribe will have immunity and cannot be voted off. If the highest scoring team has already been eliminated then no active team will have immunity.

There will be two back-to-back Tribal Councils each Friday during this game. House Harsanyi will meet at 10:15 am and House Vickrey will meet at 10:45 am.

**Logistics:** During the in-class periods of the game, you will submit your quantities in a sealed envelope to the “market maker”. For out of class periods, submit quantities via a Google Form to be sent out by Sibo.

**Timeline**

All moves outside of class due via Google Form before 5pm.

1. Wed 9/24 - Auction and submit moves for period 1.
2. Fri 9/26 - Period 2 moves due.
4. Tues 9/30 - Period 4 moves due.
5. Wed 10/1 - OPEC mini-summit.
   - 1st Tribal Council immunities awarded based on results of the first 4 periods.
   - Period 5 moves due in class at end of class.
6. Fri 10/3 - Period 6 moves due.
7. Sun 10/5 - Period 7 moves due.
8. Tues 10/7 - Period 8 moves due.
9. Wed 10/8
   - Cold fusion research progress revealed in class.
   - 2nd Tribal Council immunities awarded based on results of periods 5 to 8.
10. Fri 10/10 - Period 9 moves due, if cold fusion not yet discovered. Next cold fusion progress report released.
11. Sun 10/12 - Period 10 moves due, if cold fusion not yet discovered.

Total quantity of oil produced and resulting market clearing price for each market will be released the morning after moves are due. Ordinal ranking of teams within each market will also be updated.