Self Test
Game Theory and the European Natural Gas Market

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Click on True or False to test your knowledge of the chapter.

1. **True** **False** From 1953-1999, there was a growing European dependence on natural gas.

2. **True** **False** From 1953-1999, coal use in Europe increased.

3. **True** **False** The evolution of the European natural gas industry since the end of WW II shows an increasingly interconnected market with a high degree of government participation.

4. **True** **False** Town gas is a form of natural gas produced locally and delivered without a long distance pipeline system

5. **True** **False** In Europe, town gas was increasingly replaced with less expensive natural gas in the 60s

6. **True** **False** Most European countries produce enough natural gas for their own needs.

7. **True** **False** The European Economic Community (EEC) and the European Union (EU) can be used alternatively to describe an alliance of European Nations.

8. **True** **False** In the last two decades European energy policy focused on three main issues:

oil production in the North Sea, imports from middle East, and energy price caps.

9. **True** **False** The European Energy Charter Treaty supports energy reform, encourages technology transfers and promotes environmental goals in former Eastern Bloc countries.

10. **True** **False** From 1973-1983, the use of oil decreased in Europe.

11. **True** **False** The Troll field is a major gas field located in the North Sea.

12. **True** **False** Zeebrugge is a major gas field in Russia, discovered in the mid 90s.

13. **True** **False** The Urengoi gas field in Russia along with eight other gas fields are connected to Europe's gas markets.

14. **True** **False** Russia has huge gas reserves, equivalent to an 80 years supply of gas at the 1999 rate of production.

15. **True** **False** Small firms dominate the European energy markets.

16. **True** **False** The Cournot model is solved just like a monopoly.

17. **True** **False** A backstop technology is one, which is currently available at a reasonable price.

18. **True** **False** The Stackelberg model is similar to a dominant firm model.

19. **True** **False** Price and total profit in a competitive model is higher than in a Cournot duopoly model.

20. **True** **False** In a competitive market, the short run supply curve equals the horizontal sum of the marginal cost curves while in a Cournot duopoly model, the duopolists face the same demand and cost functions and they choose the price to maximize profit

21. **True** **False** Suppose that Russia (country 1) and Norway (country 2) are the only two gas exporters to Germany. The inverse demand function in this market is P = 200 - 0.7(q1 + q2). Where P is price in $/1000 cubic meters and q1 and q2 are the outputs for firms 1 and 2, respectively, measured in billions of cubic meters (bcm). C1 = $1.5q_1^2$ and C2 = $1.8q_2^2$. Where C1 and C2 are the total costs for firms 1 and 2. Then if Russia is a Stackleberg player and Norway is a Cournot player, the quantities are q1 = 93.33, q2 = 26.67 and P = 40.

22. **True** **False** In the Stackleberg model, the leader firm chooses its own output level based on how other firms will react, while the follower firm chooses their optimal output based on what the leader produces. In the dominant firm model one firm or the dominant firm is the price setter and the smaller, fringe firms, are price takers.

23. **True** **False** Assume the demand in a market is $P = 1{,}000 - \Sigma q_i$ where i varies depending on the number of firms in the Cournot market and assume that each firm has the same total cost function equal to $100q_i$. The equilibrium price with three firms is lower than it is for two firms.

24. **True** **False** The equilibrium price in a Bertrand duopoly is higher than the equilibrium price in a perfectly competitive market.

25. **True** **False** Suppose Firm 1 and Firm 2 are duopolists for a given market. The inverse demand function is P = 200 - 2(Q_1+Q_2), where P is price and Q_1 and Q_2 are the outputs for Firm 1 and Firm 2, respectively. Cost functions for the firms are $C_1 = 6Q_1^2$ and $C_2 = 5Q_2+10$. In this market, price equals to 95.66 and profit ratio of the two firms (π_2/π_1) is 11.

26. **True** **False** Suppose the average total cost function for a backstop (solar energy) technology for Q < 20 is AC = 100/Q, whereas for Q > 20, AC = 5. Demand for the energy market is Q = 60 - 2P and marginal cost function for the monopolist is MC = 0.8Q. Considering the limit pricing model, profit would be $438 for the monopolist under a threat of possible backstop entry.

27. **True** **False** In a bilateral monopoly, the reservation price of the supplier results in zero producer surplus.

28. **True** **False.** We expect that price in a bilateral monopoly would be between the reservation price of the buyer and the supplier.

29. **True** **False** A perfectly price discriminating monopolist would produce the same amount as would be produced in a competitive market and there will no dead-weight loss from the monopoly power, because the marginal revenue and demand curves of the perfectly price discriminating monopolist are identical.

30. **True** **False** A perfectly price discriminating monopolist faces a demand curve of P = 50 - 0.25Q and a marginal cost of MC = 2.5Q. The profit maximizing quantity = 18.18 and price = $45.45, and the profit of the monopolist = 454.56.

31. **True** **False** As fossil fuels are depleted, we expect to move on to lower cost renewable fuels.

32. **True** **False** The biggest exporter into the continental European gas market is Russia. (Contributed by Ganna Bielenka)

33. **True** **False** In the Cournot and Bertrand models, firms choose the prices to set, whereas in the Stackelberg model they choose quantity. (Contributed by Ganna Bielenka)