

ECON 301, Professor Hogendorn

Problem Set 8

1. *Normal*. Find the Nash equilibrium(a) in this normal form game:

	L	C	R
T	(2,2)	(5,0)	(1,1)
M	(0,5)	(4,4)	(1,1)
B	(1,1)	(1,1)	(2,2)

2. *Tractors*. Two American companies, Case and John Deere, have decided to introduce their tractors in either the Polish market or the Hungarian market. Neither company has sufficient resources to enter both markets.

If they both enter the Polish market, they both expect profits of \$1 million. If they both enter the Hungarian market, they both expect profits of \$1.5 million.

If Case enters the Polish market and John Deere enters the Hungarian market, then Case expects profits of \$3 million and John Deere expects profits of \$4 million.

If Case enters the Hungarian market and John Deere enters the Polish market, then Case expects profits of \$5 million and John Deere expects profits of \$3 million.

There is a single consulting firm with special expertise that will enable either Case or John Deere to move first. The firm will offer its services to the highest bidder.

Use a normal form game to describe the most likely outcome.

- (a) Case outbids John Deere for the consultant's services. Case enters the Polish market first and then John Deere enters the Hungarian market.
  - (b) Case outbids John Deere for the consultant's services. Case enters the Hungarian market first and then John Deere enters the Polish market.
  - (c) John Deere outbids Case for the consultant's services. John Deere enters the Polish market first and then Case enters the Hungarian market.
  - (d) John Deere outbids Case for the consultant's services. John Deere enters the Hungarian market first and then Case enters the Polish market.
3. *CreditCards*. Visa and Discover are considering the introduction of a new credit card service. Both firms have the same production function  $f(L, K) = L^8 K^{-3}$ . Labor and capital both cost \$10 per unit.
- (a) Assume  $K$  is fixed in the short run. Confirm that the short-run total cost curve is  $TC(y|K) = 10K + 10K^{-0.375} y^{1.25}$ .
  - (b) Suppose that Visa can move first and choose  $K = 17$  or  $K = 32$ , and Discover can see what it chose. Then Discover chooses either  $K = 17$  or  $K = 32$ . Both firms then compete using the cost curve from part (a). The way competition works is that the lower cost firm gets to sell 100 units at a price of 13 each. The higher cost firm exits the market – it gets no revenue but also has no costs, including no fixed cost of capital. In the event of a tie, both firms get to sell 50 units at a price of 13. Draw the extensive form of this game and fill in the payoffs.
  - (c) What is the subgame perfect Nash equilibrium outcome?
  - (d) Suppose Visa had an additional cost of 100 if it chose  $K = 32$ , but otherwise everything is the same. Does this change

the subgame perfect Nash equilibrium? Does it suggest some type of contract that Visa might like to write with Discover?