Sequential Games

A Sequential Game

- Our basic payoff matrix assumes that strategies are enacted at the same time, as in odds or evens
- In many games, the moves take place in sequence
  - In chess, one player moves
  - Then the other player moves

Sequential Games

A Sequential Game

- A firm is considering entering a new business. After it enters, or doesn’t, the incumbent can either expand or maintain his capacity.
- The incumbent threatens that it will expand capacity if the new firm enters. If it does, the new firm will lose money.

• A simple test: Is it then in the interest of the existing firm to expand? If so, the threat to expand is credible. If not, it is simply a bluff.

The Payoff Strategy
Sequential Games

The Payoff Strategy

Entrant

Stay Out

Enter

Incumbent

Expand
Not Expand

Incumbent

Expand
Not Expand

(10, 15)
(-5, 5)
(0, 20)
(0, 10)

Sequential Games
The Payoff Strategy

The choice is easy; expand. The incumbent's threat to expand is not credible because it is not in his self-interest.

(-5,5)  (10, 15)  (0,20)  (0,10)

How to be Credible

• How can the incumbent firm make its threat credible?
  – It wants to expand, but also wants to keep the new entrant out.
How to be Credible

• How can the incumbent firm make its threat credible?
• It could, for example, sign a binding contact on a new building.

Suppose it spends $15 on a new building.
– If it actually expands, the money is not lost.
– If it doesn’t the money is lost forever.

The Payoff Strategy

<table>
<thead>
<tr>
<th>Entrant \ Incumbent</th>
<th>Stay Out</th>
<th>Enter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expand</td>
<td>(10, 15)</td>
<td>(0, 10)</td>
</tr>
<tr>
<td>Not Expand</td>
<td>(0, 20)</td>
<td>(0, -5)</td>
</tr>
<tr>
<td>Expand</td>
<td>(10, 0)</td>
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<td>(0, -5)</td>
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</tr>
</tbody>
</table>
The Payoff Strategy

The potential entrant will stay out because the threat to expand is now, thanks to the advance commitment, credible.

Ent: Stay Out
Ent: Enter
Inc: Expand
Inc: Not Expand

(-5, 5) (0, 20) (10, 10)
(10, 0) (0, -5)

How to be Credible

• This example illustrates the importance of credibility and how to achieve it.

Another Illustration

• I am thinking of hiring you to do some work.
  – I get $60 of benefit
  – You give up $40 of leisure
  – We agree on $50.

• However the agreement is not enforceable.
Another Illustration
- I am thinking of hiring you to do some work.
- However the agreement is not enforceable.
- Should you show up and do the work?

In short, you know it will be in the employer's interest not to pay once the work is done. So, the work will never get done.

There is an important missing element: the employer's right to sue for non-payment. The legal system plays an important role. Suppose the courts would award $60 if the employer failed to pay.
Because we have a legal system and contracts are enforceable, you will do the work and get paid. We have a win-win situation.

Some Extensions

- If I pay you in advance, we have the same issue
- Without a legal system, we would pass up many valuable opportunities for contracts and exchange of goods and services.

End