Repeated Games

• Our basic business games were one time events
• Often, you compete period after period with your opponent

• Each period is then a different game
• You are playing repeated games

Repeat to our basic problem

\[ Q = 100 - 2p \]
\[ MC = 5 \]

• Return to our basic problem

\[ Q = 100 - 2p \]
\[ MC = 5 \]

• The monopoly solution is
\[ p = 27.50, \pi = 1012.50, Q = 45 \]
• With a cartel, each firm makes $506 each period.
• Suppose one firm cheats, announces a price of $26.50. It sells Q = 47
\[ \pi = (47)(21.50) = 1010 \]
The Basic Strategy

• A firm can honor the cartel strategy or cheat.
• If it undercuts, it may all unravel.

<table>
<thead>
<tr>
<th>Firm 1’s choices</th>
<th>Follow cartel strategy</th>
<th>Undercut by a dollar</th>
</tr>
</thead>
<tbody>
<tr>
<td>π2 = 506</td>
<td>π2 = 1010</td>
<td>π1 = 0</td>
</tr>
<tr>
<td>π1 = 506</td>
<td>π2 = 0</td>
<td>π1 = 505</td>
</tr>
<tr>
<td>π2 = 1010</td>
<td>π2 = 505</td>
<td>π1 = 505</td>
</tr>
</tbody>
</table>

A Strategy to Stop Cheaters

• Firm 2 signals that, if Firm 1 cheats, it will cut its price to $5 forever thereafter.
• Firm 1 can then eschew cheating and earn its share of cartel profits.

• Firm 2 signals that, if Firm 1 cheats, it will cut its price to $5 forever thereafter.
• Firm 1 can then eschew cheating and earn its share of cartel profits.
• Firm 1 can cheat for one period, earn a huge profit and nothing thereafter.

The Payoff

• Of course, this assumes a credible threat.

<table>
<thead>
<tr>
<th>Period</th>
<th>Cheat</th>
<th>Don’t Cheat</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$1010</td>
<td>$506</td>
</tr>
<tr>
<td>2</td>
<td>$0</td>
<td>$506</td>
</tr>
<tr>
<td>3</td>
<td>$0</td>
<td>$506</td>
</tr>
</tbody>
</table>

Credible Threats

• This threat will work if it is believed.
Credible Threats

- This threat will work if it is believed.
- This basic strategy unlined MAD during the Cold War.

But is it credible here? Won’t the hard line firm find it in its self interest to reach an accommodation?
- After all, it is earning zero profits for itself as well.

The Tit-for-Tat Strategy

<table>
<thead>
<tr>
<th>What Firm 1 Did Last Period?</th>
<th>Firm 2’s Strategy this Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Followed the Cooperative Strategy</td>
<td>Follow the Cooperative Strategy</td>
</tr>
<tr>
<td>Followed the Non-cooperative Strategy</td>
<td>Follow the Non-cooperative Strategy</td>
</tr>
</tbody>
</table>

Variants appear to be the optimal way to deal with non-cooperative behavior.

This is a credible strategy.

End

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