SOMEBODY IN THE IRISH SEA
Outline

- Information exchange and the two-agent newsvendor problem: sample problems
- More sample problems
- The two-agent resource game
Sample problems

» Pricing IPO’s:
• Situation:
  – Bank wishes to bring an IPO to market.
• Decision:
  – How should the bank price the IPO?
• Behavior:
  – Bank solicits information from investment banks, who indicate a price lower than they are willing to pay.
• Outcome:
  – If the bank goes to market with too low of a price, it leaves money on the table.
  – If bank goes to market with too high of a price, it will not clear the market and is left with shares on hand.
Sample problems

» Allocating shares for an IPO:
  • Situation:
    – IPO
  • Decision:
    – Broker requests shares of upcoming IPO for his customers.
  • Behavior:
    – The IPO will be oversubscribed, so requests will have to be cut back.
    – Broker knows this, so he over-requests.
  • Outcome:
    – Scenario A: Broker is not given enough. Customers have to be given less than they asked. Actual demand is not measured.
    – Scenario B: Broker is given too much. He goes to the phones and “sells” the excess shares. All shares are cleared.
Sample problems

» IT department:
  • Situation:
    – Request for programming
  • Decision:
    – IT department requests 3000 hours to complete a programming assignment.
  • Behavior:
    – Big penalty for not finishing on time, so estimate is inflated.
  • Outcome:
    – Project takes only 2000 hours.
      » If IT brings the project early, business unit may learn that IT inflates estimates by 50 percent.
      » IT pads project by checking, documentation, adding features, cleaning code, etc. etc.
Sample problems

» Spending a budget:
  • Situation:
    – You have a $1.2 million budget for the year. After three months, you have spent $200,000.
  • Decision:
    – You receive a request to spend $500,000.
  • Behavior:
    – You have the money in the budget, but have to think about future expenses.
  • Outcome:
    – You only allow $400,000 of the request. You did not satisfy the demand, but you have money left over.
Sample problems

» Military exercise:
  • Situation:
    – Civilian leadership initiates a military action.
  • Decision:
    – Armed forces evaluate situation and ask for resources:
      » Soldiers
      » Military equipment
      » Supporting people and equipment
      » Airlift capability
  • Outcome:
    – If too few resources are provided:
      » Conflict is prolonged
    – If too many resources are provided:
      » Resources are spread around activities.
The military has a way of testing the seriousness of the civilian leadership. Asked to do something difficult and dangerous, like putting combat troops into a far-off country like Afghanistan, the top brass will make impossible manpower and logistical requirements: whole divisions, massive airlift and backup, everything including “a bowling alley and a PX,” says one White House cynic.

The military would test the seriousness of the civilian leadership. Asked to do something difficult and dangerous, like putting combat troops into a far-off country like Afghanistan, the top brass will make impossible manpower and logistical requirements: whole divisions, massive airlift and backup, everything including “a bowling alley and a PX,” says one White House cynic.

Abbas resigns in frustration, leaving Bush’s dreams of reform in tatters

Running Off the Roadmap

BY JOSHUA HAMMER

Last Thursday morning, Palestinian Prime Minister Mahmoud Abbas called a meeting of the Legislative Council in Ramallah to report on the achievements of his government after 100 days in office. As the prime minister got up to speak, a gang loyal to Yasser Arafat, including several men wearing black masks, burst into the room. The intruder’s clothes, says Abbas, were covered in blood. The intruders continued to be loyal Palestinians, and a reluctance to act—down in the ranks.

The CIA and the Air Force had recently developed the perfect execution machine, the Predator, a remote-control unmanned vehicle able to loiter over a target and launch Hellfire missiles with deadly accuracy. On one of the first nights of the Afghan war, a Predator spotted a convoy believed to be carrying Taliban leader Usama bin Laden. The passengers got out and entered a building. The CIA was almost—but not entirely—sure that Usama bin Laden was inside. Should the Predator take a shot? At CENTCOM headquarters, General Francis W. Galen, the top military lawyer, a female Navy captain, posed tough questions. What if innocent civilians were killed? And there was a worse question: What if the mosque was damaged?

The strike was aborted; Usama bin Laden got away and is still at large somewhere in Afghanistan. After Rumsfeld and others expressed their dissatisfaction, the rules of engagement were tweaked, and the Predator was used to kill a senior bin Laden lieutenant near Kabul, among others. But once the Afghan conflict was over, the OI-13 was resumed. Killing a “leadership target” in wartime is not assassination. But is the war on terror open-ended? Under the laws of war, can nations strike preemptively to deal with an “imminent” threat? Just how imminent does the threat have to be?

Since Afghanistan, a senior intelligence official says, the Predator has been used only once to eliminate a Qaeda leader, blowing up a car containing Abu Ali—a former bin Laden security guard suspected of plotting the attack against the USS Cole in the Yemeni desert last winter. Even that attack made the lawyers nervous; one of the passengers in the car was an American citizen. The man was a suspected terrorist; even so, the lawyers asked, was it lawful to execute him without a trial? If so, did that mean...
Sample problems

» IMF makes loans to countries:
   • Situation:
     – A country has a financial crisis and requests a loan from the IMF.
   • Decision:
     – IMF evaluates the need and (potentially) makes a loan.
   • Behavior:
     – There is an international incentive to make sure that all economies get past problem periods.
   • Outcome:
     – IMF loans too much:
       » Country becomes dependent on external funding and/or money may be used for other purposes.
     – IMF loans too little:
       » Country remains in crisis and/or has to ask for more.
Sample problems

» Academic “space wars:”

• Situation:
  – ORFE splits off from Civil Engineering, and is allocated its own space for the first time (E-Wing of Equad)

• Decision:
  – How much space should ORFE get? Fourth floor (traditional location), but how much of the third floor?

• Behavior:
  – Department chairs (Prof. Cinlar and chair of Civil) invented numerous future plans for new research teams.

• Outcome:
  – If ORFE gets more space than it needs:
    » Activities are “spread around”
  – If ORFE still has too little space:
    » Faculty are squeezed
    » Poor quality of life for students and faculty
Sample problems

» Academic “space wars:”

• Situation:
  – ORFE gets new building (Sherrerd Hall). ORFE is unable to fill the entire building, and CITP needs space.

• Decision:
  – How much space should ORFE get? First and second floors, but how much of third floor?

• Behavior:
  – Dean gives CITP most of third floor, which it does not need, so people get very large offices. But ORFE is doing some of its own “spreading.”

• Outcome:
  – ORFE is now out of space in Sherrerd. Requests to host visitors are routinely declined. Prof. Powell is given limits on his ability to take on students from outside of ORFE.
  – CITP still has those big offices!
Outline

- Information exchange and the two-agent newsvendor problem: sample problems
- More sample problems
- The two-agent resource game
The printing industry

- The resource allocation challenge at a printing plant:
  - Planners determine how much time is required on a printing press from:

    \[
    \frac{\text{Pages to print}}{\text{Pages/hour}} = \text{Hours required on press}
    \]

  - Challenge: What is the print rate of a machine?
The printing industry

The allocation process:

» Customer requires 10,000,000 pages to print.
» Estimated print rate = 120,000 pages per hour.
» Estimated hours on press:

\[
\frac{10,000,000}{120,000} = 83.3 \text{ hours on press}
\]

» Outcomes:
  • Too little time was allocated:
   – Job runs over or is incomplete. Company may call customer to see if he can get away with less for now, with the remainder to come later.
  • Too much time was allocated:
   – Printers slow down the presses. Reduces likelihood of printer failure, and “hides” the excess time. Lowers the estimated productivity of the machine, resulting in more time allowed for the next job.
Outline

- Information exchange and the two-agent newsvendor problem: sample problems
- More sample problems
- The two-agent resource game
Two-agent resource allocation

- Original newsvendor problem:
  » Single “agent” requests resources, and gets whatever is requested.
  » Has to live with the outcome.

- Two-agent newsvendor problem:
  » “Field agent” requests resources from a “central command”.
  » Request represents information to the central command. Central command may decide to a different amount from what was requested.
Two-agent resource allocation

Problem characteristics:

» Central command’s cost of underage is typically lower than that for the field.

» Field agent has better (potentially perfect) information about actual requirements.

» After the event, the field agent may know what was really required.

» What does the central command learn?
  • Case A: Exactly what was required.
  • Case B: An unbiased but noisy estimate of what was required.
  • Case C: A biased (and possibly noisy) estimate of what was required.
Two-agent resource allocation

_rules_

» Field agent gets to see information that provides an estimate of what is required.

» Field agent requests resources from central command.

» Central command thinks about it and decides how much to give the field.

» Central command and field get to see what was really required.
Two-agent resource allocation

The two-agent resource game:

<table>
<thead>
<tr>
<th>Field</th>
<th>Central</th>
<th>Actual</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initial</td>
<td>Request</td>
<td>Give to</td>
</tr>
<tr>
<td></td>
<td>estimate</td>
<td>from central</td>
<td>Field</td>
</tr>
<tr>
<td>1</td>
<td>14</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Two-agent resource allocation

The two-agent resource game:

<table>
<thead>
<tr>
<th>Field</th>
<th>Central</th>
<th>Actual</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial estimate</td>
<td>Request from central</td>
<td>Give to exogenous</td>
<td>Central demand</td>
</tr>
<tr>
<td>Costs Field</td>
<td>c^o = 5</td>
<td>c^u = 5</td>
<td>c^o = 2</td>
</tr>
<tr>
<td>1</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Two-agent resource allocation

The two-agent resource game:

<table>
<thead>
<tr>
<th></th>
<th>Field</th>
<th>Central</th>
<th>Actual</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initial estimate</td>
<td>Request</td>
<td>Give to Field</td>
<td>exogenous demand</td>
</tr>
<tr>
<td>1</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The resource allocation game

■ Now you do it:

  » Divide into pairs. Each pair will play the game twice.
  » For the first round, one takes the role of central command and the second is the field. The field takes the sheet marked “field – round 1.”
  » The field looks at the “estimate” (which is confidential) and makes a request to the central command. The central command then makes an allocation. The central command faces equal costs for underage and overage (5). The field faces a cost of 10 for being under vs. 2 for being over.
  » After making decisions, wait for instructor to reveal the actual.
  » Record decisions, actual, and overage/underage.
  » Maintain a running total of costs.
  » For round 2, switch roles, and use “field/central – round 2” sheet.