Web-Based Beer Game Exercise

The beer game is an exercise that simulates the flow of material and information in a simplified channel of production and distribution. There are four channel participants who have the following sets of responsibilities:

<table>
<thead>
<tr>
<th>RETAILER:</th>
<th>WHOLESALER:</th>
<th>DISTRIBUTOR:</th>
<th>FACTORY:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Orders beer from wholesaler</td>
<td>• Orders beer from distributor</td>
<td>• Orders beer from factory warehouse</td>
<td>• Schedules beer production in factory</td>
</tr>
<tr>
<td>• Manages inventory levels</td>
<td>• Manages inventory levels</td>
<td>• Manages inventory levels</td>
<td>• Manages finished goods inventory levels</td>
</tr>
<tr>
<td>• Sells/ships beer to fill</td>
<td>• Sells/ships beer to fill</td>
<td>• Sells/ships beer to fill</td>
<td>• Sells/ships beer to fill</td>
</tr>
<tr>
<td>end-consumers’ orders</td>
<td>retailer's orders</td>
<td>wholesaler's orders</td>
<td>distributor's orders</td>
</tr>
</tbody>
</table>

The simulation focuses on the linkages between one beer manufacturer, one of its distributors, one of that distributor’s wholesalers, and one of that wholesaler’s many retailers. In reality, a beer distribution network might consist of dozens of distributors, hundreds of wholesalers, and thousands of retailers. Because of the large number of parties in an actual beer-distribution network, communication traditionally would consist almost entirely of orders passed from downstream companies to upstream companies. In this simplified simulation, those orders are, in fact, the only information allowed to flow in the channel.

Leadtimes

As Exhibit 1 indicates, there is a transport delay from each position (except the retailer) to the next (“downstream”) position. For example, goods shipped in a given week from the distributor to the wholesaler arrive some number of weeks later. At the start of the game, all players are told how long the transport delay is. There is a similar order-processing delay from each position to the previous (“upstream”) position. An order placed by a wholesaler in a given week, for example, “shows up” at
the distributor some number of weeks later. Again, at the start of the game, all players are told how long this delay is.

Note: The “factory” doesn’t actually manage a production line; it manages the finished goods inventory in the factory warehouse and schedules production by generating a “production request” each week. Kegs of beer to satisfy that request arrive some number of weeks after the order is placed. At the start of the game, if you are playing the role of the factory, you are told how long this factory delay is.

Cost Structure

This is a cooperative effort: your objective is to minimize total channel costs. During the exercise, costs are calculated weekly. Specifically, you will be charged

$0.50 for each keg of beer that remains in your inventory at the end of each week, and

$1.00 for each keg of beer that is backlogged at the end of each week.

Demand History and Forecasts

The beginning of the simulation corresponds to the last week in May. Demand has been stable for several months. Specifically, the end-consumer demand observed by the one retailer in this simplified channel has been steady at 6 kegs per week. In fact, for several months, the entire system has been stable, with weekly orders throughout the channel synchronized with consumer demand. Specifically, for many weeks, every order sent upstream has been for 6 kegs. Thus, for example, in the first week of the simulation, you will receive 6 kegs from your supplier, in response to an order for 6 kegs placed earlier. The inventory positions have also been stable: each member of the channel has carried inventory equal to three weeks of average demand, i.e. 18 kegs.

There are, however, some expectations of changing demand. Late spring and summer months, depending on the weather, are often characterized by weekly demand higher than that observed in the fall, winter and early spring months. Moreover, marketing has informed us of an aggressive new advertising campaign that will be launched in the early fall that management expects will curtail the usual drop in fall sales.

Weekly Sequence of Activities

You will be assigned to one of the four positions. (See Exhibit). During each week, you will:

1. Receive beer from your upstream supplier (for the Factory, newly barreled kegs of beer from the manufacturing line) and place it in inventory.

2. Receive orders from your downstream customer (for retailers, from the end-consumer).

3. Fill orders from inventory. Any unfilled orders (if you lack sufficient inventory) are backlogged; backlogged orders must be filled in subsequent weeks, as inventory permits. That is, each week you must fill all of the incoming order plus any backlogged orders that you can. If you don’t have enough inventory, you will fill as much of the demand (incoming orders plus backlog) as you can; the remaining unfilled demand will become your current backlog. Orders are filled automatically, without any action required from a player. If there
are enough kegs to fill a customer’s order, they are shipped. If there are not, backlog increases.

4. Send an order (for the Factory, a "production request") to your upstream supplier. 
   *Note that only this step involves an explicit decision; each player must decide how much to order each week.*

**End of exercise**

When the exercise is completed, the following screen will appear for managers of factories, distributors, and wholesalers. The retailer sees only a screen saying “Thank you. Game over.” which indicates that the retailer has completed the exercise and can leave.

Please draw a demand curve representing your estimated guess of the weekly demand seen by the RETAILER. This is the actual demand from the end consumer.

To do this… click the graph and drag your mouse in a continuous line from left to right to represent how many kegs the consumer wanted each week. When you release your mouse, you will be prompted to **CLEAR** your curve and try again, or **SUBMIT** the curve and end the game.

As indicated, all factory, distributor, and wholesaler managers should **sketch a rough graph** representing their estimate of what the **end consumer ordered from the retailer**.

After your graph is submitted, you will see a screen saying “Thank you. Game over.” which indicates that you have completed the exercise and can leave.
Exhibit 1  Depiction of Supply Channel

- Factory (warehouse)
  - Delay from production request to kegs of beer ready to ship
  - Transport delay
  - Order processing delay

- Distributor
  - Order processing delay
  - Transport delay

- Wholesaler
  - Transport delay
  - Order processing delay

- Retailer
  - To end consumer