4301 A, 2019 Fall, HW 2, Due: 9/3

1. (5) What are the characteristics of certain sectors in the information technology, such as in Games, popular consumer software, phone apps? Based on the economies of scale, what tends to be the consequences?

This types of products have high initial cost but very low marginal cost. In fact, the marginal cost is near zero. As a result, winner take it all. One product or company often dominate the market, reach to monopoly, or very tight oligopoly.

1. (5) Please give a concrete example of diseconomies of scale.

New demand is far away. The initial cost is only a small portion of the average cost, or marginal cost is high, and is difficult to manage. The marginal cost in managing larger operations outpace the marginal cost for each unit. One example is repair business. Most of the costs are the incremental cost that does not go down with volume. Salons, speicialty restaurants, niche travel agents, are other examples.

1. (5) Please list a major benefits of economies of scale at macro level and a major drawbacks of economies of scale at the macro level?

At macro level, the volume increase from consolidation, specialization cut the unit cost so that basic needs for more people, even the economically disadvantaged, are met. More in the notes, and I hope you can come up with others.

Draw backs includes the reduction of variety, reduced personal services, higher barrier for new business that serve human needs better to enter, such as more healthy food business or better health services. More in the notes.

1. (5) Please give an example of deterministic economic uniformity.

Not having honors program in BSIE reduces the cost of offering courses. Less options of products reduces the changeover cost, inventory costs, and management costs. Less variety of classroom podium reduces the cost of installation and maintenance.

1. (40) If the demand for raw materials is 60 pallets/week. The cost is $100/pallet. The holding cost for the product is $1 per pallet per week. The ordering cost is $200 per order.
   1. What is the economic order quantity and its associated inventory related cost.

per week

* 1. If you round the order quantity to the nearest 100s, what is the order quantity and its associated cost?

Here, we just do the rounding, or 150.

Only 3.3% higher. Since the assumptions are often not accurate. You can consider other factors before you fix the quantity, such as unit load, convenience, or order 180 for every 3 weeks.

If you try100, you will find the cost is about the same.

The inventory cost is not sensitive near EOQ.

* 1. What is the inventory related cost per unit of demand at EOQ?

The inventory related cost at EOQ per unit of demand is

* 1. If someone can double the demand, and all other parameters stay the same, what is the inventory related cost per unit of demand?

If demand doubles, the inventory cost will be

The inventory related cost per pallet will be 219.1/60 = $1.83 per pallet. It is reduced. This is due to more pallets now shares the setup cost and inventory cost.

1. (40) A car assembly plant receive weekly deliveries of engines from a supplier in Europe. The order leadtime plus transient time is 1 week. The weekly demand distribution for one model can be approximated by . When short, the engine will be air lifted at an extra cost of $100 each engine. The cost of holding one engine for one week is $15.
   1. Please find the safety stock level and its associated number of overage, underage and total cost.

, .

. . This is order up to level.

The expected number of underage is -

The expected number of overage is

The total cost is

* 1. A smart IE applied demand management via incentives, model consolidation, mass customization to reduce the weekly demand variations. The new demand follows . Please repeat last part.

. This is order up to level.

The expected number of underage is -

The expected number of overage is

The total cost is

This is basically one half of the cost as before!