

Quiz #2: Postmortem

I: Please circle the letter in front of the best answer.

I: 1 – d; 2 – a; 3 – a [Berle & Means had argued in their 1932 book that corporate governance facilitated the separation of ownership and control, the ownership of stock being so diffused that stock holders were prevented from effectively organizing to control corporate officers]

Part II: Please answer six (ONLY 6) of the following 7 questions:

1. Accounts receivable is an asset and Retained Earnings belongs under net worth on the balance sheet; all the other items are on the income statement. [While no item appears on both the income statement and the balance sheet, there are links. Thus addition to retained earnings on the income statement is the change in retained earnings from one year's balance sheet to the next.]
2. Economic profit, like accounting profit is calculated by subtracting costs from revenue, but there is a major difference in the cost concept. In computing economic profit, the cost figure includes the opportunity costs of owner supplied capital and of any uncompensated owner supplied time and effort. Accounting profits are usually larger than economic profit because these two factors are left out. Also, accountants take advantage of various options (such as accelerated depreciation) in the tax code that allow them to adjust reported profits so as to avoid taxes or achieve other objectives.
3. A firm with production function $q = L^{1/2} + K^{1/2}$ that employs 9 workers on 2 machines can produce 5 units of output. The marginal product of labor is $\partial q / \partial L = \frac{1}{2} L^{-1/2} = \frac{1}{2} \times \frac{1}{3} = 1/6$. The average product of labor is $q/L = L^{-1/2} + K^{1/2}/L = 5/9$; the average product of capital is $q/K = L^{1/2}/K + K^{-1/2}$.
The production function is homogeneous of degree $1/2$:
$$q(\rho L, \rho K) = (\rho L)^{1/2} + (\rho K)^{1/2} = \rho^{1/2}(L^{1/2} + K^{1/2}) = \rho^{1/2}Q.$$
4. Omitted
5. The OLS formula involves a square root relationship between the OLS and sales: $d = (2c_s q / c_i)^{1/2}$. So if sales increase from 5 to 20, a factor of 4, D will double, given the setup and inventory carrying costs.
6. If total costs are $C(q) = 9 + 4q + q^2$, then average total cost is $C(q)/q = 9/q + 4 + q$, marginal cost is $dC/dq = 4 + 2q$ and fixed costs are $C(0) = 9$.
To find the output at which average cost is minimized we calculate:
$$d[C(q)/q]/dq = -9q^{-2} + 1 = 0,$$

Hence $9 = q^2$ or $q = 3$ and $C(3) = 9 + 12 + 9 = 30$; average cost at this level of output is $C(3)/3 = 3 + 4 + 3 = 10$. The breakeven price is 10 and the breakeven quantity is 3.
If other firms are free to enter or leave the industry with the same cost function, in long-run competitive equilibrium each firm will be making zero economic profit (otherwise firms would enter or leave the industry); furthermore, the demand curve facing each firm will be horizontal and each firm will be maximizing profit. Therefore, the firms will be operating at the breakeven point, $p = 10$ and $q = 3$.

If the price is 10, the demand curve tells us that industry sales will be 300; since each firm is producing 3, there must be 100 firms in the industry.

7. If the demand function is $q = 1000 - 50p$, then $p = 20 - 0.02q$ and $R = pq = 20q - 0.02q^2$. Profits are $\pi(q) = R(q) - C(q)$. To maximize we must have $d\pi/dq = dR/dq - dC/dq = 0$; i.e., $dR/dq = 20 - 0.04q = 10$. Therefore, $q = 250$; substituting into the price equation reveals $p = 15$. Revenue is \$3,750, costs are \$2,600 and profits are \$1150.
- Consumer surplus is $(20-15) \times 250/2 = \$625$.
 - Efficiency (maximizing the sum of consumer surplus plus profits) requires that the firm produce at the point on the demand curve where price equals marginal cost. [See Ch 6, Section 2.1] Since marginal cost is constant at 10, we have $p = 10$ and $q = 500$. The firm cannot produce at this level without government subsidy because its profits would be -- \$100! Some argue that as a second-best solution the firm, if it is a public utility, should be authorized to price at average cost (i.e., set price at the point where the average cost curve crosses the demand curve).

Honors Option: $\partial q(L,K)/\partial L$ is the marginal product of labor and $q(L,K)/L$ is the average product. If average product is at a maximum then

$$\partial[q(L,K)/L]/\partial L = [\partial q(L,K)/\partial L]/L - q(L,K)/L^2 = 0, \text{ implying } \partial q(L,K)/\partial L = q(L,K)/L.$$

GRADE CALCULATION:

Part 1: 5 points on each of 3 questions

Part 2: 10 points on the best 5 out of 6 questions

That yields a maximum possible raw score of 65 points. 35 points were added to bring the possible score up to 100. One student earned a score of 104, thanks to the Honors Horror Option.

The average score on the 1st two quizzes is only 80, which is low. I will scale the quiz average upward by an additional 5 points in computing final grades. Further, students usually do quite a bit better on the writing project than they do on the quizzes. On the other hand, students who have not been doing the problem sets on a regular basis should expect to be penalized.

Graph for question 7:

