

**1. A price ceiling, consumer surplus, and producer surplus (designed to accommodate chapter 7)**

**a.**

<u>Quantity</u>	<u>PQd</u>	<u>PQs</u>	<u>Ceiling</u>
0	1200	300	700
5	1175	325	700
10	1150	350	700
15	1125	375	700
20	1100	400	700
25	1075	425	700
30	1050	450	700
35	1025	475	700
40	1000	500	700
45	975	525	700
50	950	550	700
55	925	575	700
60	900	600	700
65	875	625	700
70	850	650	700
75	825	675	700
80	800	700	700
85	775	725	700
90	750	750	700
95	725	775	700
100	700	800	700
105	675	825	700

110	650	850	700
115	625	875	700
120	600	900	700
125	575	925	700
130	550	950	700
135	525	975	700
140	500	1000	700
145	475	1025	700
150	450	1050	700
155	425	1075	700
160	400	1100	700
165	375	1125	700
170	350	1150	700
175	325	1175	700
180	300	1200	700
185	275	1225	700
190	250	1250	700
195	225	1275	700
200	200	1300	700
205	175	1325	700
210	150	1350	700
215	125	1375	700
220	100	1400	700
225	75	1425	700
230	50	1450	700

235	25	1475	700
240	0	1500	700

b. Construct a chart showing the demand curve, the supply curve, and a price ceiling of \$ 700. Label them D, S, and Ceiling.



c. In the absence of rent control, what would be the equilibrium rent? Compute your answer algebraically. Does this answer agree with the equilibrium in the table?

In the absence of rent control, the equilibrium rent would be \$750. To calculate this, set the price equations equal to each other:

$$1200 - 5Q_d = 300 + 5Q_s$$

$$900 = 10Q$$

$$Q = 90$$

With the equilibrium quantity being 90, sub that back into one of the price equations:

$$P = 300 + 5(90)$$

$$P = 300 + 450$$

$$P = 750$$

Therefore, the equilibrium price is \$750. This agrees with the answer in my table.

d. With the rent control ceiling, how many units are being rented? Is there a shortage or surplus of apartments? If yes, by how many? Derive all your answers algebraically.

With the rent control ceiling, 80 units are being supplied and rented at the price of \$700. This is a shortage of apartments by 20 because the quantity demanded is 100 units at the price of \$700.

$$\begin{aligned}
 P &= 1200 - 5Q_d & P &= 300 + 5Q_s \\
 700 &= 1200 - 5Q_d & 700 &= 300 + 5Q_s \\
 5Q_d &= 500 & 400 &= 5Q_s \\
 Q_d &= 100 & Q_s &= 80
 \end{aligned}$$

$$\text{Shortage} = Q_d - Q_s = (100 - 80 = 20)$$

**e. Considering the number of units actually being rented at the rent control price, what has happened to total consumer surplus and total producer surplus in this market compared to the situation where the equilibrium price prevailed? Compute your answers by providing before and after values for consumer, producer and total surpluses. What is the size (value) of the deadweight loss from rent controls? Derive all your answers algebraically. Remember that the deadweight loss is the difference between the total surplus before and total surplus after the ceiling is implemented.**

Before ceiling price:

Consumer surplus	Producer surplus	Total surplus
$= (\text{base} \cdot \text{height}) / 2$ $= ((1200 - 750) \cdot 90) / 2$ $= 20250$	$= (\text{base} \cdot \text{height}) / 2$ $= ((750 - 300) \cdot 90) / 2$ $= 20250$	$= \text{CS} + \text{PS}$ $= 20250 + 20250$ $= 40500$

After ceiling price:

Consumer surplus	Producer surplus	Total surplus
$= (\text{base} \cdot \text{height}) / 2 +$ $(\text{base} \cdot \text{height})$ $= ((1200 - 800) \cdot 80) / 2 +$ $(800 - 700) \cdot 80$ $= 24000$	$= (\text{base} \cdot \text{height}) / 2$ $= ((700 - 300) \cdot 80) / 2$ $= 16000$	$= \text{CS} + \text{PS}$ $= 24000 + 16000$ $= 40000$

Deadweight Loss:

$$\begin{aligned}
 &= \text{TS before ceiling} - \text{TS after ceiling} \\
 &= 40500 - 40000 \\
 &= \$500
 \end{aligned}$$

## 2. Government Spending and Taxation

a)

**i) What is the approximate current annual expenditure level? We are currently in fiscal year 2017-2018.**

The approximate current annual expenditure level in the year 2017-2018 is \$305.4 billion.

**ii) What share of GDP does this account for? (GDP means aggregate output, which can be interpreted as the size of the economy) What this figure represents is the weight of the federal government relative to the size of the entire economy.**

This accounts for 14.5% of the GDP.

**iii) How is this divided into program spending and spending on debt servicing?**

The 14.5% is divided into 6.6% program spending and 7.9% debt servicing.

**iv) What is the current annual revenue level?**

The current annual revenue level is \$559 billion.

**v) What is the projected deficit in the fiscal year 2017-2018 (which we are in now)? When do they forecast a balanced budget? I mention that these forecasts were recently updated towards higher deficits.**

The projected deficit in this fiscal year 2017-2018 is \$28.5 billion. They do not forecast a balanced budget.

**vi) What are the big-ticket items as far as federal government spending is concerned?**

The big ticket items, as far as federal government is concerned, is operating expenses, elderly benefits, transfer payments, Canada Health Transfer and, children's benefits.

**vii) What are the major sources of revenue as far as the federal government is concerned?**

As far as the government is concerned, the major sources of revenue are income taxes: personal income tax and corporate income tax in particular.

**b)**

**i) What is the projected level of expenditures for budget year 2017-2018?**

The projected level of expenditures for budget year 2017-2018 is \$141.1 billion

**ii) List 6 important expenditure areas – I call them the 'biggies'. In particular, how much is slated for you and me through the envelope of 'training, colleges, and universities'?**

- Health- \$53.8 billion
- Education- \$26.8 billion
- Interest on debt- \$11.6 billion
- Children's and Social Services- \$16.9 billion
- Postsecondary and Training- \$8.4 billion
- Other- \$10.2 billion

\$8.4 billion is slated through the envelope of “training, colleges, and universities”.

**iii) What is the projected level of revenues for budget year 2017-2018?**

The projected level of revenues for budget year 2017-2018 is \$141.7 billion.

**iv) What are the major sources of revenue for the provincial government, and what is the split between its own tax levies and the transfers that it received from the Federal government?**

- Personal income tax- 24.7%
- Sales tax- 18.4%
- Corporations tax- 9.8%

The split is 18.1 for transfers received from the Federal government and 81.9% from its own tax levies.

**v) What was the deficit for fiscal year 2016-2017, which is now over?**

The deficit for the fiscal year 2016-2017 was \$1.5 billion.

**vi) What is the projected level of the deficit for budget year 2016-2018?**

The projected level of the deficit for budget year 2017-2018 is \$0.6 billion.

**3. Production and costs (designed to accommodate chapter 13)**

**a. Fill in the blanks in table A in the Excel file. Assume that a worker costs \$ 100 a day, and that the firm faces fixed costs of \$ 200.**

<u>Workers</u>	<u>Output</u>	<u>Marginal Product</u>	<u>Total Cost</u>	<u>ATC</u>	<u>Marginal Cost</u>
0	0	X	200	X	X
1	20	20	300	15	5
2	50	30	400	8	3.3
3	90	40	500	5.6	2.5
4	120	30	600	5	3.3
5	140	20	700	5	5
6	150	10	800	5.3	10
7	155	5	900	5.8	20

**b. Fill in the blanks in table B in the Excel file. Assume that a worker costs \$ 150 a day, and that the firm faces fixed costs of \$ 200.**

<u>Workers</u>	<u>Output</u>	<u>Marginal Product</u>	<u>Total Cost</u>	<u>ATC</u>	<u>Marginal Cost</u>
0	0	X	200	X	X
1	20	20	350	17.5	7.5
2	50	30	500	10	5
3	90	40	650	7.2	3.8
4	120	30	800	6.7	5
5	140	20	950	6.8	7.5
6	150	10	1100	7.3	15
7	155	5	1250	8.1	30

**c. Fill in the blanks in table C in the Excel file. Assume that a worker costs \$ 100 a day, and that firm faces fixed costs of \$ 300.**

<u>Workers</u>	<u>Output</u>	<u>Marginal Product</u>	<u>Total Cost</u>	<u>ATC</u>	<u>Marginal Cost</u>
0	0	X	300	X	X
1	20	20	400	20	5
2	50	30	500	10	3.3
3	90	40	600	6.7	2.5
4	120	30	700	5.8	3.3
5	140	20	800	5.7	5
6	150	10	900	6	10
7	155	5	1000	6.5	20

**d. In all three tables, what pattern do you see for marginal product? Why?**

In all three tables, the pattern I noticed for the marginal product is that marginal product increases as the number of workers increases, then begins to decrease even though the number of workers continues to increase. This is the property of diminishing marginal product.

Productivity will reach a maximum value and, after said value, productivity will begin to decrease, meaning that marginal product of the input decreases as the input increases.

**e. In all three tables, what pattern do you see for average total cost? Why?**

In the tables, the pattern for average total cost is that the ATC begins to decrease, hits a minimum point, then begins to increase. This is because in the beginning, as input levels increase and, production level increases, marginal product increases as well and, so does the ATC. As productivity hits a maximum and marginal product begins to decrease, the ATC will begin to decrease as well because it will cost more to employ more but output levels will be diminishing due to diminishing marginal product.

**f. In all three tables, what pattern do you see for marginal costs?**

In all three tables, marginal costs begin to decrease, hit a minimum, then begin to increase (like the average total cost).

**g. Compare the column for marginal cost and marginal product. Explain the relationship.**

Marginal cost decreases, reaches a minimum point, then begins to increase, meanwhile, marginal product increases, hits a maximum point, then begins to decrease. This is an inverse relationship. The relationship between these two points represents the law of diminishing returns. This means that as input increases, the cost per unit will decline, then start to rise again. Marginal product will reach its maximum point as marginal cost reaches its minimum (and vice versa).

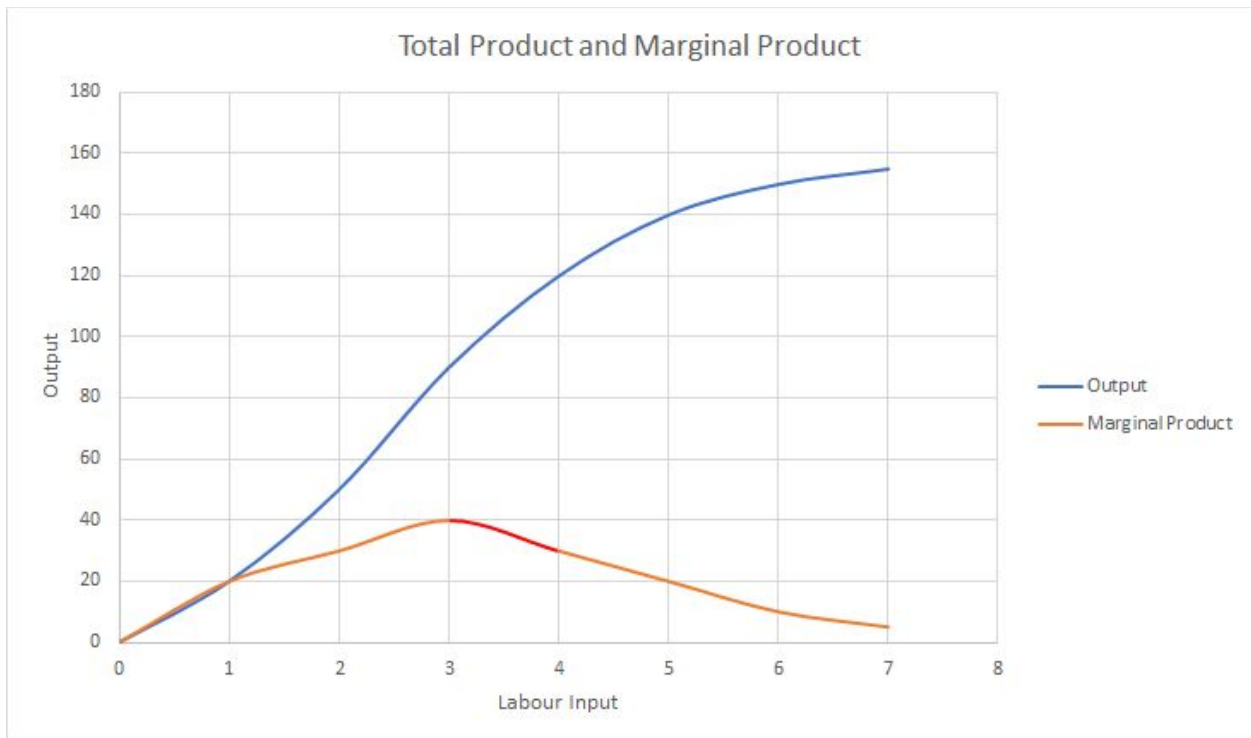
**h. Going from case a) to case b), which cost variables are affected and why? In other words, see which ones change, and think about why.**

Going from case A to case B, the variable cost changes and the fixed cost remains unaffected. Because the variable cost increases from \$100 to \$150, the average total cost, average variable cost, total variable cost, marginal cost and total cost are affected because these variables depend on the variable cost. There will be higher costs in each of these variables at each level of output because of the increase in the factor price. There will be a shift.

**i. Going from case a) to case c), which cost variables are affected and why? In other words, see which ones change, and think about why.**

Going from case A to case C, the fixed cost changes from \$200 to \$300 but, the variable cost remains the same. Because the fixed cost increases, the total fixed cost, average fixed cost, total cost and average total cost will be affected due to the fact that they depend on the fixed cost variable. There will be a shift in these curves.

j. For the figures in Table A, plot the marginal product curve and the total product curve on the same figure. Total product is the same thing as output. Label the axes and curves. Plot the marginal cost curve and the average total cost curve on another figure. Label the axes and curves.



## ATC and Marginal Cost

