

Principles of Economics I (Fall 2012)

Homework #3

(Lecture 7-8, Due on Nov. 14, 2012, submitted in class)

Note: All textbook problem numbers refer to “Problems and Application” part in corresponding chapter, the 6th Chinese/US edition of the textbook.

For Chapter 7

1. Textbook, Chapter 7, #4

4. a. Bert's demand schedule is:

Price	Quantity Demanded
More than \$7	0
\$5 to \$7	1
\$3 to \$5	2
\$1 to \$3	3
\$1 or less	4

Bert's demand curve is shown in Figure 9.

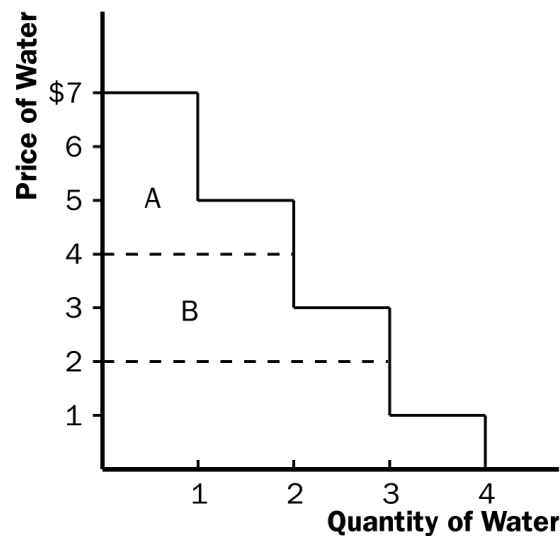


Figure 9

b. When the price of a bottle of water is \$4, Bert buys two bottles of water. His consumer surplus is shown as area A in the figure. He values his first bottle of water at \$7, but pays only \$4 for it, so has consumer surplus of \$3. He values his second bottle of water at \$5, but pays only \$4 for it, so has consumer surplus of \$1. Thus Bert's total consumer surplus is $\$3 + \$1 = \$4$, which is the area of A in the figure.

- c. When the price of a bottle of water falls from \$4 to \$2, Bert buys three bottles of water, an increase of one. His consumer surplus consists of both areas A and B in the figure, an increase in the amount of area B. He gets consumer surplus of \$5 from the first bottle (\$7 value minus \$2 price), \$3 from the second bottle (\$5 value minus \$2 price), and \$1 from the third bottle (\$3 value minus \$2 price), for a total consumer surplus of \$9. Thus consumer surplus rises by \$5 (which is the size of area B) when the price of a bottle of water falls from \$4 to \$2.

2. Textbook, Chapter 7, #5

5. a. Ernie's supply schedule for water is:

Price	Quantity Supplied
More than \$7	4
\$5 to \$7	3
\$3 to \$5	2
\$1 to \$3	1
Less than \$1	0

Ernie's supply curve is shown in Figure 10.

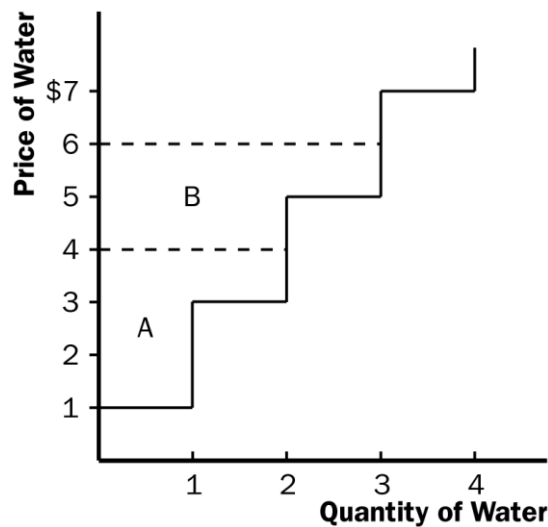


Figure 10

- b. When the price of a bottle of water is \$4, Ernie sells two bottles of water. His producer surplus is shown as area A in the figure. He receives \$4 for his first bottle of water, but it costs only \$1 to produce, so Ernie has producer surplus of \$3. He also receives \$4 for his second bottle of water, which costs \$3 to produce, so he has producer surplus of \$1. Thus Ernie's total producer surplus is $\$3 + \$1 = \$4$, which is the area of A in the figure.

- c. When the price of a bottle of water rises from \$4 to \$6, Ernie sells three bottles of water, an increase of one. His producer surplus consists of both areas A and B in the figure, an increase by the amount of area B. He gets producer surplus of \$5 from the first bottle (\$6 price minus \$1 cost), \$3 from the second bottle (\$6 price minus \$3 cost), and \$1 from the third bottle (\$6 price minus \$5 price), for a total producer surplus of \$9. Thus producer surplus rises by \$5 (which is the size of area B) when the price of a bottle of water rises from \$4 to \$6.

3. Textbook, Chapter 7, #6

6. a. From Ernie's supply schedule and Bert's demand schedule, the quantity demanded and supplied are:

Price	Quantity Supplied	Quantity Demanded
\$2	1	3
\$4	2	2
\$6	3	1

Only a price of \$4 brings supply and demand into equilibrium, with an equilibrium quantity of two.

- b. At a price of \$4, consumer surplus is \$4 and producer surplus is \$4, as shown in Problems 3 and 4 above. Total surplus is $\$4 + \$4 = \$8$.
- c. If Ernie produced one less bottle, his producer surplus would decline to \$3, as shown in Problem 4 above. If Bert consumed one less bottle, his consumer surplus would decline to \$3, as shown in Problem 3 above. So total surplus would decline to $\$3 + \$3 = \$6$.
- d. If Ernie produced one additional bottle of water, his cost would be \$5, but the price is only \$4, so his producer surplus would decline by \$1. If Bert consumed one additional bottle of water, his value would be \$3, but the price is \$4, so his consumer surplus would decline by \$1. So total surplus declines by $\$1 + \$1 = \$2$.

4. Textbook, Chapter 7, #9

9. a. The effect of falling production costs in the market for computers results in a shift to the right in the supply curve, as shown in Figure 14. As a result, the equilibrium price of computers declines and the equilibrium quantity increases. The decline in the price of computers increases consumer surplus from area A to $A + B + C + D$, an increase in the amount $B + C + D$.

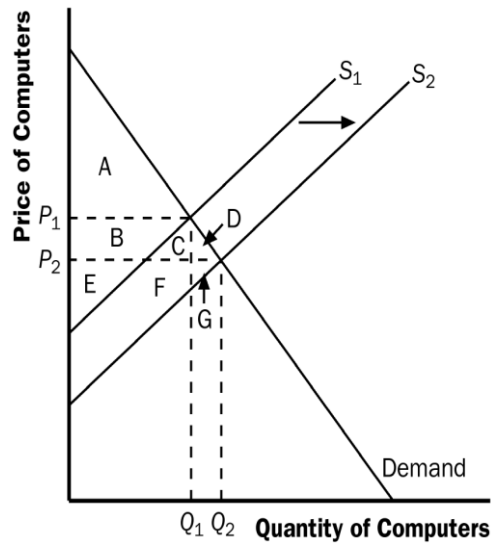


Figure 14

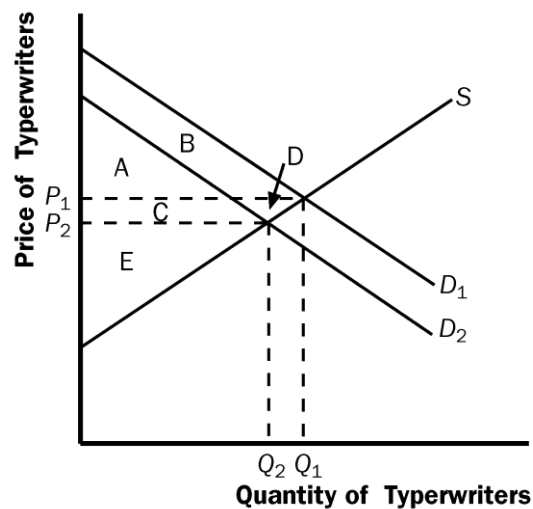


Figure 15

Prior to the shift in supply, producer surplus was areas $B + E$ (the area above the supply curve and below the price). After the shift in supply, producer surplus is areas $E + F + G$. So producer surplus changes by the amount $F + G - B$, which may be positive or negative. The increase in quantity increases producer surplus, while the decline in the price reduces producer surplus. Because consumer surplus rises by $B + C + D$ and producer surplus rises by $F + G - B$, total surplus rises by $C + D + F + G$.

- b. Because typewriters are substitutes for computers, the decline in the price of computers means that people substitute computers for typewriters, shifting the demand for typewriters to the left, as shown in Figure 15. The result is a decline in both the equilibrium price and equilibrium quantity of typewriters. Consumer surplus in the typewriter market changes from area $A + B$ to $A + C$, a net change of $C - B$. Producer surplus changes from area $C + D + E$ to area E , a net loss of $C + D$. Typewriter producers are sad about technological advances in computers because their producer surplus declines.

- c. Because software and computers are complements, the decline in the price and increase in the quantity of computers means that the demand for software increases, shifting the demand for software to the right, as shown in Figure 16. The result is an increase in both the price and quantity of software. Consumer surplus in the software market changes from $B + C$ to $A + B$, a net change of $A - C$. Producer surplus changes from E to $C + D + E$, an increase of $C + D$, so software producers should be happy about the technological progress in computers.

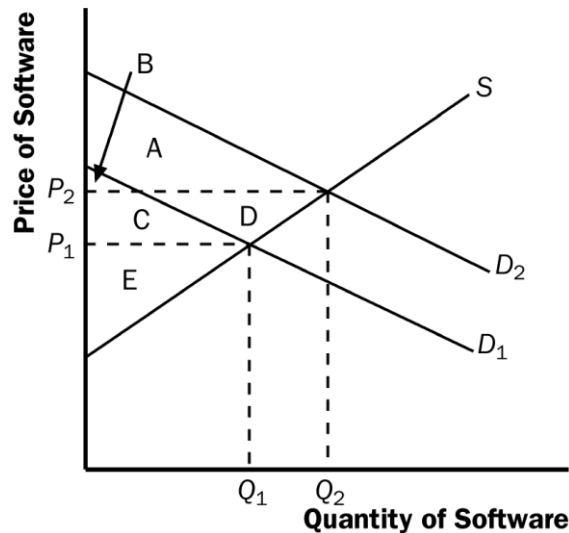


Figure 16

- d. Yes, this analysis helps explain why Bill Gates is one the world's richest people, because his company produces a lot of software that is a complement with computers and there has been tremendous technological advance in computers.

5. Textbook, Chapter 7, #10

10. a. With Provider A, the cost of an extra minute is \$0. With Provider B, the cost of an extra minute is \$1.
- b. With Provider A, my friend will purchase 150 minutes [= $150 - (50)(0)$]. With Provider B, my friend would purchase 100 minutes [= $150 - (50)(1)$].
- c. With Provider A, he would pay \$120. The cost would be \$100 with Provider B.

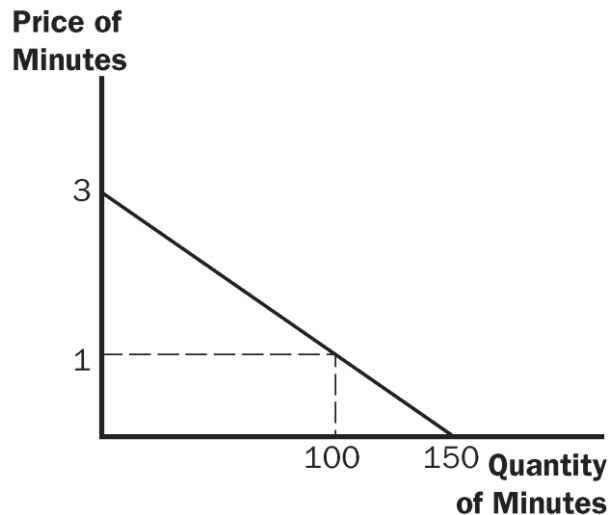


Figure 17

- d. Figure 17 shows the friend's demand. With Provider A, he buys 150 minutes and his consumer surplus is equal to $(1/2)(3)(150) - 120 = 105$. With Provider B, his consumer surplus is equal to $(1/2)(2)(100) = 100$.

6. 排队、价格与效率

小镇上生活着 1 万名居民，每个周末都会到镇里唯一的公园去休息娱乐。镇政府为了丰富居民的娱乐生活，在公园里修建了一个水族馆。假定水族馆的参观活动带给每个居民的收益（或其支付意愿）为 150 元，而公园里其他娱乐活动每小时的收益为 50 元。将其他娱乐活动的收益看成参观水族馆的机会成本。

镇政府认为水族馆是为了公众利益修建的，因此免费开放。不过，水族馆容量有限，每批参观最多容纳 100 人，每批参观时间 1 小时，每周末开放 10 个小时。因此接纳能力（1 千人）远小于居民人数（1 万人），当水族馆开门时，居民们都争先恐后地涌向水族馆，在门前排起长队。

- (1) 排队队伍通常来说长度为多少？（提示：队伍最后 1 人的净收益为零。）
200 人。
- (2) 每个周末的水族馆参观带来的消费者总剩余是多少？
对于每周末得到参观机会的 1000 个居民，第 1 个 100 个居民无需排队且免费入场，人均消费者剩余 $150 - 50 = 100$ 元；第 2 个 100 人排 1 个小时入场，人均消费者剩余 $150 - 2 \times 50 = 50$ 元。以后的都必须排 2 小时入场，人均消费者剩余为 0。因此，这 1000 人的消费者总剩余等于： $100 \times 100 + 100 \times 50 + 800 \times 0 = 15,000$ 元。（或答：0。）
- (3) 水族馆的参观活动达到了社会有效率吗？解释之。
否。每周最大可能的剩余是 $1000 \times 100 = 100,000$ 元。目前的总剩余 15,000 元远小于这个数字。

居民们对于水族馆前的长队表示了愤慨。镇政府决定将水族馆承包给私人老板。私人老板决定对水族馆收取门票。

- (4) 私人老板是追求利润最大的。他应该收取的门票价格为多少？
100 元。

- (5) 排队队伍现在的长度是多少？每个周末的消费者总剩余现在是多少？私人老板得到的生产者总剩余是多少？

排队长度 0 人。消费者总剩余 0。生产者总剩余 $100 \times 1,000 = 100,000$ 元。

- (6) 水族馆的参观活动达到了社会有效率吗？解释之。

是。因为每周总剩余（全部归生产者）为 100,000 元，等于最大可能的总剩余。

私人老板经营了一段时间后，居民们又开始抱怨门票价格太高。于是小镇政府规定门票价格上限为 50 元。政府认为：“这可以使每个参观者的收益增加 50 元”。

- (7) 排队队伍现在是多长？每个周末的消费者总剩余是多少？生产者总剩余是多少？

100 人。消费者剩余： $100 \times (150 - 50 - 50) + 900 \times 0 = 5,000$ 元。（或答：0）生产者剩余： $50 \times 1000 = 50,000$ 元。

- (8) 门票价格上限使得参观者获益了吗？如果是，获益是等于还是小于 50 元？门票价格上限是有效率的吗？解释之。

是。但每个参观者获益仅为 $5,000 / 1,000 = 5$ 元，远小于 50 元。（或答：否，如果前面回答为 0）。否。此时社会总剩余为 $50,000 + 5,000 = 55,000$ 元（或答：50,000），小于最大可能 100,000 元。

以上的分析忽略了水族馆的经营成本。下面的分析假设这个成本为每人次参观者 50 元。

最终，小镇政府决定将水族馆“私有化”。也就是由私人经营，且放开水族馆定价；但与此同时，水族馆的经营成本也由私人承担。而在“私有化”之前，水族馆的经营成本是以税负的形式分摊到每个参观者身上的。

- (9) 与最初的“政府经营、免费参观”的方案相比，“私有化”方案是否损害了消费者利益？总的来说，哪一种方案更好？解释之。

虽然“私有化”后门票价格定在了 100 元，消费者剩余等于零。但原来的免费方案在考虑税负后，每个参观者的消费者剩余等于 $15 - 50 < 0$ （或答：-50）。私有化反而使得消费者变好了。此外，根据前面的分析我们已经知道“私有化”是社会有效率的。总的来说，这个方案无论从公平（分配）还是效率角度，都优于原来的方案。

For Chapter 8

7. Textbook, Chapter 8, #7

7. a. Figure 6 illustrates the market for socks and the effects of the tax. Without a tax, the equilibrium quantity would be Q_1 , the equilibrium price would be P_1 , total spending by consumers equals total revenue for producers, which is $P_1 \times Q_1$, which equals area B + C + D + E + F, and government revenue is zero. The imposition of a tax places a wedge between the price buyers pay, P_B , and the price sellers receive, P_S , where $P_B = P_S + \text{tax}$. The quantity sold declines to Q_2 . Now total spending by consumers is $P_B \times Q_2$, which equals area A + B + C + D, total revenue for producers is $P_S \times Q_2$, which is area C + D, and government tax revenue is $Q_2 \times \text{tax}$, which is area A + B.
- b. Unless supply is perfectly elastic or demand is perfectly inelastic, the price received by producers falls because of the tax. Total receipts for producers fall, because producers lose revenue equal to area B + E + F.

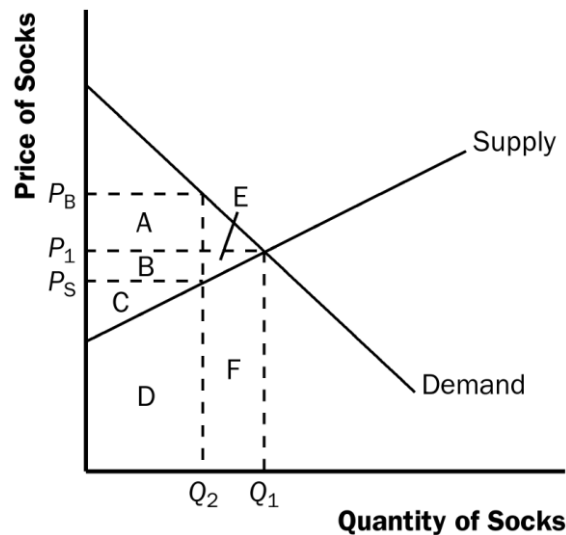


Figure 6

- c. The price paid by consumers rises, unless demand is perfectly elastic or supply is perfectly inelastic. Whether total spending by consumers rises or falls depends on the price elasticity of demand. If demand is elastic, the percentage decline in quantity exceeds the percentage increase in price, so total spending declines. If demand is inelastic, the percentage decline in quantity is less than the percentage increase in price, so total spending rises. Whether total consumer spending falls or rises, consumer surplus declines because of the increase in price and reduction in quantity.

8. Textbook, Chapter 8, #8

8. Because the tax on gadgets was eliminated, all tax revenue must come from the tax on widgets. The tax revenue from the tax on widgets equals the tax per unit times the quantity produced. Assuming that neither the supply nor the demand curves for widgets are perfectly elastic or inelastic and because the increased tax causes a smaller quantity of widgets to be produced, then it is impossible for tax revenue to double—multiplying the tax per unit (which doubles) times the quantity (which declines) gives a number that is less than double the original tax revenue from widgets. So the government's tax change will yield less money than before.

9. Textbook, Chapter 8, #9

9. Figure 7 illustrates the effects of the \$2 subsidy on a good. Without the subsidy, the equilibrium price is P_1 and the equilibrium quantity is Q_1 . With the subsidy, buyers pay price P_B , producers receive price P_S (where $P_S = P_B + \$2$), and the quantity sold is Q_2 . The following table illustrates the effect of the subsidy on consumer surplus, producer surplus, government revenue, and total surplus.

Because total surplus declines by area D + H, the subsidy leads to a deadweight loss in that amount.

	OLD	NEW	CHANGE
Consumer Surplus	$A + B$	$A + B + E + F + G$	$+(E + F + G)$
Producer Surplus	$E + I$	$B + C + E + I$	$+(B + C)$
Government Revenue	0	$-(B + C + D + E + F + G + H)$	$-(B + C + D + E + F + G + H)$
Total Surplus	$A + B + E + I$	$A + B - D + E - H + I$	$-(D + H)$

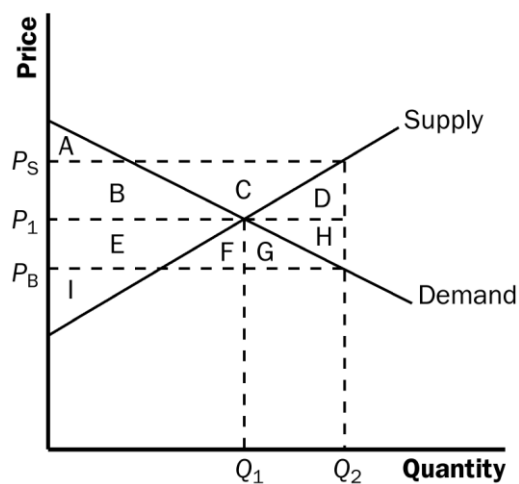


Figure 7

10. Textbook, Chapter 8, #10

10. a. Figure 8 shows the effect of a \$10 tax on hotel rooms. The tax revenue is represented by areas A + B, which are equal to $(\$10)(900) = \$9,000$. The deadweight loss from the tax is represented by areas C + D, which are equal to $(0.5)(\$10)(100) = \500 .

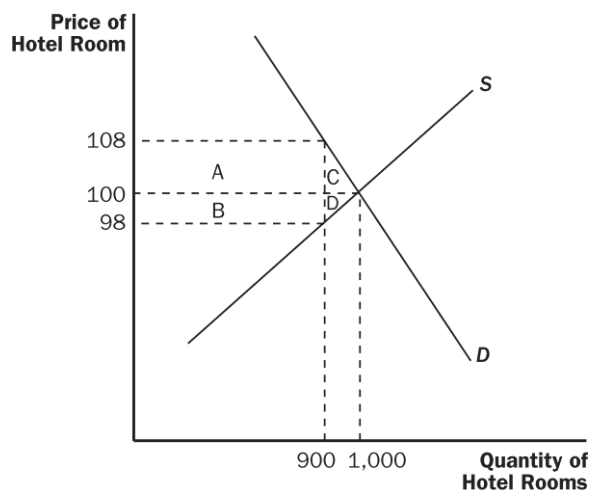


Figure 8

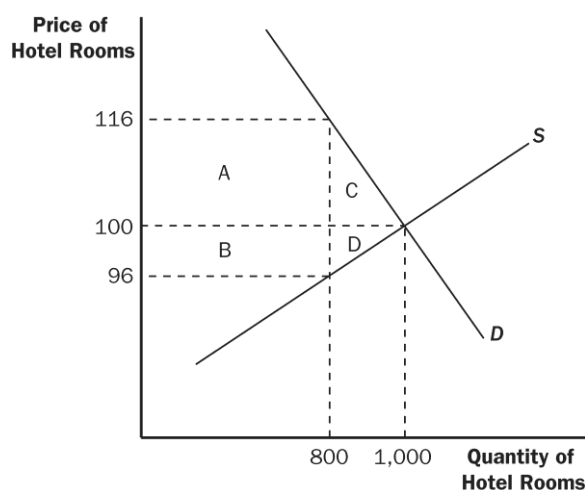


Figure 9

- b. Figure 9 shows the effect of a \$20 tax on hotel rooms. The tax revenue is represented by areas A + B, which are equal to $(\$20)(800) = \$16,000$. The deadweight loss from the tax is represented by areas C + D, which are equal to $(0.5)(\$20)(200) = \$2,000$.

When the tax is doubled, the tax revenue rises by less than double, while the deadweight loss rises by more than double.

For Chapter 9

11. Textbook, Chapter 9, #4

4. a. For a country that imports clothing, the effects of a decline in the world price are shown in Figure 7. The initial price is P_{w1} and the initial level of imports is $Q_1^d - Q_1^s$. The new world price is P_{w2} and the new level of imports is $Q_2^d - Q_2^s$. The table below shows the changes in consumer surplus, producer surplus, and total surplus. Domestic consumers are made better off, while domestic producers are made worse off. Total surplus rises by areas D + E + F.

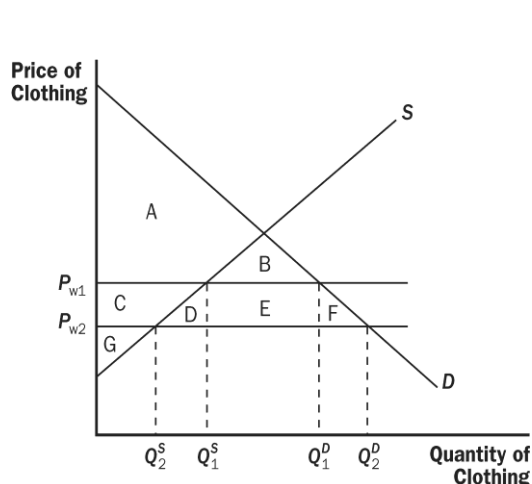


Figure 7

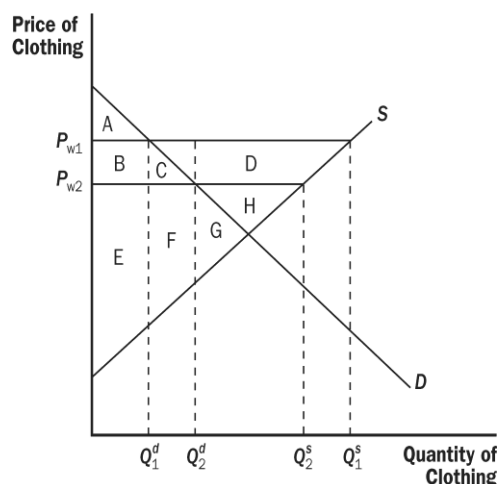


Figure 8

	P_{w1}	P_{w2}	CHANGE
Consumer Surplus	A+B	A+B+C+D+E+F	C+D+E+F
Producer Surplus	C+G	G	-C
Total Surplus	A+C+G	A+B+C+D+E+F+G	D+E+F

- b. For a country that exports clothing, the effects of a decline in the world price are shown in Figure 8. The initial price is P_{w1} and the initial level of exports is $Q_1^s - Q_1^d$. The new world price is P_{w2} and the new level of exports is $Q_2^s - Q_2^d$. The table below shows the changes in consumer surplus, producer surplus, and total surplus. Domestic consumers are made better off, while domestic producers are made worse off. Total surplus falls by area D.

	P_{w1}	P_{w2}	CHANGE
Consumer Surplus	A	A + B + C	B + C
Producer Surplus	B + C + D + E + F + G + H	E + F + G + H	-B - C - D
Total Surplus	A + C + G	A + B + C + E + F + G + H	-D

- c. Overall, importing countries benefit from the fall in the world price of clothing, while exporting countries are harmed.

10. a. This statement is true. For a given world price that is lower than the domestic price, quantity demanded will rise more when demand is elastic. Therefore, the rise in consumer surplus will be greater when demand is elastic.
- b. This statement is false. Quantity demanded would remain unchanged, but buyers would pay a lower price. This would increase consumer surplus. Domestic producer surplus will fall, but by less than the rise in consumer surplus. Gains from trade will increase.
- c. This statement is false. Even though quantity demanded does not rise when trade is allowed, consumer surplus rises, because consumers are paying a lower price.

13. Textbook, Chapter 9, #12

12. a. Using Figure 4 from the text, the quantity demanded will fall to Q_2^D , the same quantity demanded under the tariff. However, quantity supplied will not change because the price sellers receive will be the world price. Thus, quantity supplied will remain at Q_1^S .

- b. The effects of the consumption tax can be seen in the table below:

	<i>World price</i>	<i>World price + tax</i>	CHANGE
Consumer Surplus	A + B + C + D + E + F	A + B	-C - D - E - F
Producer Surplus	G	G	None
Government Revenue	None	C + D + E	C + D + E
Total Surplus	A + B + C + D + E + F + G	A + B + C + D + E + G	-F

- c. The consumption tax raises more government revenue because the tax is on all units (not just the imported units). Thus, the deadweight loss is smaller than that associated with a tariff.

14. 出口退税

中国政府常常采取对出口企业退回所征税收的政策。本题目分析这一政策对于市场均衡及福利的影响。

- (1) 画出一国出口某种产品的典型的市场供求图形。
如下图。

- (3) 现在政府决定对于企业生产产品中用于出口的部分进行退税。即对出口部分不征税，但对于在国内销售部分仍然征税。假定国内消费者只能购买国内企业生产的产品（即不允许该国既出口又进口这一产品）。重新画图表示这一新的政策的影响。由于该新的税收政策，国内企业的生产量如何变动，国内消费者的消费量如何变动？出口量如何变动？国内生产者福利如何变动？消费者福利如何变动？政府的福利如何变动？该国的总福利如何变动？该国从国际贸易中的获益如何变动？所有回答均用图形并辅助文字说明。（注：所有结果都是与没有任何税收政策时比较）

国内消费者消费量下降，从线段 BC 缩短到 BC' 。国内生产者的生产量不变，仍为线段 BD 。出口量增加，从线段 CD 延长到 $C'D$ 。

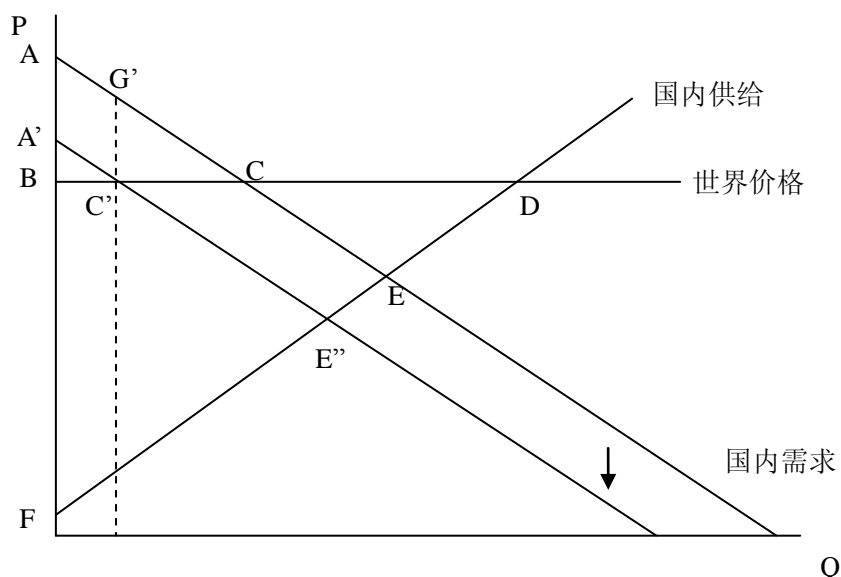
消费者福利下降，从面积 ABC 下降到 $A'BC'$ 。

生产者福利不变。（原因：生产者仍然在既定成本下面对世界价格生产。）

政府税收增加，从零增加到面积 $AA'C'G'$ 。

该国总福利下降，减少面积 $C'CG'$ 。（原因：企业既定产量无法配置给支付意愿高于世界价格的部分消费者，带来无谓损失。）

该国从国际贸易中获益增加，从面积 CDE 增加到面积 $C'DE''$ 。



- (4) 分析以下说法是否正确，并借助图形和文字加以说明：(a) 出口退税让国内企业的产量“恢复”到不征收任何税收时的水平。(b) 出口退税让国内企业的出口“恢复”到不征收任何税收时的水平。(c) 相对于“只征不退”（第(2)问）而言，向出口企业退税增加了该国总福利。如果你对第(c)的回答是不确定，那么是什么因素会影响你的回答？
- (a) 正确。产量从线段 BD' 恢复到 BD 。
- (b) 错误。出口企业的出口量比无税时增加了。出口量从线段 CD 增加到 $C'D$ 。（直观解释：此时国内消费者因税收负担减少了消费量，国内生产者面对世界价格不变，因而产量不变，则出口增加。）
- (c) 错误（或不一定）。无谓损失从面积 $D'GD$ 变为 $C'G'C$ 。两个面积的大小不定，取决于供求弹性。当需求弹性大于供给弹性时，出口退税的福利损失更大。（提示：考虑到线段 $C'G'$ 和线段 DG 是等长度的——都等于税收规模）。

