

## Social Welfare 553

### Problem Set Two

1. This question uses Frank Figure 2.6, which depicts a local apartment rental market. Were this market at equilibrium, 60,000 units would be leased each at a monthly rent of \$600.

- i. Reproduce the graph (manually or via a copier) and include the rent control ceiling of \$400/month
- ii. How large is the Metropolis housing shortage when the ceiling is set at \$400? Show where you can find that information on the graph.

*There is a shortage of 40,000 units – the space between the 40 and the 80 on the horizontal axis.*

- iii. What would be the impact on the market if the ceiling were raised to \$500/month? How many units would be rented? Would there be a shortage? What about \$700/month?

*Draw a horizontal line at \$500. Trace down to the horizontal axis from where this line intersects the supply and demand curves. At \$500, the supply would be approximately 50,000 units and the demand would be approximately 70,000 units. So there would be 50,000 units rented and a shortage of 20,000 units.*

*At \$700 a month, landlords would be willing to provide approximately 80,000 units, but tenants would only demand 40,000. Since some landlords would be willing to rent for a lower amount, prices would lower until they met demand, at the original \$600/60,000 equilibrium point. Hence at \$700, there would be no shortage.*

- iv. Suppose instead of rent controls, the Metropolis government instituted a \$200/month housing subsidy to every renting household. What would happen to the market? [show it by moving one of the lines]

*You can shift either supply or demand and the result will be the same. If the subsidy is paid to the landlord, the supply would shift out by \$200. At a market rate of \$400, landlords are now willing to provide 60,000 units (because they know they will receive an additional \$200 in subsidy). If the subsidy is paid to the tenants the demand should shift up by \$200. In either case, 80,000 units will be rented at a total cost of \$800, \$200 of which will be subsidized.*

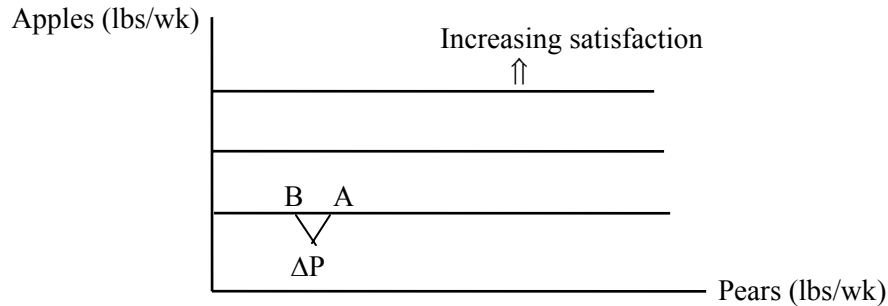
*Just as the legal incidence of a tax (whether the buyer or seller remits the tax) is not related to the economic incidence (who actually pays more), the legal incidence of a subsidy is not related to the economic incidence. This is the same principle explained in the TAXES section toward the end of chapter 2.*

- v. How much would this \$200 subsidy cost on an annual basis?

*$\$80,000 * 200 = 16,000,000$  or \$16 million.*

2. i. Frank, Chapter 3, problem 11 (Eve likes apples...)

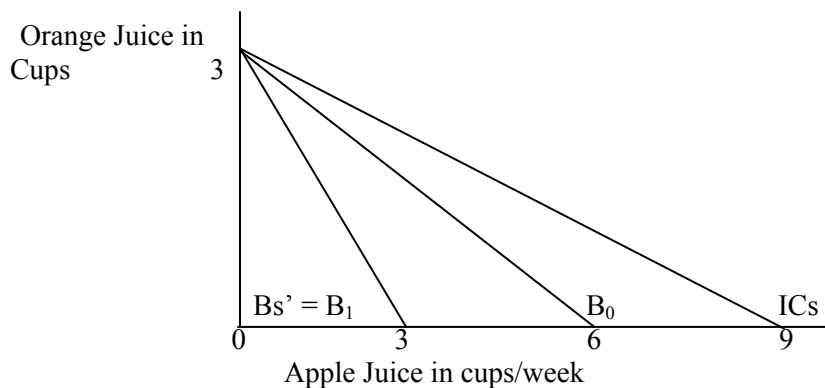
*In the diagram, suppose we start at bundle A and then take away  $\Delta P$  units of pears. How many more units of apples would we have to give Eve to make her just as happy as at A? The answer is none, because she didn't care about pears in the first place, and therefore suffered no loss in satisfaction when we took  $\Delta P$  units of pears away. Bundle B is thus on the same indifference curve as bundle A, as are all other bundles on the horizontal line through A. All of Eve's indifference curves are in fact horizontal lines, as shown.*



- ii. Draw your own indifference curves between apples and pears. Assume that you do not have to consume all fruit in the current time period – think of it as perpetual apple and pear credits at a market of your choice.

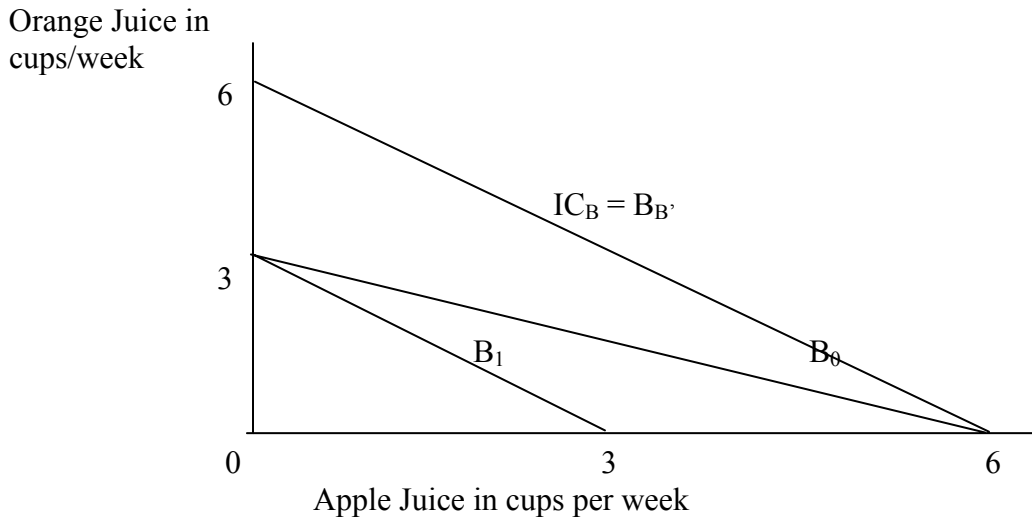
3. i. Frank, Chapter 4, problem 1 (Sam spends \$6/wk...)

*Sam's budget constraint is  $2OJ + AJ = 6$  or  $OJ = 3 - (1/2)AJ$ . Sam's indifference curves are straight lines with constant  $MRS = 1/3$ . Sam's optimal bundle is to consume no apple juice and three cups of orange juice. When the price of apple juice doubles, Sam would not need any additional income to afford his original consumption bundle, since he does not consume any apple juice.*



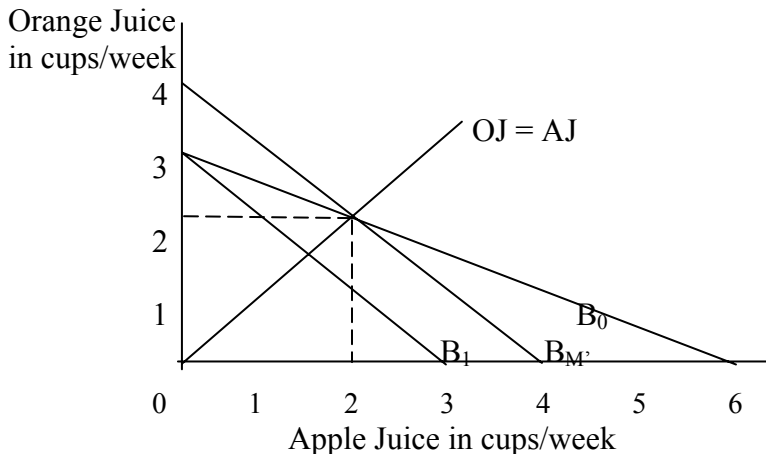
ii. Frank, Chapter 4, problem 2 (Bruce has the same income...)

Bruce's budget constraint is the same as Sam's, but his indifference curves have constant  $MRS = 1$ . Thus Bruce's optimal bundle is to consume six cups of apple juice per week and no orange juice. To afford his original consumption bundle, Bruce would need additional income  $(P'_{AJ} - P_{AJ})AJ = (2 - 1)6 = \$6/wk$ . At his new income of  $\$12/wk$  and facing the higher price of apple juice, Bruce's budget constraint would become  $2OJ + 2AJ = 12$  or  $OJ = 6 - AJ$ , which contains Bruce's original consumption point of six cups of apple juice and no orange juice.



iii. Frank, Chapter 4, problem 3 (Maureen has the same income...)

Maureen's budget constraint is the same as Sam and Bruce's but her indifference curves are right angles (L-shaped) at bundles where the cups of orange juice and apple juice consumed are the same. Setting  $OJ = AJ$  in her budget constraint gives  $OJ = AJ = 2$  as her optimal consumption bundle: two cups of orange juice and two cups of apple juice per week. To afford her original consumption bundle, Maureen would need additional income  $(P'_{AJ} - P_{AJ})A = (2 - 1)2 = \$2/wk$ . At her new income of  $\$8/wk$  and facing the higher price of apple juice, Maureen's budget constraint would become  $2OJ + 2AJ = 8$  or  $OJ = 4 - AJ$ , which contains Maureen's original consumption point of two cups of apple juice and two cups of orange juice per week.



4. Frank, Chapter 4, problem 16 (Is the cross-price elasticity...)

- a) *Tennis balls and tennis racquets are complements, so negative.*
- b) *Negative, same reason.*
- c) *Hot dogs and hamburgers are substitutes, so positive.*

5. i. Frank, Chapter 16, Question for Review 2 (Distinguish among the terms...)

*An allocation is Pareto optimal if no reallocation can make one party better off without making another worse off. A Pareto preferred or Pareto superior position makes both parties better off than they were before.*

iii. Frank, Chapter 16, Question for Review 3 (Why might voters...)

*Given concerns of equity, It may not be easy to create an exchange which would move to a Pareto optimal situation. In particular, if transaction costs are significant, then reallocation is often difficult. Also, some people may be malevolent –willing to incur cost to injure others.*