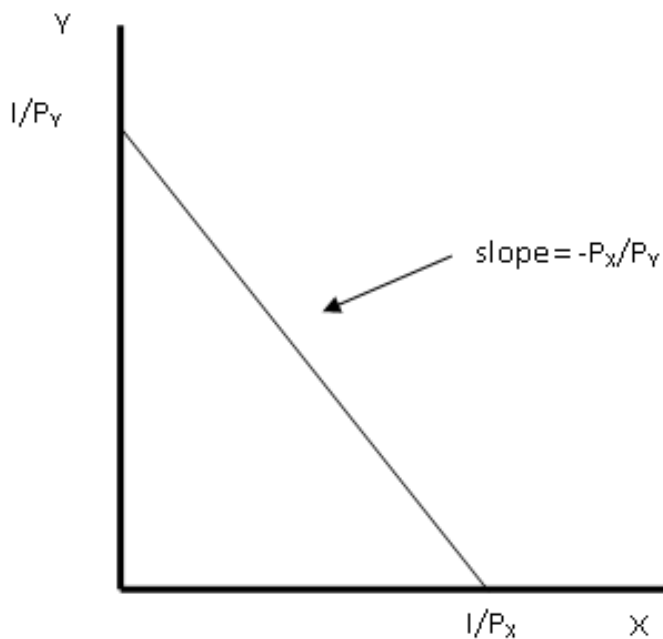


# Lecture # 9 – Consumer Behavior: Maximizing Utility

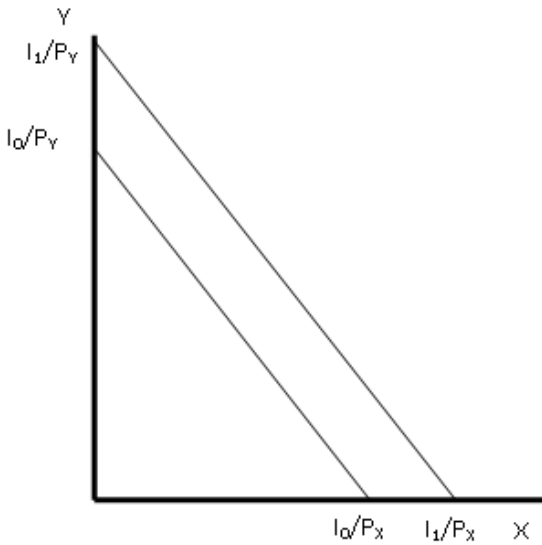
## I The Budget Constraint

- Now that we have a way of describing preferences, we need to introduce a constraint. The constraint will be the income that the consumer has available to spend.
- The Budget Constraint is all possible combinations of two commodities that are affordable, given prices and a fixed amount of income.

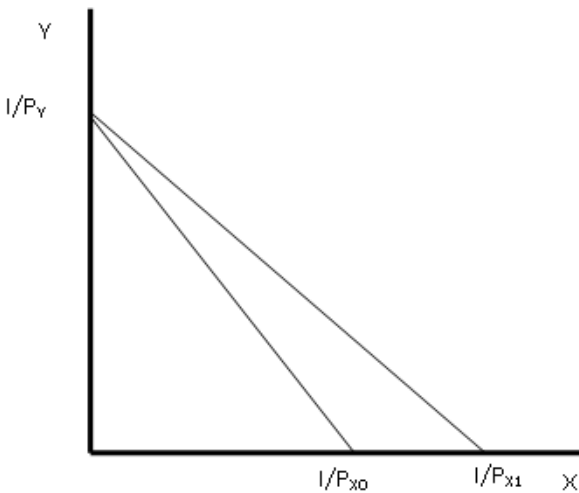


○  $I = P_xX + P_yY$

- The intercepts represent the amount of the good you can get if you spend all your income on that good ( $I/P_x$  and  $I/P_y$ ).
  - Changes in income lead to parallel shifts of the budget constraint.

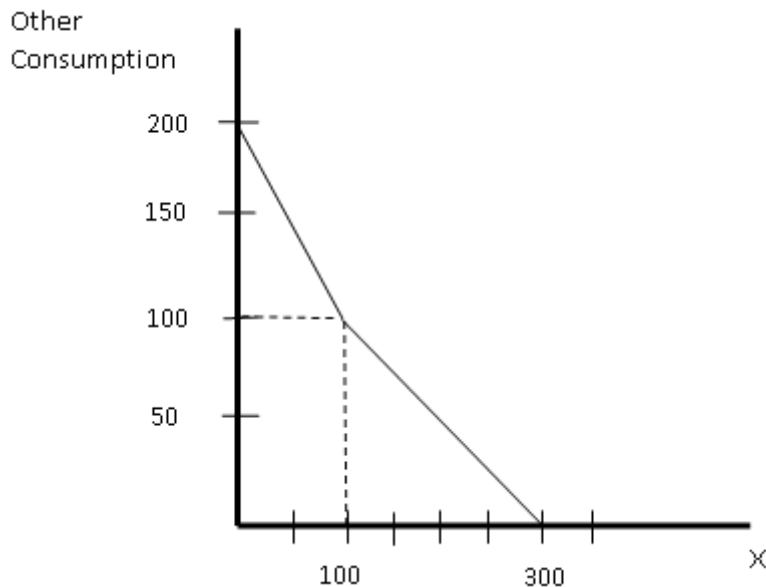


- The slope ( $-P_x/P_y$ ) represents the relative prices. It tells how much of Y you need to give up to afford another unit of X.
  - Changes in prices cause the line to rotate.
  - In the example below,  $P_{x1}$  is lower than  $P_{x0}$ . Thus, we can afford more, so the budget constraint rotates outward.



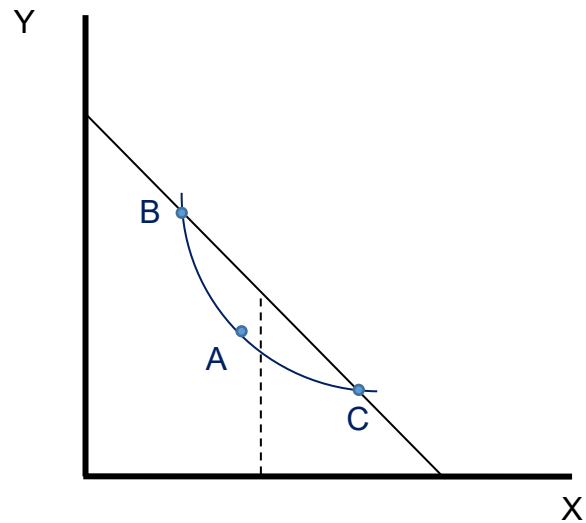
- Note in general that focusing on how bundles on the origin change (e.g. if you spend all of your money on only one good) can help determine how to change the budget constraint as income or prices change.

- Next, we illustrated examples of budget constraints with unusual shapes.
  - Bulk discounts
    - When prices vary as quantity varies, the budget constraint will have sections with different slopes.
    - Example:  $P_X = \$1$  for the first 100 units, and  $\$0.50$  thereafter. Income =  $\$200$ .
    - Key points:
      - How much other consumption is possible if no  $X$  is purchased? ( $\$200$  worth).
      - What is the maximum amount of  $X$  that can be purchased?
        - If 100 is purchased at  $\$1$  each, you have  $\$100$  remaining.
        - Since the remaining units now cost  $\$0.50$ , up to 200 units may be purchased with the last  $\$100$ .
        - Thus, a maximum of 300 units of  $X$  may be purchased.
      - Where does the slope of the budget constraint change?
        - The slope changes where the prices change. This occurs where  $X = 100$ .
        - At this point, there is  $\$100$  for other consumption.

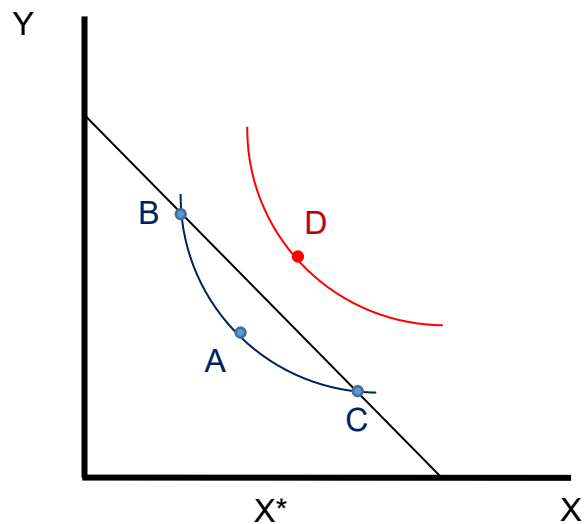


## II. Which Bundle to Choose? Maximizing Utility

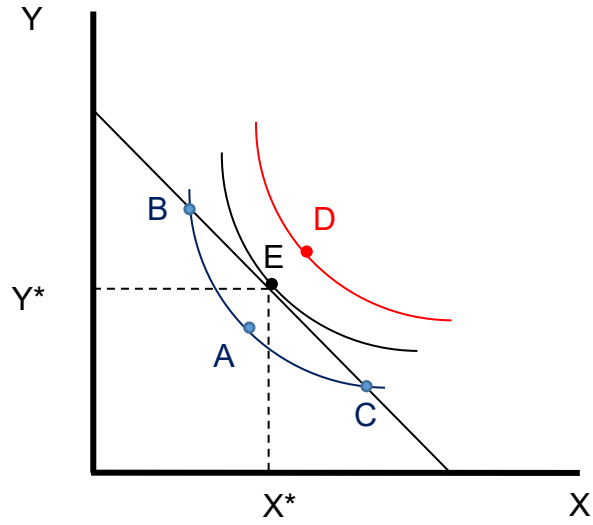
- What must be true about the maximizing bundle?
  - It must be on the budget constraint.
  - It must be on the highest possible indifference curve.
- Consider some examples



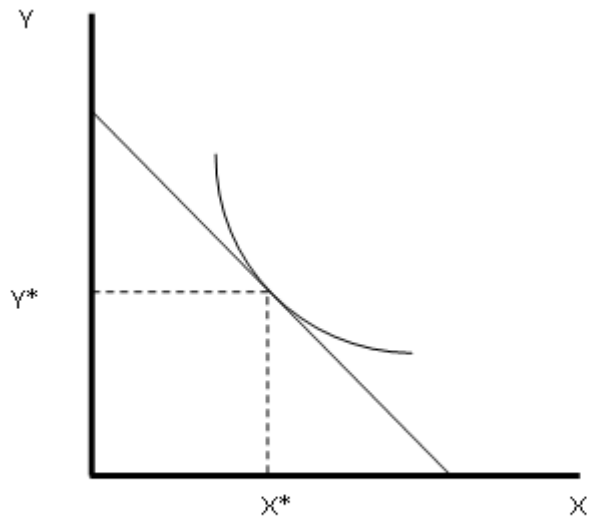
- A is not on the budget constraint: we have money left to spend
- B & C are on the budget constraint, but we can do better



- D is on a higher indifference curve, but it is not on the budget constraint: we cannot afford it



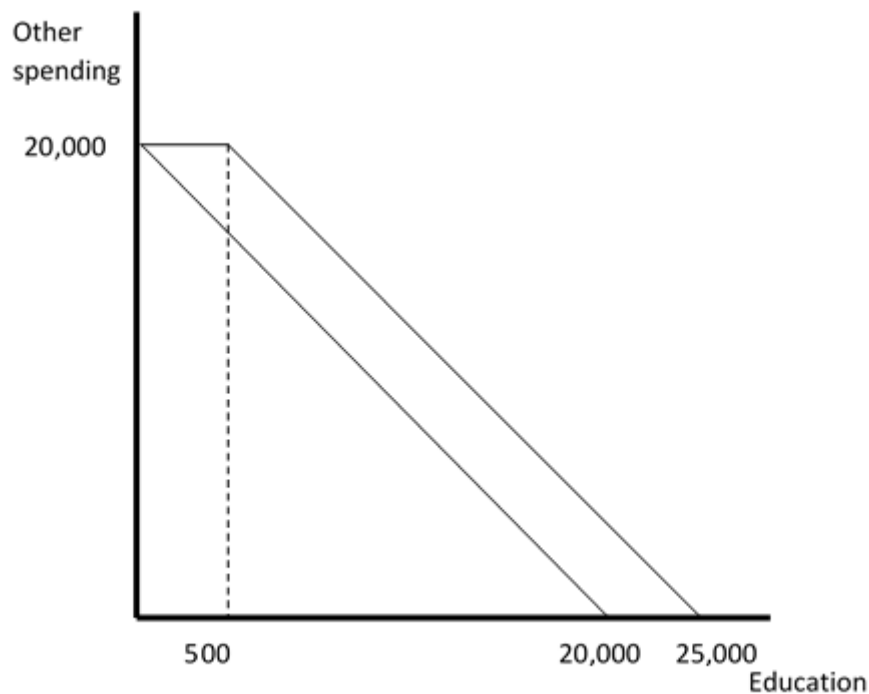
- E is the best we can do
- It is the highest possible indifference curve that is still on the budget constraint
- At this point, the indifference curve and budget constraint are tangent



- $MRS = MU_x/MU_y = P_x/P_y$  , or:
  - $MU_x/P_x = MU_y/P_y$
  - ***The marginal utility per dollar spent on x equals the marginal utility spent per dollar on y.***
  - If not, utility could be improved by spending less on the good with a lower marginal utility per dollar and more on the good with a higher marginal utility per dollar.
- Note the importance of *marginal analysis*.
  - ***In general, things are maximized when they are equal at the margin.***

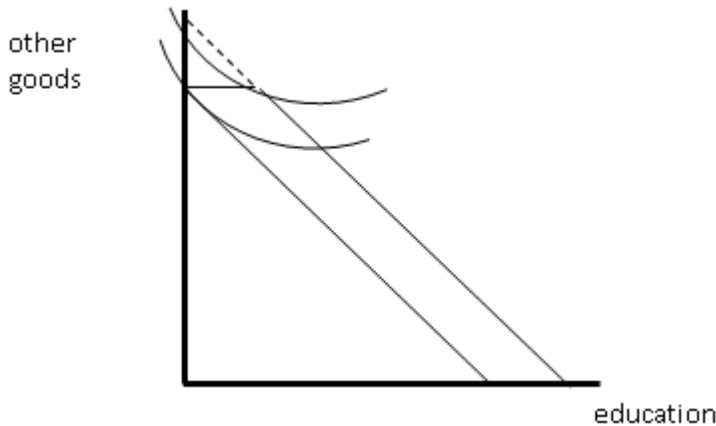
### III. In Kind Transfers

- In-kind transfers
  - In-kind transfers are when aid is given as a commodity, rather than in cash, such as food stamps
  - In the example below, I use a \$5000 education voucher as an example of an in-kind transfer.
  - The vouchers are like an increase in income. Thus, the budget constraint shifts out.
    - Note that prices remain the same, so the slope must remain the same.
  - However, the budget constraint is cut off at the top, since some income will be spent on education.
    - It is not possible to spend \$5000 more on other consumption and \$0 on education.

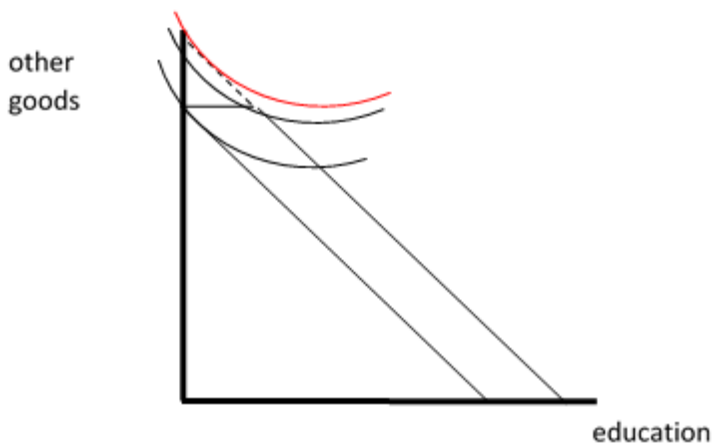


- In general, note that the key for graphing budget constraints is finding the relevant end points.

- In kind transfers, in which aid is given as a commodity, rather than cash, may lead to corner solutions
  - When we are at a corner solution, marginal utility per dollar is not equal, so consumers are being hurt by a constraint.
    - In the voucher example, the consumer would have preferred to spend less on education than the amount allocated in vouchers, but cannot.



- The person is maximizing utility given the additional constraint of the voucher program, *but would even be happier if cash was given instead.*
  - This is shown in the graph below. Note that, had we given this family cash instead (represented by the dashed line), they could have attained higher utility, represented by the red indifference curve.



- Moreover, as the article on aid in India discusses, in kind transfers may lead to other problems, such as a black market developing.
- However, such policies do ensure that the aid is used as the donor intended.

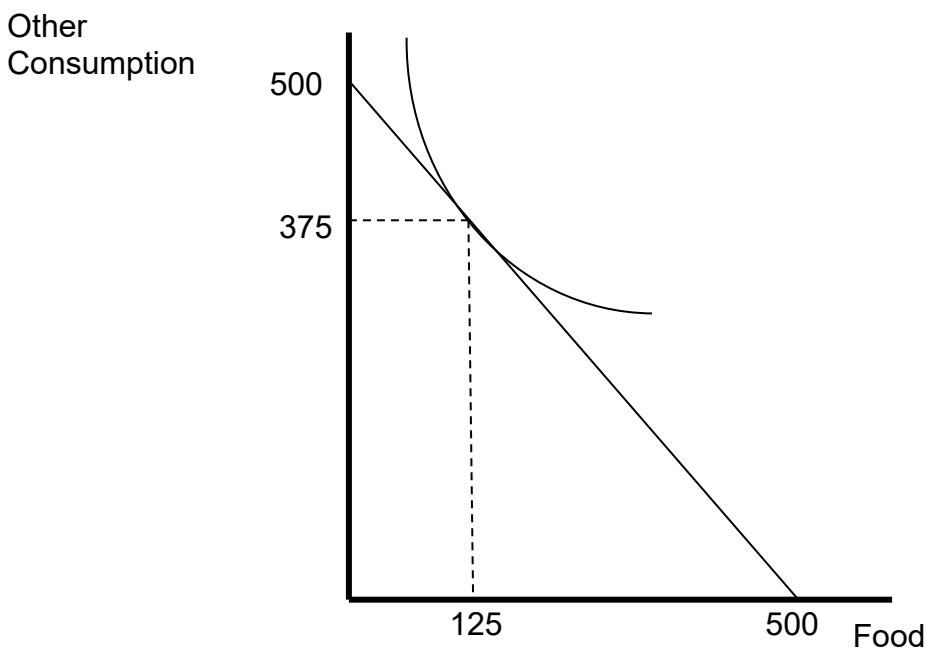


## IV. Subsidies

- In our next example, we compared in-kind transfers to subsidies
- Concerned about access to food, government officials are considering two alternative plans to help improve nutrition.
  - *Food Vouchers (e.g. a non-matching grant)*: Give each family a \$100 voucher for usable for food only
  - *Food subsidy (e.g. a matching grant)*: subsidize food to reduce the price to consumers
    - A \$1 “basket” of food now costs \$0.50
- Evaluate these plans for typical low-income family:
  - \$500 income per month
  - Spends \$125/month on food

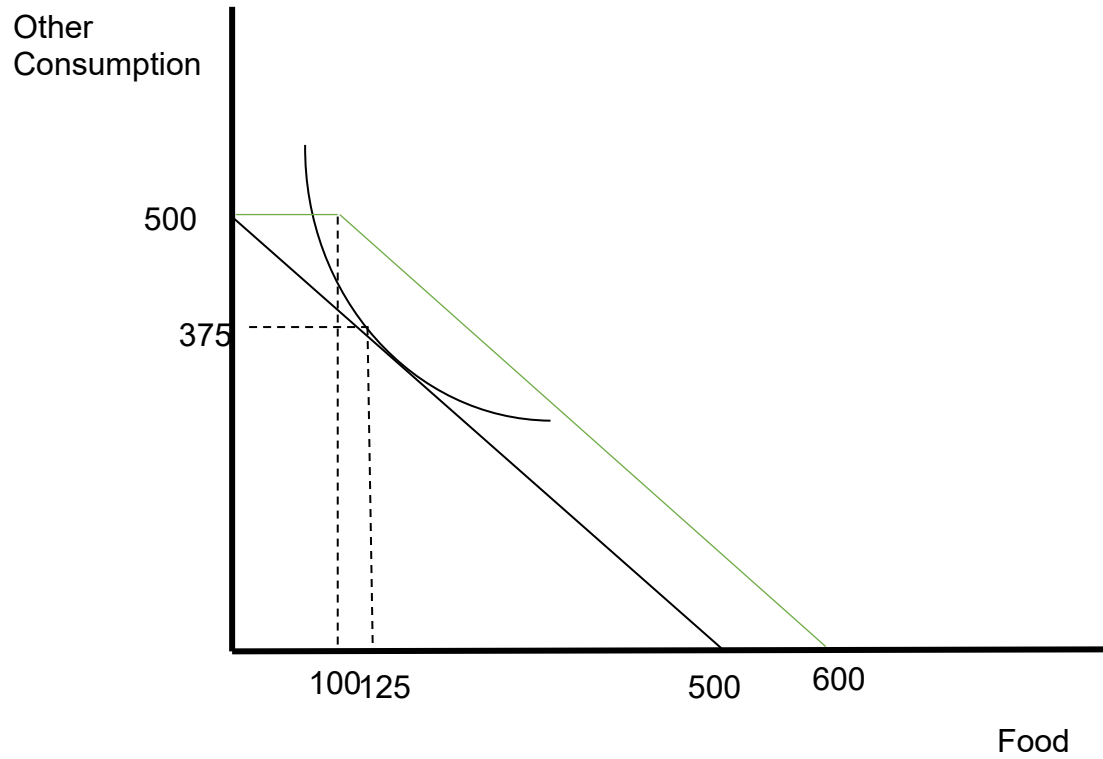
### 1) Draw the initial budget constraint

- Draw the budget constraint
  - A family can spend up to \$500 on other consumption and up to \$500 on food.
  - Note that these endpoints are what is important for the budget constraint – we want to show *what is possible*, not just what the consumers actually do.
- Draw the indifference curve
  - The typical low-income family actually chooses to purchase \$125 worth of food.
  - This choice leaves them with \$375 to spend on other goods.
  - This is shown by drawing an indifference curve tangent to the budget constraint at 100 units of food.



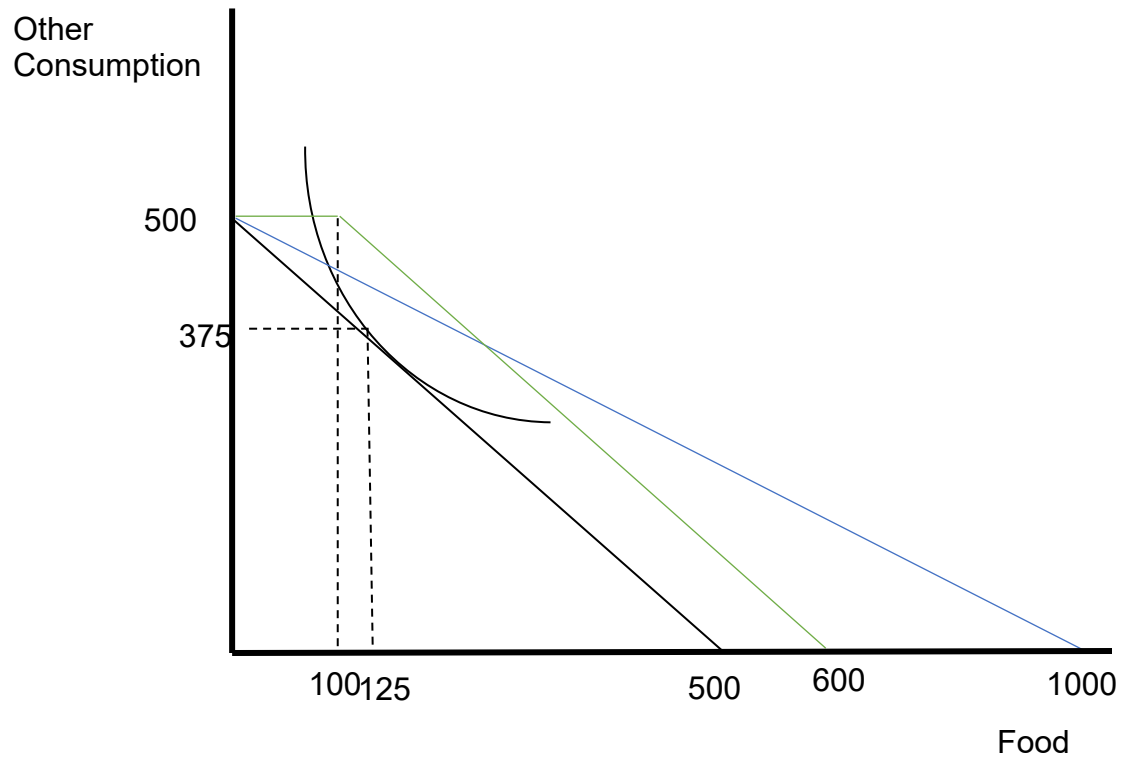
## 2) Add the budget constraint for the voucher

- With the voucher, the family can purchase up to \$600 worth of food, and can purchase \$100 worth of food even if they consume \$500 of other goods.
- Thus, the voucher is like income, but with a restriction that it can only be used to purchase food (green line).



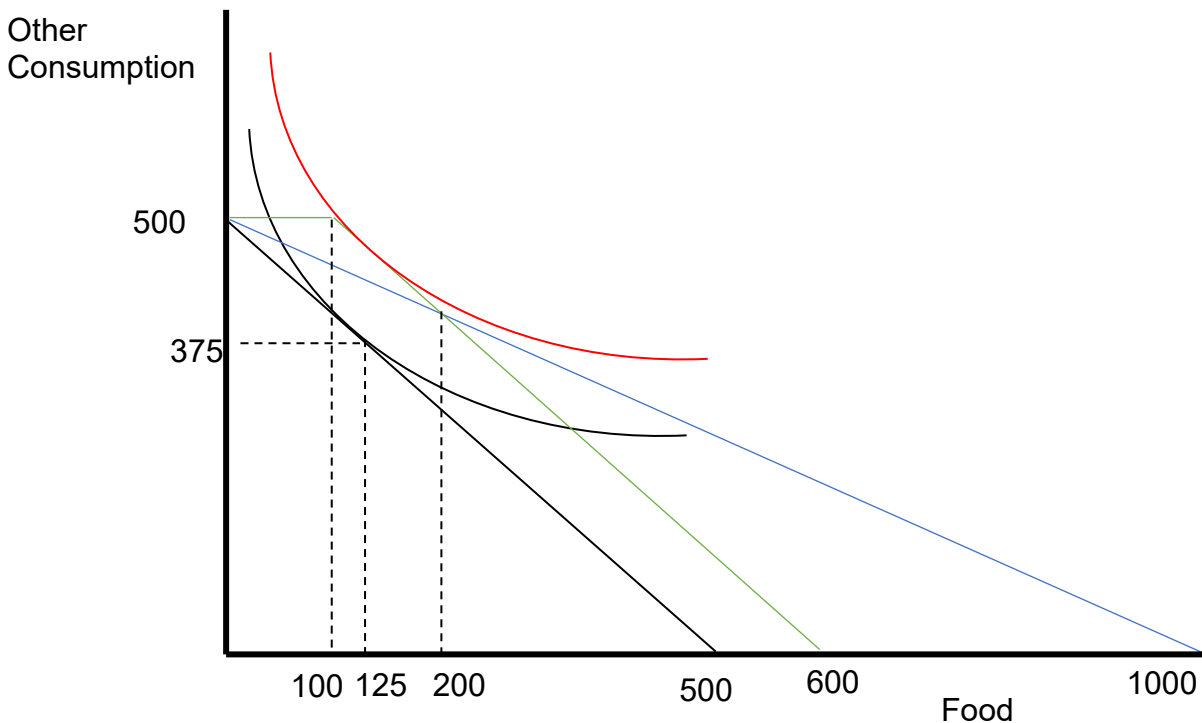
### 3) Add the budget constraint for the subsidy

- With the subsidy, a typical family's income goes twice as far.
  - They can purchase \$1,000 worth of food with their \$500 income. Thus, the price of a unit of food falls to \$0.50.
  - The budget constraint rotates outward (blue line).



#### 4) Compare the two policies

- The key to this problem is that the budget constraints intersect at \$200 worth of food. (I will give you this information)
  - With the voucher, consumers get \$100 worth of food free, and purchase an additional 100 units for \$1 each. They spend \$100 to get 200 units of food.
  - Under the subsidy, the family can also purchase 200 units of food for \$100, since each unit costs the family \$0.50.
- Start with the indifference curves *before* policy – *we know where these go*.
  - Without either policy, a typical family purchases just \$125 worth of food.
  - This puts them well to the left of the intersection of the two budget constraints.
- The new indifference curve (red) should be consistent with the original.
  - Remember, for example, that indifference curves cannot cross.
- Now, compare the position of these indifference curves to where the budget constraints for the two policies cross:
  - In this situation, they will prefer the vouchers. Note on the graph that, to the left of the intersection, the budget constraint for the vouchers is higher. I've added an indifference curve consistent with this outcome.



- The intuition here is that, since the typical family doesn't purchase a lot of food, the income it saves under the subsidy is not as valuable as the \$100 the family receives under the voucher.
  - A family needs to purchase at least \$200 worth of food for the subsidy to provide at least \$100 worth of savings.
- Finally, note that while the family likely consumes less than \$200 worth of food, the family will choose more than \$125 worth of food with the voucher.
  - The voucher provides the family with extra income. Because of the extra income, consumption of both food and other goods increases.