

LECTURE 6
FIRST WELFARE THEOREM
WALRAS' LAW
MIDTERM REVIEW



Additional Question Q4

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- A consumer buys two goods
 - ▣ A basic good b (e.g., rice)
 - ▣ A fancy good f (e.g., meat)
- Suppose the consumer is subject to a *subsistence constraint*
 - ▣ The total calories consumed must be at least 36 for the consumer to survive
- One unit of basic good provides a calorie of 1
- One unit of fancy good provides a calorie of 2
- The price of b is \$1, the price of f is \$4, and the income is \$40

Additional Question Q4: Optimal Basket

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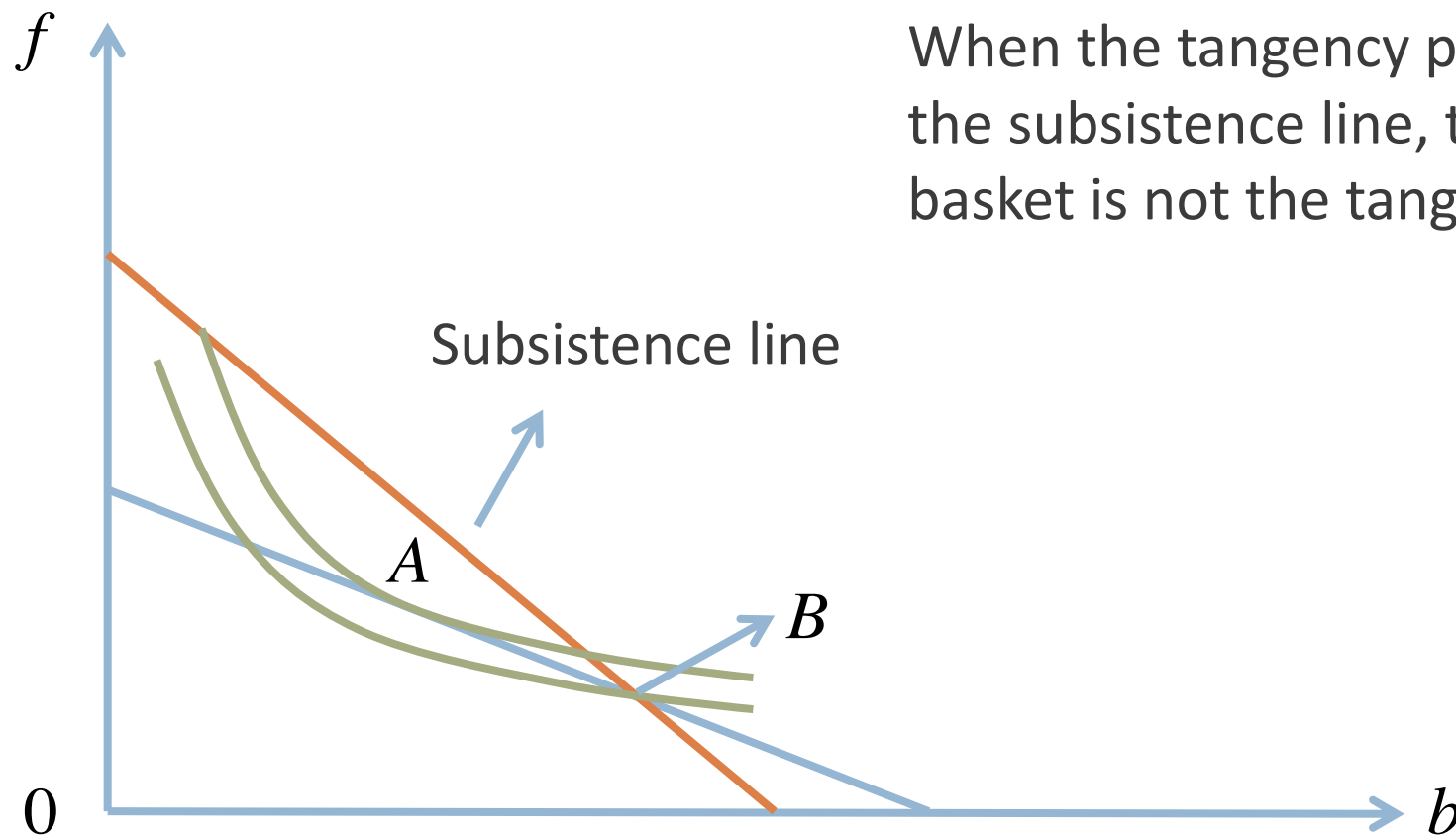
- The utility maximization problem is

$$\begin{aligned} \max_{b,f} \quad & bf \\ \text{s.t.} \quad & b + 4f = 40 \\ & b + 2f \geq 36 \end{aligned}$$

- If there is no subsistence constraint
 - ▣ The optimal basket will be the tangency point between the budget line and the indifference curve
- Now we add the subsistence constraint
 - ▣ The tangency point may lie above, on, or below the subsistence line
- When is the optimal basket NOT the tangency point?

Additional Question Q4: Graph

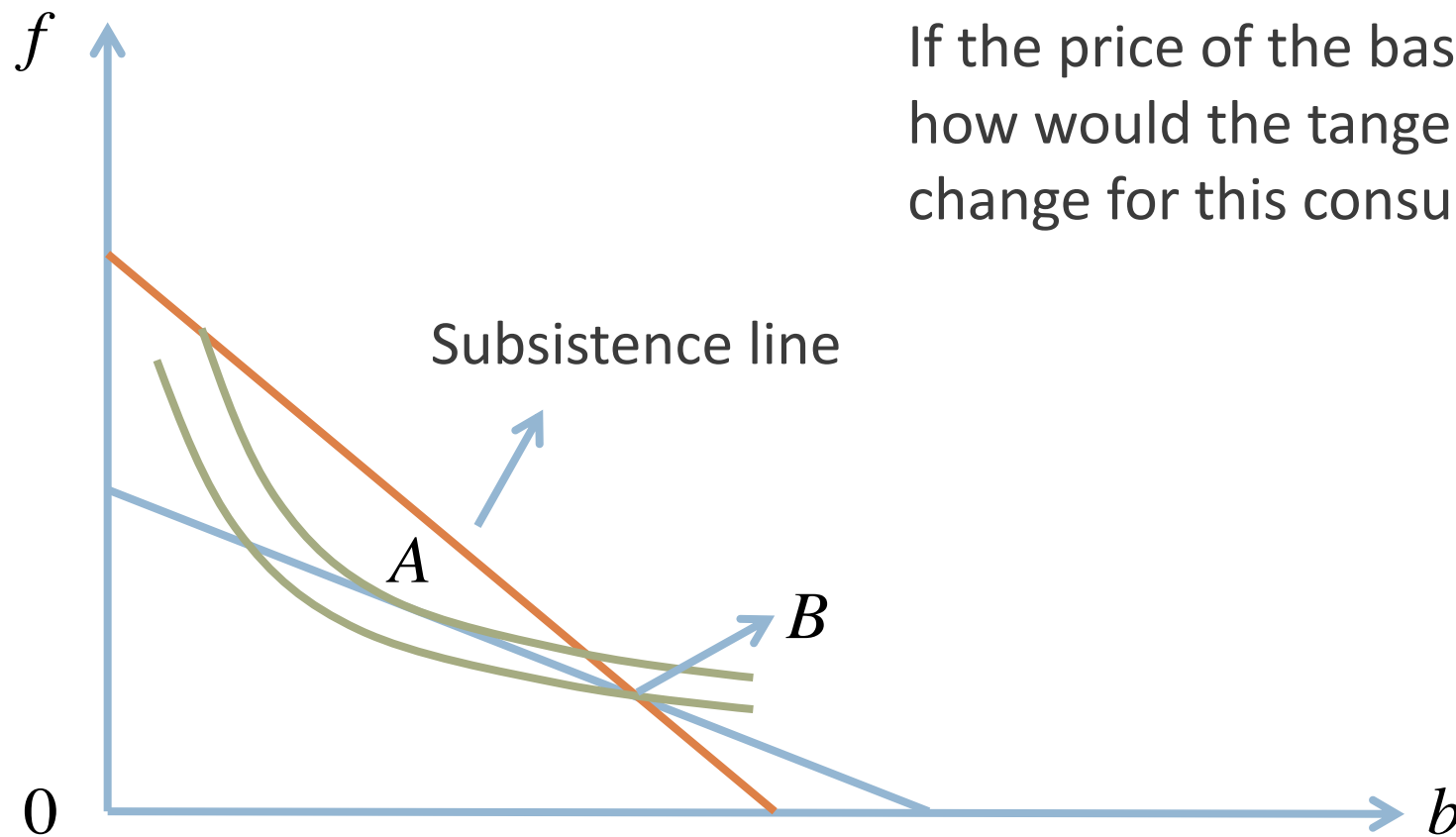
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When the tangency point lies below the subsistence line, the optimal basket is not the tangency point

Additional Question Q4: Price Change

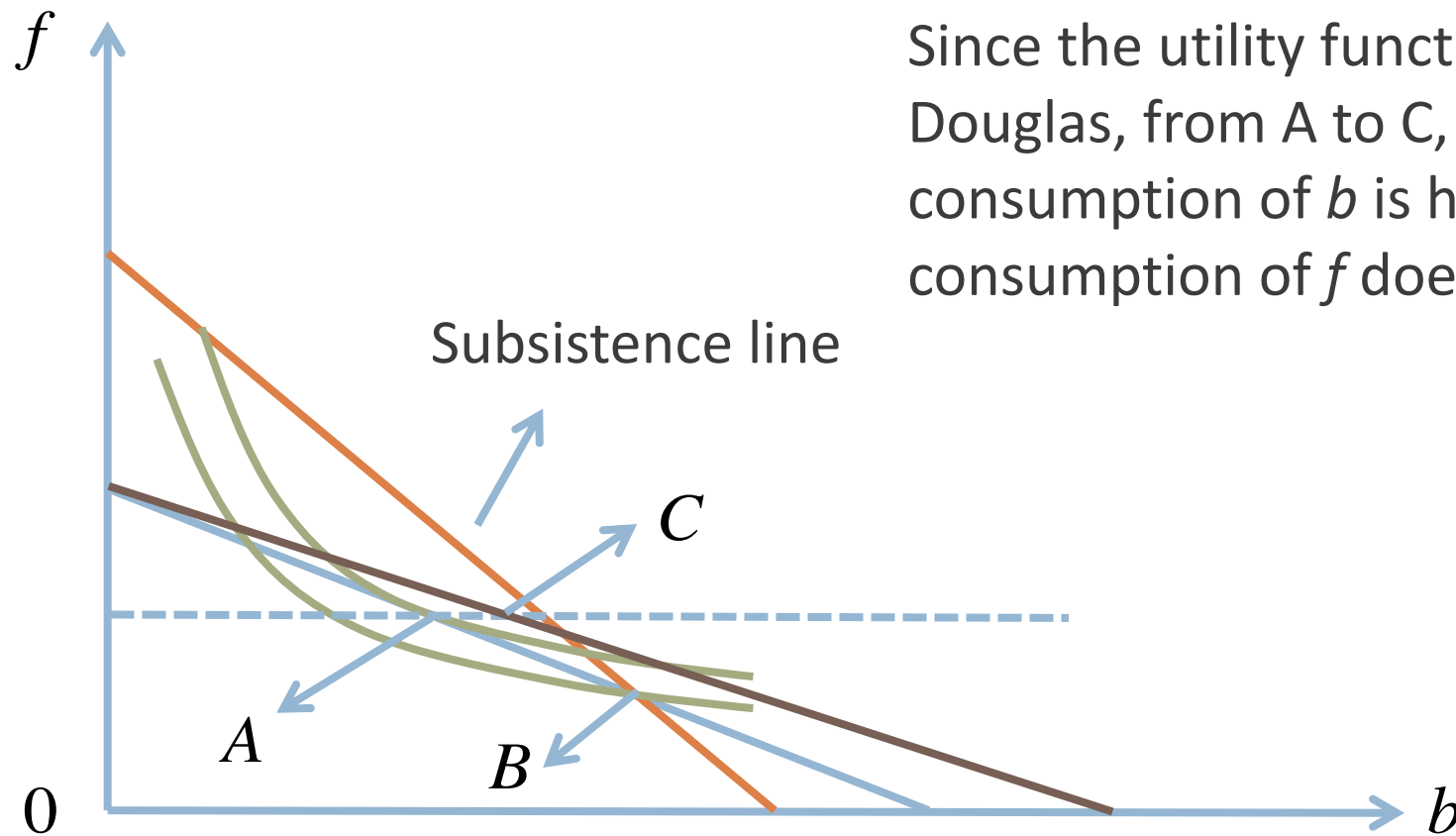
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If the price of the basic good drops, how would the tangency point change for this consumer?

Additional Question Q4: Price Change

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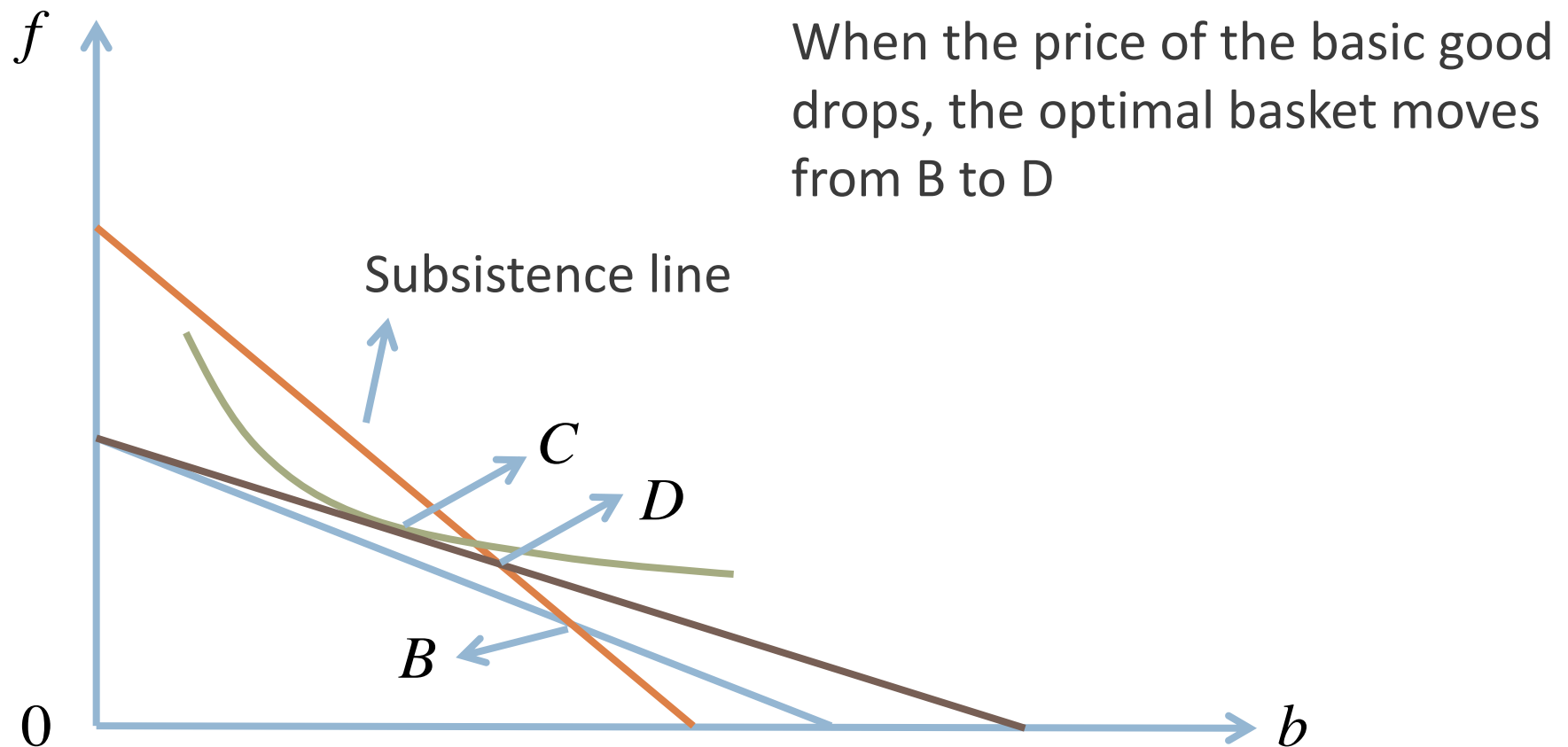


Since the utility function is Cobb-Douglas, from A to C, the consumption of b is higher and the consumption of f does not change

Subsistence line

Additional Question Q4: Giffen Behavior

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MCQ: Example 1

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- A consumer buys two goods, rice and housing. At the initial optimal basket, the consumer buys both goods. When the price of rice decreases while the price of housing and the consumer's income remain constant, the consumption of rice increases by 4 units. If rice is an inferior good, regarding the substitution effect (SE) and income effect (IE) with respect to rice, which of the following is true?
 - ▣ A. $0 \leq SE \leq 4$, $0 \leq IE \leq 4$
 - ▣ B. $-4 \leq SE < 0$, $-4 \leq IE \leq 0$
 - ▣ C. $SE > 4$, $IE < 0$
 - ▣ D. $SE < 0$, $IE > 4$

Solution for MCQ 1

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- Answer: C
- Substitution effect is non-negative
- Since rice is inferior
 - ▣ When rice becomes cheaper, purchasing power increases in step 2
 - ▣ Income effect should be negative
- $SE + IE = 4$
- Thus $SE > 4$, $IE < 0$

MCQ: Example 2

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- Suppose a consumer has utility function $U(x,y)=\min(ax,y)$, where $a>0$. Which of the following statements is true?
 - ▣ A. The consumer always buys the same amount of x and y .
 - ▣ B. The consumer's expenditure on y is always greater than the expenditure on x .
 - ▣ C. When income doubles, the consumer doubles his consumption of both x and y .
 - ▣ D. When x becomes more expensive, the consumer buys more y .

Solution for MCQ 2

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- Answer: C
- Solving for the demand functions

$$ax = y$$

$$P_x x + P_y y = I$$

- Demand functions are

$$x = \frac{I}{P_x + aP_y}, \quad y = \frac{aI}{P_x + aP_y}$$

- Expenditure on x and y are

$$P_x x = \frac{P_x I}{P_x + aP_y}, \quad P_y y = \frac{aP_y I}{P_x + aP_y}$$

MCQ: Example 3

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- Suppose a consumer's preference satisfies the three assumptions. The consumer has an income of \$18. When the price of x is \$2 and the price of y is \$1, the consumer's optimal choice is 6 units of x and 6 units of y . When the price of x becomes \$1 and the price of y becomes \$2, assuming income does not change, the optimal choice CANNOT be
 - ▣ A. 10 units of x and 4 units of y
 - ▣ B. 8 units of x and 5 units of y
 - ▣ C. 6 units of x and 6 units of y
 - ▣ D. 4 units of x and 7 units of y

Solution for MCQ 3

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- Answer: D
- The initial optimal basket is still on the new budget line
 - ▣ $\$1 \cdot 6 + \$2 \cdot 6 = \$18$
- All the 4 baskets are on the new budget line
- Basket D is below the initial budget line
 - ▣ $\$2 \cdot 4 + \$1 \cdot 7 = \$15 < \18
- Thus the initial optimal basket is strictly preferred to D
- Since the initial optimal basket is still affordable given the new budget line
 - ▣ D cannot be optimal

Q&A on Lecture 6