

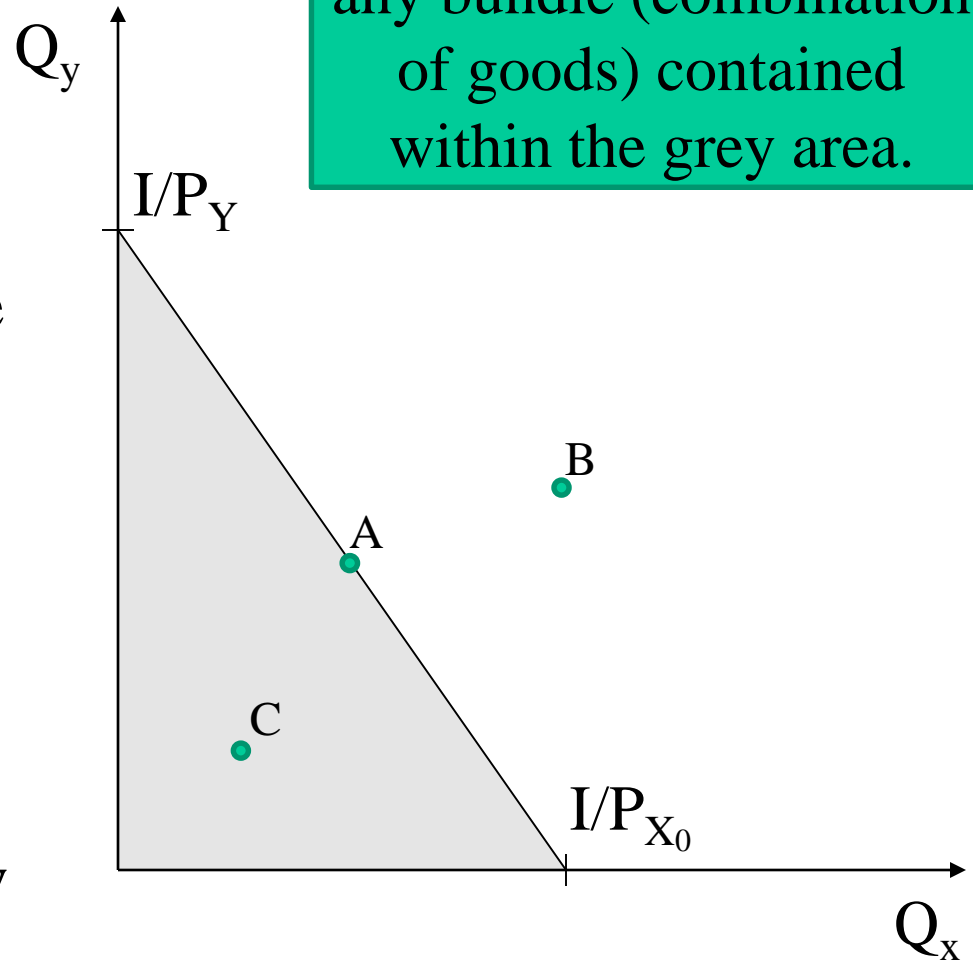
# Microeconomics (Week 3)

## Consumer choice and demand decisions (part 1):

- Budget lines
- Indifference curves
- Consumer choice

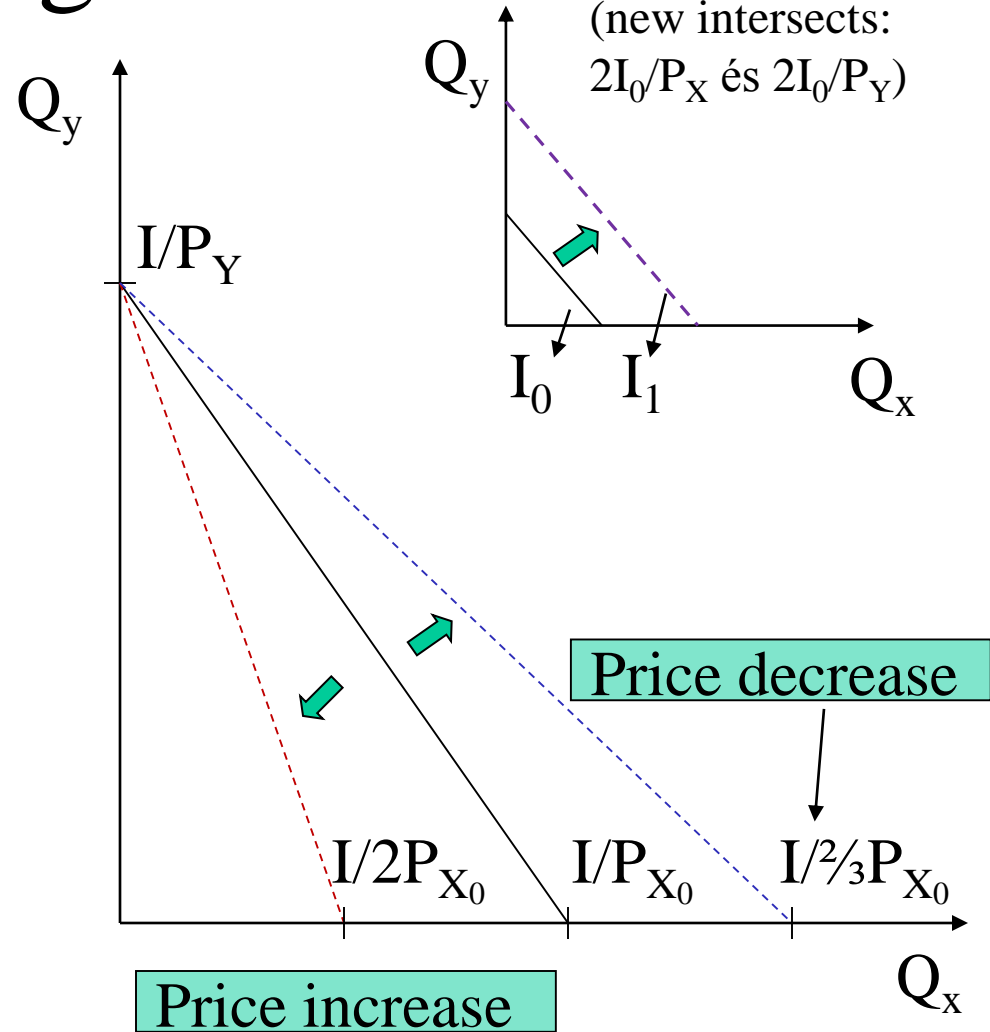
# The budget constraint

- The budget constraint describes the different bundles that the consumer can afford.
- Points *on* the budget line (such as *A*) use up the entire consumer budget.
- Points *above* the budget line are unaffordable.
- Points *inside* the budget line (like *C*) would allow additional spending.



# The effects of price and income changes

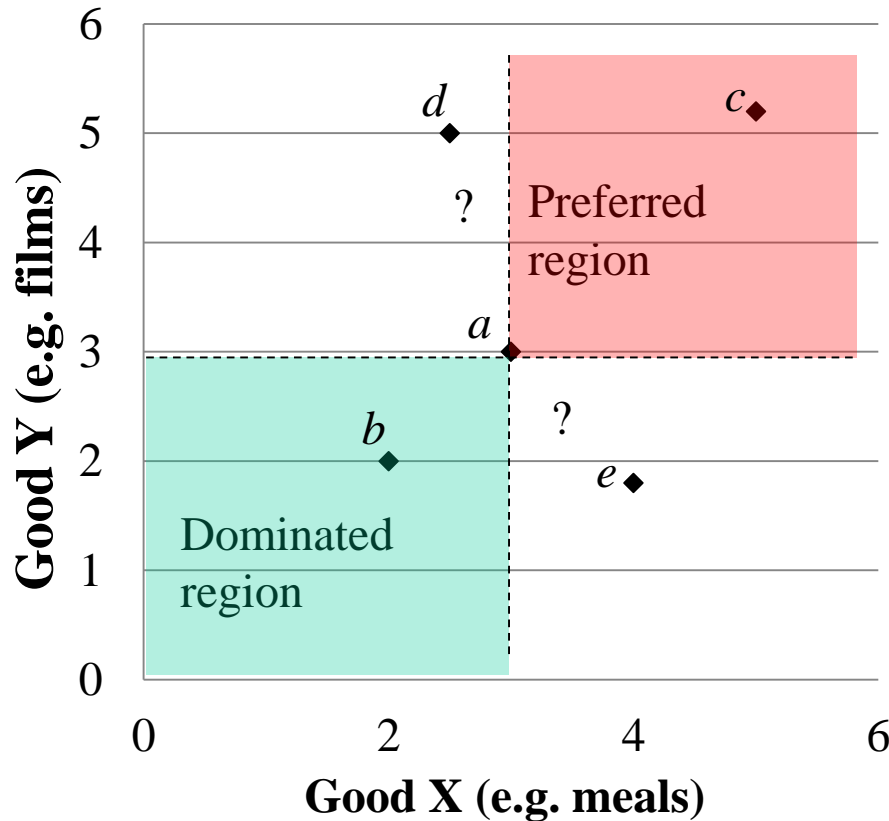
- The budget line shows the maximum combinations of goods that the consumer can afford, **given income and the prevailing prices**.
- Budget constraint (for 2 goods):  $P_X Q_X + P_Y Q_Y \leq I$
- Slope:  $-P_X/P_Y$



# Consumer tastes

- Three main assumptions:
  - The consumer can rank alternative bundles of goods, according to the satisfaction or utility that they provide.
  - We will assume that the consumer prefers more to less.
  - Consumer tastes exhibit a diminishing marginal rate of substitution. (To hold utility constant, diminishing quantities of one good will be sacrificed to obtain successive equal increases in the quantity of the other good.)

# Ranking alternative consumption bundles



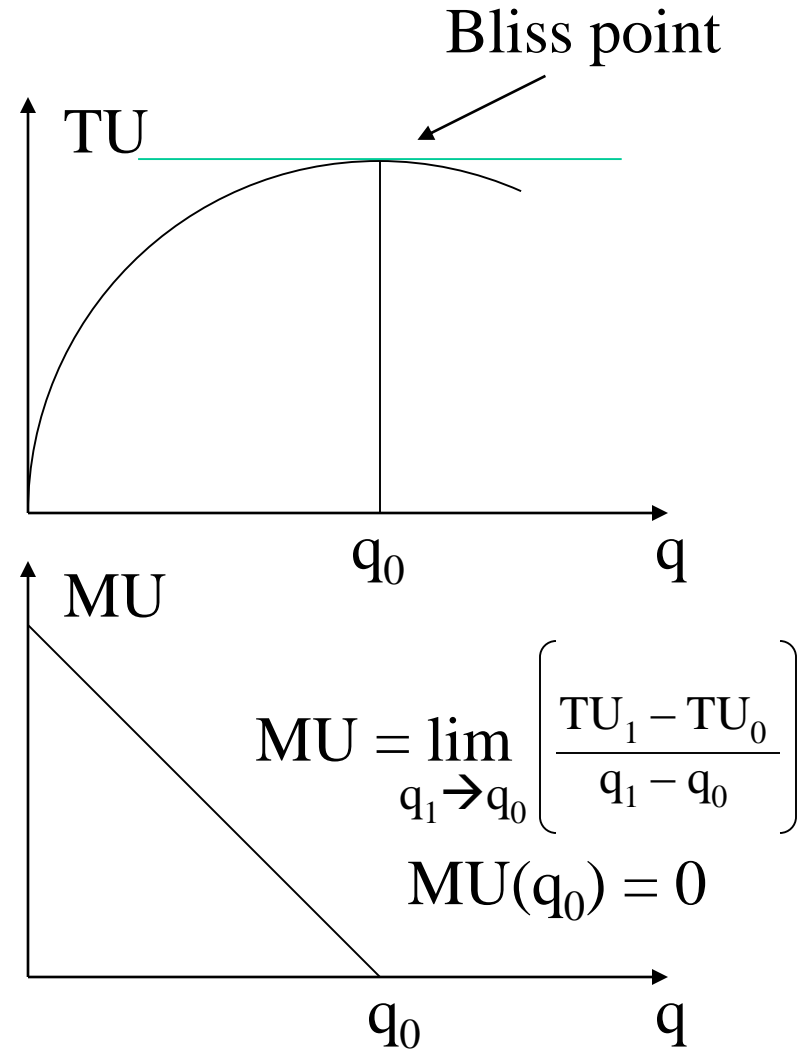
- The consumer evaluates consumption bundles *a*, *b*, *c*, *d* and *e*.
- With respect to point *a*, any point to the north-east (like *c*) is preferred and any point to the south-west (like *b*) is dominated by *a*.
- Points such as *d* or *e* in the other two regions may or may not be preferred to *a*, depending on the consumer tastes.

# Measurable utility

TU – *total utility*

MU – *marginal utility*

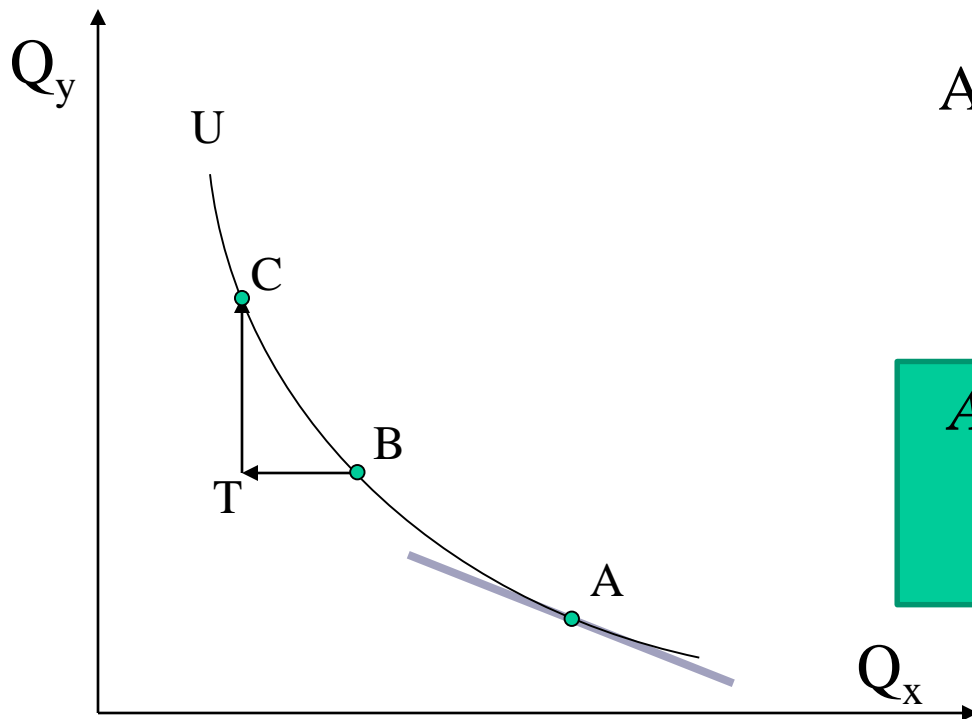
- We assume that the consumers can rank different bundles according to the utility or satisfaction they give.
- Saying bundle A gives more utility than bundle B just means the consumer prefers A to B. We don't need to know by how much A is preferred to B.
- Nineteenth-century economists believed utility levels could actually be measured, as if each consumer had a utility meter measuring his/her happiness. This extra assumption is unnecessary but it might make the mathematical treatment easier.
- The marginal utility of a good is the increase in total utility obtained by consuming one additional unit of that good, for given consumption of other goods.



# Indifference curves

An indifference curve shows all the consumption bundles yielding a particular level of utility.

The marginal rate of substitution is the slope of the indifference curve at the point from which we begin.



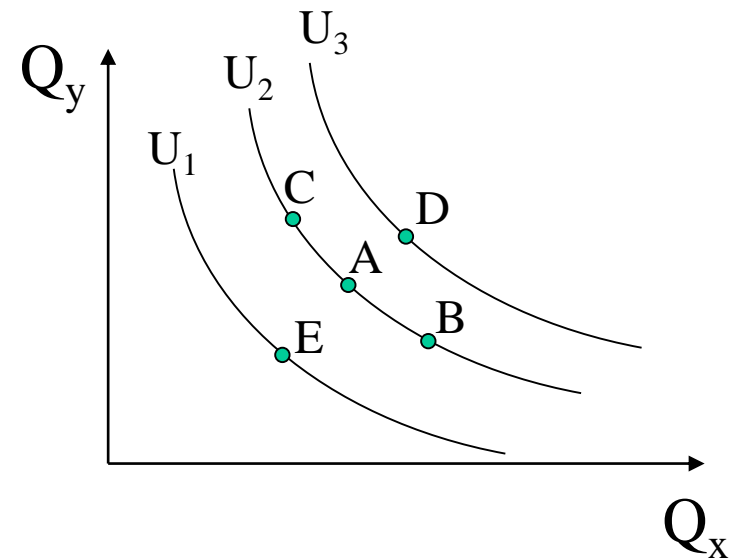
Assuming measurable utility:

$$MRS = - \frac{MU_X}{MU_Y}$$

**A and B are on the same curve:**  
therefore they must yield the  
same level of utility.

# Representing consumer tastes by indifference curves

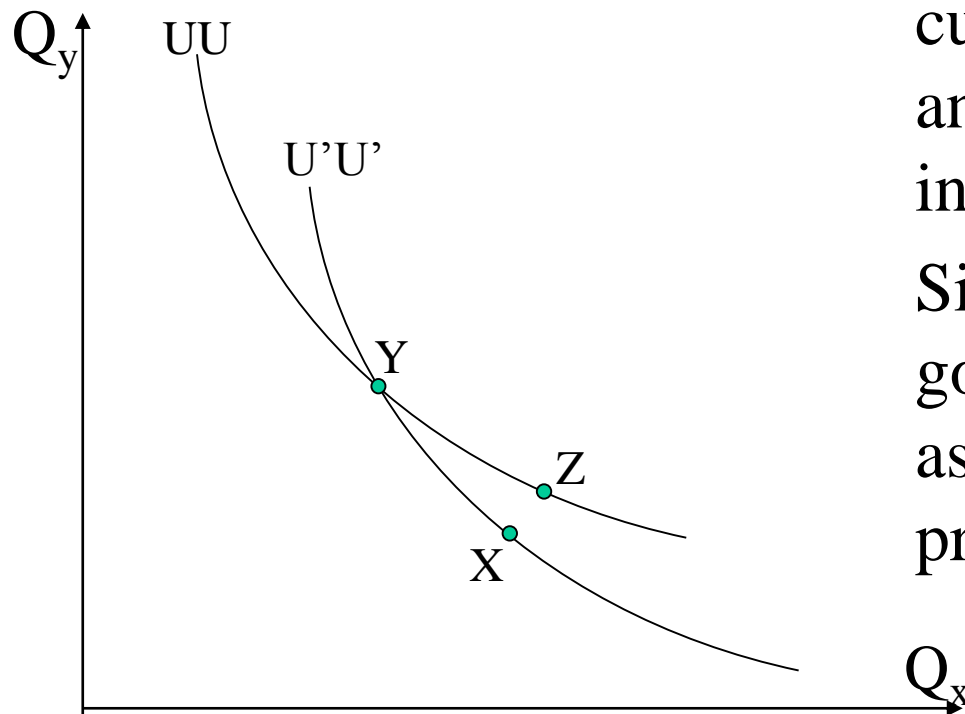
- D offers more of both goods than A and is therefore preferred to A.
- E offers less of both goods than A and therefore yields less utility than A.



- Along each curve consumer utility is constant. Since more is preferred to less, any point on a higher indifference curve is preferred to any point on a lower indifference curve.
- Indifference curves slope downwards. Otherwise the consumer would have more of both goods and be better off.
- Diminishing marginal rates of substitution imply that each curve becomes flatter as we move along it to the right.



# Indifference curves cannot intersect



If indifference curves intersected, the consumer would be indifferent between  $Z$  and  $Y$  on the indifference curves  $UU$ , and between  $Y$  and  $X$  on  $U'U'$ , and hence indifferent between  $X$  and  $Z$ .

Since  $Z$  offers more of both goods than  $X$ , this violates the assumption that consumers prefer more to less.

# Consumer choice

To complete the model, we assume the consumer chooses the affordable bundle that maximizes their utility.

They will select a point on the budget line at which an indifference curve just touches the budget line.

The budget line is a tangent to the indifference curve at this point.

Assuming measurable utility, the consumer's choice is optimal,

when: 
$$\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y}$$

When this holds, the consumer cannot rearrange the division of their total spending to increase their utility. This also implies:

$$\frac{P_X}{P_Y} = \frac{MU_X}{MU_Y} = -MRS^1$$

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<sup>1</sup> *Marginal Rate of Substitution*

# Consumer choice in action

Points above the budget line are unaffordable. The consumer cannot reach the indifference curve  $U'U'$  (e.g. they can't afford B).

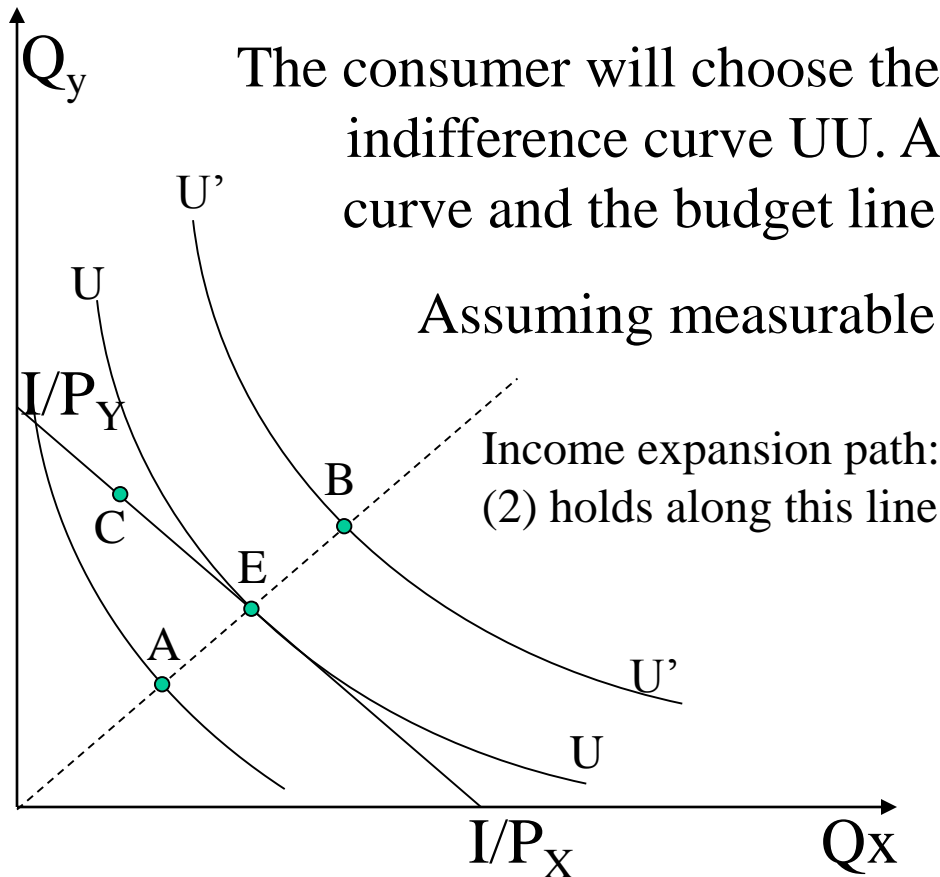
Points such as A and C are affordable but they don't allow the consumer to reach the indifference curve  $UU$ .

The consumer will choose the point E to reach the highest possible indifference curve  $UU$ . At the chosen point E, the indifference curve and the budget line just touch and their slopes are equal.

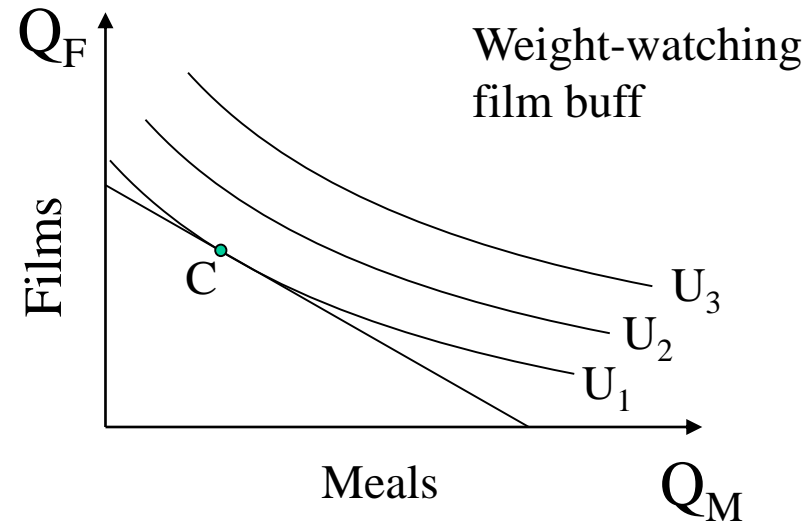
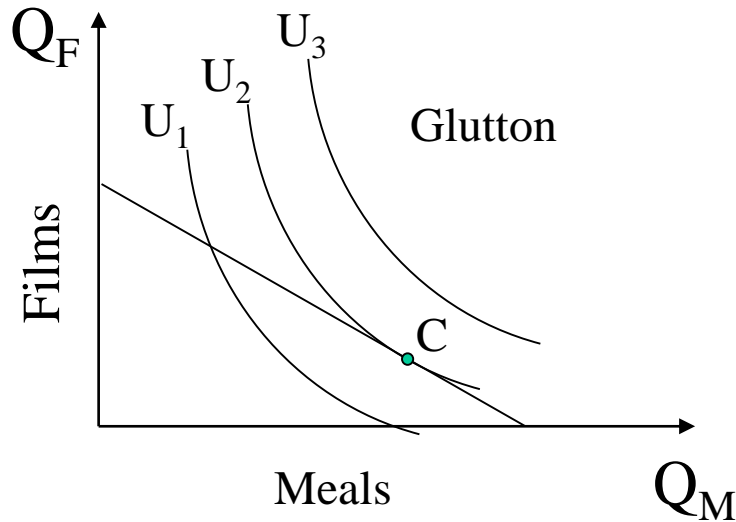
Assuming measurable utility, the optimality conditions are:

$$(1) I = P_X X + P_Y Y$$

and (2) 
$$\frac{P_X}{P_Y} = \frac{MU_X}{MU_Y} = -MRS^*$$



# The effect of tastes on consumer choice



Holding utility constant on any indifference curve, to get more food a glutton sacrifices more films than a film buff. Both of them face the same budget line and choose the point  $C$ , maximizing utility where the indifference curve is tangent to the budget line. The glutton has steep indifference curves and eats a lot of meals before the diminishing marginal rate of substitution flattens the indifference curve sufficiently. The film buff has flat indifference curves and the point of tangency is much further to the left. The glutton chooses more meals but fewer films than the film buff.

# Microeconomics

## Consumer choice and demand decisions (part 2):

- Income and substitution effects
- ICC and Engel curves
- PCC and demand curves

# A change in the price of one good

- A change in the price of one good rotates the budget line around the point at which none of that good is purchased. Such a price change has an income effect and a substitution effect.
- The substitution effect of a price change is the adjustment of demand to the relative price change alone.
- The income effect of a price change is the adjustment of demand to the change in real income alone.

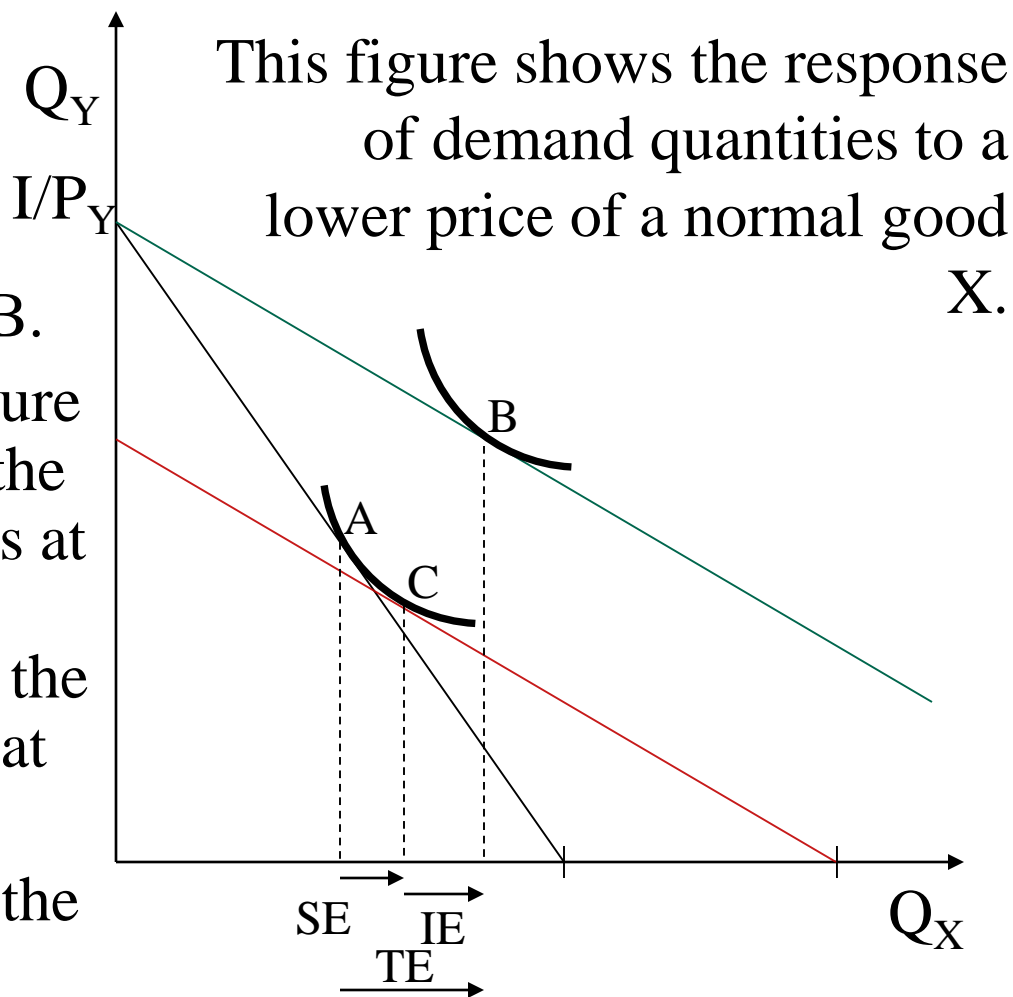
# Income and substitution effects

A decrease in  $P_x$  rotates the budget line around the point  $(0; I/P_y)$  at which no good  $X$  is bought.

The consumer moves from  $A$  to  $B$ .

This can be decomposed into a pure substitution effect, from  $A$  to  $C$ , the response to relative price changes at the old standard of living, plus a pure income effect, from  $C$  to  $B$ , the response to a rise in real income at constant relative prices.

The substitution effect increases the quantity of  $X$  demanded. The income effect also increases the quantity of  $X$  demanded if  $X$  is a normal good.

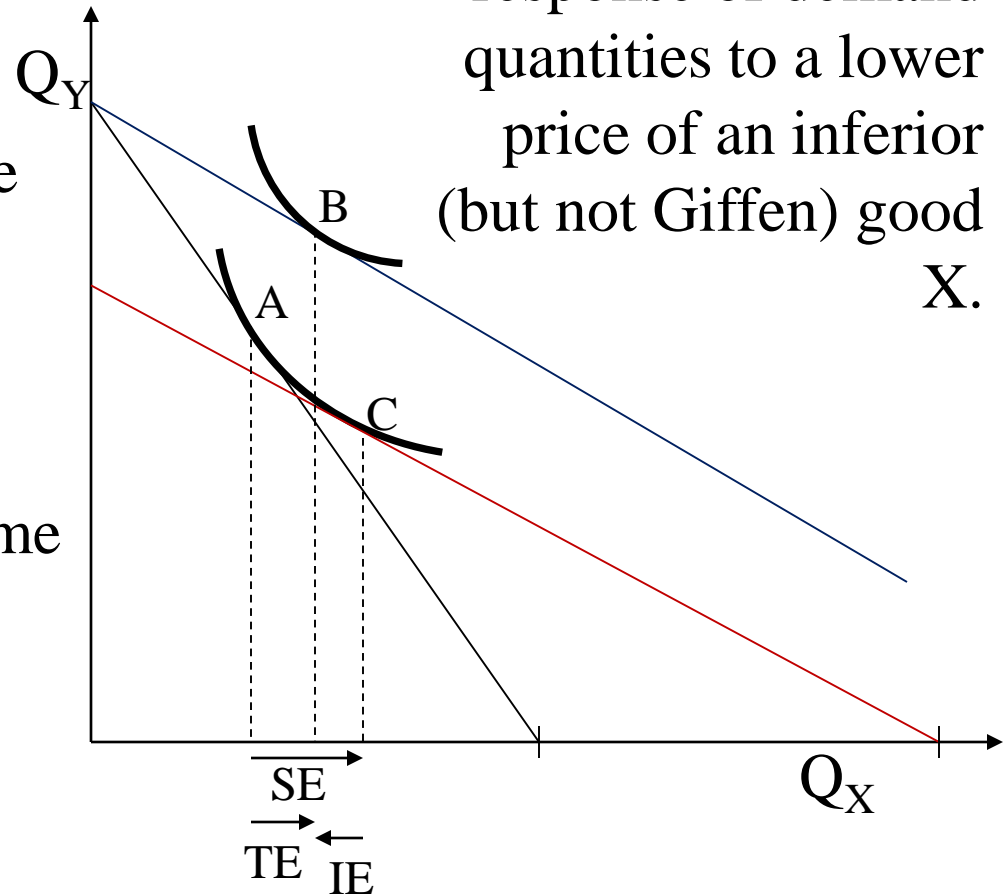


Under these circumstances, price cuts increase the quantity demanded and demand curves slope downwards.

# An increase in income reduces demand for the inferior good

Although the substitution effect must increase the quantity of good X demanded when its price is reduced ( $A \rightarrow C$ ), the income effect goes in the opposite direction if the good is inferior.

If X is an inferior good, the quantity demanded falls as income rises. The consumer then moves from C to B.





# A Giffen good

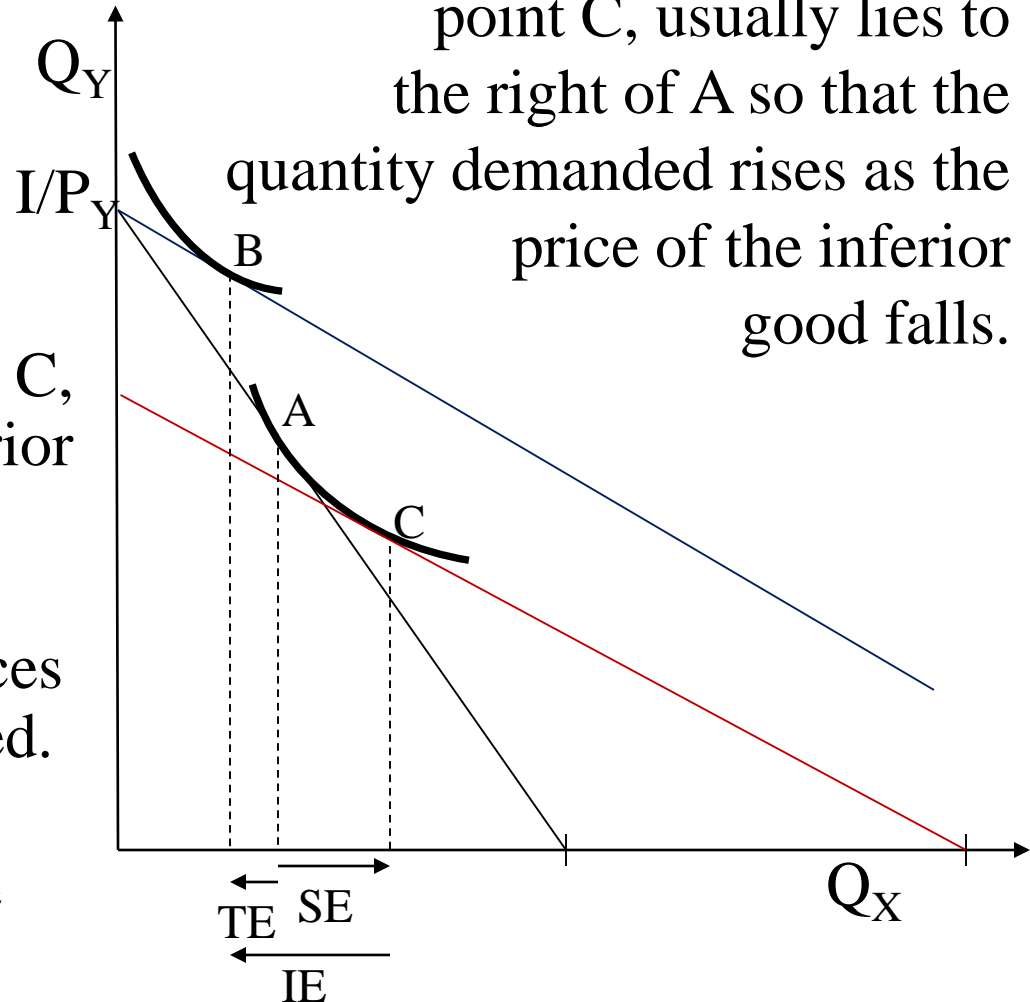
The figure to the right shows the response of demand quantities to a lower price of a Giffen good X.

A price reduction rotates the budget line around the point  $(0; I/P_Y)$  at which no good X is bought.

The substitution effect, from A to C, increases the quantity of the inferior good demanded.

Since the good is inferior, the income effect, from C to B, reduces the quantity of the good demanded.

For a Giffen good, the income effect dominates and B lies to the left of A.

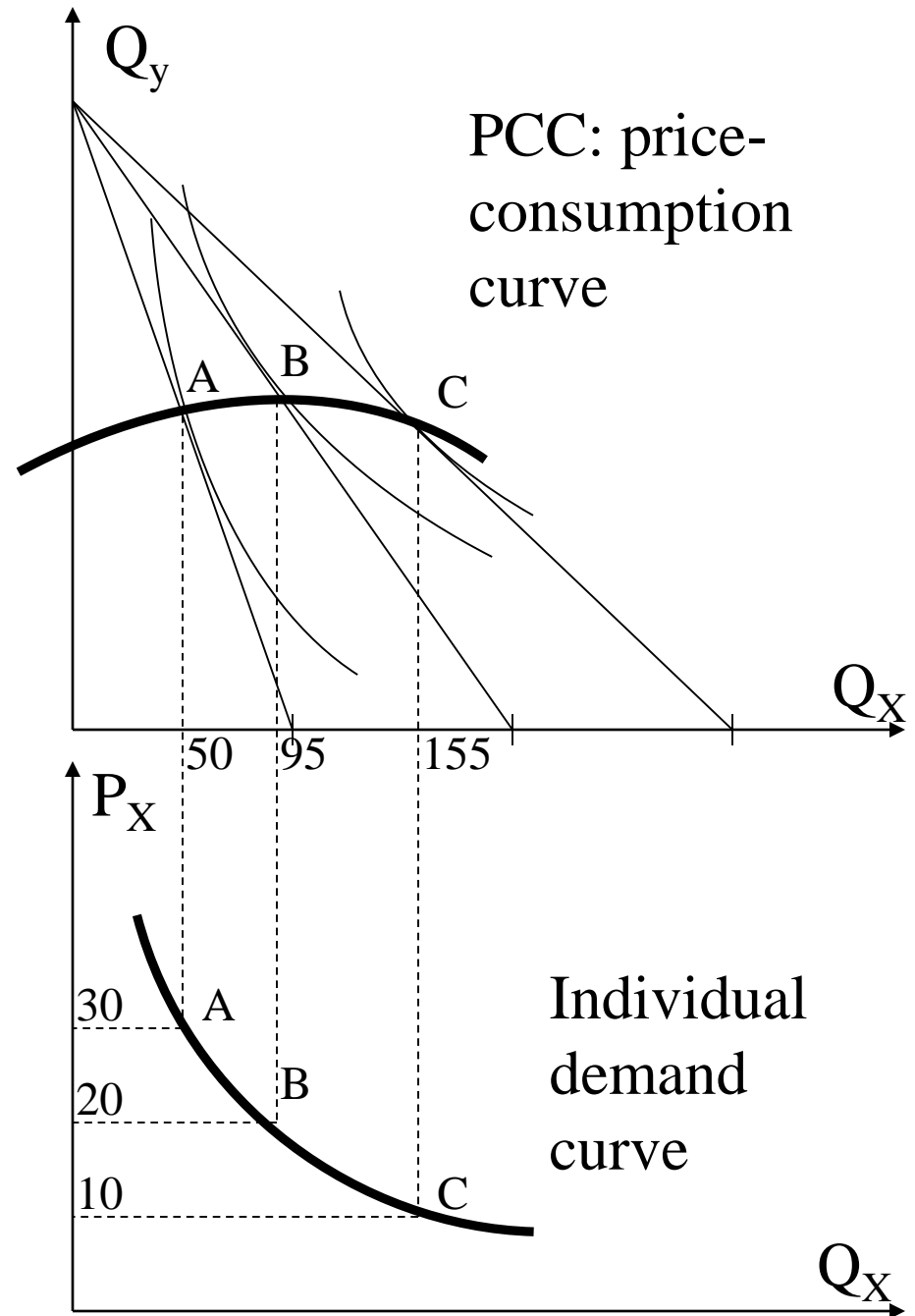


In practice, the income effect for most inferior goods is less strong and the point B, although to the left of point C, usually lies to the right of A so that the quantity demanded rises as the price of the inferior good falls.

# Deriving PCC and individual demand curves

The price-consumption curve is the set of optimal points as the price of one good (here: good x) varies, with other prices (like  $P_y$ ) and income held constant.

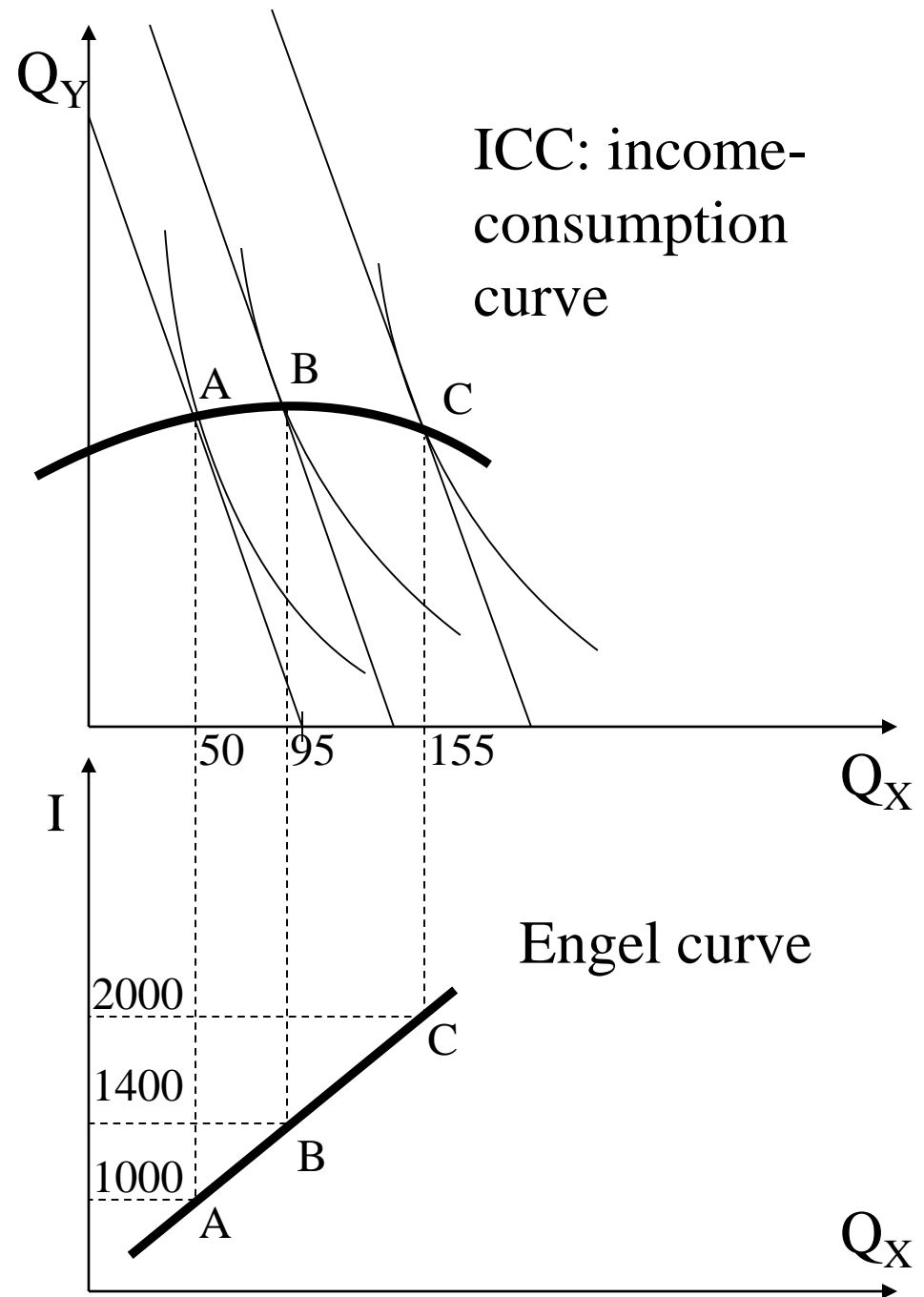
The demand curve shows the relation between price and quantity demanded, holding other things constant.



# Deriving ICC and Engel curves

The income–consumption curve (or: the income expansion path) is the set of optimal points as income varies, with prices held constant.

Engel curves show the relation between income and quantity demanded, holding other things constant.



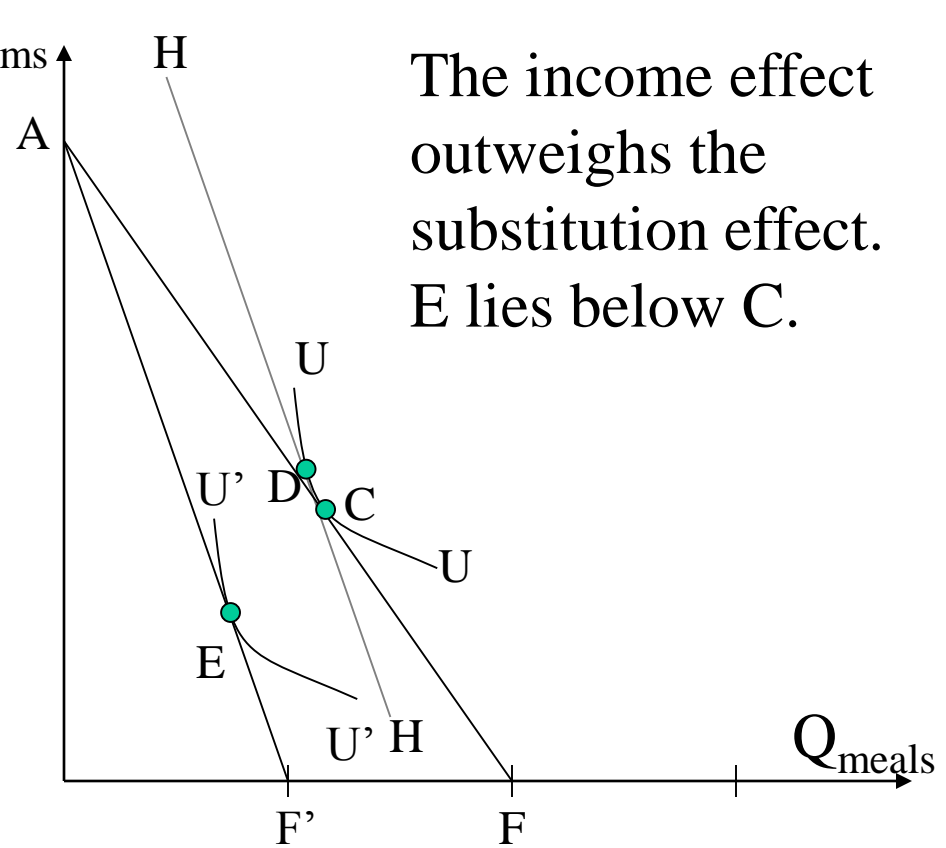
# Microeconomics (Week 4)

## Consumer choice and demand decisions (part 3):

- Cross-price elasticities and consumer choice
- Complements and substitutes
- The market demand curve
- Transfers in kind

# A negative cross-price elasticity

An increase in the price of meals rotates the budget line from  $AF$  to  $AF'$ . The substitution effect from  $C$  to  $D$  is small. Indifference curves have large curvature since the two goods are poor substitutes in utility terms. The income effect from  $D$  to  $E$  implies a large reduction in films for two reasons. First, the reduction in real income is larger the further to the right the initial point  $C$ . Second, films are a luxury good whose quantity demanded is sensitive to changes in real income.



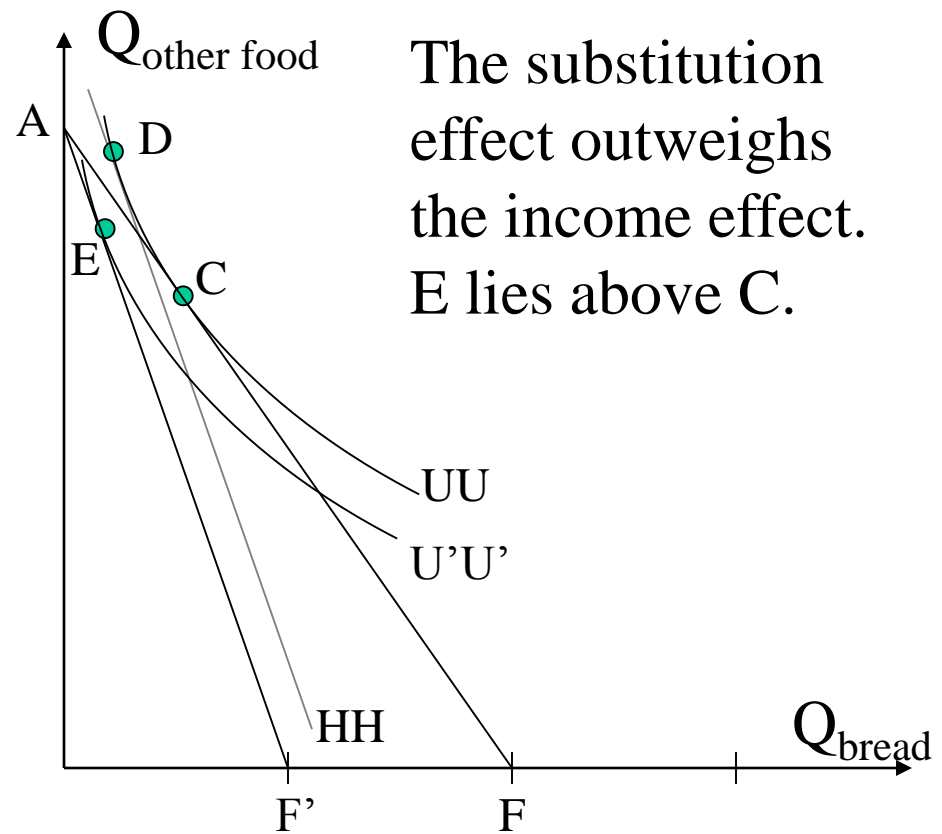
The income effect outweighs the substitution effect.  $E$  lies below  $C$ .

## Legend:

- $UU$ : Utility before the price increase
- $U'U'$ : Utility after the price increase
- $AF$ : budget line before the price increase
- $AF'$ : budget line after the price increase
- $HH$ : hypothetical budget line (parallel to  $AF'$  but tangent to  $UU$ )

# A positive cross-price elasticity

An increase in the price of bread rotates the budget line from  $AF$  to  $AF'$ . The substitution effect from  $C$  to  $D$  is large. Indifference curves have little curvature since the two goods are good substitutes in utility terms. The income effect from  $D$  to  $E$  is relatively small because the income elasticity of demand for other food is low and because the reduction in real income is small since bread forms a small share of the consumer budget.



## Legend:

- $UU$ : Utility before the price increase
- $U'U'$ : Utility after the price increase
- $AF$ : budget line before the price increase
- $AF'$ : budget line after the price increase
- $HH$ : hypothetical budget line (parallel to  $AF'$  but tangent to  $UU$ )

# The effect of an increase in the price of good $i$ on the quantity demanded of goods $i$ and $j$

Good	Type	Substitution effect	Income effect	Total effect
$i$	Normal	Negative	Negative	Negative
	Inferior	Negative	Positive	Ambiguous
$j$	Normal	Positive	Negative	Ambiguous
	Inferior	Positive	Positive	Positive

# Substitution effect with two goods

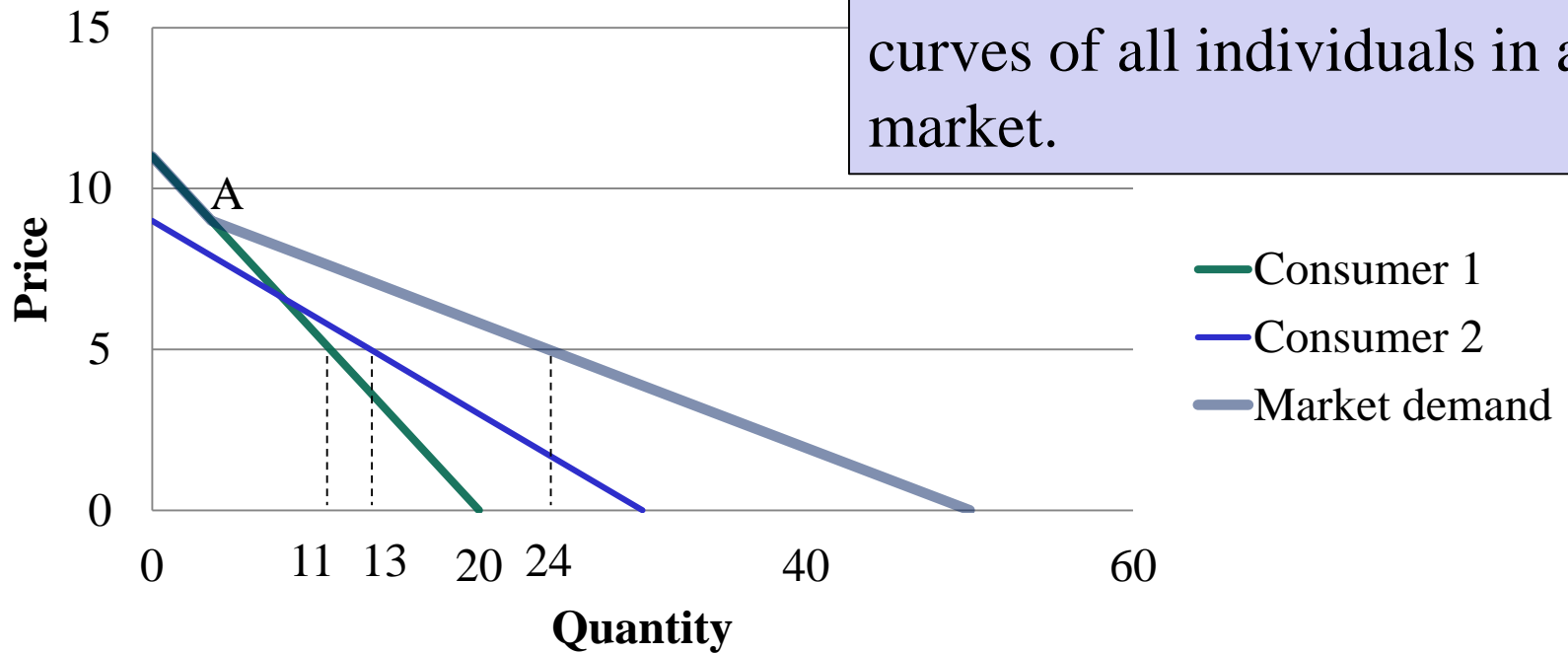
- Income and substitution effects are used to understand the effects of a price change.
- Whatever the direction of the income effect, with only two goods the substitution effect is always negative (if the price is increased).
- The pure relative price effect leads the consumer to substitute away from the good whose relative price has risen towards the good whose relative price has fallen.



# Substitution effect with more than two goods

- Even with many goods, there is always a substitution effect *away* from goods whose relative price has risen. However, substitution may not be *towards* all other goods.
- The pure substitution effect of a price increase also reduces demand for goods that are complementary (=consumed jointly) to the good whose price has risen (e.g. pipes and pipe tobacco, cars and petrol etc.).

## Individual demand curves and the market demand curve



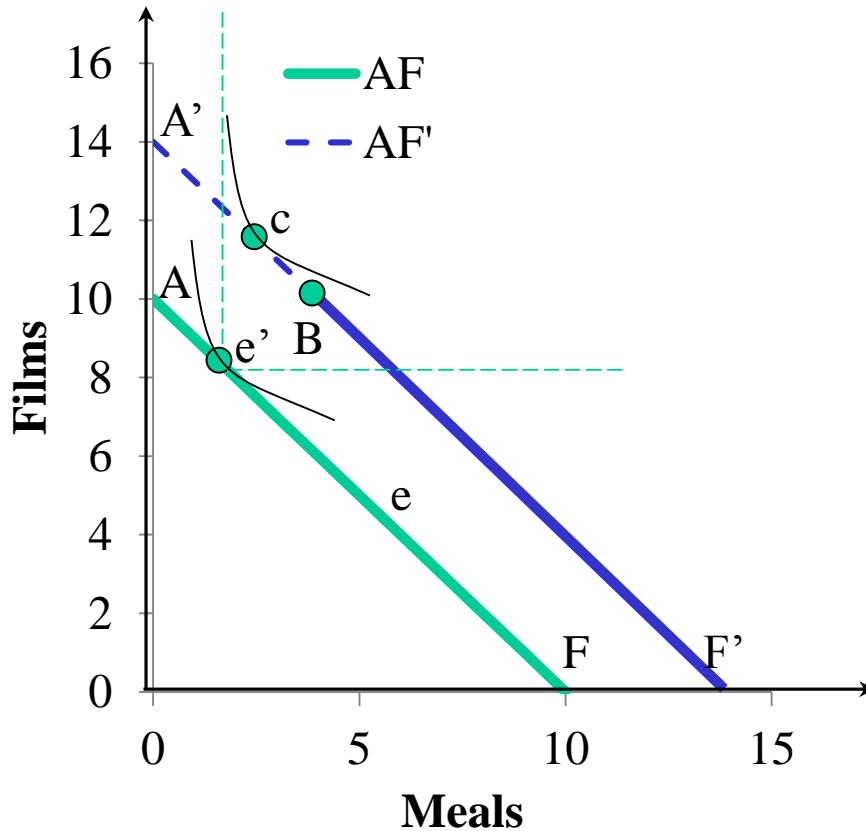
The **market demand curve** is the sum of the demand curves of all individuals in a market.

The market demand curve is the horizontal sum of individual demand curves. For example, if the price £5, the quantity demanded by consumer 1 is 11 units, and consumer 2 is 13 units. The total quantity demanded in the market at £5 is thus 24 units as shown in the market demand curve. The market demand curve is kinked at point A, the price at which consumer 2 first comes into the market.

# Transfers in kind

- A transfer is a payment, usually by the government, for which no corresponding service (e.g. labour) is provided by the recipient. A transfer in kind is the gift of a good or a service.
- An example of a transfer in kind is food stamps, given to the poor to buy food.
- The stamps must be spent on food, not beer, films, or petrol.

# Transfers in cash and in kind



Consumers prefer to receive transfers in cash rather than in kind, if the two transfers have the same monetary value. A transfer in kind may restrict the choices a consumer can make.

A food transfer in kind may leave consumers less satisfied than a cash transfer of the same value. A consumer at  $e'$  might wish to spend less than the full allowance on food moving to  $c$ . The budget line is  $A'B'F'$  under a cash transfer. The in-kind transfer restricts the budget line to  $ABF'$ , ruling out points  $A'B$ .