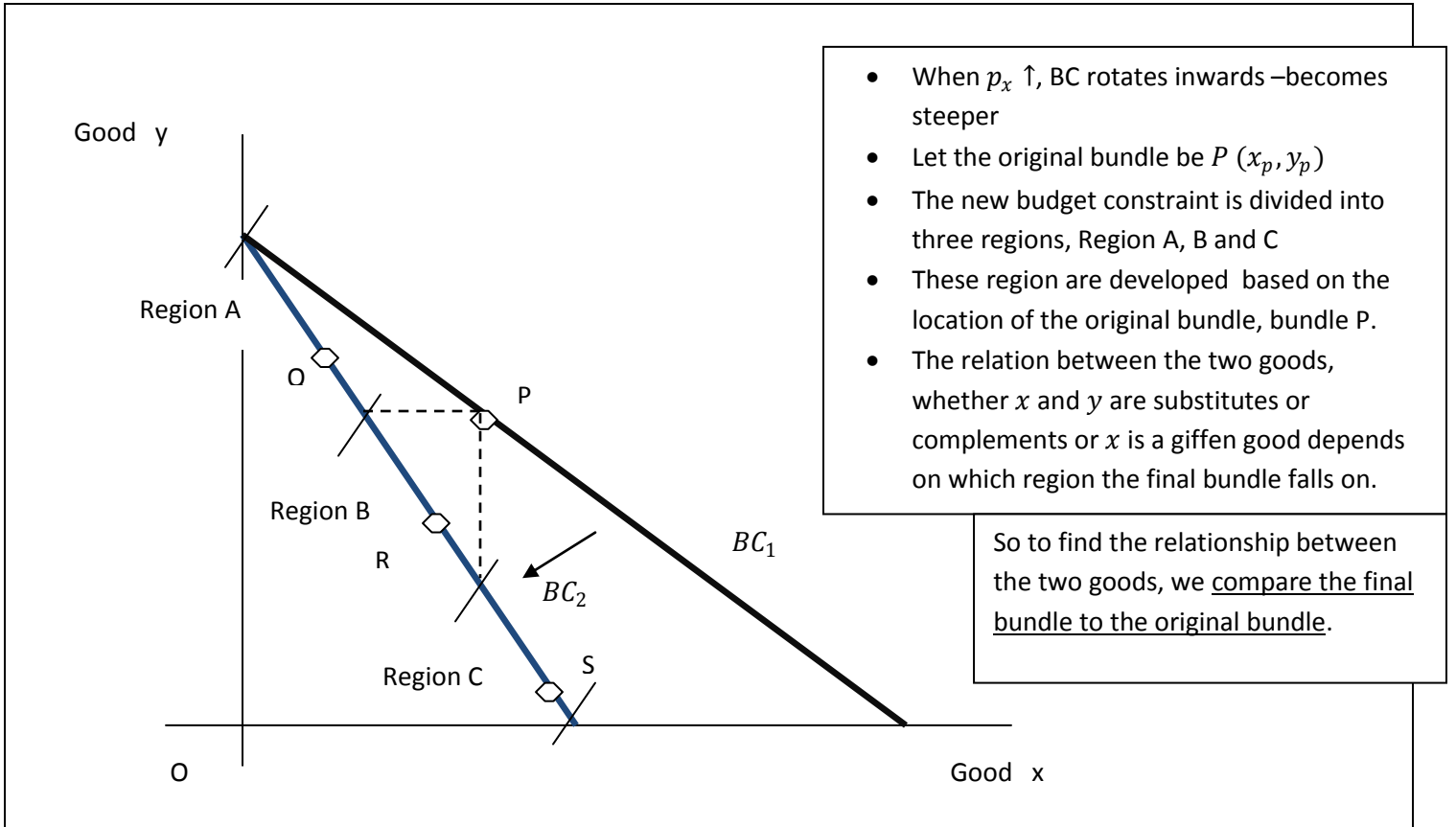


Understanding the Slutsky Decomposition: Substitution & Income Effect

Placement of the “Final Bundle” when $p_x \uparrow$: Substitute or Complement Goods?



If the final bundle falls in :

Region A

- Say, at Bundle Q where:
- $x_Q < x_P$
- $y_Q > y_P$
- We see that as price of good x increases, the individual buys less x and more y
- i.e. he/she switches from a more expensive x to a cheaper y
- so x and y are **SUBSTITUTE** goods.
- Since quantity demanded of $x \downarrow$ as $p_x \uparrow$, x is an **ORTHODOX**

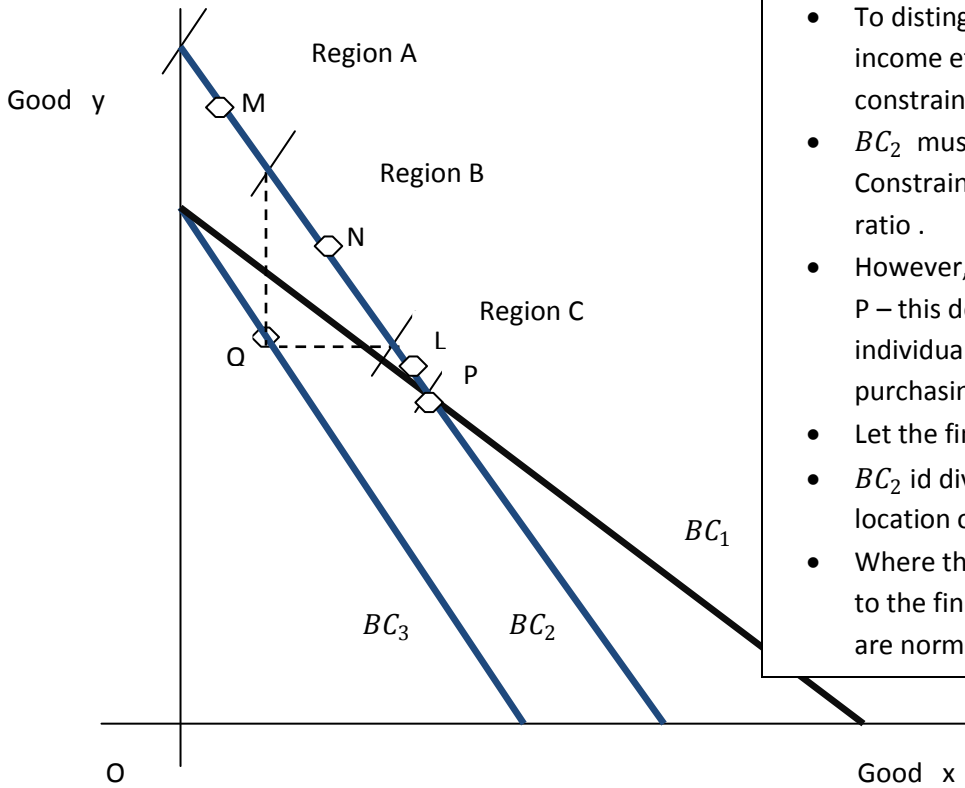
Region B

- Say, at Bundle R where:
- $x_R < x_P$
- $y_R < y_P$
- We see that as price of good x increases, the individual buys less of both x and y
- i.e. the goods are jointly consumed - **COMPLEMENTS**
- Also, since quantity demanded of $x \downarrow$ as $p_x \uparrow$, x is an **ORTHODOX** good

Region C

- Say, at Bundle Q where:
- $x_S > x_P$
- $y_S < y_P$
- Since quantity demanded of $x \uparrow$ as $p_x \uparrow$, x is an **GIFFEN** good

Placement of the “Intermediate Bundle” when $p_x \uparrow$: Normal or Inferior Goods?



- To distinguish between the substitution and income effect, we draw the intermediate budget constraint, BC_2
- BC_2 must have the same slope as the final Budget Constraint, BC_3 – thus incorporating the new price ratio .
- However, BC_2 must go through the original bundle, P – this denotes that some income is “given” to the individual so that he can maintain the same purchasing power as before.
- Let the final bundle be $Q(x_Q, y_Q)$
- BC_2 is divided into three regions based on the location of the final bundle and the original bundle.
- Where the intermediate bundle lies, in comparison to the final bundle, indicates whether the goods are normal or inferior.

So, to find out whether the good is normal or inferior we compare the intermediate bundle to the final bundle (Why?)

If the intermediate bundle falls in:

Region A

- Say, at Bundle M where:
- $x_M < x_Q$
- $y_M > y_Q$
- We see that as income is “given” to the individual x falls and y rises
- i.e., as $I \uparrow, x \downarrow$ - so x is an **INFERIOR** good
- as $I \uparrow, y \uparrow$ - so y is a **NORMAL** good

Region B

- Say, at Bundle N where:
- $x_N > x_Q$
- $y_N > y_Q$
- We see that as income is “given” to the individual both x and y rises.
- i.e., as $I \uparrow, x \uparrow$ - so x is a **NORMAL** good
- as $I \uparrow, y \uparrow$ - so y is a **NORMAL** good

Region C

- Say, at Bundle L where:
- $x_L > x_Q$
- $y_L < y_Q$
- We see that as income is “given” to the individual x rises but y falls.
- i.e., as $I \uparrow, x \uparrow$ - so x is a **NORMAL** good
- as $I \uparrow, y \downarrow$ - so y is an **INFERIOR** good

Drawing the IC and BC to show the Slutsky Decomposition: Tips

1. First, draw the original BC and final BC and decide the location of the original and final bundle – based on the relationship between the two good
 - When the relationship between the two goods is not mentioned (choose the relationship which will make it easiest for you to draw in the ICs later on)
2. Then draw the intermediate BC – and draw in the intermediate bundle based on whether good x is normal, inferior or a giffen good.
3. Lastly draw in the ICs – make sure they are always tangent to the BC at the original, intermediate and final bundle.
 - Also, make sure your ICs do not intersect.

So, what is the SLUTSKY DECOMPOSITION?

Since Slutsky was the first economist to figure out that the total effect of a price change is caused by two separate effects : the **substitution effect (SE)** and the **income effect (IE)** – the process of breaking the **total effect (TE)** down into the SE and the IE is referred to as the Slutsky Decomposition.

What will be the sign of the SE and IE ?

Sign of SE

Sign of the SE is always negatives

Why – let's see...

- When $p_x \uparrow, Q_d \text{ of } x \downarrow$ because compared to good y , good x has become less attractive
- When $p_x \downarrow, Q_d \text{ of } x \uparrow$ because compared to good y , good x has become more attractive
- Since there is always this inverse relationship between p_x and $Q_d \text{ of } x$, the sign of the SE is $-ve$.

Sign of IE

Sign of the IE may be positive or negative – depends on whether the good is normal or inferior:

- If good x is normal, i.e., *when $I \uparrow, x \uparrow$* - income and demand move in the same direction – i.e. IE is $+ve$.
- If good x is Inferior, i.e., *when $I \uparrow, x \downarrow$* - income and demand move in opposite directions – i.e. IE is $-ve$.

Which effect is stronger?

Normal Good

- SE and IE reinforce each other – both work in the same direction

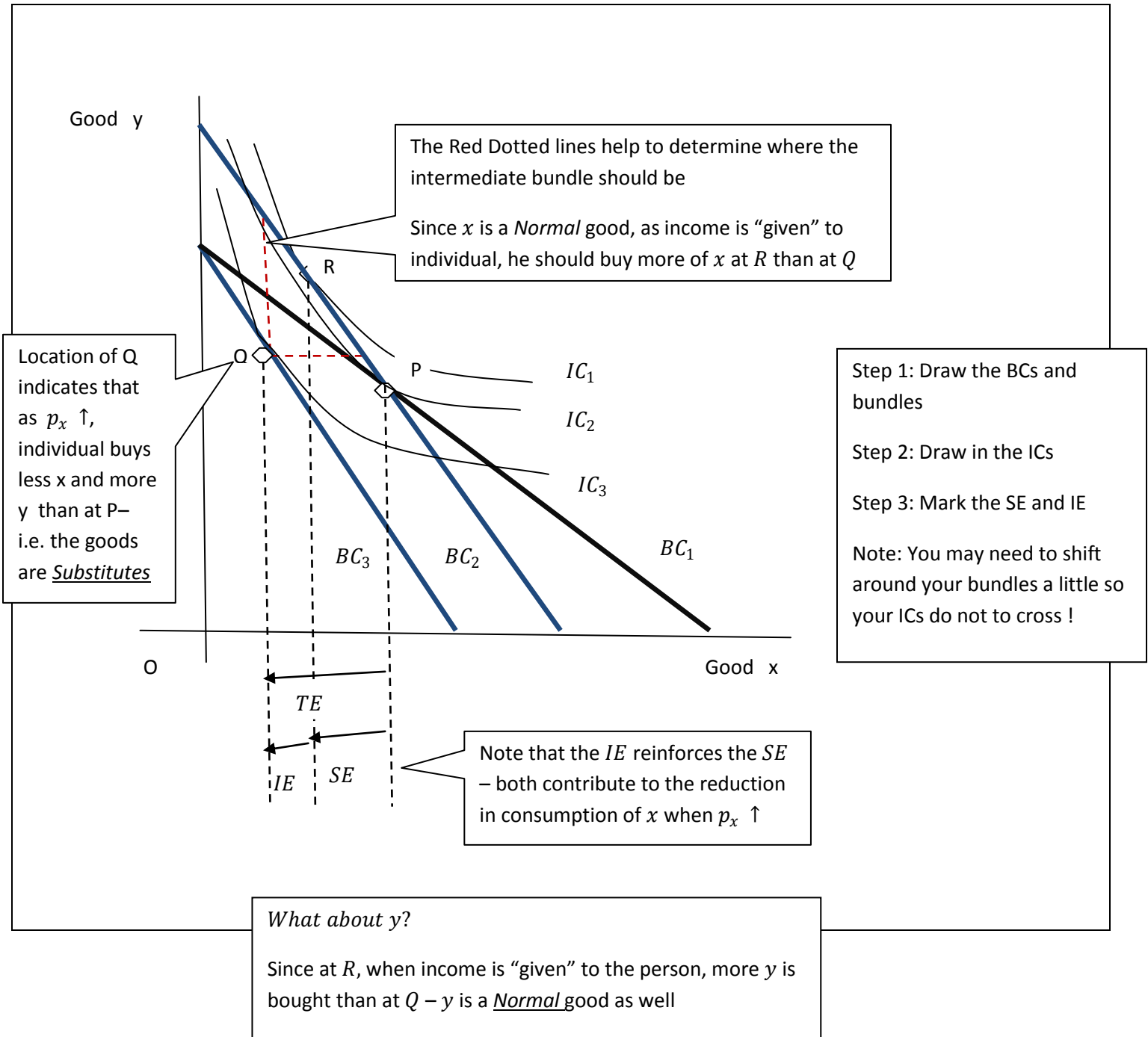
Inferior Good

- SE and IE work in opposite directions

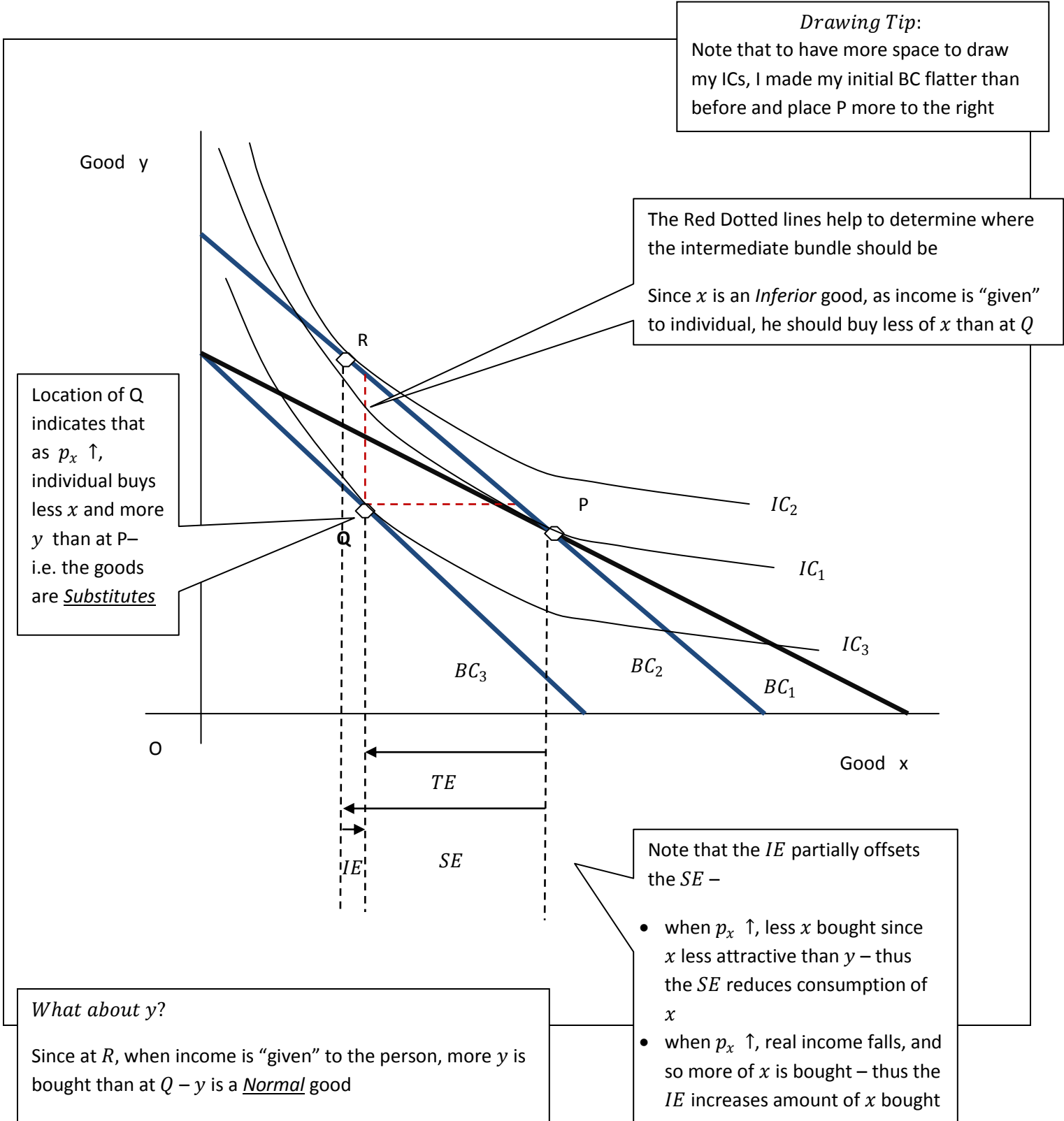
Giffen Good

- IE outweighs SE – this explain how $Q_d \text{ of } x \uparrow$ as $p_x \uparrow$,

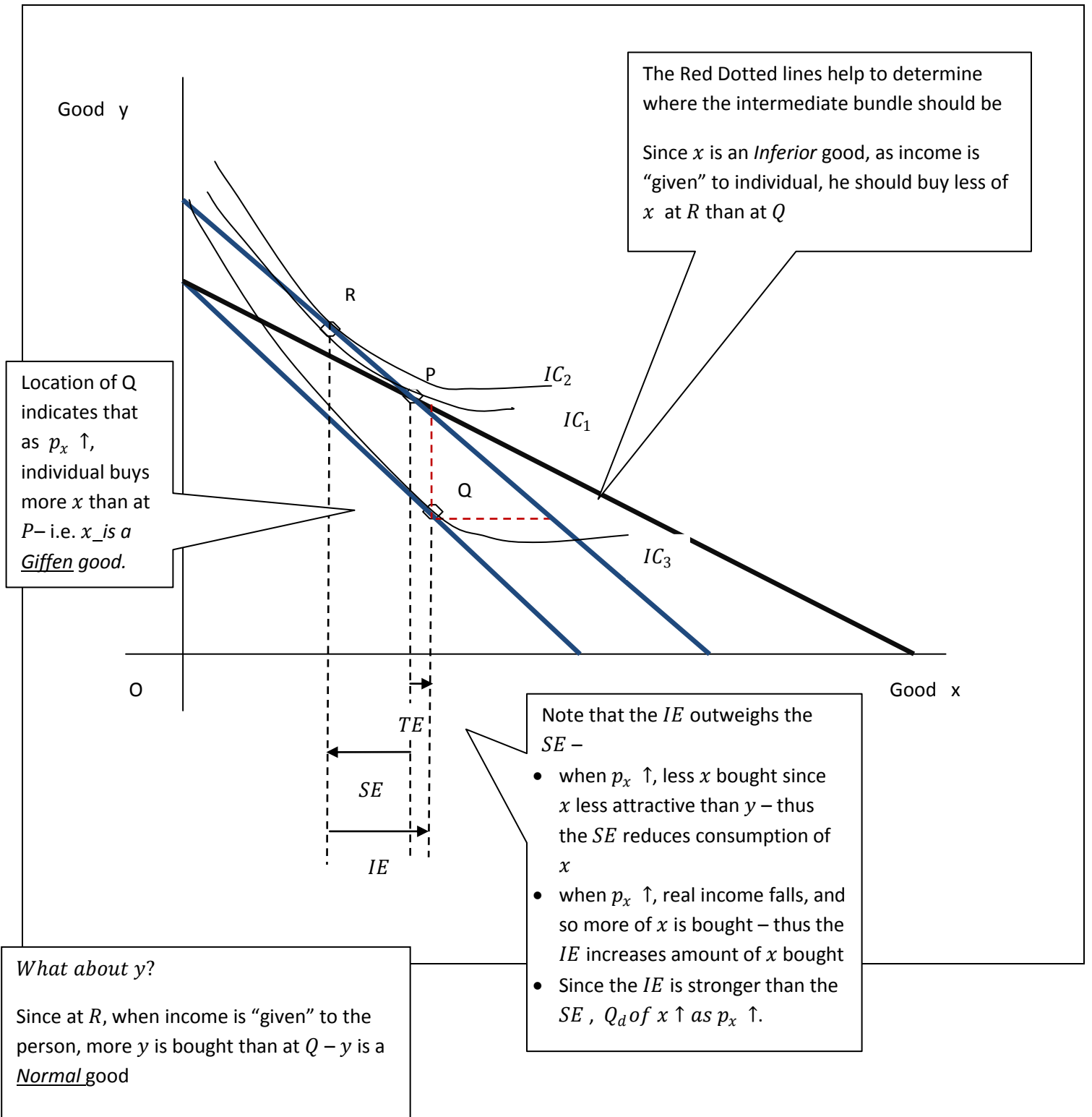
Slutsky Decomposition for a Normal Good when Price Increases



Slutsky Decomposition for an Inferior Good when Price Increases

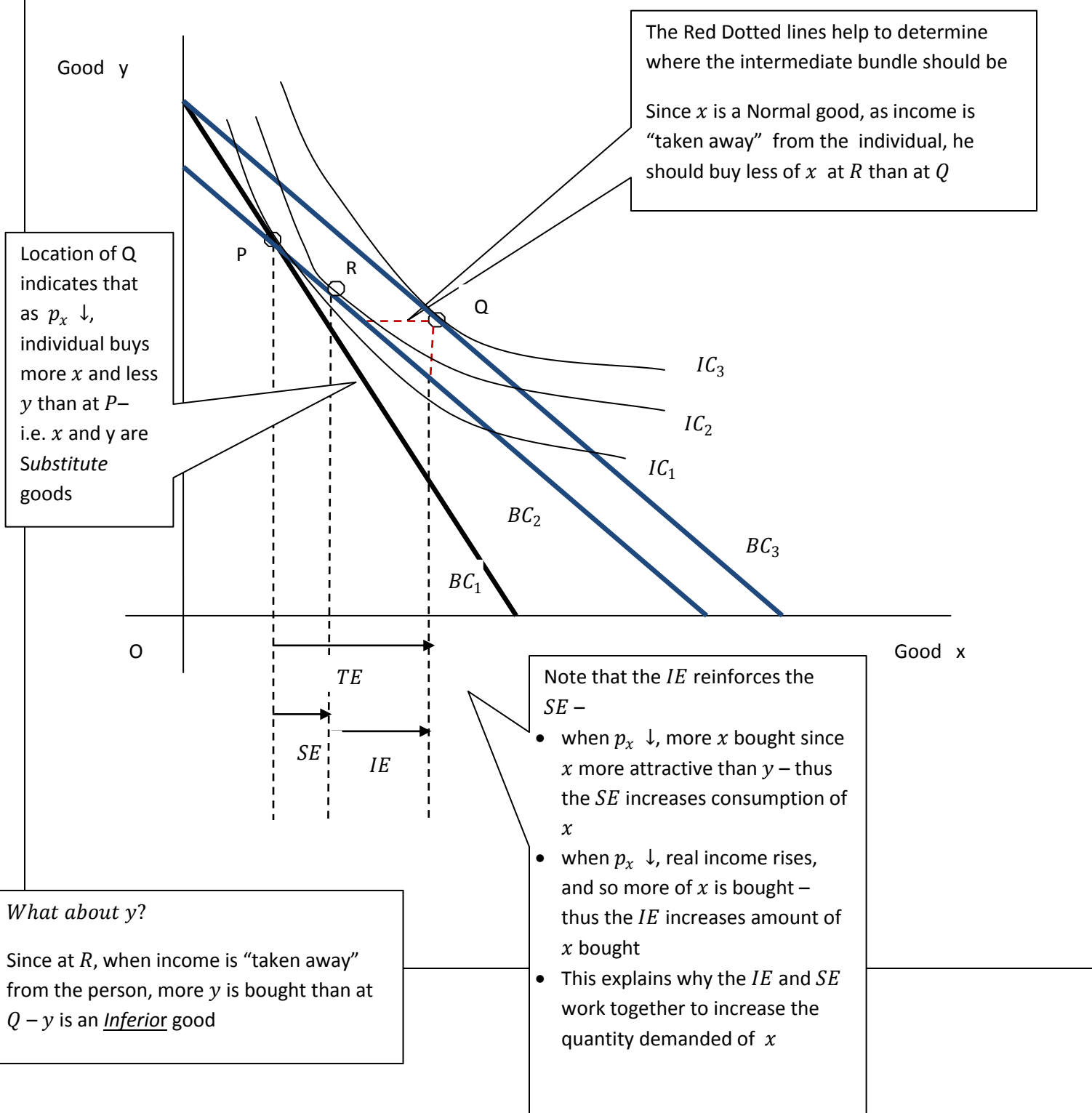


Slutsky Decomposition for a Giffen Good when Price Increases



Slutsky Decomposition for Normal Good when Price Decreases

When $p_x \downarrow$, BC rotates outwards from BC_1 to BC_3 - to distinguish between the SE and IE - we draw the intermediate BC at BC_2 - the BC that passes through the original bundle, Bundle P in order to retain the same purchasing power as before, but has the slope of BC_3 in order to incorporate the new price ratio.



The Red Dotted lines help to determine where the intermediate bundle should be

Since x is a Normal good, as income is "taken away" from the individual, he should buy less of x at R than at Q

Location of Q indicates that as $p_x \downarrow$, individual buys more x and less y than at P - i.e. x and y are *Substitute* goods

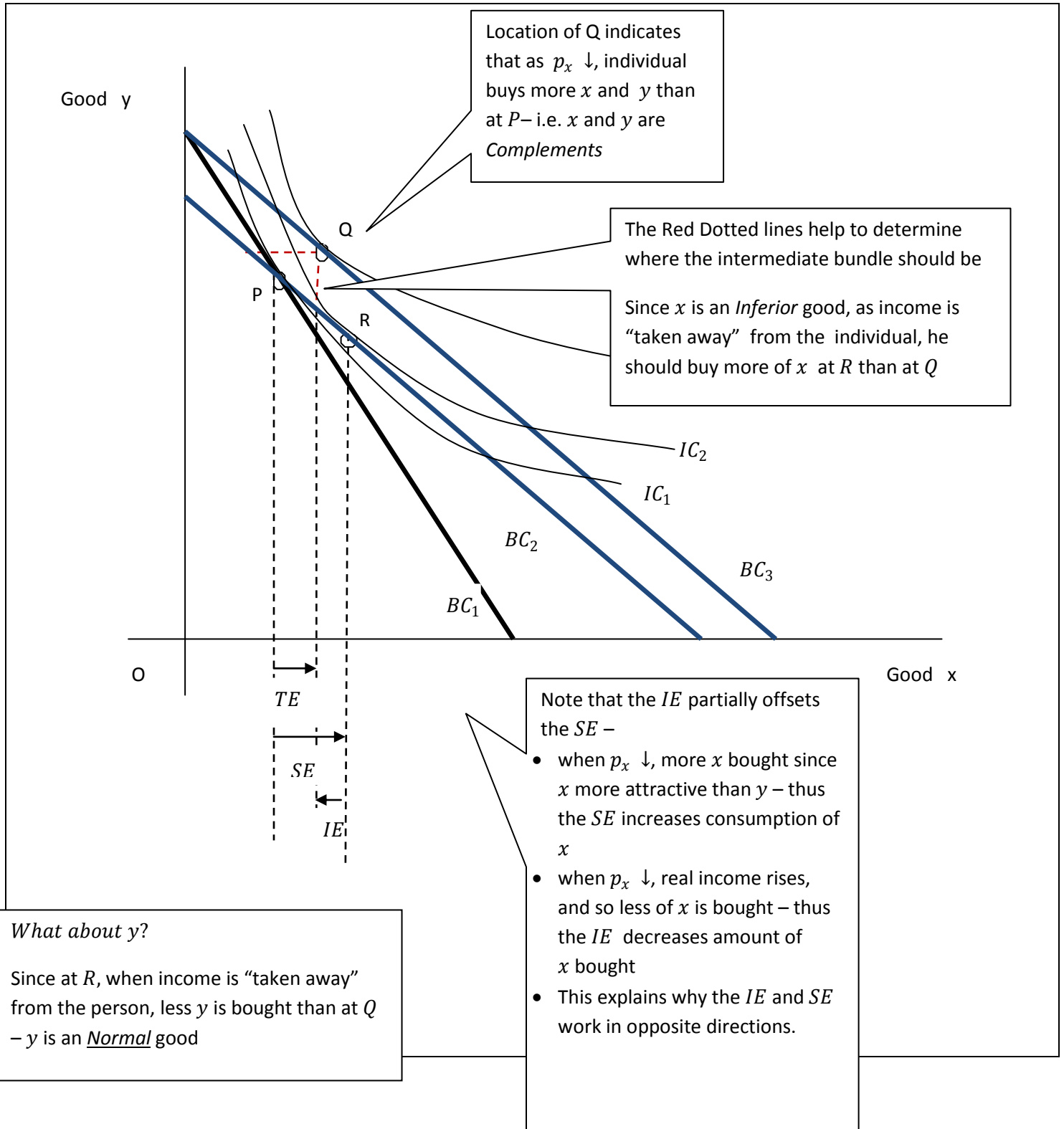
Note that the *IE* reinforces the *SE* -

- when $p_x \downarrow$, more x bought since x more attractive than y - thus the *SE* increases consumption of x
- when $p_x \downarrow$, real income rises, and so more of x is bought - thus the *IE* increases amount of x bought
- This explains why the *IE* and *SE* work together to increase the quantity demanded of x

What about y?

Since at R , when income is "taken away" from the person, more y is bought than at Q - y is an *Inferior* good

Slutsky Decomposition for Inferior Good when Price Decreases



Slutsky Decomposition for Giffen Good when Price Decreases

