5.3 Consumer Responses to Price Changes: Substitution and Income Effects

Substitution Effect

- the change in a consumers consumption choices that results from a change in the relative prices of two goods.

↑ Utility held constant! (on same indifference curve)

Income Effect

- the change in a consumers consumption choices that results

from a change in the purchasing power of the consumer's income.

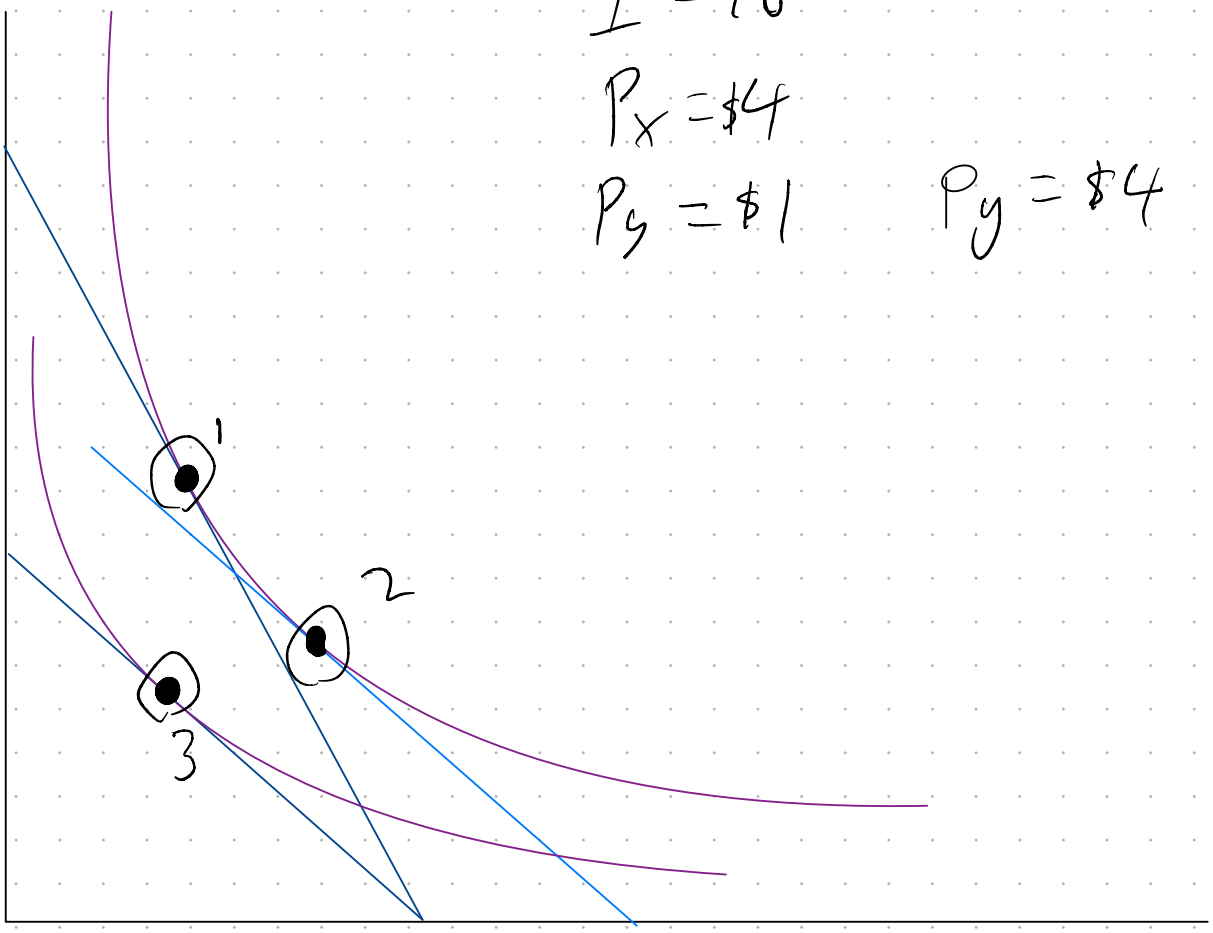
(Purchasing Power Effect)

↑ relative prices held constant, only purchasing power affected

$I = 16$

$P_x = \$4$

$P_y = \$1$ $\quad P_y = \$4$



1 → 2
Sub. Effect

2 → 3
Income effect

Total Effect = Substitution Effect + Income Effect

Q. What is the sub. Effect and the Income Effect when P_y ↑ from 1 to 4?

$U(x,y) = xy$ $\quad P_x = 4 \quad I = 16$

$MRS_{xy} = \frac{y}{x}$ $\quad P_y = 1, \; P_y = 4$

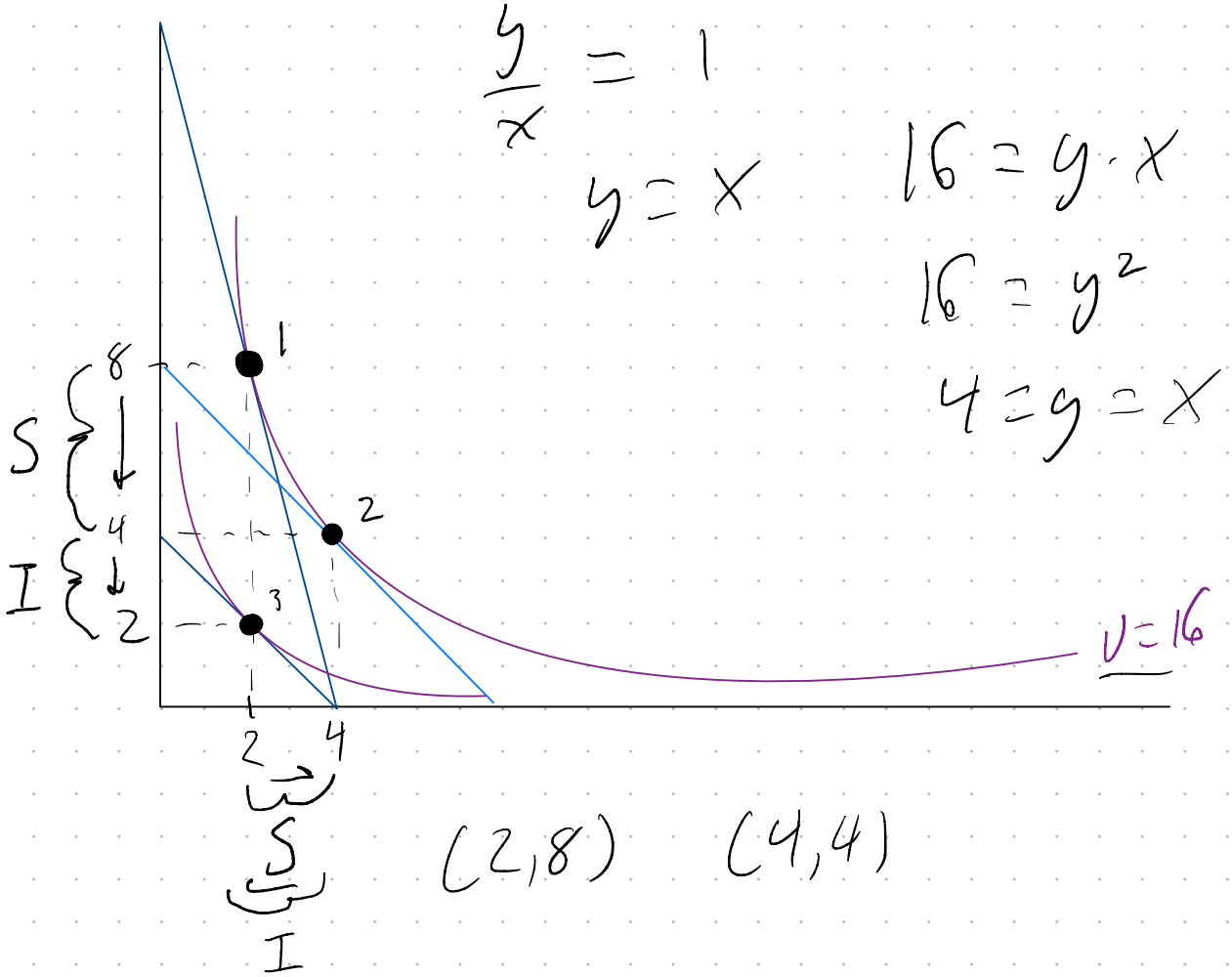
$\frac{y}{x} = 1$

$y = x$

$16 = y \cdot x$

$16 = y^2$

$4 = y = x$



1. Find original bundle

2. Find slope of new budget line

3. Set MRS = Slope of new line

4. System of Eq. with old utility level

5. Calculate difference in x, y from 1 to 2. This is the substitution effect.

To find the income effect

do steps above then

6. Find point 3, the new optimal bundle under the new prices.

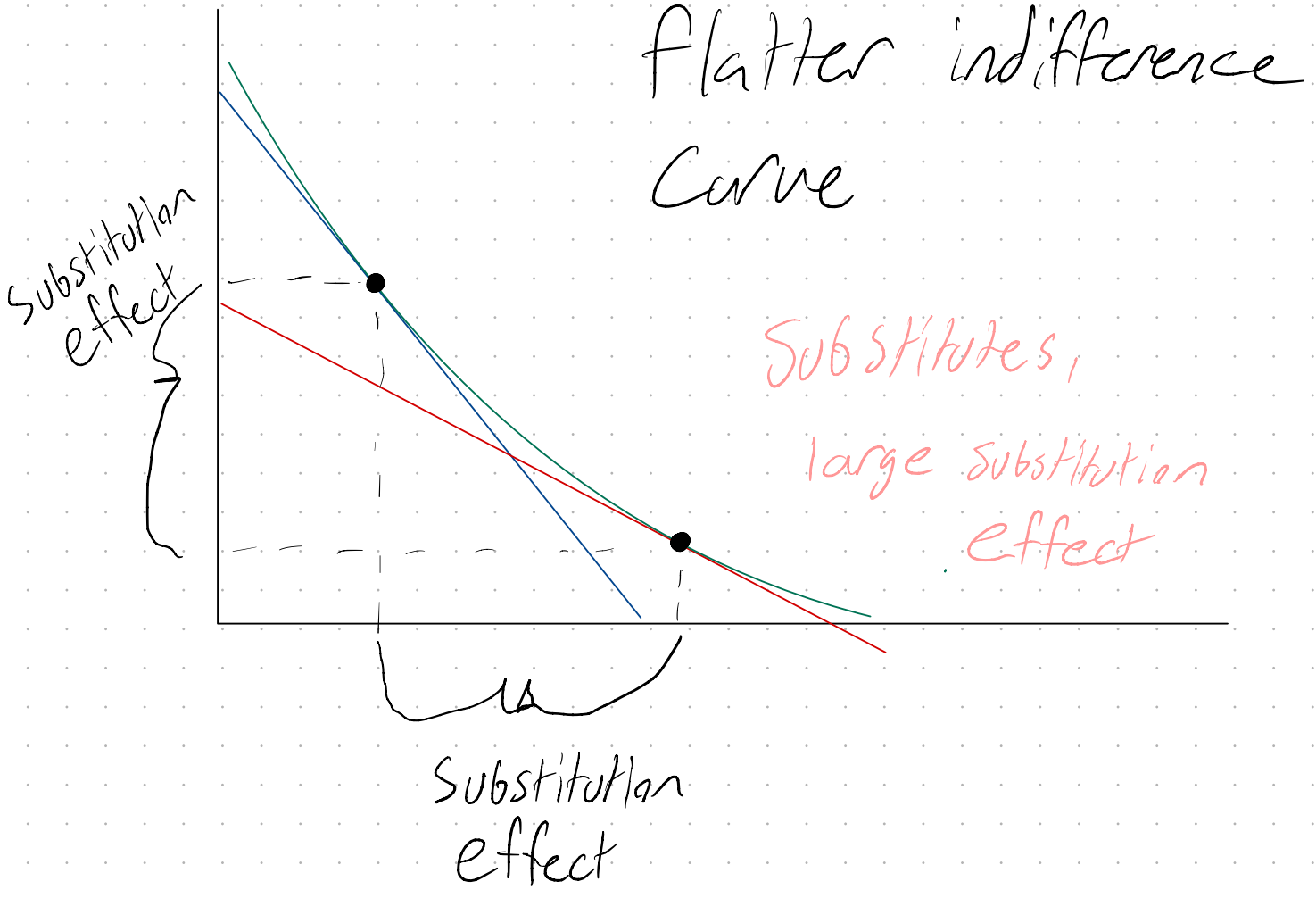
7. Calculate the difference in x, y from 2 to 3. This is the income effect.

Q: What determines the size of the substitution + Income Effects?

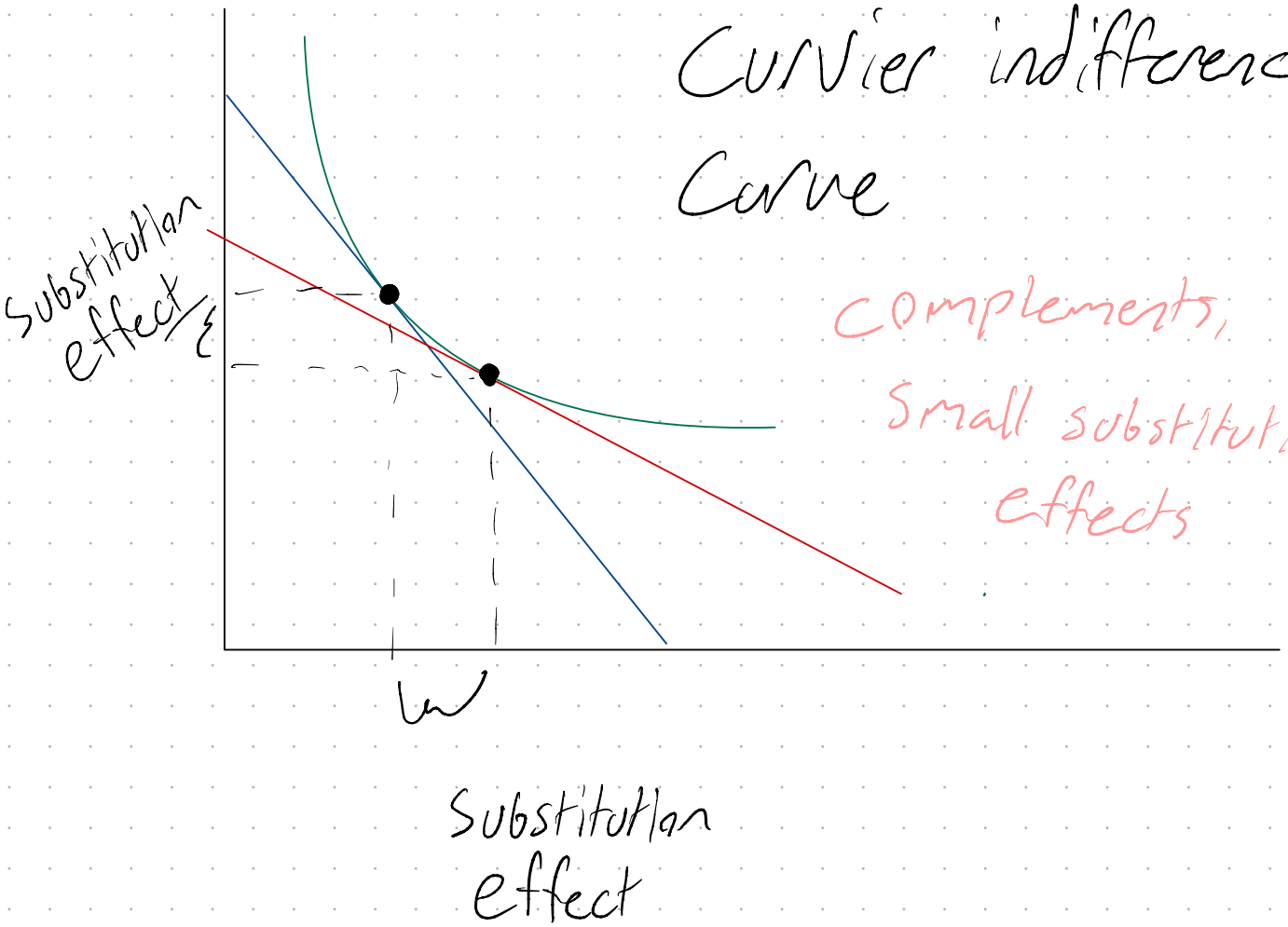
Substitution Effect

- Depends on the curvature of indifference curves

flatter indifference curve



Substitutes, large substitution effect



Income effect

- Depends on how much was consumed of the good whose price changed.

ex: originally consumed 10 units of good X. P_x ↓ by $5. Now effective income ↑ by $50.

Income and Substitution effects for inferior goods

X & Y both normal
not perfect sub/complements

$P_X \uparrow$

Substitution Effects	Income Effects
$Q_X \downarrow$	$Q_X \downarrow$
$Q_Y \uparrow$	$Q_Y \downarrow$

Total Effect

$Q_X \downarrow$ Q_Y?

X inferior, y normal
not perfect sub/complements

$P_X \downarrow$

Substitution Effects	Income Effects
$Q_X \uparrow$	$Q_X \downarrow$
$Q_Y \downarrow$	$Q_Y \uparrow\uparrow$

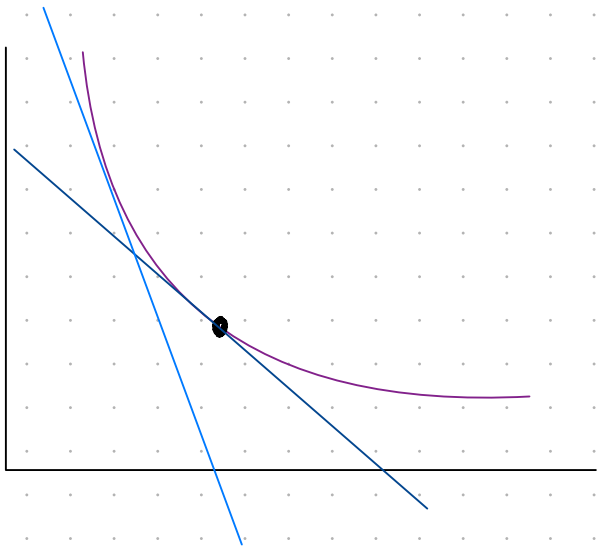
Total Effect

Q_X? $Q_Y \uparrow$ (?)

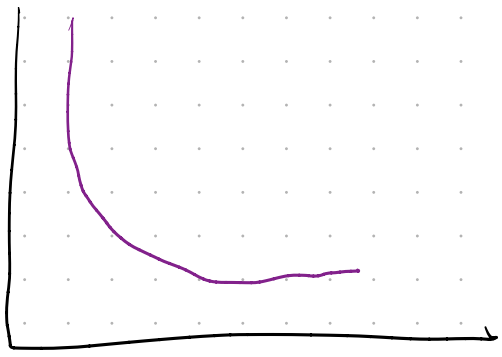
↗

Q: If $P_x \uparrow$ is the substitution effect always $Q_x \downarrow$, $Q_y \uparrow$?

not perfect sub/complements



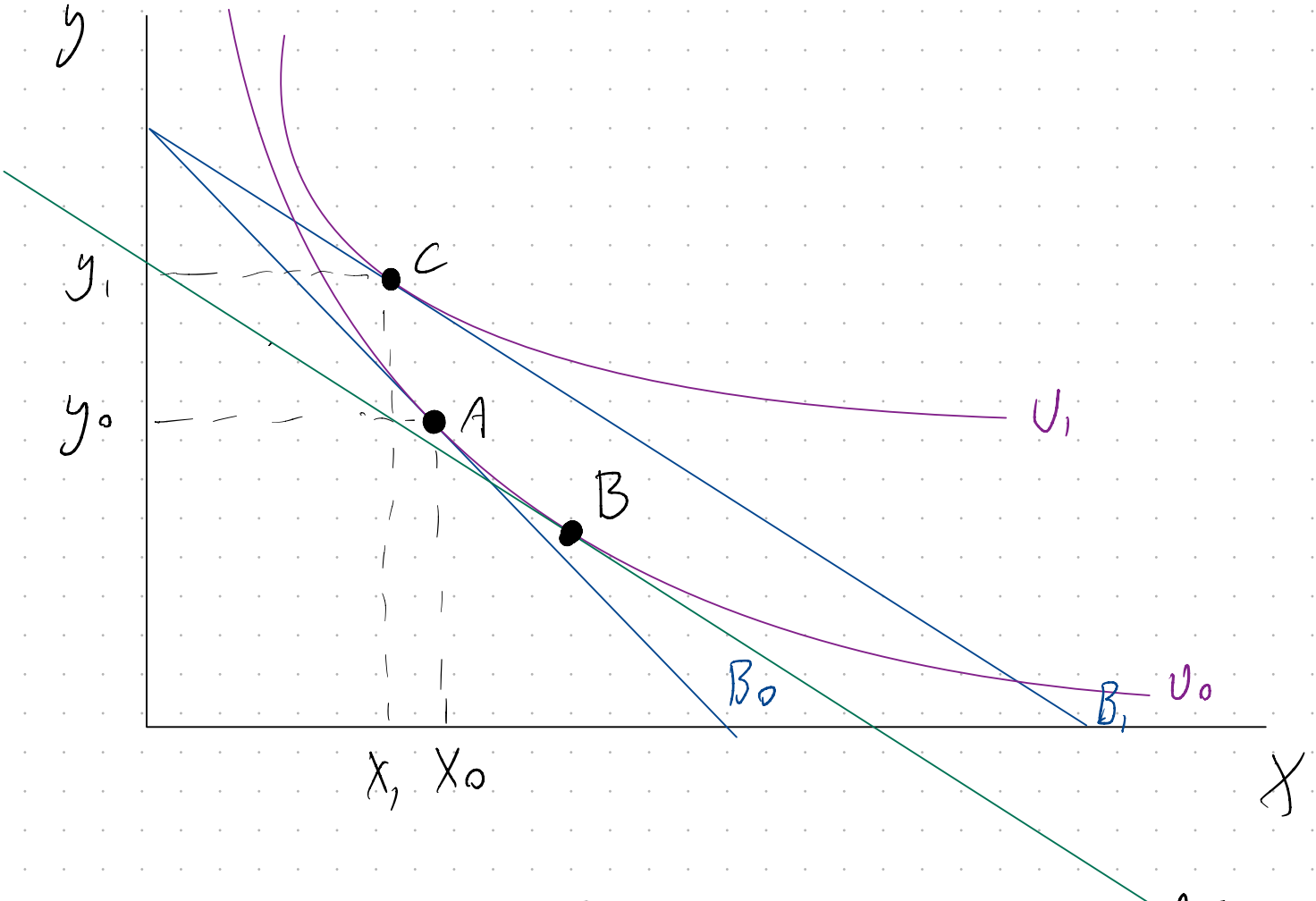
4. Indifference curves are convex to the origin (curve away)



Giffin Goods:

goods where when $P_x \downarrow$, $Q_x \uparrow$.

$P_x \downarrow$



$A \rightarrow B$: Substitution effect

$B \rightarrow C$: Income effect

Q: Why must giffen goods be inferior goods?

Need: $P_X \downarrow \rightarrow Q_X \downarrow$

2 effects:

Substitution

↓

$\Delta Q_X^{Sub} \geq 0$

↑

always

Income

↓

need

$\Delta Q_X^{Sub} + \Delta Q_X^{Inc} < 0$

$\Delta Q_X^{Inc} < -\Delta Q_X^{Sub}$

$-\Delta Q_X^{Sub} \leq 0$

$\Delta Q_X^{Inc} < -\Delta Q_X^{Sub} \leq 0$

$\Delta Q_X^{Inc} < 0$

↗

This is a

Inferior good

5.4: The Impact of Changes in another good's price: Substitutes and complements

Substitutes: goods that can be used in place of one another

Assume X, Y are substitutes.

$P_x \downarrow$

Sub. effect

$Q_y \downarrow$

Income effect

$Q_y \uparrow$

$P_x \uparrow$

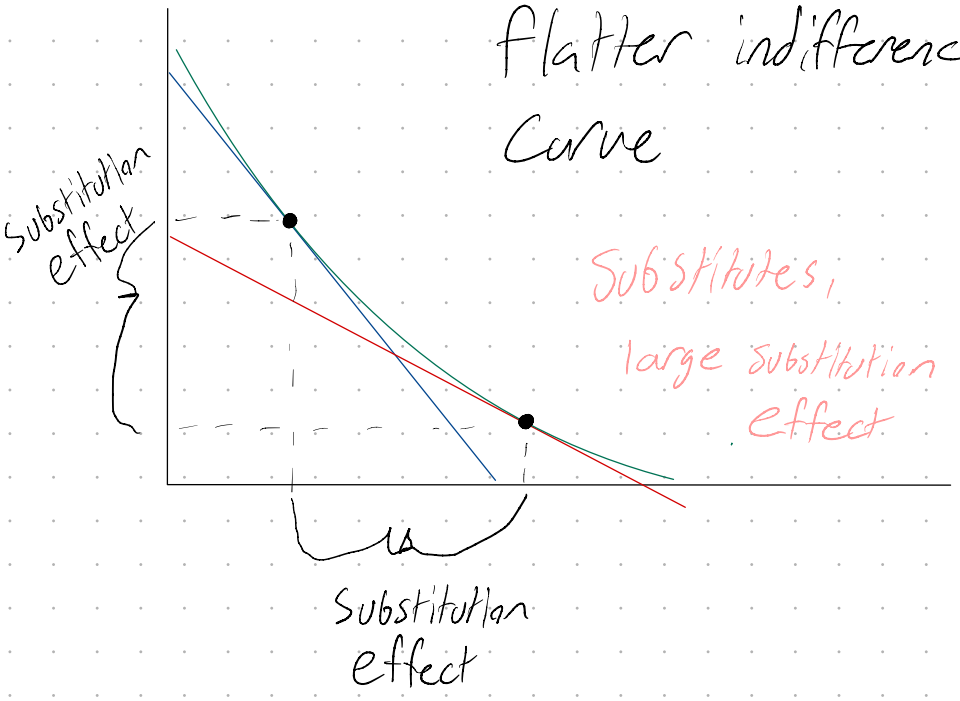
Sub. effect

$Q_y \uparrow$

Income effect

$Q_y \downarrow$

What effect dominates?



flatter indifference curve

Substitutes, large substitution effect

Sub. Effect Large.

Dominates income effect

Total Effect

$Q_y \downarrow$

Total Effect

$Q_y \uparrow$

Complements: goods that are used in combination

Assume X & Y are complements

$P_X \downarrow$

Sub. effect → $Q_y \downarrow$

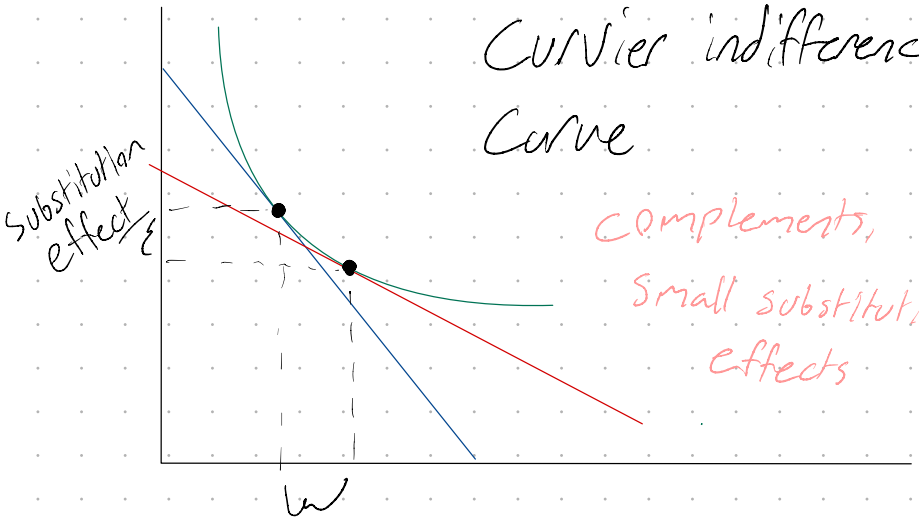
Income effect → $Q_y \uparrow$

$P_X \uparrow$

Sub. effect → $Q_y \uparrow$

Income effect → $Q_y \downarrow$

What effect dominates?



Curvier indifference Curve

complements, Small substitution effects

Sub. effect is small

Income effect dominates

Substitution effect

Total Effect

$Q_y \uparrow$

Total Effect

$Q_y \downarrow$