

經濟二甲 A108260035 許靜菱

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消費決策 Max $U = f(X, Y) = X^{\frac{2}{3}} Y^{\frac{1}{3}}$

Subject to $700 = 10X + 20Y$

$$MRS_{XY} = \frac{\frac{2}{3} X^{-\frac{1}{3}} Y^{\frac{1}{3}}}{\frac{1}{3} X^{\frac{2}{3}} Y^{-\frac{2}{3}}} = \frac{10}{20} \text{ 價格}$$

$$Y = \frac{1}{4} X$$

$$\text{代入 } 700 = 10X + 20Y \Rightarrow 700 = 10X + 20(\frac{1}{4}X)$$

$$700 = 15X$$

$$X = 20, Y = 5$$

20 杯奶茶 5 個漢堡

如果將奶茶價格提高為 20 元

消費決策 Max $U = f(X, Y) = X^{\frac{2}{3}} Y^{\frac{1}{3}}$

Subject to $700 = 20X + 20Y$

$$MRS_{XY} = \frac{20}{20} = \frac{2Y}{X} \quad 2Y = X$$

$$Y = \frac{1}{2} X$$

$$\text{代入 } 700 = 20X + 20Y \Rightarrow 700 = 20X + 20(\frac{1}{2}X)$$

$$700 = 30X$$

$$X = 10, Y = 5$$

$$\text{總效用 } U = X^{\frac{2}{3}} Y^{\frac{1}{3}} = (20)^{\frac{2}{3}} (5)^{\frac{1}{3}} = (2000)^{\frac{1}{3}}$$

$$\text{價格變動後 } U = X^{\frac{2}{3}} Y^{\frac{1}{3}} = (\frac{1}{2} X)^{\frac{2}{3}} = (2000)^{\frac{1}{3}}$$

$$X = (4000)^{\frac{1}{3}}$$

$$Y = (500)^{\frac{1}{3}}$$

$$\text{替代效果: } (20, 5) \sim ((4000)^{\frac{1}{3}}, (500)^{\frac{1}{3}})$$

$$\text{所得效果: } ((4000)^{\frac{1}{3}}, (500)^{\frac{1}{3}}) \sim (10, 5)$$