

week 10

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$$\text{Max } U = f(x, y) = x^{\frac{2}{3}} y^{\frac{1}{3}}$$

$$\text{subject to } 300 = 10x + 20y \Rightarrow U = f(x, y) = x^{\frac{2}{3}} y^{\frac{1}{3}}$$

$$x=20, y=5$$

價格上升20元  $300 = 20x + 20y$

$$MRS_{xy} = \frac{\frac{2y}{x}}{\frac{1}{3}x} = \frac{P_x}{P_y} = 1$$

總效用  $U = x^{\frac{2}{3}} y^{\frac{1}{3}} = (20)^{\frac{2}{3}} (5)^{\frac{1}{3}} = (2000)^{\frac{1}{3}}$   
 $= (\frac{1}{2} x^3)^{\frac{1}{3}} = 2000^{\frac{1}{3}} \Rightarrow y = \frac{1}{2} x$

$$x=10, y=5$$

$$x = (4000)^{\frac{1}{3}} \approx 15.87401, y = (500)^{\frac{1}{3}}$$

① 替代效果 = 由  $(x, y) = (20, 5)$  到  $[(4000)^{\frac{1}{3}}, (500)^{\frac{1}{3}}] = 4000^{\frac{1}{3}} - 20 < 0$

② 所得效果 = 由  $(x, y) = [(4000)^{\frac{1}{3}}, (500)^{\frac{1}{3}}]$  到  $(10, 5)$