

Koopmans Program p 3/2

$$1) \quad q x_1 + p_1 y_1 + p_2 y_2 = q_2$$

Replacing (x_1, y_1, y_2) by $(0, 0, \mu)$ and then by $(1, \mu, 0)$

$$2) \quad \mu p_2 = q_2$$

$$3) \quad \mu p_1 = q_2 - q = q_1 \quad \underline{\text{so that}} \quad q_2 - q_1 = q$$

Rewriting ①

$$① \quad p_1 y_1 + p_2 y_2 = q_2 - q x_1$$

$$= q_2 - (q_2 - q_1) x_1 \quad \text{from ③}$$

$$= x_1 q_1 + (1 - x_1) q_2$$

$$= x_1 q_1 + x_2 q_2$$

From ② + ③

$$p_1 y_1 + p_2 y_2 = \cancel{\mu p_1 q_1} + \mu p_2 q_2$$

$$= \cancel{(1+r)} (\cancel{p_1 q_1} + \cancel{p_2 q_2})$$

$$= \mu p_1 x_1 + \mu p_2 x_2$$

$$\text{let } \mu = (1+r)$$

$$= (1+r) (p_1 x_1 + p_2 x_2)$$