Example

Recap of Theory

- Each individual (trader) starts with some initial endowments (bundle of goods)
- Market $\longrightarrow$ buy and sell
- Someone announces the prices (Walras' Law)
- You trade such that: value of sales = value of purchase
- Value of bundle consumed equals value of bundle started with

Recap of Theory

- Total consumption limited by initial endowment
- That is, for each good total ss equals total dd (***non-wasteful***)
- Prices are everything
- Suppose at that initial price total ss of good i > total dd; then price of good i falls and new prices set in
- Final (market clearing) prices ensure eqm allocation of goods

Walrasian Equilibrium

- Each person buying the best bundle that he can afford and all individual decisions are consistent

- If market does not clear, prices adjust until dd=ss

- Once eqm reached, no incentive to deviate

Example

- Two individuals *i* (1 and 2); two goods *j* (apples and grapefruits)

- $(u_1; u_2)$

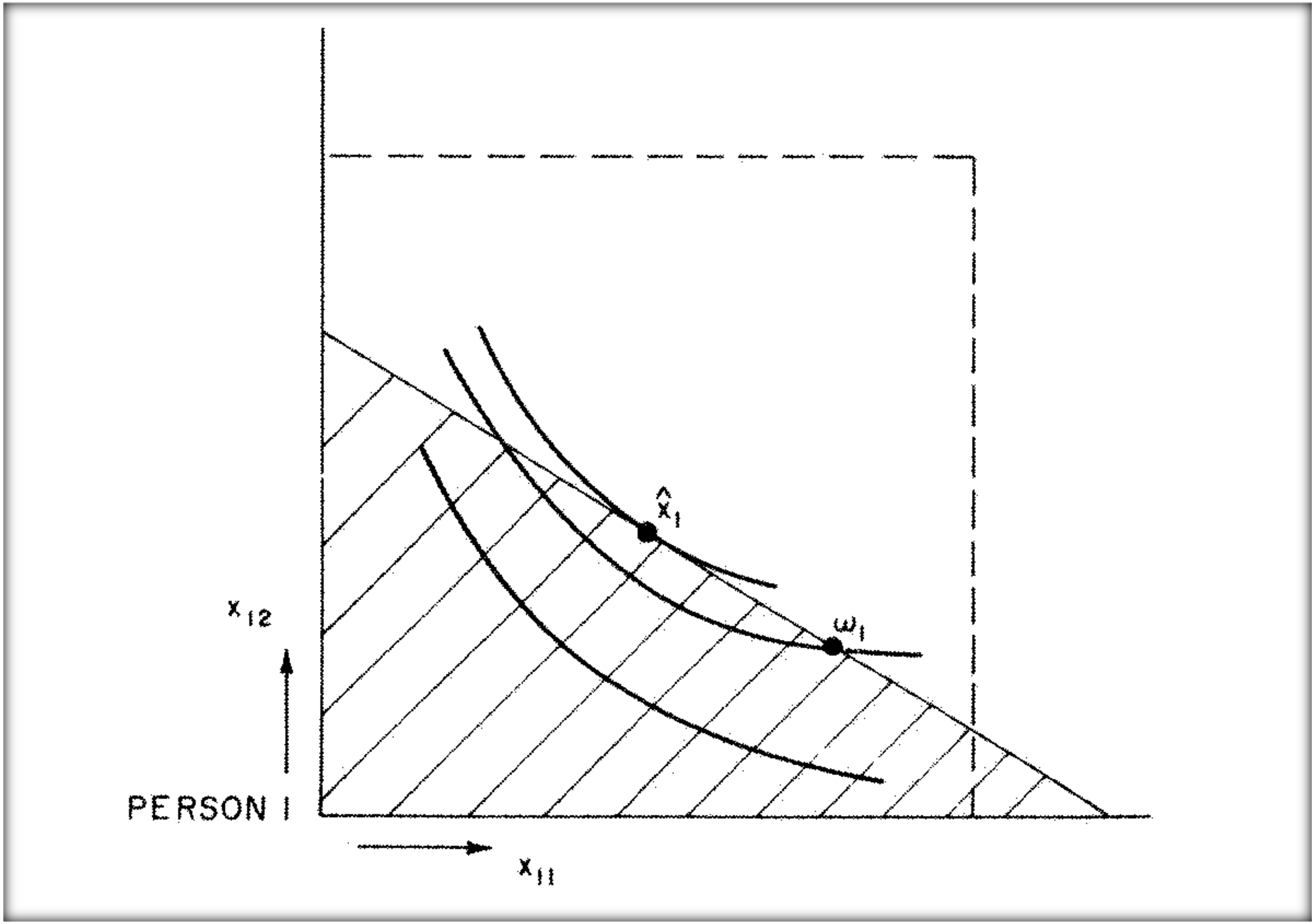
- Suppose we start with prices (10, 25)

- Endowments $(\omega_1; \omega_2)$
  such that $\omega_1 = (\omega_{11}; \omega_{12}); \omega_2 = (\omega_{21}; \omega_{22})$

Example

- Suppose we start with $\omega_1 = (0;10)$
- Budget constraint for 1: $10A + 25G = 250$
- In general: $p_1 x_{11} + p_2 x_{12} \leq p_1 \omega_{11} + p_2 \omega_{12}$
- Final consumption $\hat{x}_1 = (x_{11}, x_{12})$ depends on ω_1 and $p = (p_1, p_2)$
- That is, value of initial bundle given prices (perfect competition, price taking)

Example



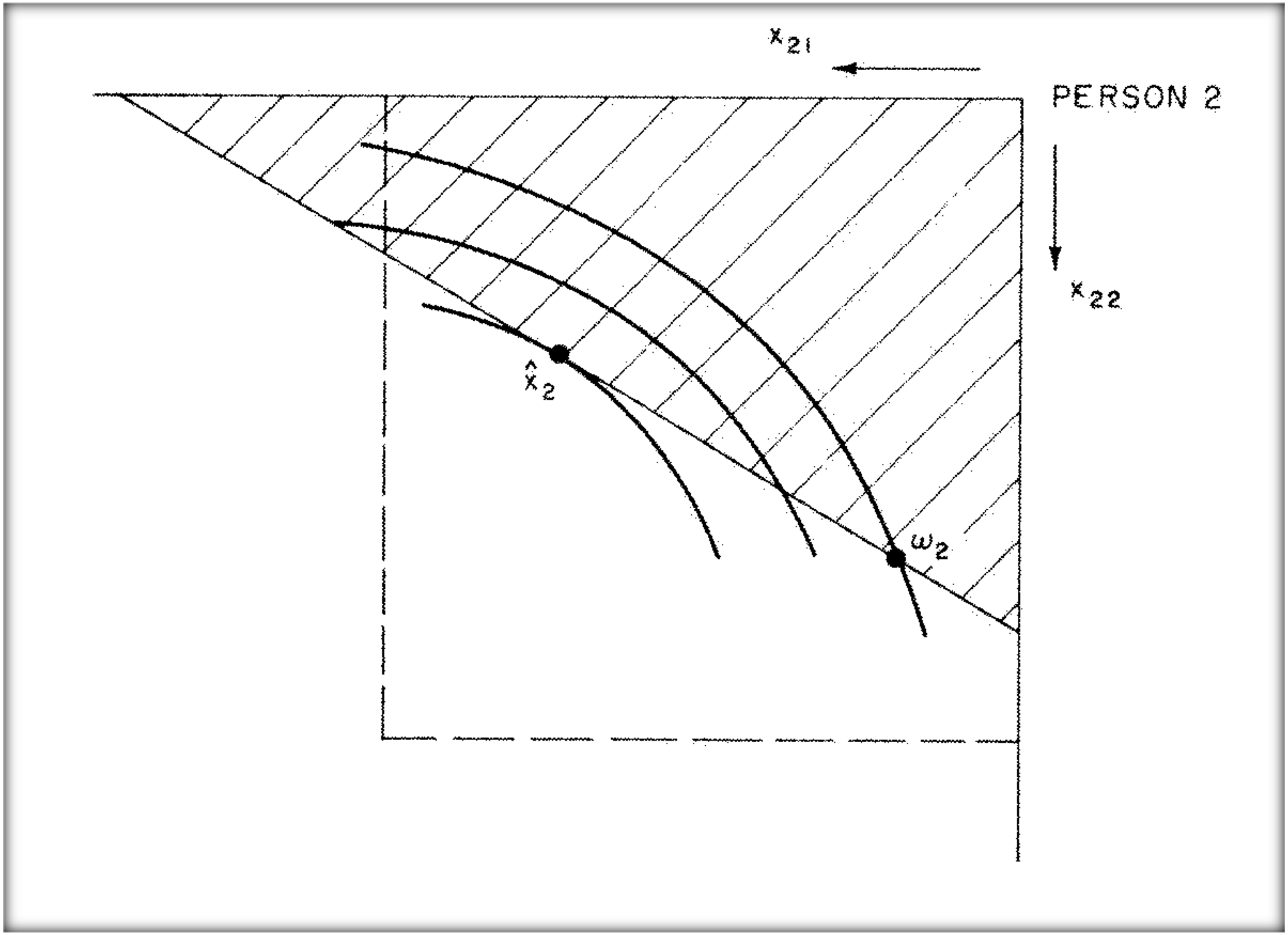
Example

- Similarly, for individual 2

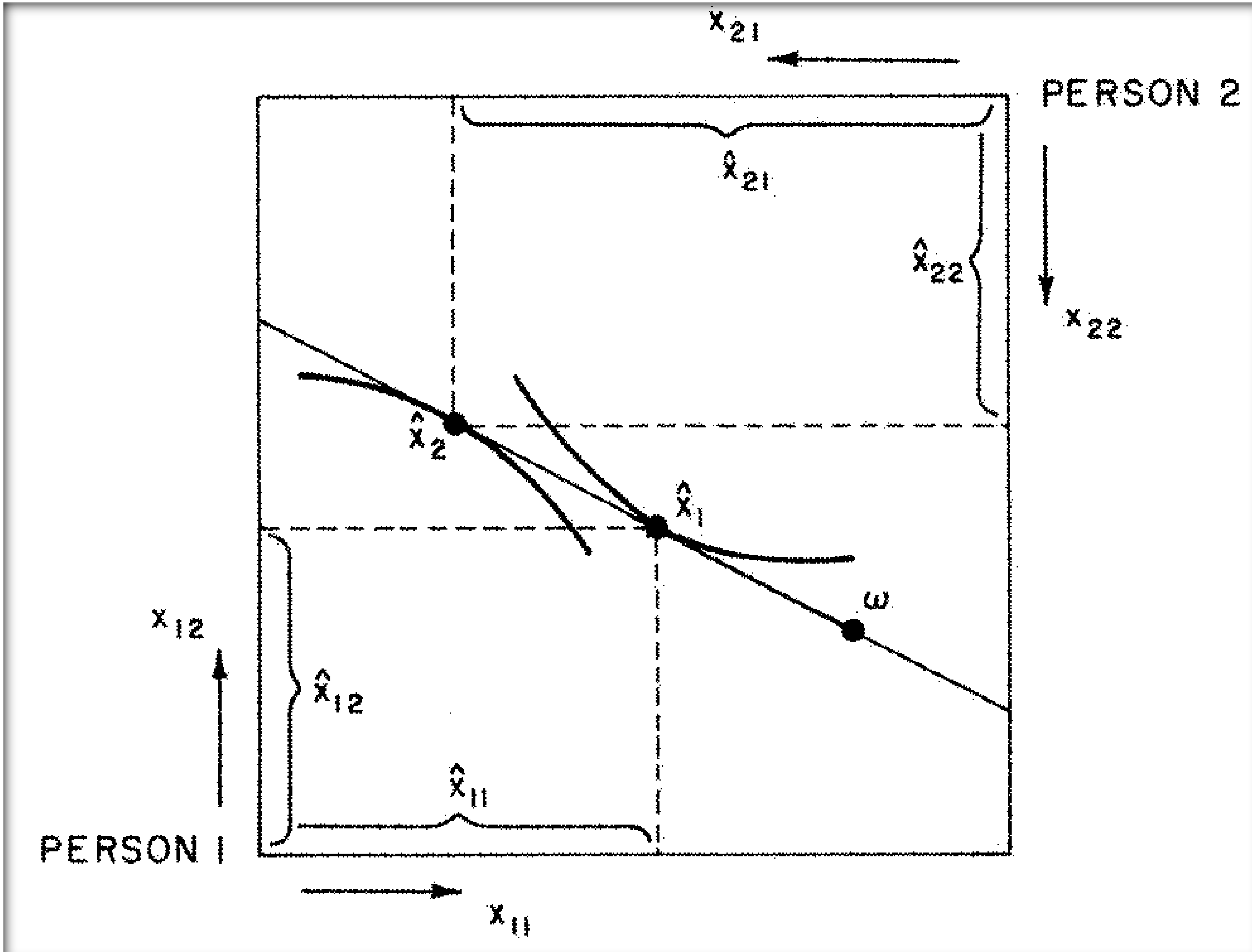
$$p_1 x_{21} + p_2 x_{22} \leq p_1 \omega_{21} + p_2 \omega_{22}$$

- But, non-wastefulness implies: $x_{1j} + x_{2j} = x_j;\ j = 1,\ 2$
- Let's assume $x_j = 1;\ j = 1,\ 2$
- Rearrange BL for 2 – get BL for 1

Example



Example



x_{21}
PERSON 2
$\hat{x}_{21}$
$\hat{x}_{22}$
x_{22}
$\hat{x}_2$
$\hat{x}_1$
ω
x_{12}
$\hat{x}_{12}$
$\hat{x}_{11}$
PERSON 1
x_{11}

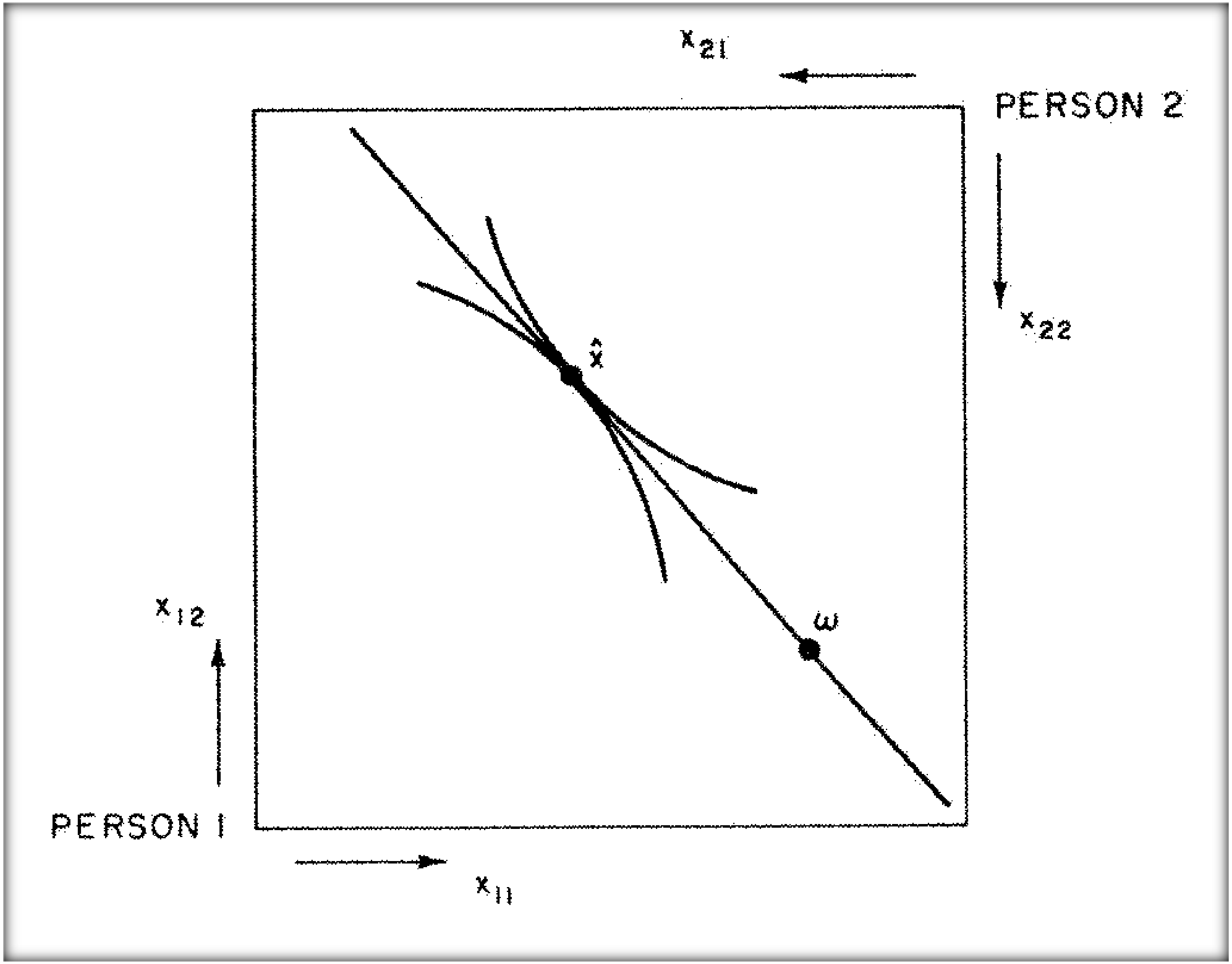
Example

- But given the initial (p_1, p_2) we have total demand for 1 exceeds total supply of 1 in the economy

$$p_1 x_{21} + p_2 x_{22} \leq p_1 \omega_{21} + p_2 \omega_{22}$$

- So excess demand for 1
- Prices should change such that $\dfrac{p_1}{p_2} \uparrow$

Example



Numerical Example

- Let's assume $u_1 = x_{11} + 2x_{12};\ \omega_1 = (1, \frac{1}{2})$
- MRS for 1: $\dfrac{1}{2}$
- Individual 2: $u_2 = x_{21}.x_{22};\ \omega_2 = (0, \dfrac{1}{2})$
- MRS for 2: $\dfrac{x_{22}}{x_{21}}$
- BL for 2: $p_1 x_{21} + p_2 x_{22} = \frac{1}{2} p_2$
- MRS = relative price implies $p_1 x_{21} = p_2 x_{22}$

Numerical Example

- Solving: $x_{21} = \frac{1}{4} . \frac{p_2}{p_1}$; $x_{22} = \frac{1}{4}$
- MRS1 = MRS2: $\dfrac{x_{22}}{x_{21}} = \dfrac{1}{2} \Rightarrow 2x_{22} = x_{21}$
- Therefore, $x_{21} = \frac{1}{2}$
- Rel prices: $\frac{p_2}{p_1} = \frac{1}{2}$
- Endowments imply supply of both goods = 1
- At eqm: $x_{11} + x_{21} = 1$ $\quad x_{12} + x_{22} = 1$

  $\Rightarrow x_{11} = \frac{1}{2}$ $\quad => x_{12} = \dfrac{3}{4}$

Numerical Example

- So, by 1st FWT we have –

$$\hat{x}_1 = (\tfrac{1}{2}, \tfrac{3}{4});\ \hat{x}_2 = (\tfrac{1}{2}, \tfrac{1}{4}); \frac{p_1}{p_2} = \frac{1}{2}$$

- Suppose govt wants to implement: $y_1 = (\tfrac{1}{4}, \tfrac{5}{8});\ y_2 = (\tfrac{3}{4}, \tfrac{3}{8})$

- Let $p = (1, 2)$

- We must have: $p.y_1 = p.\omega_1 + T_1$ and $p.y_2 = p.\omega_2 + T_2$

- Solving: $T_1 = -\tfrac{1}{2};\ T_2 = +\tfrac{1}{2}$ (2nd FWT)