

Lecture XXII: General Equilibrium

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A Simple General Equilibrium

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- ▶ Consider the simplest possible general equilibrium – it has two markets a goods market and factor market.
- ▶ The goods market can be written as demand minus supply – excess demand

$$q_1^D(p_1, Y) - q_1^S(p_1, w_1) \leq 0. \quad (1)$$

where q_1^D is the quantity demanded, q_1^S is the quantity supplied, p_1 is the price of the consumption good, Y is the income to consumers, and w_1 is the price of the factor of production.

- ▶ For our purposes here, let us assume that the quantity supplied in the factor market is fixed

$$x_1^D(w_1, p_1) - W_1 \leq 0. \quad (2)$$

- ▶ First, the $\leq$ in the equations implies that some factors of production and consumption items may exist in abundance (Moss and Schmitz 2014).
- ▶ The model is "closed" by the restriction that the households own the factor of production and, hence, the income is generated by factor payments.
- ▶ Thus, the equilibrium becomes

$$\begin{aligned} \xi_1(p_1, w_1) = q_1^D(p_1, w_1 W_1) - q_1^S(p_1, w_1) &= 0 \\ \xi_2(p_1, w_1) = x_1^D(w_1, p_1) - W_1 &= 0 \end{aligned} \quad (3)$$

- ▶ The system of equations presented in Equation 3 is over-parameterized in that we cannot simultaneously derive Y , p_1 , and w_1 . Hence, there is typically a normalization condition. In this case, we let $p_1 = 1$. Then $\tilde{w}_1 = w_1/p_1$.
- ▶ Writing the full system out, we include the prices and the complementry slackness conditions (basically a Kuhn-Tucker formulation)

$$\begin{aligned} \xi_1(1, \tilde{w}_1) 1 &= \left[q_1^D(1, \tilde{w}_1 W_1) - q_1^S(1, \tilde{w}_1) \right] 1 = 0 \\ \xi_2(1, \tilde{w}_1) \tilde{w}_1 &= \left[x_1^D(\tilde{w}_1, 1) - W_1 \right] \tilde{w}_1 = 0 \end{aligned} \quad (4)$$

The conjecture (true by fixed-point theorem) that there exists one price $\tilde{w}_1$ that makes both of these conditions true at the same time.

Graphical Depiction of the General Equilibrium

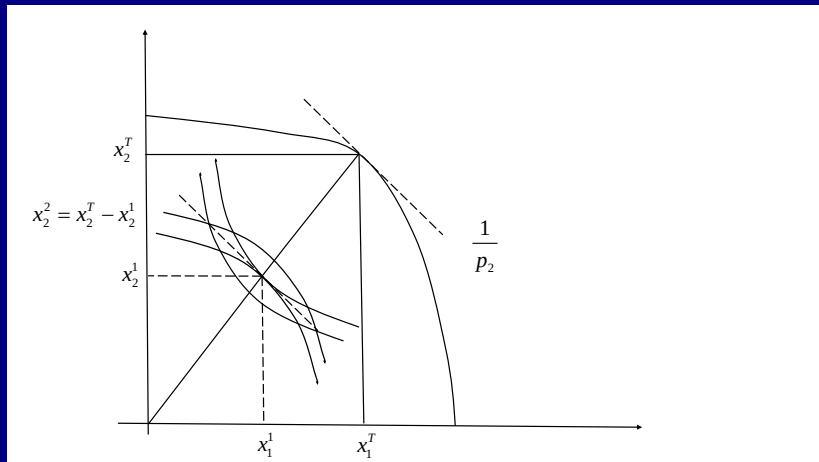


Figure : Graphical Depiction of the General Equilibrium