

Allocative Efficiency

Econ 43750

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Topic Overview

- Quick review of concepts from last time
 - Used Pareto Optimality concept to think about **optimal risk sharing** (insurance against idiosyncratic risk)
 - Achievable by the planner and/or by the market system
 - Compared Mao and Deng economies according to how well risk was shared across Chinese provinces.
 - Declared Deng the winner (but not by much)

Topic Overview

- Today: Using Pareto Optimality concept to think about **efficient allocations** of resources.
- This material is background for the Hsieh and Klenow article.
 - They compare efficiency of China's manufacturing industries to the US.
 - We doing some background to fix ideas about efficiency.
- Issues to cover (not in any of the readings—just here).
 - What is Pareto Optimal mix of goods (industrial goods versus agricultural products)?
 - What is Pareto Optimal allocation of productive resources (capital for industrial or agricultural sectors , labor for industry or agriculture)?
 - Achievable by the planner and/or the market system.
 - If the current allocation isn't Pareto Optimal, you are needlessly hurting (some segment of) society, so let's get there!

Edgeworth Box in production space

Production space in the two sectors: Flip right figure over 180 degrees.

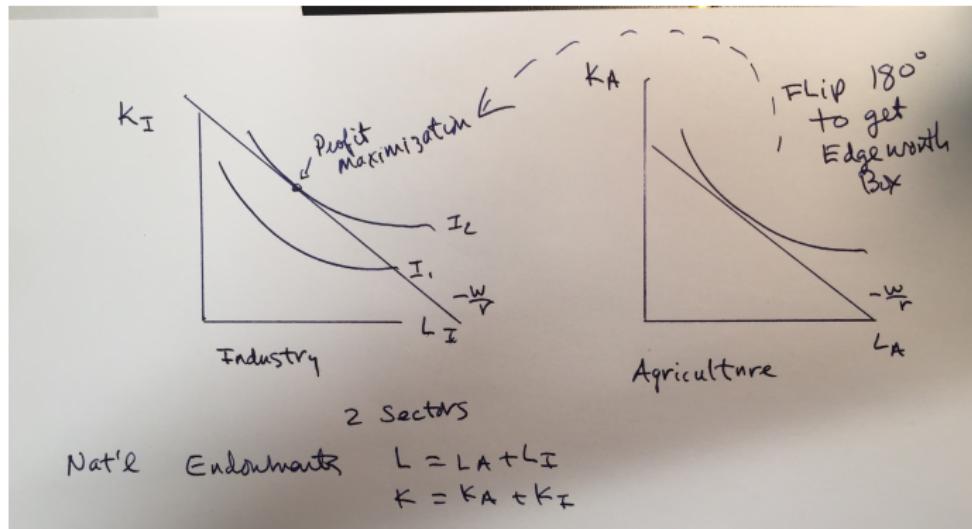


Figure: Fig 1. Industry Isoquants and Factor Inputs

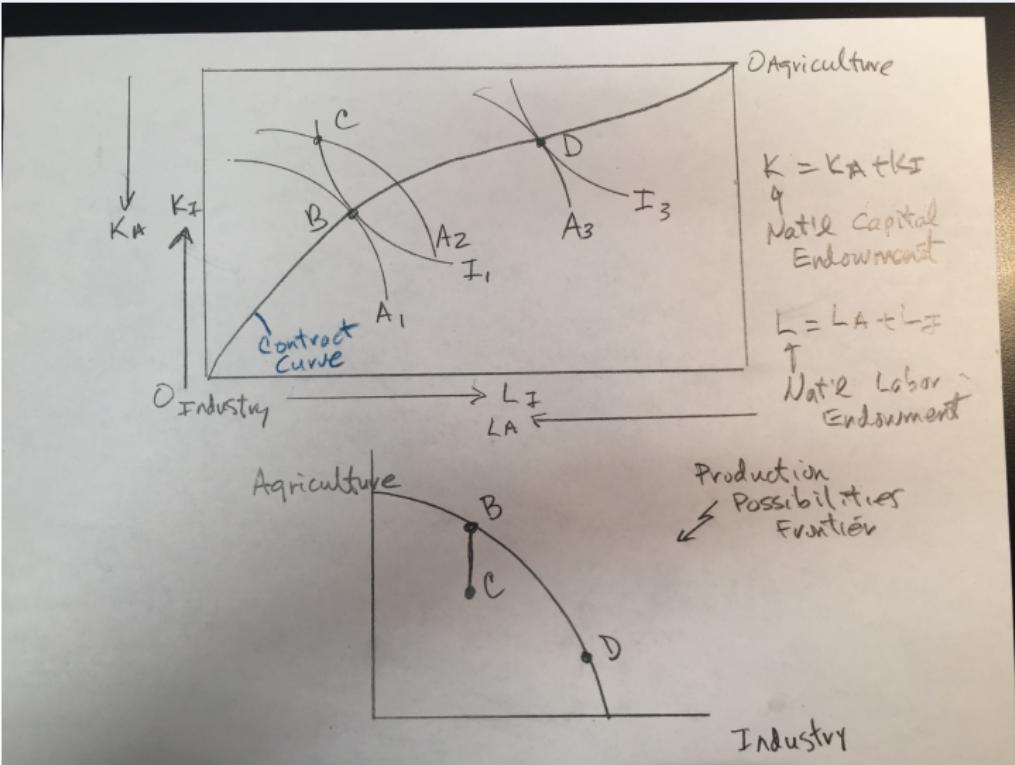
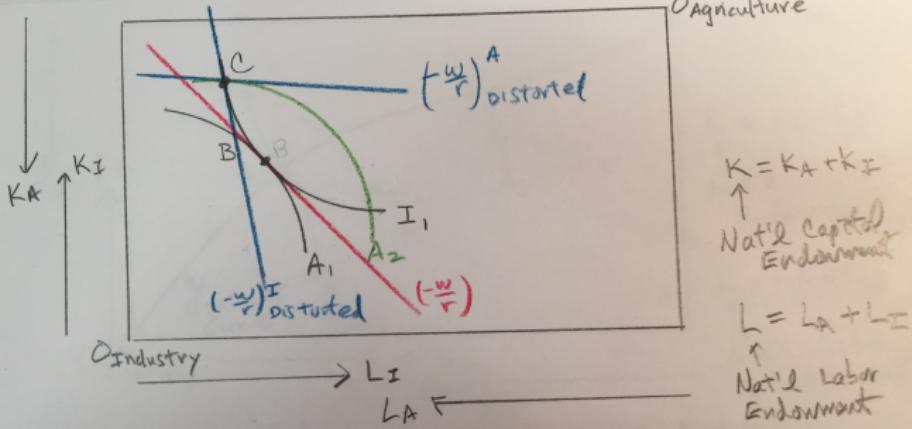


Figure: Fig 2. Edgeworth Box and PPF.



Market Distortions
Create Inefficiencies.

Blue: Subsidize Capital to Industry
Tax Capital to Agriculture

Figure: Fig 3. Market Efficiency and Distortions

Quick Summary of Concepts Thus Far

- 1 Two sectors: Agriculture and industrial products (see Fig 2)
- 2 Two factors: Capital and labor
- 3 Pareto optimum is efficient and represented by being on contract curve
- 4 If on the contract curve, MPK same in both industries. MPL same in both industries.
- 5 Allocation **B**: Led there by planner (Fig 2) or by factor prices (Fig 3).
- 6 Allocation **C**: Off the contract curve. Price distortions, bad planning. Produces same amount of industrial goods as allocation **B** but fewer agricultural products.
- 7 Next question: How does the product mix get determined? Level of industrial and agricultural production? i.e., where on the PPF?

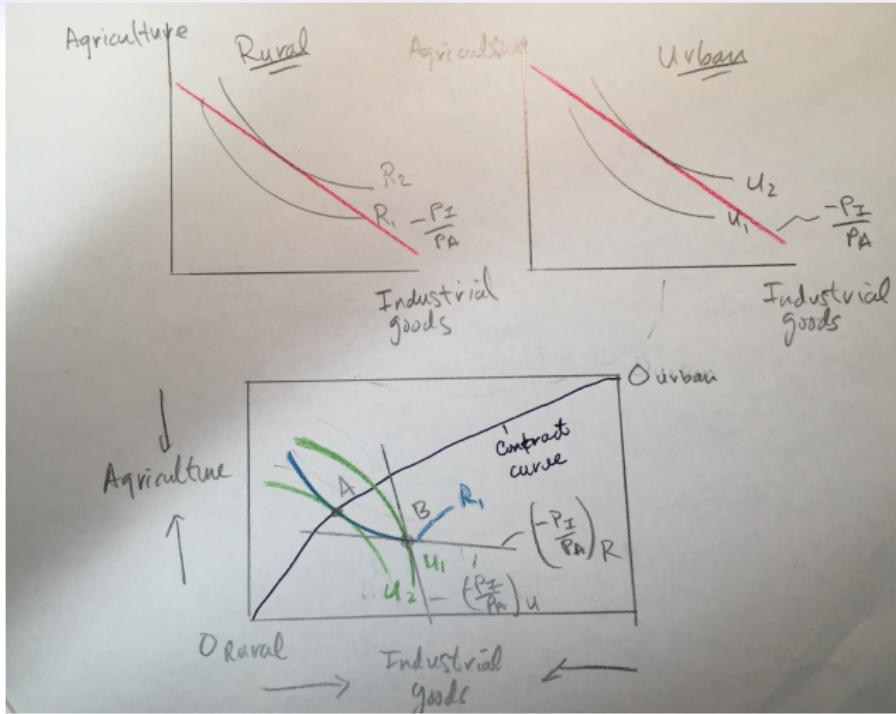
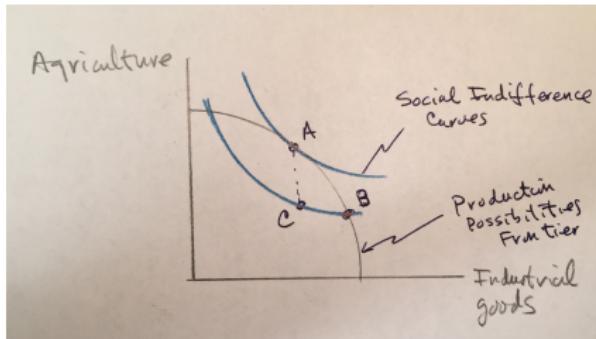


Figure: Fig 4. Edgeworth Box in consumption space

To determine **product mix**, we need a **social welfare function**—something we can maximize.

- 1 Give weights to rural and urban people who consume food and steel
- 2 Rural utility: $R(C_A^R, C_I^R)$. Weight α
- 3 Urban utility: $U(C_A^U, C_I^U)$. Weight $1 - \alpha$
- 4 SWF = $\alpha R(C_A^R, C_I^R) + (1 - \alpha) U(C_A^U, C_I^U)$. Maximize SWF subject to economy's resource constraints, represented by the production possibilities frontier.

Graphical Representation



- A: Marginal rate of substitution = marginal rate of transformation
- B: Some pay too much for food.
 - Rural P_F too high.
 - Urban: P_F too low
- B: Production efficiency? Yes—on the production contract curve. Product mix efficiency? No—not on consumption contract curve. Not Pareto item
- C: Production inefficiency—Not Pareto optimal

Welfare rankings, $A > B = C$. Both A and B are on production contract curve. C is off the production contract curve. B produces too many industrial goods

Summarize: To avoid inefficiency

- 1 Planner has to be very smart and informed. Don't play favoritism.
- 2 Market economy: Also don't play favoritism with subsidies and taxes that distort prices, and therefore, allocations. Promote factor mobility.
- 3 Production efficiency occurs when MPK and MPL is equal across firms.
- 4 Consumption efficiency occurs when MU (marginal utility) of food and of industrial goods is equal across individuals