ECON 672: Economics of Development

Week 3: Structural transformation and inequality

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The Lorenz Curve and the Gini Coefficient

Last time we thought about the Gini coefficient; the **Lorenz curve** is a graphical representation of this concept.

The Lorenz Curve plots the cumulative share of income (or wealth) against the cumulative share of the population, starting with the poorest individual or household. The further the Lorenz curve is from the line of equality (the 45-degree line), the greater the inequality.

The Gini coefficient can be calculated as the area between the line of equality and the Lorenz curve, divided by the total area under the line of equality.

Lorenz Curve for a Hypothetical Country

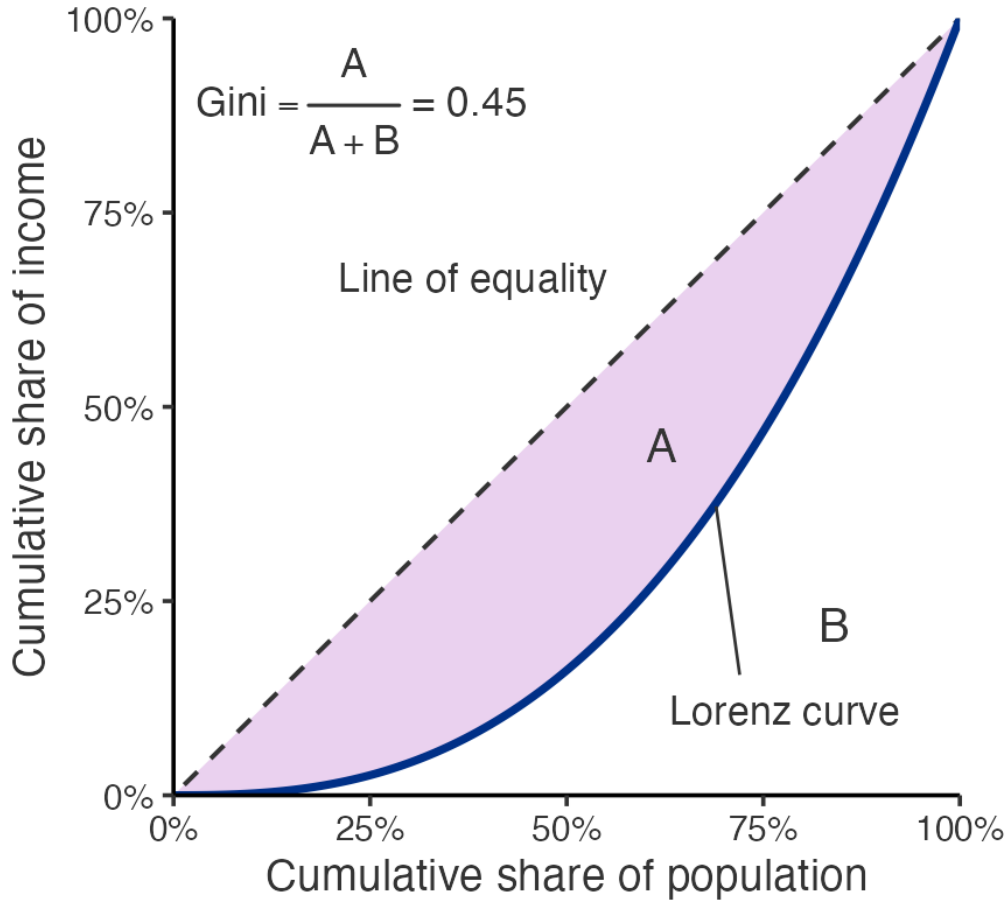

Figure 1: Hypothetical income distribution with a Gini coefficient of 0.45

The Kuznets Inverted-U Hypothesis

We also thought about the *Kuznets curve*, an inverted-U-shaped relationship between income inequality and economic development *across countries*.

We might use Kuznets's hypothesis to eschew redistributive policies for growth-first policies, since inequality could be seen as a "self-righting" problem. In practice, however, we do not observe a *causal* relationship between growth and inequality *within countries*; growth past a certain point does not mechanically lead to lower inequality.

Inequality and Growth in Brazil

In countries like Brazil, inequality rose and fell as GDPpc increased, but the decline has not been due to growth alone, but to social policies introduced by the Cardoso and da Silva governments to reduce inequality.
— de Janvry & Sadoulet, p. 172

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- However, we should be cautious not to overstate the direction of causality; structural transformation is a *consequence* of development, not a *cause*. Simply observing declining agricultural labor shares and rural-urban migration is not always associated with GDP(pc) growth.

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- Empirical estimates of the marginal product of labor in traditional agriculture are often very low, consistent with the idea of "disguised unemployment" and a "dual economy", but this model is not without its critics.

Agriculture as a Labor Reservoir

...agriculture can serve as a reservoir for surplus labor for a long time, especially if there is population growth, and that for as long as surplus labor exists growth can occur rapidly through investment in industry...The role of agriculture is passive, providing food and labor to industry without the need to invest in agriculture. The model thus justified neglecting agriculture and legitimized a strong "urban bias".
— de Janvry & Sadoulet, p. 233

Surplus Labor and the Lewis Turning Point

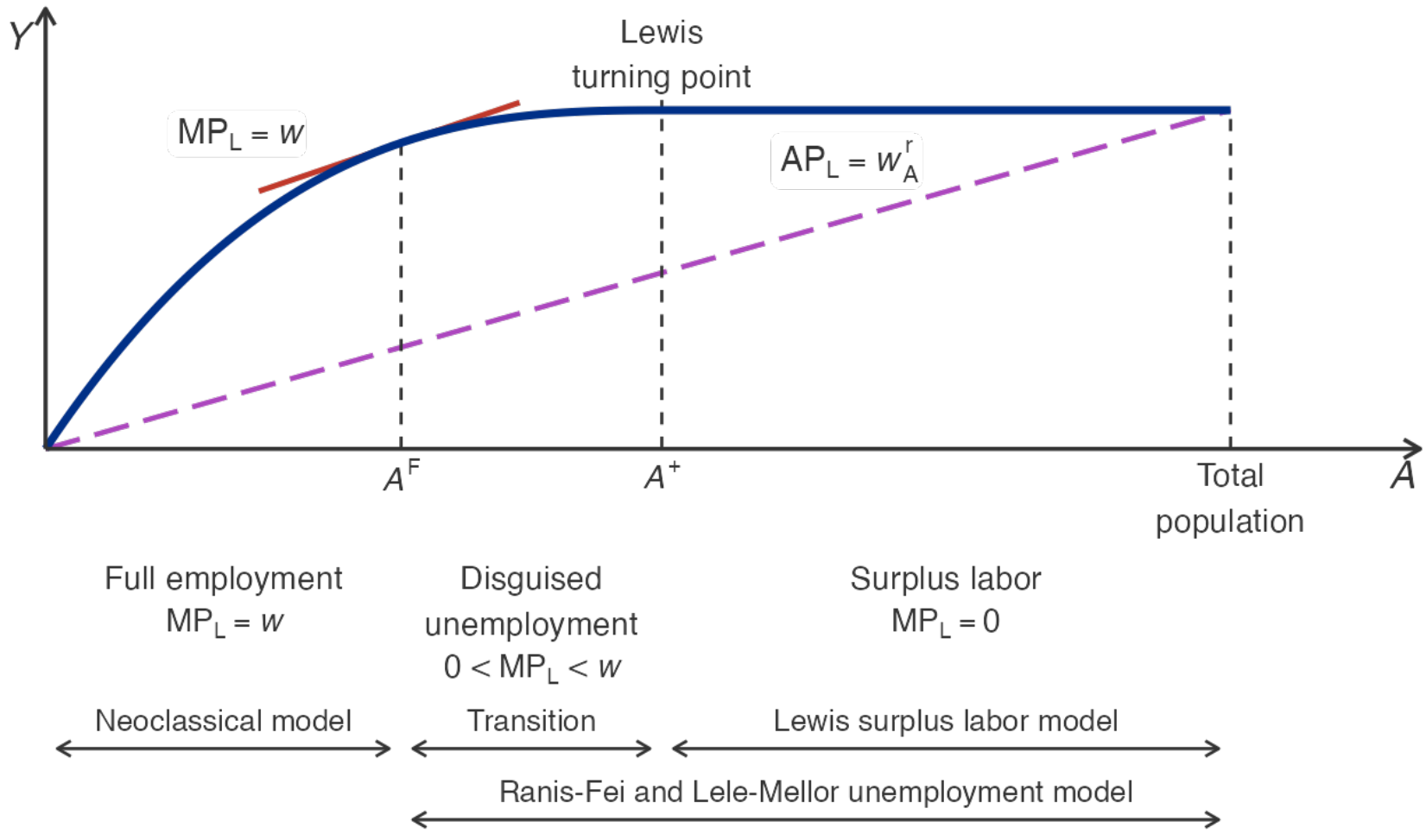

Figure 2: After de Janvry & Sadoulet, Figure 8.7

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Dual economy models after Lewis:

- Jorgenson (1967)
- Ranis & Fei (1961) and Lele & Mellor (1981)

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- These labor-saving ideas will yield *increasing* returns to scale, meaning we do not predict *convergence*. Instead, Romer's model predicts a *balanced growth path* (BGP) and labor moving from LDCs to MDCs, accelerating divergence.

The Agricultural Productivity Gap

Agricultural productivity gap: average value added per worker is lower in the agricultural sector than in industry, particularly in developing countries. We call this a **misallocation of labor**[2].

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What should workers do? Move from agriculture to industry! We broadly call this **structural transformation**.

GLW (2014) study if this perceived gap is coming from mismeasurement and largely conclude no. Instead, their evidence suggests that the persistence of this gap may come from poor institutional quality, geography, or labor mobility. These are all factors of development we have or will consider more deeply.

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Takeaways from the Misallocation Story

Key takeaways of this labor misallocation story:

- People have different levels of skill; some of these skill differences may be person-based, such as education and experience, others place-based, such as local infrastructure and market access, and others sector-based, i.e. specific skills.

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- A simple economic model would predict workers move to the sector where they are most productive (highest value added). However, this requires the ability and willingness to migrate, among other things.
- If workers do *not* move to sectors/areas where they provide the highest value added, aggregate (country-level) productivity and growth suffers. In reality, we do see this productivity gap between sectors persist: higher potential gains are not pulling enough workers out of agriculture, particularly in developing countries (or sorting is on unobservable skill, e.g. Young 2013).

Why the Agricultural Divide Matters

McMillan and Rodrik (2011) argue that reallocations of workers to the most productive sectors—taking the underlying productivity data at face value—would raise aggregate output per worker substantially in many countries.
Our focus on the divide between the agricultural and nonagricultural sectors is important because the vast majority of workers in developing countries are in agriculture...
— Gollin, Lagakos, & Waugh, 2014, pp. 942–943

The Cobb-Douglas Production Function

Cobb-Douglas production function:

$$Y_j = A_j L_j^{\alpha} K_j^{\beta}$$

- Y_j is output in sector j
- A_j is total factor productivity (TFP) for output in sector j
- L_j is the labor input in sector j and K_j is the capital input
- α and β are the output elasticities of labor and capital, i.e. the percent increase in output from a one percent increase in workers or machines. $\alpha < 1$ and $\beta < 1$ imply diminishing marginal returns to labor and capital, respectively.
- $\alpha + \beta = 1$ implies *constant returns to scale (CRS)*; doubling all inputs (capital K and labor L) should double output Y. $\alpha + \beta < 1$ implies decreasing returns to scale; $\alpha + \beta > 1$ implies increasing returns to scale. We generally assume CRS.

Labor Shares and Equalizing the Marginal Product

In competitive labor markets, the output elasticity of labor α is also the share of production paid to workers[3], the **labor share**. Accordingly, β is the **capital share**.

[3] Let $\pi = Y - wL - rK$ represent real net profits, output less labor and capital costs. Profit-maximizing firms set $\partial\pi/\partial L = \partial Y/\partial L - w = 0$, or $\partial Y/\partial L = w$. Assuming CRS, $Y = AL^{\alpha}K^{1-\alpha}$, $\partial Y/\partial L = \alpha A(K/L)^{1-\alpha}$. Thus, the labor share $wL/Y = (\alpha A(K/L)^{1-\alpha}L)/(AL^{\alpha}K^{1-\alpha}) = \alpha$.

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Following GLW (2014), we assume α is the same in both sectors, so the real MPL in sector j is $\alpha Y_j/L_j$. Equalizing the real MPL therefore equalizes average value added per worker, accounting for possible relative real price differences in output across sectors: $\frac{Y_i}{L_i} = \frac{P_j}{P_i}\frac{Y_j}{L_j}$ or $(Y_i/L_i)/(Y_j/L_j)p_{ij} = 1$, where $p_{ij} = P_i/P_j$.

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5-minute Break

Gollin, Lagakos, & Waugh (2014)

Randomly selected presenter: **Emily**

1. What is the research question?
2. How do the authors answer it?
3. What do they find?
4. Are you convinced by the design and results?
5. How does the paper connect to our other readings?

Group Discussion

Bringing together our lecture material and academic article, I have prepared the following suggested discussion questions:

- What do we mean by "structural transformation" in an economy? How does this relate to a story of economic growth? Who might be the winners and losers from such a transformation?
- What do we mean by "labor misallocation"? How does this relate to structural transformation and economic growth?
- Based on the models we have discussed, what might be the key to sustained economic growth? What are the key constraints to achieving this growth? Should we expect growth to be distributed equally among the population?

Roadmap

Looking Ahead to Week 4

What do we have on the horizon before next Tuesday?

- My office hours for ECON 672 will be held Tuesday before class, 12:15-2:15pm in MCL 108 or virtually by appointment
- Our fourth topic will be *History of thought in development economics*. Our textbook reading will be Chapter 3. Our *Poor Economics* reading will be the Foreword and Chapter 1. Our required journal article will be Rodrik (2010), "Diagnostics before Prescription," JEP.
- Our **Weekly Reading Response** assignment for this paper will be due Tuesday at 2:40pm before class. One student will be randomly selected to **present their response** to the class in 5-8 minutes.