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STRUCTURAL CHANGE

Development Policy

FSPPM



ECONOMIC DEVELOPMENT WITH UNLIMITED SUPPLIES OF LABOR (1954)



W. Arthur Lewis

- How do developing countries raise the rate of investment during industrialization?
- The answer: the supply of labor is not fixed because some labour is unemployed or underemployed
- Wages are not always equal to marginal productivity
→ they are set “institutionally” or by bargaining.

Two structural features of developing economies

1. The presence of surplus labor, particularly in the rural sector, which is unemployed or underemployed despite low market wages.
2. Low share of savings and investment in national income.



STRUCTURAL CHANGE

- Four components of structural change:
 - Agriculture's share in national output and employment falls
 - Share of manufacturing and modern services rises
 - People move from rural to urban areas (and between rural areas)
 - \cap shaped demographic transition: Falling mortality rates, then falling fertility rates.
- Productivity growth is faster in manufacturing than agriculture, so even as output grows in agriculture its share of GDP falls.
- Manufacturing's share of GDP increases until GDP per capita reaches about \$14,000 (high income status)
 - Textiles, garments and food processing develop first: labor intensive, low tech, domestic demand
 - Successful countries move into more capital and knowledge intensive industries like machinery and vehicles



ENGEL'S LAW: THE INCOME ELASTICITY OF FOOD IS LESS THAN ONE.

- The increase in food demand relative to changes in income
- $\varepsilon_d = \frac{\Delta Q/Q}{\Delta I/I}$, where Q is quantity demanded and I is income.
- For food, ε is greater than zero and less than 1 (demand goes up with income, but not as much as income goes up).
- As we get richer we spend less of our income on food and more on other things like housing, clothing, education, transportation, etc.

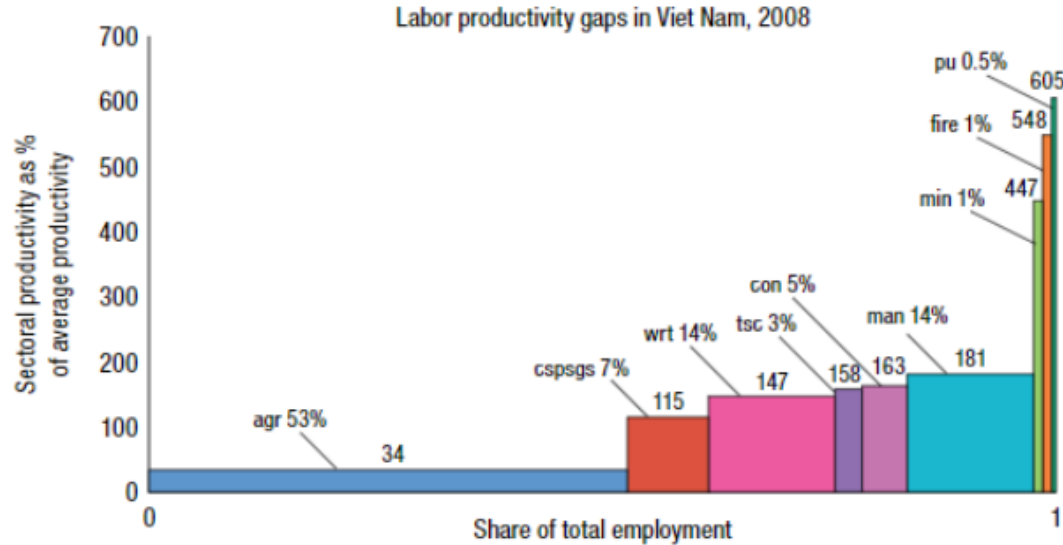


PRODUCTIVITY GROWTH MORE RAPID IN MANUFACTURING

- Manufacturing is not constrained by biological processes, seasonality or climate
- Increasing returns to scale more common in manufacturing than in agriculture
- Exports of manufactured goods creates opportunities for rapid productivity growth
- Even as output increases in agriculture its share of GDP falls
- But labor productivity differences between sectors narrow as labor leaves agriculture for other sectors (few workers in agriculture means that each worker is more productive)



LABOR PRODUCTIVITY GAPS IN VIETNAM, 2008



Source: McCaig and Pavcnik 2016

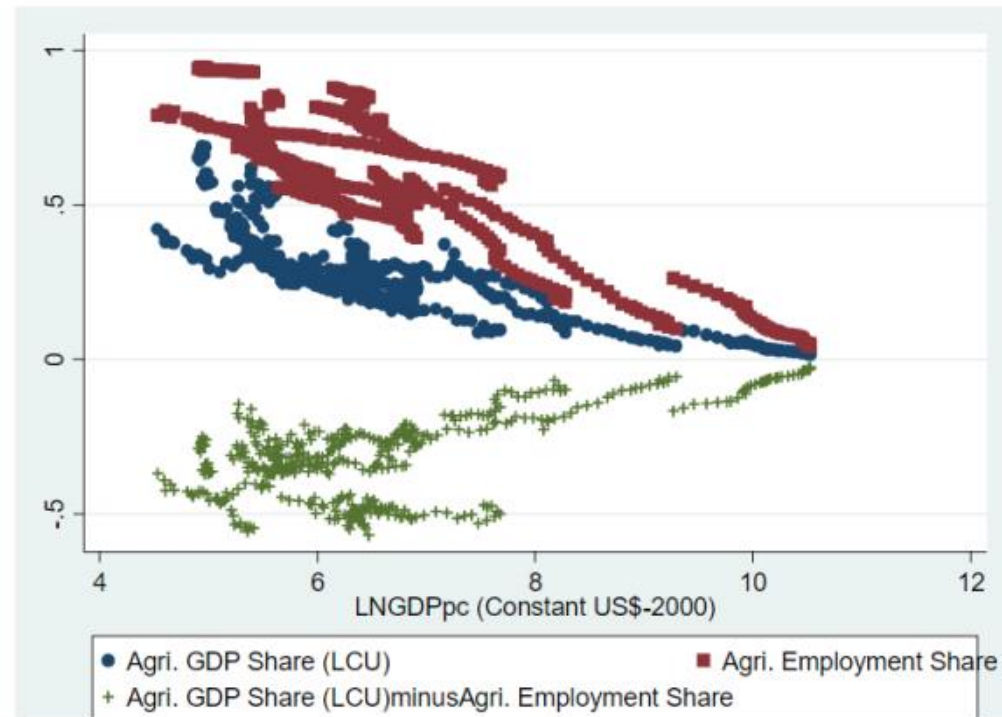
- Labor productivity in manufacturing 5x in agriculture
- Slow but steady movement of labor from agriculture to manufacturing and services
- Slow but steady movement of labor from unenumerated to enumerated sector



GAP BETWEEN AGRICULTURE'S EMPLOYMENT GDP SHARES IS THE PRODUCTIVITY GAP

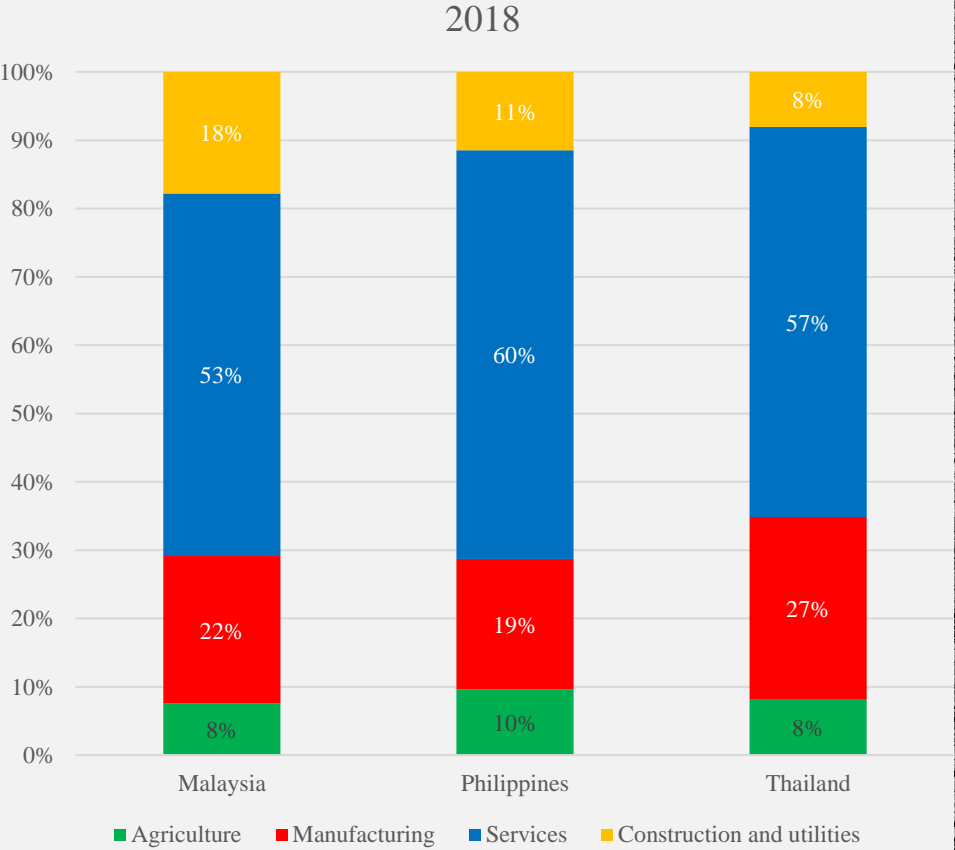
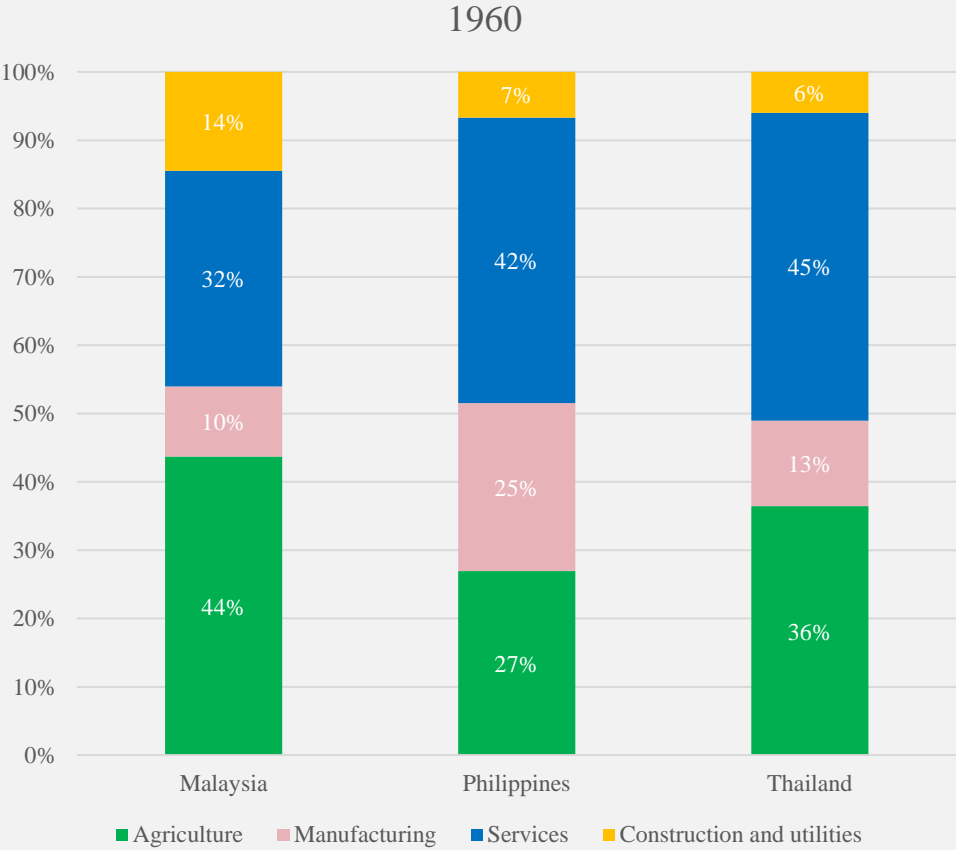
- Agriculture's share of the labor force declines more slowly than its share of GDP
- Low productivity and surplus labor in agriculture
- Gap eliminated at high levels of income
- Asian countries shed labor from agriculture more slowly because more investment in rural sector

13 Asian Countries – Bangladesh, China, India, Indonesia, Japan, Korea, Malaysia, Nepal, Pakistan, Papua New Guinea, Philippines, Sri Lanka, and Thailand

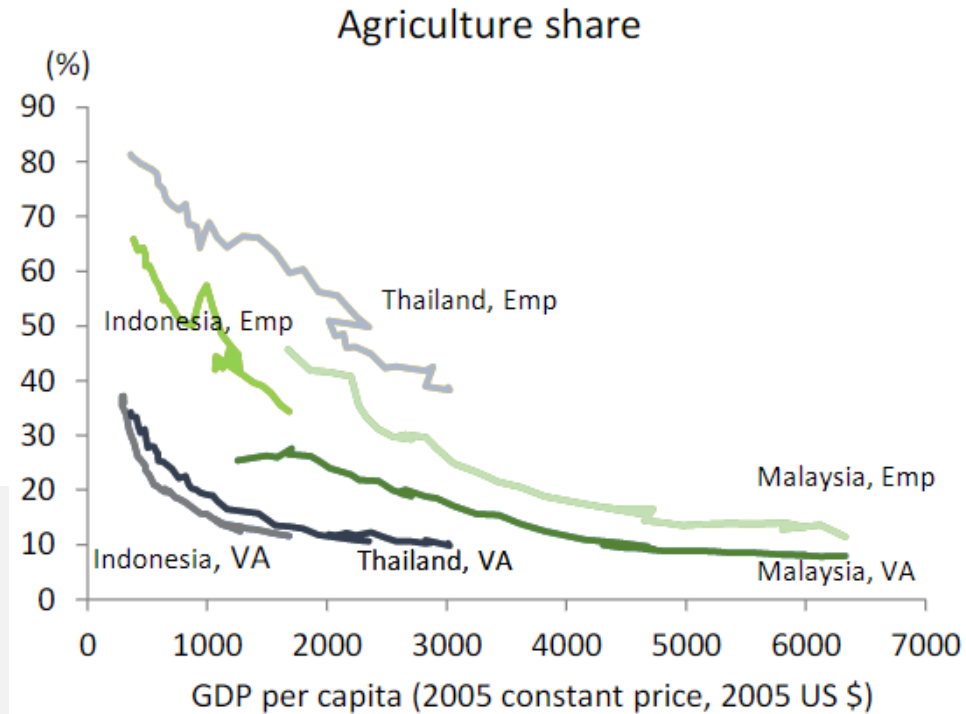
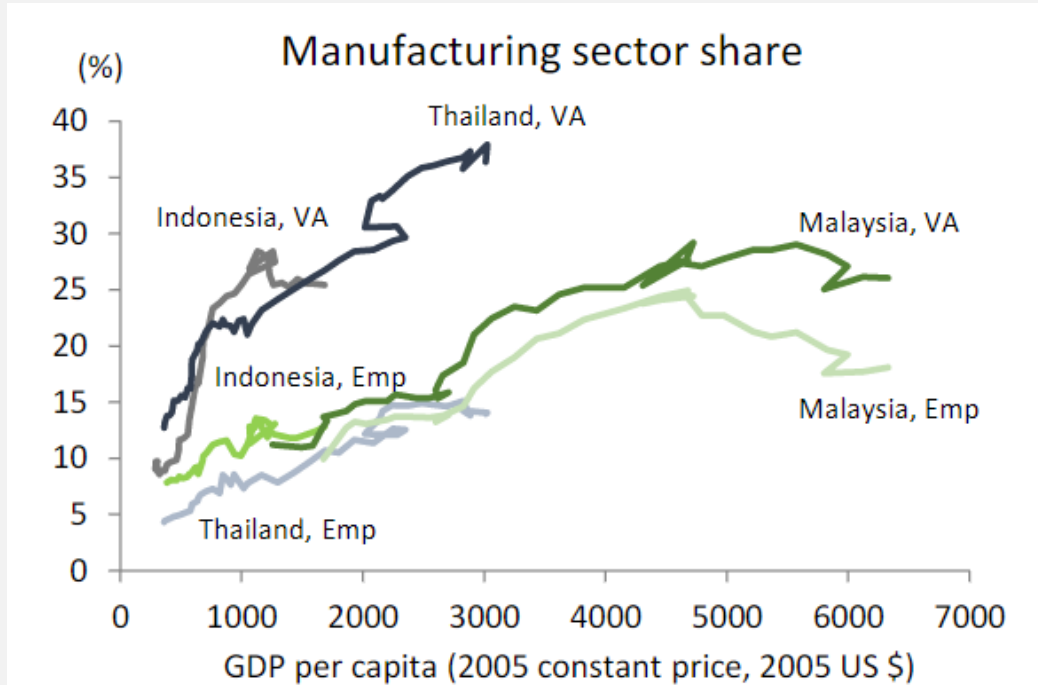


Timmer and Akkus 2008

STRUCTURAL CHANGE: AGRICULTURE'S SHARE IN GDP FALLS

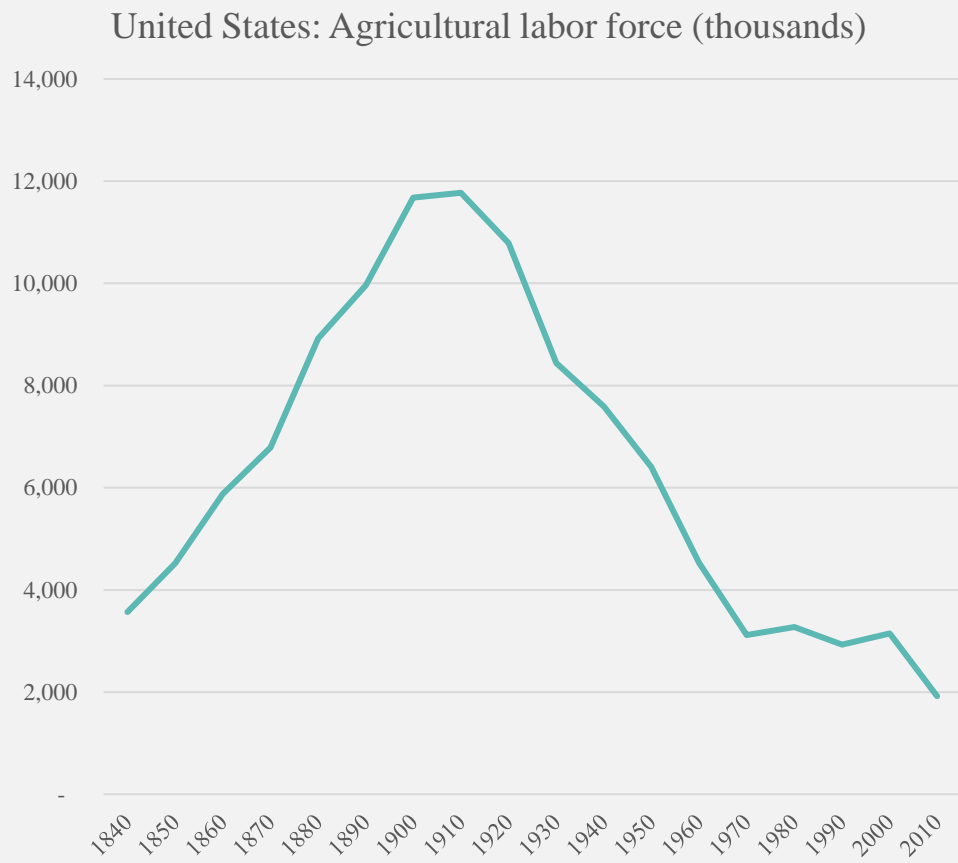
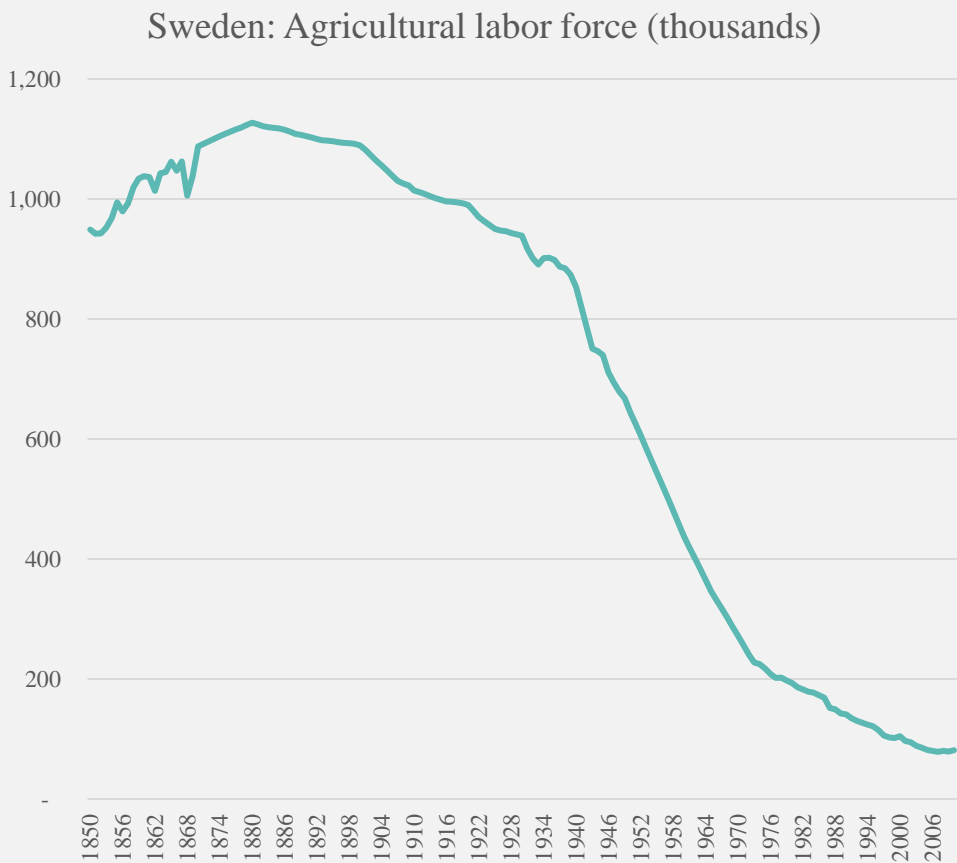


MANUFACTURING VALUE ADDED RISES WITH GDP PER CAPITA



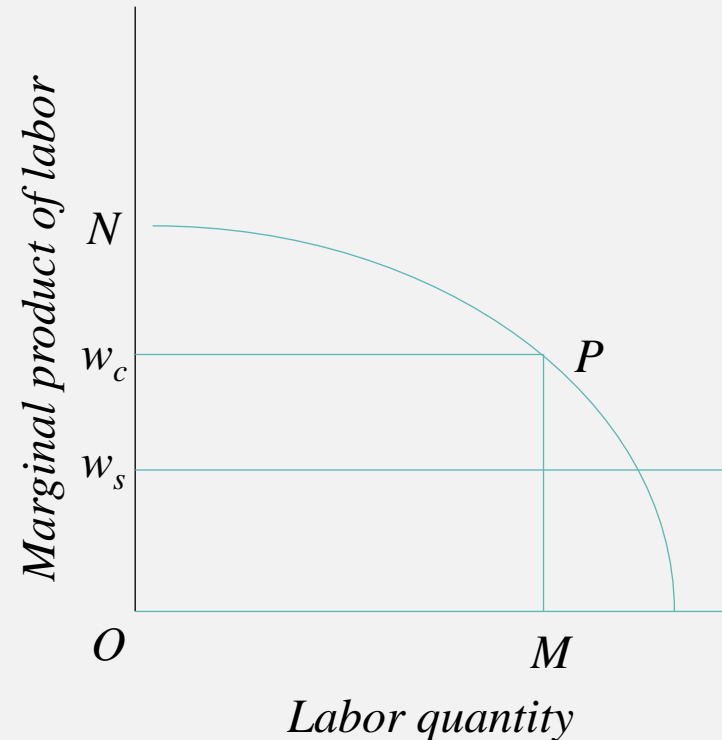
Source: Arief and Sumner 2017

AGRICULTURAL LABOR FORCE DECLINES AS WORKERS MOVE INTO INDUSTRY AND SERVICES



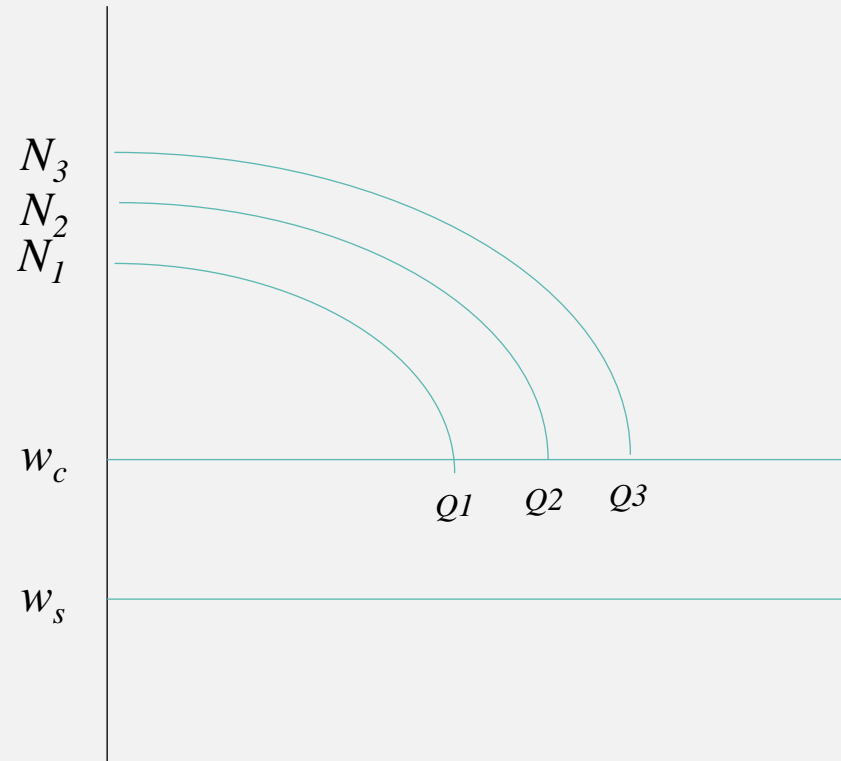
LEWIS: ECONOMIC DEVELOPMENT WITH UNLIMITED SUPPLIES OF LABOR (1954)

- Marginal productivity of labor is low → extra family workers on small farms; small traders; shoe-shiners; unpaid female labor.
- The supply of labor at the subsistence wage is greater than demand and is therefore “unlimited”.
- If w_c is the wage that capitalists must pay to attract labor (above subsistence wage w_s)
- Capitalists hire labor to the point at which the marginal product equals the wage
- The workers' share is $w_c PMO$ and the capitalists' share is Nw_cP
- Workers outside of the capitalist sector earn less than w beyond M



ECONOMIC DEVELOPMENT WITH UNLIMITED SUPPLIES OF LABOR (1954)

- “The key to the process is the use which is made of the capitalist surplus.”
- As the surplus is reinvested, the marginal productivity of labor and the amount of labor in the capitalist sector increase, which increases capitalist surplus.
- Why do poor countries save so little? Not because they are poor, but because the capitalist sector is small. Profits small as a share of national income.



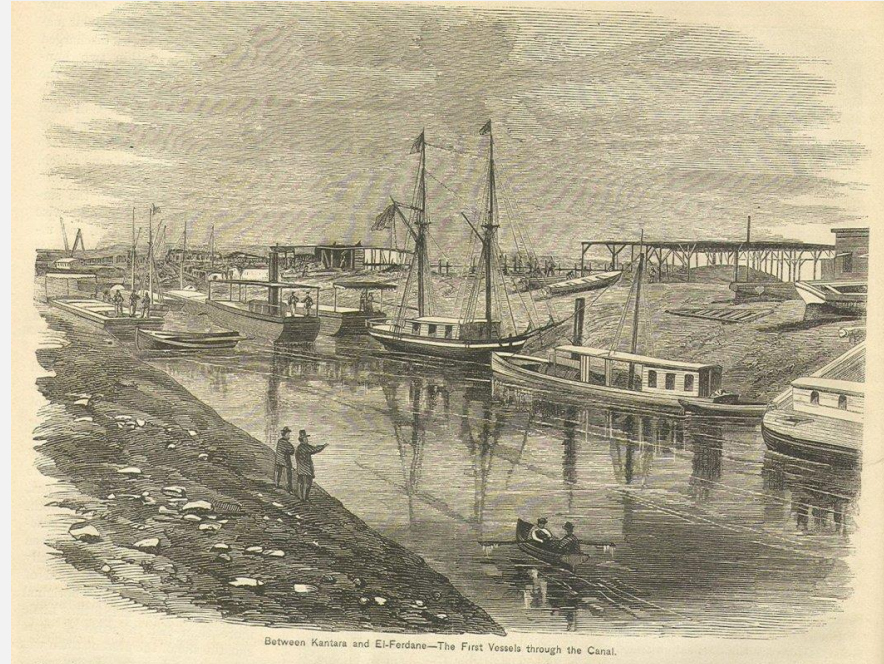
LEWIS AS A DEPARTURE FROM THE STANDARD ECONOMIC MODEL

- In the neoclassical model, all labor is paid its marginal product, so there is no capitalist surplus
- Therefore, an increase in the share of investment in GDP comes at the expense of the share of consumption—workers save their incomes, and these savings are used for investment.
- But with “surplus” labor, wages are less than marginal productivity in the capitalist sector, creating a surplus for reinvestment that comes from capitalist savings, not workers’ savings.
- The mechanism only works if there is a sufficient supply of food (wage goods) to prevent inflation and rising wages (which reduce surplus) – the “wage goods constraint”
- The process ends when surplus labor is employed, and real wages rise.



SOUTHEAST ASIA FROM LAND TO LABOR SURPLUS

- 1900 Southeast Asian population was 80 million, with 1/3 living in Java
- The Industrial Revolution and advances in transportation → demand for tropical products (rubber, tea, coffee, sugar) and minerals (oil and tin).
- Suez Canal and US transcontinental railroad completed in 1869; advances in steamships made long distance shipping commercially viable
- Burma, Thailand and Vietnam exported rice to feed to growing labor force in mines, on plantations and in factories.
- From 1880 to 1940, 20 million Indians and 30 million Chinese migrated to Southeast Asia → equivalent to the European migration to North America
- Mostly male (until 1920s) and often circular → permanent migrants about 20%
- Local peasantry left to grow food, while plantations and mines run with cheaper migrant labor; local elite resisted use of local labor on plantations



FROM LAND TO LABOR SURPLUS (HIRSCHMAN AND BONAPARTE 2012)

Population Estimates (Millions) and Average Annual Growth Rates by Country:
1950 to 2010, with Projections to 2050 (continued on next page)

	Colonial Censuses		UN Population Estimates			1980	1990	2000	2010
	c. 1900–11	1930–39	1950	1960	1970				
World			2,532	3,038	3,696	4,453	5,306	6,123	6,896
Asia			1,403	1,708	2,135	2,638	3,199	4,164	4,164
SE Asia	~85	~130	173	219	285	359	445	524	593
% of World Pop			6.8%	7.2%	7.7%	8.1%	8.4%	8.6%	8.6%
% of Europe			31.6%	36.3%	43.5%	51.8%	61.8%	72.1%	80.4%
Brunei Darussalam			0.0	0.1	0.1	0.2	0.3	0.3	0.4
Cambodia	1.7		4.3	5.4	6.9	6.5	9.5	12.4	14.1
Indonesia	40.2	60.7	74.8	91.9	118.4	150.8	184.3	213.4	239.9
Laos	0.6		1.7	2.1	2.7	3.2	4.2	5.3	6.2
Malaysia	2.4	3.8	6.1	8.2	10.9	13.8	18.2	23.4	28.4
Myanmar/Burma	10.5	14.7	17.2	21.0	26.2	32.9	39.3	45.0	48.0
Philippines	7.6	16.0	18.4	26.0	35.5	47.1	61.6	77.3	93.3
Singapore	0.2	0.6	1.0	1.6	2.1	2.4	3.0	3.9	5.1
Thailand	8.3	11.5	20.6	27.3	36.9	47.5	57.1	63.2	69.1
Timor-Leste			0.4	0.5	0.6	0.6	0.7	0.8	1.1
Vietnam	14.9	17.6	28.3	35.2	44.9	54.0	67.1	78.8	87.8



RISING FERTILITY AND DECLINING MORTALITY

- Colonialism production increased demand for rice and stimulated expansion of irrigated rice into frontier areas.
- Colonial administration reduced warfare and political instability
- Not much evidence of declining mortality until after independence: But after 1950 historic falls in mortality → insecticides (malaria); childhood immunization programs.
- Fertility transition from the 1980s: rising income levels and female secondary and tertiary education the main factors.
- Southeast Asian population will stabilize in second half of 21st century.



FROM LABOR SCARCE TO LABOR SURPLUS AND STRUCTURAL CHANGE IN SOUTHEAST ASIA

- It was underutilized land that attracted imperial powers to Southeast Asia, not surplus labor.
 - During the early years of colonialism labor was imported from China and India to work on the plantations and in mines.
 - Vietnam was a partial exception: labor was imported from north to work rubber plantations in the south—the degree of exploitation of local labor was crucial to the nationalist and communist movements
- Unintended consequence of imperialism: fertility rates rose as colonial powers imposed order (fewer wars) and stimulated demand for food crops (rice) → the long transition from labor scarce to labor abundant
- Mortality rates fell after independence, rapid increase in population.



SOME POLICY IMPLICATIONS

- Development entails transfer of labor from agriculture to industry, and rising investment in industry.
- This *does not mean* falling investment in agriculture: As we shall see in coming weeks, structural change can be choked off by slow productivity growth in agriculture.
- Employment creation is the driver of poverty and inequality reduction: If employment growth is slow, labor will be stuck in low productivity, unsteady jobs, which makes inequality worse.
- Outcomes depend on how the surplus (capital) created during structural change is invested. If it is invested in speculative (land) rather than productive (factory) assets, growth will be slower.



DISCUSSION QUESTIONS

1. Explain the relationship between surplus labor and the accumulation of capital for investment. What are some of the factors that could disturb this relationship?
2. Describe the transition in Southeast Asia from land surplus to labor surplus economies? What will happen when and if the labor surplus is exhausted in Vietnam?

