

# Agriculture in a modern world

Lecture 5 - EE461 2/2018

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# Structural transformation

- ▶ Starting from agriculture through higher productivity, agriculture provides food, labor, and savings to the process of urbanization and industrialization
- ▶ What did we observe?
  - ▶ A declining share of agriculture in GDP and employment
  - ▶ A rural-to-urban migration that stimulates the process of urbanization
  - ▶ the rise of modern industrial and service economy
  - ▶ a demographic transition from high rates to low rates of births and deaths (associated with better health standards in urban areas)
- ▶ The gap in labor productivity between agricultural and nonagricultural workers approaches zero when incomes are high enough and the two sectors have been integrated by well-functioning labor and capital markets

# Structural transformation

## The Lewis model

- ▶ Structural transformation: resources move out of one sector to fuel the growth of another
- ▶ Lewis model: labor and resources move from a 'traditional sector' to a 'modern sector' with capital accumulation
  - ▶ The traditional sector has surplus labor (labor can be removed without loss in output, the marginal product of labor = 0)
  - ▶ So, labor moves to the modern sector (industrial sector, and later service sector)
- ▶ In order to absorb labor, the modern sector needs capital accumulation to increase demand for labor, but will also induce more rural-urban migration.

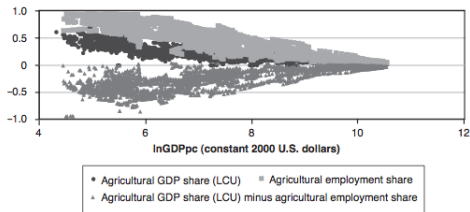
# Structural transformation

## The Harris-Todaro model

- ▶ Harris-Todaro model adds informal urban sector
  - ▶ 3 sectors: rural sector, formal urban sector, and informal urban sector
- ▶ Formal urban pays high wage, but small demand, while rural and informal sectors have low wages (why?)
  - ▶ Not everyone can absorb into formal sector. If they fail, they will return to urban informal sector while rural sector is like a relatively sure thing.
  - ▶ More labor can be absorbed in any sector at a lower wage
  - ▶ With wage differential, there is a rural-urban migration
- ▶ To alleviate persistent migration between the sectors, the wages in the two sectors must be equalized.

# Structural transformation

FIGURE 1-1  
THE STRUCTURAL TRANSFORMATION IN EIGHTY-SIX COUNTRIES  
FROM 1965 TO 2000



SOURCE: Timmer and Alkus 2008.

NOTE: Figure 1-1 shows the declining share of agriculture in employment (squares), in economic output (circles), as per capita incomes increase, and the gap between these two shares (triangles).

- ▶ In the early stages, there is a substantial gap between the share of the labor force employed in agriculture and the share of the GDP generated by that labor force
- ▶ This gap narrows with higher incomes, reflecting better-integrated labor and financial markets

## Structural transformation

- ▶ However, gains in farm productivity have been quickly lost in lower prices. Farm incomes usually fall behind incomes earned in the rest of the economy
- ▶ In many countries, this structural gap actually widens during the periods of rapid growth
  - ▶ When overall GDP is growing rapidly, the share of agriculture in GDP falls much faster than the share of agricultural labor in the overall labor force
- ▶ After labor productivity in the two sectors begins to converge, the turning point in the gap has been moving to the right over time, requiring progressively higher per-capita incomes before the convergence process begins
- ▶ Most of the time the integration of farm labor into the nonfarm economy takes a long time. The productivity gap is then difficult to converge through economic growth alone, and this requires political tensions to protect the agricultural sector.

# Agricultural development strategies

- ▶ Three different agricultural strategies/policies that view development of agricultural sector as a means to speed the overall process of development
- ▶ (i) a free-market strategy
- ▶ (ii) an activist government strategy directed toward small farmers
- ▶ (iii) an intermediate strategy recognizing government failures as well as market failures

## (i) Free-market strategy

- ▶ The agricultural sector must decline in proportional output terms and absolutely in the labor force, and the long-run decline in basic agricultural commodity prices due to technical change emphasizes that society is best served by getting resources out of agriculture as rapid as possible
- ▶ There is a problem of declining real incomes in agricultural sector under the impact of rapid technical change domestically and lower world prices for the output (with more open economies)

## (ii) Interrelated strategy

- ▶ Johnston and Mellor (1984) present an 'interrelated strategy' and the need for government in strategic design and program implementation. Agricultural growth not only satisfies the need for food to meet nutrition requirements, but also fosters a favorable employment-oriented demand structure as well.
- ▶ This strategy is mainly directed by government planners while the private sector only plays a small role as small farmers, and focus on a closed economy
- ▶ 3 key elements to meet all objectives of agricultural development:
  - ▶ massive investment in human capital through nutrition, health, and family planning services
  - ▶ creation of the complex, rural organizational structures seen in Japan and Taiwan that provide services to small farmers while serving as a voice for their interests
  - ▶ investment in rapid technical change appropriate to these small farmers to raise agricultural output and rural incomes

### (iii) Market policy strategy

- ▶ This strategy calls for government policy interventions into market outcomes but uses markets and the private marketing sector as the vehicle for those policy interventions.
- ▶ It recognizes market failures in agriculture and extensive government failures in implementation of economic tasks.
- ▶ Main focus: how to cope with segmented rural capital and labor markets, poorly functioning land markets, the welfare consequences of prices instability in commodity markets.
- ▶ However, government interventions still have many flaws, or sometimes make matters worse.
- ▶ Way to solve these problems: try to clearer understanding the necessary interaction between the public and private sectors

### (iii) Market policy strategy

- ▶ Dilemma objectives: agricultural performance as its capacity to feed the population regularly and cheaply, or as its ability to provide fair incomes to farmers
- ▶ Market policy path believes in using interventions into the prices determined in markets, not by leaving markets alone or by doing direct activities by the government.
- ▶ It requires that government intervention be based on an empirical understanding of economic responses to a change in policy and the political repercussions from them.

# Agricultural policy and structural change

- ▶ Hayami and Ruttan (1985) indicate that poor performance in agricultural sector was neither the meager endowment of natural resources nor the lack of technological potential to increase output from available resources to meet the demand growth.
- ▶ The major constraint limiting agricultural development was the policies that impeded rather than induced appropriate technical and institutional innovations.
- ▶ For agricultural transformation, we need a mix of appropriate new technology, flexible rural institutions, and a market orientation that offers farmers rewards for their efforts and for the risks they face from both nature and markets.

## Induced technical and institutional change

- ▶ Hayami and Ruttan (1985): the direction of technical and institutional change in agriculture toward saving labor or saving land is induced by relative scarcity of labor versus land.
- ▶ Agriculture is characterized by stronger constraints of land on production than other sectors. Hence, agricultural growth may be viewed as a process of easing the constraints on production imposed by inelastic supplies of land and labor.
- ▶ Nonagricultural sector absorbs labor from agriculture and supplies modern technical inputs to agriculture. These inputs can be substituted for land and labor.

## Induced technical and institutional change

- ▶ A rise in the price of land relative to the price of labor induces the substitution of labor for land.
- ▶ New high-yield seeds and fertilizer also relax land constraints.
- ▶ The advance in technology is itself a function of institutional innovation. Therefore, farmers exert political pressure to induce institutional innovations that will advance technological change.
- ▶ In this process, we see that shifts in the demand for institutional change are induced by changes in relative factor supply and technical change.