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Economics 404W
Lecture 12
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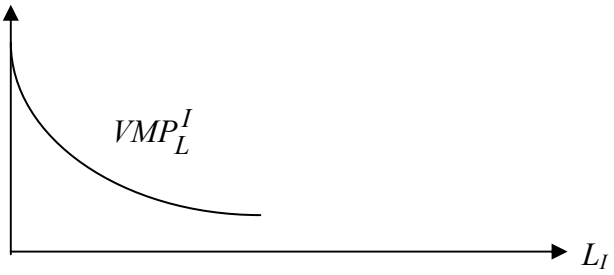
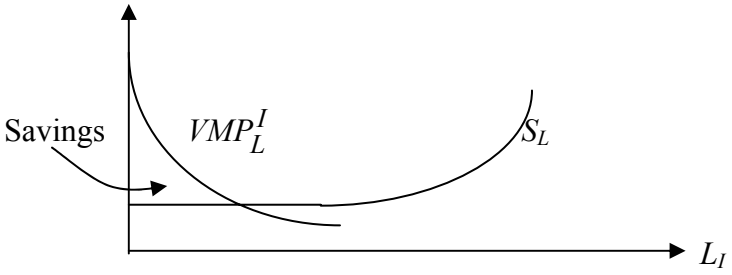
D. Dual Economy Models, continued

The industrialization story: Suppose one rich family has the resources to build a factory. They will want to hire workers to work in it, and the profit maximizing rule is to employ all who contribute more to revenues than to costs. Given that the industrial production function is neoclassical, there are diminishing returns to labor. Thus, given the initial capital stock (K_0), the VMP_I is downward sloping:



Combining this with the labor supply schedule, the amount of labor that will be attracted to the industrial sector when the first factory is built will be L_I^0.



Finally, to characterize the capital accumulation process, assume that industrialists (i.e., the capitalist family) save all their income, while workers save nothing. (Actually, an positive savings rate for industrialists will do.) This means that next period they will re-invest the return on the capital from the first period, and the demand for labor will shift out as the capital stock expands.

As the process unfolds we observe:

- Emergence of an industrial sector, which grows in importance relative to agriculture.

- A rising savings rate as a fraction of GDP
- Growth acceleration, as the industrial sector becomes more important, then slowdown when surplus labor is exhausted and wages start to rise:

$$\frac{\Delta Y}{Y} = \frac{\Delta Y_A}{Y} + \frac{\Delta Y_I}{Y} = \frac{Y_A}{Y} \cdot \left(\frac{\Delta Y_A}{Y_A} \right) + \frac{Y_I}{Y} \cdot \left(\frac{\Delta Y_I}{Y_I} \right)$$

- Potential for rising then falling income inequality. First everyone is a poor rural worker, then a few capitalists emerge, creating inequality. Finally, as wages rise and the return on capital falls, workers' incomes start to catch up.

A Cobb-Douglas Example:

Suppose the industrial sector is characterized by a Cobb-Douglas technology, $Y_I = 2\sqrt{KL}$, and the subsistence wage is *w*. Then, since the price of industrial goods is \$1, the value of the marginal product schedule (which is also the labor demand schedule) is

$$VMP_L = \frac{\partial Y_I}{\partial L} = \sqrt{\frac{K}{L}}$$

So the profit-maximizing amount of labor in the industrial sector can be found by equating this expression to the wage rate:

$$\sqrt{\frac{K}{L}} = w \quad \Rightarrow \quad \frac{K}{w^2} = L\,.$$

Also, capital's income (and thus savings) are total revenue minus the cost of labor:

$$S = Y_I - wL = 2\sqrt{K\left(\frac{K}{w^2}\right)} - w\left(\frac{K}{w^2}\right) = \frac{K}{w}\,.$$

Hence the amount of savings is proportional to the capital stock and *inversely* proportional to the wage. As a fraction of industrial output, it is

$s = \frac{S}{Y_I} = \frac{K/w}{2\sqrt{KL}} = \frac{1}{2w}\sqrt{\frac{K}{L}} = \frac{1}{2}$, and since no savings takes place out of rural output, the savings rate out of *total* output grows with the relative importance of the industrial sector. The growth rate of the industrial sector,

$$\Delta K/K = S/K = 1/w,$$

slows when the wage rate increases. (These are actually general results that hold for any constant returns, neoclassical production function.)

Notice that externalities and big push arguments are not part of the story.
These models are still considered to capture some fundamental features of the transition process. However, they have some unattractive features:

- Savings behavior is not a result of optimal decision-making on the part of households.

- Productivity growth is missing or exogenously given, rather than the consequence of behavior

- Household behavior in the rural sector is hard to formally justify.

    1. What is the household decision-making process that leads them to give subsistence to unproductive workers. How do they choose who works?

    2. When workers leave and output per worker rises, why do they keep giving subsistence to some household members? Don't migrants to the city keep ties with the households?

Extensive research on rural household behavior has cast doubt on the simplistic household representations of the surplus labor model. Even the neoclassical variant has some problems because it presumes workers get paid their *average* product rather than their marginal product.

For these reasons, the dual economy models are not stressed today nearly as much as they were in the 1960s and early 1970s.

E. Migration and Unemployment

We've now seen several explanations for why the industrial sector emerges. As it does so, urbanization occurs too. Both phenomena are fundamental to the development process—refer to early lectures. Why does urbanization accompany industrialization? Agglomeration economies:

- Modern firms want to be near their suppliers and buyers because of transport costs, and to attract customers (other firms and consumers).
- Modern firms can learn from each other.
- Modern firms can share a specialized labor pool.
- Modern firms can share an infrastructure (utilities, public transport, etc.)
- Workers like having lots of employers around.
- Workers like the amenities of cities—public services, consumption choices, entertainment.

Of course, some forces act *against* city growth. With lots of housing and businesses cramming into limited geographic areas, congestion becomes a problem; costs of living increase. (Compare State College and New York City.) But once a city is established as a dominant commercial center, it often precludes the development of additional centers. (Again, a coordination problem.)

Cities therefore are central to the development process, but they create some problems too, especially when coordination problems and "first city bias" allow them to get too big.

	Largest City, population	*Second-City, population*
Argentina	Buenos Aires, 10.7 million	Rosario, 1.1 million
Chile	Santiago 4.3, million	Concepcion, 0.3
Mexico	Mexico City 15.0, million	Guadalajara, 2.9
Peru	Lima 6.4, Million	Arequipa, 0.6

source: Todaro and Smith, chapter 7

Not only are they characterized by congestion—try to drive in them—but they are also home to vast tracts of shanty towns and people living on very low incomes. Most of these people have migrated from the countryside to live in urban squalor, working for themselves on the fringes of the economy, or not working at all.

Urban unemployment rates in the mid 1990s

	Unemployment rate
Algeria	23.8
Argentina	18.6
Barbados	21.9
Chile	6.3
Colombia	9.2
Egypt	8.3
Indonesia	10.0
Jamaica	15.4
Morocco	15.5
Nicaragua	20.2
Panama	14.3
Peru	8.8
Philippines	9.5
Saudi Arabia	15.5
South Africa	33.0
South Korea	6.4
Sri Lanka	13.6
Thailand	5.8
Uruguay	10.7
Venezuela	10.3

source: Todaro and Smith, Table 7.7

What's going on?

Types of jobs

To answer this question, it is useful to begin by distinguishing 3 types of jobs for workers:

- *urban formal sector jobs*: modern factories, modern services, and government
- *urban informal sector jobs*: cottage industry, small scale retail and services
- *rural jobs* (agriculture). One could distinguish plantation, family farm, and share-cropping be we won't.

Those who don't find work in any of these three sectors are either openly unemployed, or considered to be "disguised unemployed". The openly unemployed have no job and are actively seeking work—a luxury in LDCs, so these people tend to be more educated and from better-off families.

The disguised unemployed have either dropped out of the LF for lack of success finding work, or they are doing very marginal work:

- selling papers in traffic (or chicklettes, or cigarettes); alternatively,
- members of rural households, sharing in earnings of others and marginally helping out.

Migration toward high-paying jobs

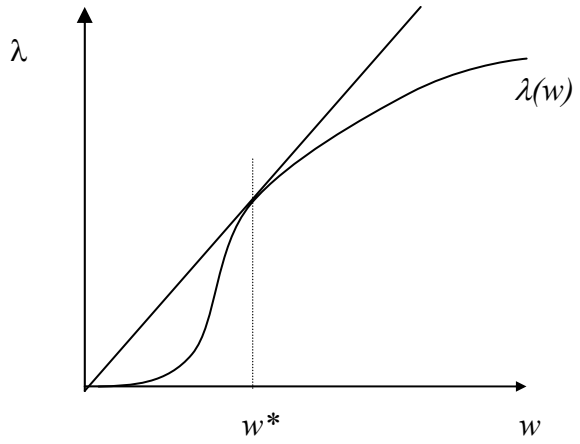
People typically migrate to the city because they are seeking jobs in the urban formal sector—its wages tend to be much higher. Often they are double rural or informal wages. Why? Part of the explanation may be extra compensation for the relatively unpleasant urban factory life, as in the Rosenstein-Rodan model we discussed. But there would be no persistent tendency to migrate if the wage premium were just sufficient to compensate for the different work and living environment. To explain this we must appeal to:

- minimum wages (only enforced at large, visible establishments)
- unions, or
- efficiency wage effects.

Efficiency wages: First, suppose that each worker's productivity, or flow of labor services, depends positively on how much you pay him or her. This dependence might be due to better health (they eat better, have better shelter, and get better medical treatment), or high wages may attract the most productive workers (as well as the others) so the average quality of applicant is better, or well-paid workers may be less likely to leave, and impose another round of search and training costs on management.

Second, suppose that it is infeasible to monitor the output of each individual worker. That is, we are not talking about piece-rate jobs.

Then it may be management's interest to set a high wage and only hire a fraction of the applicants. To see this, consider first the relation between wages (w) and the amount of labor services per worker (picture):



So long as there is excess labor around, you can get workers at any number of wage rates. But you won't necessarily want to pay the lowest wage at which workers can be attracted. Rather, you should set your wage to get the maximum amount of labor services per dollar spent. That is, choose w to maximize $\lambda(w)/w$. Then, for any desired total amount of labor services, you pay the least.