Development Economics 355
Lecture Notes 2

Week 2 notes (TS ch. 3, E. ch. 2,3)

Classic Theories of Economic Development

- Will cover some of the **history of thought** in modeling economic growth and development

1. Development as growth (linear, or "AK" models)

- after WWII interest in poor, mostly agrarian nations begins to materialize (post-colonial emerging economies) – but lack of economic theory
- however, there is the **Marhall plan** experience (huge infusion of investment to Europe) and own history (developed countries also started as agrarian and poor)
- so, not much data, **top-down theorizing and policy**
- W. Rostow: transition from underdevelopment to development is a *series of stages* through which all countries must proceed (traditional society, preconditions for take-off, take-off, drive to maturity, age of high mass consumption)

The Harrod-Domar (AK) growth model

- One of principal strategies for "take-off" was thought to be **mobilizing capital investment** (roads, dams, factories, etc.) to generate economic growth
- Basic idea: GDP is proportional to capital (the Y=AK part) and so **growth in GDP is proportional to** the change in capital (machines), i.e., **investment.**

Formally:

* Assumption 1: the capital-income ratio $K/Y = k$ is assumed **constant, for any level of K! (around 3 in data)** (often $1/k$ is denoted by A, as in Y = AK) – *no law of diminishing returns!*

* Assumption 2: the net saving ratio, s is a **fixed fraction of income**, Y (e.g. 6%) (another constant)

*from Assumption 1 we get $\Delta Y = (1/k)\,\Delta K = (1/k)\ \Delta K = (1/k)\ I$

*national saving and investment are equal, $S = I$

*So, using Assumption 1 and Assumption 2 together:

* $sY = S = I = \Delta K = k\,\Delta Y$.

* Therefore, ***$\Delta Y/Y = s/k$ –*** *GDP growth equals the ratio of the saving rate and the capital-output ratio.*

- That is, **in the HD model GDP growth is a direct f-n of the saving rate** – the more saving (investment) the higher the growth.

Problems and issues with the Harrod-Domar model

1. **labor sector not modeled** (assumed labor is abundant); This could be a problem as *labor and capital can be substituted* (if many abundant workers, why not use cheap labor as substitute for expensive capital?)

2. technological progress not modeled (A is constant but we could potentially allow it to grow)
3. the model implies that (in the short run when A or 1/k is fixed) **the only way we can increase growth is by increasing capital investment** (through increased *savings*, or in general, increased investment relative to GDP) This can come from abroad as aid, etc. $\Delta Y/Y = A\ \Delta K/Y = AI/Y$ remember!

Example: if $s = I/Y = 6\%$ and $k = 3$, then GDP growth = 2%. If we somehow increase I so that $s = 15\%$, then GDP growth will become 5%!

* This implies that **the major constraint to growth is lack of savings (investment)**. If a country cannot save a lot (e.g., because it is too poor) – it grows less and remains poor – a "financing gap". If say 7% growth needed to "take-off", need to fill the gap (like the Marshall plan did for Western Europe).

* the HD model and the so-called *financing gap* (the gap between the 6% and 15% investment rate above) it implies have been the idea behind much of **foreign aid policy** historically (to fill the gap in investment which poor countries supposedly can't do themselves). See Easterly, ch. 2 for review.

MORE PROBLEMS WITH THE HD MODEL (based on Easterly, ch. 2)
a. Conceptual: the model mechanically assumes that the country can successfully absorb all the new investment (typically supplied by the gov't or from outside as aid) and *transfer it proportionately to growth*. BUT TO DO THAT one needs efficient gov't bureaucracy, qualified labor to run the machines, managerial competence, no corruption and stealing. Are these factors present in developing countries? If they were, why don't rich investors clamor to invest and yield the high returns possible?

b. Evidence on the Harrod-Domar (and financing gap) approaches – discuss Easterly in tutorial in more detail
investment-to-GDP growth association (the key mechanism in HD)

*cross-country evidence: Easterly regresses growth in one 4-year period on investment in the previous 4-year period for 138 countries – finds **no correlation**!

*individual countries over time: two tests if model is right:
1. there should be positive relationship between GDP growth at time *t* and investment at time *t-1*.
2. the investment to GDP growth ratio (k) should be in a reasonable range (for example, 2 - 5 typically).

Result: only 4 countries (out of 138) pass these tests: Israel, Liberia, Reunion, Tunisia. *See **Zambia figure** in the book.

c. Investment as "necessary but not sufficient" condition for growth?
Easterly checks how many 4-year long high-growth episodes (7% of more) associated with the "necessary" high investment rates in the previous four year.

Answer: only 10% of these high-growth episodes have the necessary high investment rates predicted by the HD model

*of course investment is associated with growth in the long-run (if no investment K will depreciate) but can this association be used as a policy tool? The data suggests a negative answer.

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2. The Lewis model of structural change

- instead of looking at the whole economy as a single unit as in Harrod-Domar and try to apply business-cycle intuition to developing ctrs, Lewis tries to model their *economy structure of a developing country* in more detail.

Basic Idea:

- the underdeveloped country consists of **two sectors:**
- rural sector: traditional, subsistence sector with **zero marginal product of labor** (workers can be withdrawn/migrate to city and agricultural output won't fall)
- urban sector: high-productivity (MPL > 0). The urban wage is higher, thus an elastic flow of rural-to-urban migration assumed

THE DETAILS (figure 3.1)

- **subsistence sector prod. f-n** is $TP_A = f(L_A, K_A, t_A)$, where K_A, t_A – fixed capital/land and technology. Two assumptions:
  - 1. there is surplus labor: $MP_L^A = 0$ at the current rural labor force
  - 2. all rural workers share equally the produced output, i.e. $w_A = TP_A / L_A$ (cheating/weird labor market, to get positive w_A = APLA)
- **modern sector prod. f-n** is $TP_M = f(L_M, K_M, t_M)$; where K_M can grow; t_M fixed.
  - Labor markets in the modern sector are perfectly competitive: hire Lm so that w_M = MPLM.
  - Further assumed that if $w_M > w_A$ there is perfectly elastic supply of workers from the rural sector (the S_L line)

How is growth generated in the Lewis model? (look at figure 3.1)

- The difference between the wage bill ($L_M * W_M$) and the total area below the MPLM curve (D_1) is return to capital – that's where investment comes from. Lewis assumes this capital return is reinvested – K grows to K_{M2}, labor demand curve shifts to $D2(K_{M2})$ – but the wage w_M (**exogenous**) stays the same!

- As K_M grows, finally the surplus labor is exhausted, the labor supply curve SL becomes upward sloped and both sector wages can grow as labor becomes scarce and needs to be allocated to its best use.

SOME CRITICISMS:

- Lewis' model assumes that the labor transfer rate to the urban sector is proportional to the rate of capital accumulation. But what if profits reinvested in **labor-saving technologies**? (fig. 3.2 – L1 does not change, all extra output

accrues to capital owners). *(The TS book seems to imply this is bad (capitalists capture more profits) – a "Luddite fallacy" as Easterly calls it, but if you think about it, it means those workers are free to produce something else now, more goods. More on this in Easterly ch. 3)* But what if profits are expatriated abroad? (e.g. if FDI)

- Ad-hoc assumptions & facing the data:
  - the "surplus" labor in the rural areas, vs. "full employment" in urban (not much evidence in favor)
  - constant urban wages? At what level? In fact, a lot of wage growth observed in the data
  - Rural workers paid average product, urban workers paid MP, why? Inconsistent.
  - Not modeled why not *all* rural people try to move given $w_M > w_A$ or who moves first?
  - capital is again the primary driver of growth (not much mention of labor or other productivity).

Conclusions from the Lewis model:

- nice first attempt to build a specialized model of development and economic transformation.
- A "positive" approach – emphasizes patterns rather than theory.
- Hard for policy (just wait?) For example, we see outflow from agricultural sector – it seems we should focus on the urban sector? E.g., high education before basic literacy?
- Welfare implications? Does rural-urban migration have no cost; externalities?