# ECO102 Lecture Notes

Tianyu Du

January 24, 2018

## 1 Jan. 24 2018

### 1.1 Factors of production over time.

**Focus on Capital** Excluding changes in inventory from this definition of investment.

$$Capital_{t+1} = Capital_t - Depreciation_t + Investment_t$$

**Simplest Model**

$$GDP = Y = C + I \implies S = I = Y - C\textit{(gross saving)}$$

**Still Simple Model**

$$Y = C + I + G \implies I = Y - C - G$$

$$\text{Government Spending}\begin{cases}\text{Consumption}\\\text{Investment}\end{cases}$$

**Assets/work increase slowly in a mature economy**
Consider:

- Stock of capital Assets.
- Stock per capita and per worker.
- Flow. Investment goes into (i)<u>increase in per labor capital</u> and (ii)<u>depreciation</u> as well.
- Investment Increase.
- Capital Assets Increase.
- Capital Assets per worker.

**Motivating the importance of productivity**

$$GDP = A\ f(L, K, H)$$
$$\frac{GDP}{L} = A\ f(\frac{K}{L}, \frac{H}{L})$$

With A and T fixed and <u>constant</u> returns to scale in L and K, we have increasing GDP only if the growth rate of K is greater than the growth rate of L.

**Promoting productivity:**

- Increased access to education.
- Encourage saving and investment.
- Promote research and development.
- Public goods and infrastructure.

$$\text{Higher wage} \implies \text{more productivity}$$

*Sometimes, higher concentration leads to higher productivity.*

## 1.2 Increasing Returns: it's all about knowledge

### 1.2.1 Knowledge

**knowledge leaks** Cannot prevent knowledge from being known by others.t

**Complementarity** The private returns are increasing in the level of knowledge.

### 1.2.2 Implications of increasing returns

**Matching** Concentration of industry due to complementarity: e.g. HollyWood, Finance, Agricultural: Denmark

**Social v.s. private returns** Effects:

1. Private return $<$ social returns.
2. Private return increasing in knowledge base.

**Virtuous cycle**

**Vicious cycle** Starting with low knowledge base (Effect 1 > Effect 2)
$\Longrightarrow$ Little incentive to invest in knowledge.
$\Longrightarrow$ No new knowledge.
$\Longrightarrow$ No increasing in incentive in invest.

### 1.2.3 Implications for poor countries

**Problem** How do we transition from the vicious-cycle equilibrium to the virtuous-cycle equilibrium.

**Public policy solution** South Korea

- Promoted electronic industry.
-

### 1.2.4 Institutions

**Property of goods institutions.**

- Political stability.
- Role of law. (Transparent and non arbitiray laws)
- Effective public service.
- Enforced property rights.
- No corruption.