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Aggregate Incomes and Production function

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What is GDP measuring

- Well-beings of a society
- Can we compare GDP of different countries?
- India has 1.877 Trillion Dolloar GDP (2013).
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India V.S Iceland

Adjust population

- **Income per capita** (per person) or **GDP per capita :** GDP divided by the **total population** in the country.

- India GDP per capita: 1,498.87 USD (2013)
- Iceland GDP per capita: 47,461.19 USD(2013)

- Some tiny issue: Exchange rate! Since we are using different currency!
- Exchange rates convert currencies into the same units: 6.3 RMB/dolloar

Adjust population, Purchasing power

- Exchange rates convert currencies into the same units: 6.3 RMB/dolloar
- But It fail to account for the fact that the prices of many goods and services will differ across countries.
- **Purchasing power parity (PPP)** constructs the cost of a representative bundle of commodities in each country and adjusts GDP so that a dollar in each country can purchase this representative bundle. (acts like an exchange rate)
- Example from the book a basket of good would worth $1 in U.S, and it will also cost you 8.64 Peso in Mexico.

Adjust population, Purchasing power

- **Purchasing power parity (PPP) "Exchange rate"**
- GDP p.c of Mexico= 116036 peso
- GDP p.c of Mexico (PPP)= $ 116036/8.64=$ 13460

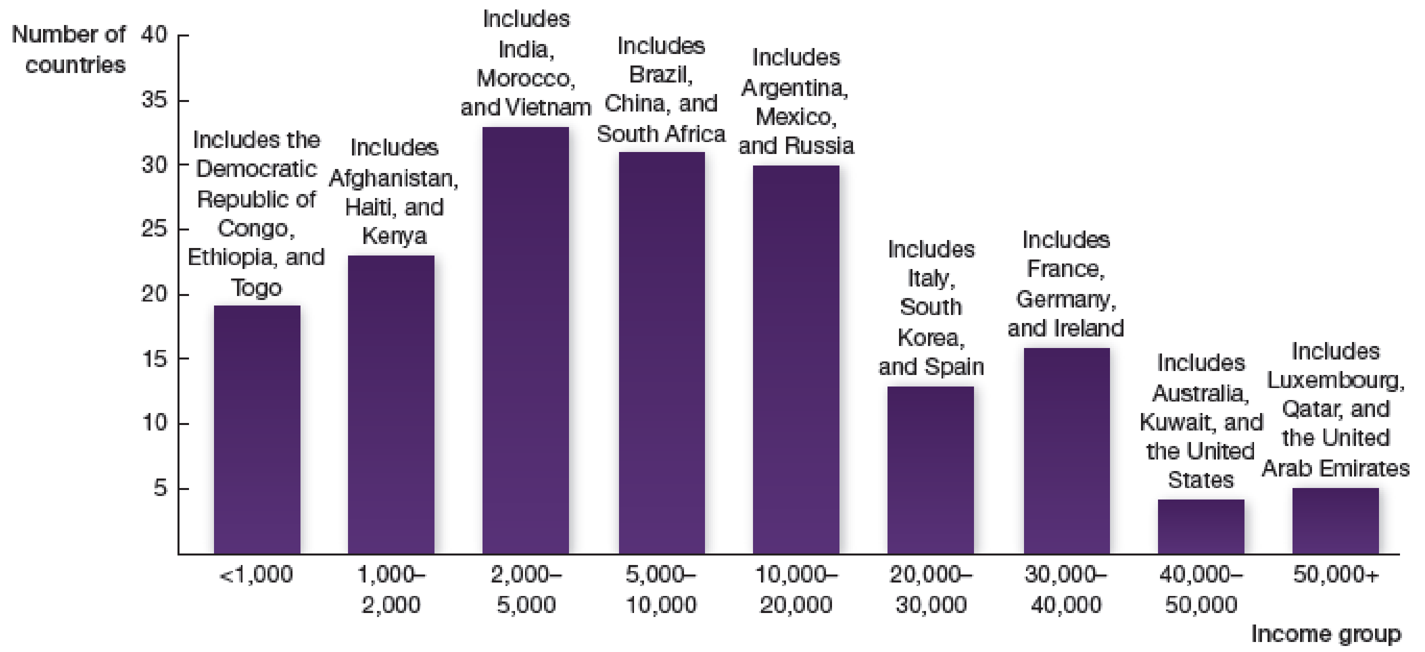

Exhibit 6.1 Income per Capita Around the World in 2010 (PPP-adjusted 2005 Constant Dollars)

Adjust number of workers, Purchasing power

- **Income (or GDP) per worker**, defined as GDP divided by "number of workers," meaning those in employment.

Inequalities!

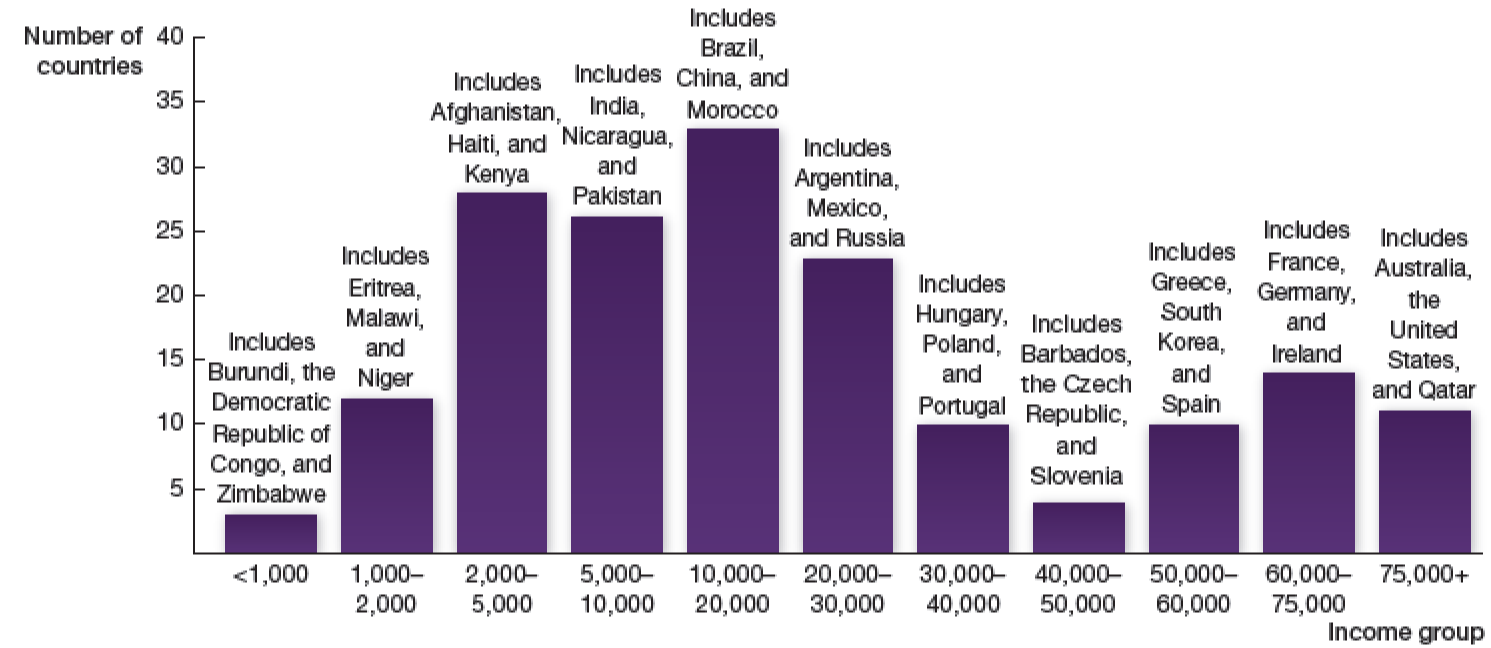

Exhibit 6.3 Income per Worker Across Countries in 2010 (PPP-adjusted 2005 Constant Dollars)

Why shall we care income p.c or p.w?

- Since it measures the well-being of this society
- **One dollar a day per person poverty line**.

- I will delete this page after this talk

- I feel very guilty that we cannot save them

Poverty

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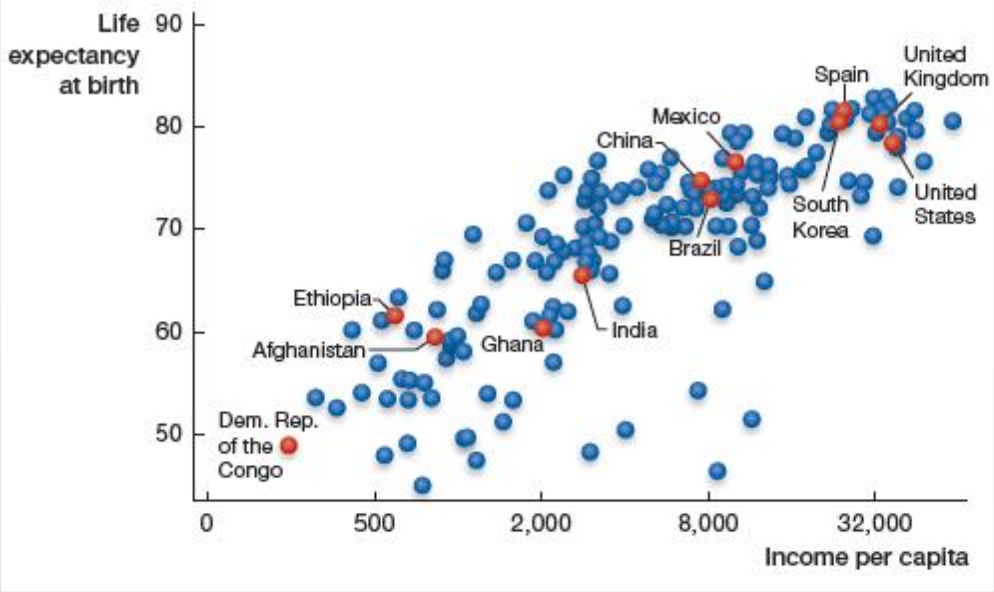
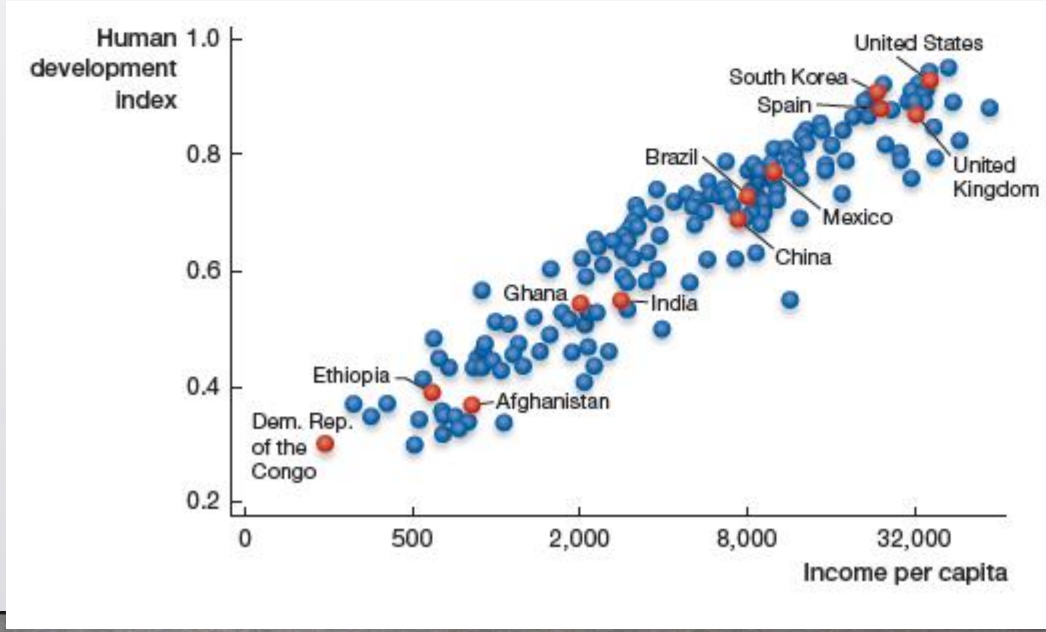




Why income p.c or p.w varies across countries

- **Productivity:** the value of goods and services that a worker generates for each hour of work.
- Varying income p.w= varying Productivity
- (1) Human capital: stock of skills to produce output or economic value;
- (2) Physical capital: Physical capital is any good, including machines (equipment) and buildings (structures), used for production.
- (3) Technology: An economy with better technology uses its labor and capital more efficientlyand thus achieves higher productivity.

Aggregate Production Function

- Generally, what is the input for our GDP?
- Labor, Capital, land and technology

- But Labor is not homogenous, so we need to adjust for its efficiency. **Total efficiency units of labor** is defined as the product of the total number of workers and the average human capital (efficiency) of (employed individuals) workers. (H=L X h)

Aggregate Production Function

$$Y = A \times F\left(K, h \times l\right)$$

- Y stands for GDP.--------Market Value
- K is the physical capital stock of the nation.-----Value
- $H = h \times l$ is the efficiency units of labor that the economy uses in production.--- NOT Value
- The function F signifies that there is a relationship between physical capital, labor,and GDP, But not All!. In particular, GDP is generated through a combination of physical capital and the efficiency units of labor.
- Anything left? A is an index of technology. A higher A implies that the economy produces more GDP with the same level of physical capital stock and total efficiency units of labor.

Aggregate Production Function, Properties

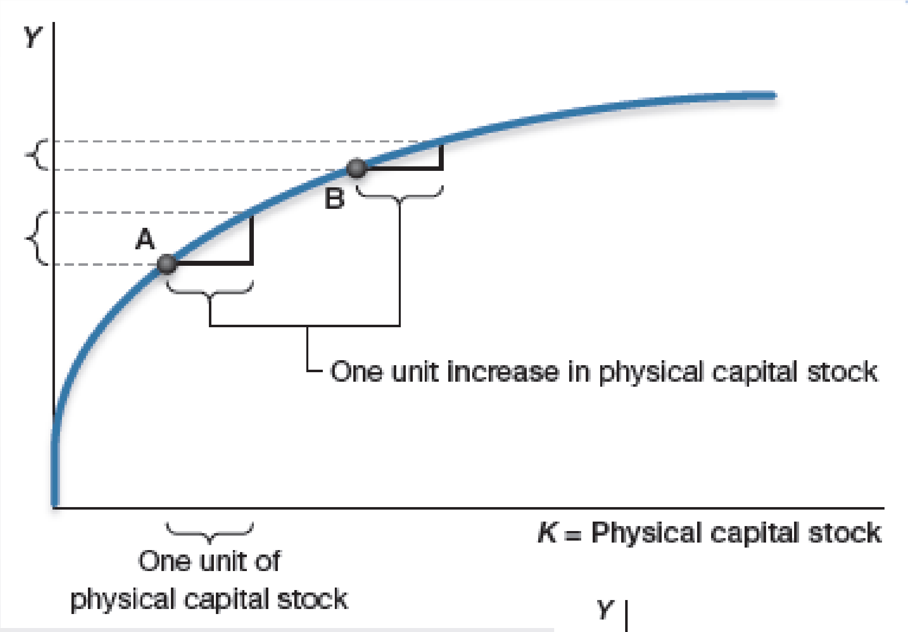
- GDP is *increasing* in both physical capital and labor—put differently, more is better. Holding labor constant, if we have a greater physical capital stock, we will be able to produce more GDP.
- Law of Diminishing Marginal Product: *the marginal contribution of a factor of production to GDP diminishes when we increase the quantity used of that factor of production (holding all other factors of production constant).*

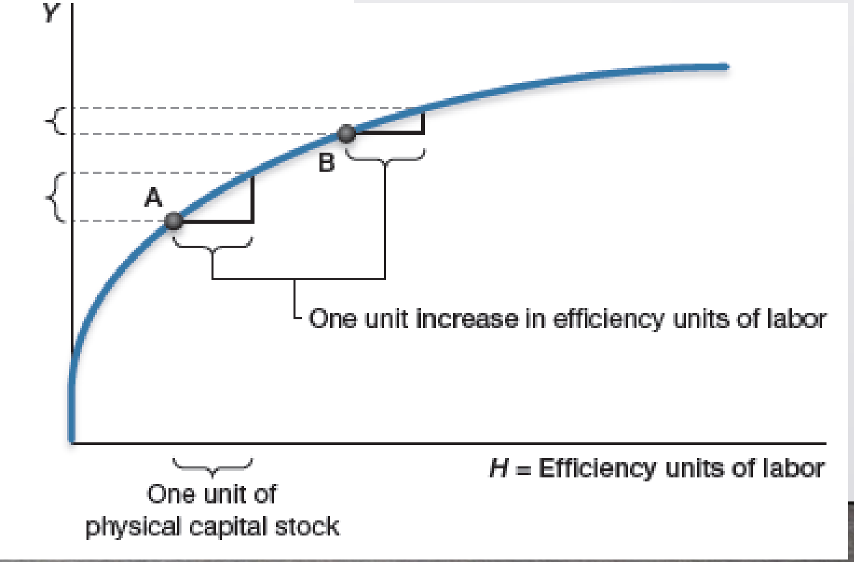
Aggregate Produ ties

- Recall what is marginal

- *Difference*

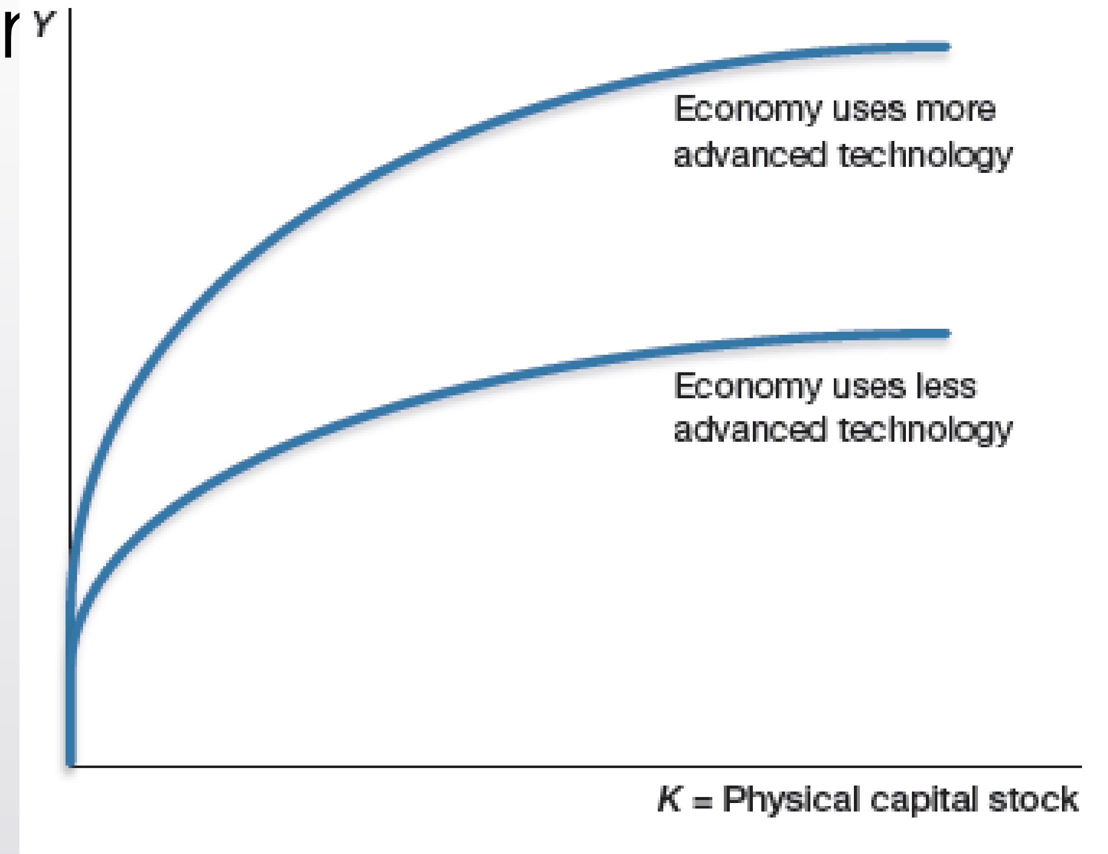
- *What if you increase your input <u>one unit</u>?*





Aggregate Production Fun

- *What if we have a higher level of A?*
- *Shift Up!!!!!*
- *A better technology means that the economy can generate more output from the same set of inputs.*



What is Technology? Can we change our technology?

- Generally, two dimension

- (1) Knowledge: enables us to perform certain tasks more efficiently. i,e I do not need to write a lot on blackboard; *Part of this technology is embeded in human capital, and physical capital!*

- (2) More and better quality goods; Nokia 1100 to Iphone?

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- (1) Knowledge: enables us to perform certain tasks more efficiently. i,e I do not need to write a lot on blackboard; *Part of this technology is embeded in human capital, and physical capital!*
- (2) More and better quality goods; Letters, telegram, phone, cell phone(more and more). Nokia 1100 to Iphone (Better)
- (3) Institution

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- Generally, yes!

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- ***Research and development (R&D)***

- ***BTW, why people would like to implement R&D? Property Right***

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