Kosmas Marinakis, Ph.D.

Economics & Society

Lecture 7

Macroeconomic Aggregates & Global Inequality

Macroeconomics

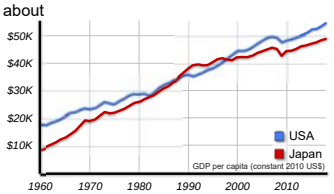
- We will now focus on the economy ***as a whole***
- ***Macroeconomics*** is the study of ***aggregate*** economic activity
- Macroeconomics is a relatively ***new field***:
  - Before 1915 aggregate economic activity was measured ***indirectly*** through proxy variables such as ***transportation tonnage***
  - Modern economies have ***sophisticated systems*** and ***accounts*** measuring the level of aggregate economic activity.
- In this lecture, we will explore the ***measurement*** of the aggregate economic production and we will examine ***why it differs*** among countries

Income differences

- Macroeconomics is interested in the ***enormous*** income differences ***across countries*** and ***across time***:
  - Income per capita in Singapore is more than ***6 times*** the level in Russia
  - Income per capita in Greece is today ***35% lower*** than 12 years ago.
- Interesting ***questions*** to answer:
  - What makes a nation's ***income*** to ***grow*** or ***shrink***?
  - How do we ***measure*** the cross-country differences?
  - What ***causes*** the ***differences*** in income ***levels*** and ***trends***?
  - Will they become ***less or more*** intense?

Not as easy as it seems: China vs. USA

- China has been ***catching up*** to the United States quickly
  growing ***4 times as fast*** as the U.S. for over ***30 years***
- Will China ***surpass*** the United States or will ***something else*** happen?
- ***For example***, Japan's income was about to overtake the US's in the 90's
- However, almost 30 years later, the US is ***still ahead***
- Economists have observed that ***growth rates*** tend to ***slow down*** as income per capita rises



Macroeconomic policy

- As we have already seen, at the market level, ***regulation*** and government ***intervention*** can ***affect the economic outcomes***
- At a macroeconomic level, ***policy*** can affect economic activity, too:
  - Growth policies can ***augment*** economic development in the L-R
  - Stabilization policies can ***stimulate*** economic activity, ***shorten recessions*** and ***alleviate unemployment*** in the S-R.
- On the other hand, ***corruption*** or ***sloppy policy*** can undermine economic prosperity
- One of the ***basic concerns*** of Macroeconomists is how ***bad policy*** can be ***avoided*** in the future

Economic crisis

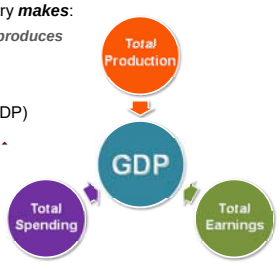
- The period from 2007 to 2009 signified the ***world financial crisis***
- The U.S. economy ***shrank*** by 4.3 percent and the ***unemployment*** rate rose from 5% to 10%
- Meanwhile, a ***chain of contagion*** started towards the rest of the world and especially Europe
  - stock market crashes, collapsing housing prices, mortgage defaults and bank failures
- Greece, Cyprus, Ireland, Portugal experienced the ***devastating consequences*** of the contagion as their weak economies ***could not withstand*** the pressure

GDP

- GDP stands for ***Gross Domestic Product***
- It measures the ***market value*** of the goods and services produced within the borders of a country during a year
- GDP is ***denoted*** by Y
- GDP has ***many aspects***, and thus, it is referred to with ***many terms***
  - *Y, GDP, total **production**, total **output**, total **income**, aggregate **expenditure***
- GDP is measured in ***monetary terms***
  - yet, GDP ***is not*** money
- There are ***3*** different approaches for ***measuring*** GDP

Three ways to measure the same thing

- If you want to measure how much a country ***makes***:
  1. Either count the value of what everyone ***produces***
  2. Or count how much everyone ***spends***
  3. Or count how much everyone ***earns***.
- All 3 aspects measure the ***same thing*** (GDP) and, in principle, yield the ***same estimate***



1. Measuring total production

- In every economy, total production can be ***grouped*** as:
  - ***Final goods***: sold by firms to consumers intended for ***direct consumption***
  - ***Intermediate goods***: sold by firms to other firms for ***production*** of other goods.
- GDP includes ***only*** the value of ***final goods***
  - because the value of intermediate goods is ***included*** in the price of the final goods
- We use the ***price*** of every final good to estimate its ***market value*** for the GDP
- For instance, if the economy produced a single good, GDP would simply be

$$Y = p \cdot Q$$

- If 3 goods were produced, GDP would be

$$Y = p_1 \cdot Q_1 + p_2 \cdot Q_2 + p_3 \cdot Q_3$$

2. Measuring aggregate expenditure

- An ***alternative way*** to measure the GDP is from the ***spending side***
- GDP is produced by firms and then ***sold to consumers***
  instead of appraising the production we can ***sum the revenue*** from sales
- In the economy of 3 goods, when those goods are finally sold, the ***expenditure by consumers*** will be:

$$p_1 \cdot Q_1 + p_2 \cdot Q_2 + p_3 \cdot Q_3 = Y$$

- The ***expenditure*** by consumers must ***equal the value*** of production by the firms
- Even when some goods are ***not sold within the year***, their value will be registered as ***inventory*** and be written as ***expenditure*** by the firm

3. Measuring total income

- A ***third alternative way*** to measure GDP is to count the ***income*** it brings to the households
- In the 3-good economy, ***total income*** will be the sum of:
  - Salaries for workers: w
  - Profits for firms: $p_1 \cdot Q_1 + p_2 \cdot Q_2 + p_3 \cdot Q_3 - w$
- Thus, the ***total value of income*** received by workers and owners of firms is

$$\cancel{w} + (p_1 \cdot Q_1 + p_2 \cdot Q_2 + p_3 \cdot Q_3 - \cancel{w}) = Y$$

  every dollar of spending will either ***go to some worker*** or be ***retained by some firm owner*** as profit
- Hence, total GDP can be ***equivalently measured*** by adding the incomes of workers and capitalists in the economy

Circular flows

- We can ***represent the connections*** between households and firms with a circular flow diagram
- There are ~~**4 economic flows**~~ between firms and households:

- The circular flow is a ***simplification*** of the economy since it ***leaves out*** the government, banks and the foreign sector
  still, it provides a ***useful way of understanding*** the basic structure of the economy

National Income Accounts: Production

- The production-based national income accounts sum up each domestic firm's ***value added*** to the production:

	Value added
Firm A researches car ***technology*** and licenses it for $4,000 per vehicle	$4,000
Firm B produces the car ***components*** and sells them for $16,000 per car	$12,000
Firm C ***assembles*** the components to a car and sells it for $19,000 per car	$3,000
Firm D ***advertises*** and ***sells*** the car for $23,000.	$4,000
	$23,000

- The ***total value*** of production by A, B, C and D is $23,000
  the $4K, $16K and $19K are ***included*** in the $23K value of the final good
- In the ***calculation*** of GDP from the side of production we can:
  - ***Either*** include ONLY the value of the final good (the 23K)
  - ***Or*** sum ONLY the value added by each firm: 4K + 12K + 3K + 4K = 23K

National Income Accounts: Expenditure

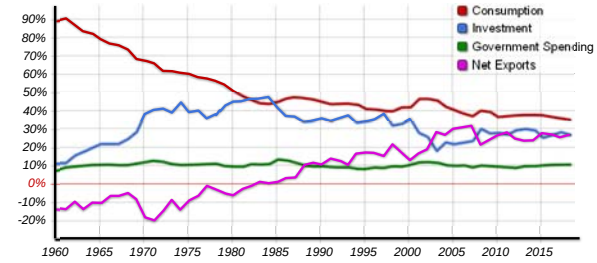
- Expenditure-based NIAs measure the ***purchases*** of goods and services produced in the economy in ***five categories***:
  1. ***Consumption (C):*** the value of goods and services bought by domestic households excluding spending on residential construction
  2. ***Investment (I):*** the value of new physical capital bought by domestic firms plus inventories and residential construction
  3. ***Government spending (G):*** the value of government purchases of goods and services excluding transfer payments and interest on government debt
  4. ***Exports (X):*** the value of domestic production sold abroad
  5. ***Imports (M):*** domestic expenditure for goods produced abroad

The National Income Accounting identity

- The ***aggregate expenditure*** on goods and services produced domestically is
$$AE = C + I + G + (X - M)$$
- The term $(X - M)$ represents the ***net exports***
  we ***subtract*** M because its value will be ***included*** in one of C, I, or G
- AE is a ***decomposition*** of GDP based on ***who consumes*** it
- As we already showed the value of Y ***equals*** the aggregate expenditure, thus
$$Y = C + I + G + (X - M)$$
- Indicatively, the ***decomposition*** of expenditure ***in the US***:

Consumption: 68.5%	Investment: 5.9%
Gov. spending: 18.6%	Net exports: -2.9%

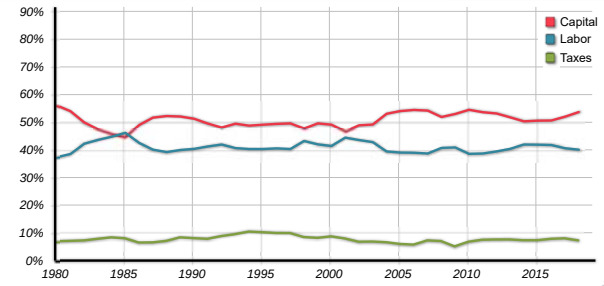
GDP % expenditure in Singapore



National Income Accounts: Income

- We can also view GDP as an ***income concept***
- Earnings can be decomposed into ***two key categories***:
1. ***Labor income*****:** income from labor services
   wages, salaries, bonuses, health coverage, pension benefits and various perks
2. ***Capital rents***: income or benefits earned by owning physical or financial capital
   dividends, interest payments, earnings retained by corporations, rent payments, even the benefit of living in your own house
- Also, remember that ***firms are owned by households***
  firms can't own themselves, thus all income earnings -one way or another- ***end up to individuals***

GDP % Income components in Singapore



GDP vs. GNP

- Gross Domestic Product refers to production by the country's ***residents*** ***within*** the country's ***borders***
- Gross National Product refers to production by the country's ***citizens*** ***within or outside*** the country's ***borders***
- Therefore,

$$\text{GNP} = \text{GDP} + \begin{matrix}\text{production of}\\ \text{domestic}\\ \text{factors abroad}\end{matrix} - \begin{matrix}\text{production of}\\ \text{foreign factors}\\ \text{domestically}\end{matrix}$$

Exclusions from GDP

Not included in GDP – capital depreciation

- ***Physical capital depreciation*** is the reduction of the value of physical capital due to ***obsolescence*** or ***wear and tear***
- Most productive processes cause ***capital to lose value***:
  - ***Machinery*** wears down
  - ***Electronic equipment*** gradually becomes obsolete
  - ***Resources*** deplete.
- A meaningful calculation of production ***should subtract depreciation*** from the value of total production

  governments measure depreciation in national accounts, though ***they do not subtract*** it when calculating GDP

GDP flaws

Measuring depreciation

- In most economies depreciation is equal to ***around*** 10–15% of GDP
- However, depreciation estimates are far from ***consistent*** or ***precise*** or ***well-defined***
- For example, depreciation estimates do not cover:
  - Natural ***resources*** depletion
  - Worsening of ***environmental*** conditions
  - Changes in population's ***health***
  - ***Brain*** drain

GDP flaws

Home production

- GDP ***does not include*** home production
- Making a ***cake at home*** is not included in GDP – buying the same ***cake at the store*** is included
- Excluding home production from GDP is surely ***a flaw***

  but we do ***not yet have a way*** to measure home production
- The ***problem of measurement*** is mostly practical:
  - There is no documented market ***transaction***
  - There is no formal process of ***price*** or ***quantity appreciation***
- An estimated ***15% value*** on top of GDP takes place at home

  food preparation, household maintenance, childcare, housework etc.

GDP flaws

The underground economy

- The ***underground economy*** refers to transactions that are intentionally ***hidden*** from the authorities for ***two reasons***:
  1. Legal transactions that happen under the table for ***tax evasion*** reasons, ***immigration*** status or ***personal*** reasons

     the handyman who asks to be paid in cash etc.
  2. Illegal transactions that cannot take place officially

     drug dealing, prostitution, bribes etc.
- In ***developed countries*** underground economy is around 10% - in ***developing countries*** it may exceed 50%
- Ireland, Italy, Greece, the UK and other countries have recently ***started counting illicit activities*** in GDP

GDP flaws

Negative externalities

- Externalities –negative or positive– are usually ***omitted from GDP***
- GDP counts the value of the product but ***fails to subtract*** byproducts, residuals, pollution, noise, health problems
- Often negative externalities count as ***positive contributors*** to GDP
- For example, industrial production creates ***water pollution*** in the area, which necessitates the use of ***water filters*** by residents:
  - The value of the water filters should count as ***damage*** from the negative externality
  - Yet, it is ***added*** to the GDP (like every other good) making it to ***appear larger***

GDP flaws

Leisure

- Leisure is a definitive component of ***happiness*** and ***well-being*** but is ***not included in GDP***
- In time-use surveys, people ***report*** that they are ***happiest*** when they have free time to ***socialize***
- Residents of ***different countries*** work at different levels of ***intensity***
- The ***cost*** and the ***quality*** of leisure ***differs*** from country to country
- GDP tells us how many ***material goods*** are being produced by an economy

  but it does not tell how those goods ***contribute to the happiness*** of the citizens

External video

In this video by THE HILL, Krystal Ball and Saagar Enjeti discuss their view of how "the metrics prosper – but the people suffer". What is happiness and how can it be measured? A masterpiece of journalism for you to watch and see how it compares to your opinion.

Inequality

Inequality

- We live in a world of ***significant disparities***
  standards of living, educational opportunities, health services, and infrastructure ***differ tremendously*** across countries
- On average your ***citizenship*** plays a key role to the resources available to you
- Macroeconomics provides a ***useful conceptual framework*** for studying ***why such disparities exist***
- Here we will attempt to explain how we can ***measure differences*** in ***standards of living*** across countries

GDP per capita

Inequality

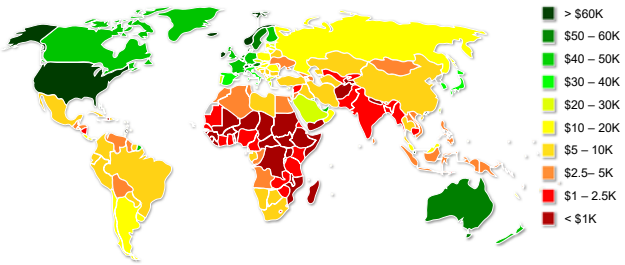
- China has a GDP of ***$13.6T*** – Switzerland has a GDP of only ***$0.7T***
  yet, the average Chinese is ***way poorer*** than the average Swiss national
- When making cross-country comparisons, it makes sense to ***compare income per individual***
- Dividing GDP by the country's population yields the ***GDP per capita***
- Still, GDP pc values ***across countries*** are ***not directly comparable***
  we have to ***convert*** GDP pc to the ***same currency***
- The ***current exchange rate*** serves currency trading purposes but does ***not translate well*** the value of production across countries
- Economists use the ***PPP conversion*** to normalize international values

Internal video

This video explains how we can use the CPI to make GDP comparable from year to year and the PPP to make the GDP comparable across countries.

Nominal GDP pc map 2018

Inequality



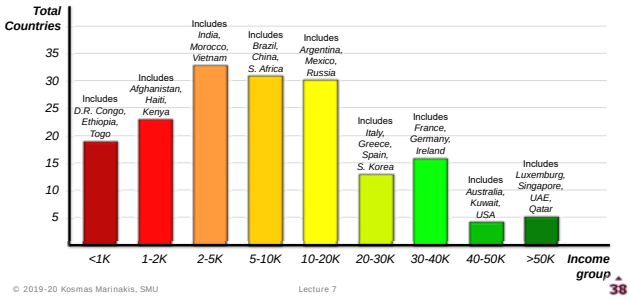
Inequality

GDP pc 2018 for selected countries

1	Luxembourg	$114,234	24	Japan	$39,306
2	Switzerland	$82,950	25	Italy	$34,260
3	Norway	$81,695	28	S. Korea	$31,346
4	Ireland ??	$76,099	30	Kuwait	$30,839
6	Qatar	$70,780	39	Greece	$20,408
7	Singapore	$64,041	60	Russia	$11,327
8	USA	$62,606	63	Malaysia	$10,942
10	Australia	$56,352	67	China	$9,608
16	Germany	$48,264	68	Turkey	$9,346
18	Canada	$46,261	81	Thailand	$7,187
19	France	$42,878	96	Iran	$5,491
20	UK	$42,558	141	India	$2,036
21	Israel	$41,644	186	S. Sudan	303

Inequality

2018 GDP pc distribution in 2005 PPP dollars



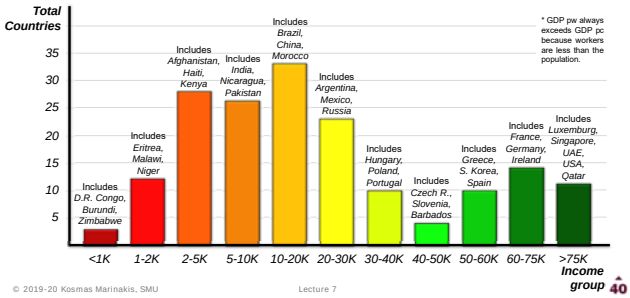
Inequality

GDP per worker

- Total population includes ***children***, the ***elderly***, and the ***unemployed***
  - these groups are the ***non-work-force*** population
- Also, in some countries ***safety nets*** or ***social reasons*** allow people to **drop out** of the labor force for extended amounts of time
  - maternity, illness, re-training, homemaking social norms etc.
- Are cross-country GDP variations ***due to differences*** in the non-labor-force populations?
- To ***test*** for this possibility we can compare cross-country ***GDP per worker***, instead of GDP per capita
  - GDP pw is a better measure for the ***productivity of labor***

Inequality

2018 GDP pw distribution in 2005 PPP dollars



Productivity

Productivity

- The ***main reason*** why income per capita varies across countries is ***labor productivity***
- ***Productivity*** is the value of goods and services a worker produces per hour of work
- GDP per worker and productivity are very ***closely related***
- To understand the huge ***differences in productivity*** across countries we must look at the ***production side***
  - we need to study the ***factors*** that ***make labor much more productive*** in some countries than in others

1. Human capital

- Workers differ in terms of ***human capital***, which is their ***stock of skills*** to produce output or economic value
  - for ***example*** an economist from SMU will be a ***more productive banker*** than someone with just a high school degree
- A ***highly trained*** worker can:
  - Either produce ***higher quantity*** of output
  - Or produce ***better quality*** of output, which lower skilled workers ***cannot*** produce.
- The human capital stock of an economy is the result of ***investment in education***

2. Physical capital

- ***Physical capital*** is any good used for production
  - machines, equipment, software, buildings and miscellaneous infrastructure
- Aggregate production ***will depend*** on the physical capital and infrastructure
- In macro, we mostly ***see*** physical capital as ***the means to enable*** the human capital to be more productive
- Skilled or unskilled ***workers will be more productive*** when the economy has a larger or better physical capital stock
  - enabling each worker to work with ***more*** or ***superior equipment*** and structures

3. Technology

- An economy with better **technology** uses its labor and capital ***more efficiently*** and thus achieves higher productivity
- An economy can have ***better technology***:
  - Either because of ***superior knowledge*** about the production process
  - Or because of ***superior organization*** of the production process

Thank you!

kmarinakis@smu.edu.sg
www.kmarinakis.org
t.me/kosmas_teaching
Kosmas Marinakis
Kosmas Marinakis
@Kos_Marinakis
kosmas_marinakis