Measuring a Nation's Income

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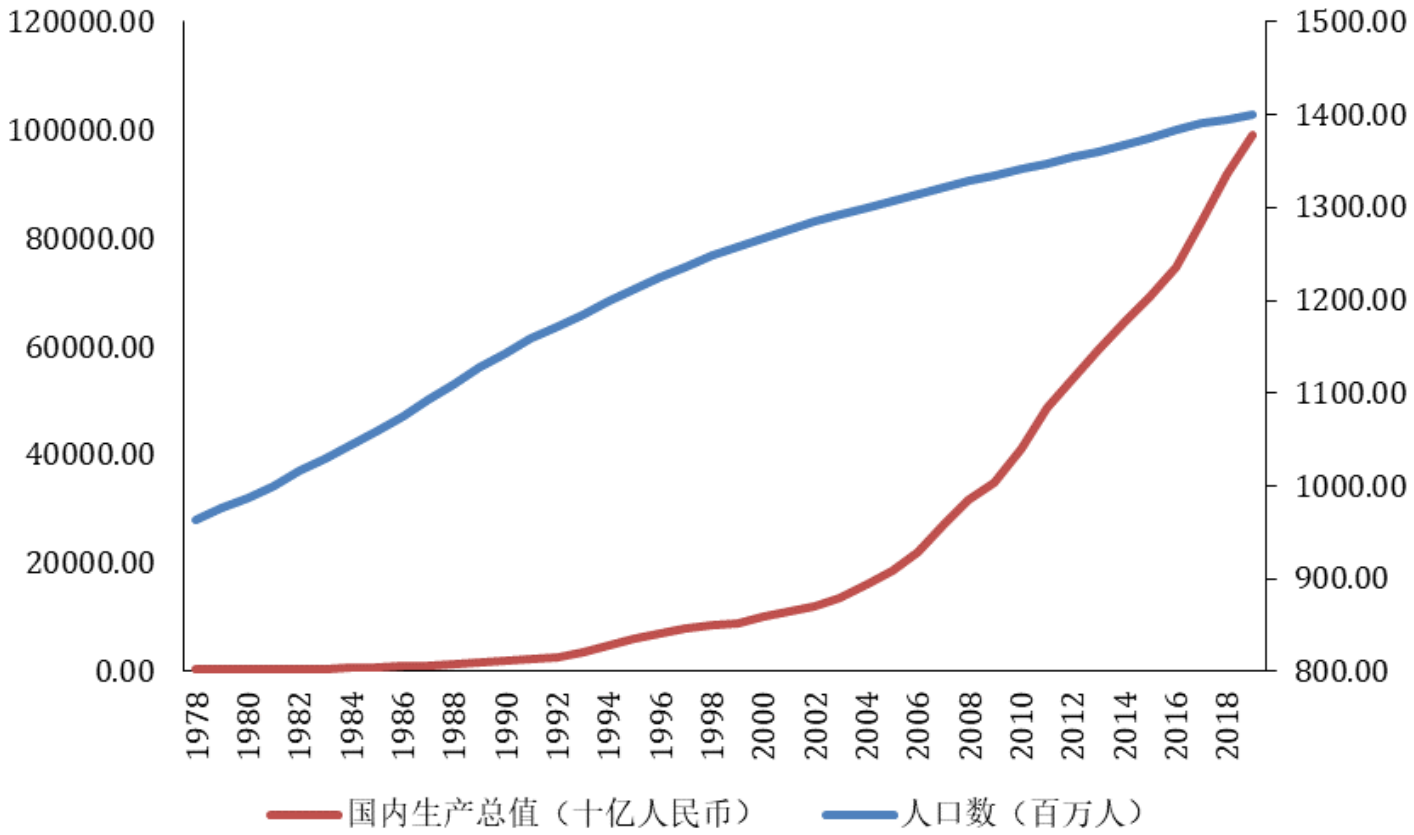
Economics

- Microeconomics
  - Study of how households and firms
    - Make decisions
    - Interact in a specific market
- Macroeconomics
  - Study of economy-wide phenomena
    - Including inflation, unemployment, and economic growth

What do we do in the following lectures?

- We first look at macroeconomic statistics.
  - It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to suit facts.

    —Sherlock Holmes
  - Gross Domestic Product (GDP) is the most important one.
- Principle 8: A country's standard of living depends on its ability to produce goods and services
  - GDP allows us to measure this ability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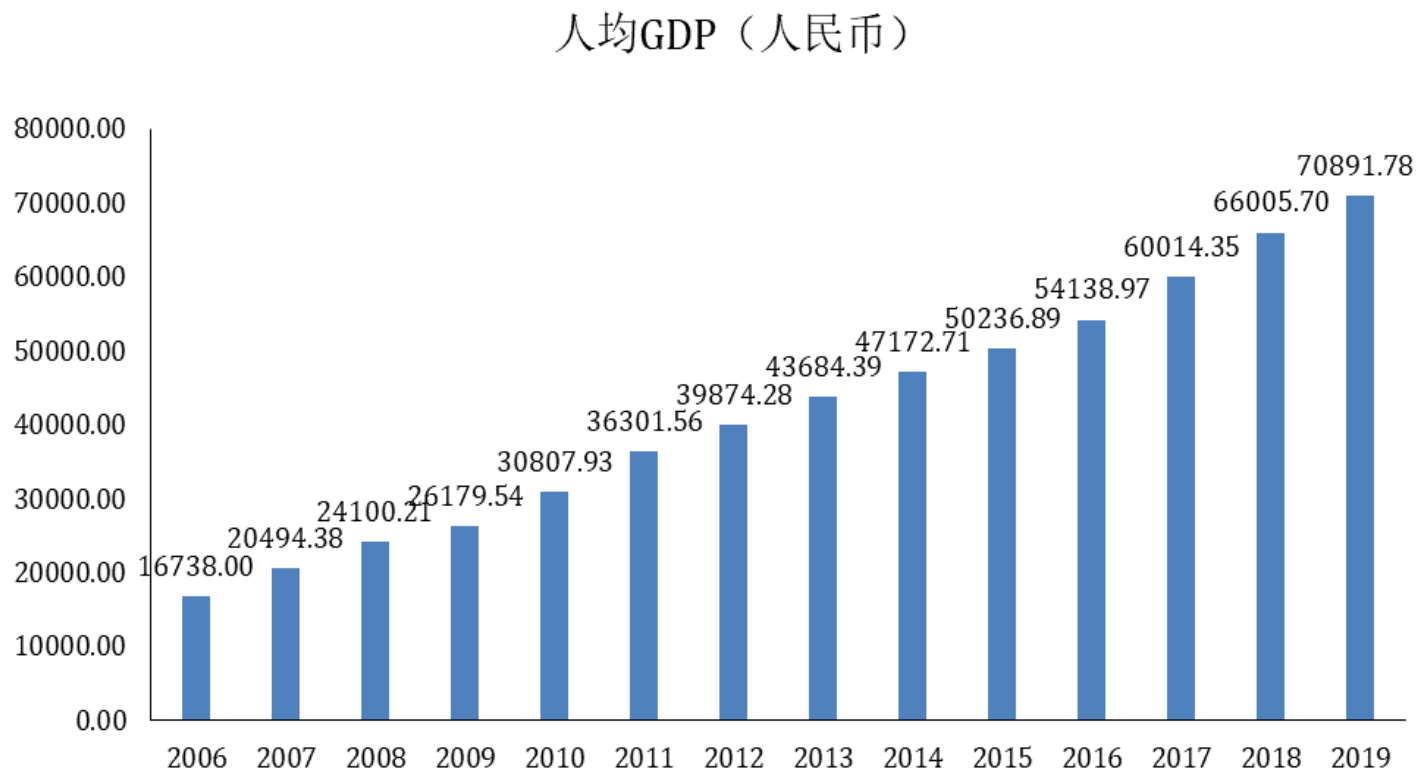
国内生产总值（十亿人民币）
人口数（百万人）

•source: CEIC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20494.38
24100.21
26179.54
30807.93
36301.56
39874.28
43684.39
47172.71
50236.89
54138.97
60014.35
66005.70
70891.78
2006
2007
2008
2009
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2011
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2018
2019

•source: CEIC

Main question

- Why do we need ''GDP''?
- What is the idea of ''GDP''?
- What is the message behind ''GDP''?
- Some other relevant concepts?

What is GDP?

- Gross Domestic Product (GDP) is
  - The market value of
  - all final goods and services
  - produced
  - within a country
  - in a given period of time

The measurement of GDP

- "Market value"
  - Represent the value of goods and services to some extent
  - In competitive market, market price = willingness to pay
- "Final"
  - Final goods: for consumption or investment
  - Intermediate goods: for producing other goods
    - Egg bought by a household: final goods
    - Egg bought by a restaurant: intermediate goods
  - Value of intermediate goods is already included in P_{final}
  - One exception: intermediate goods as inventory

The Measurement of GDP

- "… of all…"
  - All items produced in the economy
    - And sold legally in markets
    - include market **production** and some nonmarket **production (tenant occupied housing and owner occupied housing)**
  - Excludes
    - Produced and sold illicitly
    - Produced and consumed at home
    - **nonproduction** transaction, such as government/private transfer payment, financial market transaction(stock and bond sales), second handed sales

The measurement of GDP

- "Produced"
  - **GDP is a measure of production**, not sale
    - Count: Xiaomi sells a new cellphone to Jeremy
    - Not count: Xiaomi sells a cellphone from inventory to Jeremy
- "Within a country"
  - The production activity happens within the territory of a country, which means …
  - Goods or service are produced by **domestically located factors**
    - Count: CBA pays LeBron James salary for a game in China
    - Not count: Disney pays Jackie Chen salary for a movie in Hollywood

The measurement of GDP

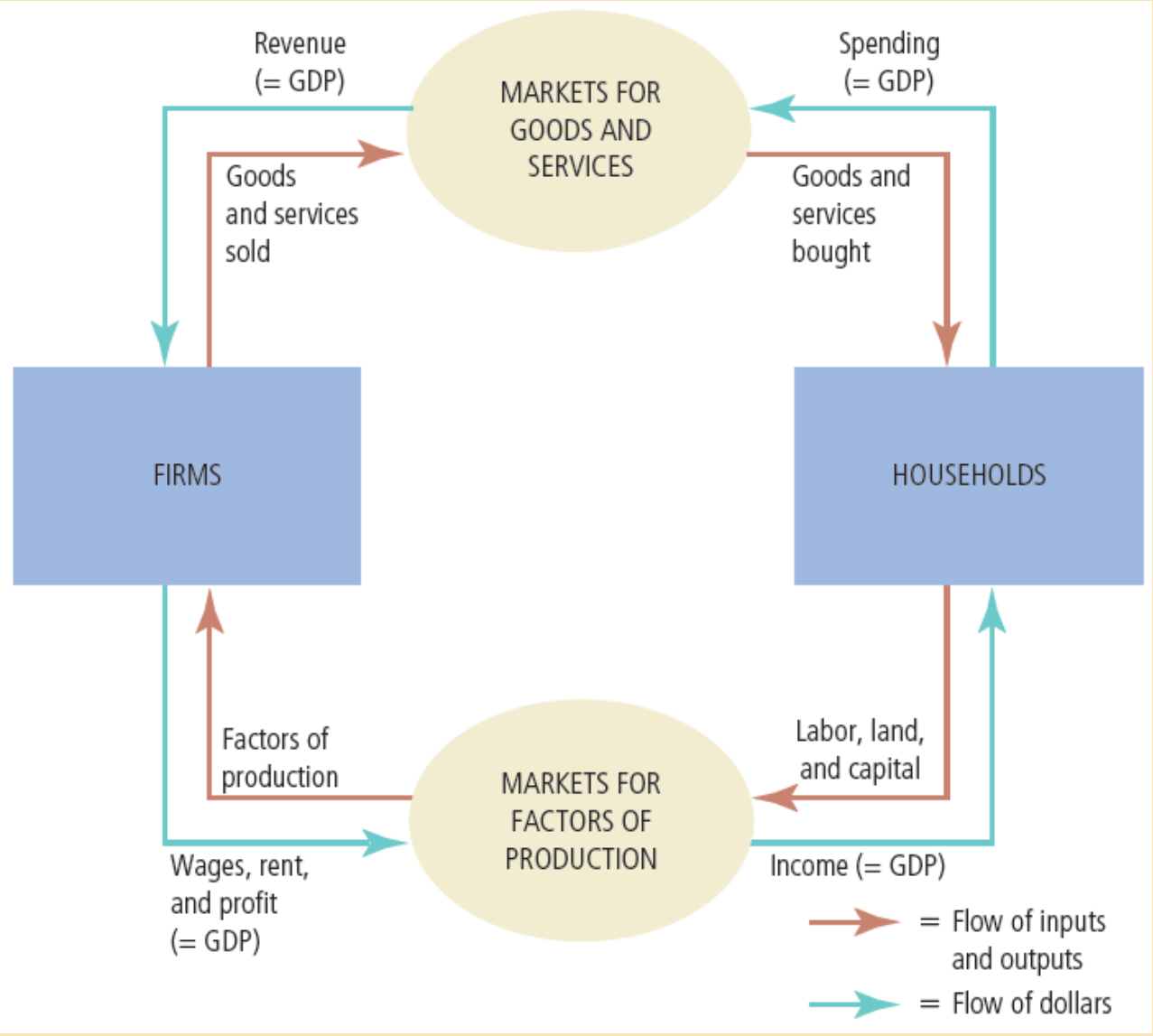
- “In a given period of time”
  - GDP measures the value of production that occurs within a specific time interval
  - Usually a year or a quarter
    - Count: car produed in Sep 2022 when compute annual GDP of 2022
    - Not count: car produced in Sep 2022 when compute GDP of the forth quarter
    - Not count: car produced in Sep 2021 but sold in Sep 2022 when compute annual GDP of 2022
- Reading assignment: 23-2 of Mankiw’s textbook

Economy's Income & Expenditure

- GDP measures two things at once
  - **Total expenditure** on domestically produced final goods and services
  - **Total income** earned by domestically located factors of production.
- For an economy as a whole
  - Income must equal expenditure
  - For every transaction, there must be a buyer and a seller
  - Every CNY/dollar a buyer spends becomes income of the seller

The Circular-Flow Diagram

GDP measures the flow of money



Households buy goods and services from firms.

Firms use their revenue to pay households.

The Components of GDP

- $Y = C + I + G + NX$
  - **This is an identity**
  - Y = GDP
  - C = consumption
  - I = investment
  - G = government purchases
  - NX = net exports

The Components of GDP

- Consumption, C
  - Spending by households on goods and services
  - Exception: purchases of new housing
- Investment, I
  - Spending on capital equipment, inventories, and structures
  - Household purchases of new housing
  - Inventory accumulation

The Components of GDP

- Government purchases, G
  - *Government consumption expenditure and gross investment*
  - Spending on goods and services
  - By local, state, and central/federal governments
  - Does **NOT** include transfer payments(an unemployment benefit)
  - example: salaries of government workers, expenditure on public works.

The Components of GDP

- Net exports, NX = Exports - Imports
  - Exports
    - Spending on domestically produced goods by foreigners (Boeing's sale of an airplane to British airways, count in US GDP)
    - Still goods produced in domestic country
  - Imports
    - Spending on foreign goods by domestic residents/firms
    - Goods produced abroad

Housing in GDP

- The purchase of new housing is included in the investment component
- Housing service is also counted in consumption
- Tenant-occupied housing: the value of the housing service = rent
- For owner-occupied housing, the value of the housing service is imputed based on market rent, i.e. the rent charged for similar tenant-occupied housing.
- The whole real estate industry is connected to many other industries(construction, steel, furniture..)

Increase GDP?

- increase consumption?
- increase investment?
- increase government spending?
- increase export?

More examples

- Debbie spends $300 to buy her husband dinner at the finest restaurant of Xiamen
- You spend 12000 RMB on a new laptop to use in your publishing business. The laptop was built in USA
- Jane spends $800 on a computer to use in her editing business. She got last year's model on sale for a great price from a local manufacturer

More examples

- General Motors builds $500 million worth of cars, but consumers only buy $470 million of them
- Volkswagen produces a new car of $10000 in the third quarter of 2016 and sells it in the fourth quarter of 2016.

Real versus Nominal GDP

- Total spending rises from one year to the next
  - Reasons maybe either …
  - Economy - producing a larger output of goods and services (larger amount?)
  - or goods and services are being sold at higher prices (increase in price level?)
- Nominal GDP
  - Production of goods and services
  - Valued at current prices

Real versus Nominal GDP

- Real GDP
  - Production of goods and services valued at **constant prices**
  - Select one year as base year and use the base year's price
  - Evaluate goods and services in different years
- For the base year
  - Nominal GDP = Real GDP
- Choice of base year
  - Not particularly important
  - NBS of China chooses year with 0 or 5.
  - BLS of the US choose year after a recession (1982, 2009, 2012 …)

Real versus Nominal GDP

- The GDP deflator
  - Ratio of nominal GDP to real GDP times 100
  - Is 100 for the base year (if, but not only if)
  - Measures the current level of prices relative to the level of prices in the base year
  - Can be used to take inflation out of nominal GDP ("deflate" nominal GDP)

Real versus Nominal GDP

- Inflation
  - Economy's overall price level is rising
- Inflation rate
  - Percentage change in some measure of the price level from one period to the next

$$\text{Inflation in year 2} = \frac{\text{GDP deflator in year 2-GDP deflator in year 1}}{\text{GDP deflator in year 1}} \times 100$$

Table 2

Real and Nominal GDP

Prices and Quantities

Year	Price of Hot dogs	Quantity of Hot dogs	Price of Hamburgers	Quantity of Hamburgers
2010	$1	100	$2	50
2011	$2	150	$3	100
2012	$3	200	$4	150

Calculating Nominal GDP

2010	($1 per hot dog × 100 hot dogs) + ($2 per hamburger × 50 hamburgers) = $200
2011	($2 per hot dog × 150 hot dogs) + ($3 per hamburger × 100 hamburgers) = $600
2012	($3 per hot dog × 200 hot dogs) + ($4 per hamburger × 150 hamburgers) = $1,200

Calculating Real GDP (base year 2010)

2010	($1 per hot dog × 100 hot dogs) + ($2 per hamburger × 50 hamburgers) = $200
2011	($1 per hot dog × 150 hot dogs) + ($2 per hamburger × 100 hamburgers) = $350
2012	($1 per hot dog × 200 hot dogs) + ($2 per hamburger × 150 hamburgers) = $500

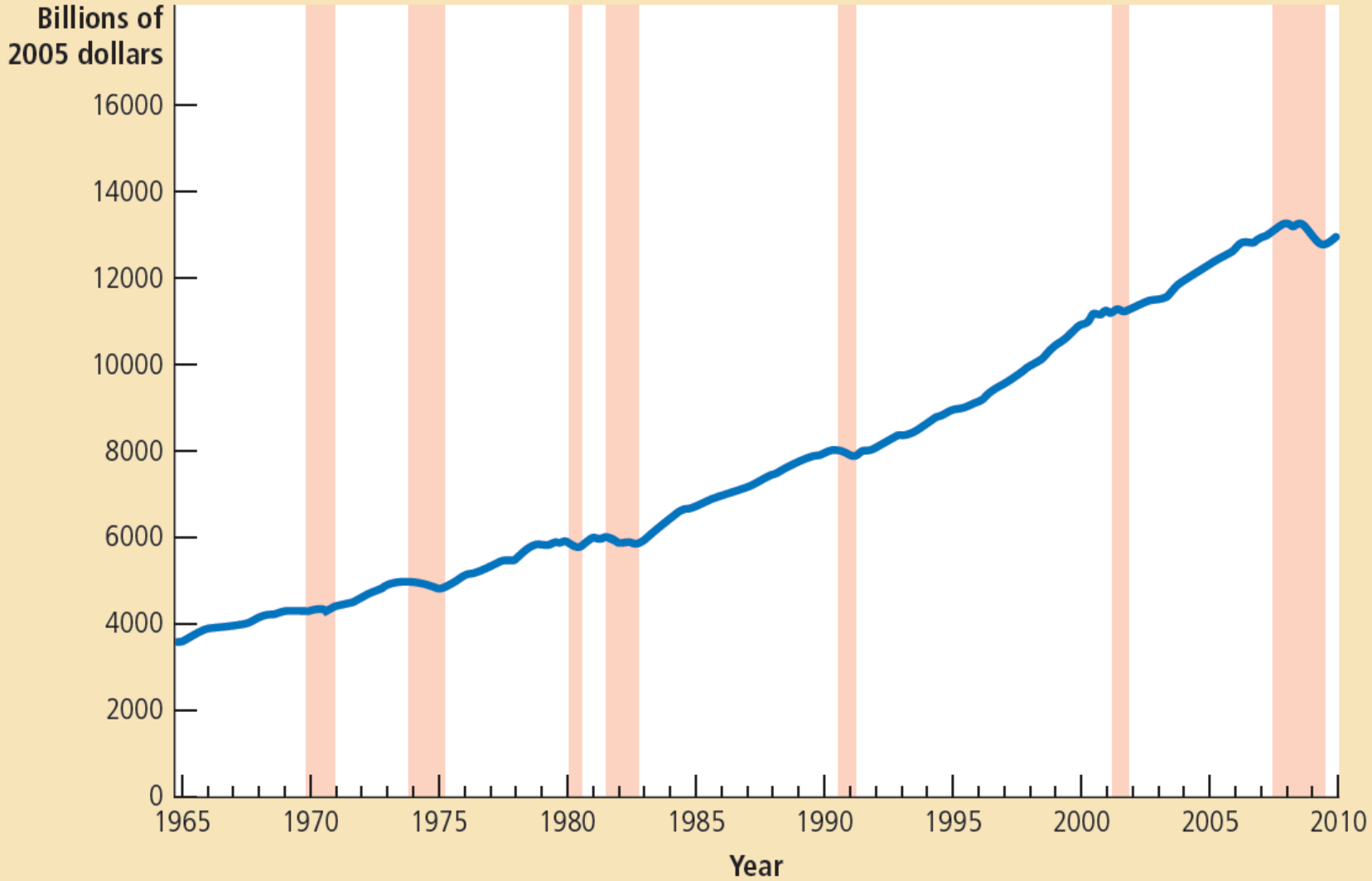
Calculating the GDP Deflator

2010	($200 / $200) × 100 = 100
2011	($600 / $350) × 100 = 171
2012	($1,200 / $500) × 100 = 240

This table shows how to calculate real GDP, nominal GDP, and the GDP deflator for a hypothetical economy that produces only hot dogs and hamburgers.

Figure 2

Real GDP in the United States



This figure shows quarterly data on real GDP for the U.S. economy since 1965. Recessions—periods of falling real GDP—are marked with the shaded vertical bars.

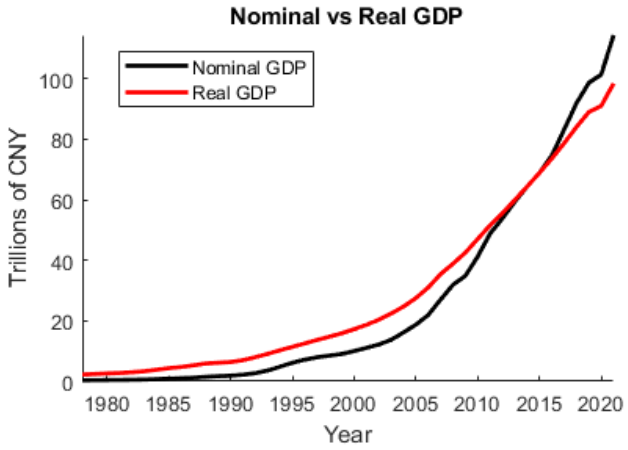
Real GDP over recent history (USA)

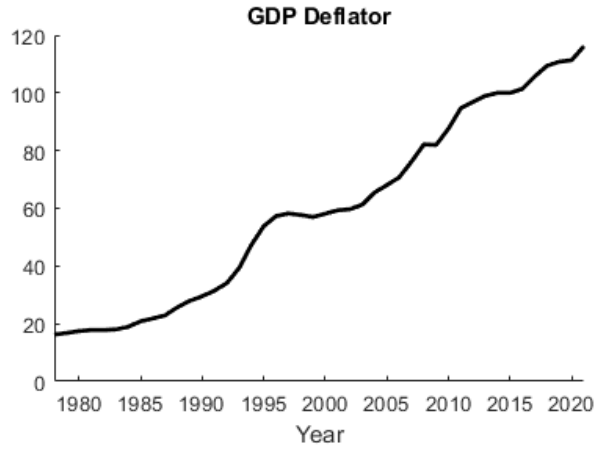
- The GDP data
  - Real GDP grows over time
  - Growth – average 3% per year since 1965
  - Growth is not steady
    - GDP growth interrupted by recessions

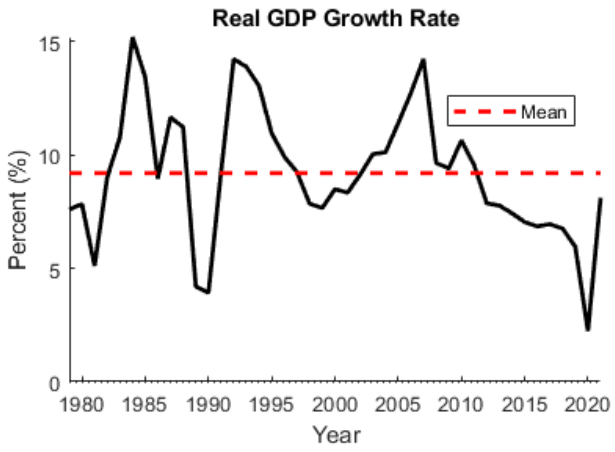
Real GDP over recent history

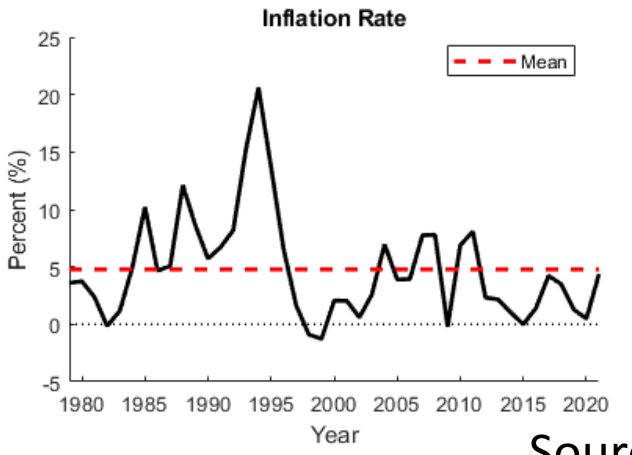
- Recession
  - Two consecutive quarters of falling GDP
  - Real GDP declines
  - Lower income
  - Rising unemployment
  - Falling profits
  - Increased bankruptcies

Case Study: China's GDP









Source: CEIC

GDP

- GDP – “the best single measure of the economic well-being of a society”
  - Economy’s total income
  - Economy’s total expenditure
  - Larger GDP
    - Good life, better healthcare
    - Better educational systems
  - Measure our ability to obtain many of the inputs into a worthwhile life

GDP

- GDP – not a perfect measure of well-being
  - Doesn't include
    - Leisure
    - Value of almost all activity that takes place outside markets (black economy)
    - Quality of the environment (Tournament competition in China)
  - Nothing about distribution of income

International differences: GDP & quality of life

- Rich countries - higher GDP per person
  - Better
    - Life expectancy
    - institution
    - Internet usage
- Poor countries - lower GDP per person
  - Worse
    - Life expectancy
    - institution
    - Internet usage

International differences: GDP & quality of life

- Low GDP per person
  - More infants with low birth weight
  - Higher rates of infant mortality
  - Higher rates of maternal mortality
  - Higher rates of child malnutrition
  - Less common access to safe drinking water
  - Fewer school-age children are actually in school

International differences: GDP & quality of life

- Low GDP per person
  - Fewer teachers per student
  - Fewer televisions
  - Fewer telephones
  - Fewer paved roads
  - Fewer households with electricity

Table 3

GDP and the Quality of Life

Country	Real GDP per Person (2007)	Life Expectancy	Adult Literacy (% of population)	Internet Usage (% of population)
United States	$45,592	79 years	99%	63%
Germany	34,401	80	99	45
Japan	33,632	83	99	67
Russia	14, 690	66	99	15
Mexico	14,104	76	93	18
Brazil	9,567	72	90	19
China	5,383	73	93	9
Indonesia	3,843	71	92	7
India	2,753	63	66	3
Pakistan	2,496	66	54	7
Nigeria	1,969	48	72	4
Bangladesh	1,241	66	54	0.3

The table shows GDP per person and three other measures of the quality of life for twelve major countries.

China's Poverty Reduction

- This is borrowed from Prof. Jing zhang, Renmin University
- 1st stage (1980-1984)
  - Specific fund to underdeveloped areas
- 2nd stage (1985-1993)
  - Substantial expansion in scale
  - Various policy tools: loans, fiscal support, public project

China's Poverty Reduction

- 3rd stage (1994-2000): Seven-Year Program for lifting 80 million people out of Poverty
  - 592 designated national poverty counties
  - Loans and fiscal support on infrastructure, education, health
  - At the end, still more than 32 million poverty population (1978 poverty line: 640 yuan per capita)

China's Poverty Reduction

•4th stage (2001-2010): Outline for Development-Oriented Poverty Alleviation for China's Rural Areas

- 592 designated national poverty counties reshuffled
- More precise targeting: villages (148,131 poverty villages) and households
- Only 55.6% poverty village are in poverty counties
- The poverty population decreased from 94.22 million to 26.88 million (2008 poverty line:1067 yuan per capita)

China's Poverty Reduction

- 5th stage (2011-2020): Outline for Development-Oriented Poverty Alleviation for China's Rural Areas
  - Targeted poverty Alleviation
  - Taking precise, targeted and differentiated measures
  - developing competitive industries, finding jobs elsewhere, relocation, improving education, providing better healthcare, better ecological protection, guaranteeing basic living standard for people unable to work

A case study on the impact of APRP in China: Zhang et al (2022), JDE

- To lift nearly 100 million impoverished rural people out of poverty, by 2020, China initiated the Targeted Poverty Alleviation (TPA) strategy in 2013
- Anti-poverty relocation program (APRP) is a major program of the TPA strategy
- What does APRP do?
- move rural household to better places
- Within county move, from villages to nearby towns
- household are offered public housing or a housing voucher

Empirical data in the case study

- The data utilized in the study are from Xin County, a county of Xinyang City
- Source: from National Poverty Alleviation and Development Information System (Not Publicly available)
- an unbalanced panel dataset, covering 12,616 households (45,059 individuals) from 2014–2018
- 1,909 households (7,786 individuals) were relocated through this program
- Outcome variable: household-level income and household level labor supply

Main findings

- The program significantly increased the participants' income by 9.61%, driven mainly by the increase in wage income
- Public housing relocation improved the labor supply of those with higher potential income in the non-agricultural sector significantly
- The relocation program improves households' access to non-agricultural job opportunities significantly


谢谢！
THANK YOU!