LSE EC1B5
Macroeconomics

Handout 2

Measurement & interpretation of GDP

Real vs. Nominal GDP

Key Idea

- GDP has limitations as a measure of economic activity and as a measure of economic well-being
- Price indexes, inflation, real and nominal GDP

GDP

- As a measure of economic activity?
- As a measure of economic well-being?

GDP vs. GNP

- GDP records production in the country regardless of whose labor and capital (domestic or foreign) is used.
- Gross national product (GNP) records production of domestically owned labor and capital in the country and abroad.
- They are nearly the same for many countries, e.g. U.S. GNP was $17.1 trillion in 2013, compared to a GDP of $16.8 trillion.

Physical Capital Depreciation

GDP omits depreciation of the physical capital stock and resources.

Negative Externalities

GDP does not count negative externalities such as pollution, noise, and crime.

Underground/informal economy

GDP does not capture transactions conducted in the underground/informal economy.

- Informal/underground economic activities include both legal and illegal activities
- Developed countries – about 10% of GDP
- Much higher in developing countries – e.g. Peru about 70% of GDP

Home Production/Leisure

- GDP excludes home production of cleaning, cooking, and child care done in the household.

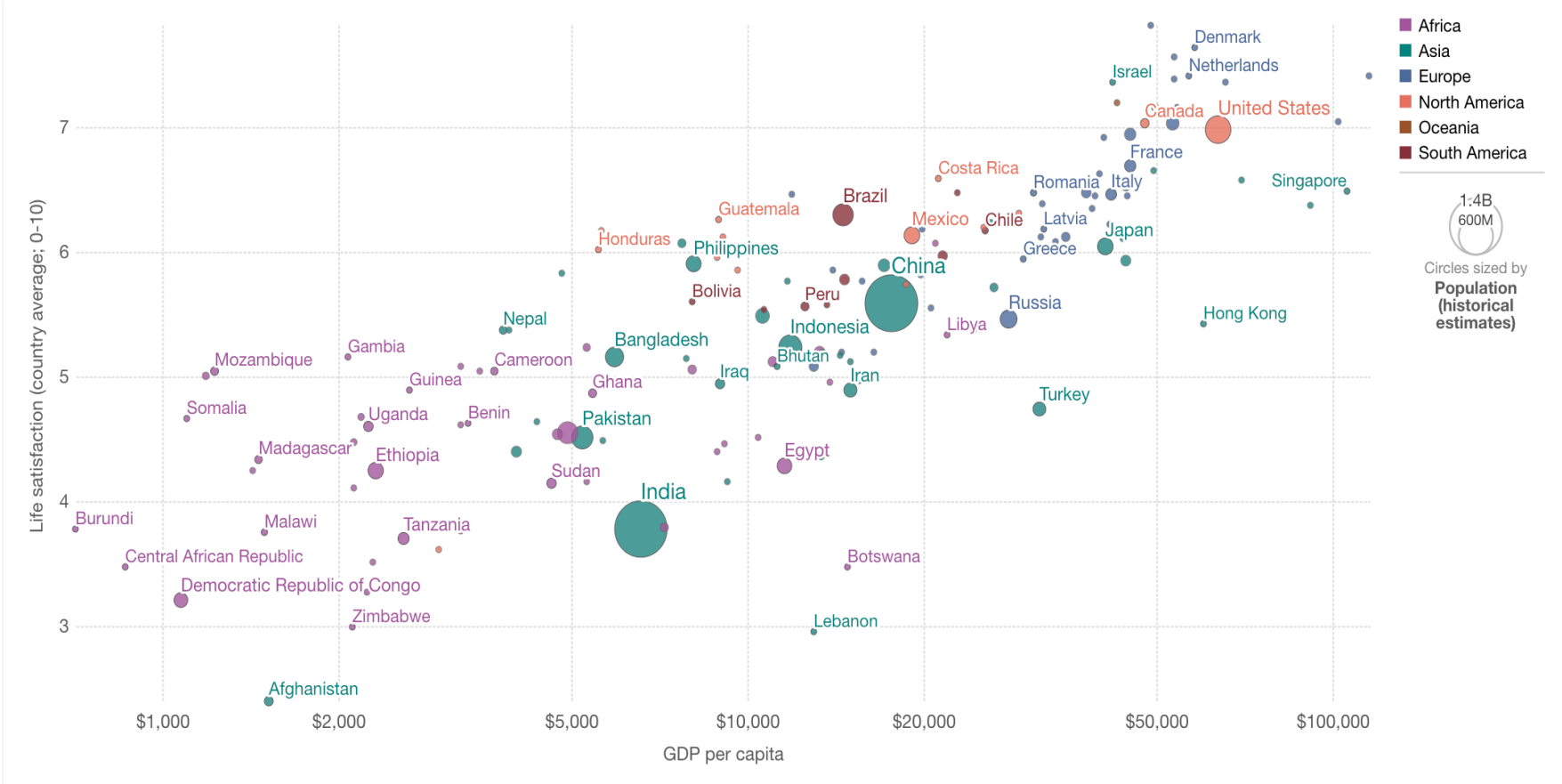
- GDP does not record leisure, which contributes to well-being.

Interpretation of GDP

Do all these limitations mean that GDP is a poor measure of well-being of an economy?

Why don't we ask people how happy or satisfied they are and compare these responses to GDP per capita?

Happiness



Data source: World Happiness Report (2023); World Bank (2023) , GDP per capita is expressed in international-$ at 2017 prices.

Real vs. Nominal GDP:

Understanding the increase/decrease in living standard

Real vs. Nominal

An increase in GDP will record both increases in actual production (and income) and increases in prices of those goods and services.

We therefore need to distinguish between nominal GDP and real GDP.

Nominal GDP

The total value of production using *current* market prices to determine the value of each unit that is produced.

Real GDP

The total value of production using market prices from a *specific base year* to determine the value of each unit that is produced.

Nominal GDP

Nominal GDP for 2009:

$$P^{09}_{apples} \times Q^{09}_{apples} + P^{09}_{big\ mac} \times Q^{09}_{big\ mac} + \ldots + P^{09}_{zucchini} \times Q^{09}_{zucchini}$$

Nominal GDP for 2013:

$$P^{13}_{apples} \times Q^{13}_{apples} + P^{13}_{big\ mac} \times Q^{13}_{big\ mac} + \ldots + P^{13}_{zucchini} \times Q^{13}_{zucchini}$$

Real GDP

Real GDP for 2009 (base year 2009):

$$P^{09}_{apples} \times Q^{09}_{apples} + P^{09}_{big\ mac} \times Q^{09}_{big\ mac} + \ldots + P^{09}_{zucchini} \times Q^{09}_{zucchini}$$

Real GDP for 2013 (base year 2009):

$$P^{09}_{apples} \times Q^{13}_{apples} + P^{09}_{big\ mac} \times Q^{13}_{big\ mac} + \ldots + P^{09}_{zucchini} \times Q^{13}_{zucchini}$$

Example: The Nation of Barney

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Calculate nominal GDP for 2012 and 2013.

Calculate real GDP for 2012 and 2013.

	Peanut Butter		Jelly	
Year	**Quantity**	**Price**	**Quantity**	**Price**
2012	20	$4.00	50	$2.00
2013	30	$5.00	100	$2.00

Example: The Nation of Barney

Nominal GDP for 2012:

Nominal GDP for 2013:

Example: The Nation of Barney

Real GDP for 2012:

Real GDP for 2013:

Real vs. Nominal – GDP deflator

GDP deflator – The price level of the overall economy.

$$\text{GDP deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100$$

Example: The Nation of Barney – GDP deflator

- What's the GDP deflator for the Nation of Barney in 2013?

Real vs. Nominal – CPI

Consumer Price Index (CPI) – The price level of a particular basket of consumer goods and services.

$$CPI(target) = 100 * \frac{cost\ of\ consumer\ basket\ in\ using\ target\ year\ prices}{cost\ of\ consumer\ basket\ using\ in\ base\ year\ prices}$$

Example: The Nation of Barney – CPI

- What's the CPI the Nation of Barney in 2013?

Real vs. Nominal

The GDP deflator and the CPI formula look nearly identical.

Question: What are the differences in the real world?

Hint: Think about what is in each "basket" of goods and services.

GDP Deflator and CPI

1. The GDP deflator includes things not purchased by households, like trains, subways, and submarines.

2. The CPI includes imports like Chinese laptops.

3. Housing-related expenditures like shelter and utility bills have a large weight in the CPI.

Growth Rate

GDP and the price level are more often quoted in growth rates.

A growth rate is defined as a percentage change:

$$\frac{(\text{GDP in 2013}) - (\text{GDP in 2012})}{(\text{GDP in 2012})}$$

- What's the growth rate of nominal GDP?

- What's the growth rate of real GDP?

Inflation rate = The percentage change in a price index.

$$\text{Inflation rate in 2013} = \frac{(\text{Price index in 2013}) - (\text{Price index in 2012})}{(\text{Price index in 2012})} \times 100$$

Where price index is either GDP deflator or CPI

Example: The Nation of Barney – Inflation rate

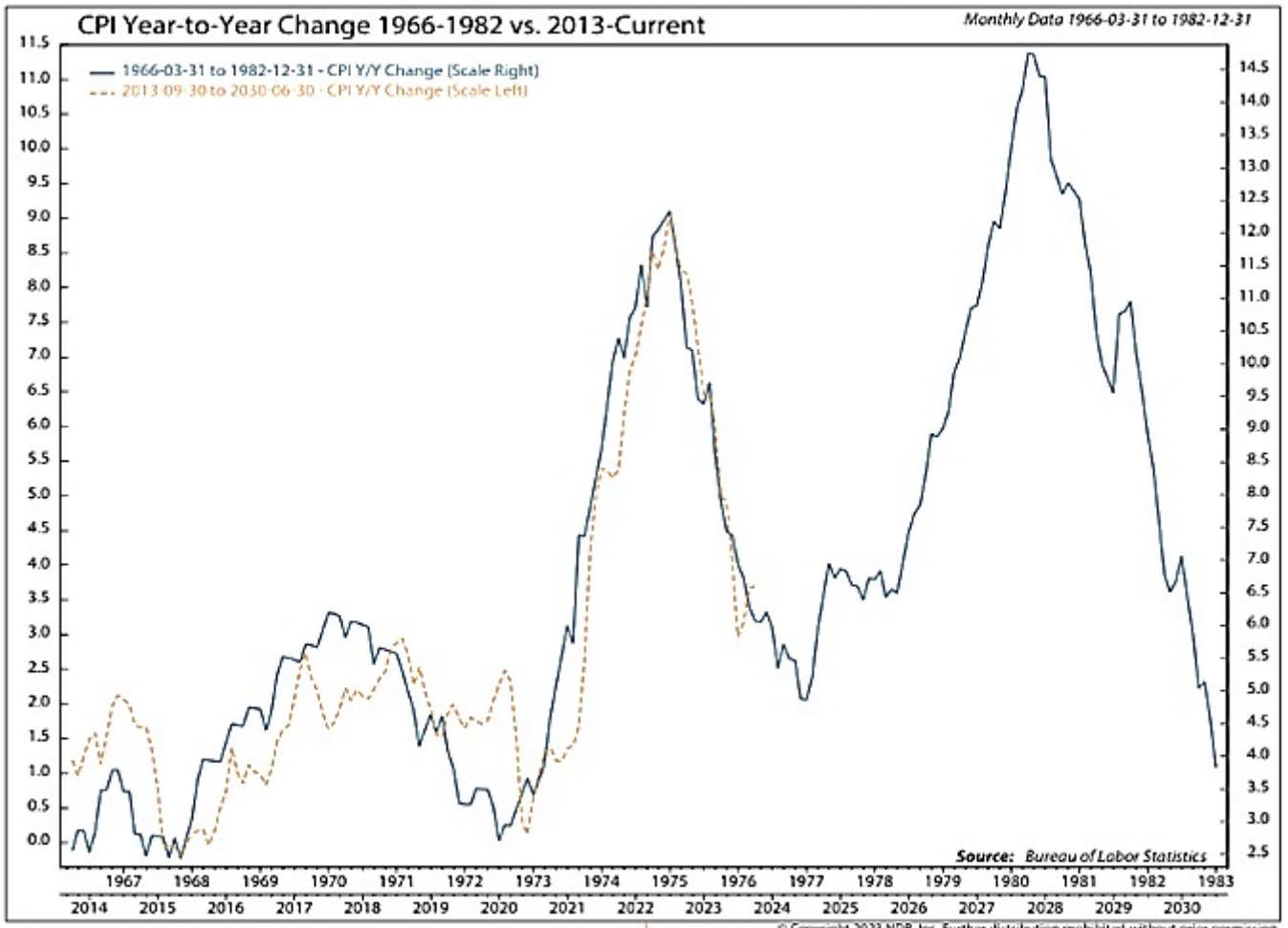
- What's the inflation rate for the Nation of Barney in 2013?

Adjusting nominal variables

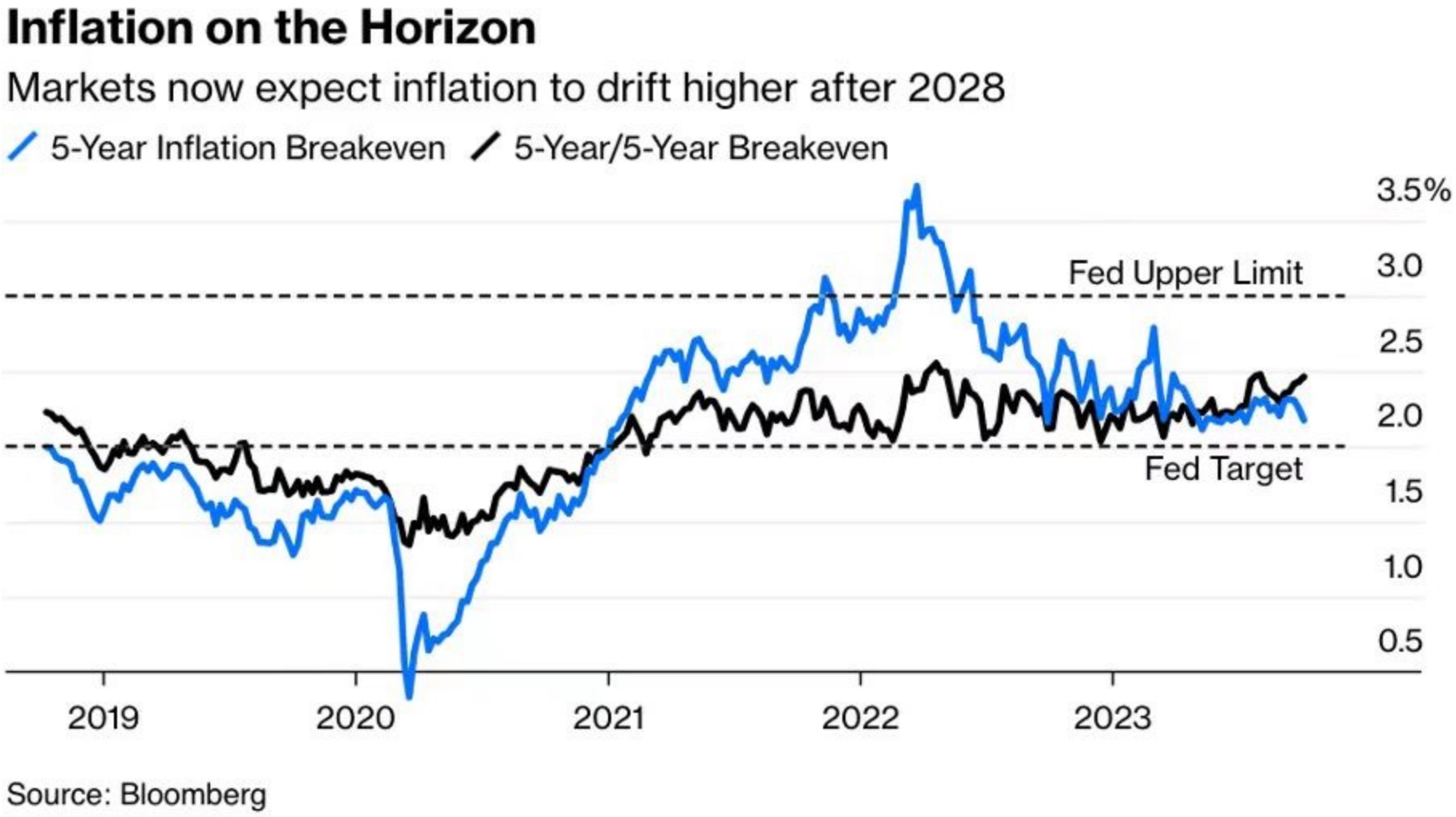
- Suppose that a book costs 1 dollar in 1929
- The same book costs 10 dollars in 2009
- The price index in 2009 is 20 times than in 1929
- Which cost more?

Example: United States

Current inflation tracking the period between 1966 and 1982



Example: United States



Problems with measurement

- 1. Quality changes? Hard to capture
- 2. New product introduction
- 3. Internet purchases?
- 4. Seasonal adjustments