Measurements of Economic Activity

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Measurements of Economic Activity review

Topics covered

I.   Gross domestic product (GDP)

II. Economic growth and business cycles

III. Unemployment

IV. Inflation

I. Gross Domestic Product (GDP)

Gross domestic product measures total production

- **GDP related videos**:

- GDP https://youtu.be/yUiU_xRPwMc

- Real GDP https://youtu.be/29S7FzI7s7g

GDP Definition

Definition: **Gross domestic product** or GDP is the market value of all final goods and services produced in a year within a country's borders.

Let's take a look at what this definition means.

GDP Definition

GDP measures the **market value** of the final goods and services produced. A country produces many different final goods and services. The problem is final goods and services are measured in different units. For example, oranges are measured in pounds, cars are measured in units, and lawyer services are measured in billable hours. With final goods and services measured in so many different units of account, it is necessary to put the final goods and services in a common unit of account when calculating total production. Since we live in the US and use the US dollar as our currency, the common unit of account is the US dollar. So instead of reporting the pounds of oranges produced, farmers report the dollar value of the oranges (price of oranges x quantity of oranges produced). Toyota reports the dollar value of the cars (price of cars x quantity of cars produced). Lawyers report the dollar value of billable hours (hourly price x billable hours).

GDP Definition

Gross domestic product (GDP) measures **production not sales** for a country. Change in inventory is recorded as part of Investment. If a final good or service is produced and not sold in a year, change in inventory increases. If firms sell more than the final goods and services produced in a year, change in inventory decreases.

GDP Definition

GDP measures only **FINAL** goods and services. Final goods and services mean they are consumed by households, businesses and governments and are not purchased with the intent to sell them to others. For example, as Cindy homeowner, I purchase lumber to build a deck in my backyard. The lumber is a final good. In this case, the lumber is a final good. As Cindy owner of Tori Construction, I purchase lumber that will be used to build a house that I will sell as part of my business. In this case the lumber is an intermediate good because its value is part of the final good, the house. In the second case, the house counts as a final good, but the lumber does not. This avoids double counting production.

GDP Definition

GDP measures production within a country's borders regardless of who owns the business. **Location of production matters, not ownership of resources**. For example, Toyota is a Japanese company with a plant in Kentucky. Production at the Toyota plant in Kentucky counts toward U.S. GDP. Coca-Cola is a US company with a plant in Europe. Production of Coca-Cola at the European plant does NOT count toward US GDP because the production takes place in Europe and not in the US.

GDP Components

GDP is often described and discussed in the context for whom the final goods and services are made.

GDP = Consumption (C)

+ Investment (I)

+ Government purchases (G)

+ Net Exports (NX)

Let's take a look at each component

GDP Components

Consumption (C) – final goods and services produced for household consumption. Examples: Wendy's hamburger, dental services.

Investment (I) – final goods and services produced for business consumption plus changes in business inventories. Examples: Office supplies, delivery truck repair. A common error is to think Investment represents financial investment such as money, stocks, and bonds. This is not correct. Investment as defined as a component of GDP are the final goods and services purchased by business and changes in business inventory.

GDP Components

Government purchases (G) – final goods and services produced for all levels of government. Examples: Tank, software design to prevent cyber attacks.

Net Exports (NX) = Exports – Imports

– **Exports** are final goods and services produced in the US but sold to consumers outside the US. Example for the United States: Ford truck produced in Detroit and sold in Canada.

– **Imports** are final goods and services produced in another country but consumed in the US. Example for the United States: Wine produced in France and sold in the United States.

GDP: Nominal GDP versus Real GDP

The difference between real GDP and nominal GDP is very important. Remember GDP measures the **market value** of all final goods and services produced. Market value uses price as a common unit of account, so the value of very different final goods and services can be summed together.

– **Nominal GDP** measures production using current year prices as the common unit of measure.

– **Real GDP** measures production using base year prices as the common unit of measure. Base year prices mean that regardless of the year the final goods and services were produced, the prices used as the common unit of measure is a specific year and does not change. For example, assume the base year is 2009. 2009 Real GDP uses 2009 prices and 2009 quantities. 2015 real GDP uses 2009 prices and 2015 quantities.

GDP: Nominal GDP versus Real GDP

A benefit of real GDP is that over time the only component changing is quantity or production. Comparing real GDP over time reveals whether an economy is increasing production over time (expansion) or decreasing production over time (recession). Nominal GDP cannot be compared over time because both prices and quantity are likely changing over time.

To calculate real GDP, a price index that measures how much prices have changed over time is needed.

Let's explore how to calculate real GDP

GDP: Nominal GDP versus Real GDP

A **price index** reports how much prices have changed since the base year. The base year price index value is 100. If 2009 is the base year, the 2009 price index = 100. If the 2010 price index = 105, it means on average prices have increased 5% since the base year. If the 2015 price index = 120, it means on average prices have increased 20% since the base year. 20% is not the 2015 inflation rate, however, because 20% is the cumulative price change over 15 years. An inflation rate measures price changes from one year to the next year; not the price changes since the base year. For 2010, 5% is the inflation rate since it measures the price change from the previous year, 2009 to 2010.

GDP: Nominal GDP versus Real GDP

Two frequently referenced price indexes are the GDP deflator and the Consumer Price Index.

The **GDP deflator** is one type of price index. It measures on average how much prices have changed for all final goods and services since the base year.

A more frequently referenced price index is the **Consumer Price Index** (CPI). The CPI measures price changes for a bundle of final goods and services consumed by the typical urban consumer.

GDP: Nominal GDP versus Real GDP

The formula to calculate real GDP is

Real GDP = $\dfrac{\text{Nominal GDP}}{\text{Price Index}}$ x 100

For example, If 2018 nominal GDP = $18 trillion and the price index = 125.0, then

Real GDP = $\dfrac{\$18 \text{ trillion}}{125.0}$ x 100 = $14.4 trillion

II. Economic Growth and Business Cycles

Economic growth and business cycle videos

– Economic growth https://youtu.be/HfCEHYukiPw

– Business cycle https://youtu.be/jGP-vPEHRRE

Economic Growth and Business Cycles

An **economic growth rate** is the percent change of production or real GDP from one year to the next. The formula to calculate an economic growth rate is

Economic growth rate (%) = $\frac{\text{(Current year real GDP} - \text{Previous year real GDP)}}{\text{Previous year real GDP}}$ x 100

Long-run economic growth arises from permanent increases in productivity. **Potential real GDP** is the maximum sustainable level of production. Ideally a country will produce at a level where real GDP = potential real GDP.

Economic Growth and Business Cycles
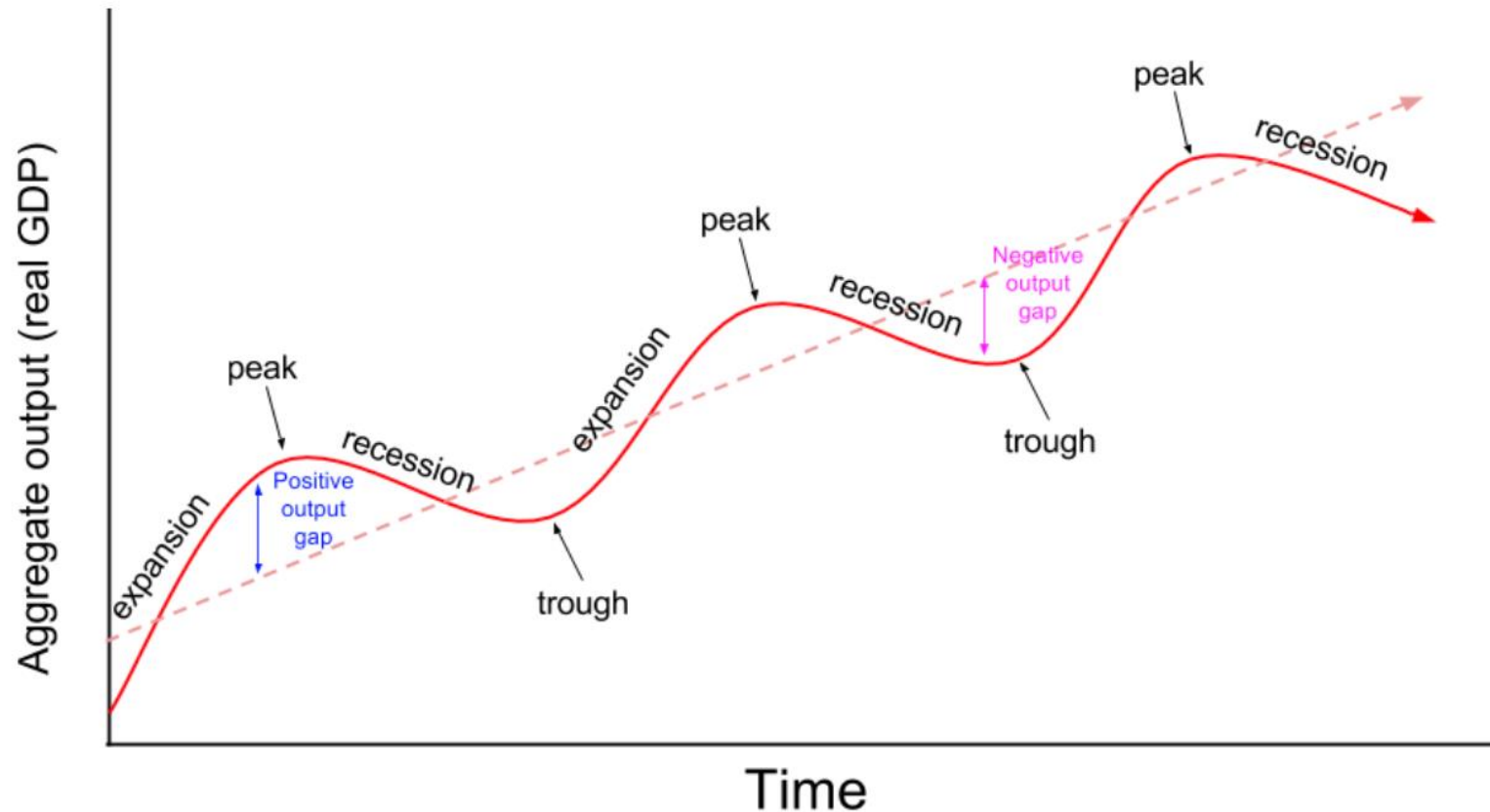
Economic Growth and Business Cycles

Business cycles are the rise and fall of real GDP or production over time.

It is easy to see how the business cycle phases are related to unemployment.

- During an **expansion**, real GDP is rising, and the growth rate is positive. To produce more, business will hire more of all resources including labor, so the unemployment rate declines. **Peak** marks the end of an expansion and the beginning of a recession.

- During a **recession**, real GDP is declining, and the growth rate is negative. Firms produce less so businesses hire fewer resources including labor, so the unemployment rate rises. Cyclical unemployment is positive. Trough marks the end of a recession and the beginning of an expansion.

- When a recession ends and a country enters the **recovery** part of an expansion phase, the unemployment rate will remain elevated (above the natural rate of unemployment) and may rise (as discouraged workers re-enter the labor force). Firms want to be sure the recession is over before hiring more workers, so the unemployment rate often remains elevated even after the recession has ended.

Economic Growth and Business Cycles

It is less clear to see how the business cycle phases are related to inflation. If we assume business cycles arise from changes in demand (which is nearly always true in the United States), the relationship is clearer.

- If a **recession arises because** demand declines, it means that fewer are willing and able to buy final goods and services. The lower demand reduces price pressures and the inflation rate declines. During recessions, inflation rates typically decline leading to disinflation.

- If an **expansion arises because** demand increases, it means that there is a greater willingness and ability to buy final goods and services. The higher demand increases scarcity causing prices to rise at a faster rate. During expansions, inflation rates typically increase.

III. Unemployment

Unemployment related videos:

– Unemployment https://youtu.be/_CdTu1pk06w

– Types of unemployment https://youtu.be/ZckAN1KYB5I

Unemployment

An **unemployment rate** is the percent of the labor force that is unemployed or those who do not have a job but have actively looked for a job within the past four weeks.

- When real GDP increases, businesses need more resources including labor. So when real GDP increases (expansion), more people are employed, and the unemployment rate declines.

- When real GDP decreases, businesses need fewer resources including labor. So when real GDP decreases (recession), fewer people are employed, more people are unemployed, and the unemployment rate increases.

Unemployment: Types of unemployment

The unemployment rate will be positive because frictional unemployment and structural unemployment are positive.

– **Frictional unemployment** tends to be short-term. Workers have the skills businesses need; it just takes time to match the worker to the correct job.

– **Structural unemployment** arises from a mismatch of worker skills and business needs. It requires workers to be retrained. It often arises from technological changes and trade agreements.

Unemployment: Types of unemployment

Cyclical unemployment arises when a country enters a recession and economic activity declines. Ideally, cyclical unemployment will be zero. When this occurs,

– Real GDP = potential real GDP

– Unemployment = natural rate of unemployment.

– Cyclical unemployment = 0.

During a recession, real GDP declines and the unemployment rate will be greater than the natural rate of unemployment. During a recession,

– Real GDP < potential real GDP

– Unemployment rate > natural rate of unemployment.

– Cyclical unemployment > 0

IV. Inflation

Inflation related video:

– Inflation and Price Indexes https://youtu.be/SmOMp8gycMA

Inflation

Inflation is a continuous increase in average prices over time. A one-time increase of average prices is not inflation.

The formula to calculate an inflation rate is

Inflation rate (%) = $\dfrac{\text{(Current year price index} - \text{Previous year price index)}}{\text{Previous year price index}}$ x 100

Inflation

Deflation: a negative inflation rate. The average price level is declining over time. Example: inflation rate = -1.5%. Deflation can be devastating to an economy because if consumers believe prices will be lower in the future, consumers will postpone purchasing final goods and services. If there is no demand for final goods and services, firms will reduce production and layoff workers.

Disinflation: over time the inflation rates are positive but declining. Example, 2015 inflation rate = 4% and 2016 inflation rate = 2%. This typically occurs during a recession because most recessions arise when demand for final goods and services decreases. Lower demand means final goods and services are more abundant so prices do not rise as quickly (final goods and services are not as scarce).

– Real GDP < potential real GDP

– Inflation rates are positive but declining

Inflation

Scarcity can cause the inflation rate to increase over time. For example, 2016 inflation rate = 2% and 2017 inflation rate = 5%.

– **Demand-pull inflation**. Scarcity arises because demand for final goods and services has exceeded what an economy can produce on a sustained basis.

  – real GDP > potential real GDP

  – inflation rates are increasing

– **Cost-push inflation**. Scarcity arises because resource costs rise reducing profits so firms reduce supply.

  – real GDP < potential real GDP (because supply is lower)

  – inflation rates are increasing

Inflation

Hyperinflation is an extremely high inflation rate. Prices are rising so quickly that the currency is abandoned, and people resort to barter. A recent example is Venezuela. During November 2016, prices were rising by 219% a month or doubling every 18 days. This means if on May 1st a loaf of bread costs $3, by May 19th a loaf of bread costs $6. By June 8th, a loaf of bread costs $12. By June 26th, a loaf of bread costs $24. And so on. A BBC article, *How do you solve catastrophic hyperinflation?*, covers five historical cases of hyperinflation. The article link is https://www.bbc.com/news/business-45523636.