# ECON 002: Principles of Macroeconomics//

Lecture 5: GDP and CPI

## **Calculating GDP**

#### • Simple UCSB Economy

|         | 2009     |       | 2016     |       |
|---------|----------|-------|----------|-------|
| Product | Quantity | Price | Quantity | Price |
| Food    |          |       |          |       |
| Housing |          |       |          |       |
| Movies  |          |       |          |       |

## **Calculating GDP**

#### • Simple UCSB Economy

|         | 2009     |       | 2016     |       |
|---------|----------|-------|----------|-------|
| Product | Quantity | Price | Quantity | Price |
| Food    | 1000     | 1     | 1500     | 2     |
| Housing | 100      | 100   | 150      | 150   |
| Movies  | 500      | 5     | 1000     | 10    |

## **Calculating GDP**

- Nominal GDP: Value of final goods and services evaluated at current year prices
  - Total dollars exchanged
- Real GDP: Value of final goods and services evaluated at *base year prices* 
  - Value of dollars exchanged if prices did not change from the prices in an arbitrary (base) year
- GDP Deflator: Measure of how much nominal GDP changes are driven by price changes

#### Using the Deflator to Calculate Price Increases

How much did prices increase between 2009 and 2017?

• How much did real GDP increase between 2009 and 2017?

#### Real GDP vs Nominal GDP with a single good

| Movie                                  | World Gross<br>(Nominal) | Movie |  |
|--|--------------------------|-------|--|
| 1. Avatar (2009)                       | \$2,923,706,026          |       |  |
| 2. Avengers: Endgame (2019)            | \$2,799,439,100          |       |  |
| 3. Avatar: The Way of Water (2022)     | \$2,320,250,281          |       |  |
| 4. Titanic (1997)                      | \$2,264,743,305          |       |  |
| 5. Star Wars: The Force Awakens (2015) | \$2,071,310,218          |       |  |
| 6. Avengers: Infinity War (2018)       | \$2,052,415,039          |       |  |
| 7. Spider-Man: No Way Home (2021)      | \$1,921,847,111          |       |  |
| 8. Jurassic World (2015)               | \$1,671,537,444          |       |  |
| 9. The Lion King (2019)                | \$1,663,075,401          |       |  |
| 10. The Avengers (2012)                | \$1,520,538,536          |       |  |

#### Real GDP vs Nominal GDP with a single good

| Movie                                     | Worldwide<br>Gross<br>(Nominal) | Movie                                     | Ticket Sales |
|---|---------------------------------|---|--------------|
| 1. Avatar (2009)                          | \$2,923,706,026                 | 1. Gone w/the Wind (1939)                 | 202,044,600  |
| 2. Avengers: Endgame (2019)               | \$2,799,439,100                 | 2. Star Wars (1977)                       | 178,119,600  |
| 3. Avatar: The Way of Water (2022)        | \$2,320,250,281                 | 3. Sound of Music (1965)                  | 142,415,400  |
| 4. Titanic (1997)                         | \$2,264,743,305                 | 4. ET (1982)                              | 141,854,300  |
| 5. Star Wars: The Force Awakens<br>(2015) | \$2,071,310,218                 | 5. Titanic (1997)                         | 135,474,500  |
| 6. Avengers: Infinity War (2018)          | \$2,052,415,039                 | 6. The Ten Commandments<br>(1956)         | 131,000,000  |
| 7. Spider-Man: No Way Home<br>(2021)      | \$1,921,847,111                 | 7. Jaws (1975)                            | 128,078,800  |
| 8. Jurassic World (2015)                  | \$1,671,537,444                 | 8. Doctor Zhivago (1965)                  | 124,135,500  |
| 9. The Lion King (2019)                   | \$1,663,075,401                 | 9. Exorcist (1973)                        | 110,599,200  |
| 10. The Avengers (2012)                   | \$1,520,538,536                 | 10. Snow White and the 7<br>Dwarfs (1937) | 109,000,000  |

### **Stable Prices**

#### **Goal 2: Stable Prices**

Inflation = Prices are rising

Deflation = Prices are falling

How much do consumers care about all prices?

What is the ideal level of inflation/deflation?



#### Federal Reserve's "Stable Prices"

#### Why is the inflation target not higher?



As prices rise, workers expect cost-of-living adjustments/wage increases

Example: Inflation is 25% away than expectations.

If inflation expectations are 2%, inflation range is 1.5% to 2.5%

If inflation expectations are 50%, inflation ranges from 37.5% to 62.5%

At 37.5% inflation, firms don't sell at high enough prices to pay input costs.

At 62.5% inflation, workers don't get raises to match the increasing prices of goods.



#### Federal Reserve's "Stable Prices"

#### Why is the inflation target not lower?

**Deflation:** 

1. Consumer Response: When the prices of goods and services are expected to decrease, consumers delay purchases.

Less spending = Less production = Lower GDP = Unemployment

#### 2. Debt Burden:

Situation: \$50,000 loan today, have to payback in 25 years \$50,000 in 25 years is equivalent to \$30,477 today at 2% inflation. Wages, prices, etc. rise, so the debt burden (\$50,000) is less costly over time.

If prices are falling and interest rates don't adjust, debt burden is growing! Deflation-still owe \$50,000, but wage, prices, etc. have decreased! At 2% deflation for 25 years, \$50,000 today is equivalent to \$82,000 in 25 years!

3. Wage Adjustments

Real Wage Growth = Nominal Wage Growth –Inflation Rate

Easier to decrease real wage than nominal wage



GDP Deflator Growth: measure of inflation

Do the prices of ALL goods and services matter to consumers?



- How do we calculate an "average price" for all goods purchased by consumers?
- STEP 1: What do consumers purchase?
- Determine basket of goods:



- How do we calculate an "average price" for all goods purchased by consumers?
- STEP 2: How heavy is each good in the basket?
- Determine the <u>weight of goods and services</u> in the basket:





- How do we calculate an "average price" for all goods purchased by consumers?
- STEP 3: Calculate the weighted cost of a basket
- Similar to GDP, calculate the cost of the average good bought by a household



Calculate Base Year (BY) Basket Cost: BY Prices x BY Q

Calculate Current Year (CY) Basket Cost: CY Prices x BY Q

**CPI = Ratio of Basket Costs** 

Inflation = CPI Growth Rate





Base Year: 1982-1984 Average Weights/Prices, CPI = 100

Today (March, 2025 released last Thursday), CPI =319.62

1950 CPI = 24



#### Is the CPI an accurate measure of inflation?

**Some Potential Problems with CPI** 

Substitution, quality, and new products can distort inflation measurements.

Consumers may change buying habits and price hikes may not always correlate with improved quality.

CPI doesn't cover new products or cheap stores/websites.

Economists believe it overestimates inflation by 0.5-1%.

