Inflation

Lecture 7

Robb T. Koether

Hampden-Sydney College

Mon, Jan 29, 2018

1. Inflation
2. Increase in Prices
3. Decrease in Purchasing Power
4. Assignment

Outline

Definitions

Definition (Inflation Rate)

The inflation rate is the annual rate at which prices increase. Equivalently, it is the rate at which money loses its purchasing power.

- DJIA history: Click here.
- Inflation history: Click here.

Definitions

Definition (Inflation Rate)

The inflation rate is the annual rate at which prices increase. Equivalently, it is the rate at which money loses its purchasing power.

- DJIA history: Click here.
- Inflation history: Click here.
- The inflation rate in Venezuela last year was 2600%.

Example


100 000 000 000 000 RESERVE BANK OF ZIMBABWE
100 000 000 000 000
I promise to pay
the bearer on demand
ONE HUNDRED
TRILLION
DOLLARS
for the Reserve Bank of Zimbabwe
Dr. G. Gono
Governor
100 000 000 000 000 HARARE 2008
AA3905431
AA3905431

Prices and Purchasing Power

- If a loaf of bread costs \$2.00 today and it costs \$2.10 next year, then the inflation rate is 5% because

$$\frac{2.10}{2.00} = 1.05.$$

- If \$3.00 buys 10 oz. of ground beef today, but it buys only 8 oz. next year, then the purchasing power of a dollar has fallen 20% because

$$\frac{8}{10} = 0.80 = 1 - 0.20.$$

Example

Example (Inflation Example)

- Suppose the rate of inflation is 3%.
- If an item costs \$10.00 today, what will it cost 3 years from now?

Year	Beginning cost	Price Increase	Ending Cost
1	\$10.00	3% of \$10.00 $=$ 0.30	\$10.30

Example

Example (Inflation Example)

- Suppose the rate of inflation is 3%.
- If an item costs \$10.00 today, what will it cost 3 years from now?

Year	Beginning cost	Price Increase	Ending Cost
1	\$10.00	3% of \$10.00 $=$ 0.30	\$10.30
2	\$10.30	3% of \$10.30 $=$ 0.31	\$10.61

Example

Example (Inflation Example)

- Suppose the rate of inflation is 3%.
- If an item costs \$10.00 today, what will it cost 3 years from now?

Year	Beginning cost	Price Increase	Ending Cost
1	\$10.00	3% of \$10.00 $=$ 0.30	\$10.30
2	\$10.30	3% of \$10.30 $=$ 0.31	\$10.61
3	\$10.61	3% of \$10.61 $=$ 0.32	\$10.93

Example

Example (Inflation Example)

- Suppose the rate of inflation is 3%.
- If an item costs \$10.00 today, what will it cost 3 years from now?

Year	Beginning cost	Price Increase	Ending Cost
1	\$10.00	3% of \$10.00 $=$ 0.30	\$10.30
2	\$10.30	3% of \$10.30 $=$ 0.31	\$10.61
3	\$10.61	3% of \$10.61 $=$ 0.32	\$10.93

- This calculation is exactly the same as the calculation for compound interest!

The Inflation Formula

- The formula for price increases is the same as the formula for compound interest.

$$\text{future price} = \text{past price} \times (1 + i)^t,$$

where i is the inflation rate and t is the number of years.

- That is,

$$F = P(1 + i)^t$$

where F is the future price and P is the past (or present) price.

Outline

Example

Example (Inflation)

- The price of a gallon of milk is \$4.00. If the inflation rate is 2%, then what is the (future) price of a gallon of milk one year later?

Example

Example (Inflation)

- The price of a gallon of milk is $4.00. If the inflation rate is 2%, then what is the (future) price of a gallon of milk one year later?
- Five years later?

Example

Example (Inflation)

- The price of a gallon of milk is $4.00. If the inflation rate is 2%, then what is the (future) price of a gallon of milk one year later?
- Five years later?
- The inflation rate in 1980 was 11.83%. If that rate had persisted, what would be the cost of a gallon of milk 10 years later?

Example

Example (Inflation)

- The price of a gallon of milk is $4.00. If the inflation rate is 2%, then what is the (future) price of a gallon of milk one year later?
- Five years later?
- The inflation rate in 1980 was 11.83%. If that rate had persisted, what would be the cost of a gallon of milk 10 years later?
- Today?

Example

Example (Inflation)

- The price of a gallon of milk is $4.00. If the inflation rate is 2%, then what is the (future) price of a gallon of milk one year later?
- Five years later?
- The inflation rate in 1980 was 11.83%. If that rate had persisted, what would be the cost of a gallon of milk 10 years later?
- Today?
- The inflation rate in 1917 was 19.66%. If that rate had persisted until now, what would be the cost of a gallon of milk?

Outline

Purchasing Power

- Suppose that 25 years ago a standard bag of groceries cost \$20 and that today the same bag of groceries costs \$50.
- Then the purchasing power of \$1.00 today (relative to a bag of groceries) compared to 25 years ago is

$$\begin{aligned} \frac{20}{50} &= 0.40 \\ &= 40¢. \end{aligned}$$

Purchasing Power

Definition (Purchasing Power of $1.00)

The purchasing power of $1.00 today vs. a time in the past is the past price of that item divided the current price of that same item.

$$\text{Purchasing power of \$1.00} = \frac{\text{past price}}{\text{current price}}.$$

- That is,

$$\begin{aligned}\text{Purchasing power of \$1.00} &= \frac{P}{P(1+i)^t} \\ &= \frac{1}{(1+i)^t} \\ &= (1+i)^{-t}.\end{aligned}$$

Example

Example (Inflation Example)

- Suppose the rate of inflation is 3%.
- What will be the purchasing power of $1.00 three years later?

Example

Example (Inflation Example)

- Suppose the rate of inflation is 3%.
- What will be the purchasing power of $1.00 three years later?
- 10 years later?

Example

Example (Inflation Example)

- Suppose the rate of inflation is 3%.
- What will be the purchasing power of $1.00 three years later?
- 10 years later?
- In 10 years, $10.00 will buy what $7.44 buys now.

Example

Example (Inflation)

- Since 1968, the inflation rate has averaged 4.035%.
- Assuming a constant 4.035% per year, what was the current purchasing power of a “1999 dollar” in terms of the 1967 dollar?

Example

Example (Inflation)

- Since 1968, the inflation rate has averaged 4.035%.
- Assuming a constant 4.035% per year, what was the current purchasing power of a “1999 dollar” in terms of the 1967 dollar?
- What is the purchasing power of a “2018 dollar” in terms of the 1968 dollar?

Example

Example (Inflation)

- The Fed aims to keep inflation at 2% per year.
- If they are successful, then what will be the purchasing power of a dollar 10 years from now, in terms of a 2018 dollar?

Example

Example (Inflation)

- The Fed aims to keep inflation at 2% per year.
- If they are successful, then what will be the purchasing power of a dollar 10 years from now, in terms of a 2018 dollar?
- What will be the purchasing power of a dollar 50 years from now, in terms of a 2018 dollar?

Example

Example (Inflation)

- The Fed aims to keep inflation at 2% per year.
- If they are successful, then what will be the purchasing power of a dollar 10 years from now, in terms of a 2018 dollar?
- What will be the purchasing power of a dollar 50 years from now, in terms of a 2018 dollar?
- If the inflation rate is 3%, what will be the purchasing power of a dollar in 50 years?

Outline

Assignment

Assignment

- See handout.