Inflation

Lecture 7

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Mon, Sep 10, 2018

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.

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- 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
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- 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)

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- 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,

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

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- What will be the purchasing power of $1.00 three years later?

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

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- Assuming a constant 4.035% per year, what was the current purchasing power of a “1999 dollar” in terms of the 1967 dollar?

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- 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?

Outline

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  - he withdraws a fixed amount each month for the following 20 years (also unrealistic), and
  - he wants the income of his final month to have the *purchasing power* that $5,000 has today,
- how much should he invest each month?

Outline

Assignment

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- See handout.