EPISODE OVERVIEW, QUESTIONS, & EXTENSIONS
Season 2 Episode 3
Consumer Price Index

OVERVIEW

This episode examines how economists measure inflation in a constantly changing economy using the Consumer Price Index (CPI). The basic idea behind the CPI is that the cost of a representative basket of goods and services over time is tracked to calculate the rate of inflation. In practice, however, measuring inflation becomes more complicated as the economy evolves. Consumers substitute among products as relative prices change, new goods enter the market, existing products improve in quality, and some prices fluctuate much more rapidly than others. The episode explores how economists address these challenges using updated methods, improved data sources, quality adjustments, and different measures of inflation, including the CPI and Core CPI. As the economy changes, so must the tools used to measure the cost of living.

Key Macroeconomics Links

- **Inflation:** An increase in the overall level of prices in the economy
- **Consumer Price Index (CPI):** The Consumer Price Index measures changes in the prices consumers pay for a representative basket of goods and services and is a widely used measure of inflation.
- **Core CPI:** Core CPI excludes food and energy prices from the representative basket of goods because these prices are more volatile from month to month. Economists examine both Core CPI and the Consumer Price Index to distinguish short-term price fluctuations from broader inflation trends.
- **Nominal Price:** The current ‘sticker’ price, not adjusted for inflation.
- **Real Price:** The nominal price adjusted for inflation.

Preview Question

What are some difficulties that arise in accurately measuring inflation over time?

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Discussion Questions

1. Why do we need to measure inflation and why is measuring it accurately important?
2. Explain how the Consumer Price Index (CPI) measures inflation. What does the basket of goods represent?
3. The episode identifies four challenges to measuring inflation. What are they, and why does each make inflation more difficult to measure accurately?
4. Why is substitution bias a problem for a fixed market basket? Can you think of another example where consumers might substitute one product for another?
5. Suppose the monthly price of a streaming service stays the same, but the number of available movies and shows doubles. How does this impact the CPI and how can we adjust for quality changes in products?
6. Why do economists often compare the CPI with Core CPI? What information does each measure provide?
7. How could inaccurate measures of inflation affect households, businesses, or government policies such as Social Security payments, wage contracts, or monetary policy? How can the accuracy of measures like CPI be supported by policies?
8. Do you think economists should focus more on improving existing measures or developing entirely new ways to measure changes in the cost of living? Explain your reasoning.
9. The episode describes several ways economists improve inflation measurement, including updating market baskets, adjusting for quality changes, and using new data sources. Do you have a greater appreciation of the effort that goes into these measures?
10. The CPI is released monthly for the prior month. If you had to choose, would you prefer inflation measures that are released more quickly but are less precise, or measures that are more accurate but available only after a longer delay? Explain your reasoning.

Multiple Choice Questions

1. What is the primary purpose of the Consumer Price Index (CPI)?
   A) To measure changes in the average cost of producing goods and services
   B) To track changes in the prices consumers pay for a representative basket of goods and services over time
   C) To measure changes in the purchasing power of the U.S. dollar relative to foreign currencies
   D) To estimate the value of all goods and services produced in the economy

   Answer: B

2. Why does measuring inflation become more difficult as the economy changes?
   A) Inflation affects services differently than physical goods.
   B) Consumers have consistent spending patterns over time.
   C) Businesses change prices more frequently than government agencies can measure them.
   D) Consumers substitute among products, new goods enter the market, product quality changes, and some prices fluctuate more than others.

   Answer: D

3. If the price of beef rises sharply and many consumers switch to chicken, why might a fixed market basket overstate the increase in the cost of living?
   A) It assumes consumers continue purchasing the original basket rather than substituting toward lower-priced alternatives.
   B) It gives food products a larger weight than housing and transportation.
   C) It assumes consumers purchase more goods whenever prices increase.
   D) It excludes newly available food products from the market basket.

   Answer: A

4. A streaming service costs $15 per month in both 2023 and 2026, but by 2026 it offers much more content and higher video quality. Why might economists adjust the measured price?
   A) The service should receive a larger weight in the CPI because more people subscribe to it.
   B) The quality-adjusted price may have fallen because consumers receive more value for the same nominal price.
   C) The nominal price should be increased to reflect improvements in technology.
   D) Digital services should be excluded from inflation measures because quality is difficult to measure.

   Answer: B

5. What is the goal of quality adjustment in price measurement?
   A) To remove products from the CPI.
   B) To simplify data collection.
   C) To increase measured inflation.
   D) To account for improvements in product features and functionality.
   Answer: D

6. What is Core CPI?
   A) A measure of inflation that excludes imported goods.
   B) A measure of inflation that includes only digital goods and services.
   C) A measure of inflation that excludes food and energy prices because they are often more volatile.
   D) A measure of inflation used only by the Federal Reserve.

   Answer: C

7. Why do economists compare the overall CPI with Core CPI?
   A) Core CPI is always more accurate than the overall CPI.
   B) The two measures provide more information about inflation, especially when food and energy prices fluctuate sharply compared to other goods and services.
   C) Core CPI is calculated more frequently than the overall CPI, making it more accurate.
   D) The overall CPI excludes housing costs which are large compared to other goods and services.

   Answer: B

8. Which organization is responsible for producing the Consumer Price Index (CPI) in the United States?
   A) Bureau of Labor Statistics
   B) Federal Reserve
   C) Department of Commerce
   D) Congressional Budget Office

   Answer: A

9. Which of the following is an example of how economists improve inflation measurements?
   A) Measuring inflation only once each year.
   B) Eliminating services from the CPI.
   C) Using new data sources, updating market baskets, and adjusting for quality improvements.
   D) Ignoring changes in consumer spending patterns.

   Answer: C

10. Why is accurate inflation measurement important for households and policymakers?
    A) It determines corporate profits.
    B) It affects wages, government benefits, tax provisions, and monetary policy decisions.
    C) It automatically sets interest rates.
    D) It replaces GDP as the primary measure of economic activity.

    Answer: B

True / False Questions

1. The Consumer Price Index (CPI) measures changes in the prices consumers pay for a representative basket of goods and services over time.
   Answer: True

2. When comparing how the price of a good changes over time, it is best to use the nominal price to more accurately account for inflation.
   Answer: False

3. Measuring inflation becomes more difficult over time because businesses change their prices.
   Answer: False

4. If consumers switch from more expensive products to less expensive alternatives, a fixed market basket may overstate the increase in the cost of living.
   Answer: True

5. Measures of inflation are continually being improved to more accurately represent the changes in the cost of living for households.
   Answer: True

6. Quality adjustment helps account for improvements in product features and functionality when measuring inflation.
   Answer: True

7. Core CPI excludes food and energy prices because these prices are often more volatile than other prices.
   Answer: True

8. The Federal Reserve produces the Consumer Price Index (CPI) in the United States.

   Answer: False

9. Economists improve inflation measurement by updating market baskets, incorporating new data sources, and adjusting for quality changes.
   Answer: True

10. Accurate inflation measurement is not an important aspect of policy decisions, such as monetary policy.
    Answer: False

Application Questions

Question #1: Measuring CPI

Questions

Suppose households consume three goods that make up the CPI basket: bread, coffee, and internet service. Table 1 shows their quantities per month and prices.

Table 1. Prices and Quantities in the CPI Basket

Year	Price ($) Loaf of Bread	Quantity of Loaves of Bread	Price ($) Coffee per Cup	Quantity of Coffee Cups	Price ($) Internet (300 Mbps)	Quantity of Internet Service
2026	1.85	8	3.50	30	50	1
2027	1.93	8	3.75	33	47	1
2028	2.02	9	3.80	33	45	1

a) What is the percentage change in the prices of each good for 2027 and 2028?

b) Calculate the cost of each monthly basket using 2026 quantities. To do this, hold 2026 quantities fixed but use each year's prices to calculate the cost of the fixed basket.

c) Now calculate the cost of the basket without fixing quantities.

d) How does fixing the basket help to calculate inflation? Similarly, how does fixing the basket without making adjustments become inaccurate over time?

e) Internet prices listed in the table are fixed at a specific speed. How do you think internet speed will change in the next five years? How can CPI capture this change?

Answers

a) What is the percentage change in the prices of each good for 2027 and 2028?

Percentage change = [(New Price – Old Price) / Old Price] × 100

Bread

2027: [(1.93 – 1.85) / 1.85] × 100 = 4.32%

2028: [(2.02 – 1.93) / 1.93] × 100 = 4.66%

Coffee

2027: [(3.75 – 3.50) / 3.50] × 100 = 7.14%

2028: [(3.80 – 3.75) / 3.75] × 100 = 1.33%

Internet Service

2027: [(47 – 50) / 50] × 100 = –6.00%

2028: [(45 – 47) / 47] × 100 = –4.26%

Bread and coffee prices increased in both years, while the price of internet service decreased.

b) Calculate the cost of each monthly basket using 2026 quantities.

Hold the 2026 quantities fixed at 8 loaves of bread, 30 cups of coffee, and 1 internet service.

2026:
(8 × $1.85) + (30 × $3.50) + (1 × $50)
= $14.80 + $105.00 + $50.00
= $169.80

2027:
(8 × $1.93) + (30 × $3.75) + (1 × $47)
= $15.44 + $112.50 + $47.00
= $174.94

2028:
(8 × $2.02) + (30 × $3.80) + (1 × $45)
= $16.16 + $114.00 + $45.00
= $175.16

The cost of the fixed 2026 basket increases from $169.80 in 2026 to $174.94 in 2027 and $175.16 in 2028.

c) Now calculate the cost of the basket without fixing quantities.

Use the actual quantities purchased each year.

2026:
(8 × $1.85) + (30 × $3.50) + (1 × $50)
= $169.80

2027:
(8 × $1.93) + (33 × $3.75) + (1 × $47)

= $15.44 + $123.75 + $47.00
= $186.19

2028:
(9 × $2.02) + (33 × $3.80) + (1 × $45)
= $18.18 + $125.40 + $45.00
= $188.58

The total cost increases more when quantities are allowed to change. However, this increase reflects both changes in prices and changes in the quantities households purchase, so it does not isolate inflation.

d) How does fixing the basket help to calculate inflation? Similarly, how does fixing the basket without making adjustments become inaccurate over time?

Fixing the basket allows economists to compare the cost of purchasing the same quantities of goods and services over time. This helps isolate changes in prices from changes in how much consumers purchase.

However, a fixed basket can become less accurate over time because consumer behavior and the products available in the economy change. Consumers may substitute toward less expensive products, new products may enter the market, and existing products may improve in quality. If the basket is not updated, it may no longer accurately represent what consumers purchase or changes in their cost of living.

e) How do you think internet speed will change in the next five years? How can CPI capture this change?

Internet speeds are likely to increase over time, even if the monthly price stays the same or decreases. This means consumers may receive a higher-quality service without paying a higher price.

The CPI can account for these improvements through quality adjustments. These adjustments attempt to separate changes in price from changes in the quality of the product or service, providing a more accurate measure of changes in the cost of living.

Question #2: CPI and Policy Implications

Questions

Suppose the CPI reports inflation of 2% over a year. Social Security payments and tax brackets are adjusted using this figure.

a) If digital services are improving rapidly but quality changes are not fully captured, how might the reported inflation rate be biased?

b) How could this bias affect Social Security recipients in real terms?

c) How might the average basket of goods differ for consumers who are working and raising families, compared to those who are retired? Would this difference benefit Social Security recipients? Explain.

d) How could the same bias affect workers whose wages are adjusted using CPI-based contracts?

e) Why is it especially important for policymakers to understand these measurement challenges when designing economic policy?

Answers

a) Reported inflation may be overstated if quality improvements in digital services are not fully captured, because prices appear constant while value rises.

b) Social Security recipients could experience larger benefit increases than necessary to maintain real purchasing power if inflation is overstated.

c) Consumers who are working and raising families may spend a larger share of their budgets on childcare, education, transportation, and other expenses associated with work and children. Retired consumers may spend relatively more on housing and health care. Because Social Security benefits are adjusted using the CPI, the adjustment may not perfectly reflect the changes in prices experienced by retirees. If the prices of goods and services purchased more heavily by retirees rise faster than the overall CPI, Social Security recipients could lose purchasing power. If those prices rise more slowly, they could benefit.

d) Workers with CPI-indexed wages could see real wage gains, as their nominal wages rise faster than the true cost of living.

e) Policymakers rely on inflation measures to make decisions about benefits, taxes, and monetary policy. If inflation is mismeasured, policies may over- or under-compensate households, leading to unintended economic effects.

Innovative Ways to Extend the Lessons

1. **Listen to our podcast!**

    - **Student Assignment:** Listen to the generated podcast summary and reflect: *What is lost or gained when research is translated into casual language? What do you note here that you did not when watching the video? What does the video do a better job of explaining? What do you understand better from both listening to the podcast and watching the video?*

2. **Inflation in Your Life**
    - **Student Assignment:** Choose one product or service you regularly purchase (such as food, clothing, communication, or entertainment). Track its nominal price and note any changes in its quality or features over a five-year period. Discuss whether the change reflects inflation, an improvement in quality, or both. How might economists account for these changes when measuring inflation?

3. **CPI vs. Core CPI**
    - **Student Assignment:** Using the Federal Reserve Economic Data (FRED) website (https://fred.stlouisfed.org), search for different CPI measures and state the definitions for these measures. Construct a graph that compares the CPI (with the entire basket of goods) and Core CPI (without food and energy) over the past five years. The Core CPI can be found by searching for Core CPI (CPILFESL). Identify periods when the two measures moved together and periods when they diverged. What events or changes in the economy might explain these differences? Why do economists and policymakers examine both measures when evaluating inflation?