Assignment 3

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| Note |
| A Microsoft word version of the assignment can be found [here](file:///Users/nathanielcline/Documents/Teaching/Econ%20351/econ_351_website/docs/docs/assignments/assignment3.docx) |

## CPI Practice

The Consumer Price Index represents the average price of goods that households consume. Many thousands of goods are included in such an index. Here consumers are represented as buying only food (pizza) and gas as their basket of goods. Here is a representation of the kind of data the Bureau of Economic Analysis collects to construct a consumer price index. In the base year, 2012, both the prices of goods purchased and the quantity of goods purchased are collected. In subsequent years, only prices are collected. Each year, the agency collects the price of that good and constructs an index of prices that represents two exactly equivalent concepts: How much more money does it take to buy the same basket of goods in the current year than in the base year? How much has the purchasing power of money declined, measured in baskets of goods, in the current year, from the base year?

The data: In an average week in 2012, the Bureau of Economic Analysis surveys many consumers and determines that the average consumer purchases 2 pizzas and 6 gallons of gas in a week. The prices per pizza and per gallon in subsequent years are shown below.

Sample CPI Data

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| Year | Price of Pizzas | Price of Gas |
| 2012 | $10 | $3 |
| 2013 | $11 | $3.30 |
| 2014 | $11.55 | $3.47 |
| 2015 | $11.55 | $3.50 |
| 2016 | $11.55 | $2.50 |
| 2017 | $11.55 | $3.47 |

1. What is the cost of the consumer price basket in 2012?

*2 x $10 + 6 x $3 = $38.00*

1. What is the cost of the consumer price basket in 2013 and in subsequent years?

*2013: $41.80*

*2014: $43.92*

*2015: $44.10*

*2016: $38.10*

*2017: $43.92*

1. Represent the annual cost of the consumer price basket as an index number. Set the value of the index number equal to 100 in 2012.

*Indexes are:*

*2012: 100.0,*

*2013: 110.0,*

*2014: 115.6,*

*2015: 116.1,*

*2016: 100.3,*

*2017: 115.6.*

*Price indexes are traditionally expressed to one decimal point.*

1. Calculate the annual rate of inflation using the percent change in the value of the index number between each year from 2013 on.

*Just as with the GDP deflator, the index number for CPI itself has no interpretation. The percentage change in the index is interpreted as inflation.*

*The rates of inflation are:*

*2013: 10%,*

*2014: 5.1%,*

*2015: 0.4%,*

*2016: -13.6%,*

*2017: 15.3%.*

*Rates of inflation are traditionally to one decimal point.*

1. Is there a year in which inflation is negative? Why does this happen?

*Inflation is negative in 2016. This is a year where there is deflation. Pizza prices have remained constant, but gas prices fell, bringing down the overall price of the consumer basket.*

1. What is the source of inflation in the year 2015? How is that different from inflation in 2013 and 2014?

*In 2015, pizza prices remains the same, but gas prices rise. Thus “inflation” is just because gas prices increased thus making the value of the index larger and generating positive inflation. In 2013 both the price of pizza and the price of gasoline rise by 10% from their 2008 values. This is the more usual idea of inflation – sometimes called pure inflation – where all prices rise by the same percentage amount.*

1. How many baskets of goods can I buy with $100 in 2012? How many baskets can I buy with that money in 2017? What is the percentage decline in the purchasing power of my money? How does that decline relate to the change in the value of the price index between 2012 and 2017?

*With $100 in 2012, I can buy 2.63 baskets (you have to imagine buying only part of a pizza and a part gallon of gasoline). With $100 in 2017, I can buy only 2.28 baskets. The percentage decline in the purchasing power of money from 2012 to 2017 is 13.8%. You can see that the price index increased from 100 in 2012 to 115.6 in 2017. The larger the increase in the price index, the larger the decline in the purchasing power of money.*

1. From 2013 to 2015, the price of a pizza remains the same. The price of gas rises. How might consumers respond to such a change? In 2016, the price of gas falls. What are the implications of such changes in relative prices for the construction of the Consumer Price Index?

*As the price of gas rises, economists expect that consumers would purchase less gas. When it falls, consumers purchase more gas. This means using the 2012 basket to construct the Consumer Price Index could be misleading in both 2015 (gas prices rise a little bit) and especially in 2016, when gas prices fall a lot. The text mentions that the Consumer Price Index basket is changed every two years to try and keep up with both new goods – think the latest model of your phone – as well as large changes in prices of items like gasoline.*

## Okun’s Law

Okun’s law states that when output growth is higher than usual, the unemployment rate tends to fall.

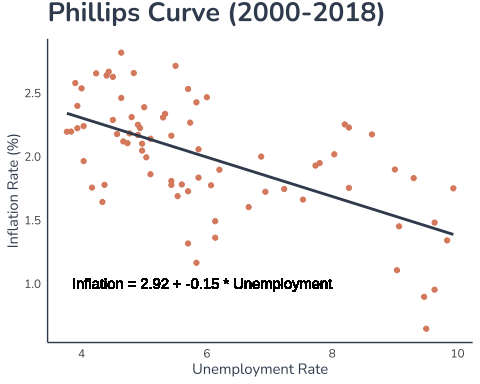
1. Explain why usual output growth is positive.

*Usual output growth is positive as population grows and output per worker grows. Note the implication that economic growth must be positive (between 2.5-3% depending on how Okun’s law is estimated) just to keep employment constant.*

1. In which year—a year in which output growth is 2% or a year in which it is –2%—will the unemployment rate rise more?

*The unemployment rate rises more in a year when output growth is -2%.*

## Phillips Curve



The Phillips curve is a relation between the inflation rate and the unemployment rate

1. Using the Phillips curve estimated above, is the unemployment rate zero when the rate of inflation is 2%?

*The unemployment rate at which inflation rate is 2% is about 5.5%, considerably larger than zero. You solve the Phillips curve expression 2 = 2.93 – 0.17 u for the value of u.*

1. The Phillips curve is often portrayed as a line with a negative slope. In the figure above, the slope is about -0.15. In your opinion, will the economy be “better” if the line has a large slope, say –0.5, or a smaller slope, say -0.1?

*The slope does not, by itself, tell us much about whether one economy is better than another.*

*Assuming the constant in the Phillips curve remains at 2.93, then the Phillips curve with a slope of 0.5 and a constant term of 2.93, finds target inflation hit at an unemployment rate of 1.86%. If the constant term remains at 2.93 and the slope is 0.1, then the Phillips curve, with a slope of 0.1 and a constant term of 2.93, finds target inflation hit at an unemployment rate of 9.3%. You can make an argument that the economy with 1.86% unemployment is better than one with 9.3% unemployment. But it is both the slope and the constant term of the Phillips curve that determine the value of the unemployment rate where target inflation is achieved.*

## FRED

In the FRED database, the series that measures real GDP is GDPC1, real GDP in each quarter of the year expressed at a seasonally adjusted annual rate (denoted SAAR). The monthly series for the unemployment rate is UNRATE.

1. Use FRED to produce a graph of quarterly real GDP growth (percent change) from 1999 to 2010 and paste it in your homework.

A graph showing a line

Description automatically generated with medium confidence

1. Look at the data on quarterly real GDP growth from 1999 through 2001 and then from 2007 through 2009. Which recession has larger negative values for GDP growth, the recession centered on 2000 or the recession centered on 2008?

*The 2008 recession very clearly has larger negative values for GDP growth.*

1. Produce a graph of the monthly unemployment rate (UNRATE) from 1999 to 2010 and paste it in your homework.

A graph showing the growth of labor statistics

Description automatically generated

1. Is the unemployment rate higher in the 2001 recession or the 2009 recession?

*Much higher in the 2009 recession.*

1. The National Bureau of Economic Research (NBER),which dates recessions, identified a recession beginning in March 2001 and ending in November 2001. The equivalent dates for the next, longer recession were December 2007 ending June 2009. In other words, according to the NBER, the economy began a recovery in November 2001 and in June 2009. Given your answers to the previous questions, do you think the labor market recovered as quickly as GDP? Explain.

*The unemployment rate remains high even by the end of 2010, while GDP growth seemed to have recovered by Q4 of 2009. This is sometimes referred to as a “jobless recovery” and the extended unemployment caused a great deal of pain for workers.*