4 Cost of living

4.1 Introduction

From 2020 onwards, there has been an increase in inflation in the United States. The inflation value of a certain period in an economy actually gives us a sense of how much the cost of living increases. How is the inflation indicator created? We have answered this question previously with the GDP deflator. There is another measure which we will discuss in the following section.

4.2 The Consumer Price Index

The GDP deflator is an index that uses both the nominal and real GDP. This means we use the market value of **all** goods and services. There are however goods and services which are more common or important for individuals and households.

Why not create an indicator that can represent the real household basket of goods and services along with their price levels? That's what Consumer Price Index (CPI) is all about.

The CPI is an index of price levels of a limited number of goods and services. We say limited because the goods and services used are chosen based on a representative household or consumer in the economy.

Let's see an example:

Suppose in our country firms produce hammers, nails, aeroplanes, computers and apples. You establish that the most important goods for the average consumer in your country are computers and apples. Then, we obtain their respective quantities and prices from 2020 to 2022, we select 2020 as the base year and we proceed to compute the CPI as follows:

Year	Computers		Apples		Cost of Basket	CPI
	Quantity	Prices	Quantity	Prices		
2020	20	1000	800	5	24,000	100
2021	25	1100	820	9	34,880	145.33
2022	27	1150	870	8	38,010	158.38

Where the cost of basket formula is:

$$Cost\ of\ Basket\ for\ year\ t = \sum_{i=0}^{N} P_{it} * Q_{it}$$

The CPI formula is as follows:

$$CPI\ of\ year\ t\ = \frac{Cost\ of\ Basket_t}{Cost\ of\ Basket_{base\ year}}$$

We can get the inflation rate from this index, too. The formula will be given as

$$Inflation\ of\ year\ t\ = \frac{CPI_t}{CPI_{t-1}} - 1$$

4.3 Which to choose? The GDP Deflator vs the CPI

As previously said, the GDP deflator takes into consideration all the goods and services produced in the economy. On the other hand, the CPI takes into account only a subset of those goods and services that represent what an average consumer buys.

For example, in India, we have Toyota cars imported and bought by its people. The deflator GDP won't necessarily take into consideration the Toyota cars' market value since these cars are not produced in the country, they're actually produced in the US. However, it might be considered in the CPI computation in case those cars are commonly purchased in India. So CPI can reflect better the inflation rate from the consumer's perspective.

However, the CPI considers a basket of goods and services determined in the base year. You might deduce that this basket of goods and services makes a good representation of the consumption of households and individuals for the base year and close years.

The base year selection is done by government officials and you need to wait for their pronouncements of a base year change to have a more accurate CPI. The GDP deflator doesn't have this problem at all, because it uses all goods and services produced.

The GDP deflator and the CPI might differ in their inflation rates, but you should not expect very different behaviour from them. Both tend to have a similar pattern.

4.4 Do I earn enough to make ends meet? Real vs nominal variables

Meanwhile, you learned previously that you can have a nominal and a real GDP. Can we deduce that, in economics, every single variable can be described as nominal and real? The answer is, yes. And interest rates don't escape this topic.

Nominal variables are variables whose value is in currency units. For example, your salary of 1000 dollars is a nominal variable. Your salary in real terms would be given in "goods" amount.

For example, imagine that we only eat oranges in our economy and their price is 2 dollars. Then our salary in real terms would be 500 oranges.

Why? Because:

Salary in real terms = 1000 dollars / 2 dollars per orange = 500 oranges.

In real life, you would use the CPI or the GDP deflator. Using the 1000 dollars salary and the CPI inflation example from above, we can calculate our salary in real terms:

CPI	Real Salary
100.00	10.00
145.33	6.88
158.38	6.31

You see that your real salary is decreasing, right? Let's discuss this in the following sections.

4.5 Interest Rates

You might have heard a lot about this concept, while obtaining a loan, lending some money, trading, talking about investment costs, etc. An interest rate is a proportion of an amount lent, deposited or borrowed (named capital). The interest amount will be the interest rate multiplied by the total capital. In the GDP computation, you learned that landowners or physical capital owners receive a rent or interest amount for lending their property. Banks also receive interest for lending their money. Usually, an investment agreement has an interest rate to be charged.

Households and businesses are always checking interest rates from the economy to determine their consumption or investment decisions appropriately.

4.6 Are you sure you have a decent annual return in trading?

When you go to your bank and request a loan, they will tell you the exact interest rate they will charge you. When you invest, you always want to know how much interest or return you are going to make per year. The same when you trade.

Suppose you started trading on December 1st 2021 in the US markets. You opened a brokerage account with $100,000. At the end of November 2022, you got a decent 14.1% return from your trading i.e. $14,100 At that point, you were happy and celebrated your fabulous year.

However, we have not only nominal but also real interest rates. How do we compute the real interest rate? Let's see the formula:

$$r = \frac{(1+i)}{(1+\pi)}$$

Where:
r: Real interest rate
i: Nominal interest rate
π: Inflation rate

A log-approximation formula can be given as

$$r = i - \pi$$

So, coming back to your trading return, what about if we tell you that the annual inflation rate for the same period in the US was 7.1%?

You immediately think about what we're learning and you say: Uh oh! My real return is 7%!

Yes!

In the example of your salary in real terms, your salary in nominal terms didn't change throughout the 3 years, but in real terms, it was decreasing!

You should not only check your nominal return, as a trader or investor, you should always care about your earnings or returns in real terms.

The conclusion is the following: Whenever inflation is positive, you will see a decrease in your purchasing power and your investment returns in real terms. When it is negative, you will see an increase in your purchasing power and your investment returns in real terms.

For the coming years, while trading, keep in mind this important difference between nominal and real variables.