

# Title: Principle of Economics

## Measuring the cost of living

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🔊 [0:00]

In chapter 24 we will continue discussing the aggregate income or aggregate amount of output in the economy at different points in time.

So we will focus on the changing price level or the changing cost of living in different time periods.

In chapter 23 we introduced the GDP deflator as a measure of the increase in the cost of living.

In chapter 24 we will introduce a new measure of inflation that the consumer price index.

And at the end of the lecture we will compare CPI with the GDP deflator and we will realize that there are several differences between them.

CPI is more relevant to people and to policy makers for several reasons.

So in terms of use it's more important for us to understand the definition of consumer price and its careful interpretation than the GDP deflator.

If you should think that GDP deflator and the consumer price index are not the only measures of changing price level in the economy.

Consumer price index focuses on goods bought by households and private individuals but other members of the economy might be interested in other bundle of products.

And for that reason we can also talk about producer price index or the exports price index or the raw materials price index which include a different set of products in the evaluated bundle.

And if the price index ease compared have the same base year such as year 2000, we would find that in year 2000 all the price indices have this same value but they would generally have different values in years after and years before 2000.

Okay?

Looking at this graph it would be interesting to compare the consumer price index



with the GDP deflator.

In general we would find that they increase at a similar rate.

But for example the raw materials price index increases at a much faster rate especially after year 2000 and that comes from the factor that raw materials include gasoline and other natural resources and in recent years there has been great growth in the price of gasoline.

So we find this interesting very high growth rate.

Okay?

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How do we calculate consumer price index?

So, consumer price index measures the change in the price of a bundle that consumers typically buy.

That means that we have to first fix the bundle that a typical household will buy.

And, we have to find prices for all of the goods in that bundle in different years.

And, we compute the price of the entire bundle in different years.

So, the idea is that we have a fixed bundle that a typical household buys overtime and we evaluated using prices in different time periods.

And, we would say that consumer price index is the price of the total basket in the year of interest divided by the price of that same basket in a base year times one hundred.

Again, that we would say that if CPI is greater than one hundred then prices have increased overtime.

If CPI is less than one hundred prices have decreased in the economy.

To get to the variable interest which is the inflation rate we would subtract CPI in one year from CPI in the previous year we would divide by the original level of CPI and here you should think that well.

So, this means that this will be the percent change in CPI between two years divided by one hundred and if we multiply them by one hundred we will get numbers which are the percent growth in prices between two years.

Okay? So the result of this calculation might be something like five which would be interpreted as inflation rate of five percent.

Finally if the...we are not evaluating two neighboring years, if these two years are separated by two, three, or ten years we might want to include account for the number of years between them to calculate the annual inflation rate.

In which case we would look at the ratio of CPI between the two yearstake a root of that ratio where the parameter of that root is the number of years between the base year and current year, minus one that gives us the annual inflation rate between any arbitrary two years.

What is the bundle that consumers buy composed off?

In the US we would find that about forty percent of CPI is ...expenditures on housing.

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Fifteen percent each on transportation and food and then various miscellaneous expenditures.

Here you should think that in each country consumers buy a different bundle of products.

So for Korea we would get a different composition of CPI bundle.

And if we look at the growth in the prices of individual components of the CPI bundle, we would also find great variation.

For in this graph, I'm showing the change in prices in the components of CPI.

So the CPI started at one hundred and in the following twenty five years we can see that some components of CPI decrease significantly in that price such as high technology products.

Whereas some services such as college tuition, medical care, housing increased at a very high rate.

So here, it's important to keep in the back of your head that we're talking about a bundle of different products and these products don't change...don't experience the same inflation over time.

Some products become significantly cheaper or significantly more expensive over time.

That's related to some of the problems in interpretation of CPI.

We'll say that the CPI suffers from 3 problems.

It misses measures, the true cost of living or the true changes in prices that consumers face because of three reasons.

One is a substitution bias.

So, we've seen on the previous slide that some goods become much cheaper than before or much more expensive than before.

So naturally we would expect consumers to adjust the consumers will buy more of the relatively cheaper goods in future time periods.

But CPI doesn't allow that.

For CPI, we're using the same basket of products in different years.

We're not allowing consumers to substitute from more expensive to cheaper products.

Other 2 issues are the unmeasured quality changes and introduction of new goods.

The one issue with these...so here the idea is that products sold in the market place change over time.

If we have a new product in the market place such as an iPod to value the...to include iPod in the CPI basket, we would have to know pre-existing prices of an iPod.

And you would think that for when you goods are introduced we don't know what their prices would be in previous years.

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Or if a product is a significantly improved overtime, you may think that mobile phones today are very different product than mobile phones 10 years ago.

And comparing the prices of this product in different time periods will give us a very biased view how the cost of living has changed.

So, for these three reasons, we may think that CPI overstates the true changes in the cost of living overtime.

And this issue is important b/c CPI is quoted by very often and government publications and evaluation reports some compensations are linked to the CPI in the economy, such as the pensions received by the retired people are adjusted and annually for the CPI.

And, If CPI overstates the amount of changes and the cost of living, then the government will be compensating certain members of the society at a greater and greater level over time.

Generally these three sources of a bias result in an overstatement of true inflation by maybe 1 percentage point of each point of inflation.

So, if the CPI tells us that prices have increased by 4% in a given year, in the back of your head, you should perform an additional calculation and you would say that "Well, that probably means that prices have increased only by 3% or 3.5%"

So now we have introduced CPI and GDP deflator as two alternative measures of inflation.

How are they different, will they give us roughly the same answer and let's explore this issue a little bit.

So CPI measures the cost of a fixed basket of product purchased by consumers.

And we evaluate, so we have a fixed basket of products and we compare the prices today with prices in a base year to calculate inflation.

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GDP deflator compares the currently produced, domestically produced products and again it compares the prices of these currently domestically produced goods with prices in a base year.

So notice that CPI talks about consumption goods what typical households buy and GDP deflator talks about the actual production.

So one difference is that this (CPI) is about consumption, this (GDP) is about production.

Right?

This (CPI) is about domestic consumption, this (GDP) is about domestic production.

### 🔊 [14:40]

Notice that this is a fixed basket of products whereas here the basket of products changes in every year.

So, when you think a back of the two...of the three problems with the CPI you may think that GDP might suffer from different biases, in particular GDP deflator might not suffer from the substitution bias because the bundle produced in the economy every year gets updated.

When we compare GDP deflator and CPI, in fact, we observe that GDP deflator is...usually lower than the CPI that comes in one part from the substitution effect within the CPI that is not present within the GDP deflator.

...So, if we look at this figure there are several interesting things to note.

One, both measures of inflation are always positive.



That means that between 1965 and 2000 in the US economy prices always increased, they never decreased.

We always had inflation rather than deflation.

Second thing that i mentioned is that the CPI is generally greater than the GDP deflator because of the substitution of...bias in the CPI.

But note is that CPI can be lowered than the GDP deflator because we are measuring two different bundles of products.

CPI is talking about consumption by domestic consumers.

GDP deflator talks about products produced by domestic companies.

One additional thing that we might observe from this figure that is that...CPI seems to vary more than the GDP deflator.

And, one possible interpretation of that is that because CPI measures consumption by domestic consumers it includes imports of products from abroad.

And, if there is variation in exchange rates between our economy and the rest of the world the prices of imports could...vary overtime simply because of exchange rates.

GDP deflator on the other hand, only includes domestically produced products...and it's uses domestic market prices of the products so you should think that this...these domestic prices will not be heavily influenced by exchange rates.

So, if we think that the fluctuation in exchange rates in the real world is significant that could explain why the CPI varies more overtime than the GDP deflator.

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So that concludes our discussion of the size of an economy and a comparison of the size of the economy between different time periods.

In the next few chapters, we will look at productivity by workers in a domestic economy

We will look at to the domestic a labor market and the definition of an unemployment rate and we will look at the determinants of the saving and investment in the economy.