

# *Science You Can Use*

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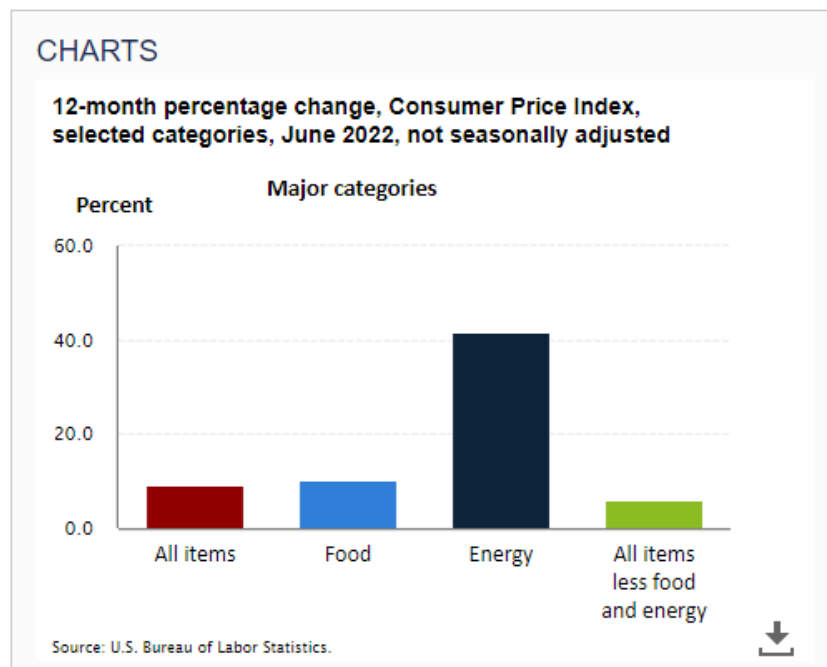
**Dear Science:** It seems to me like the price of gasoline in the US continues to increase with no end in sight. My income never seems to keep up with it. Is this a short-term problem or a siege? -- Buck R.

**Dear Buck:** The answer to your question depends on the time-scale you consider and how much money you have left, over that same time-scale, after paying for “essentials” such as food and housing. Let’s look at two cases: (1) the last year (“short-term”), and (2) 1978 to the present. (1978 was the most recent year in which inflation was as high as has been over the last year.)

*Gasoline prices over the last year.* The price of gasoline posted on gasoline pumps in the US rose from about \$3.30 per gallon, to about \$5.00 per gallon, from June 2021 to June 2022, a difference of \$1.70 per gallon (about 50%). On the surface, this sounds “big”, but “big” is such only relative to the cost of something else essential. Assume you drive about 10,000 miles per year and that your car(s) makes about 25 miles per gallon. Then you would have to pay (  $(10,000 \text{ miles/year}) / (25 \text{ mpg}) \times \$1.70/\text{gal} =$  ) \$680 more *per year* (about \$55/month) at the June 2022 price than you would have paid at the June 2021 price. Compare this increase to the cost of food. Suppose you paid about \$1000/month (about \$10,000/year) for food, June 2021 – June 2022. Then the increase (June 2021 to June 2022) in what you paid for gasoline is comparable to a 5.5%/year increase in what you paid for food. Even at \$5/gallon of gas, you would pay  $(\$10,000 / ((\$5/\text{gallon}) \times 400 \text{ gallons}) = )$  five times as much for food as for gasoline.

The price of food, moreover, did not stay constant from June 2021 to June 2022 – it increased, in total, about 10% (see Figure 1; <https://www.bls.gov/cpi/>). (If you are reading this column in an electronic format, you may want to use a “Zoom (in)” function on Figure 1 to make it more readable.) This means that the percentage increase in the price of food over the last year was *twice* the percentage increase in the price of gasoline over that same period.

If, after paying for essentials, you don’t have \$55/month available to cover the increased cost of gasoline, the increase in the price of gasoline from June 2021 to mid-June 2022 is a threat to your well-being. If you do have an extra \$55/month you can spare (even if grudgingly) for gasoline, then the increase is merely annoying.



**Figure 1. Percent increase in the price of various consumer items, June 2021 – June 2022** (adapted from Bureau of Labor Statistics, <https://www.bls.gov/cpi/> )

*Gasoline prices 1978 -2020.* There are some important senses in which gasoline prices did not, on average, rise between 1978 and 2020. To see this, let’s define *inflation over a time period T* be the percentage increase in the “All items” category of the Consumer Price Index (an example of the “All items” category is shown in Figure 1; in that Figure, T is June 2021 – June 2022). In 1978, the average price at the pump of gas in the US was \$0.63 per gallon. In 2020, that price, adjusted for inflation, would be \$2.83 per gallon. But in 2020 the average price of gasoline in the US was only \$2.28.

*Gasoline prices as a fraction of inflation-adjusted median income, 1978 – 2020.* Median income is defined as that income at which half of earners receive less, and half, more than that income. Adjusted for inflation, US median income – averaged over a sliding three-year “window” -- remained constant from 1978 to 2021. This fact, together with the fact that the inflation-adjusted price of gasoline remained, on average, constant over the same period, implies that the inflation-adjusted cost of gasoline was a *constant* fraction of the inflation-adjusted median income. That’s not necessarily the good news. If your income was less than the inflation-adjusted median income during this period, you had to spend a larger fraction of your income on gasoline than people whose inflation-adjusted median income was equal to or greater than the median inflation-adjusted income during this period.

*The recent sharp rise in gasoline prices is not unique.* During 2003-2005, 2007-2008, 2009-2011, and 2016-2018, the percentage rate of increase non-inflation adjusted gasoline prices was

as high as the percentage rate of increase during 2020-present. The current percentage rate of increase in non-inflation-adjusted gasoline gas prices, that is to say, is far from unique.

All this said, there is a good reason, Buck, why even if you received three percent income increases every year, you just can't keep up with inflation: increases in wages and salaries have typically lagged rises in the cost of essentials. Income and cost of living may balance, on average, on a scale of three years, but bills, on average, are due "within 30 days".

For further information, see Bureau of Labor Statistics, Consumer Price Index, <https://www.bls.gov/cpi/>.

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