

Using US CPI weights to help assess the macroeconomic impact of the COVID 19 response or:

“What happens to the CPI when there is no toilet paper?”

Price indices, such as the US Consumer Price Index (CPI), are based on monthly surveys of prices of thousands of goods and services consumed by “average households”. The CPI is widely used for indexing various payments, such as Social Security, as well as provide a snapshot into the overall increase/decrease in the “cost of living”, useful for establishing a baseline for wage negotiations.

Producing a CPI requires two operations.

The first is to determine the average household’s “consumption basket” and derive the weights for each item in the basket. The individual weights are equal to the *proportion of total spending* accounted for by spending on the individual item (good or service).

A consumption survey is undertaken each year of what is believed to be a representative sample of households. This identifies what portion of total spending is spent by an “average” household on various broad categories of spending subcomponents. In the US, the primary components of spending are categorized under “food and beverages”, “housing”, “transportation”, “medical care”, “apparel”, “recreation”, “education and communications”, and “other”.

Those broad categories are broken down into more narrow components, for example, “apples”, “bread, cakes, cupcakes and cookies”, form part of “food and beverages”; “gasoline”, “auto repair”, “tires”, and “public intracity transportation” form part of “transportation”; “music lessons”, “event admissions”, “sports equipment” fall under “recreation”. The narrowest subcategories are then identified with specific products or services¹. For example, household electric bills from the local utility company, (e.g. Con Ed in New York), gasoline of a certain octane sold by specific companies (e.g. Mobile).

The US CPI weight for “bread” is .196 percent of total spending, and for “cakes, cupcakes and cookies” it is .175 percent. Thus, out of total monthly spending of, for example, \$5,000, the CPI basket survey indicates the average household spends \$18.55 on bread, cakes, cupcakes and cookies.

When in 1992 I began working with the countries of the former Soviet Union, I was astounded to find that the weight of bread in their CPIs was in the range of 33 - 40 percent. In other words, 1/3rd of their spending was on bread. There simply was not much else to buy while rents, utilities, and public transport were extremely inexpensive. In other words, out of total monthly spending of 1,000 rubles, it was estimated that the average household spent about 350 rubles on bread alone.

Once the item weights are determined in a CPI, it is necessary to identify the individual products and services whose prices will be observed each month in various markets throughout the country. In the countries of the former Soviet Union, this task was originally not difficult. If all the bakeries were state-owned, all charged the same price for a standard product (wheat loaf) and they changed prices infrequently, it was a trivial task to get the cost of 33-40 percent of the price index. A single state employee would need only call one bakery and get one price.

In a diversified market economy, it takes a significant amount of work to survey prices. There might be a dozen or more types of bread in a US supermarket whose prices might vary from location to location

¹ For more information see <https://www.bls.gov/cpi/tables/relative-importance/2019.pdf>

even within the same city. When it comes to toilet paper, there are various brands, various qualities, various size rolls, various packages of rolls, some of which are on sale at different stores. Decisions must be made as to how to come up with a representative quality and size package of toilet paper so that from month to month the survey is tracking the price of the same item “toilet paper”.

“BLS data collectors visit (in person or on the web) or call thousands of retail stores, service establishments, rental units, and doctors' offices, all over the United States to obtain information on the prices of the thousands of items used to track and measure price changes in the CPI. We record the prices of about 80,000 items each month, representing a scientifically selected sample of the prices paid by consumers for goods and services purchased.”²

I mention “toilet paper” because I suspect just about every household in America has seen barren store shelves where paper products used to reside. And they might easily imagine a price checker walking down the aisle and wondering...hmm...if there is no toilet paper does the posted price matter?

A more serious issue than how to handle no products to price in the stores is to what extent the CPI weights can give us insight into the response of the economy and consumers to closure of dine in restaurants, working from home, suspension of schools and sporting events as well as the liquidity impacts of potential deferral of mortgage and student loan payments.

A big caution before I start:

THESE NUMBERS PERTAIN TO A MYTHICAL AVERAGE CONSUMER THAT DOES NOT EXIST NOR CAN EXIST

THEY DO NOT APPLY EXACTLY TO ANY REAL PERSON OR HOUSEHOLD

THEY ARE BASED ON URBAN CONSUMERS' SPENDING HABITS AND THE PRICES THEY FACE IN METROPOLITAN AREAS (about 93 percent of the US population). INFLATION FACED BY RURAL CONSUMERS MAY DIFFER SIGNIFICANTLY

HOUSING COSTS REPRESENT AN AVERAGE OF RENTERS' COSTS AND HOMEOWNERS' COSTS

Below is a table showing the primary components of the US CPI and the weights in the index:

Primary US CPI Spending Groups	%
Housing	42
Transportation	16
Food & Beverages	15
Medical Care	9
Education & Communication	7
Recreation	6
Apparel	3
Other	2
Total	100

² <https://www.bls.gov/cpi/questions-and-answers.htm>

The US CPI weight for food and beverages is 14.8 percent.

The sub-category “food at home” is 7.6 percent & “alcoholic beverages at home” .57 percent.

The sub-categories “food *away* from home” & “alcoholic beverages *away* from home” are 6.2 and .45 percent, respectively.

That “away from home” sub-category is broken down further into “full-service meals and snacks” equal to 3.1 percent & “limited service” 2.7 percent. The remainder is primarily food at employer establishments and at schools and food at vending machines and mobile locations such as food trucks.

Since “full service” dining establishments and bars are largely closed owing to the COVID 19 response, as well as schools and employer canteens, one could argue that were the Bureau of Labor Statistics (BLS) to do a flash survey of consumption habits, the “weight” on those items would likely fall to almost zero. Those categories account(ed) for about 3 1/2 percent of consumer expenditure.

We might also see significant declines in conventional take-out, i.e. drive through establishments, owing to general “shelter in place” directives. In dense urban areas there may be some compensatory traffic from walking through the “drive out” and from delivery to home. If we assume the limited service food away from home number stays at 2.7 percent, the question is where will the proportion of expenditure formerly allocated to the other dining away from home be reallocated?³

In considering the ultimate impact on spending and production in the economy of the various reallocations occurring as a result of the COVID 19 response it is useful to consider whether reductions in spending allocation are temporary or permanent and whether there are readily available substitutes for goods and services being impacted.

For example, if we make the assumption that the proportion of consumer spending on food is fairly stable, then most of the spending that had been allocated to “away from home” will be reallocated to the “food at home” category. Should this be the case, the impact on GDP, the production side of the economy, should be felt on the services side not on the raw materials or “raw food production” side of the economy. The GDP related to the work of cooks, wait staff, cleaning, managing, etc. will be lost and unemployment in that sector will rise sharply.

Indeed, measuring GDP from the income side (adding together all domestic wages, profits, and rents) will give a decline in GDP essentially equivalent to the lost income. However, it could be suggested that this is an overstatement of the loss of production owing to the fact that more cooking, serving and cleaning up will be done at home which is not measured in the GDP statistics as it is “non-market”.

As a thought experiment, consider three large families owning three restaurants on a city block. If they each eat all their meals in another restaurant the sales of the restaurants, minus raw materials cost, is measured in GDP. If they each eat only at their own restaurant, no statistical production is measured even though there has been no decline in actual production. (Naturally there are no taxes paid either!).

If we think about spending on recreational activities, they will also fall sharply, as exercise and social clubs close, major sports and cultural events are cancelled, and outdoor activities are sharply curtailed.

³ Note: we are not talking here about changes in the \$ value of expenditure but changes in the proportion of \$ expenditure allocated to certain consumption items.

“Club fees” (.7 percent), “admissions” (.7 percent) “sporting goods” (.6 percent) and “fees for lessons and instructions” (.2 percent) may fall sharply. However, it is likely that certain items, such as “cable and TV subscriptions” (1.2 percent) will see increases in spending proportions as working and distance learning as well as home entertainment become relatively more required. The ultimate impact on the economy will depend on whether certain events, such as the Olympics are cancelled or merely postponed⁴, whether postponed football matches will be made up, etc.

Similarly, one would expect to see an increase in relative spending on “information and information processing” (3.6 percent), comprising telephone services, (2.3 percent), and “information technology, hardware and services” (1.3 percent). Btw, according to the current CPI weights, the average American household spends 4.8 times as much on wireless service plans as land-line plans.

Transportation is another primary group where one would expect to see decreased relative expenditure during the period of active distancing owing to COVID 19. Airline fares account for .8 percent of total spending which has sharply fallen, and CNBC reported on 3/23/2020 that US consumers might spend \$20 billion less on gasoline in April 2020.

Oh, and lest I be accused of not answering my own rhetorical question. “Household Paper Products” have a weight of .221 percent in the CPI. How much of that is “toilet paper” I don’t know, but the US Bureau of Labor Statistics will presumably use the previous month’s price(s) to estimate the price of this CPI item. Once paper products become available, they may take the sales weighted average of prices in the future and the past to adjust their estimate for any months when they cannot get actual data.

CPI weights provide interesting information that can give insight into just how relatively important certain sectors of a given economy are. Although it would be interesting to delve into what the CPI tells us about transportation costs⁵ during COVID 19 lockdown, I will conclude by writing about “housing” costs which is the largest primary component of the US CPI.

Housing comprises 42.1 percent of the US CPI, of which:

Rent of primary residence comprises 7.8 percent and

Owners’ equivalent rent of primary residences comprises 22.9 percent.

The concept of rent for a renter is clear, the cash required monthly to remain in their primary residence.

Owners’ equivalent rent of a primary residence is not so clear. If a household owns its primary residence, it does not pay cash rent. One might say that the housing cost of owner-occupied housing is related to mortgage payments (if any) or prices of existing similar homes that have been recently sold but these indicators have obvious drawbacks.

Not household has a mortgage and those that do have varying payment profiles and durations.

Mortgage payments also include amortization of principal, which is essentially a payment to oneself, increasing equity in the home. Sales of comparable houses might also be thought a good proxy for the cost of home ownership but for people who remain in a single home for many years, changes in house

⁴ The 2020 Tokyo Summer Olympic games were postponed to 2021 on 3/24/2020.

⁵ 16 percent of total spending in the CPI index.

prices are not very relevant to their “expenditure” pattern⁶ nor in the direction anticipated. Indeed, rising home prices (associated with an increase in imputed rent) may have a wealth effect as households borrow against the increased equity in their homes and spend more of their income on non-housing items, the opposite of what one would expect with increases in rent for renters’ expenditure.

In order to mitigate these problems with finding a proxy for housing costs when the home is owned, the US BLS attempts to “impute” or estimate the rent that a home owner would have to pay to someone else if they had to rent their home, i.e. what it would cost to rent the house they own⁷. This is done with sampling techniques, observing rental costs for similar homes in similar locations. Although certainly not a perfect way to capture the actual cash costs of owning a home, it does measure the “opportunity cost” of living in the home, i.e. the imputed rent is basically what a homeowner could expect to receive were they to rent their home and to pay were they to move to a similar home—say for a temporary assignment—in a similarly priced locality. The outcome of this technique is to give a reasonably updated and comparable concept to true renter’s costs.

Owner imputed rent does have a significant drawback though, as intimated above, in the sense that rising or falling imputed rent has a much more muted impact on the ability to spend on other expenditure items than rising or falling rents have on renters for the same change in housing costs.

This issue could be overlooked for some purposes were owner imputed rent a small proportion of the US CPI index. But it is not. At 22.9 percent of total household spending, a disaggregated approach to this part of the CPI is necessary. Particularly in that it is largely a non-cash “expenditure”. Unlike the prices of food, apparel, transportation and medical services, volatility in the value of owner equivalent rent neither stress the households’ liquidity situation nor its short-term budget constraint. Certainly not to the extent of volatility in rents.

Mortgage payments and real property taxes do stress owner household budgets. But as noted above, the proportion of expenditure allocated to these items varies widely among individual depending on demographics—older owners are likely to have lower or no mortgage payments. And those numbers are not available from the CPI weights. It is thus not obviously clear how effective mortgage payment delays or property tax deferrals would be compared, for example, to direct household income support.

In this context I think it will be important to take a disaggregated look at inflation for the next several months, particularly excluding imputed rent, during this time. That (significant) component of the CPI is not relevant in assessing the cost of living while American families respond to COVID 19. Furthermore, it is clear that going forward, for a time, American families will be allocating an increased proportion of their spending on staple items and vastly less on items such as “full service dine in food” & “air travel”.

These examples are just an illustration of a more general idea.

In attempting to forecast and assess the macroeconomic impact of COVID 19 and the measures taken to contain it, we must be mindful of fundamental uncertainty and treat with a great deal of caution any rush to judgement based on frequently ill-understood conventional statistical measures. These standard statistical measures have well-known flaws even in normal times, reflecting their divergence from

⁶ In jurisdictions where real property taxes are linked to changes in annual property prices, increases in property values will generally lead to increases in owners’ equivalent rent although cuts in tax *rates* would mitigate this.

⁷ Note that rent does not include utilities, maintenance, upkeep, household supplies, etc.

genuine “quality of life” measures; the underreporting of non-market work and output; the neglect of accounting for the exhaustion of natural resources, forests, wildlife and human life; as well as the ability of economies to rapidly adjust to changing circumstances that make “baselines” for comparison quickly out of date. In normal circumstances, for comparative purposes, economists and analysts may dismiss casually these defects, but when the structure of the economy, spending and production are changing extremely rapidly, we need to be very careful before rushing to judgement.

Stay safe.

©Peter Stella
All Rights Reserved
Central Bank Archaeology
March 2020