Inflation and the U.S. Census Bureau's Economic Indicator Programs

Paul Bucchioni, John Hatley, James Hunt, Scott Scheleur, and Deanna Weidenhamer, U.S. Census Bureau

September 2022

In the recent July 2022 Consumer Price Index (CPI) published by the Bureau of Labor Statistics (BLS), the price index for All Urban Consumers (CPI-U) reached a growth rate of 8.5% from July 2021 for All Items. Drilling into the release provides even more evidence of these price impacts. The CPI-U for Food increased 10.9% on a year-over-year basis, highest since March 1979[1]. See Figure 1 below for a look at the 12-month increases in the CPI-U for All items, Food, Energy, and All items less food and energy.
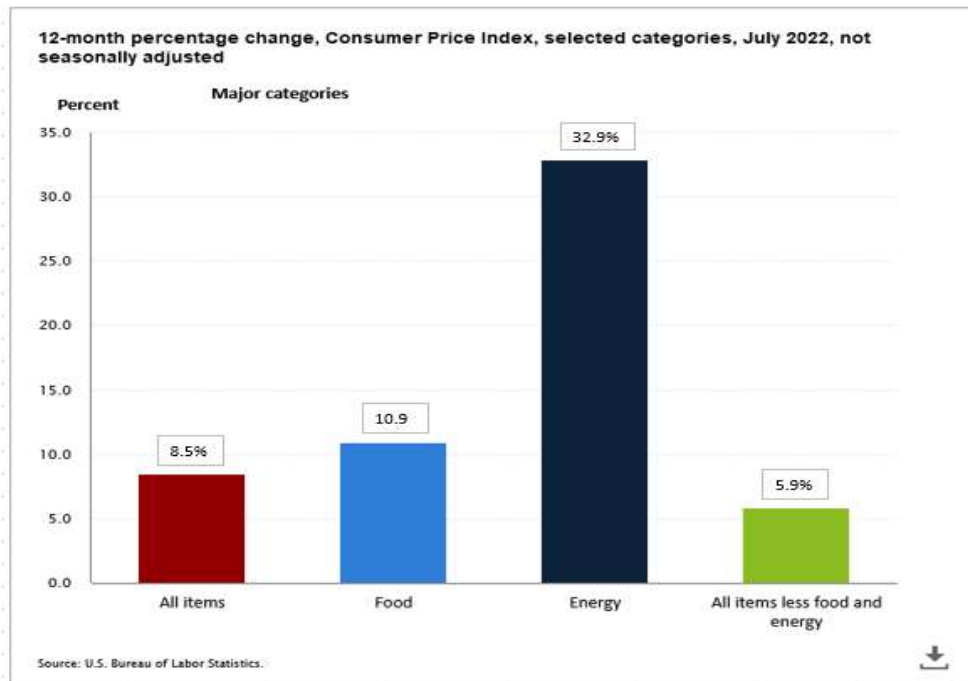

Figure 1: 12-month percentage changes, BLS, Consumer Price Index, July 2022[2]

U.S. Census Bureau Economic Indicators

The Census Bureau produces 13 economic indicators on either a monthly or quarterly frequency. These indicators (and related non-indicator products) are known for their quality, consistency, and longevity. These official statistics are often referred to as the "gold standard" for the sectors and topics they measure. Public and private data users utilize these indicators for everything from metrics on the current state of the economy to forecasting future economic performance. In addition, our sister agency, the Bureau of Economic Analysis (BEA), feeds the results of many of these surveys into the quarterly calculation of the Gross Domestic Product (GDP).

---

[1] Consumer Price Index release, Bureau of Labor Statistics, July 2022, Table 7. Consumer Price Index for All Urban Consumers (CPI-U): U.S. city average, by expenditure category, 12-month analysis table
[2] Consumer Price Index release, Bureau of Labor Statistics, July 2022, Graphics for Economic News Release

While these indicators provide insights into the U.S. economy, many of these indicators are presented on a nominal basis. That is, there are no price adjustments applied to those economic indicator estimates. Without these adjustments, it can be challenging to identify the true underlying trend from these indicators released each month/quarter.

The BEA, as part of the GDP calculation, does translate the nominal estimates generated from these indicators into real estimates primarily utilizing Census Bureau data in conjunction with the Consumer Price Index (CPI) and Producer Price Index (PPI) from the Bureau of Labor Statistics. This results in a comprehensive presentation of quarterly data on a real basis for use in understanding how the U.S. economy performed in any quarter.

While these real estimates generated each quarter present the underlying trends, how might one attempt to create approximations of real dollar estimates for a given indicator release? To investigate this, we can look at the Advance Monthly Sales for Retail and Food Services.

Advance Monthly Sales for Retail and Food Services

The Advance Monthly Sales for Retail and Food Services (often referred to as MARTS) has been a highly sensitive principal federal economic indicator since the 1950s. Released approximately two weeks after the reference month, the MARTS estimates are a closely monitored barometer of consumer spending and is one of the first economic indicators released by the Census Bureau each month.

The MARTS[3] estimates are based on a monthly survey of approximately 5,500 retail and food services businesses. Each month, these businesses are asked to provide sales for the preceding month, but no price or quantity information. This sample is a sub-sample of the larger Monthly Retail Trade Survey (MRTS), which collects sales, end-of-month inventories, and e-commerce sales from approximately 13,000 retail and food services businesses. After the MARTS release, the sales estimates are replaced the following month by estimates from this larger MRTS[3] sample.

The MARTS presents nominal sales on both a not adjusted and seasonally adjusted[4] basis, as well as month-to-month, quarter-to quarter, year-to-year, and cumulative year-to-date trends for the retail sector and food services sub-sector as defined by the North American Industry Classification System (NAICS). These estimates are price adjusted by the BEA and fed into their respective components within the Personal Consumption Expenditures (PCE) piece of the GDP.

The MARTS data can be misleading if you do not acknowledge the role inflation (or any price change) plays in the trends shown in the release. In certain cases, the price change can be the primary reason for a nominal increase or decrease and potentially obscure an underlying trend that could even be in the

---

[3] Estimates in the MARTS and MRTS releases are subject to sampling and nonsampling error. Additional information on the survey methodology, including sampling and nonsampling error, may be found at https://www.census.gov/retail/how_surveys_are_collected.html

[4] The seasonal adjustment for MARTS includes adjustment for seasonal variation, as well as holiday and trading-day differences. More information can be found at https://www.census.gov/topics/research/seasonal-adjustment.html

opposite direction. With that in mind, we examined options to conduct some high-level price adjustment using MARTS data and corresponding CPI-U series as inputs.

Price Adjustment Approach

As we look to price adjust MARTS estimates to shed light on underlying retail trends, it's important to understand that this is an attempt to utilize high-level data from Census and BLS to roughly approximate real retail spending. This is <u>not</u> an attempt to approximate the real spending estimates that the BEA will show in their quarterly GDP release nor their monthly consumer spending estimates.

The MARTS release[5] contains monthly estimates for Retail Trade (NAICS sector 44-45) and Food services (NAICS subsector 722). In addition, MARTS includes estimates for the twelve (12) 3-digit NAICS subsectors within retail trade. Utilizing CPI-U estimates from the BLS' Consumer Price Index (CPI) release in conjunction with the MARTS related estimate, we can generate aggregate price adjustments. Some examples:

MARTS Series Name	CPI-U Name
Retail Trade and Food Services	All Commodities Index
Grocery Stores	Food at Home
Gasoline Stations	Gasoline (all types)
Food Services & Drinking Places	Food Away from Home

Table 1. MARTS time series matched to a comparable BLS CPI-U price index.

By utilizing these series from both agencies, a direct calculation can be done using these two series to price adjust the nominal MARTS series. While these methods may not generate the most precise price adjusted data, they can serve as a measure for how prices are impacting the nominal trends published each month.

The process used was to take the nominal sales number for the series and divide by the deflator to price adjust the estimates. This deflator was developed by dividing the BLS price series by the 2012 average for that same price series to index it.

For simplicity, the BLS CPI-U All Commodities price index[6], rebased to 2012, was used as the deflator for Retail Trade and Food Services. This series was chosen as the closest representation of the coverage of retail sales and food services that is found in the MARTS release since it excludes key sectors like services, housing, education, etc.

This produces a real dollar series one can use to better understand the indicator estimates. This is a different approach from how this is normally done where weighted percentages would be used for each component price index to derive an aggregate fixed-weight deflator. Taking this more detailed approach could be an avenue pursued later but for the purposes of this illustration of price impacts, this direct

---

[5] The MARTS release referenced in this release is the July 2022 release which can be found at: https://www2.census.gov/retail/releases/historical/marts/adv2207.pdf. The most up-to-date retail data can always be found at https://www.census.gov/retail/index.html

[6] The BLS CPI-U All Commodities price index is BLS series CUUR0000SAC which can be found in Table 3 of the CPI release each month at https://www.bls.gov/news.release/cpi.t03.htm

approach can be used as an approximation. See figure 2 for a look at the original nominal time series versus the real dollar series using fixed weights that results from this method.
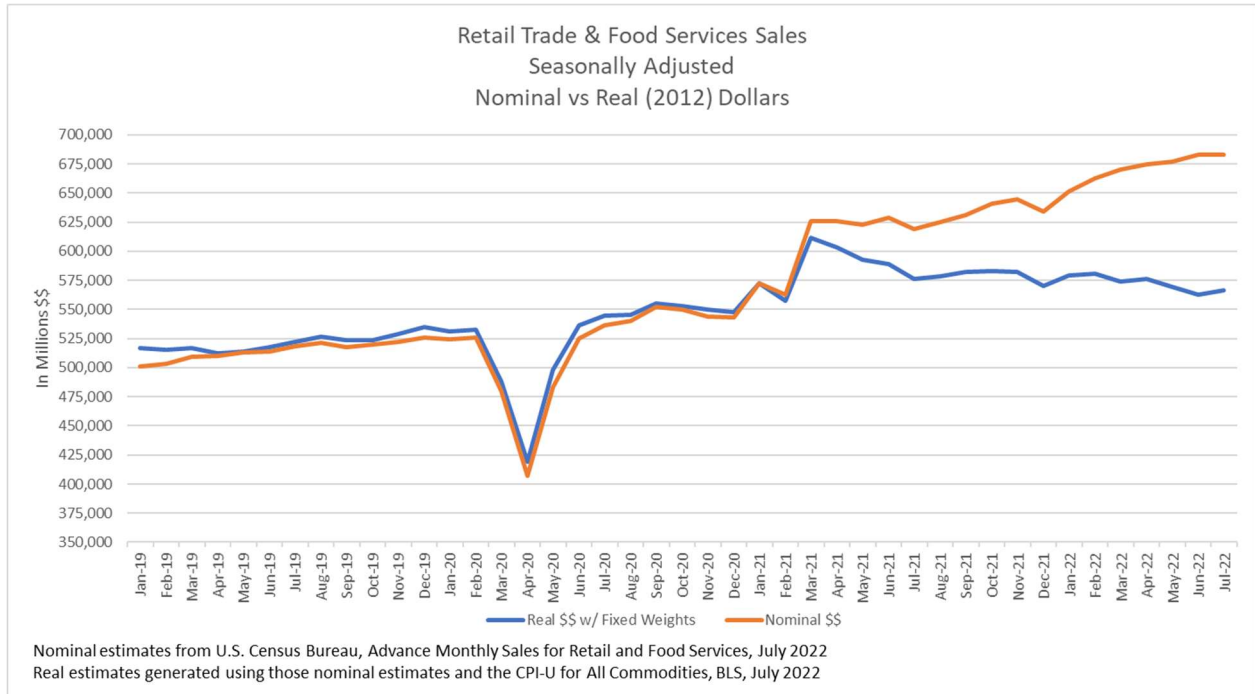

Figure 2. Nominal vs Real Dollar estimates for Retail & Food Services using CPI-U for All Commodities

Using the calculated real dollar estimates shown in figure 2, this process allows calculations of real dollar month-to-month percent changes that can be compared against their nominal counterparts. See figure 3 below for this presentation.
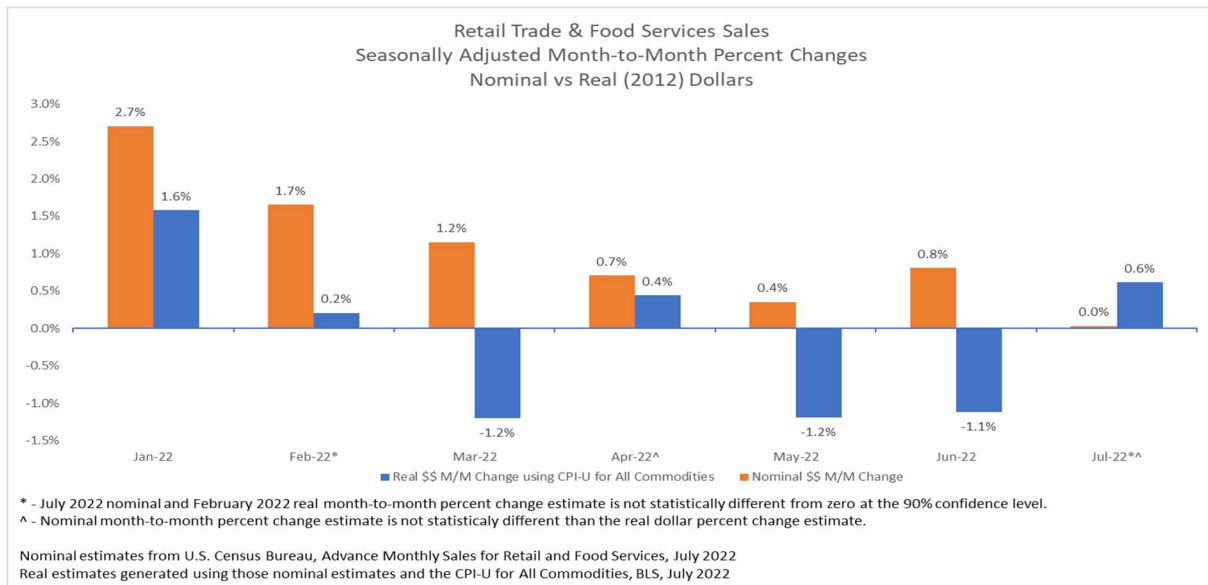

Figure 3. Nominal vs Real Dollar month-to-month percent changes for Retail & Food Services using CPI-U for All Commodities

Similarly, calculations can be done for year-over-year percent changes. Figure 4 presents those results. As with the month-to-month percent changes in figure 3, one can see how the percent changes vary between a nominal and real dollar basis and the different perspective of consumer spending trends. Herein lies the value of adjusting for price changes.
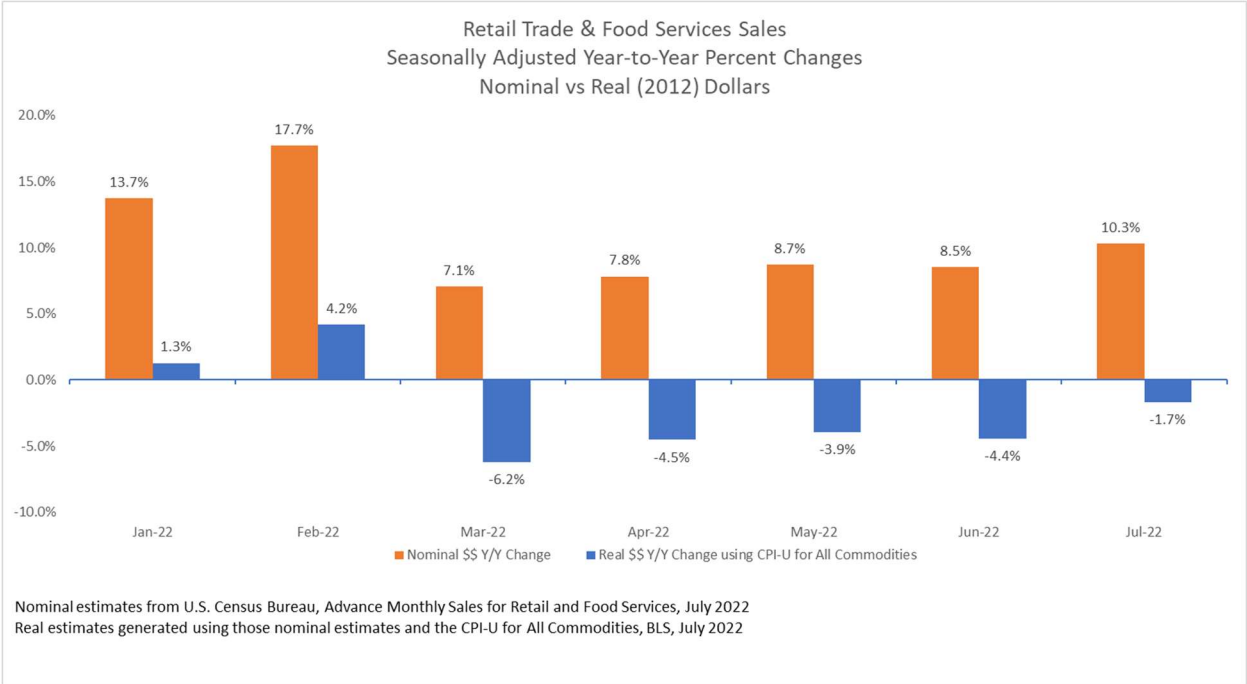

Figure 4. Nominal vs Real Dollar year-to-year percent changes for Retail & Food Services using CPI-U for All Commodities

Summary

Since the U.S. Census Bureau does not publish real dollar estimates for many of its economic indicators, interpreting the meaning of changes in any given month can be a challenge. Utilizing time series from the U.S. Census Bureau along with corresponding price indices from the BLS' Consumer Price Index can provide users with a method to better understand the impacts price changes may be having on the estimates.

The methods presented here for the MARTS do have their limitations. The sales estimates collected each month do not have unit or quantity information and the sample is not controlled to ensure representative product coverage[7] within each NAICS subsector. The methods above also do not try to decompose the estimates to a finer level of detail to use more precise price indices in creating price adjusted estimates. That's what the BEA does as part of the GDP calculations each quarter.

---

[7] The monthly retail samples are controlled to ensure the representativeness of the NAICS industries within a published level, but this does not guarantee the selected companies have a similar product composition to the universe. For more information, see https://www.census.gov/retail/how_surveys_are_collected.html

This effort was done to provide some insight on the price impacts to retail sales and the results should be used with caution. However, the type of price adjustment presented has value for helping data users better understand the role prices may be playing in the nominal estimates released each month.

We want to hear from YOU! Email all feedback to eid.retail.indicator.branch@census.gov