



COVID-19 Working Paper: National Trends in Food Retail Sales During the COVID-19 Pandemic: Findings from Information Resources, Inc. (IRI) Retail-Based Scanner Data

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This paper has been published through USDA Economic Research Service's (ERS) COVID-19 Working Paper series. ERS' temporary Working Paper series is designed to publicly release preliminary analyses relevant to the impacts of the COVID-19 pandemic on agriculture, food, the environment, and rural America in a timely manner. ERS' COVID-19 Working Papers have not undergone the review and editorial process generally accorded official ERS publications, but they have been reviewed by ERS economists and social scientists through an expedited review process.

Abstract

This report summarizes national trends in the level and composition of food retail sales associated with the Coronavirus (COVID-19) pandemic. The analysis primarily uses weekly retail-based scanner data that span the start of the pandemic through March 13, 2022. For the first 2 years of the pandemic, between the declaration of the national emergency concerning the pandemic on March 13, 2020, and March 13, 2022, real food retail sales increased by roughly 10 percent compared to pre-pandemic levels. These increases were especially driven by sales of meat products (including beef, pork, and seafood), although the relative composition of food retail sales roughly returned to pre-pandemic makeup as of March 2021. Real food retail sales during the second year of the pandemic, between March 13, 2021, and March 13, 2022, were 6.6 percent higher compared to pre-pandemic levels. While total nominal food retail sales varied across States, changes in national-level nominal sales largely explain changes in sales over time within each State. Changes in real food retail sales generally mirrored changes in the number of transactions taking place at food service establishments, but during March and April 2020, real food retail sales rose faster than the rate at which the number of food service transactions fell.

Keywords: COVID-19, Coronavirus, food at home, food away from home, food expenditures, food prices, food retail, food sales, Information Resources, Inc., IRI, The NPD Group, NPD, pandemic, proprietary data, scanner data.

Acknowledgments

The analysis, findings, and conclusions expressed in this report should not be attributed to Information Resources, Inc. (IRI) nor The NPD Group. The authors thank USDA, Economic Research Service (ERS) reviewers Diansheng Dong and Monte Vandever and Shawn Arita from the Office of the Chief Economist for their helpful comments. We also thank Elaine Symanski, Christopher Whitney, and Adele Wilcoxon of USDA, ERS for their editorial and design assistance.

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Summary

What Is the Issue?

The Coronavirus (COVID-19) pandemic wrought major disruptions to all aspects of life, including the food and agricultural sector and the broader U.S. economy. In the weeks following the national emergency declaration concerning the pandemic on March 13, 2020, States issued extraordinary public safety measures (such as closing in-person schooling, closing or restricting restaurants and other businesses, and issuing stay-at-home orders). Among many fundamental shifts in the U.S. economy, the pandemic and collective public safety response caused substantial changes to how U.S. residents acquired food. To provide information for policymakers and researchers interested in studying the impacts of the pandemic on the food sector, this report summarizes national trends in both the level and composition of food retail sales associated with the COVID-19 pandemic from the week ending March 15, 2020, through March 13, 2022.

What Did the Study Find?

Despite the first documented case of COVID-19 in the United States occurring in January 2020, a meaningful impact on food retail sales at the national level only appeared following declaration of a national emergency. In the first year following the declaration—the week ending March 15, 2020, through March 7, 2021—the following was observed:

- U.S. total real (i.e., inflation adjusted) food retail sales during the first year of the pandemic saw a year-over-year increase (i.e., the change relative to the same time 1 year ago) of 10.7 percent. The largest increase occurred during the first 2 weeks of the pandemic: 57.5 percent during the week ending March 15, 2020, (the maximum value) and 56.2 percent during the week ending March 22, 2020.
- A similarly large year-over-year decrease in the number of transactions at food service establishments occurred 4 weeks later (-46.5 percent the week ending April 12, 2020). This decrease and its timing indicate that stocking up on food at home (as opposed to substituting food away from home) caused much of the initial increase in food retail sales.
- The meat, eggs, and nuts food category saw a 15.3 percent year-over-year increase in real food retail sales and an increase in the share of total food sales from 17.0 percent to 17.8 percent for the 52 weeks before and after the national emergency declaration, respectively. This category was the primary driver of retail sales increases and changes in shares of food retail sales across all categories.
- Within the meat, eggs, and nuts category, the primary drivers of growth were meat products such as beef and pork. These items experienced major supply chain disruptions and large price increases—with a 14.8-percent year-over-year increase in real food retail sales and the largest share of the meat, eggs, and nuts category; as well as poultry and fish, with 12.8 percent and 31.6 percent increases, respectively.

During the second year of the pandemic (the weeks between March 14, 2021, and March 13, 2022), real food retail sales remained roughly 6.6 percent above their pre-pandemic baseline (i.e., compared to 2 years prior). However, the composition of food retail sales largely returned to its pre-pandemic makeup with category shares within 0.5 percent of pre-pandemic values. Finally, year-over-year and 2-years-ago changes in total nominal food retail sales varied substantially across States. However, 60 percent or more of this variation could be explained by national level trends throughout the first 2 years of the pandemic, including substantial increases during the weeks ending March 15, 2020, and March 22, 2020.

How Was the Study Conducted?

The analysis was primarily composed of summary statistics of food retail sales data from retail-based scanner data sources. In response to the pandemic, the USDA, Economic Research Service (ERS) acquired pandemic response scanner data from Information Resources, Inc. (IRI) that was an aggregated version of the annual scanner data historically acquired by USDA, ERS but delivered on a weekly basis. These data included weekly dollar value and volume of food retail sales of aggregate products (e.g., whole milk) that were representative at the national and State level. The products were linked to the same product classification scheme used for the USDA, ERS Quarterly Food-at-Home Price Database. To provide additional context to changes in food retail sales, the analysis also drew on NPD Consumer Reported Eating Share Trends (CREST) Performance Alerts data on changes in the number of transactions taking place at food service establishments and Bureau of Labor Statistics (BLS) Consumer Price Index (CPI) data from the USDA, ERS Food Price Outlook.

Introduction

The COVID-19 pandemic wrought major disruptions to all aspects of life and the U.S. economy, including the food and agricultural sector. In the early weeks following the declaration of a national pandemic emergency on March 13, 2020 (85 FR 15337), States issued extraordinary public safety measures (such as closing in-person schooling, closing or restricting restaurants and other businesses, and issuing stay-at-home orders). These measures, in combination with a voluntary response, induced U.S. residents to substantially increase the amount of time spent at home (Gupta et al., 2020). The U.S. economy fell into a recession in February 2020, with significant increases in unemployment and implications for changes in food spending (Weinstock, 2021; Dong and Zeballos, 2021; Restrepo et al., 2021). The pandemic interrupted almost every level of the food supply chain—especially for meat products like beef and pork—from the farm to food processors, packers, and retailers and food service establishments (Chenarides et al., 2021a; Johansson et al., 2021; Lusk et al., 2020; Mallory, 2021). Evidence also pointed to a substantial increase in the share of the U.S. population (especially the elderly) reporting trouble obtaining adequate food through at least July 2020 (Ziliak, 2021). In response, policymakers took unprecedented action to shore up food supply chains, including aid to farmers (Johansson et al., 2021; Giri et al., 2021), and increase the social safety net, including increases in food assistance benefits (Bitler et al., 2020; Jones, 2021). The combined effect of all these changes likely had a major impact on the acquisition of food at home (FAH) and food away from home (FAFH).

To provide information to policymakers and researchers interested in studying the impacts of the pandemic on the food sector, this report summarizes national trends in the level and composition of food retail sales and household food expenditures associated with the COVID-19 pandemic. In particular, the analysis provides statistics on the changes in the level of total food retail sales, compared to a pre-pandemic baseline (e.g., year-over-year and 2-years-ago changes) at the national and State levels, as well as changes in the composition of sales (e.g., broad food categories) at the national level. Finally, the report summarizes changes in the prices of FAH, overall and in select categories, as well as how changes in FAFH purchases evolved with changes in food retail sales.

The primary data source is product-level weekly food retail sales data derived from retail scanner data acquired by USDA, ERS from IRI. This pandemic response scanner data is an aggregated version of the scanner data historically acquired by ERS but delivered on a weekly basis. To provide additional context to changes in food retail sales, the analysis also drew on NPD Consumer Reported Eating Share Trends (CREST) Performance Alerts data on changes in the number of transactions taking place at food service establishments and Bureau of Labor Statistics (BLS) Consumer Price Index (CPI) data from the USDA, ERS Food Price Outlook to summarize and account for important changes in food prices.

Data

This report uses both proprietary and public data sources to examine food sales, purchases, and prices. In general, the high frequency of the data delivery represents the key advantage of these new-to-ERS proprietary data over existing sources. IRI delivered data weekly, with relatively minimal lags from the dates of measurement. In addition to the timeliness of most recently available data, these sources also provide a sufficiently long history to allow for pre-pandemic comparisons that account for seasonality and long-term trends. For instance, many variables of interest are expressed in year-over-year changes (i.e., the percentage change compared to the same time 1 year ago) and 2-years-ago changes (i.e., the percentage change compared to the same time 2 years ago).

Pandemic Response IRI Scanner Data

Retailer-based scanner data from IRI provide information on weekly food retail sales representative at the national and State level. IRI derives these data from the same sources that compose the scanner data typically acquired by USDA, ERS on an annual basis. In particular, IRI obtains weekly food retail sales data from the same retailer point-of-sale data collection, comprising InfoScan. However, the pandemic response data are more aggregated in terms of food products, respondents, and geographies. A detailed description of InfoScan (as acquired by USDA, ERS and including statistical properties) is in Muth et al. (2016) and Levin et al. (2018).

The retail-based pandemic response sales data used in this report contain variables on the dollar value of food retail sales and volume-equivalent units sold (e.g., number items sold in 16-ounce equivalents) for each product during a given week and within a given geography.¹ Each week spans the 7 days ending with Sunday (e.g., the week ending September 5, 2021). The geographies used in this report are at the national and State levels, where data were provided for only 43 States due to data disclosure limitations.² Both the dollar value of food retail sales and volume-equivalent units sold are projected to represent the given geography, using the full breadth of the IRI InfoScan data.³ In addition, IRI provides “year ago” values (e.g., the product’s dollar value of sales the same week, 1-year prior).

The weekly retail sales pandemic response scanner data sets report food products at a much more aggregate level compared to InfoScan, which often reports information for individual items sold by a universal product code (UPC) or price-lookup (PLU) code. Instead, the products sold in the pandemic response data are reported in four levels of aggregation: the department (e.g., refrigerated), aisle (e.g., dairy), IRI category (e.g., milk), and IRI subcategory (e.g., whole milk). To gain a better understanding of changes in the sales and purchases of foods by type, each product is classified into the broad categories and subcategories used in the Quarterly Food-at-Home Price Database (QFAHPD), using the methodology of Todd et al. (2010). These categories are alcohol; (non-alcoholic) beverages; commercially prepared items; dairy; fats and oils; fruits; grains; meats, eggs, and nuts; sugar and sweeteners; vegetables; and other (e.g., spices and infant foods). Appendix A provides a full list of categories and subcategories used in the analysis.

NPD Group Consumer-Reported Eating Share Trends (CREST) Performance Alerts

To gauge the extent to which increases in the sales of FAH replace sales of FAFH on a weekly basis, this report used NPD CREST PA data, which reports year-over-year and 2-year-ago changes in the weekly number of transactions at food service establishments (i.e., restaurants). NPD compiles these data using mobile phone GPS data giving the location of individuals combined with a proprietary database on restaurant locations (NPD ReCount) and a comprehensive survey on FAFH purchases from a nationally representative panel (CREST).⁴ The CREST Performance Alerts data measure nationally representative changes in the number of transactions at all food service establishments. In addition, the measures are stratified by restaurant types (e.g., quick-service or full-service restaurants) and meal time (e.g., breakfast, lunch, or dinner). See Marchesi and McLaughlin (2022) for a detailed examination.

¹ The data also include a “raw units” variable, which counts a unit the same, regardless of volume or weight.

² State-level sales are unavailable for Alaska, Delaware, Hawaii, Idaho, Montana, North Dakota, and New Jersey—as well as the District of Columbia and U.S. Territories. Additional geographies not used in this report include 39 IRI markets (i.e., similar to Metropolitan Statistical Areas) and IRI regions (California, Great Lakes, Mid-South, Northeast Plains, South Central, Southeast, West).

³ The full breadth of InfoScan includes a “census” component (all sales of a given retailer) and a sample component (sales from a statistically representative sample of stores of a given retailer). The InfoScan data acquired by USDA, ERS on an annual basis includes only the “census” component. The projections are proprietary and are without standard errors.

⁴ See Cho et al. (2019) for a discussion of the statistical properties of NPD ReCount.

Food Price Outlook

The USDA, ERS Food Price Outlook uses the U.S. Bureau of Labor Statistics' Consumer Price Index (CPI) to measure and predict average changes in the price of food. This report draws on the CPIs for FAH and selects broad food categories to examine how food prices changed monthly and annually over the pandemic at the national and regional levels. In addition, nominal values of food retail sales from the pandemic response IRI weekly sales data were adjusted for inflation, using the category specific CPIs to represent real food retail sales values. Each product in the weekly sales data was matched to the most similar CPI category and each category's CPI was used to deflate nominal sales values to a January 2020 benchmark. For example, the nominal value of chicken breast sales during April 2021 was divided by the ratio of the chicken category's CPI value in April 2021 to that of January 2020. For weeks spanning 2 months, the deflating process used an average of each month's CPI weighted in proportion to the number of days in each month. For more information see USDA, ERS's Food Price Outlook website or Kuhns et al. (2015).

Sustained Increases in National Level Food Retail Sales

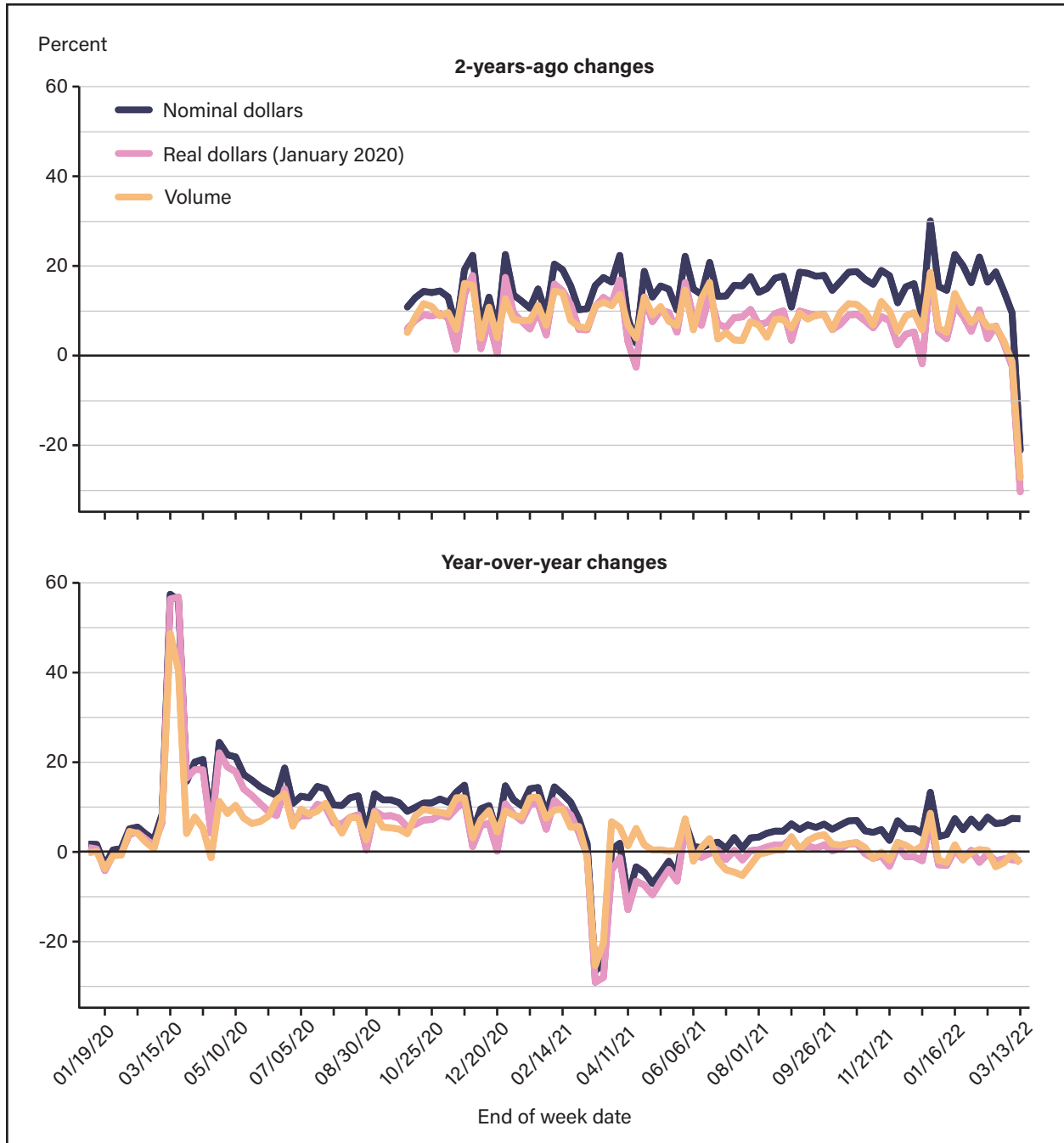
The President's declaration of a national COVID-19 emergency on March 13, 2020, coincided with a roughly 50 percent jump in weekly food retail sales, compared to both the same time 1-year ago (i.e., the year-over-year change) and the preceding weeks. Specifically, during the week ending March 15, 2020, year-over-year increases in the nominal dollar value of food retail sales and volume-equivalent units sold were respectively 57.5 percent and 48.7 percent (figure 1). The nominal dollar value of food retail sales was estimated to be 52.8 percent higher than the average of weekly sales values observed in all weeks prior in 2020 (figure 2). This substantial increase in food retail sales persisted through March 22, 2020, with year-over-year increases in the nominal dollar value of food retail sales and volume-equivalent units sold of 56.2 percent and 39.6 percent, respectively.

Food retail sales subsequently fell and continued to decrease gradually through May 2020 but remained at elevated levels. For instance, weekly year-over-year increases in the nominal dollar value of food retail sales ranged from 14.5 to 24.4 percent (10.8 to 22.1 percent in real or inflation-adjusted terms) or an average of 19.0 percent (16.6 percent in real terms) for the weeks ending March 29, 2020, through May 31, 2020 (excluding the week ending April 19, 2020). The excluded week was an outlier, due to yearly differences in the timing of the Easter holiday.⁵ Furthermore, figure 1 shows weekly year-over-year changes in both the nominal and real dollar values of food retail sales conspicuously trended downwards during this time. From the week ending June 7, 2020, through March 7, 2021—weekly year-over-year changes in the dollar value of food retail sales were relatively stable (at an average of 11.4 percent and 7.7 percent in nominal and real terms, respectively). Altogether, year-over-year changes in the nominal and real dollar value of food retail sales were 14.0 percent and 10.7 percent, respectively, from the week ending March 15, 2020, through March 7, 2021.

⁵ One year prior to April 19, 2020, was the 2019 Easter holiday (April 21, 2019), which saw a roughly 6-percent increase in the nominal dollar value of food retail sales compared the week prior, whereas the 2020 Easter holiday fell on April 12. Comparing April 19, 2020, to those of the week ending April 28, 2019 (i.e., the week after the 2019 Easter holiday), the nominal dollar value of food retail sales was 24 percent higher, in line with the stated range of year-over-year growth observed for the weeks ending March 29, 2020, through May 31, 2020.

Figure 1

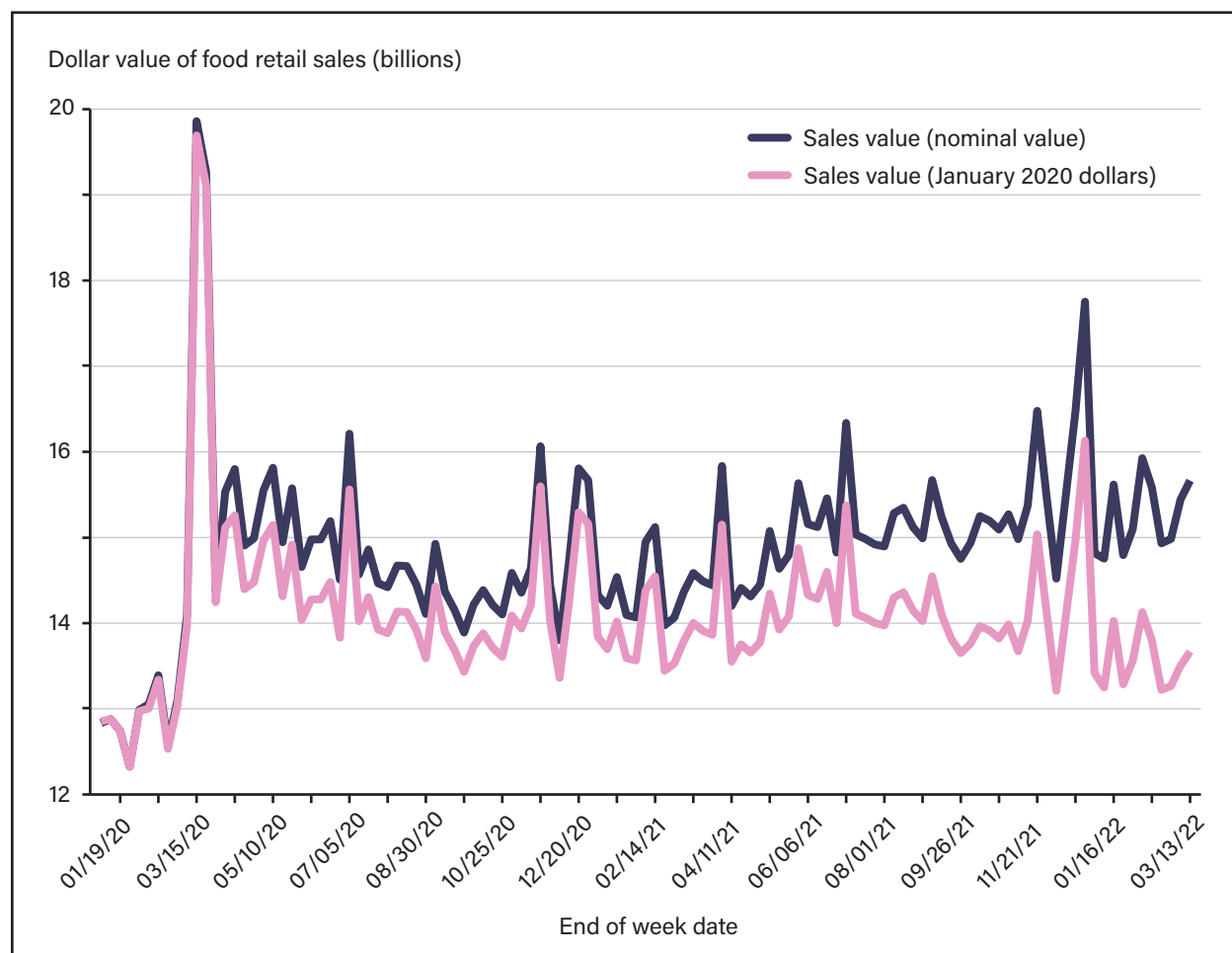
Weekly year-over-year and 2-years-ago percent changes in nominal and real national food retail sales value and volume-equivalent units sold



Note: Real dollars (January 2020) are nominal dollars adjusted for inflation to January 2020 dollars using food category consumer price indices.

Source: USDA, Economic Research Service calculations using IRI scanner data and U.S. Bureau of Labor Statistics Consumer Price Index data.

Figure 2
Total national food retail sale value, nominal and real



Note: Real dollars (January 2020) are nominal dollars adjusted for inflation to January 2020 dollars using food category consumer price indices.

Source: USDA, Economic Research Service calculations using IRI scanner data and U.S. Bureau of Labor Statistics Consumer Price Index data.

On the 1-year anniversary of the national emergency declaration and the associated jump in food retail sales—the weeks ending March 14, 2021, and March 21, 2021—sales remained elevated compared to pre-pandemic times, although below pandemic-onset levels. Year-over-year changes in the nominal dollar value of food retail sales the week ending March 14, 2021, for example, were -26.6 percent (-29.1 percent in real terms)—but 2-years-ago, changes were 15.6 percent (10.9 percent in real terms). From the week ending on April 4, 2021, through August 29, 2021 (but excluding April 18, 2021, due to different dates for the Easter holiday), average year-over-year and 2-years-ago increases in the nominal dollar value of food retail sales were 0.1 percent and 15.5 percent (-1.9 percent and 9.0 percent in real terms, respectively).⁶ Altogether, 2-years-ago changes in the nominal and real dollar value of food retail sales were 14.9 percent and 6.0 percent, respectively, from the week ending March 7, 2021, through February 27, 2021.

⁶ For the specified time range, the 95 percent confidence interval for average nominal year-over-year changes ranged from -1.47 percent to 2.6 percent (-3.9 percent to 0.1 percent in real terms) and average 2-years-ago changes ranged from 13.8 percent to 17.1 percent (7.3 percent to 10.6 percent in real terms).

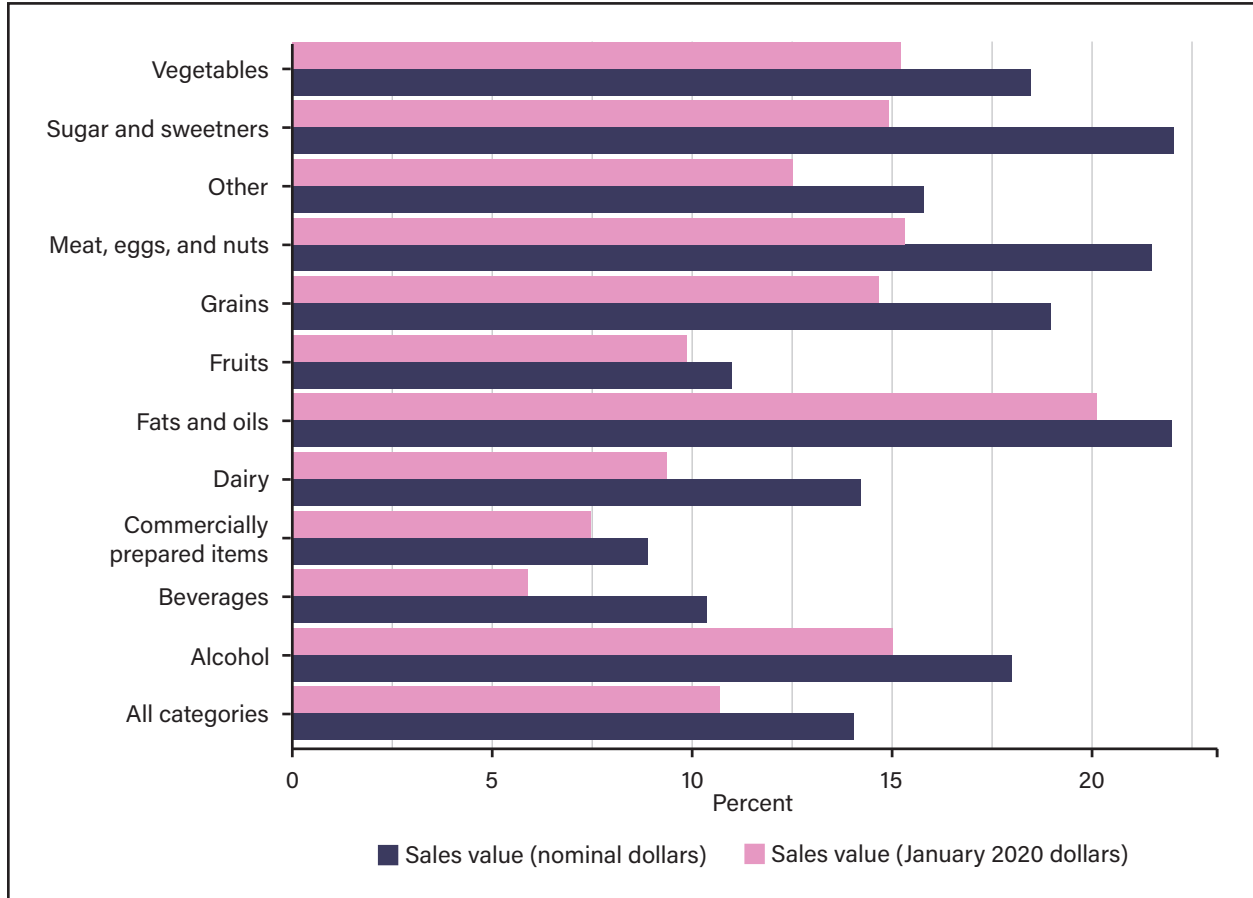
Figure 1 shows a noticeable gap between nominal year-over-year changes in the dollar value of retail sales and volume-equivalent units sold from the onset of the pandemic. This persistent difference likely reflects a combination of price increases and changes in the mix of products sold. The nominal dollar value of food retail sales grows faster than volume-equivalent units sold when there are price increases—and should grow at similar rates when prices remain constant—as the quantity of food items sold is a part of both measures. As discussed in a later section, food prices increased substantially following the onset of the pandemic. As a result, the gap between year-over-year changes in the real dollar value of retail sales and volume-equivalent units sold is comparatively small. However, changes in the values of these two measures often differ, which suggests the relevance of changes in the mix of food items purchased. Consumers may have shifted the composition of retail food purchases or substituted for higher or lower priced versions of the same food item.

Changes in the Composition of National Food Retail Sales

For the 52 weeks during and following the declaration of the pandemic emergency (i.e., the week ending March 15, 2020, through March 7, 2021), year-over-year changes in national food retail sales were positive in all food categories, with varying magnitudes (figure 3). During this time, year-over-year increases in the real dollar value of food retail sales for only four categories were below the 10.7 percent year-over-year change in all food retail sales: fruits (9.9 percent), dairy (9.4 percent), commercially prepared items (7.5 percent), and beverages (5.9 percent). Year-over-year increases in the real dollar values of food retail sales in all other categories ranged from 12.5 percent for the “other” category to 20.1 percent for fats and oils.

Figure 3

Year-over-year changes in national food retail sales by category for the weeks ending March 15, 2020, through March 7, 2021

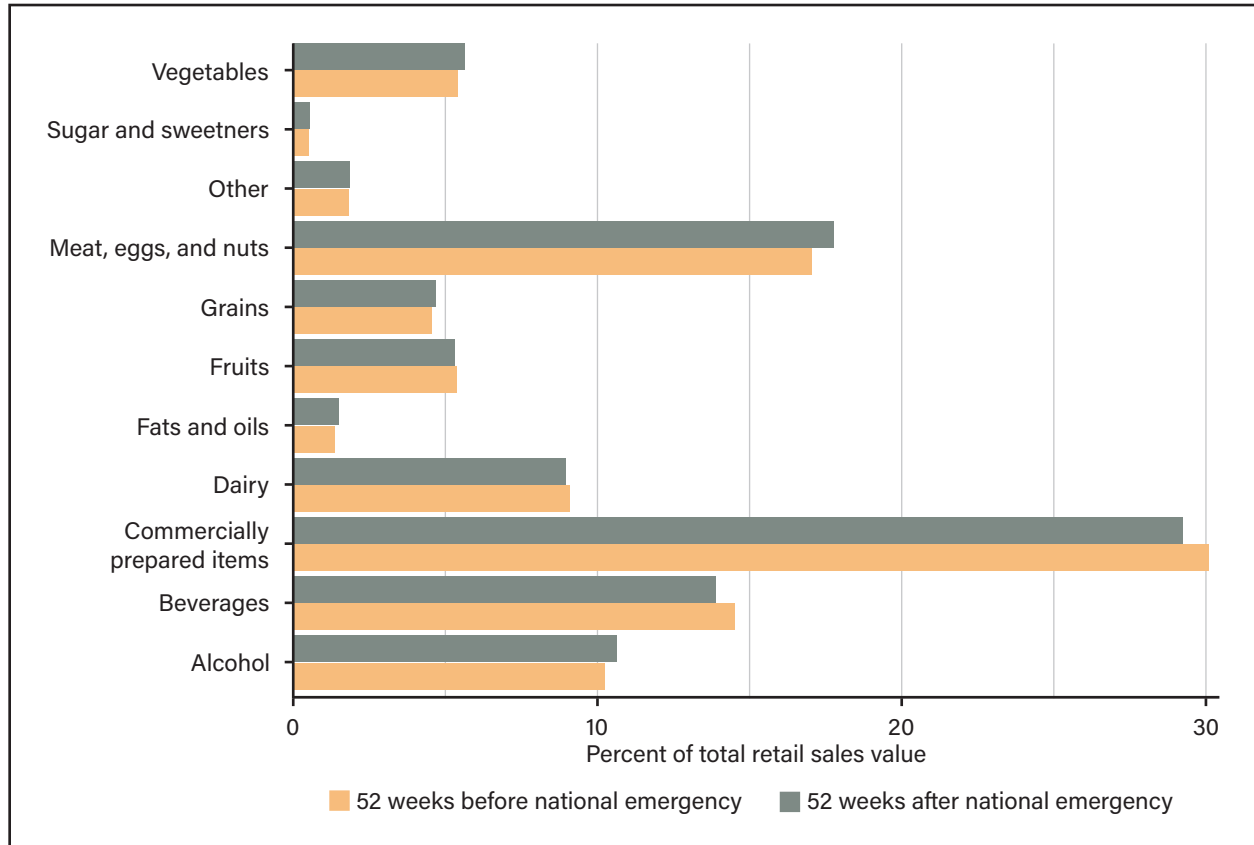


Notes: Real dollars (January 2020) are nominal dollars adjusted for inflation to January 2020 dollars using food category consumer price indices. The "other" category includes foods such as spices and infant food that do not readily fit in the other categories.

Source: USDA, Economic Research Service calculations using IRI scanner data and U.S. Bureau of Labor Statistics Consumer Price Index data.

Figure 4

Share of total real food retail sales value by category 52 weeks before and after the national emergency

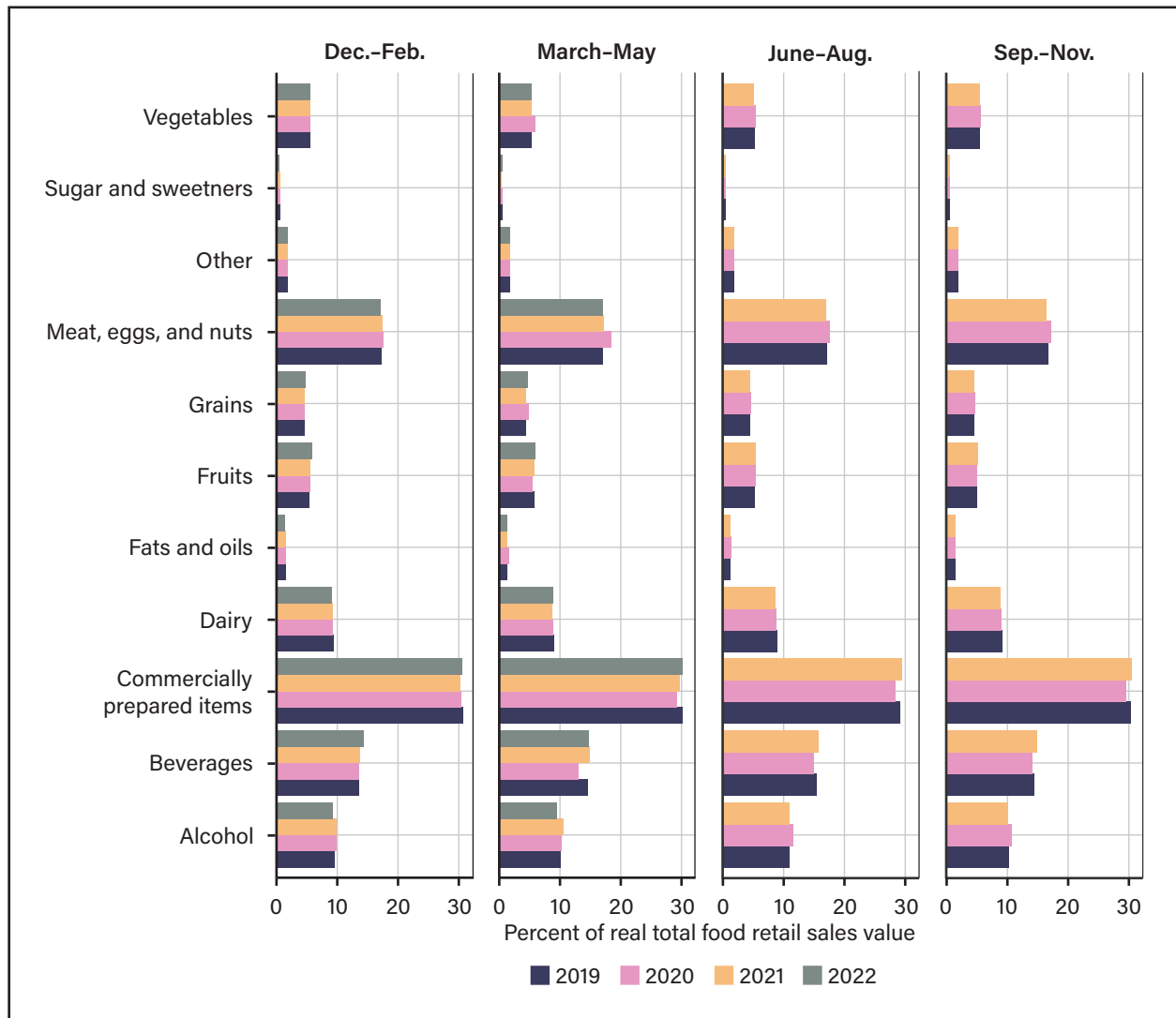


Notes: Real dollars (January 2020) are nominal dollars adjusted for inflation to January 2020 dollars using food category consumer price indices. The “other” category includes foods such as spices and infant food that do not readily fit in the other categories.

Source: USDA, Economic Research Service calculations using IRI scanner data and U.S. Bureau of Labor Statistics Consumer Price Index data.

Examining the share of real food retail sales by category 52 weeks before and after the declaration of the national emergency reveals mostly small changes in the relative composition of sales (figure 4). The absolute value of year-over-year changes in real sales share for all but three categories was less than 0.5 percentage points. The largest share increase occurred in meats, eggs, and nuts—from 17.0 percent of the real value of all food retail sales 52 weeks before the national emergency declaration versus 17.8 percent 52 weeks after. The largest share decreases occurred in commercially prepared items (30.1 percent versus 29.2 percent over the 52 weeks before and after the emergency declaration) and beverages (14.5 percent versus 13.9 percent), which simultaneously had the smallest concurrent year-over-year increases in real sales value, and the first and third largest real sales share among all categories.

Figure 5
Share of real total food retail sales value by category and quarter

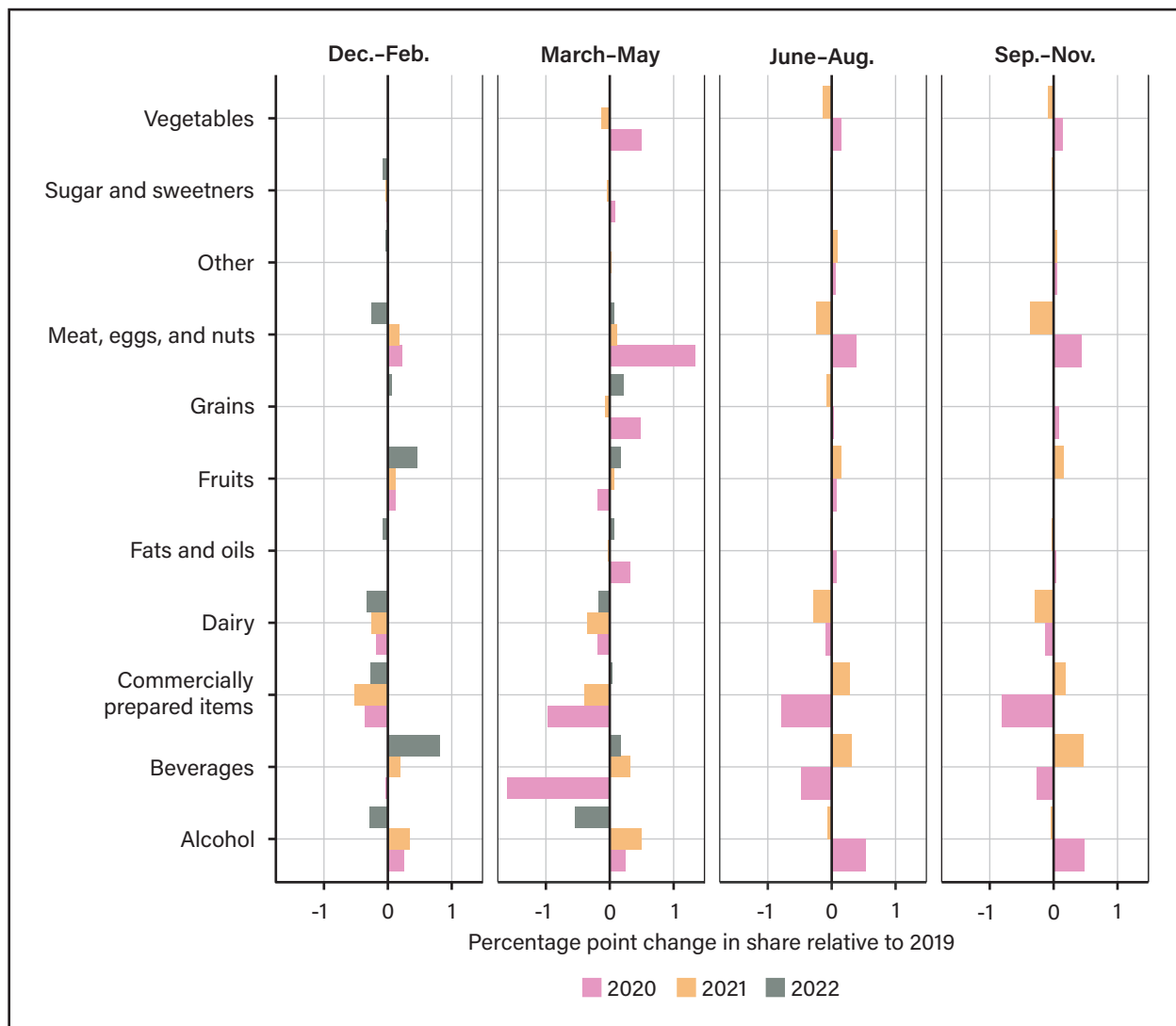


Notes: Real dollars (January 2020) are nominal dollars adjusted for inflation to January 2020 dollars using food category consumer price indices. The "other" category includes foods such as spices and infant food that do not readily fit in the other categories.

Source: USDA, Economic Research Service calculations using IRI scanner data and U.S. Bureau of Labor Statistics Consumer Price Index data.

Figure 6

Percentage point change in share of real total food retail sales value by category and quarter relative to 2019



Notes: Real dollars (January 2020) are nominal dollars adjusted for inflation to January 2020 dollars using food category consumer price indices. The “other” category includes foods such as spices and infant food that do not readily fit in the other categories.

Source: USDA, Economic Research Service calculations using IRI scanner data and U.S. Bureau of Labor Statistics Consumer Price Index data.

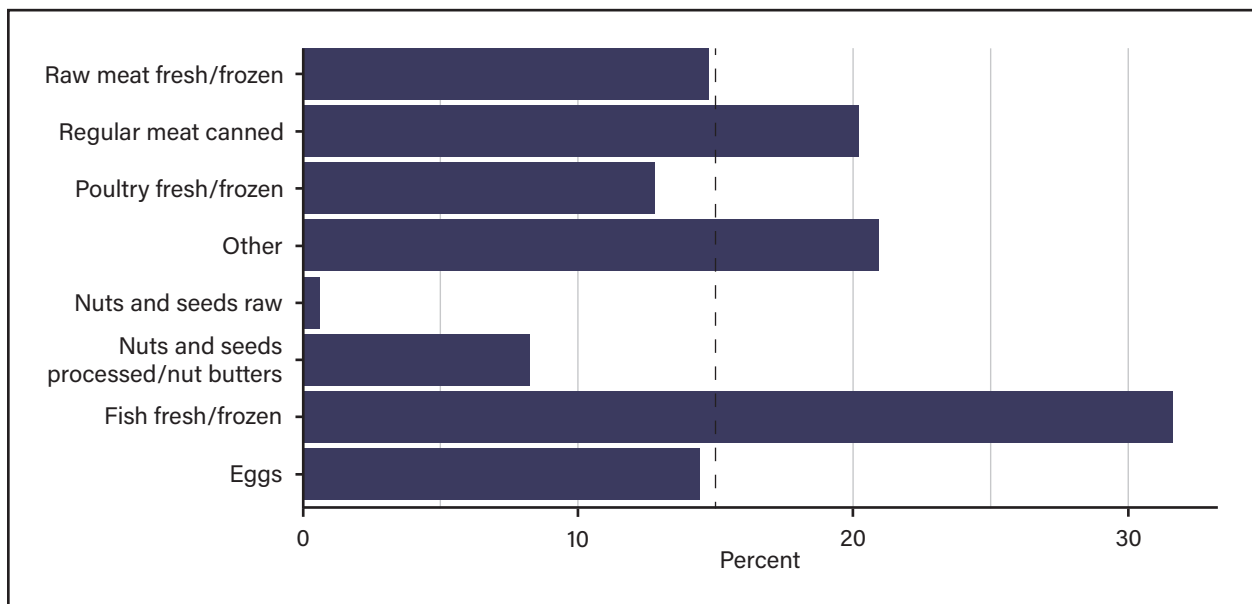
A further examination of category-level trends over shorter periods of time (e.g., 3 months) provides a largely similar view with some differences. For instance, figure 5 breaks down the share of food retail sales by category into customized quarters for each year where data are available: December–February, March–May, June–August, and September–November.⁷ Furthermore, figure 6 summarizes percentages point differences in shares compared to the same quarter in 2019 (i.e., shares in March–May 2020 minus the shares of March–

⁷ While the relatively high frequency of these data allow for analysis tracking shifts in food sales and expenditure patterns in response to a rapidly evolving situation, there were instances where aggregating the data over time was desirable. For example, aggregating over time may effectively remove “noise” appearing in week-to-week movements or may provide easy to interpret snapshots. In some cases, it was of interest to aggregate the weekly sales data to calendar months, which is challenging because a week’s worth of data could span 2 months. If aggregating to a calendar month was of interest, then it was assumed that sales took place uniformly across the week and could be assigned to each month in proportion to the share of days in each month. For example, the data point for the week ending September 5, 2021, included food sales that took place in both August and September. To aggregate to the calendar month, it was assumed that 5/7 of the dollar value of sales for the week took place in September and 2/7 in August.

May 2019). March—May 2020 exhibited similar trends to the annual trends observed in figure 4, where the absolute value of year-over-year changes in real sales share exceeded 0.5 percentage points for meats, eggs, and nuts; commercially prepared items; and beverages. However, the share of real sales returned to pre-pandemic levels as of June 2020 for meat, eggs, and nuts and beverages (except December 2021– February 2022). In addition, the share of real sales for alcohol increased by 0.5 percentage points from 11.0 percent in June–August 2019 to 11.5 percent in June–August 2020. Differences in shares compared to the same quarter in 2019 from June–August 2020 to March–May 2021 did not exceed 0.5 percentage points in all other cases, except commercially prepared items.

The large increase in the level and share of food retail sales of meat, eggs, and nuts (compared to 1-year ago) appears to be driven by increases in sales of fresh and frozen regular meat (e.g., beef and pork), poultry, and fish (figures 7 and 8). Year-over-year changes in the real sales of regular meat (14.8 percent) and poultry (12.8 percent) were slightly below the overall category change of 15.3 percent (figure 7). In addition, regular meat and poultry had the largest shares of real sales of meat, eggs, and nuts—which were relatively unchanged following the pandemic onset (e.g., less than 0.5 percentage point change) (figure 8). Fish saw substantial growth with year-over-year changes in real sales of 31.6 percent with the share of real sales increasing from 10.6 percent to 12.2 percent in the 52 weeks following the national emergency. Eggs, to a lesser extent, played a role in the substantial increase in meat, eggs, and nuts following the pandemic onset with year-over-year changes in real sales of 14.4 percent, a number comparable to regular meat and poultry. However, eggs’ share of real meat, eggs, and nuts sales remained virtually unchanged after the pandemic onset at 5.8 percent, less than half the share of fish.

Figure 7
Year-over-year changes in national real food retail sales of meat, eggs, and nuts by subcategory for the weeks ending March 15, 2020, through March 7, 2021

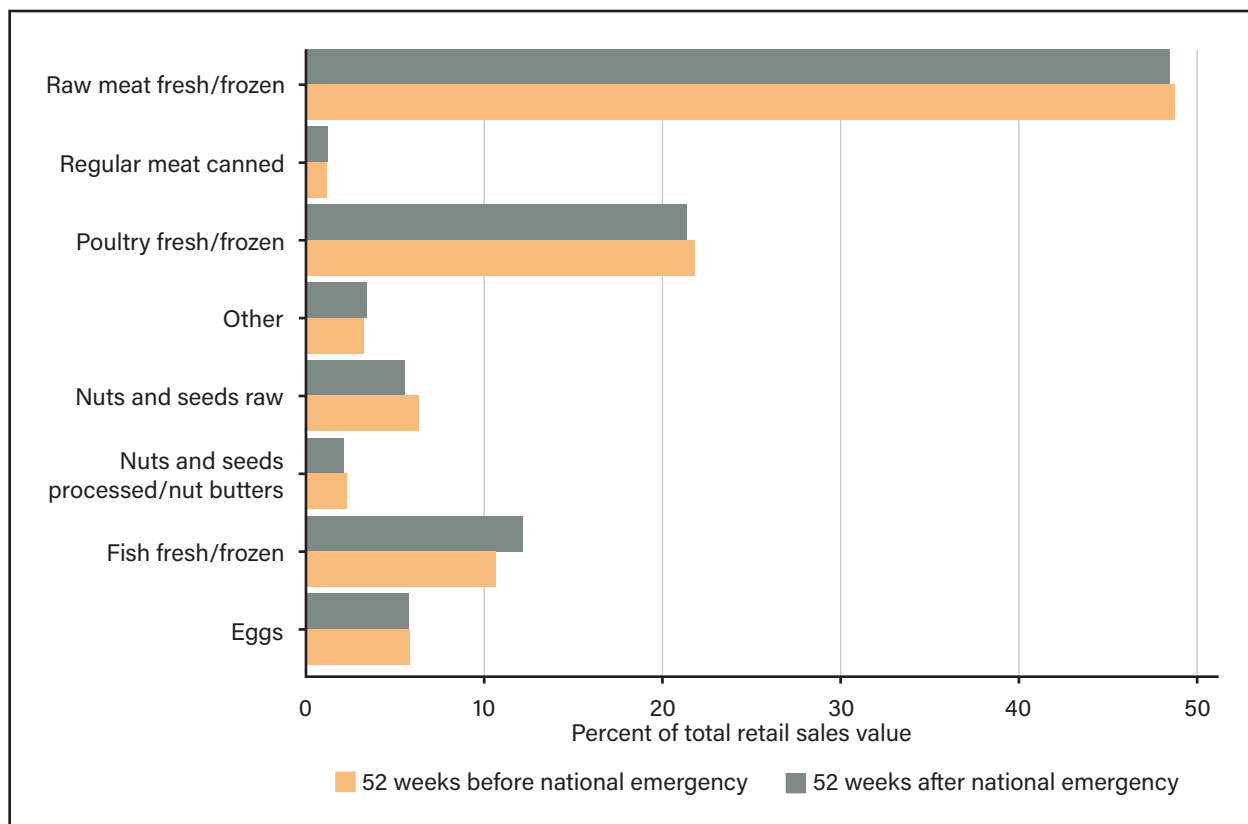


Notes: The dashed line represents national year-over-year increases in real food retail sales of meat, eggs, and nuts—15.3 percent. Regular meat includes beef, pork, and other meat products that are not poultry or seafood. The other subcategory includes alternative meat products and meat-based condiments.

Source: USDA, Economic Research Service calculations using IRI scanner data and U.S. Bureau of Labor Statistics Consumer Price Index data.

Figure 8

Category-specific share of real sales of meat, eggs, and nuts subcategories 52 weeks before and after the national emergency declaration



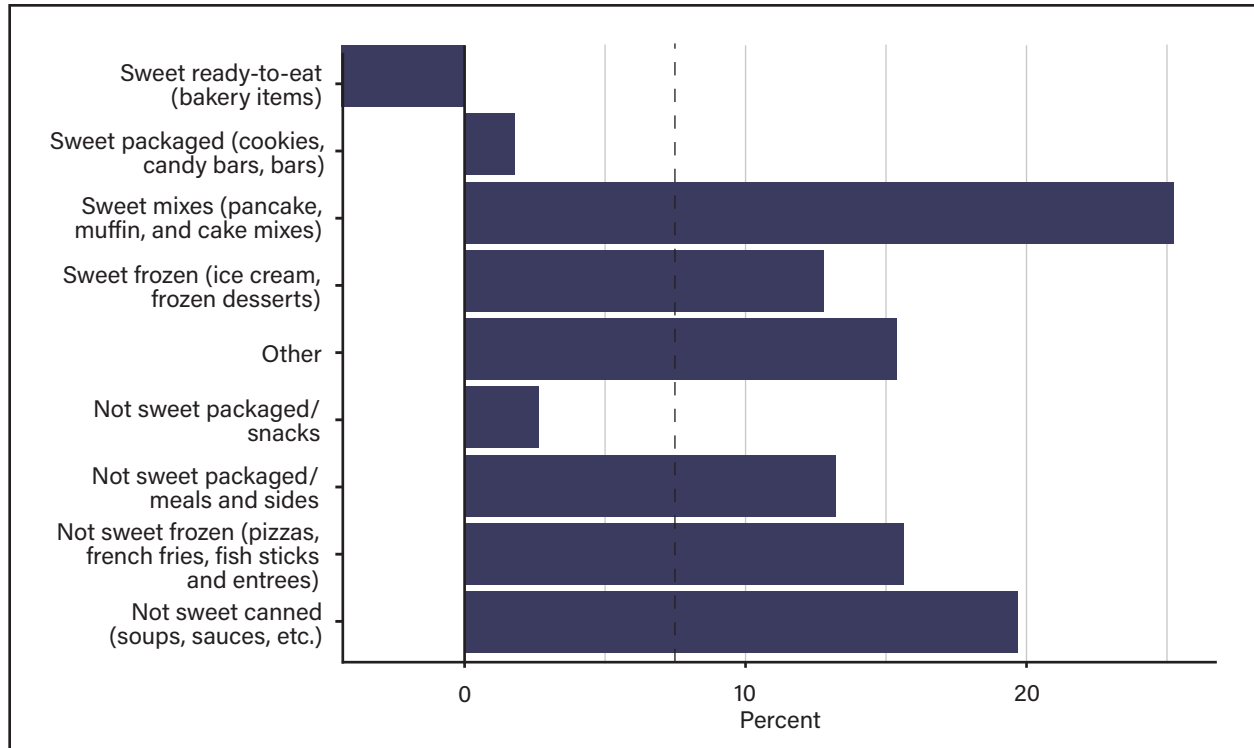
Notes: Regular meat includes beef, pork, and other meat products that are not poultry or seafood. The other subcategory includes alternative meat products and meat-based condiments.

Source: USDA, Economic Research Service calculations using IRI scanner data and U.S. Bureau of Labor Statistics Consumer Price Index data.

While real food retail sales of commercially prepared items saw relatively small increases despite being the most predominant category in terms of overall share, most subcategories experienced substantial increases compared to the category specific increase (7.4 percent) and increase across all foods (10.7 percent) as seen in figure 9. The only subcategories that did not see a relatively large increase in real sales were not-sweet packaged/snacks (2.7 percent), sweet packaged snacks (1.8 percent), and sweet ready-to-eat snacks (-4.4percent). During both the pre- and post-pandemic onset, sweet packaged food items had the largest share of real food retail sales among all commercially prepared items subcategories (figure 10). Therefore, low growth in sweet packaged food items drove the low growth in the commercially prepared food items category compared to categories overall. Likewise, the three low growth subcategories were also the only subcategories to experience a decline in the share of real sales of commercially prepared food items. The largest share increases that exceeded 0.5 percentage points were in not-sweet canned (6.8 percent versus 7.6 percent 52 weeks before and after the pandemic onset, respectively), not-sweet frozen (12.4 percent versus 13.3 percent), and not-sweet packaged/meals and sides (11.3 percent versus 11.9 percent).

Figure 9

Percent change compared to 1 year ago in national real food retail sales of commercial foods by subcategory for the weeks ending March 15, 2020, through March 7, 2021

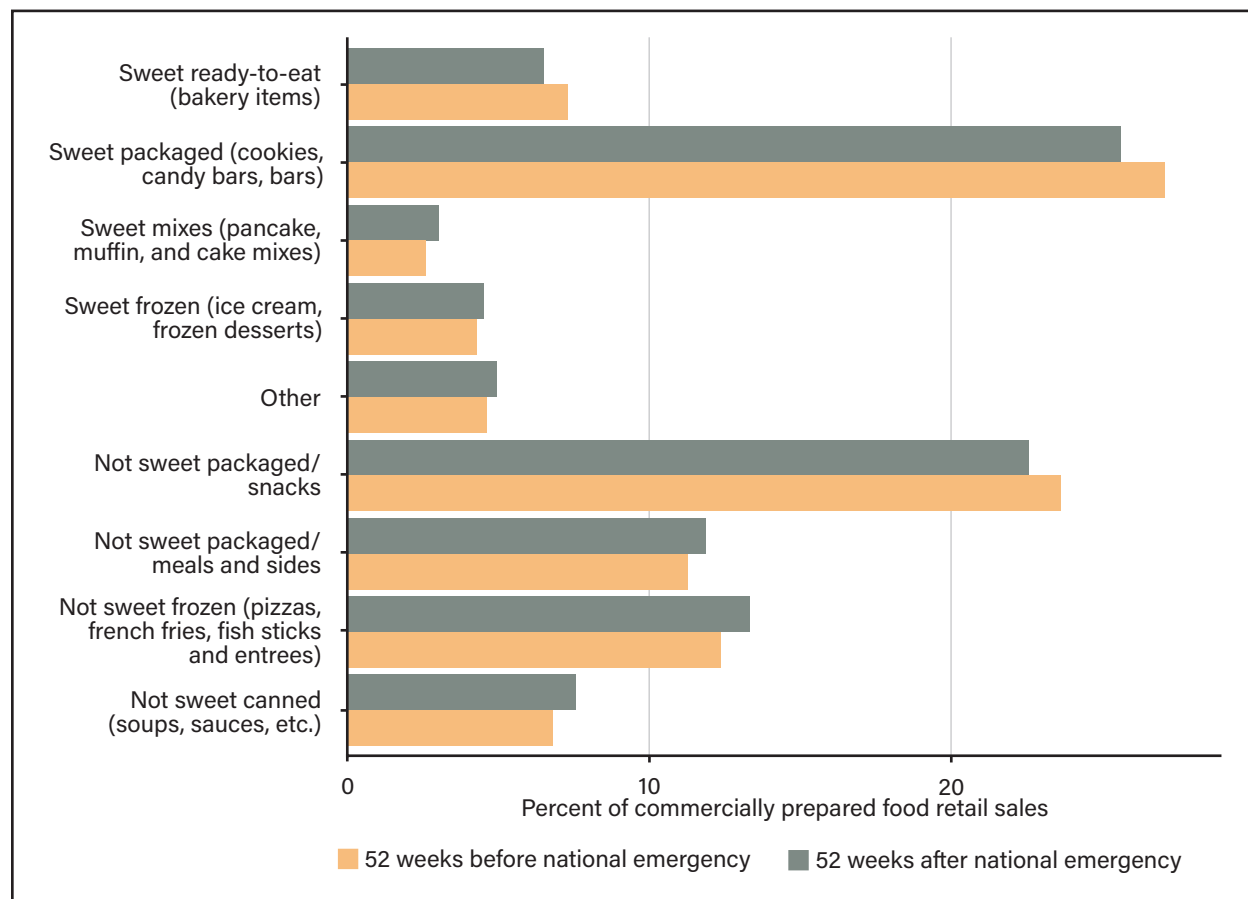


Notes: The dashed line represents national year-over-year changes in food retail sales of commercially prepared items— +7.5 percent. The other subcategory includes, for example, baking ingredients and condiments not readily classified into the other subcategories.

Source: USDA, Economic Research Service calculations using IRI scanner data and U.S. Bureau of Labor Statistics Consumer Price Index data.

Figure 10

Category-specific share of real sales of commercial foods subcategories 52 weeks before and after the national emergency declaration



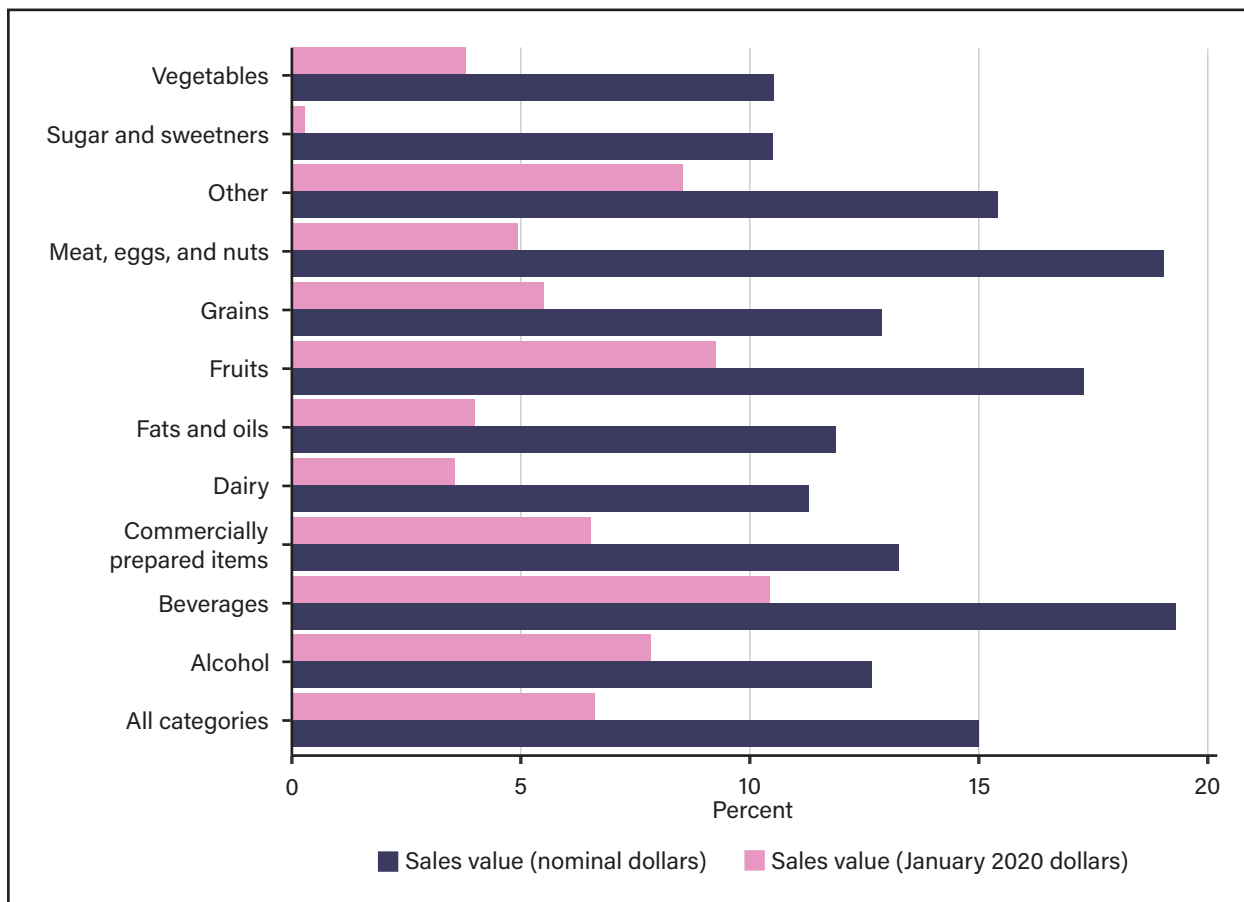
Note: The other subcategory includes, for example, baking ingredients and condiments not readily classified into the other subcategories.

Source: USDA, Economic Research Service calculations using IRI scanner data and U.S. Bureau of Labor Statistics Consumer Price Index data.

Data spanning the 13–24 months following the onset of the pandemic indicate the category composition of national food retail sales largely returned to pre-pandemic levels. For instance, the shares of food retail sales among all but two categories in December 2021–February 2022 and March 2022–May 2022 (which only has values for the first 2 weeks in March 2022) were within 0.5 percentage points of their 2019 values (figure 5). The share of real food retail sales for beverages during December 2021–February 2022 was 14.4 percent compared to 13.6 percent during December 2020–February 2021—while the share for alcohol was 9.5 percent the first 2 weeks of March 2022 compared to 10 percent in March–May 2019. Nevertheless, the level of real sales remained at more than 6.6 percent (i.e., the increase in the real value of all food retail sales compared to 2-years ago) compared to pre-pandemic values for many categories (figure 11). For the week ending March 14, 2021, through March 13, 2022—2-years-ago changes in real food retail sales exceeded 6.6 percent for beverages (10.4 percent), fruits (9.3 percent), alcohol (7.8 percent), and the other category (7.8 percent).

Figure 11

2-years-ago changes in national food retail sales by category for the weeks ending March 14, 2021, through March 13, 2022



Notes: Real dollars (January 2020) are nominal dollars adjusted for inflation to January 2020 dollars using food category consumer price indices. The “other” category includes foods such as spices and infant food that do not readily fit in the other categories.

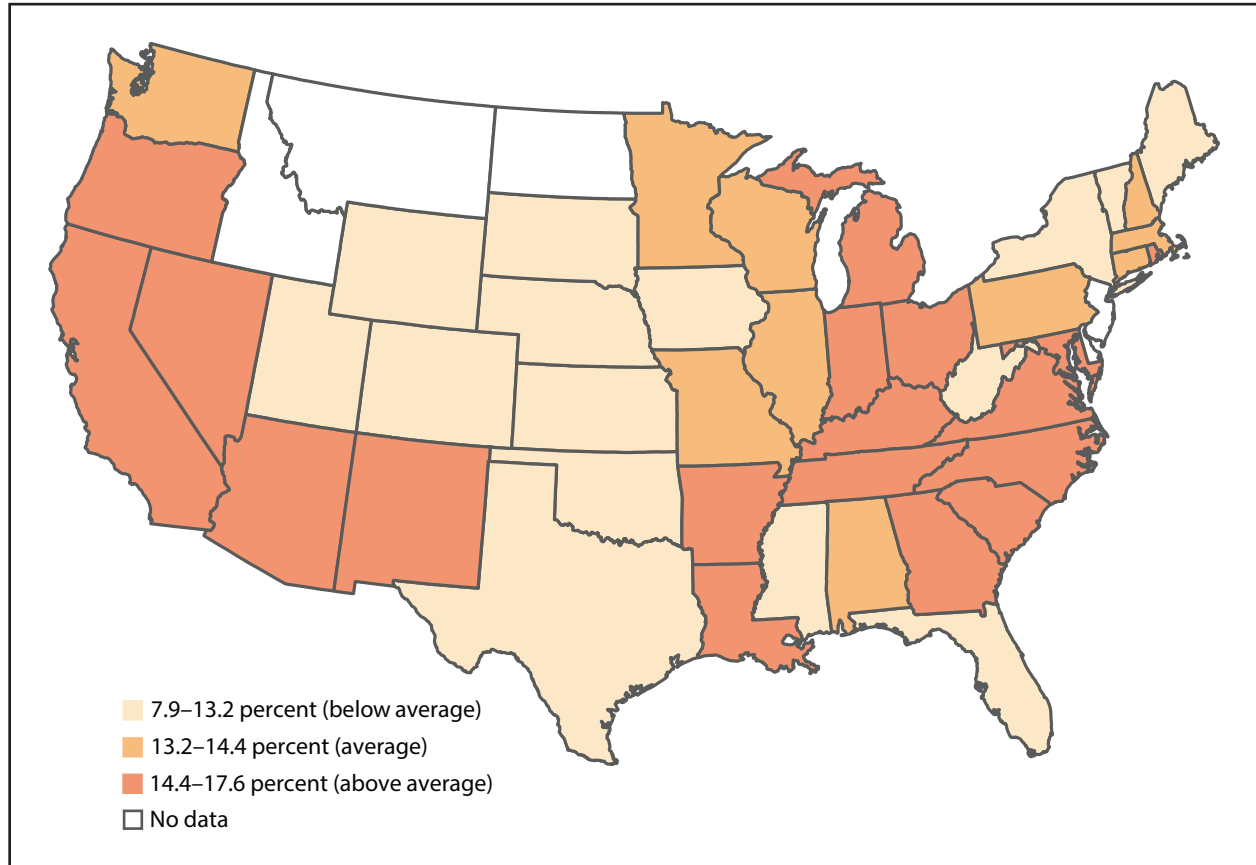
Source: USDA, Economic Research Service calculations using IRI scanner data and U.S. Bureau of Labor Statistics Consumer Price Index data.

State-Level Changes in Total Food Retail Sales

Whereas the year-over-year increase in food retail sales 52 weeks following the onset of the pandemic was 14.0 percent at the national level in nominal terms, this increase ranged from 7.9 percent in Wyoming to 17.6 percent in Oregon for the 43 States for which sales data are available (figure 12). All studied States saw maximum year-over-year increases around the pandemic onset—either the week ending March 15, 2020, or March 22, 2020—with values ranging from 39.5 percent in South Dakota to 76.3 percent in California (table B1). The States with the largest year-over-year increases in nominal food retail sales tended to be on or near the coasts, including in the South Atlantic and Pacific Census Divisions, as well as the East North Central Division of the Midwest. However, more central States of the Midwest and South tended to have the lowest year-over-year increases in nominal food retail sales.

Figure 12

Year-over-year changes in State-level nominal food retail sales the weeks ending March 15, 2020, through March 7, 2021



Notes: Bins are developed by computing the 95 percent confidence interval of the average State-level year-over-year changes in total nominal food retail sales. States' values that are below, within, or above this range define the ranges of the below average, average, and above average bins, respectively.

Source: USDA, Economic Research Service calculations using IRI scanner data.

to account for both State-specific and time-invariant food retail shopping patterns modestly increased variation explained (i.e., adjusted $R^2 = 64$ percent) and is statistically significant ($F = 12.63$, $p < 0.01$). However, the increased adjusted R^2 from similarly adding week fixed effects is statistically insignificant ($F = 1.00$, $p = 0.464$), indicating States' nominal food retail sales patterns tend to not deviate from movements in national trends over time.

Given that the States in the average range of year-over-year changes in nominal food retail sales for the first 52 weeks of the pandemic tend to be smaller States (figure 12), larger States may be relatively more likely to break away from national trends (for unknown reasons). Specifications 7 to 9 of table 1 repeat the regression of State year-over-year changes in nominal food retail sales changes on national year-over-year changes, with State- and week-fixed effects for the 10 most populous States only.⁹ Among this subset, national year-over-year changes in food retail sales explain roughly 65 percent of State-level variation. The adjusted R^2 increases to 71 percent when adding State fixed effects ($F = 13.82$, $p < 0.01$). However, the week-fixed effects in specification 9 are jointly statistically insignificant compared to specification 8, which excludes these variables ($F = 0.45$, $p = 0.99$). Therefore, like the 43 States for which data are available, the top 10 States' year-over-year changes in nominal food retail sales also largely follow national trends.

A close relationship between State-level and national trends in nominal food retail sales continued following the 1-year anniversary of the pandemic onset. For instance, repurposing the regression approach above to 2-years-ago changes in nominal food retail sales reveals that national 2-years-ago changes in food retail sales explains 78 percent and 81 percent of the variation in State-level changes for all available States and the top 10 most populous States, respectively (table 2). Furthermore, adding State fixed effects increases the adjusted R^2 to 84 percent for all available States ($F = 20.20$, $p < 0.01$) and 88 percent for the top 10 most populous States ($F = 36.56$, $p < 0.01$). Weekly fixed effects are jointly statistically insignificant compared to specifications without them.

⁹ The top 10 most populous States according to the 2020 Decennial Census in order are: California, Texas, Florida, New York, Pennsylvania, Illinois, Ohio, Georgia, North Carolina, and Michigan.

Table 1

Estimated regression of weekly State-level year-over-year changes in food retail sales on covariates for the weeks ending March 15, 2020, to March 7, 2021

Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
National YoY change	0.959	0.959	0.906	0.986	0.986	0.934	0.988	0.988	0.927
	(0.019)	(0.018)	(0.018)	(0.023)	(0.022)	(0.061)	(0.042)	(0.040)	(0.108)
Constant	0.004	0.001	0.005	0.001	-0.001	0.005	0.004	0.016	0.025
	(0.003)	(0.005)	(0.005)	(0.003)	(0.005)	(0.008)	(0.005)	(0.006)	(0.012)
Includes weeks ending 3/15/20 and 3/22/20	Yes	Yes	Yes	No	No	No	No	No	No
Top 10 most populous States only	No	No	No	No	No	No	Yes	Yes	Yes
State fixed effects	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Week fixed effects	No	No	Yes	No	No	Yes	No	No	Yes
Number of observations	2,236	2,236	2,236	2,150	2,150	2,150	500	500	500
R ²	0.82	0.85	0.86	0.56	0.65	0.66	0.65	0.72	0.74
Adjusted R ²	0.82	0.85	0.85	0.56	0.64	0.64	0.65	0.71	0.70
F	10,337.9	298.6	140.5	2,728.3	90.2	43.2	908.0	124.3	20.6

Notes: National YoY change = weekly national-level year-over-year changes in food retail sales. The top 10 most populous States according to the 2020 Decennial Census in order are: California, Texas, Florida, New York, Pennsylvania, Illinois, Ohio, Georgia, North Carolina, and Michigan. White's heteroskedastic-robust standard errors are in parentheses below regression coefficient estimates. Bold coefficients are statistically significant at the 0.01 significance level.

Source: USDA, Economic Research Service calculations using IRI scanner data.

Table 2

Estimated regression of weekly State-level year-over-year changes in food retail sales on covariates for the weeks ending March 14, 2021, to March 6, 2022

Specification	(1)	(2)	(3)	(4)	(5)	(6)
National YoY change	0.954	0.954	0.900	1.010	1.010	1.027
	(0.014)	(0.013)	(0.260)	(0.027)	(0.022)	(0.037)
Constant	0.000	0.026	0.276	0.003	-0.029	-0.034
	(0.001)	(0.004)	(0.005)	(0.002)	(0.003)	(0.007)
Top 10 populous States only	No	No	No	Yes	Yes	Yes
State fixed effects	No	Yes	Yes	No	Yes	Yes
Week fixed effects	No	No	Yes	No	No	Yes
Number of observations	2,236	2,236	2,236	520	520	520
R ²	0.78	0.84	0.85	0.81	0.89	0.89
Adjusted R ²	0.78	0.84	0.84	0.81	0.88	0.88
F	7,873.2	268.9	125.8	2,228.1	393.4	61.6

Notes: National YoY change = weekly national-level year-over-year changes in food retail sales. The top 10 most populous States according to the 2020 Decennial Census in order are: California, Texas, Florida, New York, Pennsylvania, Illinois, Ohio, Georgia, North Carolina, and Michigan. White's heteroskedastic-robust standard errors are in parentheses below regression coefficient estimates. Bold coefficients are statistically significant at the 0.01 significance level.

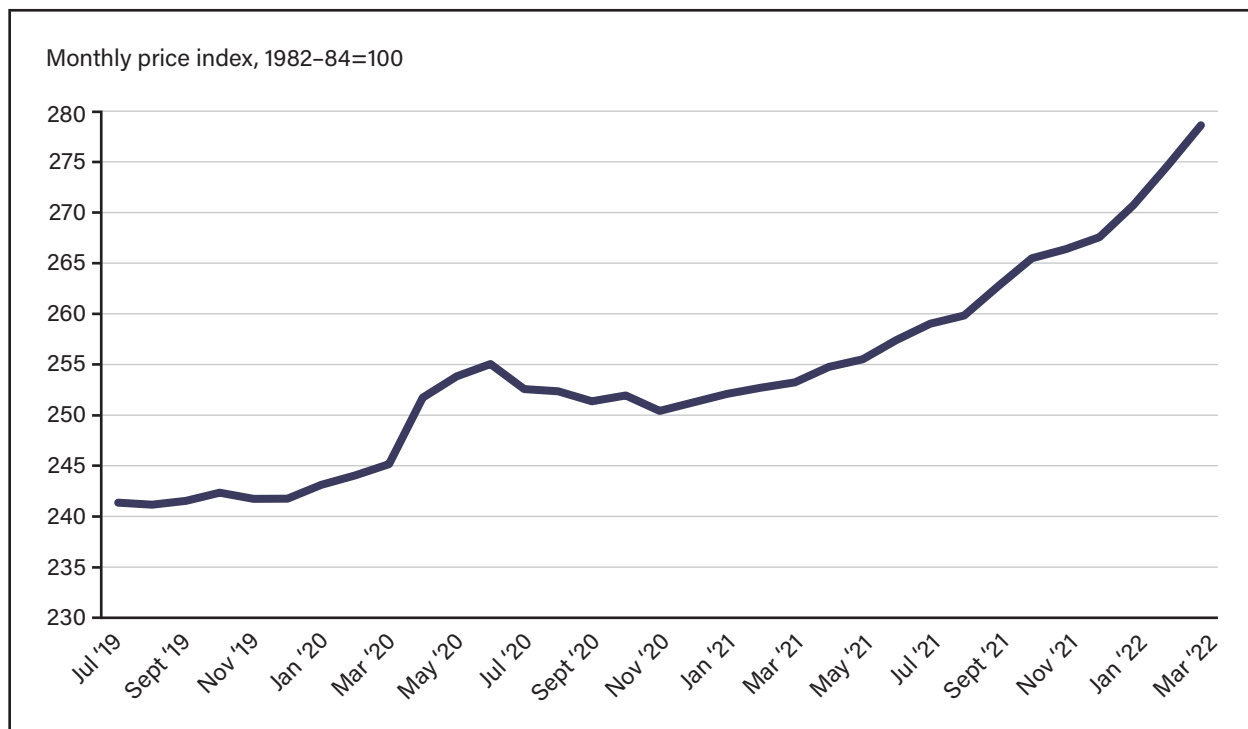
Source: USDA, Economic Research Service calculations using IRI scanner data.

Changes in Food Prices

Figure 14 shows food-at-home prices rose by an average of 0.5 percent in January, February, and March 2020—followed by a jump of 2.7 percent in April, as measured by the U.S. Bureau of Labor Statistics Consumer Price Index (CPI). The CPI for food at home includes prices for a specific set of grocery store foods and beverages bought in cities around the country and compares the price of this “market basket,” or indexes it, to 1982–84 prices. Inflation for food at home continued to increase in May and June—but in July, August, and September prices fell by 1.0, 0.1, and 0.4 percent, respectively. Prices continued to fluctuate for the final months in 2020 but remained higher, on average, than in 2019. By the end of year, food-at-home prices were 4.1 percent higher in December 2020 than a year and half prior. Food-at-home prices posted an average increase of 0.33 percent per month in 2020. For context, annual inflation for food at home averaged about 2 percent for the past 20 years and 1.4 percent for the past 10 years. From July to December 2019, the monthly price index for food at home ranged from 241.2 to 242.6, indicating prices rose or fell by no more than 0.6 percent per month.

Average annual food-at-home prices were 3.5 percent higher in 2020 than in 2019. Similarly, food-at-home prices increased by 3.5 percent between 2020 and 2021. The 20-year historical level of retail food price inflation is 2.0 percent per year—meaning the 2020 and 2021 increases were 75 percent above average. Only fresh fruit prices decreased, by 0.8 percent, in 2020. In 2020, meat prices were affected the most: Beef and veal prices increased 9.6 percent, pork prices increased 6.3 percent, and poultry prices increased 5.6 percent in 2020 (figure 15). This pattern repeated in 2021—as beef and veal prices increased by 7.3 percent, pork prices increased by 8.6 percent, and poultry prices increased by 5.1 percent. Fresh fruit increased by 5.5 percent, and fish and seafood prices increased by 5.4 percent. This increase coincides with meat products seeing the largest increases in year-over-year sales among all food at home products (figure 3). The CPI prices for all categories increased in 2021 (figure 16).

Figure 14
Consumer Price Index for food at home, July 2019–March 2022

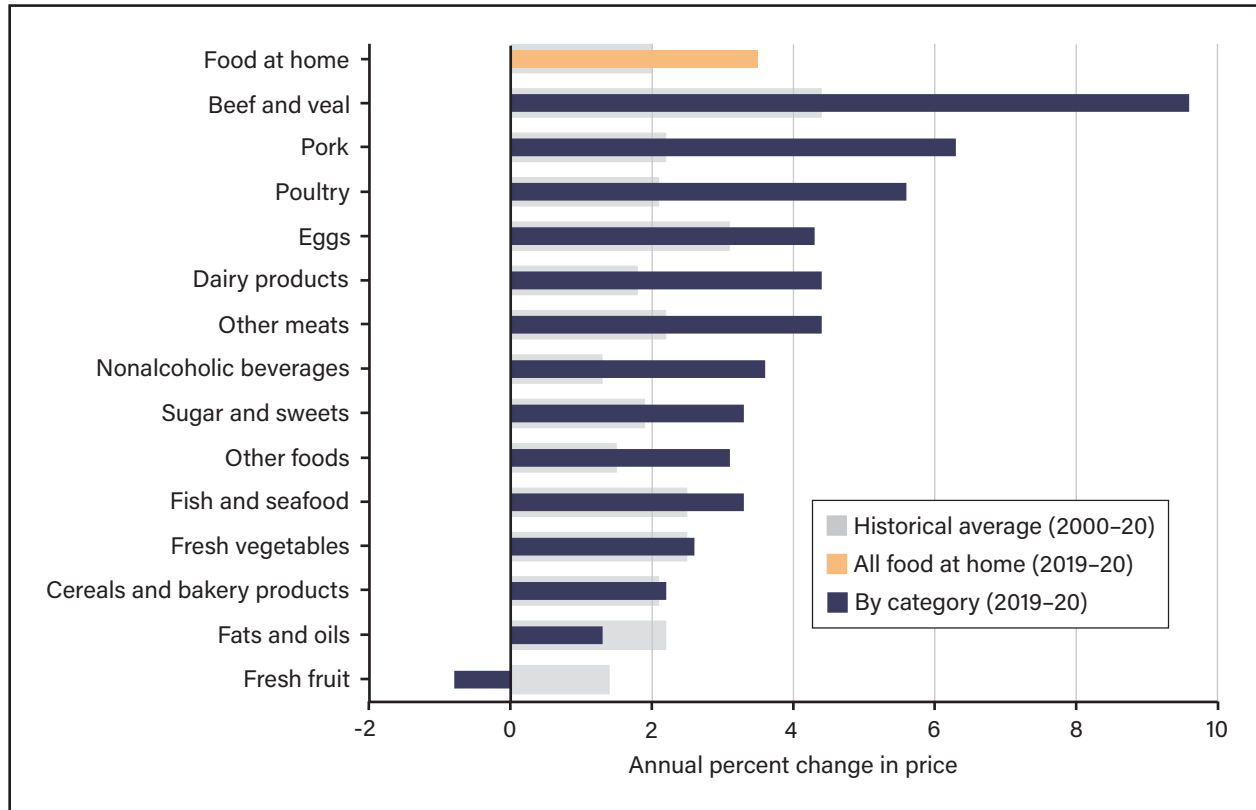


Note: Monthly price index values are benchmarked with 1982–84 values being equal to 100.

Source: USDA, Economic Research Service using U.S. Bureau of Labor Statistics Consumer Price Index data.

Figure 15

Price increases for Consumer Price Index food-at-home categories, 2019–20

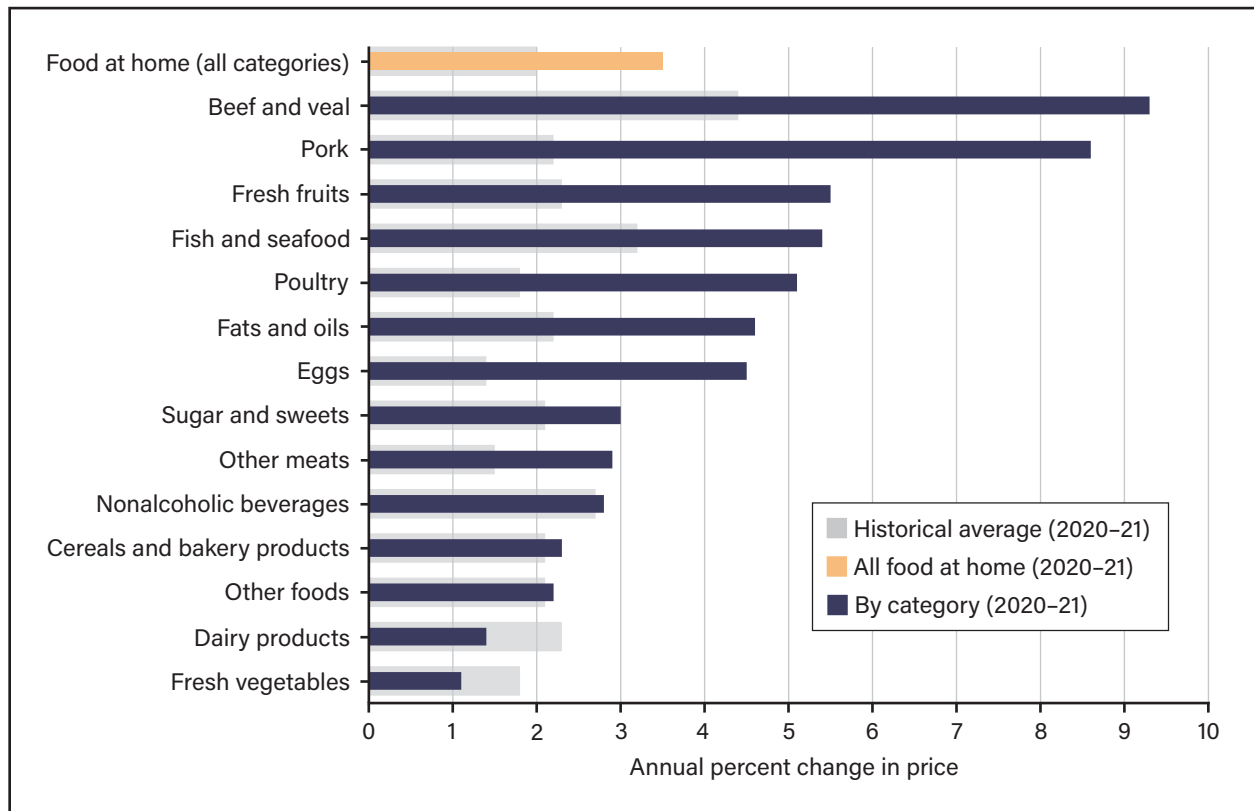


Note: Other foods includes food items not readily classified into the other categories such as spices, seasoning, sauces, and pickles.

Source: USDA, Economic Research Service using U.S. Bureau of Labor Statistics Consumer Price Index data.

Figure 16

Price increases for Consumer Price Index food-at-home categories, 2020-21

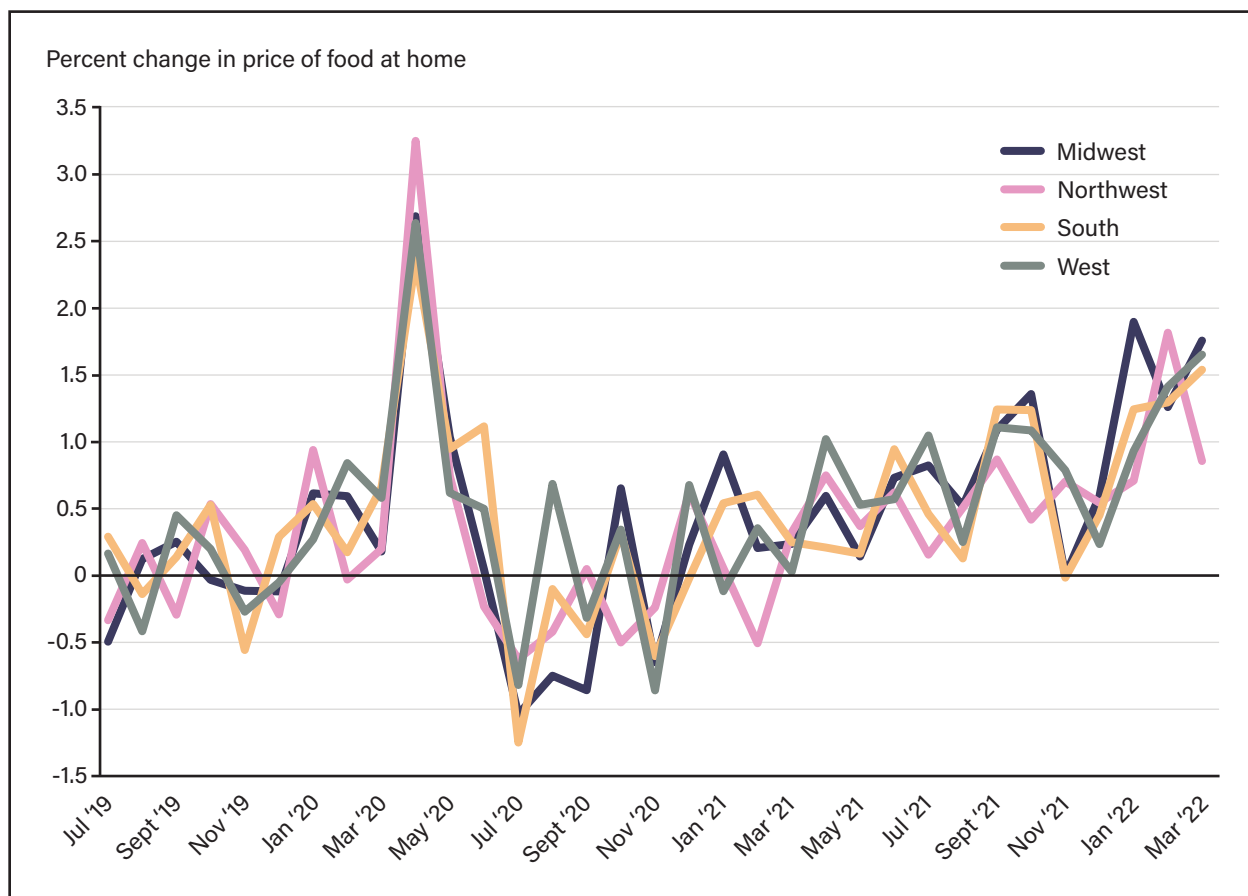


Note: Other foods includes food items not readily classified into the other categories such as spices, seasoning, sauces, and pickles.

Source: USDA, Economic Research Service using U.S. Bureau of Labor Statistics Consumer Price Index data.

Figure 17

Regional percent changes in the price of food at home, July 2019–March 2022



Source: USDA, Economic Research Service using U.S. Bureau of Labor Statistics Consumer Price Index data.

The range of price changes increases when stratifying by region (figure 16).¹⁰ The lowest monthly price changes occurred in the South, from June to July 2020, at -1.2 percent; the highest monthly price changes occurred in the Northeast, from March to April 2020, at 3.3 percent. On average, over March 2020–March 2022, average monthly inflation was lowest in the Northeast and highest in the West.

Rapid Shifts in Food at Home Versus Food Away From Home

In the weeks during and following the national emergency declaration on March 13, 2020, year-over-year changes in the number of transactions at food service establishments (obtained using NPD CREST Performance Alerts data) largely tracked the inverse of year-over-year changes in real food retail sales (figure 18). However, the decrease in the number of food service transactions was more gradual than the rise of food retail sales. For example, during the week ending March 15, 2020, year-over-year changes in real food retail sales were 56.4 percent, while year-over-year changes in the number of food service transactions was -8.5 percent. The latter number continued to fall, bottoming out at -46.5 percent the week ending April 12, 2020, while year-over-year changes in real food retail sales fell to 18.4 percent. By July 5, 2020, and through March

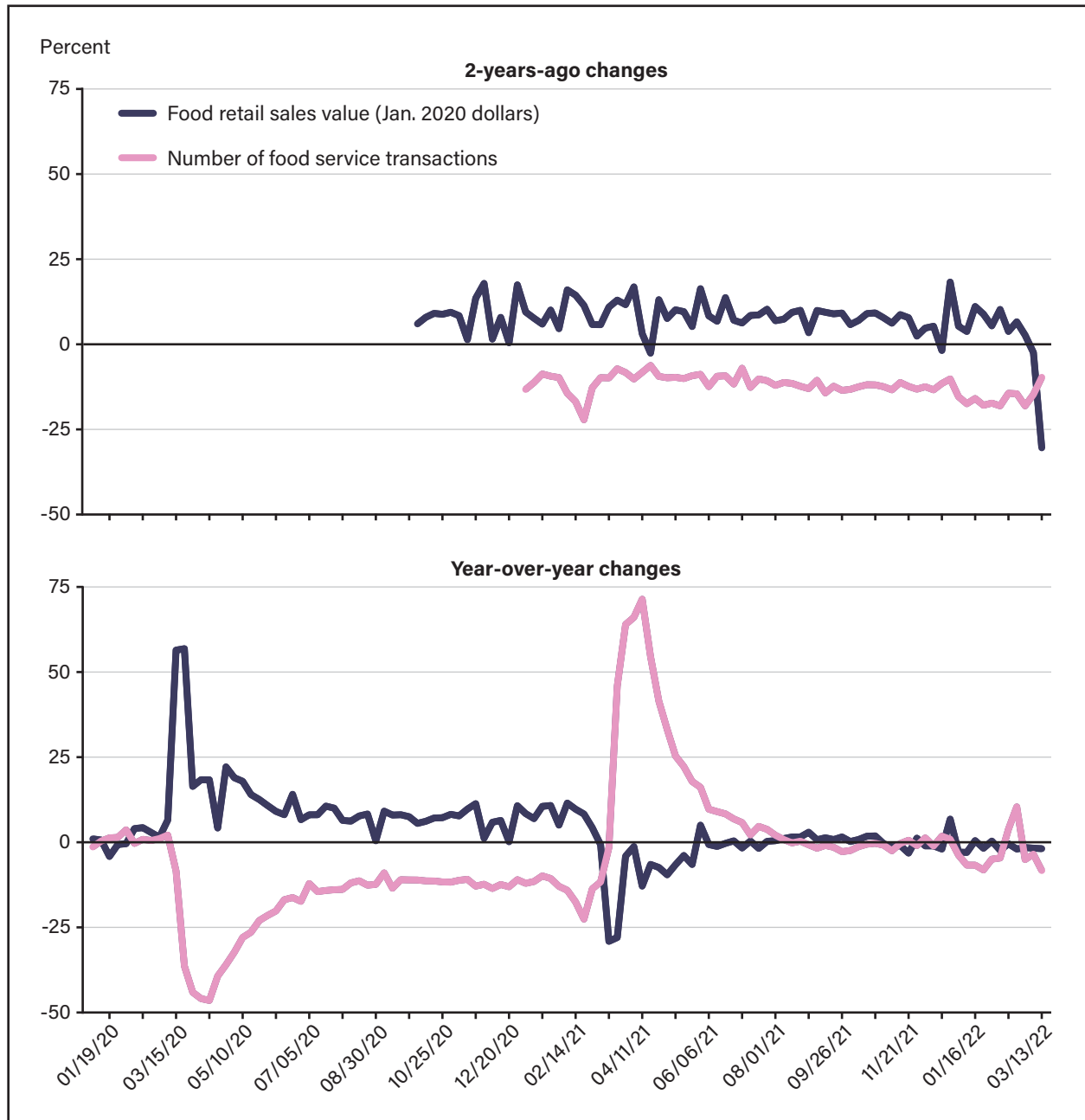
¹⁰ BLS collects data only from urban locations (e.g., Kansas City, MO; Los Angeles, CA). Thus, data may not be representative of rural areas in the United States.

7, 2021, year-over-year changes in real food retail sales and the number of food service transactions were relatively stable at roughly 7.3 percent and -12.6 percent, respectively.

Following the 1-year anniversary of the pandemic onset, the tendency of changes in real food retail sales and the number of food service transactions to mirror each other has continued. For instance, figure 18 shows 2-years-ago changes in both real food retail sales and the number of food service transactions ran roughly parallel to each other—with an inverse sign from the week ending March 14, 2021, through March 13, 2022—although there appears to be relatively more variation in food retail sales. During this time (but excluding the week ending April 18, 2021, due to different dates for the Easter holiday), average 2-years-ago changes were 7.3 percent for real food retail sales and -12.1 percent for the number of food service transactions. In other words, from pandemic months 4 to 24, the differences between pandemic and pre-pandemic real food retail sales and the number of food service transactions were relatively steady.

Figure 18

Weekly year-over-year and 2-years-ago changes in national food retail sales value and number of food service transactions



Note: Real dollars (January 2020) are nominal dollars adjusted for inflation to January 2020 dollars using food category consumer price indices.

Source: USDA, Economic Research Service calculations using IRI scanner data, NPD Group Consumer Reported Eating Share Trends (CREST) Performance Alerts, and U.S. Bureau of Labor Statistics Consumer Price Index data.

Conclusion

Despite documented cases of COVID-19 in the United States as early as January 2020, meaningful changes to food retail sales did not take place until the week of the national pandemic emergency declaration on March 13, 2020. Changes were substantial, essentially amounting to a 50- to 60-percent increase in both real and nominal terms compared to the same time the previous year for the weeks ending March 15, 2020, and March 22, 2020. In contrast, a similarly dramatic year-over-year decrease in the number of food service transactions did not appear until mid-April, although values of this measure indicate food service transactions fell between March and April as well. Increases in food retail sales (coupled with delayed decreases in food service transactions) suggest most of the increases in food retail sales during the early weeks of the pandemic were due to consumers stocking up on FAH in the face of an uncertain future and restrictions on economic activity, as opposed to consumers purchasing less FAFH alone.

Total food retail sales declined after this initial upwards shock but remained high for the first year of the pandemic (i.e., the 52 weeks including and following the national emergency declaration). Year-over-year changes in total real food retail sales during this time were 10.7 percent, coinciding with a 3.5 percent increase in total FAH prices from 2019 to 2020.

Category-specific year-over-year changes were disproportionately high for many categories, such as alcohol; fats and oils; grains; sugars and sweeteners; and vegetables. However, the meat, eggs, and nuts category was the largest driver of the total sales increase. The meat, eggs, and nuts category saw the second largest year-over-year changes (15.3 percent) and largest increase in the share of real food retail sales (17.8 percent the year following the pandemic onset versus 17.0 percent the year prior) while having the second-largest share overall. This category-level increase was especially driven by substantial increases in real sales of regular meat (e.g., beef and pork) and fish. Simultaneously, the highest 2019–20 price increases were in regular meat: 9.6 percent for beef and veal and 6.3 percent for pork. Given that year-over-year changes in real food retail sales of regular meat were 14.8 percent higher, this shift indicated a substantial increase in real expenditures sustained throughout the first year of the pandemic, despite supply chain challenges affecting meat products. The relative composition of real food retail sales roughly remained the same for all other categories, except for commercially prepared items and beverages, which saw share decreases from 30.1 percent to 29.2 percent and 14.5 percent to 13.9 percent, respectively.

Following the 1-year anniversary of the pandemic onset (i.e., the week ending March 14, 2021), total real food retail sales remained relatively high—about 7 percent above pre-pandemic levels—while the number of food service transactions remained 12 percent below pre-pandemic levels. However, despite this sustained change, the composition of food retail sales largely returned to its pre-pandemic characterization.

State-level trends in total food retail sales largely followed national trends, despite significant variation in changes in food retail sales and prices across the country. The largest year-over-year changes in nominal food retail sales for each studied State occurred during the week the national emergency was declared and the week after, although States differed as to which of the 2 weeks the “true maximum” fell. While high food retail sales persisted in some States compared to pre-pandemic times, the majority of variation in State-level year-over-year and 2-years-ago change could be explained by national level changes. Furthermore, the strength of this relationship appeared to generally be the same over time. In other words, the dynamics of total food retail sales at the national level throughout the pandemic were largely similar to those at the State level.

While the data enabled the measurement of rapid changes in food retail at a relatively high level of detail (e.g., the types of foods sold or purchased) as the pandemic situation evolved, the high level of aggregation across products and geographies present unavoidable limitations. Future research can overcome some

limitations using more granular data, including the household-level and store-level scanner data historically acquired by USDA, ERS. The data used in the report are unable to pinpoint the substitution of individual items with different prices or specific attributes (e.g., organic) that would typically be observable in IRI scanner data product dictionaries. These data are also unable to document out-of-stock items on store shelves, a phenomenon documented during the pandemic (Chenarides et al., 2021b). In addition, these analyses were unable to capture potential heterogeneity in household food retail purchase response. This is particularly important for lower-income households as the prevalence of overall food insecurity remained unchanged between 2020 and 2019, despite increases in food insufficiency in the summer of 2020 (Coleman-Jensen et al., 2021; Ziliak, 2021). Concurrently, the Nation experienced a recession and reduced employment (Weinstock, 2021) and a substantial increase in the social safety net benefitted many (but not all) affected U.S. consumers (Bitler et al., 2020; Jones, 2021). Instead of using a data set on food service transactions, studies that can estimate and use food service sales values as the point of comparison to food retail sales may offer a more complete examination of substitution between FAH and FAFH. This comparison is an important consideration, as the relationship between the number of transactions and sales in food service may have changed over the pandemic (Marchesi and McLaughlin, 2022). Finally, national-level or State-level food retail sales and prices cannot capture specific types of geographies, like low food access areas or rural areas.

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Appendix A: Classification of Products in IRI Pandemic Response Scanner Data by Category and Subcategory

Alcohol

Beverages

- Water
- Carbonated non-alcoholic
- Fruit drinks and non-carbonated sugary
- Other

Commercially prepared foods

- Not sweet canned (soups, sauces, etc.)
- Not sweet frozen (pizzas, french fries, fish sticks, and entrees)
- Not sweet packaged/meals and sides
- Not sweet packaged/snacks
- Not sweet ready-to-eat (hot and cold deli items)
- Sweet frozen (ice cream, frozen desserts)
- Sweet mixes (pancake, muffin, and cake mixes)
- Sweet packaged (cookies, candy bars, granola bars, and other sweet bars)

Sweet ready-to-eat (bakery items)

Dairy

- Cheese
- Low-fat milk
- Regular-fat milk
- Yogurt and other

Fats and oils

- Oils
- Solids

Fruit

- Fruit juice
- Whole canned
- Whole fresh/frozen

Grains

- Packaged (bread, rolls, pita, tortilla, rice, pasta, cereal)
- Flour and mixes
- Frozen/ready to cook
- Other

Meats, eggs, and nuts (protein foods)

Poultry fresh/frozen

Regular meat canned

Regular meat fresh/frozen

Eggs

Fish canned

Fish fresh/frozen

Low-fat meat fresh/frozen

Nuts and seeds processed/nut butters

Nuts and seeds raw

Other

Sugar and sweeteners

Vegetables

Dark green canned (e.g., collard greens, spinach)

Dark green fresh/frozen (e.g., collard greens, broccoli, kale, spinach)

Legumes canned (e.g., black beans, garbanzo beans, lentils)

Legumes fresh/frozen (e.g., black beans, garbanzo beans, lentils)

Orange canned (e.g., carrots, sweet potatoes, pumpkin)

Orange fresh/frozen (e.g., carrots, sweet potatoes, pumpkin, acorn squash)

Starchy canned (e.g., potatoes, peas, corn)

Starchy fresh/frozen (e.g., potatoes, peas, corn)

Other-nutrient-dense canned (e.g., tomatoes)

Other-nutrient-dense fresh/frozen (e.g., tomatoes, cabbage, avocado)

Other-mostly water canned (e.g., green beans, mushrooms, beets)

Other-mostly water fresh/frozen (e.g., green beans, mushrooms, cucumbers, iceberg lettuce, onions)

Other

Appendix B. Maximum State-Level Year-Over-Year Increases in Food Retail Sales

Table B1

Maximum weekly year-over-year percentage increase in food retail sales in 2020, by State

State	Week ending	Maximum YoY percentage increase	State	Week ending	Maximum YoY percentage increase
Alabama	3/15/2020	54.4	Nevada	3/15/2020	65.2
Arizona	3/15/2020	59.2	New Hampshire	3/22/2020	63.9
Arkansas	3/22/2020	60.1	New Mexico	3/15/2020	62.5
California	3/15/2020	76.3	New York	3/22/2020	67.2
Colorado	3/15/2020	61.0	North Carolina	3/15/2020	61.3
Connecticut	3/22/2020	59.1	Ohio	3/15/2020	60.7
Florida	3/15/2020	59.1	Oklahoma	3/22/2020	64.6
Georgia	3/15/2020	53.2	Oregon	3/15/2020	54.7
Illinois	3/15/2020	65.1	Pennsylvania	3/22/2020	57.1
Indiana	3/22/2020	71.2	Rhode Island	3/22/2020	69.3
Iowa	3/22/2020	52.4	South Carolina	3/15/2020	50.3
Kansas	3/22/2020	65.5	South Dakota	3/15/2020	39.4
Kentucky	3/22/2020	61.0	Tennessee	3/22/2020	56.8
Louisiana	3/15/2020	63.1	Texas	3/15/2020	63.1
Maine	3/22/2020	56.2	Utah	3/15/2020	75.5
Maryland	3/22/2020	67.0	Vermont	3/22/2020	57.4
Massachusetts	3/22/2020	64.6	Virginia	3/15/2020	56.4
Michigan	3/22/2020	61.9	Washington	3/15/2020	55.8
Minnesota	3/22/2020	70.4	West Virginia	3/22/2020	58.9
Mississippi	3/22/2020	50.9	Wisconsin	3/22/2020	64.2
Missouri	3/22/2020	65.1	Wyoming	3/15/2020	48.1
Nebraska	3/15/2020	51.0			

Note: Maximum YoY percentage increase = maximum weekly State-level year-over-year changes in food retail sales observed in 2020.

Source: USDA, Economic Research Service calculations using IRI scanner data.