



Food inflation through the supply chain: how it's measured and recent trends

March 27, 2023



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Statistics
Canada

Statistique
Canada

Canada

Figure 1
Canadian beef supply chain (imports not pictured)



Note: This figure displays the beef supply chain step-by-step; it does not include imports. First, cattle are raised in ranches then usually sent to feedlots to gain mass, once they reach the desired size they are sent to slaughterhouses and meat processing plants. From the meat processing plants, carcasses are then either sent to merchant wholesalers, food manufacturers, or a combination of both. The resulting products are finally sold to the food-service industry, exported, or sold to retailers for consumer consumption.

Source: COVID-19 and the beef supply chain: An overview (statcan.gc.ca), <https://www150.statcan.gc.ca/n1/pub/45-28-0001/2020001/article/00086-eng.htm>





Producer Price Indexes (PPIs)

Definitions

- PPIs measure changes in prices of domestic producer goods and services
 - *Output PPIs*: prices received for goods and services produced domestically
 - *Input PPIs*: prices paid for intermediate inputs used in production

Uses

- Indicator of inflationary pressure in the business sector
- Deflation of revenue estimates to produce measures of real growth
- Contract escalation by governments and businesses

Statistics Canada's PPIs

Output PPIs

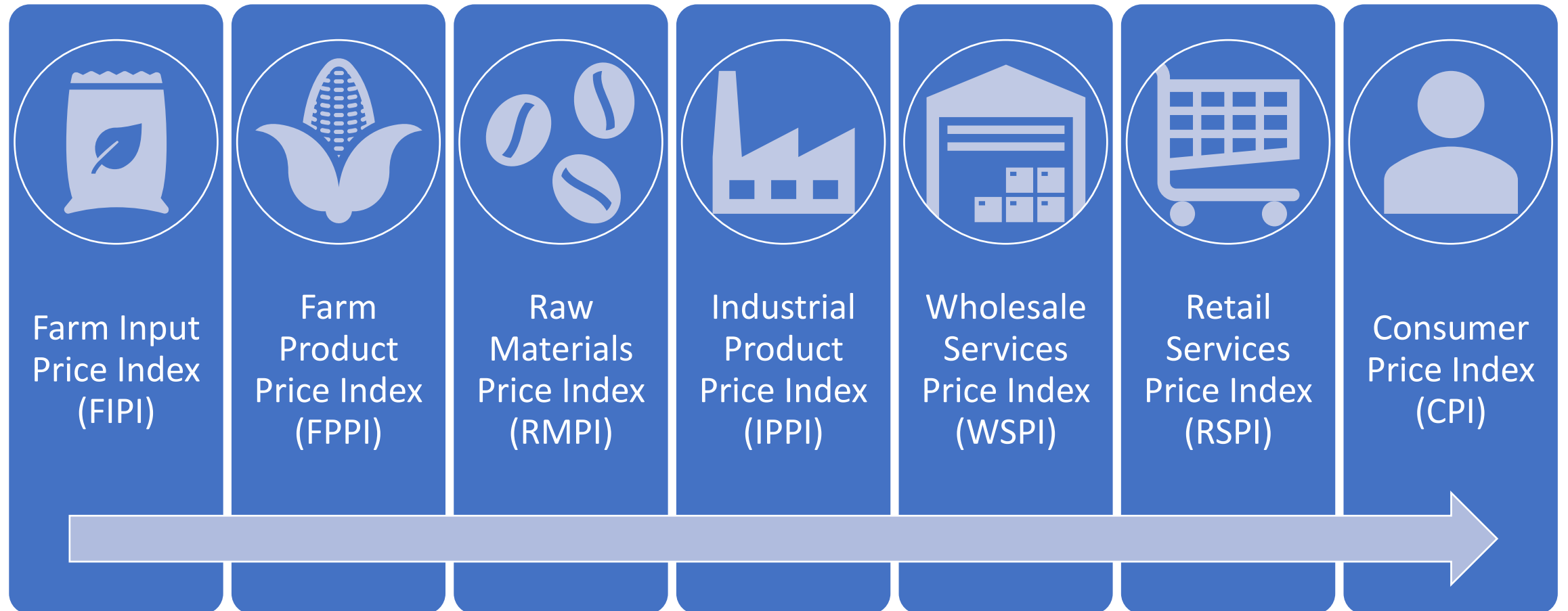
- [Industrial Product Price Index \(IPPI\)](#)
- [Wholesale Services Price Index \(WSPI\)](#)
- [Retail Services Prices Index \(RSPI\)](#)
- [Farm Product Price Index \(FPPI\)](#)
- [New Housing Price Index \(NHPI\)](#)
- [Building Construction Price Index \(BCPI\)](#)
- [Couriers and Messengers Services Price Index \(CMSPI\)](#)
- [Telecommunications Services Producer Price Indexes \(TSPPPI\)](#)
- [Accounting Services Price Index \(ASPI\)](#)
- [Informatics Professional Services Price Indexes \(IPSPI\)](#)
- [Commercial Rents Services Price Index \(CRSPI\)](#)
- [For-hire Motor Carrier Freight Services Price Index \(FHMCFSPI\)](#)
- [Commercial and Industrial Machinery and Equipment Rental and Leasing Services Price Index \(CIMERLSPI\)](#)
- [Consulting Services Price Index \(COSPI\)](#)
- [Architectural, Engineering and Related Services Price Index \(AESPI\)](#)
- [Freight Rail Services Price Index \(FRSPI\)](#)
- [Investment Banking Services Price Index \(IBSPI\)](#)
- [Lending Services Price Index \(LSPI\)](#)

Input PPIs

- [Raw Materials Price Index \(RMPI\)](#)
- [Construction Union Wage Rate Index \(CUWRI\)](#)
- [Electric Power Selling Price Indexes for Non-residential Customers \(EPSPI\)](#)
- [Machinery and Equipment Price Index \(MEPI\)](#)
- [Farm Input Price Index \(FIPI\)](#)



Price Indexes - A Supply Chain View



Consumer Price Index (CPI)

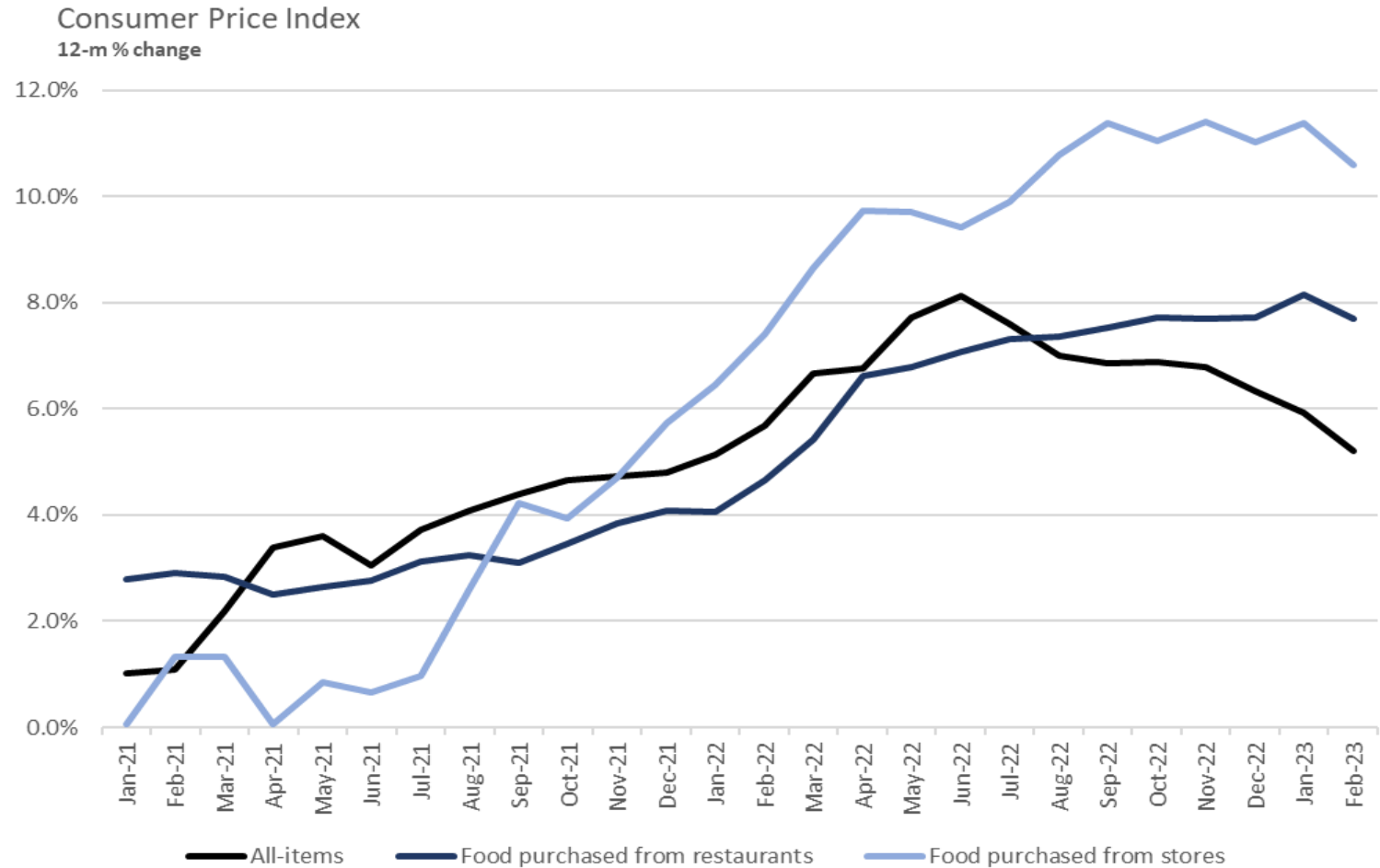
- CPI is one of the most widely known, cited and used economic indicators in Canada
- The CPI tracks changes in the prices experienced by Canadian consumers by comparing, through time, the cost of a fixed basket of goods and services
- Designed in accordance with international standards
- Canada's official measure of inflation
- Covers all 10 provinces and the 3 territorial capital cities
- CPI has a long and rich history in Canada: Statistics Canada has produced the CPI dating back to 1914





How is inflation measured?

- Rate of inflation expressed in three common time horizons
 - 12-month percent change
 - 1-month percent change
 - Annual average percent change



The CPI basket and prices

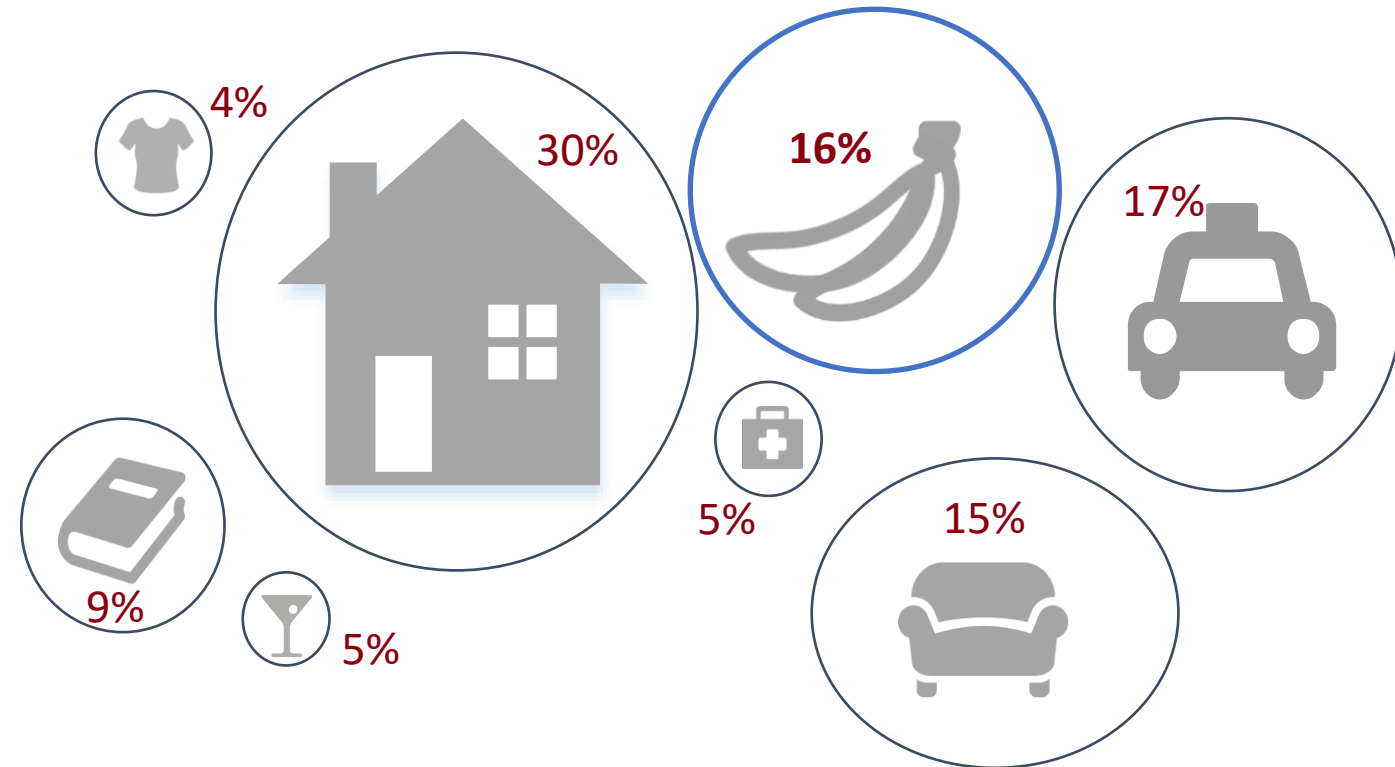
- What is a fixed basket?
 - Measures pure price change over time
- Basket weights
 - Based on Canadian spending patterns of Canadian households
 - Applied to give more importance to certain products, less to others
 - Generated based on various sources of data such as Household Final Consumption Expenditure series
- Updating the basket
 - Relevance and accuracy
 - Captures shifting consumer preferences and evolving goods and services
- CPI price data



Basket weights

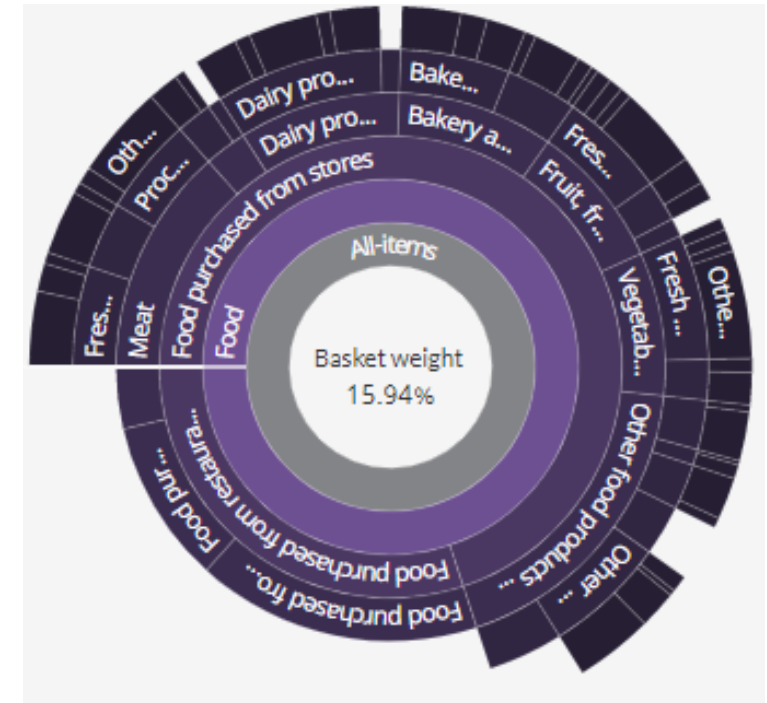
- Eight major components:
 - Shelter
 - Transportation
 - **Food**
 - Household operations, furnishing and equipment
 - Clothing and footwear
 - Recreation, education and reading
 - Health and personal care
 - Alcoholic beverages, tobacco products, and recreational cannabis

- Canadians on average have directed about 16% of their total expenditures to food purchased from stores and food purchased from restaurants









CPI price data for food purchased from stores

- Price data:
 - Retail scanner data from **three** major grocery chains and their **21** subsidiaries. **This is the highest-quality data for price index calculation, since both price and quantity are available.**
 - Prices collected from websites and online flyers, some telephone
- Three stage sampling:
 1. Representative geographic areas: 19 strata (16 areas from the provinces and 3 territorial capitals)
 2. ≈ 500 Representative outlets
 3. ≈ 179 [Representative products](#): more than 56,000 price quotes utilized from millions of weekly transactions and online prices



Average prices vs the CPI: key differences

- The [average prices tables](#) are based on an arithmetic average of prices for a given product **across** different geographies at a specific point in time (i.e. in a specific month).
- The [CPI](#) compares prices over time, while the average price tables compare price levels of different products in the same month.

Average Prices vs. Consumer Price Index		
	Consumer Price Index	Average Prices
Type of Measure	Pure price change over time (inflation)	Price levels in a given month
Method	<p>A fixed basket of consumer goods containing products of unchanging or equivalent quantity and quality from one month to another</p>  <p>February March</p> <p>Basket weights are updated annually based on most recent household expenditure data</p>	<p>A selection of products which may be subject to changing quality, brand and location based on consumer preferences from one month to another</p>  <p>February March</p> <p>Weights change on a monthly basis based on the retailer's share of total units sold for a product</p>
Uses	<p>Compare prices over time</p>  <p>Fresh or frozen chicken</p> <p>March 2021: 170.8 March 2022: 183.5</p> <p>Year-over-year % change = 7.4%</p>	<p>Compare price levels of different products in the same month</p>  → Whole chicken \$5.55/kg Chicken breast \$13.93/kg ←   → Chicken thigh \$10.40/kg

Source(s): Tables 18-10-0004-01 and 18-10-0245-01

Average prices table vs. CPI: Examples

Average prices table (Monthly estimated average prices)			CPI (year-over-year change)
	January 2022	January 2023	Jan 2022/Jan 2023
Bacon	\$6.90	\$7.04	+5.9%
Butter	\$4.72	\$5.87	+19.7%
Eggs	\$3.91	\$4.38	+13.6%
Peanut butter	\$4.67	\$5.36	+4.4%

- Comparing January 2022 with January 2023 average prices to calculate a price change would be an incorrect measure of food inflation
- Food inflation or pure price change is measured in the CPI (last column)
- It is therefore recommended that the [CPI and its sub-indexes](#) be used to measure pure price change over time

Standardization and quantity adjustments

- **Smaller packaging for the same price** will be shown as a price increase
 - Quantity adjustment is the default treatment for all prices in the food category – accounting for changes in the quantity of a product – e.g. package size.



If a cup of coffee from your favourite restaurant now comes in a smaller cup but you pay the same amount, the price has **increased**.



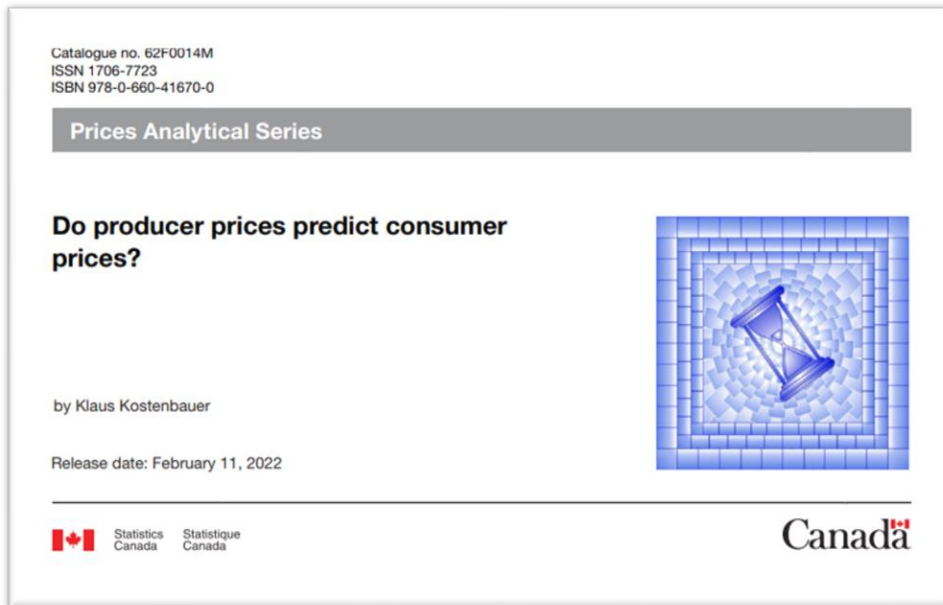
Key Conceptual Differences

	Output PPI	CPI
Imports	N/A	Included
Exports	Included	N/A
Sales and excise taxes	Excluded	Included
Distribution costs	Excluded	Included
Index Frequency	Monthly, quarterly or annually	Monthly
Classification basis	By industry and/or product	By product



Do producer prices predict consumer prices?

- Prediction of the All-Items CPI requires more than just the IPPI
 - Differences in scope, such as treatment of imports, limits predictive power
 - Margins (wholesale, retail) play an important role that is missed when limiting analysis to the IPPI and CPI
- Regardless, interesting dynamics can be found by examining commodities at a detailed level
- Relationships evolve and should not be presumed to be stable over many years



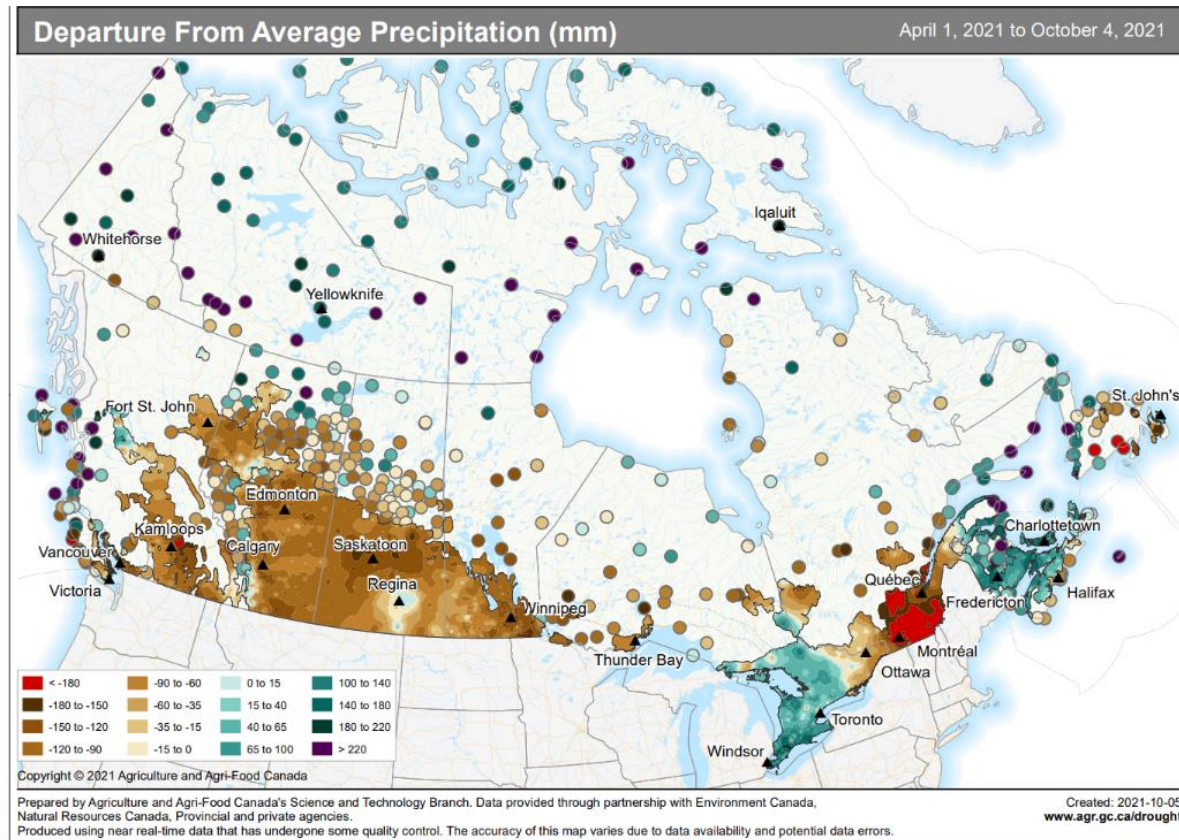


Wheat

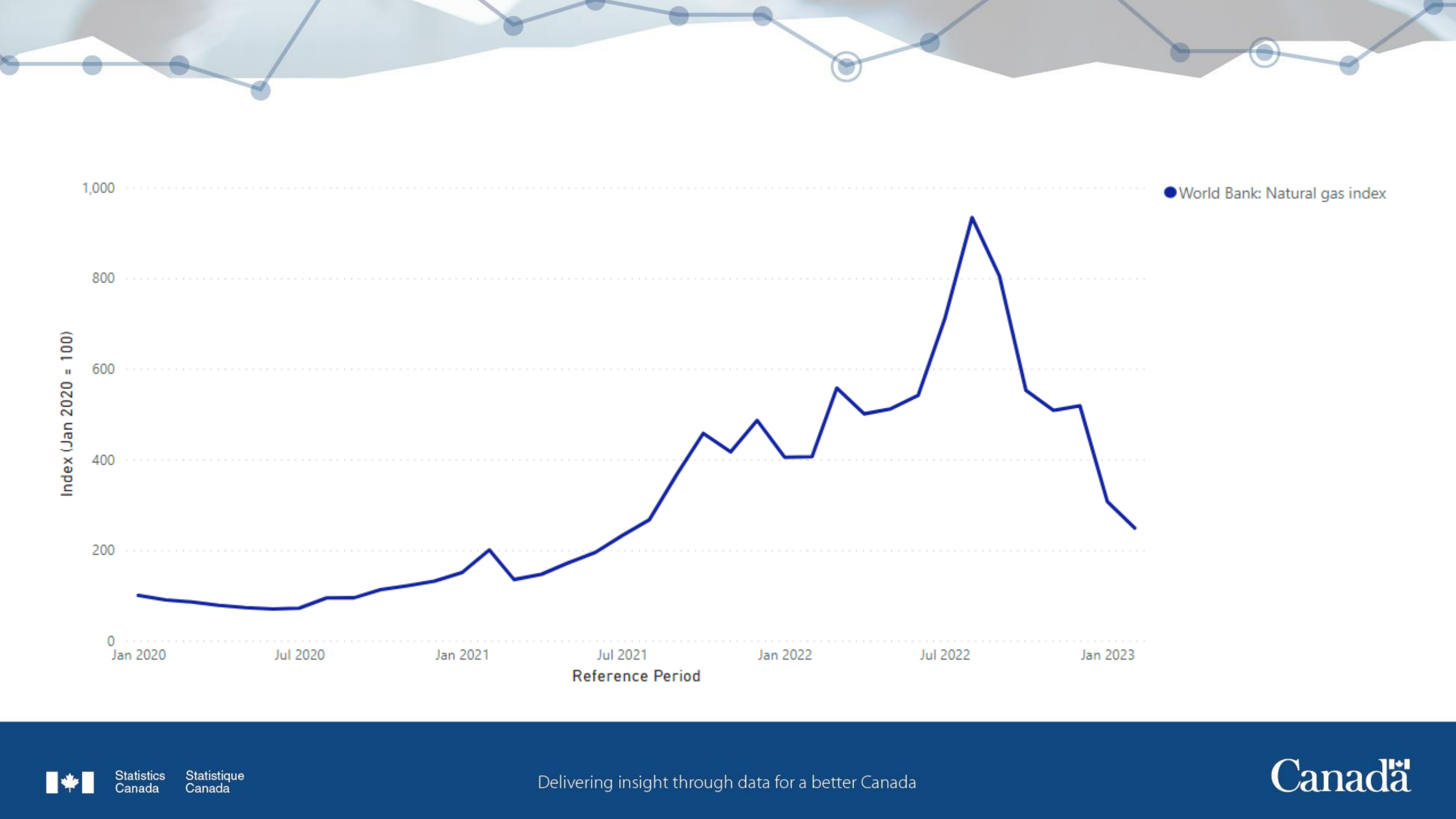


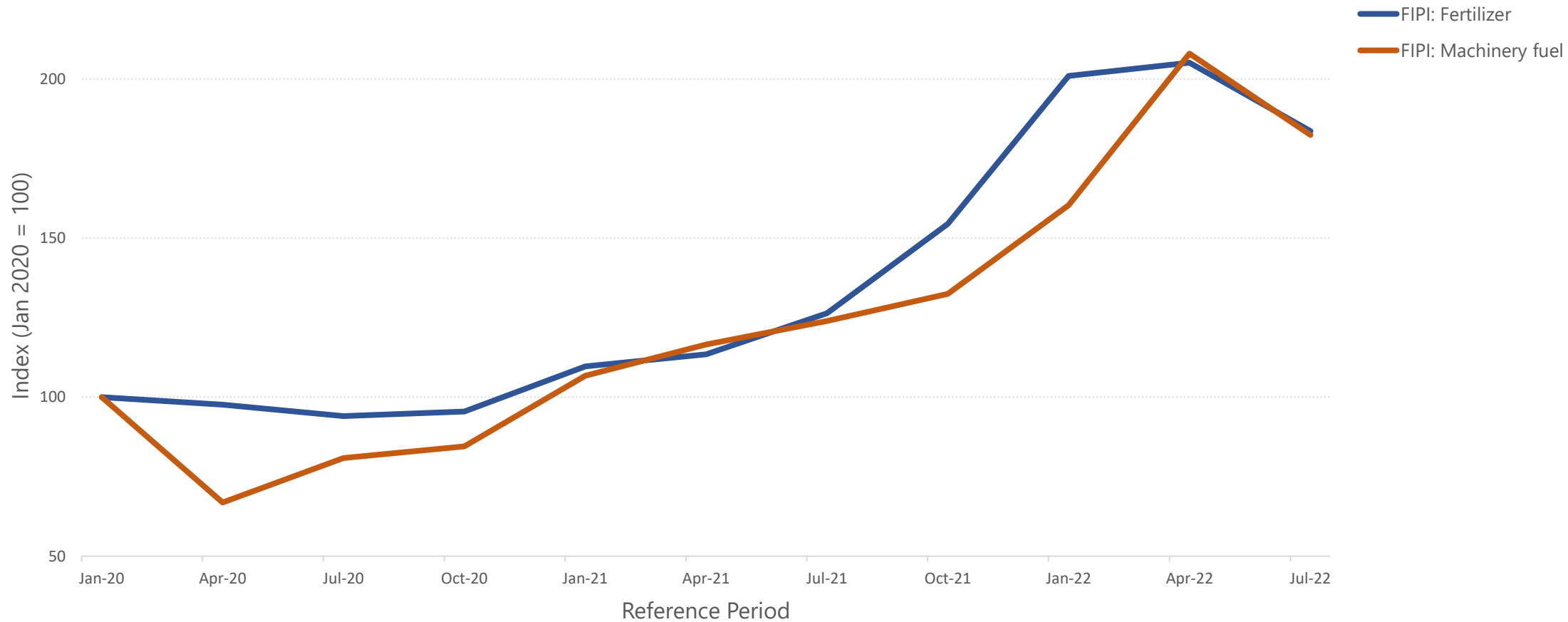
Context: wheat prices

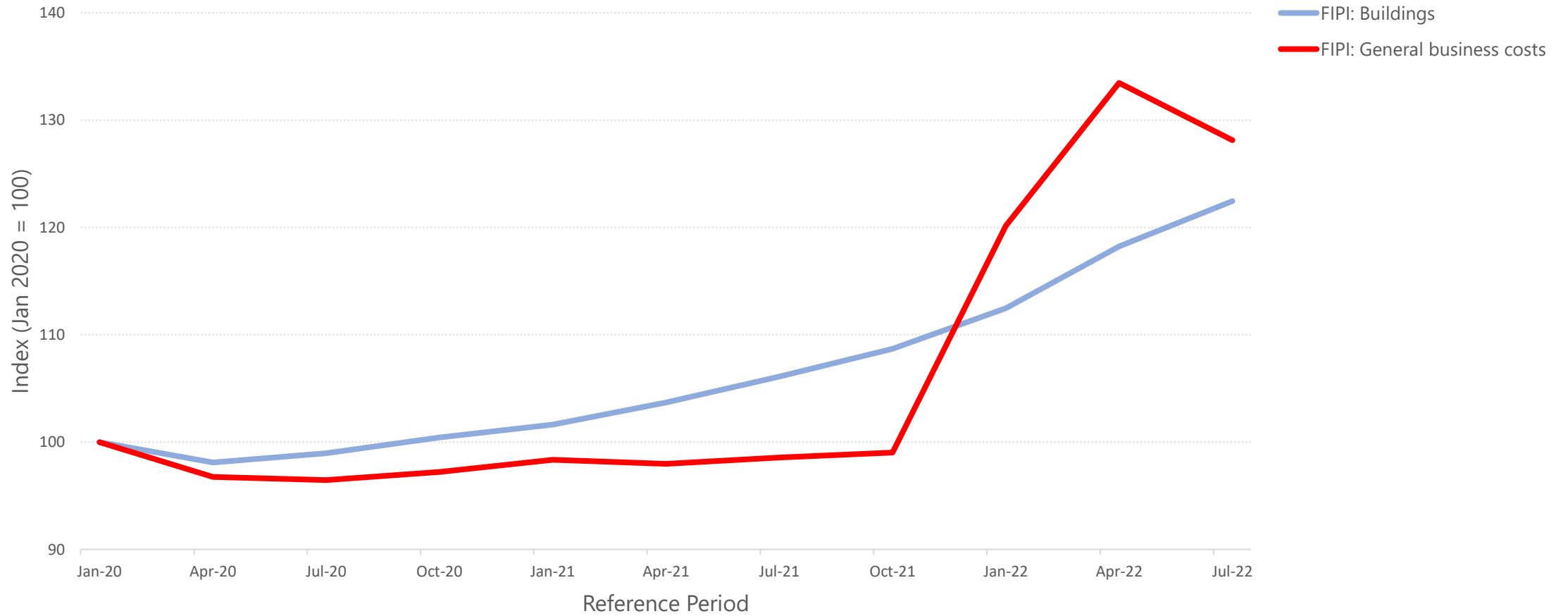
- Russian invasion of Ukraine
- High input prices
- Bad weather

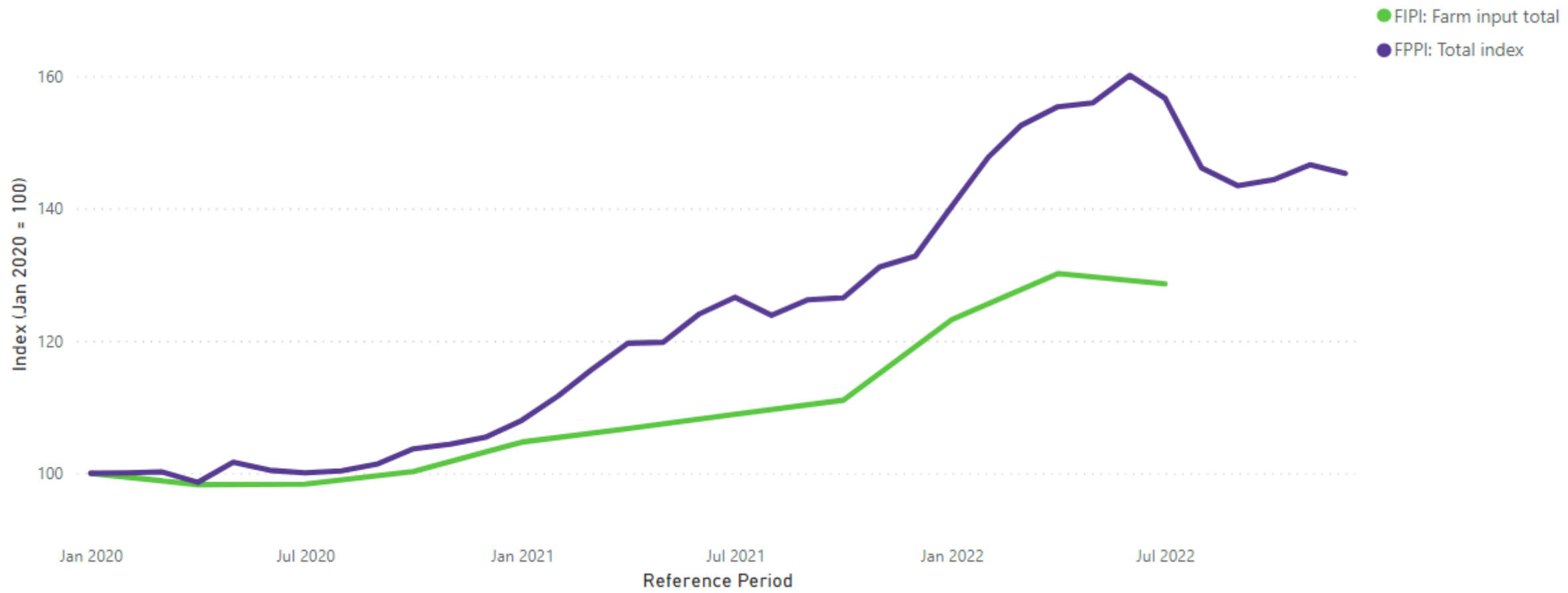


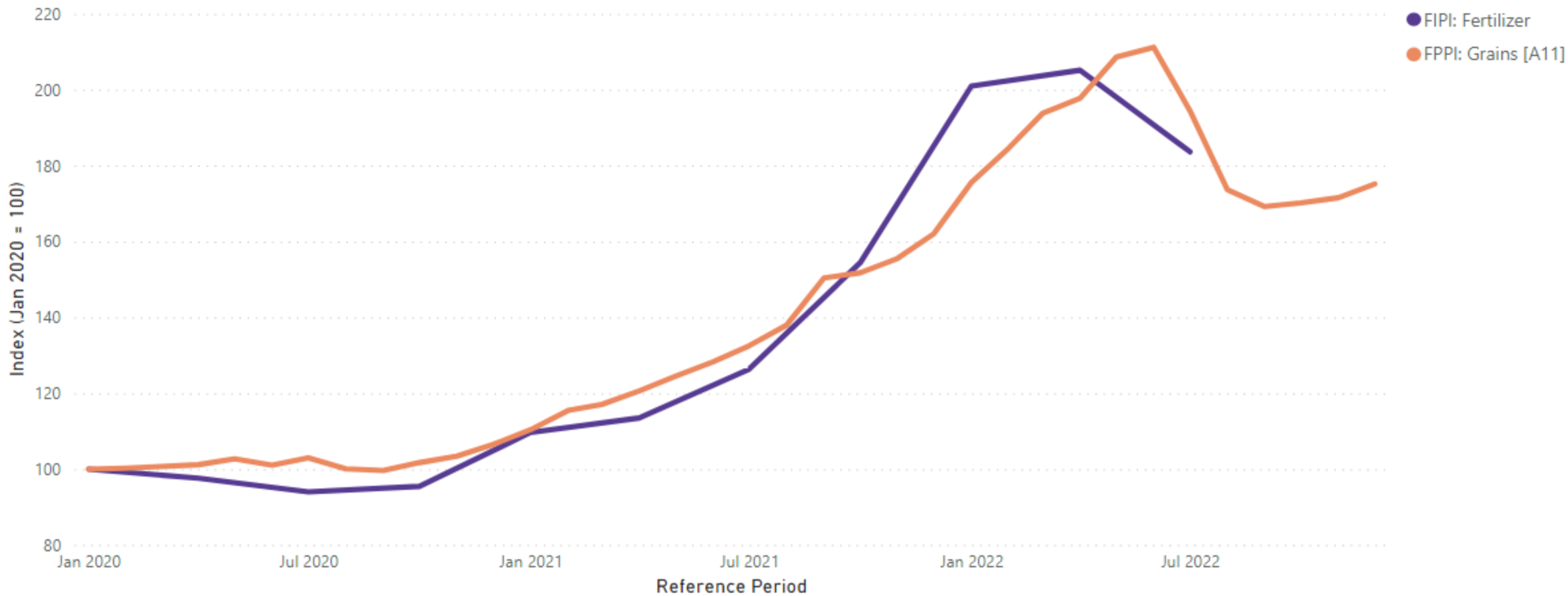
Country	Global Share
China	17.8%
India	14.2%
Russian Federation	9.9%
United States	5.8%
France	4.7%
Ukraine	4.2%
Australia	4.1%
Pakistan	3.6%
Canada	2.9%
Germany	2.8%
*Source: FAO data from 2021	

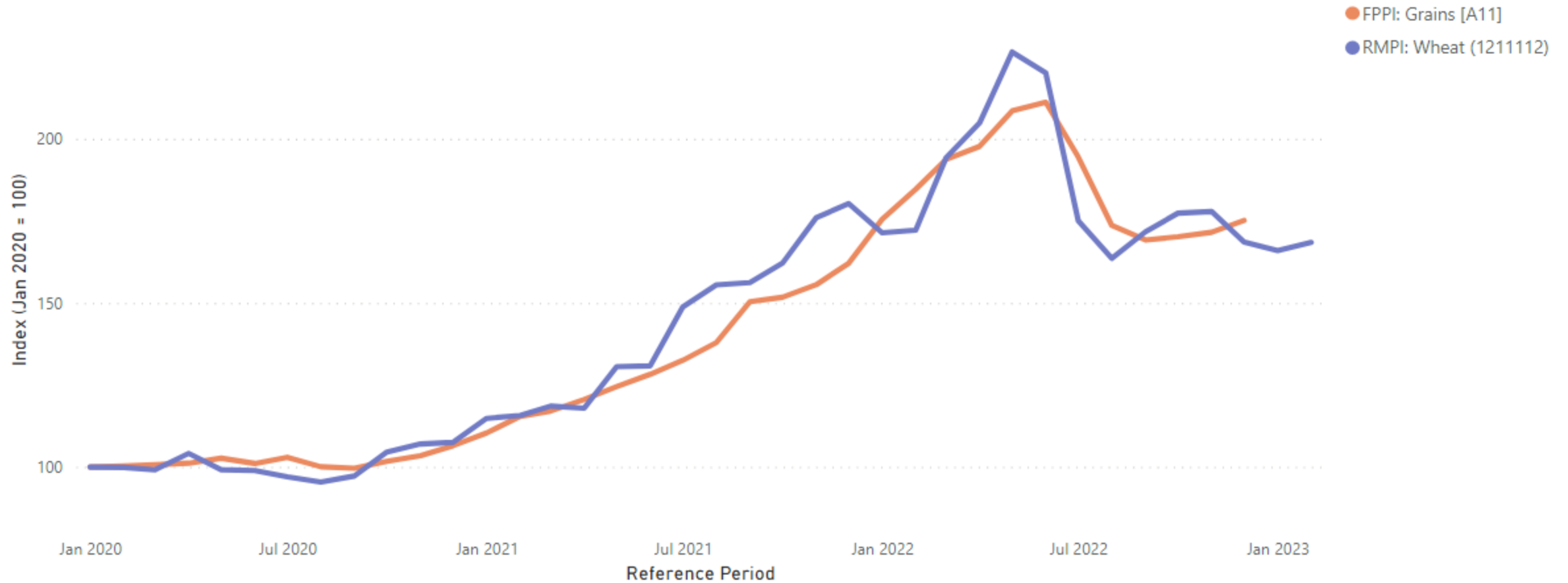


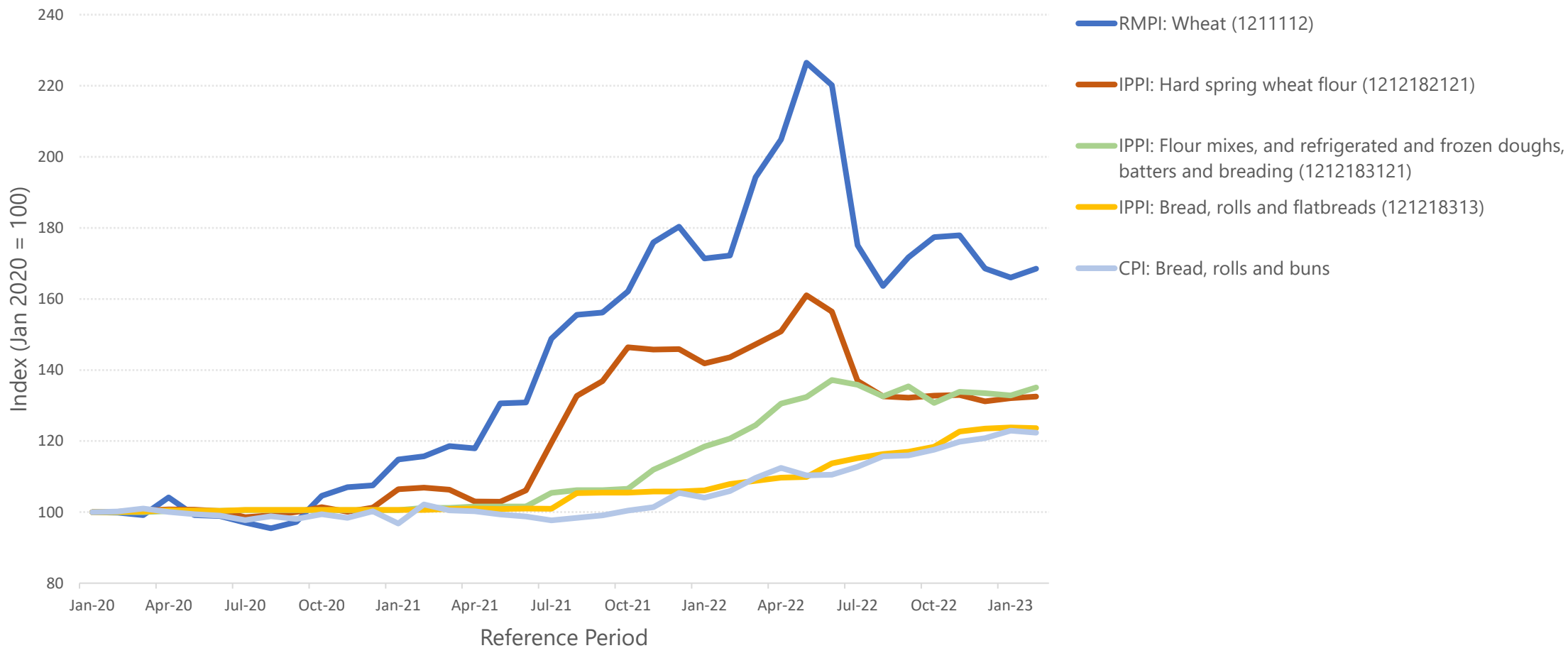








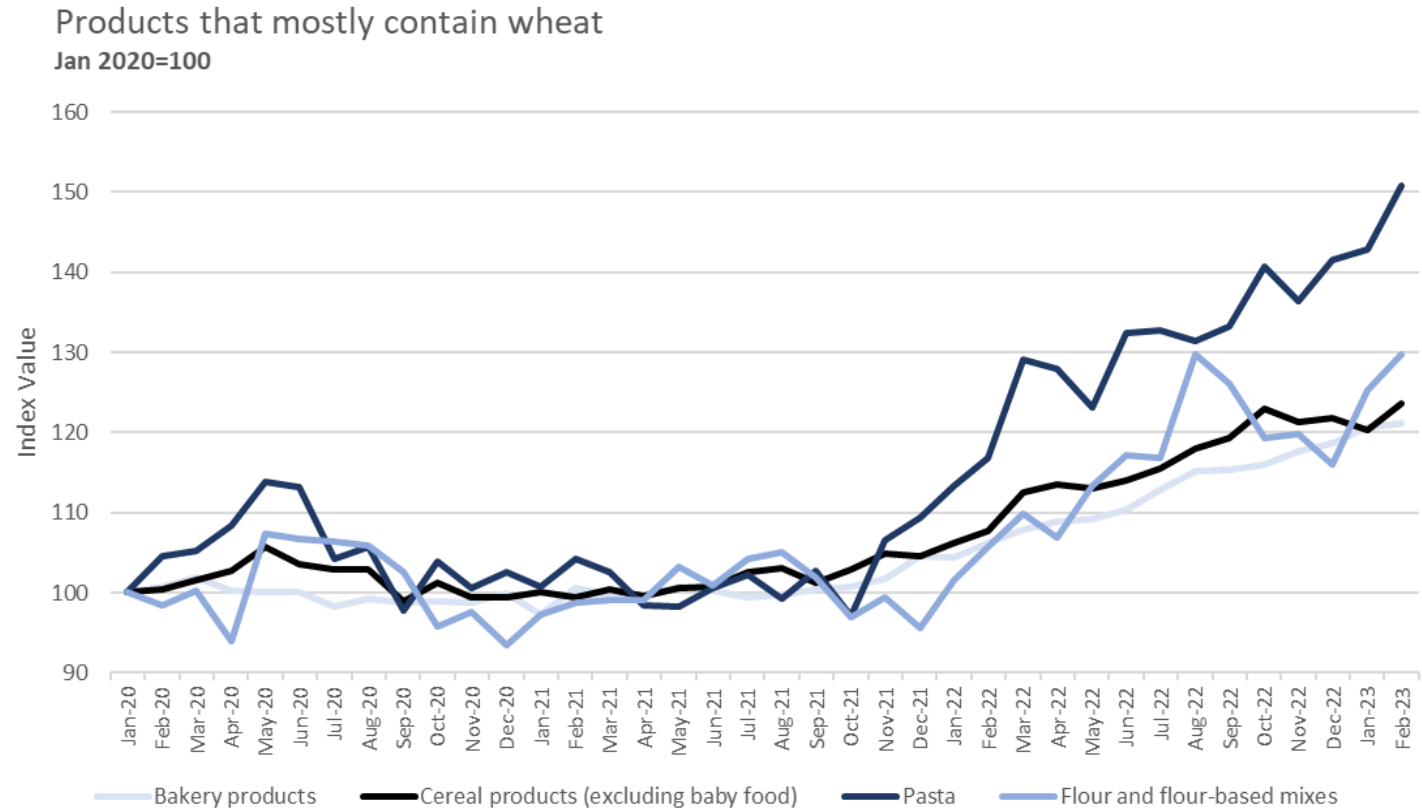






CPI: wheat prices

- Grocery prices in February increased 11.4% compared with Feb 2022
 - Bakery products: +13.9%
 - Cereal products: +14.8%
 - Pasta: +29.1%
 - Flour and flour-based mixes: +22.9%





Edible Oils



Context: edible fats and oils

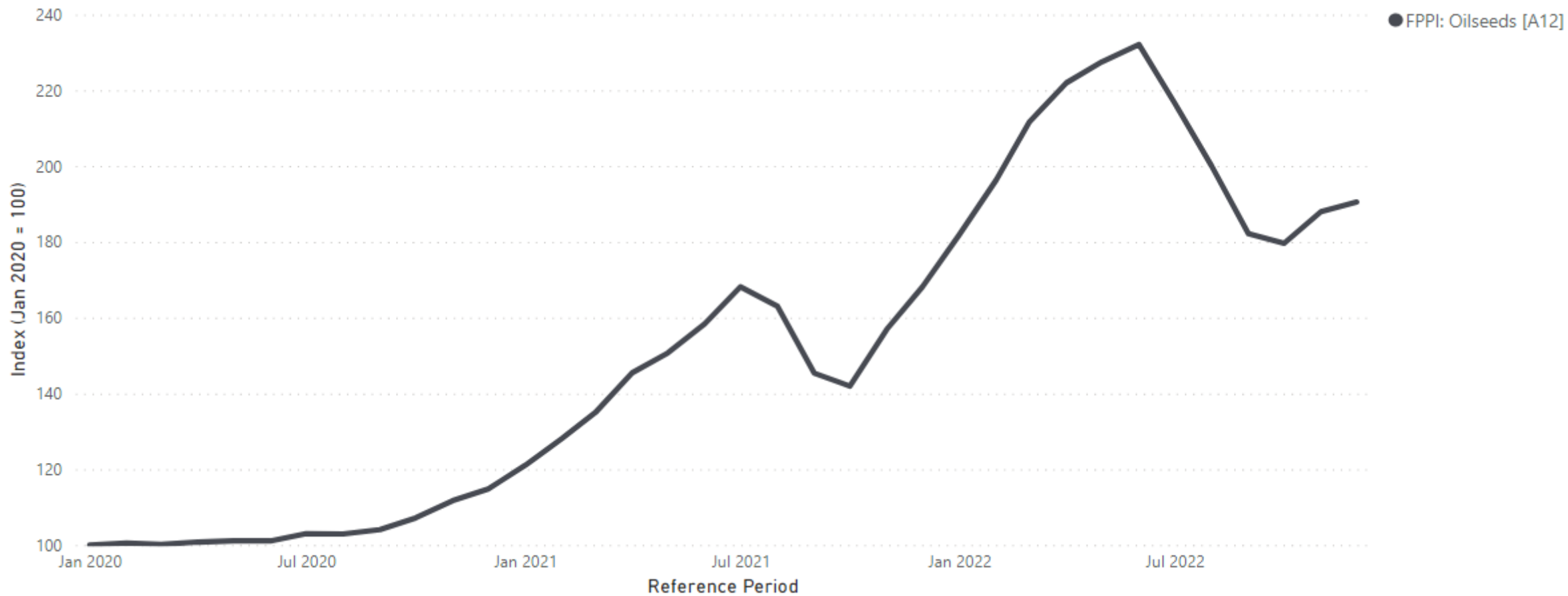
- Malaysian and Indonesian production
- Russian invasion of Ukraine
- Canadian production
- Higher input prices

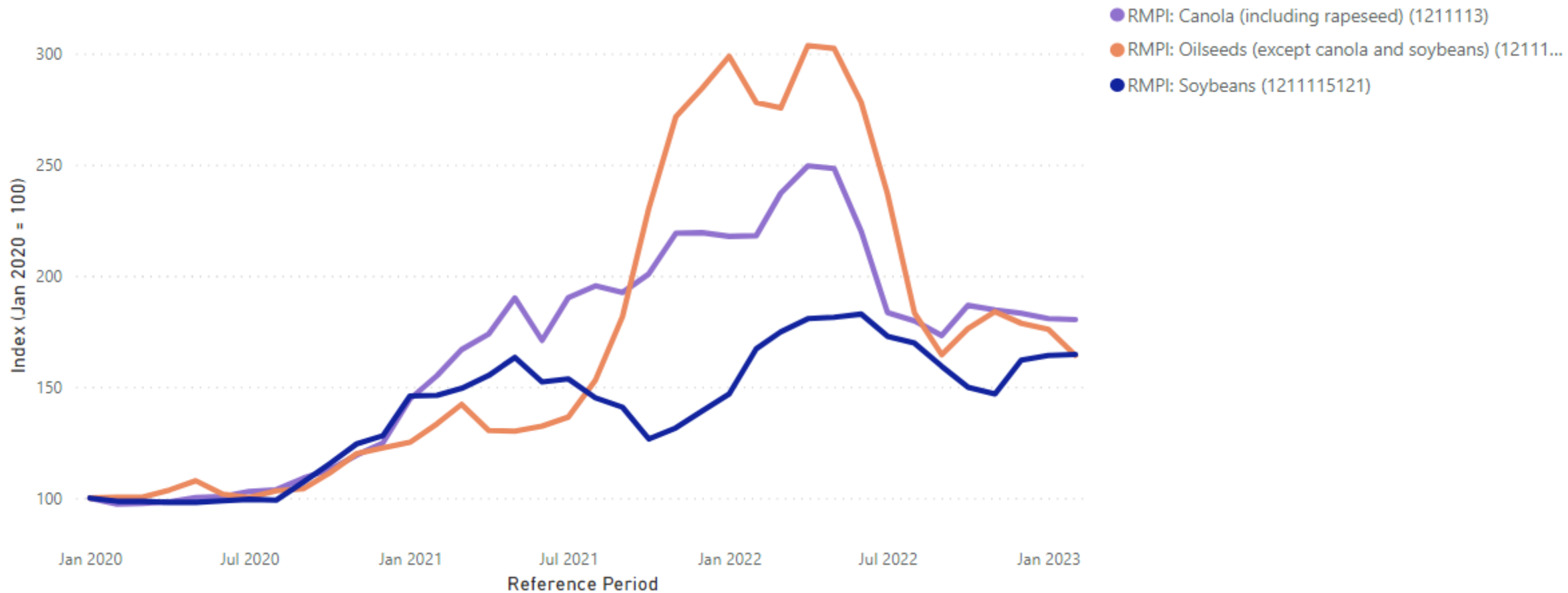
Vegetable Oil	Top producer	Global share
Palm and palm kernel	Indonesia	61.5%
Canola/Rapeseed	Canada	17.9%
Soy	Brazil	36.3%
Sunflower	Ukraine	29.6%

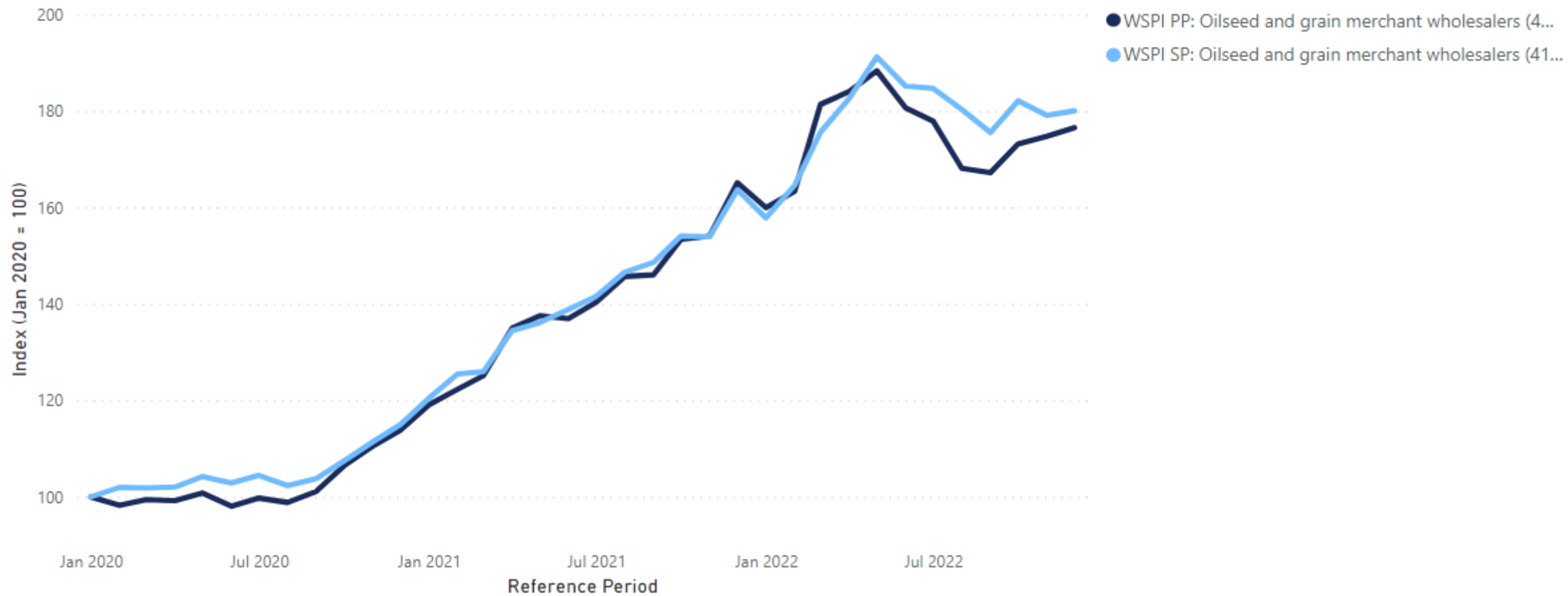
*Source: FAO data for 2021

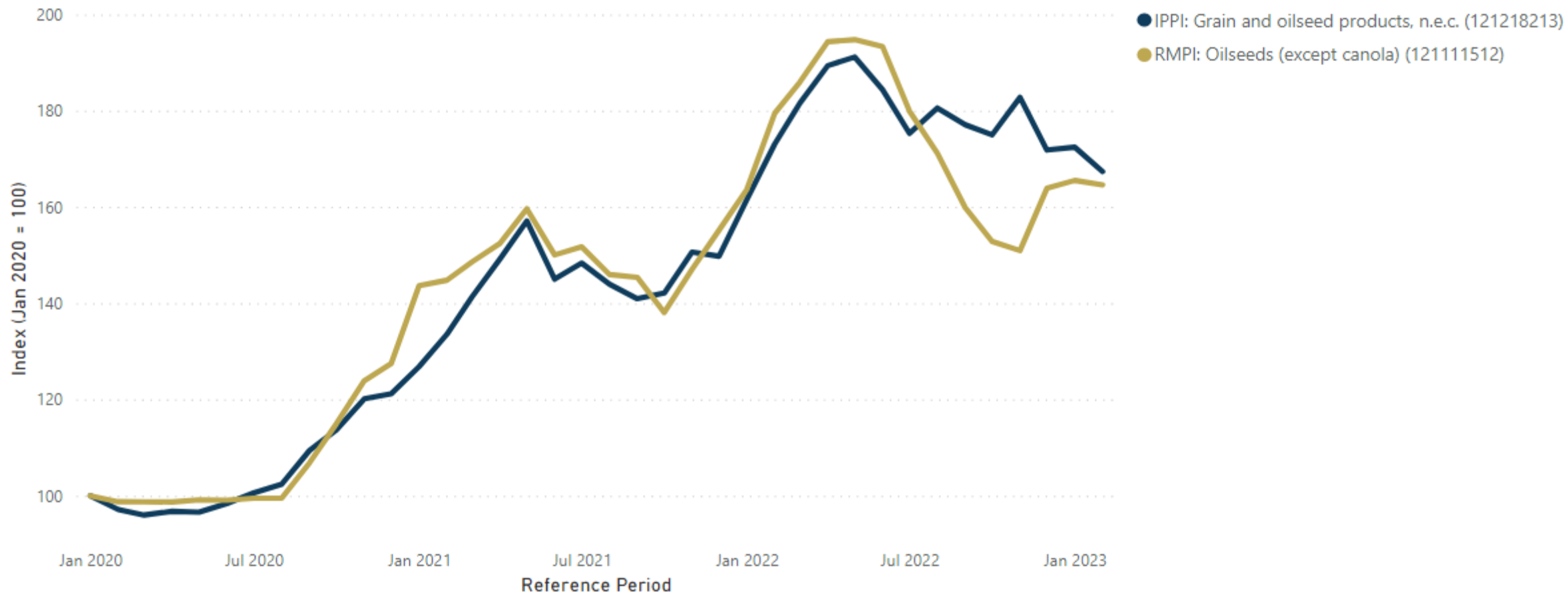
Vegetable Oils	Share of Total
Palm and palm kernel	39.7%
Soy	28.0%
Canola/Rapeseed	14.7%
Sunflower	9.4%
Peanut	3.0%
Cottonseed	2.3%
Coconut	1.7%
Olive	1.3%

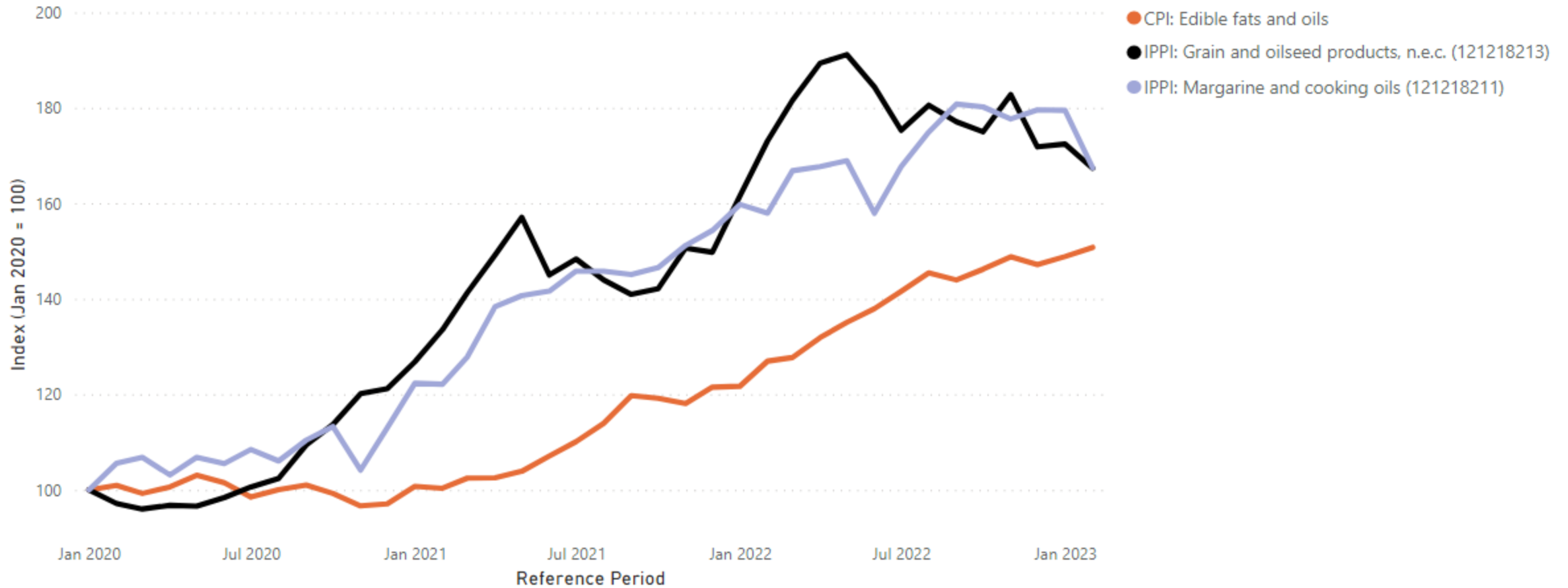
*Source: USDA (data for Feb 2023)

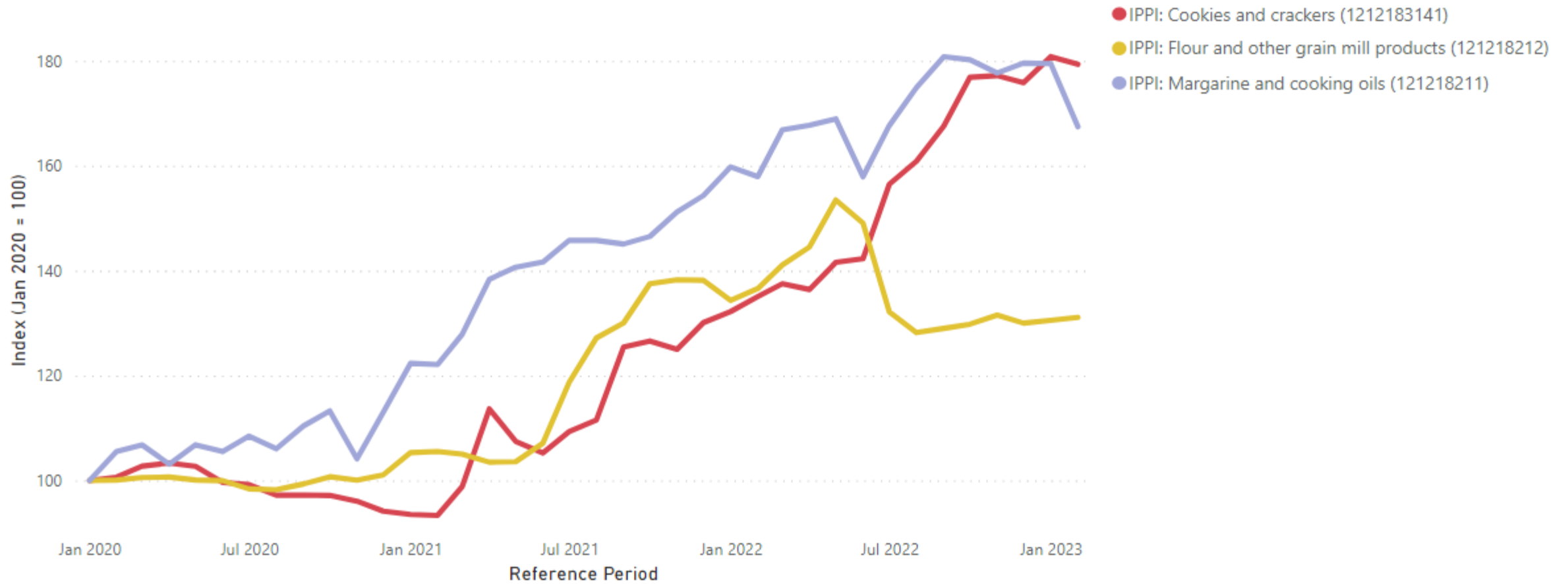










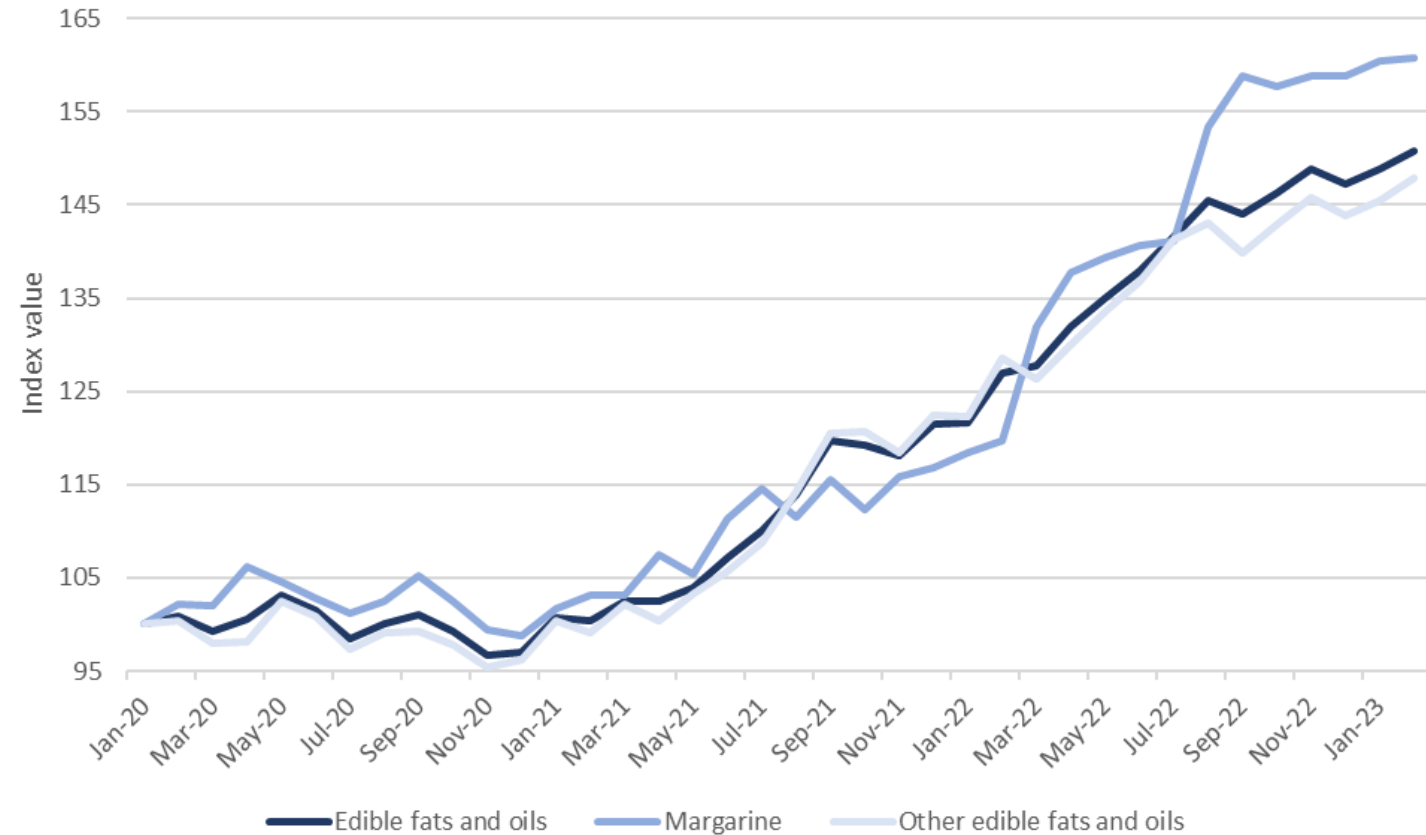




CPI: edible oils

- Grocery prices in February increased 10.6% compared with Feb 2022
 - Edible fats and oils: +18.8%
 - Margarine: +34.4%
 - Other edible fats and oils: +15.0%

Edible fats and oils
Jan 2020=100





Meats



Context: meat prices

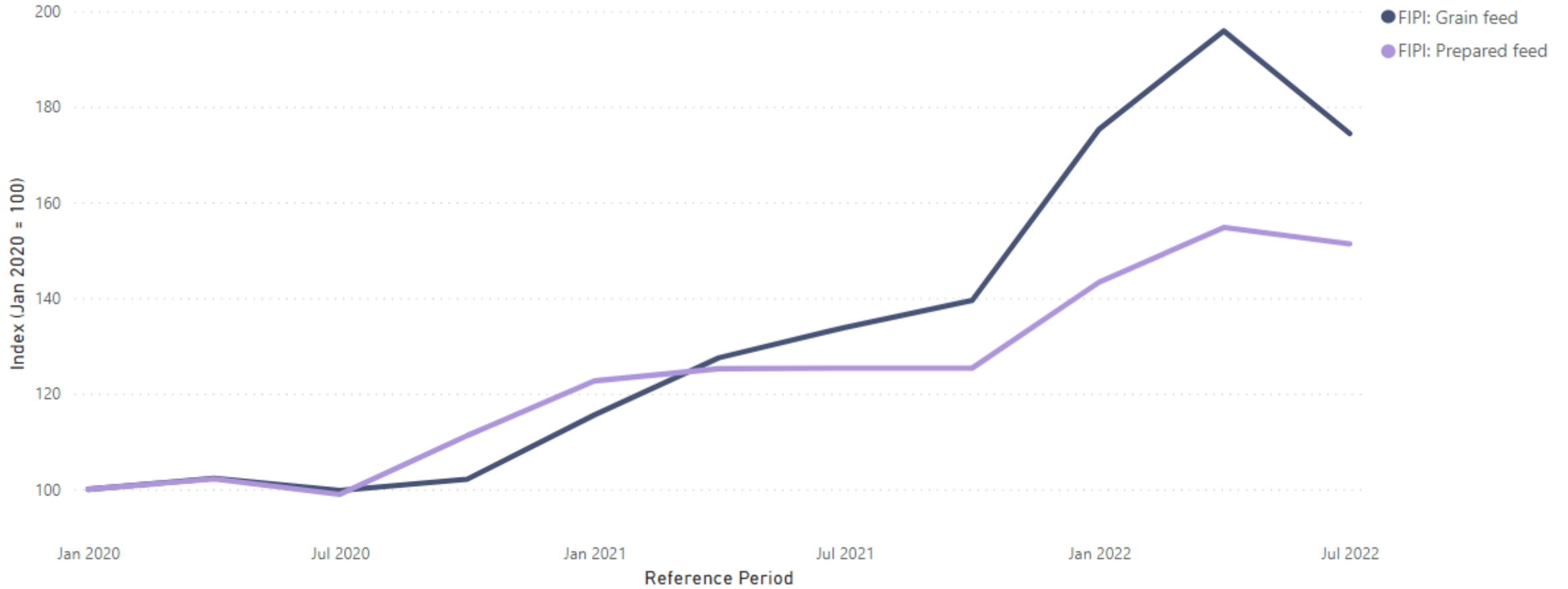
- High input prices
- Bad weather
- COVID-19
- Diseases
 - Avian flu and African swine fever

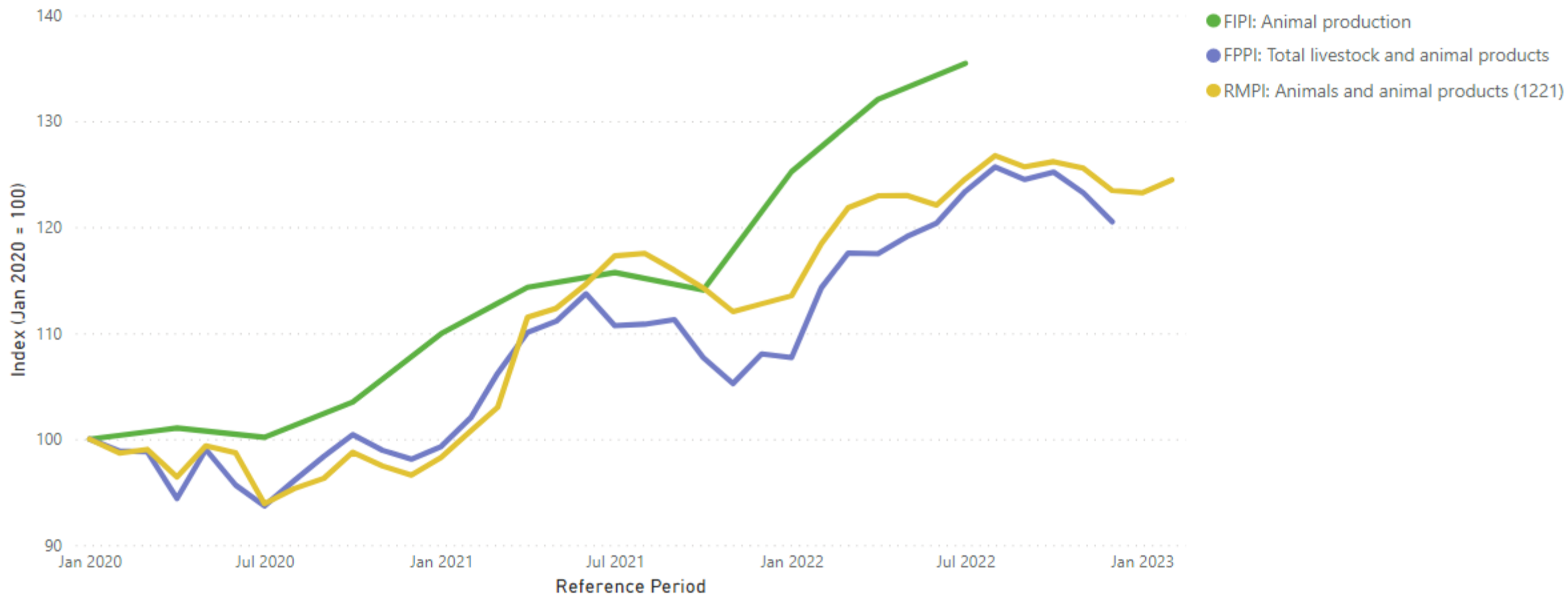
Share of meat imports by country

Country	Share of total imports
United States	60.7%
Australia	7.7%
New Zealand	7.6%
Uruguay	5.2%
Mexico	3.7%
Germany	2.7%
Spain	2.3%
Italy	1.8%
Brazil	1.8%
Denmark	1.5%

Share of Livestock imports by country

Country	Share of total imports
United States	90.4%
Netherlands	3.0%
Viet Nam	1.4%
Mexico	0.7%
Cambodia	0.6%
Ireland	0.5%
Saint Kitts and Nevis	0.5%
United Kingdom	0.5%
Mauritania	0.4%
France	0.3%





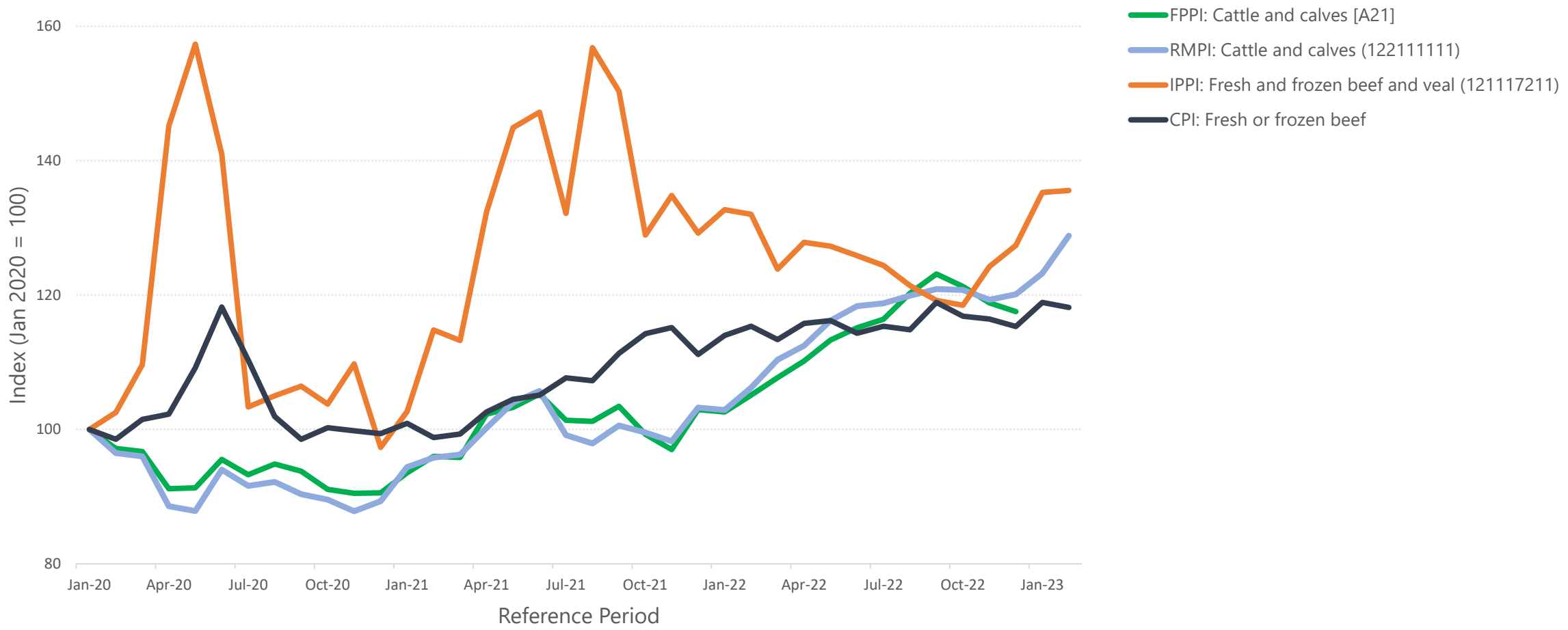
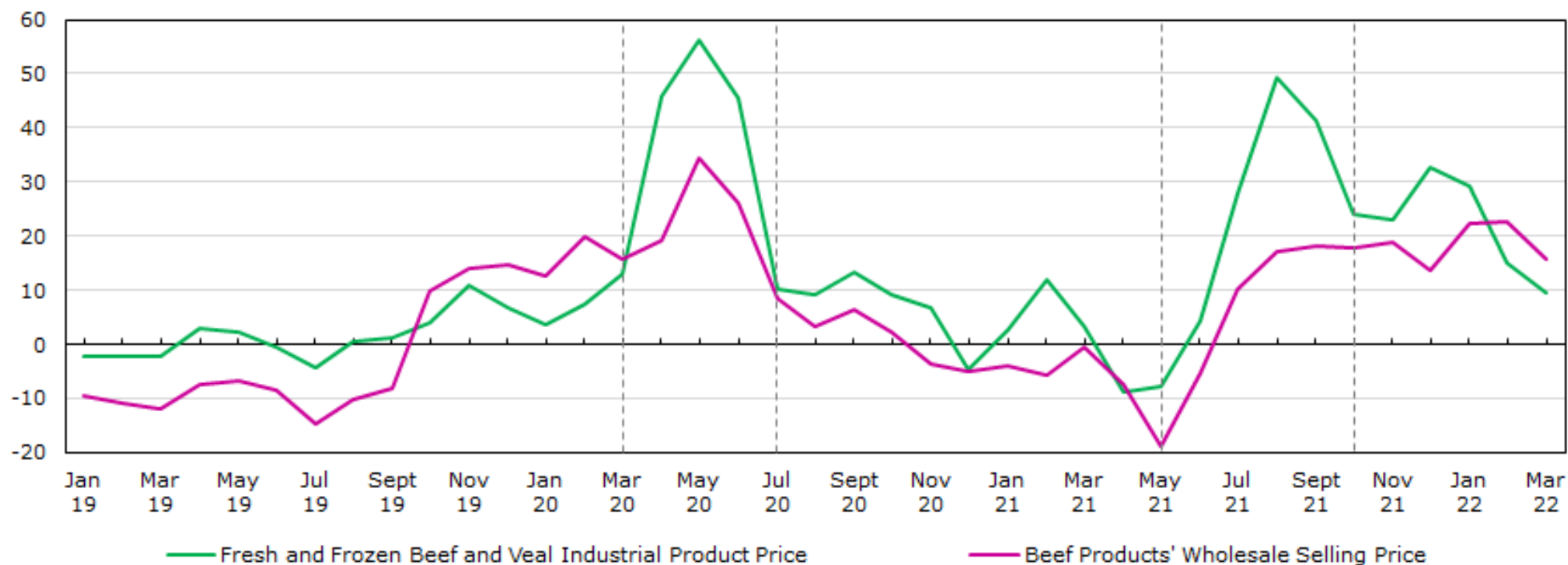


Chart 2
Industrial product price and wholesale selling price compared

Year-over-year percentage change

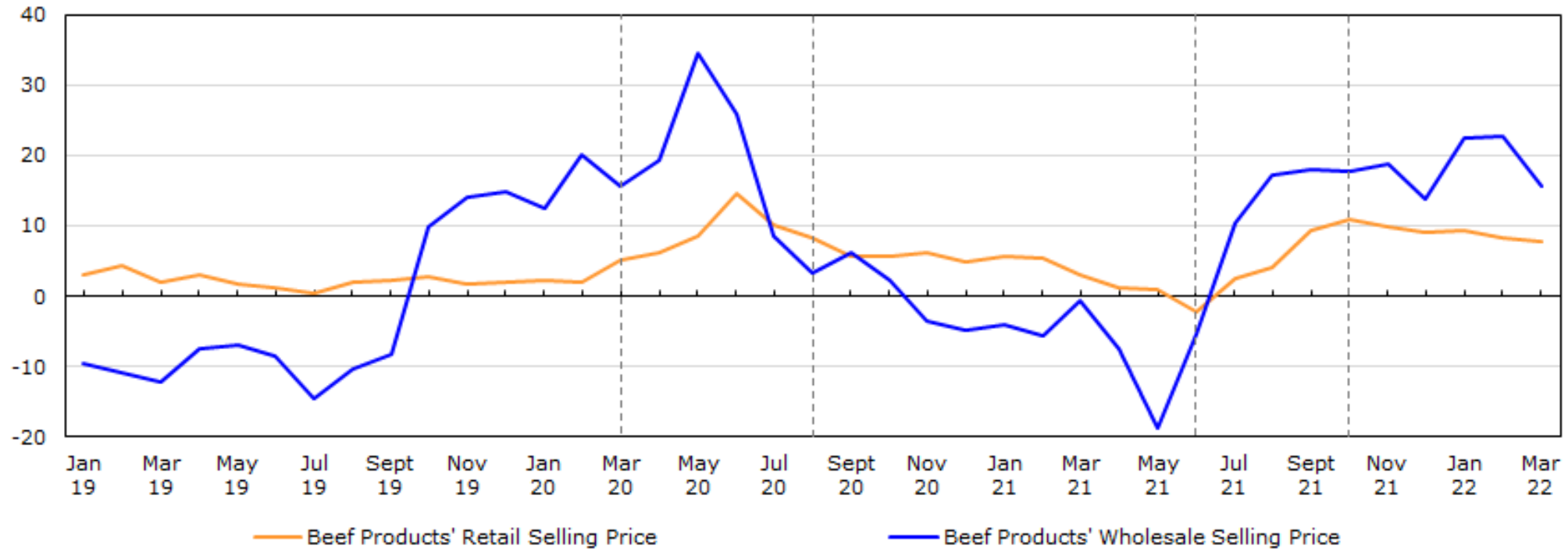


Source: Statistics Canada. Table 18-10-0266-01 Industrial product price index, by product, monthly and special calculation based on Statistics Canada's Wholesale Price Report (survey number 5106) for beef products.



Chart 3
Wholesale selling price and retail selling price compared

Year-over-year percentage change



Source: Special calculation based on Statistics Canada's Wholesale Price Report (survey number 5106) and Retail Services Price Index program (survey number 5135) administrative data for beef products.



Chart 4
Retail selling price, purchase price and margin price compared

Year-over-year percentage change

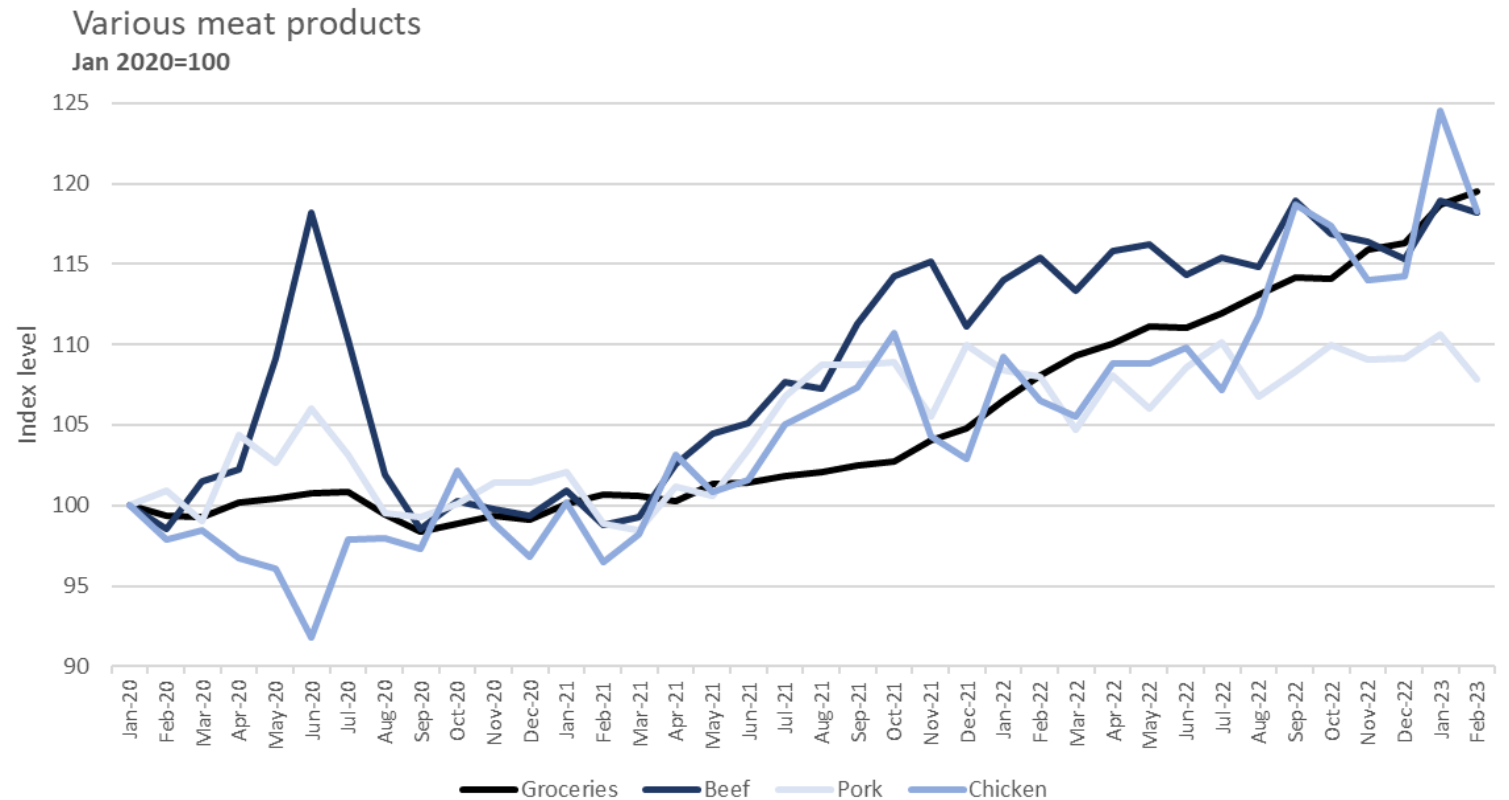


Source: Special calculation based on Statistics Canada's Retail Services Price Index Program (survey number 5135) administrative data source for beef products.



CPI: meat prices

- Grocery prices in February increased 10.6% compared with Feb 2022
- Meat prices increased +6.2%
 - Beef: +2.4%
 - Pork: -0.2%
 - Chicken: +11.1%
- What has been happening?
 - Beef (summer 2021)
 - Pork (labour unrest)
 - Chicken (avian flu)



Recent Supply Chain Price Analysis



[Behind the Numbers: What's Causing Growth in Food Prices](#)



[From slaughter to supermarket: How supply-chains inform beef prices](#)



[An analysis of recent issues faced by the Canadian pork industry](#)



[Prices through the supply chain: Softwood lumber](#)



[Price Connections: From the gas well to the farm stand](#)

Conclusion: Ongoing enhancements



Our CPI modernization efforts continue in order to meet the evolving data needs of Canadians, and to ensure the CPI remains an accurate and relevant indicator of price change across the country. We are continuously improving our data sources and methods as the retail landscape evolves.



Thank you and please reach out to us if you have any [questions](#)

Email address: statcan.cpddisseminationunit-dpcunitedediffusion.statcan@statcan.gc.ca

Find us at the [CPI Portal!](#)

- One stop shop for information relating to all CPI data, publications, interactive tools, and announcements highlighting new products and upcoming changes to the CPI in one convenient location.
- **Explore the Consumer Price Index**
- Check out the "[Personal Inflation Calculator!](#)" This interactive calculator allows you to enter dollar amounts in the common expense categories to produce a personalized inflation rate, which you can compare with the official measure of inflation for the average Canadian household—the CPI.
- Check out the "[Consumer Price Index Data Visualization Tool](#)" to access current and historical CPI data in a customizable visual format.

Resources:

- [Video: Statistics Canada Training Institute – CPI](#)
- [Video: An Overview of Canada's CPI](#)
- [Video: The CPI and Your Experience of Price Change](#)
- [Measuring Pure Price Change in a Constantly Changing World](#)
- [The Consumer Price Index: Keeping up with Canadian Consumers](#)
- [The Daily — Food prices in the Consumer Price Index](#)
- [Data Table: Consumer Price Index, monthly, not seasonally adjusted](#)
- [Data Table: Monthly average retail prices for selected products](#)
- [Consumer Price Index: Frequently asked questions](#)
- [Video: Producer Price Indexes](#)
- [StatCan Data Literacy Training](#)
- [Eh Sayers Season 1 Bonus Episode - Why Should You Care About Inflation?](#)
- [Eh Sayers Season 2 Episode 3 - Dude, Where's My Semiconductor?](#)