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Trends in U.S. Merchandise Trade, 2022

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Introduction

This working paper—the second in a series of four papers providing analysis on U.S. merchandise trade in 2022—covers four industry sectors (agricultural products, energy-related products, forestry products, and minerals and metals), providing discussion and analysis on U.S. exports, imports, and trade balance by sector (e.g., agriculture), digest (e.g., poultry or oilseeds), and leading trading partners. The third paper will cover chemicals and related products, footwear, and textiles and the fourth paper will cover electronic products, machinery, and transportation equipment. These working papers are intended to be read with the interactive data tables and figures that can be found on the USITC website at: https://www.usitc.gov/research_and_analysis/tradeshifts/2022/index.

Box 1.1 Background on the trade data used in this working paper

For the purposes of this paper, trade is divided into ten broad industry sectors (e.g., agriculture). The industry sectors are further divided into digests (e.g., poultry or oilseeds). Each USITC sector digest encompasses various 8-digit subheadings in the Harmonized Tariff Schedule of the United States (HTS). The USITC maintains and publishes the HTS which sets out the tariff rates and statistical categories for all merchandise imported into the United States. The U.S. Census Bureau (Census) collects and compiles export statistics of approximately 8,000 commodity classifications (10-digit classification codes) in Schedule B: Statistical Classification of Domestic and Foreign Commodities Exported from the United States. Schedule B classification codes are concorded to HTS 10-digit statistical reporting numbers based on USITC estimates; therefore, the classification codes for exports are presented using HTS 8-digit subheadings for imports.[a]

The trade data presented in this working paper principally rely on three broad categories of trade: "total exports," "domestic exports," and "general imports." Unless otherwise noted, the export data used in tables are for domestic exports; some tables also include data on re-exports.[b] The import data used in the tables are for general imports.

Definitions of the five broad categories of trade data gathered by the U.S. Census:

General imports are total physical arrivals of merchandise from foreign countries into the United States, whether such merchandise enters consumption channels immediately or is entered into bonded warehouses or Foreign Trade Zones (FTZs) under Customs custody.

Imports for consumption (sometimes called "special imports") are merchandise that have physically cleared through Customs, either entering consumption channels immediately or entering for consumption after withdrawal from bonded warehouses or FTZs under Customs custody.

Domestic exports are (1) exported goods that were grown, produced, or manufactured in the United States, and (2) exported commodities of foreign origin that have been changed in the United States (including changes made in a U.S. FTZ) from the form in which they were imported, or that have been enhanced in value or improved in condition by further processing or manufacturing in the United States.

Re-exports (sometimes called foreign exports) are calculated as total exports minus domestic exports of goods of foreign origin that (1) have previously entered the U.S. customs territory, a Customs bonded warehouse, or a U.S. FTZ, and (2) at the time of exportation, have not undergone any substantial change in form or condition or any enhancement in value by further manufacturing in the U.S. customs territory or U.S. FTZs.

Total exports are U.S. domestic exports plus re-exports. This includes all exports of physical merchandise from the United States.[c]

[a] For a complete list of HTS subheadings classified in a particular sector or digest, see https://www.usitc.gov/system/files/research_and_analysis/tradeshifts/files/sectors_digest_table_2022.html.
[b] For more information on trade terminology, please refer to USITC, "Special Topic: Trade Metrics https://www.usitc.gov/research_and_analysis/trade_shifts_2014/trade_metrics.htm, Shifts in U.S. Merchandise Trade, 2014.
[c] USDOC, Census webpage, "Trade Definitions," https://www.census.gov/foreign-trade/reference/definitions/ USITC, "A Note on U.S. Trade Statistics," August 22, 2014, http://www.usitc.gov/publications/research/tradestatsnote.pdf. Census also notes the following definition for foreign exports: "Exports of foreign merchandise (re-exports) consist of commodities of foreign origin which have entered the United States for consumption, or into Customs bonded warehouses or U.S. Foreign Trade Zones, and which, at the time of exportation, are in substantially the same condition as when imported." USDOC, Census webpage, "Guide to Foreign Trade Statistics," http://www.census.gov/foreign-trade/guide/sec2.html (accessed September 15, 2018).

Agricultural Products

Changes in 2022 from 2021:

- **U.S. total exports increased by $20.2 billion (10.9 percent) to $205.0 billion**
  - **U.S. domestic exports increased by $19.4 billion (10.9 percent) to $198.1 billion**
  - **U.S. re-exports increased by $753 million (12.3 percent) to $6.9 billion**
- **U.S. general imports increased by $28.2 billion (14.6 percent) to $222.0 billion**

The value of U.S. domestic exports of agricultural products[1] rose by $19.4 billion (10.9 percent) to $198.1 billion in 2022 (table AG.1).[2] Among U.S. exports of agricultural products, oilseeds, which includes soybeans, recorded the largest year-on-year increase in exports, rising by $7.0 billion (25.3 percent).[3] Other sectors where exports increased by more than $1 billion include: cotton (up $3.3 billion, 58.6 percent); dairy products (up $1.9 billion, 26.2 percent); animal feeds, which includes distillers' grains and pet foods (up $1.8 billion, 11.3 percent); cereals, which includes corn and wheat (up $1.2 billion, 4.0 percent); and ethyl alcohol for non-beverage purposes (ethanol) (up $1.0 billion, 36.3 percent).[4] Combined, these digests represented 83.2 percent of the net total export value increase in 2022. Exports to China, Mexico, and Canada contributed the largest absolute values to this growth, up $5.5 billion, $3.0 billion, and $2.7 billion, respectively.

The value of U.S. general imports of agricultural products rose by $28.2 billion (14.6 percent) to $222.0 billion in 2022 (table AG.2). Animal or vegetable fats and oils had the largest year-on-year increase in imports of any agricultural product sector, growing by $4.1 billion (41.6 percent) from 2021 levels. Other sectors where imports increased by more than $2 billion include coffee and tea (up $3.0 billion, 38.0 percent); fresh or frozen fish (up $2.5 billion, 24.9 percent); pasta, cereals, and other bakery goods (up $2.4 billion, 23.5 percent); and distilled spirits (up $2.2 billion, 20.5 percent). Combined, these digests represented 50.2 percent of the net general import value increase in 2022. The markets contributing to the largest absolute value of the growth in U.S. agricultural imports were Mexico (up $5.4 billion, 13.8 percent), Canada (up $5.3 billion, 14.7 percent), Brazil (up $1.5 billion, 30.7 percent), Indonesia (up $1.4 billion, 24.9 percent), and China (up $1.0 billion, 17.9 percent). These five markets were the source of 51.3 percent of the total increase in U.S. agricultural and food imports in 2022.

The key contributor to increased food and agricultural import and export values in most sectors was food price inflation. Global prices in 2022 exceeded those already high prices in 2021; the annual 2022 Food and Agriculture Organization of the United Nations (FAO) Annual Real Food Price Index totaled

[1] The Agricultural Products sector consists of 50 product digests. Each USITC sector digest encompasses various 8-digit subheadings in the Harmonized Tariff Schedule of the United States (HTS). For a complete list of HTS subheadings classified in a particular sector or digest, see this data table.
[2] Unless otherwise noted, the export data used in this section are for domestic exports. For more information on trade terminology, please refer to USITC, "Special Topic: Trade Metrics," *Shifts in U.S. Merchandise Trade, 2014*, June 2015.
[3] The digest number for oilseeds is AG032. USITC DataWeb/Census, HTS 8-digit subheadings for digests AG001-050, accessed January 23, 2023; USITC, "HTS 8–digit subheading ranges included in industry/commodity groups and subgroups, by sector," October 2018.
[4] The digest number for cotton is AG049; for dairy products, AG010; for animal feeds, AG013; for cereals, AG030; and for ethanol, AG050.

143.7, a record high for the index, compared to 125.7 in 2021 (a previous record high).[5] This record high annual average was driven by price growth earlier in the year—prices peaked in many agricultural sectors during the spring and summer before declining in the second half of 2022.[6] Increased global food prices were generally driven by the drawdown of global stocks, high prices for inputs like fertilizer, supply shortages due to weather-related events, and supply disruptions related to the Russian invasion of Ukraine.[7] For imports, a strong U.S. dollar relative to the currencies of import source countries allowed U.S. importers to meet U.S. consumer demand despite high prices.[8] For exports, shipments to China (the recipient of 16.5 percent of 2022 U.S. agricultural exports) continued to recover from the effects of trade actions imposed during 2018 and eased during 2020[9] as a result of developments in U.S.-China trade relations as well as developments in the livestock sector affecting Chinese import demand for feed grains (as discussed below).[10]

U.S. Domestic Exports

U.S. exports of oilseeds, which is composed almost exclusively of soybeans (97.8 percent by volume and by value), increased by $7.0 billion (25.3 percent) to reach $34.6 billion in 2022 (table AG.1).[11] The overall increase was dominated by exports of soybeans, which rose by $6.7 billion (24.7 percent). This increase was driven by both rising volumes and rising unit values. The quantity exported grew by 7.5 percent (up 3.9 million metric tons) and unit values grew by 16.1 percent (up $83 per metric ton) from

[5] The FAO Food Price Index is a measure of the monthly change in international prices of a basket of food commodities. In 2022, the monthly food price index grew from 135.6 in January to peak at 159.7 in March—a record high for the monthly index—before steadily decreasing to 132.4 in December 2022. FAO, "FAO Annual Real Food Price Index," accessed January 23, 2023.

[6] The FAO meat and dairy price indexes decreased from June peaks of 125.9 and 150.2 to 113.8 and 139.1, respectively, in December 2022. From March to December 2022, the cereals price index decreased from 170.1 to 147.3, and the largest drop was recorded in the vegetable oils price index, which decreased from 251.8 to 144.4 during the same period. Meat, dairy, cereals, and vegetable oils columns of FAO, "FAO Annual Real Food Price Index," accessed March 13, 2023; Matthieu, "FAO Food Price Index Continues Steady Decline," February 3, 2023.

[7] Vos, Glauber, Laborde, "Is Food Price Inflation Really Subsiding?," January 3, 2023.

[8] Vos, Glauber, Laborde, "Is Food Price Inflation Really Subsiding?," January 3, 2023; Gopinath and Gourinchas, "How Countries Should Respond to the Strong Dollar," October 14, 2022.

[9] Trade actions imposed by China in response to U.S. section 301 tariffs caused U.S. agricultural exports to China to fall rapidly in 2018. On January 15, 2020, the United States and China entered into a Phase One Trade Agreement that committed China to make additional purchases of certain U.S. goods and services and to make structural changes to its economic and trade regime. Under Phase One of the U.S.-China Economic and Trade Agreement, China agreed to increase food, agricultural, and seafood product imports by $12.5 billion above the 2017 baseline in 2020 and by $19.5 billion above the 2017 baseline in 2021. In early 2020, China announced that approximately 150 agricultural and seafood products would be eligible for exclusion from these prior trade actions. This exclusion list included major U.S. export products such as soybeans and some grains. USITC, "Section 232 and 301 Trade Actions in 2018," *Shifts in U.S. Merchandise Trade, 2018*, December 2019; USITC, "Agricultural Products," *Shifts in U.S. Merchandise Trade, 2020*, November 2021; USTR, "Fact Sheet: Agriculture and Seafood Related Provisions," accessed March 13, 2023; USTR, Phase One Agreement, January 15, 2020; USTR, "China Fact Sheet: Expanding Trade," accessed March 13, 2023; USDA, FAS, *China Announces a New Round of Tariff Exclusions*, February 26, 2020.

[10] For more information on these factors, see the cotton and oilseeds sectors write-ups that follow.

[11] U.S. Census, Schedule B, exports of "soybeans, whether or not broken, except seeds," 1201.90.0095, accessed January 25, 2023; USITC DataWeb/Census, Schedule B number 1201.90.0095, digest AG032, accessed January 23, 2023.

2021 to 2022. Increasing unit values are reflective of lower-than-expected global export supply from major soybean exporting countries, particularly Brazil.[12] The total volume of Chinese soybean imports from all country sources decreased in 2022 because of COVID-19 lockdowns, drawdown of existing stocks, and overall slowing animal feed demand.[13] However, U.S. soybean exports to China actually rose by 2.9 million metric tons (10.6 percent; a value increase of $3.7 billion or 26.2 percent), the largest year-on-year increase by volume and value to any U.S. destination market.[14] U.S. exports of soybeans surged in 2022 because U.S. soybean production is countercyclical to that of Brazil, with U.S. producers filling much of the backlog of Chinese demand (due to low Brazilian soybean exports) in the latter half of the year.[15] The leading destinations for U.S. oilseeds exports included China (up $3.8 billion), Mexico (up $1.0 billion), and Egypt (up $586 million), with all three destinations seeing increases in volume.[16] Rising exports to Mexico were driven by Mexican population growth, growing feed demand, and rising domestic crush capacity, which has increased the volume of whole soybeans imported in recent years relative to imports of U.S. soybean oil and meal.[17] The growth in soybean exports to Egypt was largely driven by spikes in feed prices due to disruptions to grain and oilseeds trade as a result of the Russian invasion of Ukraine.[18]

[12] Low export supply from Brazil was driven by low levels of production due to irregular and lower than average rainfall in September and October 2021 at the beginning of the planting season and high domestic consumption due to high crush margins. The "crush margin" is the difference in the value of whole soybeans vs. the value of its byproducts (e.g., oil and meal) following the crushing process. It is considered a gauge of the potential profit margin for soybean processors. As the value of soybean oil and oilcake increased last year (see animal feed exports and animal and vegetable fats and oils imports write-ups that follow), the crush margin grew, which in turn increased demand for soybeans by processors, especially those in Brazil who were counting on a larger domestic soybean supply. USDA, FAS, *Oilseeds and Products Update - Brazil*, October 18, 2022, 2, 7; CME Group, "Understanding Soybean Crush," accessed March 13, 2023.

[13] Patton, "China's December Soybean Imports Jump, Annual Volumes Fall for 2nd Year," January 12, 2023; USDA, FAS, *Oilseeds: World Markets and Trade*, January 2023, 2.

[14] USITC DataWeb/Census, annual domestic exports by quantity and value, 2021–22, Schedule B number 1201.90.0095, accessed February 14, 2023.

[15] Braun, "U.S. Agriculture Exports Top $200 Billion in 2022 as China Grabs Record Share," February 8, 2023; Patton, "China's December Soybean Imports Jump, Annual Volumes Fall for 2nd Year," January 12, 2023.

[16] USITC DataWeb/Census, accessed February 14, 2023.

[17] USSEC, *Country Snapshot: Mexico*, accessed March 1, 2023; USDA, FAS, *Oilseeds and Products Annual - Mexico*, May 9, 2022, 2.

[18] Following the Russian invasion of Ukraine, many foreign investors pulled capital out of emerging markets like Egypt to mitigate their portfolio risk. This produced a foreign currency shortage within Egypt, which impacted Egyptian companies' ability to purchase incoming containers of grains and soybeans, limiting the country's supply of animal feed inputs. Feed demand is especially strong in the Egyptian poultry industry because the country is more than 95 percent self-sufficient in poultry and egg production. USDA, FAS, *Poultry Sector In Egypt Impacted by the Repercussions of War in Ukraine*, October 25, 2022, 1; England, "Egypt and the IMF: Will Sisi Take the Economy out of the Military's Hands?," October 31, 2022; Saleh, "'There Are No Dollars': Foreign Currency Crunch Hits Egypt's Economy," January 1, 2023.

Table AG.1: Leading changes in U.S. domestic exports by product group, 2018–22
In millions of dollars and percentages.

Product group (digest)	2018 (million $)	2019 (million $)	2020 (million $)	2021 (million $)	2022 (million $)	Absolute change 2021–22 (million $)	Percentage change 2021–22 (%)
Oilseeds	17,377	18,968	25,782	27,653	34,635	6,983	25.3
Cereals	20,602	16,553	19,059	30,058	31,245	1,186	3.9
Animal feeds	13,621	12,852	13,528	15,977	17,788	1,811	11.3
Cattle and beef	8,254	7,957	7,545	10,644	11,614	970	9.1
Edible nuts	9,207	9,757	9,165	9,555	9,688	133	1.4
Cotton, not carded or combed	6,550	6,140	5,949	5,684	9,015	3,332	58.6
Dairy products	4,972	5,404	5,941	7,095	8,953	1,858	26.2
Infant formulas, malt extracts, and other edible preparations	6,583	7,032	7,023	7,984	7,674	-310	-3.9
Swine and pork	5,236	5,819	6,692	6,863	6,370	-493	-7.2
Poultry	4,284	4,328	4,307	5,294	6,005	711	13.4
Pasta, cereals, and other bakery goods	3,574	3,718	3,714	3,850	4,240	390	10.1
All other product groups	47,751	45,391	42,741	48,053	50,911	2,857	5.9
Total	148,010	143,918	151,448	178,710	198,139	19,428	10.9

Source: USITC DataWeb/Census, accessed February 16, 2023.
Notes: Export values are based on free along ship value, U.S. port of export. Calculations are based on unrounded data.

U.S. exports of cotton grew by $3.3 billion (58.6 percent) to reach $9.0 billion in 2022. Most of this increase was driven by exports of non-pima, long-fiber cotton, which comprised nearly two-thirds of the value of exports in the digest in 2022 and grew by $2.6 billion (81.8 percent) from 2021 levels.[19] As with soybeans, this growth in non-pima, long-fiber cotton was driven by both an increase in unit values, which rose by 36.6 percent (up $693 per metric ton) and volumes, which rose by 33.1 percent (up 545.4 thousand metric tons). The leading U.S. export destination for products in the cotton digest is China, the world's biggest importer of cotton.[20] U.S. cotton exports to China grew by $1.6 billion (116.9 percent) to reach $2.9 billion in 2022. These exports grew in terms of quantity as well—U.S. cotton exports to China were up by 472 million metric tons (68 percent) over volumes the previous year, or 125,000 metric tons less than 2019 pre-pandemic volumes.[21] This increase in U.S. cotton exports to China is counter to an annual decline in total Chinese cotton imports in 2022 compared to 2021 levels.[22] The resultant gains in

[19] U.S. Census, Schedule B, exports of "cotton, n.e.s.o.i., not carded or combed, having a staple length 28.575 mm (1 1/8 inches) or more," 5201.00.9000, accessed January 25, 2023; USITC DataWeb/Census, accessed January 23, 2023.
[20] Davies and Gale, "Shift in Geography of China's Cotton Production Reshapes Global Market," December 5, 2022.
[21] USITC DataWeb/Census, annual domestic exports by quantity to China, Schedule B 5201.00.1025, 5201.00.9000, 5201.00.2030, 5201.00.1090, 2021–22, accessed February 14, 2023.
[22] Overall declines in Chinese cotton imports were attributed to COVID-19 pandemic-related restrictions diminishing activity levels in the downstream textile industry, slowing Chinese and global demand for apparel, and declining yarn prices relative to the prices of cotton lint inputs for yarn spinning. USDA, FAS, *Cotton and Product Update - China*, December 22, 2022, 6–7; USDA, FAS, "Cotton: World Markets and Trade," December 2022, 1–2; USDA, FAS, *Cotton: World Markets and Trade*, November 2022, 7.

U.S. market share in Chinese cotton imports are attributed to the competitive quality and availability of U.S. cotton compared with other suppliers and may also be a result of the imposition and enforcement of the Xinjiang cotton and cotton products ban that began in June 2022. The ban led Chinese mills to seek replacements for their mostly Xinjiang Province-grown cotton inputs from other markets (including the United States) to meet U.S import demand for their textiles.[23]

From 2021 to 2022, U.S. exports of dairy grew by $1.9 billion (26.2 percent) to reach $9 billion. The largest dairy export increase was to Mexico (up $651.5 million or 36.9 percent). By product, the largest increase in value of U.S. exports in the dairy digest was skim milk powder (SMP), driven by rising unit values (up 32.8 percent).[24] A versatile ingredient used widely in Mexico's processed baked goods industry, SMP has also become increasingly important since the onset of the-COVID-19 pandemic in 2020 shifted the purchasing preferences of Mexican consumers toward bulk and longer shelf-life dairy products.[25] Mexico is reliant on imports for its supply of SMP because the country has limited infrastructure to dehydrate fluid milk and imports from the United States are competitively priced over domestically produced SMP.[26] On July 12, 2022, President Biden and Mexican President López Obrador issued a joint statement committing Mexico to purchasing 20,000 metric tons of U.S. SMP by the end of 2022 to assist Mexican families in rural and urban communities.[27] Mexican imports of U.S. SMP slightly exceeded this goal, totaling more than 21,000 metric tons by yearend 2022, comprising more than 40 percent of all U.S. SMP exports. The total volume of U.S. SMP exports to all markets, however, actually shrank by 54,000 metric tons (6.1 percent) from the previous year.[28] The U.S. dairy sector also reported record volumes of cheese exports globally—more than 451,000 metric tons—in 2022, an increase in

[23] In 2022, 27 percent of U.S. textile and apparel imports were from China, the largest share from any source country (see Textile and Apparel section of this report). U.S. cotton comprised 58 percent of all Chinese cotton imports by value in 2022, compared to 45 percent in 2020 and 39 percent in 2021 when U.S. cotton export purchases were covered under the Phase One Agreement. In 2017, before trade actions were imposed by China in response to U.S. section 301 tariffs, U.S. cotton comprised 45 percent of all Chinese cotton imports by value. S&P Global, Global Trade Atlas, Chinese imports, HS 5201.00, 2017–22, accessed March 13, 2023. Under the Uyghur Forced Labor Prevention Act, the United States placed an embargo on cotton produced in Xinjiang and products manufactured from such cotton. More than 90 percent of China's cotton is grown in Xinjiang, which has typically been the main source of inputs for the country's textile mills, mostly located along the coast and in river valleys near urban centers and ports. Only about 20 percent of cotton used by Chinese textile manufacturers is imported, meaning that most Chinese cotton products contain cotton that was produced in Xinjiang and are thus subject to the ban. Pub. L. No. 117-78, § 3(a), 135 Stat. 1529; Fibre2Fashion, "China's Cotton Imports from US Skyrocket after Xinjiang Ban," January 19, 2023; USDA, FAS, *Cotton and Product Update - China*, December 22, 2022, 8; Davies and Gale, "Shift in Geography of China's Cotton Production Reshapes Global Market," December 5, 2022.

[24] U.S. Census, Schedule B, exports of "milk and cream, concentrated, whether or not sweetened, in powder, granules or other solid forms, fat content not exceeding 1.5%," 0402.10.0000, accessed January 25, 2023; USITC DataWeb/Census, accessed January 23, 2023.

[25] USDA, FAS, *Dairy and Products Annual - Mexico*, October 24, 2022, 18.

[26] USDA, FAS, *Dairy and Products Annual - Mexico*, October 24, 2022, 18; USDA, FAS, *Dairy and Products Annual - Mexico*, October 27, 2021, 13.

[27] White House, "President Biden and President Lopez Obrador Joint Statement," July 12, 2022. This commitment is likely in response to continued demand for fluid milk above what LINCONSA, Mexico's government agency in charge of purchasing milk from small milk producers and supplying it to those most in need, was able to collect. Because LINCONSA was not able to collect its target volume of fluid milk, SMP had to be substituted and reconstituted into a dairy formula. USDA, FAS, *Dairy and Products Annual - Mexico*, October 24, 2022, 18–19.

[28] USITC/Census DataWeb, domestic exports, 2021–22, Schedule B 0402.10.0000, accessed March 1, 2023.

value of $487.7 million. Cheese exports to Mexico, which accounted for around 27.4 percent of all U.S. cheese exports, also reached record volumes of nearly 123,000 metric tons.[29]

U.S. exports of animal feeds grew by $1.8 billion (11.3 percent) to reach $17.8 billion in 2022. This growth was driven by high unit values rather than rising trade volumes. Unit values grew by 16.3 percent for the digest overall in 2022; trade volumes actually shrank by 4.3 percent.[30] These high unit values are attributable in part to the fact that many of the inputs used to produce animal feed are derived from products of the oilseeds (e.g., meal) and cereals sector, which, as noted above and in the paragraph below, saw rising prices (as reflected by increasing unit values) in 2022.[31] The animal feeds product with the largest increase in U.S. exports was soybean oilcake (a form of soybean meal), which grew by 2.0 percent (191,000 metric tons) in terms of volume and by 14.4 percent ($640.6 million) in terms of value to 9.8 million metric tons ($5.1 billion) in 2022.[32] The largest increases in animal feeds export shipments by value from 2021 to 2022 were those to the Canadian and Colombian markets. U.S. export shipments of animal feeds to Canada grew by $338 million (15.4 percent) to $2.5 billion in 2022, with growth in trade volumes driven by increased U.S. exports of dried distillers' grains with solubles (DDGS), an animal feed coproduct generated by dry mill ethanol plants.[33] U.S. export shipments to Colombia grew by $262 million (34.4 percent) to $1.0 billion in 2022, with trade volumes driven by increased U.S. exports of soybean oilcake, which is used in feed for Colombia's growing domestic poultry industry.[34]

U.S. exports of cereals grew by $1.2 billion (3.9 percent) to reach $31.2 billion in 2022. The increase in export value in this sector was driven by increasing prices; volumes actually fell by nearly 15.6 million metric tons (down 15.1 percent) from 2021 levels. Wheat exports drove the increase in U.S. export value in the cereals digest.[35] With the unit value for U.S. wheat exports increasing by 34.7 percent to override a 3 million metric ton decline (down by 12.8 percent) in export volumes, the export value for this product grew by $1.3 billion (17.5 percent) in 2022. Corn, the largest product sector in the cereals digest by export value, drove the drop in export trade volumes, declining by 11 million metric tons (down by 16

[29] USDEC, "U.S. Dairy Exports Post Third Straight Record Year," February 7, 2023. USITC/Census DataWeb Schedule B 0406.10.0000, 0406.20.0000, 0406.30.0000, 0406.40.0000, 0406.90.1000, 0406.90.6500, and 0406.90.9550, accessed March 1, 2023.
[30] USITC/Census DataWeb, domestic exports, 2021–22, Schedule B numbers under digest AG013, accessed March 1, 2023.
[31] USDA, ERS, "Livestock, Dairy, and Poultry Outlook," July 18, 2022.
[32] Soybean oilcake classified under Schedule B statistical reporting number 2304.00.0000. USITC DataWeb/Census, accessed January 26, 2023.
[33] IRFA, "Ethanol Co-Products," accessed March 3, 2023. As with corn, Canadian farmers increased imports of U.S. DDGS to substitute for barley in livestock feed because of lower-than-expected domestic barley production. U.S. Grains Council, "MY 2021/22 Exports Hit Second-Highest Year On Record," October 20, 2022. Dried distillers' grains with solubles (DDGS) is Schedule B statistical reporting number 2303.30.0000. USITC DataWeb/Census, accessed January 26, 2023.
[34] Zahniser et al., "Examining Opportunities for U.S. Agricultural Exports to Colombia," April 20, 2022.
[35] U.S. Census, Schedule B, exports of "durum wheat," 1001.19.0000, "rye, other than seed," 1002.90.0000, "white wheat, except seed," 1001.99.2015, and "wheat and meslin, except durum wheat, seed, n.e.s.o.i.," 1001.99.2055," accessed January 25, 2023; USITC DataWeb/Census, domestic exports, 2021–22, Schedule B numbers under digest AG030, accessed January 23, 2023.

percent) to 58 million metric tons in 2022.[36] The value of U.S. corn exports held relatively constant during the 2021–22 time period, only slightly decreasing by $20 million (1.0 percent) while increasing unit values for corn (up by 17.0 percent) counteracted further drops in total trade value. Increasing unit values for corn and wheat were more a function of supply disruptions than supply itself. Global production and stocks of major grains held relatively steady compared to the previous year,[37] but events such as the Russian invasion of Ukraine (a major corn and wheat exporter) and India's announcement of its wheat export ban, as well as conditions like low water levels and high barge shipping rates in the Mississippi River, disrupted the flow of available supply of these commodities to the export market, putting upward pressure on prices.[38] The leading U.S. export destination for cereals is China, which received $7.5 billion of such products in 2022. The largest increase in export value from 2021 to 2022, however, was to the Canadian market. Exports to Canada grew by $615 million (57.7 percent) to $1.7 billion, driven by increased quantities of corn exports because Canadian farmers began substituting lower-priced U.S. corn in cattle feed following price increases for the Canadian barley that they typically use.[39]

U.S. General Imports

U.S. imports of animal or vegetable fats and oils grew by $4.1 billion (41.6 percent) to $13.9 billion in 2022 (table AG.2). The products in this digest with the largest increase from 2021 to 2022 were palm oil,

[36] Includes corn classified under Schedule B but does not include popcorn. U.S. Census, Schedule B, exports of "yellow dent, U.S. No. 1," 1005.90.2030, exports of "yellow dent, U.S. No. 2," 1005.90.2035, exports of "yellow dent, U.S. No. 3," 1005.90.2045, exports of "yellow dent, U.S. No. 4," 1005.90.2070, exports of "yellow dent, other," 1005.90.4055, exports of "white corn," and 1005.90.4065, exports of "other corn," accessed January 25, 2023. Yellow dent corn #2 and #3 were the main contributors to this drop in volumes, decreasing by a combined 10.7 million metric tons (down by 16.3 percent), in large part because of declining exports volumes to China, Japan, and South Korea. USITC DataWeb/Census, accessed January 23, 2023.

[37] USDA's Production, Supply, and Distribution database estimates that global production of rice from January to December 2022 increased by around 1 percent, increased for corn by less than 1 percent over the October 2021–November 2022 period, and increased by less than 1 percent for wheat in each of the two trade years that span calendar year 2022 (the wheat trade year 2021 spans July 2021–June 2022, and wheat trade year 2022 spans July 2022–June 2023. Stocks for wheat and rice decreased slightly (by less than 4 percent) for these time periods, although stocks for corn grew by around 5 percent from the previous year. USDA, FAS, *PS&D Database*, accessed February 24, 2023; USDA, FAS, *PS&D Database FAQs*, accessed February 24, 2023.

[38] Wheat and corn export prices grew sharply following the Russian invasion of Ukraine in February 2022. Wheat prices spiked again following India's May 13, 2022 announcement of export restrictions on wheat. Wheat and corn prices tapered off in the summer before rising again from August through October as high freight costs and low water levels in the Mississippi River limited deliveries of grain to U.S. ports for export. Wheat export prices declined slightly for the rest of the year. U.S. export prices of corn fell sharply after reaching peak levels for the year at the beginning of November. USDA, FAS, *Grain: World Markets and Trade*, February 2023, 3, 12; USDA, FAS, *Grain: World Markets and Trade*, June 2022, 3; Government of India, Directorate General of Foreign Trade, "Amendment in Export Policy of Wheat," May 13, 2022; USDA, FAS, *Grain: World Markets and Trade*, March 2022, 4; USDA, FAS, *Grain: World Markets and Trade*, October 2022, 3, 14; IGC, *Maize Export Prices - US 3YC Gulf Daily Price Series, 2022*, accessed February 23, 2023.

[39] Production levels of barley in Canada were low because of droughts during the 2021–22 growing season. These low production levels led to farmers drawing down stocks and reducing the overall supply of Canadian barley, driving up the barley price to the point where farmers sought grain alternatives for feed inputs. Skeritt and Hirtzer, "Canada's Cows Binge on US Corn as Homegrown Barley Feed Gets Too Steep," November 15, 2022; USDA, FAS, *Grain and Feed Annual - Canada*, April 29, 2022, 1, 15.

which grew by $869 million (39.5 percent) to $3.1 billion, and refined low erucic acid rapeseed—more commonly known as canola oil—which saw an increase of $1.1 billion (37.9 percent) to $3.9 billion.[40] Around 85 percent of 2022 U.S. palm oil imports by value came from Indonesia; around 96 percent by value of canola oil imports came from Canada.[41] Indonesia and Canada were also the source markets for the largest increases of U.S. imports of palm oil and canola oil by value, respectively. In 2022, imports of palm oil from Indonesia were up $774 million (42.3 percent) and imports of canola oil from Canada were up $973 million (35.3 percent). Import volumes in the vegetable and animal oils and fats digest increased by 13.8 percent from 2021 to 2022. Rising unit values (up 24.4 percent) due to various disruptions in the supply of several vegetable and animal oil products were the main driver of growth in trade values across all these products. Canola oil unit values rose in response to tightening rapeseed supply, because severe drought in the Canadian prairie in 2021 led to a low-yielding rapeseed harvest with diminished crop oil content.[42] Rising unit prices for soybean oil were due to a combination of factors, including inflation, lower-than-expected oilseed production in major oilseed-producing countries (which led to a drawdown of global stocks during the previous three years), and continuing expectations for low soybean production in Argentina and the United States.[43] Additionally, disruption to the Ukrainian sunflower oil market caused by the Russian invasion of Ukraine increased the uncertainty of supply of sunflower oil, driving up prices. Cascading effects on the markets of substitute products such as palm and soybean oils increased in the months immediately following the Russian invasion.[44] Increased global demand for substitutes for sunflower oil led Indonesia, the supplier of around 60 percent of global palm oil exports, to take steps to shore up its domestic supply in an effort to keep domestic prices at a reasonable level for Indonesian consumers. Beginning in February 2022, the government of Indonesia enacted commitments from its palm oil producers to sell a portion of their planned exports to the domestic market and, in April 2022, imposed a temporary ban on palm oil exports.[45] Although global vegetable oil prices fell in the latter half of 2022 as the market adjusted and some of these supply constraints were resolved, unit values for the top U.S. imports from the animal and vegetable fats and oils digest remained elevated compared to 2021. For example, unit values for canola oil were up 29.0 percent in 2022, compared to 41.8 percent for palm oil.[46]

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[40] Palm oil includes HTS subheadings 1511.10.00, 1511.90.00, 1513.21.00, and 1513.29.00. Canola oil include HTS subheadings 1514.11.00 and 1514.19.00. USITC DataWeb/Census, general imports, 2021–22, under digest AG033, accessed January 26, 2023.

[41] Low erucic acid (a crystalline acid ($C_{22}H_{42}O_2$)) rapeseed commonly called canola is the second-most-consumed vegetable oil after soybean in the United States; about 90 percent of Canada's canola oil production is exported and the United States is the largest buyer of it and canola meal. The Canola Council of Canada, "Industry Overview," 2021.

[42] USITC DataWeb/Census, annual general imports, 2021–22, HTS subheadings 1514.11.00 and 1514.19.00. accessed January 26, 2023; USDA, FAS, *Oilseeds and Products Annual - Canada*, April 7, 2022, 1; Biobased Diesel Daily, "Canada's Rapeseed Harvest up from Last Year but Smaller than Average," October 24, 2022.

[43] Ates and Bukowski, "Examining Record Soybean Oil Prices in 2021–22," December 21, 2022; USDA, FAS, *Oilseeds: World Markets and Trade*, January 2023.

[44] Ukraine produces more than 50 percent of global sunflower oil exports; sunflower oil comprises 12 percent of global food oil consumption. Ates and Bukowski, "Oil Crops Outlook: April 2022," April 12, 2022, 10–11.

[45] The ban was lifted after three weeks. USDA, FAS, *Oilseeds and Products – Indonesia*, August 4, 2022, 4; Root, "How Indonesia's Brief Palm Oil Ban Impacted the Global Food Market," June 22, 2022; Glauber, Laborde, Mamun, "Food Export Restrictions Have Eased as the Russia-Ukraine War Continues, but Concerns Remain for Key Commodities," January 23, 2023.

[46] FAO, "FAO Monthly Real Food Price Indices," accessed March 6, 2023.

Table AG.2: Leading changes in U.S. general imports, 2018–22
In millions of dollars and percentages.

Product group (digest)	2018 (million $)	2019 (million $)	2020 (million $)	2021 (million $)	2022 (million $)	Absolute change 2021–22 (million $)	Percentage change 2021–22 (%)
Shellfish	11,261	11,016	11,014	15,569	14,410	-1,159	-7.4
Animal or vegetable fats and oils	6,810	6,192	6,566	9,854	13,950	4,096	41.6
Distilled spirits	8,604	9,414	8,801	10,564	12,728	2,164	20.5
Pasta, cereals, and other bakery goods	7,733	8,293	8,940	10,202	12,599	2,397	23.5
Fresh or frozen fish	8,954	8,693	7,915	9,966	12,453	2,487	24.9
Fresh, chilled, or frozen vegetables	9,142	9,522	10,637	11,265	12,133	869	7.7
Coffee and tea	6,616	6,766	6,685	7,962	10,990	3,028	38.0
Cattle and beef	7,078	7,688	8,474	9,609	9,992	383	4.0
Infant formulas, malt extracts, and other edible preparations	6,010	6,779	7,517	8,549	9,862	1,313	15.4
Cocoa, chocolate, and confectionery	6,645	6,947	6,998	7,951	8,929	978	12.3
All other product groups	77,579	78,439	79,787	92,310	103,977	11,667	12.6
Total	156,431	159,749	163,334	193,803	222,024	28,222	14.6

Source: USITC DataWeb/Census, accessed February 16, 2023.
Notes: Import values are based on U.S. customs value. Calculations are based on unrounded data.

U.S. imports of coffee and tea grew by $3.0 billion (38.0 percent) to $11.0 billion in 2022. Most of this increase within the coffee and tea digest was driven by unroasted coffee imports, which increased by $2.4 billion (46.6 percent) to $7.6 billion. As with other commodities in 2022, the growth in the value of U.S. unroasted coffee imports was driven more by higher unit values (up 42.4 percent) than by increased trade volumes (up 3.0 percent).[47] This was driven in part by lower export supply; the world's two largest exporters of coffee during the past two years, Brazil and Colombia, saw lower than expected coffee production totals in 2022 because of weather-related issues.[48] Brazil and Colombia accounted for the largest increases in the value of U.S. imports of unroasted coffee in 2022—imports from Brazil grew by $829 million (up 67.8 percent) and from Colombia by $540 million (up 41.2 percent).

From 2021 to 2022, U.S. imports of fresh and frozen fish grew by $2.5 billion (24.9 percent) to $12.5 billion. This increase was driven by rising unit values (up 18.6 percent for the digest) as well as rising volumes (up 5.3 percent). A strong U.S. dollar in major seafood-exporting countries meant that U.S. importers had the purchasing power to keep pace with rising global prices to meet growing U.S.

[47] Unroasted coffee includes HTS statistical reporting numbers 0901.11.0015, 0901.11.0025, 0901.11.0045, 0901.11.0055, 0901.12.0015, and 0901.12.0025. USITC DataWeb/Census, accessed January 26, 2023.
[48] S&P Global, Global Trade Atlas, imports HS subheadings 0901.11 and 0901.12, 2021–22, accessed March 6, 2023; USDA, FAS, *Coffee Semi-Annual - Colombia*, November 18, 2022, 2; USDA, FAS, *Coffee Semi-Annual - Brazil*, November 22, 2022, 2.

consumer demand.[49] Among the top imported products by the United States, salmon—including fresh and chilled salmon fillets—grew by $932 million (18.8 percent) to $5.9 billion in 2022. This growth in import value corresponded to a volume increase of more than 10,000 metric tons (up 2.2. percent), continuing a rebound from a 2020 dip in import volumes related to a pandemic-induced slowdown in the 2020 demand due to the closure of food service establishments.[50] Imports of fresh and frozen fish from Chile (up $555 million or 21.7 percent), Vietnam (up $462 million or 74.6 percent), and Norway (up $293 million or 31.9 percent) reported the largest increases in import values within this digest, continuing a recovery from pandemic-induced lows in 2020. Rising prices within the fish digest were attributed in part to strong demand. The market recovered from the effects of the pandemic as well as increasing feed costs for aquaculture in major exporting markets.[51]

U.S. imports of pasta, prepared cereals, and other baked goods grew by $2.4 billion (23.5 percent) to $12.6 billion in 2022. Imports of bread, pastry, cakes, biscuits, and other baked products were a large driver of this increase, growing by $981 million (24.6 percent).[52] More than half the imports of these products came from Canada. Canada also accounted for the largest growth in the value of U.S. imports of pasta, prepared cereals, and other baked goods sector, increasing by $1.0 billion (22.8 percent) during this time period. Mexico and Italy were the sources of the next largest increases in U.S. imports in this sector, rising by $499 million (25.3 percent, of mostly cookies and waffles, and bread, pastry, cakes, biscuits, and other baked products) and $257 million (32.1 percent, of mostly pasta), respectively.[53] Increases in trade values were driven by growth in unit values (up 10.6 percent) and trade volumes (up 11.6 percent). Import volume, which has grown at an average annual rate of 16.7 percent since 2009, has been driven most recently by the COVID-19-related shift in food consumption; consumers tend to eat meals at home as opposed to restaurants.[54] Unit values in this digest grew as rising prices for inputs such as flour, eggs, sugar, and butter put upward pressure on the cost of production for these products.[55]

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[49] Gopinath and Gourinchas, "How Countries Should Respond to the Strong Dollar," October 14, 2022; Reuters, "Vietnam Dong Extends Loss against Dollar, down 0.16% to 24,570," October 20, 2022; Euromeatnews.com, "Norway's Seafood Exports Worth NOK 151.4 Billion in 2022," January 10, 2023.

[50] Salmon includes all statistical reporting numbers under HTS tariff lines 0302.13.00, 0302.14.00, 0302.19.00, 0303.11.00, 0303.12.00, 0303.13.00, 0303.19.01, 0304.41.00, 0304.52.00, 0304.81.10, and 0304.81.50. USITC DataWeb/Census, accessed February 14, 2023. FAO, "Q&A: COVID-19 Pandemic - Impact on Fisheries and Aquaculture," accessed March 13, 2023.

[51] Moliniari, "Chile's 2022 Salmon Exports Jump to USD 6.6 Billion despite 'Moderate' Volume Growth," January 30, 2023; Dao, "Vietnam Hits Major Seafood Export Milestone, but Faces Grim Forecast for 2023," December 20, 2022; Euromeatnews.com, "Norway's Seafood Exports Worth NOK 151.4 Billion in 2022," January 10, 2023.

[52] Bread, pastry, cakes, biscuits, and other baked products include HTS subheading (or tariff line) 1905.90.10. USITC DataWeb/Census, accessed February 21, 2023.

[53] Pasta includes HTS statistical reporting number 1902.11, 1902.19, 1902.20, 1902.30. Cookies and waffles includes HTS statistical reporting number 1905.31 and 1905.32. USITC DataWeb/Census, accessed February 21, 2023.

[54] USITC DataWeb/Census, accessed March 13, 2023. Even as restrictions to indoor dining have been lifted, food-at-home sales exceeded food-away-from-home sales in 2022. This has been attributed in part to work-from-home becoming a permanent posture for many former office workers and the response to food price inflation that led consumers to manage high food costs by continuing to dine in rather than eat out. Frossard, Filott, "Bakery Bites: The Bakery of 2022," September 2021; Martino, "Five Hot Topics as US Food Industry Enters 2023," January 3, 2023; Morgan Stanley, "Egg Prices Plus Dining Out Vs Food at Home," February 9, 2023.

[55] Futrell, "Consumers and Wholesalers Paying More for Bakery Needs in 2022," December 27, 2022.

U.S. imports of distilled spirits increased by $2.2 billion (20.5 percent) to reach $12.7 billion in 2022. Tequila imports, shipped almost exclusively from Mexico, grew by $1.3 billion (36.1 percent), continuing a steady trend of increasing U.S. imports in volume terms that began in 2009.[56] Imports of brandy grew by $195 million (9.3 percent) to $2.3 billion;[57] imports of Irish and scotch whiskies grew by $315 million (24.2 percent) to $1.6 billion.[58] Behind Mexico, the largest influx of U.S. imports of distilled spirits in 2022 came from the United Kingdom (up $453 million or 33.1 percent), a major U.S. source market for Irish and Scotch whiskies, and from France (up $213 million or 6.9 percent), a major U.S. source market for brandy and vodka imports.[59] Growing trade values in distilled spirits are attributed to growth in the share of consumer purchases in the premium segment and shifting consumer preferences for spirits over other alcoholic beverages like beer. Sales of spirits in the U.S. market surpassed sales of beer for the first time ever in 2022, reflecting increasing consumer demand for cocktail and ready-to-drink preparations.[60]

[56] Tequila is classified under the HTS subheadings 2208.90.50 and 2208.90.55. USITC DataWeb/Census, accessed January 30, 2023.
[57] Brandy is classified under HTS subheadings 2208.20.20, 2208.20.30, 2208.20.40, 2208.20.50, 2208.20.60, 2208.90.12, 2208.90.14, 2208.90.15, 2208.90.20, 2208.90.25, 2208.90.30, 2208.90.35, 2208.90.40, and 2208.90.71. USITC DataWeb/Census, accessed January 30, 2023.
[58] Irish and scotch whiskies are classified under HTS statistical reporting numbers 2208.30.3030 and 2208.30.3060. USITC DataWeb/Census, accessed January 30, 2023.
[59] Vodka is classified under HTS subheadings 2208.60.1000, 2208.60.2000, and 2208.60.5000. USITC DataWeb/Census, accessed January 30, 2023.
[60] Schreiner and Salter, "Liquor before Beer: Spirits Beat Brews in New Market Data," February 9, 2023; IWSR, "US Alcohol Sales in 2022 Led by Premium Spending across All Categories," accessed March 6, 2023; Distilled Spirits Council of the United States, "Annual Economic Briefing," 10, 16, 18–19.

Energy-related Products

Changes in 2022 from 2021:

- **U.S. total exports of energy-related products increased by $139.9 billion (56.4 percent) to $388.1 billion**
  - **U.S. domestic exports of energy-related products increased by $139.4 billion (57.3 percent) to $382.9 billion**
  - **U.S. re-exports of energy-related products increased by $0.5 billion (11.4 percent) to $5.1 billion**
- **U.S. general imports of energy-related products increased by $96.2 billion (43.7 percent) to $316.5 billion**

The value of U.S. domestic exports of energy-related products[61] rose by $139.4 billion (57.3 percent) to $382.9 billion in 2022, after rising by 56.9 percent in 2021 (table EP.1).[62] All digests in this sector grew in export value, with petroleum products (up $54.5 billion), crude petroleum (up $47.0 billion), and natural gas and components (up $29.6 billion) together accounting for 94.0 percent of the total increase in value. Exports grew by the largest amount to Mexico (up $14.3 billion or 33.3 percent), Canada (up $12.0 billion or 51.9 percent), and the Netherlands (up $12.4 billion or 104.6 percent).

The value of U.S. general imports of energy-related products grew by $96.2 billion (43.7 percent) to $316.5 billion during the same period (table EP.2). All digests in this sector also grew in import value, with crude petroleum (up $65.2 billion) and petroleum products (up $19.4 billion) accounting for approximately 88.0 percent of the total increase in value. Imports grew by the largest amount from Canada (up $53.5 billion or 51.0 percent), Mexico (up $10.2 billion or 63.4 percent), and Saudi Arabia (up $9.5 billion or 84.0 percent). By contrast, imports from Russia fell significantly in 2022 (down $12.2 billion or 67.0 percent). Consequently, Mexico replaced Russia as the second-largest import destination.

In 2022, changes in both U.S. import and export values were primarily driving by elevated prices as a result of supply constraints and strong global demand conditions across energy-related products (mainly crude petroleum, petroleum products, and natural gas and components). According to the Organization of Petroleum Exporting Countries (OPEC), world oil demand rose to 99.9 million barrels per day (mb/d) in 2022 but supply only grew to 100.1 mb/d, leading to significant price volatility and the highest inflation-adjusted price since 2014 .[63] Crude petroleum prices were high due to a culmination of factors: (1) a strong U.S. dollar relative to the value of many global currencies, (2) limited crude oil capacity, and

[61] The energy-related products sector consists of six energy-related product digests. Each USITC sector digest encompasses various 8-digit subheadings in the Harmonized Tariff Schedule of the United States (HTS). For a complete list of HTS subheadings classified in a particular sector or digest, see this data table.
[62] Unless otherwise noted, the export data used in this section are for domestic exports. For more information on trade terminology, please refer to USITC, "Special Topic: Trade Metrics," *Shifts in U.S. Merchandise Trade, 2014*, June 2015; USITC DataWeb/Census, digests EP001-006, accessed February 16, 2023.
[63] IEA, *Oil Market Report - January 2023*, accessed January 23, 2023; Troderman, "Crude Oil Prices Increased in First-Half 2022," January 4, 2023.

(3) strong demand as many countries attempted to diversify away from Russian suppliers.[64] Attempts by many countries to replenish crude oil inventories in the face of capacity constraints also led to higher prices.[65] For natural gas, high prices were the result of limited capacity stemming from declining U.S. natural gas production, unseasonably cold weather in many countries, and demand diversion away from Russian sources.[66] The significantly higher global prices increased the value of energy-related products trade, making imports more expensive while increasing the value of exports.[67]

U.S. Domestic Exports

In 2022, U.S. exports of crude petroleum increased $47.0 billion (70.6 percent) to $113.6 billion, largely because of rising prices, although the average weekly U.S. export volume also increased by 22.9 percent to 1,274.6 million barrels (table EP.1).[68] A global price surge in the first half of the year was stimulated by supply uncertainty stemming from sanctions against Russian crude oil exports following its invasion of Ukraine. In addition, inventory replenishment activities by many countries augmented the already strong demand for oil as the global economy bounced back from COVID-19 pandemic-related restrictions. Global crude oil inventories experienced eight consecutive quarters of decline from the third quarter of 2020 through the second quarter of 2022.[69] Together, in 2022, these factors caused the average annual West Texas Intermediate – Cushing, Oklahoma spot price to increase by 39.2 percent to $94.90 per barrel, whereas the average annual Brent, Europe spot price increased by 42.4 percent to

[64] According to the OPEC MOMR, in early 2022, major central banks increased their monetary tightening measures to control increasing levels of inflation and recalibrate their economies amid continued strong global economic growth. However, their policies were divergent which had three major results: (1) strengthened the US dollar (higher interest rates caused an appreciation of the US dollar in global currency markets, making oil more expensive for other countries because oil is quoted in US dollars), (2) raised the average cost of capital and (3) inverted the yield curve for short-to-long- term US bonds.
Sanctions against Russian oil caused exports of Russian crude falling to near zero except for Turkey. The European market was impacted the most and suppliers had to search for new sources.
OPEC, "Monthly Oil Market Report," January 2023, v, 25, 56, 59 – 60; IEA, *Oil Market Report - January 2023*, January 2023. Somasekhar, "U.S. Shale Oil Output to keep Growing," December 12, 2022.
OPEC+ countries adjusted their production amounts a few times during the year which increased the uncertainty around crude oil supply.
Astakhova, "OPEC+ Sees Tighter Market in 2022," August 31, 2022; Meredith, "OPEC+ to Cut Oil Production by 2 million barrels," October 5, 2022.
[65] The EIA define spare capacity as s the volume of production that can be brought on within 30 days and sustained for at least 90 days. OPEC spare capacity provides an indicator of the world oil market's ability to respond to potential crises that reduce oil supplies. As a result, oil prices tend to incorporate a rising risk premium when OPEC spare capacity reaches low levels. EIA, "What Drives Crude Oil Prices?," January 10, 2023; Troderman, "Crude Oil Prices Increased in First-Half 2022," January 4, 2023.
[66] The annual average spot prices are based on delivery at the Henry Hub in Louisiana. EIA, "Henry Hub Natural Gas Spot Price," accessed January 17, 2023; and Lawrence, "Average Cost of Wholesale," January 9, 2023; Troderman, "Crude Oil Prices Increased in First-Half 2022," January 4, 2023.
[67] USAFACTS," What types of energy does the US produce and consume? How much energy do Americans use?," accessed July 26, 2023.
[68] USITC DataWeb/Census, digests EP004, accessed February 16, 2023.
[69] Troderman, "Crude Oil Prices Increased in First-Half 2022," January 4, 2023; IEA, *Oil Market Report - January 2023*, 1, January 2023. Sanctions placed on Russian oil includes EU crude embargo and G7 price cap.

$100.93 per barrel.[70] Exports of crude petroleum increased by the largest amount to Singapore (up $6.8 billion or 217.7 percent), the United Kingdom (up $5.9 billion or 111.6 percent), and the Netherlands (up $5.4 billion or 79.2 percent).[71] Rising demand for U.S. crude oil in Europe was largely attributable to European refiners seeking to diversify away from Russian sources following its invasion of Ukraine. Asian refiners increased their purchases of U.S. products because cheaper procurement costs compared to other countries and supply constraints from OPEC.[72]

Table EP.1 Leading changes in U.S. domestic exports, 2018–22
In millions of dollars and percentages.

Product group (digest)	2018 (million $)	2019 (million $)	2020 (million $)	2021 (million $)	2022 (million $)	Absolute change, 2021–22 (million $)	Percentage change 2021–22 (%)
Petroleum products	104,359	95,212	63,524	92,986	147,479	54,493	58.6
Crude petroleum	47,757	63,661	49,042	66,582	113,605	47,023	70.6
Natural gas and components	30,124	33,073	34,761	70,946	100,544	29,599	41.7
Coal, coke, and related chemical products	13,819	11,187	7,031	11,788	19,969	8,181	69.4
Electrical energy	393	436	182	505	703	199	39.3
Nuclear materials	517	538	700	702	634	-68	-9.7
Total	196,969	204,106	155,240	243,508	382,935	139,426	57.3

Source: USITC DataWeb/Census, accessed February 16, 2023.
Notes: Export values are based on free along ship value, U.S. port of export. Calculations are based on unrounded data.

In 2022, U.S. petroleum product exports rose by $54.5 billion (58.6 percent) to $147.5 billion, largely as a result of higher prices as volumes rose by only 4.0 percent.[73] Such high prices were driven by rising costs for material inputs (raw crude oil) as well as strong demand stemming from the recovery of the global economy following the COVID-19 pandemic.[74] The increase in the value of exports of unleaded gasoline, jet fuel, and naphthas resulted from higher prices due to a combination of tight global supplies and sanctions on Russia (which contributed to higher global prices), which caused buyers to seek suppliers from the Middle East and other alternate sources.[75] The largest increases in the value of U.S. exports were to Mexico (up $12.8 billion), Chile (up $5.9 billion), and Canada (up $5.4 billion), with such

[70] Calculated by Commission staff from data provided by the EIA. EIA, "Spot Prices for Crude Oil and Petroleum Products," accessed January 17, 2023.
[71] USITC DataWeb/Census, digest EP004, accessed February 16, 2023; According to the EIA, the Netherlands is also home to the Title Transfer Facility (TTF) natural gas hub, the largest and most liquid natural gas hub in continental Europe. TTF has also been the fastest-growing natural gas hub in Europe, and in 2014, TTF surpassed the United Kingdom's National Balancing Point hub in terms of spot volumes traded. EIA, "Netherlands—Analysis," accessed January 25, 2023.
[72] Northham, "How Russia's war in Ukraine is changing the world's oil markets," February 28, 2023; Horton & Palumbo, "Russia sanctions: What impact have they had on its oil and gas exports?," January 26, 2023.
[73] USITC DataWeb/Census, digest EP005, accessed February 16, 2023, 2022.
[74] OPEC, "*Monthly Oil Market Report*," January 2023, 27 – 28; USITC DataWeb/Census, digest EP004, accessed February 16, 2023.
[75] EIA, "Less U.S. Jet Fuel Consumption," December 5, 2022; Wang, "Asia's Naphtha End-Users Expand Import Origins," December 15, 2022.

exports composed mainly of ultra-low sulfur diesel, unleaded gasoline, naphthas, and jet fuel, respectively.[76]

U.S. exports of natural gas and components grew by $29.6 billion (41.7 percent) to $100.5 billion in 2022.[77] Within this digest, the increase in export value was mainly attributable to liquefied petroleum gas (propane or butane) and natural gas (both in its gaseous form (pipeline) and as a liquid (LNG)). Higher prices were the principal driver of export value for liquefied propane, which rose by $4.2 billion (20.2 percent) to $25.2 billion—export volumes rose by only 4.1percent.[78] The volume of U.S. exports of propane to Japan grew by 9.0 percent, driven mainly by demand for use as a petrochemical feedstock and for home heating.[79] Export volumes to Europe increased by 46.2 percent because European customers sought out new suppliers of propane following Russia's invasion of Ukraine.[80] The rise in U.S. export volumes to Europe and Japan more than offset declining volumes to China and South Korea, which fell by 19.6 percent (11.3 million barrels) and 6.3 percent (2.5 million barrels), respectively.[81]As stated above, the export value natural gas both in liquid form LNG and its gaseous form pipeline gas were primarily driven by prices. Exports of LNG grew by $20.4 billion (75.7 percent) to $47.3 billion in 2022. Although volume increased by 9.7 percent, the growth in value was principally due to dramatically higher prices.[82] In 2022, the United States became the second-largest LNG exporter (by volume), which was facilitated by steadily increasing investments in domestic export terminal capacity. U.S. LNG exports have been growing since February 2016 and as of July 2022, the United States has more LNG export capacity than any other country. The addition of the Calcasieu Pass LNG export terminal resulted in an even higher export capacity in 2022.[83] Attracted by the significantly higher prices in the European market, U.S. exports of LNG helped European countries (mainly France up $6.1 billion or 466.8 percent, the Netherlands up $3.4 billion or 291.7 percent, Spain up $3.2 billion or 183.3 percent, the United Kingdom up $4.4 billion or 298.6 percent, and Poland up $2.1 billion or 470.9 percent) to rebuild their stockpiles following the onset of Russia's invasion of Ukraine and subsequent sanctions that resulted in a decline in Russian pipeline gas exports to these countries.[84] The increased volume of exports of LNG to Europe more than offset declining U.S. cargoes to Asia, particularly to China (down $2.3 billion or 62.8 percent), Japan (down $0.3 billion or 11.1 percent), and South Korea (down $0.3 billion or 6.3 percent). China's electricity sector demand for LNG fell for the first eight months year over year because power

[76] USITC DataWeb/Census, digest EP005, accessed February 16, 2023. The HTS number for the products are ultra-low sulfur diesel HTS 2710.19.1106, unleaded gasoline HTS 2710.12.1519, naphthas HTS 2710.12.2500, and jet fuel HTS 2710.19.1600.
[77] USITC DataWeb/Census, digest EP006, accessed February 16, 2023, 2022.
[78] USITC DataWeb/Census, digest EP006, accessed February 16, 2023.
[79] According to the EIA, The U.S. exports to Asia have grown rapidly in recent years as consumption of propane as a petrochemical feedstock and consumer demand have both increased. DeKeyserling, "The United States Exported Record Amounts of Petroleum Products," September 26, 2022; Hack, "U.S. petroleum product exports set a record high in 2022," March 20, 2023; USITC DataWeb/Census, digest EP006, accessed February 16, 2023.
[80] "U.S. petroleum product exports set a record high in 2022," March 20, 2023.
[81] EIA, "Propane Exports by Destination," accessed January 24, 2023.
[82] USITC DataWeb/Census, digest EP006, accessed February 16, 2023.
[83] Zaretskaya, "U.S. LNG Export Capacity to Grow," September 6, 2022.
[84] Disavino, "U.S. Poised to Regain Crown," January 4, 2023; USITC DataWeb/Census, digest EP006, accessed February 16, 2023, 2022. In 2022, The United States had the lowest average LNG prices - $7 per million British thermal units at the Henry Hub in Louisiana. LNG prices averaged $34 metric million British thermal unit (mmBtu) at the Japan Korea Marker and averaged $41 mmBtu at the Dutch Title Transfer Facility (TTF) in Europe.

plants were idled to combat rising fuel costs and avoid financial losses. In addition, high spot market prices caused U.S. exports of LNG to Japan and South Korea to decline by 41.1 percent and 35.4 percent, respectively.[85] As a result of the much higher prices, U.S. exports of pipeline gas increased by $2.5 billion (18.9 percent) to $15.6 billion in 2022, and the volume of exports actually declined by 3.1 percent. Although, Mexico is the predominant market for U.S. exports of pipeline gas, the lion's share of the value is attributable to Canada. U.S. exports (by volume) to Mexico declined by 4.5 percent (down 2.5 billion cubic meters) over the year while value increased 6.5 percent (up $0.7 billion). High prices decreased Mexican use of natural gas in electricity generation and industrial applications as a cost reducing measure.[86] Although volume to Canada increased by only 3.5 percent (up 0.7 billion cubic meters), the value increased drastically by 81.1 percent (up $1.9 billion).

The value of U.S. exports of coal, coke, and related products grew by $8.2 billion (69.4 percent) to $20.0 billion in 2022. Within this digest, the largest increase in exports occurred for metallurgical bituminous coal (up $5.9 billion) and thermal coal (bituminous coal, other, up $1.6 billion) – combined, grew by only 1.9 percent to 72.4 million metric tons, which is largely attributable to higher prices as a result of the Russia-Ukraine war.[87] Metallurgical coal biggest export changes occurred to India, European countries, Ukraine, and China. India's demand for steel production increased in 2022, however, it produced only a small amount of metallurgical bituminous coal - causing it to source from other countries (up 4.4 million metric tons).[88] European demand for metallurgical bituminous coal from sources outside Russia increased due to the full-scale invasion of Ukraine and its ban on coal imports.[89] U.S. exports of metallurgical bituminous coal increased to the Netherlands (up 1.9 million metric tons), Turkey (up 0.6 million metric tons), France (up 0.5 million metric tons), Poland (up 0.5 million metric tons), Italy (up million 0.4 metric tons), and Germany (up 0.4 million metric tons).[90] Production from China's own coal mines increased along with resuming coal imports from Australia contributed to the decline in imports from the U.S. (down 7.9 million metric tons).[91] While the volume of thermal coal only grew 0.2 percent, U.S. export destinations shifted, nearly doubling to Europe after the European Union's ban on all coal imports from Russia following Russia's full-scale invasion of Ukraine.[92] Hence, a substantial increase in exports to Germany (up 1.5 million metric tons), the United Kingdom (0.9 million metric tons), and Poland (0.7 million metric tons), as well as the Netherlands (up 2.4 million metric tons) which is a

[85]EIA, "U.S. Natural Gas Exports and Re-exports by Country," accessed May 23, 2023; and IEA, *Gas Market Report Q4 2022*, October 2022, 25.
[86] USITC DataWeb/Census, digest EP006, accessed February 16, 2023; IEA, *Gas Market Report Q4 2022*, 2022, 53
[87] Snook, "US coal exports to reach 3-year high amid war in Ukraine: EIA," April 12, 2022; Longoria & Hudgins, "US ramps up exports to Europe to fill energy gap left by Russia-Ukraine war," March 8, 2023.
[88] Varadhan, "India's thermal coal imports up nearly 15% in 2022 - Coalmint," January 9, 2023; USITC DataWeb/Census, digest EP003, accessed February 16, 2023. Metallurgical bituminous coal is used in steel production. Therefore, the demand for metallurgical coal trends with the demand for steel.
[89] Longoria & Hudgins, "US ramps up exports to Europe to fill energy gap left by Russia-Ukraine war," March 8, 2023.
[90] USITC DataWeb/Census, digest EP003, accessed February 16, 2023.
[91] Lolita, "Coal Exports Remained Relatively Unchanged," March 28, 2023.
[92] Lolita, "Coal Exports Remained Relatively Unchanged," March 28, 2023.

transshipment hub for Europe.[93] By contrast, U.S. export of coke to India fell (down 4.3 million metric tons) as a result of India's increased domestic production.[94]

U.S. General Imports

U.S. imports of crude petroleum increased by $65.2 billion (49.0 percent) to $198.4 billion in 2022, primarily as a result of higher prices, because the volume of such imports grew by only 2.4 percent (table EP.2).[95] As noted earlier, such high prices were caused by the combination of constrained global crude oil supplies in the face of steady demand as many economies continued to recover from the 2020 economic downturn caused by the COVID-19 pandemic. High crude prices were also the result of the market's reaction to Russia's invasion of Ukraine—and subsequent sanctions. [96] Increased import volumes of crude petroleum were driven by demand from U.S. refineries, which used crude oil as a feedstock for the production of a variety of products for a recovering U.S. economy and for export.[97] U.S. imports in this digest saw the largest increases by the largest amount from countries that were also the largest suppliers: Canada (up $37.5 billion), Mexico (up $7.7 billion), and Saudi Arabia (up $7.4 billion). By contrast, imports from Russia declined by $4.2 billion in 2022, ceasing completely after the first quarter, as a result of an Executive Order from the Biden Administration banning Russian crude imports.[98]

Table EP.2 Leading changes in U.S. general imports, 2018–22
In millions of dollars and percentages.

Product group (digest)	2018 (million $)	2019 (million $)	2020 (million $)	2021 (million $)	2022 (million $)	Absolute change, 2021–22 (million $)	Percentage change 2021–22 (%)
Crude petroleum	157,059	126,798	76,680	133,141	198,385	65,245	49.0
Petroleum products	62,686	62,479	36,733	65,711	85,108	19,397	29.5
Natural gas and components	10,372	9,212	6,868	13,932	22,010	8,078	58.0
Electrical energy	2,252	1,895	1,919	2,637	4,244	1,607	61.0
Nuclear materials	2,824	2,873	2,477	3,227	4,164	936	29.0
Coal, coke, and related chemical products	1,394	1,359	1,152	1,657	2,620	963	58.1
Total	236,587	204,616	125,829	220,305	316,532	96,227	43.7

Source: USITC DataWeb/Census, accessed February 16, 2023.
Notes: Import values are based on U.S. customs value. Calculations are based on unrounded data.

[93] Lolita, "Coal Exports Remained Relatively Unchanged," March 28, 2023; USITC DataWeb/Census, digest EP003, accessed February 16, 2023.
[94] Varadhan, "India November Thermal Coal Import at Nine-Month Low," December 10, 2022; USITC DataWeb/Census, digest EP003, accessed February 16, 2023.
[95] USITC DataWeb/Census, digest EP004, accessed February 16, 2023.
[96] "OPEC: Monthly Oil Market Report," 6, 24, accessed January 2023.
[97] EIA, "Oil and petroleum products explained: Refining crude oil," June 12, 2023; EIA, "U.S. Imports by Country of Origin," accessed May 25, 2023.
[98] USITC DataWeb/Census, digest EP004, accessed February 16, 2023; White House, "Fact Sheet: United States Bans Imports of Russian Oil, Liquefied Natural Gas, and Coal," March 8, 2022; "Weekly U.S. Imports from Russia of Crude Oil (Thousand Barrels per Day)," accessed February 6, 2023. Russia was the second-largest source of U.S. imports of crude oil in 2021.

In 2022, U.S. imports of petroleum products increased by $19.4 billion (29.5 percent) to $85.1 billion. This was entirely due to significantly higher prices; the volume of imports actually declined by 12.6 percent.[99] U.S. refineries experienced a 5.0 percent higher utilization rate in 2022, and refinery and blender net production increased significantly.[100] U.S. refineries, therefore, supplied more of the domestic demand (domestic demand grew by 142,500 mbbl, or 2.0 percent), displacing import volumes.[101] Nevertheless, because of the much higher prices, U.S. imports from Canada and Mexico increased by $6.4 billion and $2.5 billion, respectively. By contrast, imports from Russia declined by $8.2 billion as a result of the Ukraine-related sanctions.

Imports of natural gas and components increased 58.0 percent (up $8.1 billion) to $22.0 billion in 2022, with pipeline gas (up $7.1 billion) accounting for most of the increase.[102] The volume increased by only 7.7 percent to 3,024.1 billion cubic feet in 2022, indicating that the increase in import value was largely due to higher prices. Nearly all U.S. pipeline gas imports (up 7.6 percent, to 2,998.5 billion cubic feet) come from Canada and supply U.S. midwestern and western markets.[103] Capacity constraints and weather events affected the United States on a regional level in 2022. In particular, reduced natural gas inflows from the Permian basin due to pipeline constraints affected the midwestern and western markets. Regional hub maintenance, reduced hydroelectric power generation due to drought, as well as extreme temperatures, were all factors increasing natural gas imports from Canada. In turn, the U.S. experienced high net withdrawals of natural gas from storage. Domestic demand coupled with high European demand for LNG causing natural gas prices to increase as demand outpace supply. [104]

[99] USITC DataWeb/Census, digest EP005, accessed February 16, 2023; "U.S. Imports of Total Petroleum Products (Thousand Barrels per Day)," accessed January 26, 2023; and EIA, "How Much of the Crude Oil Produced in the United States," March 29, 2023.
[100] EIA, "U.S. Field Production of Crude Oil," accessed May 24, 2023; EIA, "U.S. Refinery and Blender Net Production," accessed May 25, 2023; and EIA, "U.S. Refinery Utilization and Capacity," accessed May 25, 2023.
[101] EIA, "Product Supplied," accessed May 25, 2023, and EIA, "Supply and Disposition," accessed May 25, 2023.
[102] USITC DataWeb/Census, digest EP006, accessed February 16, 2023.
[103] EIA, "Natural Gas Explained," June 30, 2023, and EIA, "Natural Gas Imports by Country," accessed January 26, 2023; Kempkey, "Canada is the United States' largest partner for energy trade," March 1, 2017; EIA, "Country Analysis Executive Summary: Canada," July 12, 2022, 7.
[104] Lawrence, "Average Cost of Wholesale U.S. Natural Gas," January 9, 2023. According to the EIA, takeaway capacity is the total capacity for moving crude oil out of the via pipeline, rail, and truck; EIA, "Williston Basin Crude Oil Production," April 17, 2012; and OGE Editors, "EIA: Gas Imports from Canada" November 22, 2022.

Forest Products

Changes in 2022 from 2021:

- **U.S. total exports of forest products increased by $3.7 billion (9.4 percent) to $43.3 billion**
  - **U.S. domestic exports of forest products increased by $3.4 billion (9.1 percent) to $41.3 billion**
  - **U.S. re-exports of forest products increased by $279.0 million (16.3 percent) to $2.0 billion**
- **U.S. general imports of forest products increased by $6.0 billion (9.8 percent) to $67.0 billion**

The value of U.S. domestic exports of forest products[105] rose by $3.4 billion (9.1 percent) to $41.3 billion in 2022 (table FP.1), after increasing by 18.1 percent in 2021.[106] Although exports in most forest products digests increased in 2022, the largest absolute changes, by value, were for industrial paper and paperboard (up $1.3 billion) and wood pulp and recovered paper (up $1.2 billion). Combined, these two digests accounted for almost three-fourths of the increase of forest products exports; export values for the remaining forest products digests were generally stable. Canada and Mexico—the two largest U.S. markets—together accounted for 43.0 percent of U.S. Forest products exports in 2022, with exports to Canada increasing by $0.9 billion (8.9 percent) and by $0.5 billion (7.3 percent) to Mexico. By contrast, in China, the third-largest market for such products, a new wave of COVID-19 cases caused considerable economic disruption, resulting in a decline in U.S. exports of $0.2 billion (4.3 percent).[107]

The value of U.S. general Imports of forest products grew by $6.0 billion (9.8 percent) to $67.0 billion from in 2022, after increasing by 37.1 percent in 2021 (table FP.2).[108] Imports of most forest products digests increased in 2022. The largest increases by value, were for printing and writing papers (up by $1.5 billion); industrial papers and paperboards (up by $1.3 billion); wood pulp and recovered paper (up by $1 billion); and moldings, millwork, and joinery (up by $0.9 billion). For many products, imports rose strongly in the beginning of 2022 but moderated by yearend. By contrast, lumber imports fell by $1.5 billion in 2022. Imports from the second- and third-largest U.S. suppliers—China and Brazil—rose by $651 million and $825 million, respectively. In addition, imports from the European Union—particularly Germany—increased by $2.1 billion. By contrast, imports from Canada—the largest U.S. forest products source—fell by $656 million in 2022.

In 2022, U.S. trade in many forest products digests recovered to pre-pandemic levels—or even exceeded these levels—in terms of both exports and imports. This recovery largely resulted from pent-up global demand that emerged when COVID-related shocks moderated—facilities reopened, logistics improved, and depleted inventories were replenished—and trade began to stabilize.[109] These factors contributed to a relatively broad-based increase in U.S. exports, with particular growth for packaging materials.

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[105] The forest products sector consists of 16 product digests. Each USITC sector digest encompasses various 8-digit subheadings in the *Harmonized Tariff Schedule of the United States* (HTS). For a complete list of HTS subheadings classified in a particular sector or digest, see this data table.

[106] Unless otherwise noted, the export data used in this section are for domestic exports. For more information on trade terminology, please refer to Lundquist, "Special Topic: Trade Metrics," June 2015.

[107] Uretsky, "How China's loosened COVID-19 policies have left the country vulnerable," December 14.2022.

[108] USITC DataWeb/Census, digests FP001-016, accessed February 9, 2023.

[109] USITC, "Trade Shifts 2020: Forest Products," 2021; USITC, "Trade Shifts 2021: Forest Products," 2022.

These same factors also facilitated a broad-based increase in U.S. imports, with the exception of lumber. Imports of lumber (particularly, softwood lumber) from Canada—which is an important input in U.S. new home construction—declined as a result of rising interest rates, a phenomenon that increased buyers' housing costs and, ultimately, resulted in weaker demand for new home purchases.[110]

U.S. Domestic Exports

In 2022, U.S. exports of industrial papers and paperboards increased by $1.3 billion, or 13.6 percent, to $10.5 billion—just short of a full recovery to pre-pandemic levels. This increase in export value was mostly driven by unit prices; the volume of industrial papers and paperboards increased by only up 1.9 percent (table FP.1).[111] This increase in export value is largely attributable to the pandemic-induced surge in consumer e-commerce purchases, which, in turn, triggered rising prices for packaging materials.[112] U.S. exports of kraftliner (a type of cardboard used in shipping boxes) were particularly strong, rising by $505 million in 2022.[113] Kraftliner exports accounted for more than one-third of the increase in export value in this digest, boosting export volumes by well over half. Canada continued to be the largest market for U.S. exports of industrial papers and paperboards, which increased by 13.4 percent to $3.5 billion, largely because of higher unit prices (particularly in packaging products).

[110] Lynch, "Consumers are shifting their spending," May 28, 2022; Bahney, "After this week's Fed rate hike," December 16, 2022.
[111] USITC DataWeb/Census, digest FP011, accessed February 9, 2023.
[112] Mahlurg, "US corrugated box and containerboard market trends," September 28, 2022.
[113] Kraftliner refers to certain products covered under HTS subheadings 4804.11 and 4804.19.

Table FP.1: Leading changes in U.S. domestic exports, 2018–22
In millions of dollars and percentages.

Product group (digest)	2018 (million $)	2019 (million $)	2020 (million $)	2021 (million $)	2022 (million $)	Absolute change 2021–22 (million $)	Percentage change 2021–22 (%)
Wood pulp and recovered paper	9,222	8,326	7,428	9,371	10,585	1,214	13.0
Industrial papers and paperboards	10,360	9,224	8,646	9,284	10,548	1,264	13.6
Logs and rough wood products	3,601	2,952	2,881	3,516	3,887	371	10.5
Printed matter	3,921	3,799	3,302	3,687	3,691	3	0.1
Lumber	3,762	2,936	2,659	3,456	3,444	-12	-0.4
Miscellaneous paper products	2,482	2,383	2,230	2,547	2,672	125	4.9
Paper boxes and bags	1,947	1,938	1,834	2,177	2,311	134	6.1
Wood veneer and wood panels	996	893	829	1,128	1,179	51	4.5
Printing and writing papers	947	891	735	851	904	53	6.2
Moldings, millwork, and joinery	652	650	557	755	854	99	13.1
All other product groups	1,462	1,387	1,000	1,125	1,262	137	12.2
Total	39,352	35,380	32,101	37,896	41,335	3,439	9.1

Source: USITC DataWeb/Census, accessed February 16, 2023.
Notes: Export values are based on free along ship value, U.S. port of export. Calculations are based on unrounded data.

U.S. exports of wood pulp and recovered paper increased by $1.2 billion (13.0 percent) to $10.6 billion in 2022, exceeding pre-pandemic (2019) export values largely because of rising prices.[114] Elevated prices in this digest were principally driven by record-high prices for pulp, which were caused by a range of supply chain constraints, including limited transportation capacity.[115] Exports of chemical wood pulp were particularly strong, largely because of increasing unit prices, accounting for most of the increase in export value for this digest. U.S. exports of wood pulp and recovered paper to Mexico—the largest country market increase in this digest—increased by $210 million to $1.1 billion in 2022, principally because of rising shipments of chemical wood pulp as the volume of exports increased by about one-third.[116] Such shipments were driven by increased production of packaging material and paper in Mexico. Indeed, some of North America's largest integrated paper and packaging producers operate mills in Mexico, a location that avoided many of the supply chain bottlenecks that hampered other destination markets.[117]

[114] USITC DataWeb/Census, digest FP009, accessed February 9, 2023. Wood pulp is processed into paper, paperboard, fiberboard, and other cellulose products.
[115] Cavanagh, "The global wood pulp market," August 25, 2022; Cavanagh, "Global wood pulp market outlook," November 17, 2022.
[116] Chemical wood pulp is an input into paper, paperboard, fiberboard, and other cellulose products.]
[117] Statista, "Monthly paper manufacturing value in Mexico 2019–2022," March 24. 2023; WestRock, "WestRock Acquisition of Grupo Gondi Complete," December 1, 2022.

Exports of logs and rough wood products (like wood pellets) rose by $371 million (10.5 percent) to $3.9 billion,[118] exceeding pre-pandemic levels. Overall, U.S. exports of wood pellets[119] drove the overall increase of export values in the logs and rough wood products digest. Wood pellet exports increased by $494 million (47.0 percent) to $1.5 billion; export volumes rose by 20.5 percent and unit values rose by 21.9 percent.[120] Exports of logs and rough wood—almost all of which were wood pellets—to the United Kingdom (UK) increased by $233 million to $951 million. In 2022, global wood pellet prices increased following Russia's invasion of Ukraine, because exports of wood pellets from Russia and Belarus were suspended under sanctions imposed by the United States, European Union, United Kingdom, and other countries (e.g., Switzerland).[121]

The value of U.S. exports of wooden containers grew by $134 million (39.0 percent) to $0.5 billion in 2022, exceeding the pre-pandemic levels. More than half the increase in exports in this digest resulted from higher prices for wooden casks, barrels, and hogsheads (used for maturing alcohol), which reflected increased input costs.[122] The countries receiving the largest increase in exports in this digest were Canada (up $29 million), Mexico (up $27 million), and the UK (up $24 million).

The value of U.S. exports of paper boxes and bags grew by $134 million (6.1 percent) to $2.3 billion in 2022, exceeding their pre-pandemic (2019) level.[123] Almost half the value increase was accounted for by cartons, boxes, and cases of corrugated paper or paperboard (used for packaging and shipping), mainly as a result of higher prices as the volume of exports declined compared to 2021. Higher prices in early 2022 reflected increased raw material and operating costs, although destocking and mill downtime caused prices to moderate by the end of the year.[124]

U.S. General Imports

U.S. imports of printing and writing papers[125] increased by $1.5 billion (53.4 percent) to $4.2 billion in 2022, as a result of rising unit prices (as overall volume declined compared to 2021) (table FP.2).[126] The largest increase in imports in this digest occurred in printing paper because of higher prices driven by a surge of buying behavior stemming from fears of raw material shortages. [127] Imports from Canada—

[118] USITC DataWeb/Census, digest FP001, accessed February 9, 2023.
[119] Wood pellets are burned in utility-scale power plants for the purpose of generating electricity.
[120] Ireland, "International Trade in Wood Pellets," 2018; USITC DataWeb/Census, digest FP001, accessed February 9, 2023.
[121] Matzuku, "Will the Production of Pellets Be Stopping in Russia?," May 7, 2022; White & Case, "Switzerland Implements Further Sanctions," July 6, 2022; Voegele, "UK Takes Action to Ensure Adequate Supply of Wood Pellets," October 26, 2022.
[122] Barton, "Looming Barrel Shortage is Bad News," February 22. 2022; WhiskyCast, "The Bourbon Barrel Problem," February 19, 2023.
[123] USITC DataWeb/Census, digest FP010, accessed February 9, 2023.
[124] Beroe Inc., "Demand for Corrugated Boxes is Expected to Spike," March 2, 2022; Rudder, "Packaging Board and Paper Price Reductions Anticipated," December 9, 2022; Premack, "Cardboard Box Demand Plunging," January 30, 2023.
[125] Printing and writing papers include paper used for writing, drawing, graphics, and photography.
[126] USITC DataWeb/Census digest FP013, accessed February 9, 2023.
[127] Paper prices increased significantly during 2022. By December 2022, demand slowed and inventories increased. Mercante, "US printing paper demand slows down," December 21, 2022.

typically the United States' largest source of printing and writing papers—increased by 34.4 percent, exceeding pre-pandemic levels in volume terms.

Table FP.1: Leading changes in U.S. general imports, 2018–22
In millions of dollars and percentages.

Product group (digest)	2018 (million $)	2019 (million $)	2020 (million $)	2021 (million $)	2022 (million $)	Absolute change 2021–22 (million $)	Percentage change 2021–22 (%)
Lumber	7,154	5,753	8,015	13,733	12,281	-1,452	-10.6
Wood veneer and wood panels	7,022	5,442	6,275	10,549	10,829	280	2.7
Industrial papers and paperboards	7,158	6,792	6,772	7,292	8,635	1,344	18.4
Moldings, millwork, and joinery	3,543	3,421	3,493	4,674	5,619	945	20.2
Printed matter	4,605	4,717	3,799	4,739	5,409	670	14.1
Wood pulp and recovered paper	3,747	3,428	2,963	4,030	4,988	958	23.8
Printing and writing papers	3,495	3,357	2,432	2,758	4,230	1,472	53.4
Miscellaneous paper products	3,040	2,937	2,632	3,016	3,823	807	26.8
Paper boxes and bags	2,738	2,606	2,550	3,039	3,507	468	15.4
Miscellaneous articles of wood	1,938	1,803	1,867	2,523	2,536	14	0.5
All other product groups	4,057	4,035	3,715	4,668	5,165	497	10.7
Total	48,497	44,290	44,513	61,020	67,024	6,004	9.8

Source: USITC DataWeb/Census, accessed February 16, 2023.
Notes: Import values are based on U.S. customs value. Calculations are based on unrounded data.

U.S. imports of industrial papers and paperboards increased by $1.3 billion (18.4 percent) to $8.6 billion in 2022.[128] The product exhibiting the largest growth, by value, was paperboard (i.e., cardboard), an important input in many packaging products, which increased by $565 million (17.5 percent). This increase in paperboard imports is largely attributable to the pandemic-induced surge in consumer e-commerce purchases, which, in turn, triggered rising demand for packaging materials.[129] In response, U.S. industry added capacity in 2022 to meet demand for paperboard and rebuild inventories, with more than half such demand met by imports from Canada (up $253 million), Sweden (up $168 million), Finland (up $66 million), and Germany (up $26 million).

Wood pulp and recovered paper imports increased by $958 million (23.8 percent) to $5.0 billion in 2022. This increase in imports reflected record high prices in 2022 due to increased transportation costs and supply chain issues, such as unexpected plant downtime. Half the increased imports in this digest were sourced from Canada (up $476 million), typically the United States' largest source.[130] Chemical wood

[128] USITC DataWeb/Census digest FP011, accessed February 9, 2023.
[129] Sousa, "The World is Using Fewer Cardboard Boxes," December 22, 2022.
[130] Pulp & Paper Canada Staff, "Canfor Pulp Reports Results for Year-End," March 2, 2023.

pulp[131] accounting for the vast majority of such imports; bleached chemical wood pulp accounted for the largest increase in imports in terms of both value and volume.[132]

In 2022, U.S. imports of moldings, millwork, and joinery (wood products typically used in home construction and remodeling) increased by $945 million (20.2 percent) to $5.6 billion,[133] largely because of rising prices. In general, price increases for this digest were driven by deferred home renovations during the COVID-19 pandemic (stemming from supply chain and labor-availability issues), which motivated ongoing remodeling projects in 2022, driving prices for the products in this digest higher.[134] Imports of products in this digest from Canada accounted for about one-fifth of the increase in 2022 (up $184 million to $1.7 billion).

The value of U.S. imports of lumber dropped by $1.5 billion (10.6 percent) to $12.3 billion in 2022, largely because of a decline of imports of softwood lumber, particularly from Canada.[135] Imports of lumber (particularly, softwood lumber)—which is an important input in U.S. new home construction—declined because of rising interest rates, a phenomenon that increased buyers' housing costs and, ultimately, resulted in weaker demand for new home purchases.[136]

U.S. lumber imports from Canada dropped by $2.1 billion (to $9 billion) in 2022, although Canada continued to be the top source (73.0 percent) of U.S. lumber imports. By contrast, imports of lumber from Germany and Sweden—the second- and third-largest sources of U.S. lumber imports—increased by $39 million (7.4 percent of U.S. imports) and $124 million (3.6 percent of U.S. imports), respectively.

[131] Chemical wood pulp is an input into paper, paperboard, fiberboard, and other cellulose products.
[132] Cavanagh, "The Global Wood Pulp Market," August 25, 2022; Cavanagh, "Global Wood Pulp Market Outlook," November 17, 2022.
[133] USITC DataWeb/Census digest FP003, accessed February 9, 2023.
[134] Dalheim, "Remodeling Upturn Expected to Carry into 2022," April 15, 2021; Bradford, "Pent-Up Demand Drives 2022 Remodeling Projects," March 17, 2022; NAHB, "Top 20 Markets for Remodeling in 2022," March 22, 2022; NAHB, "New Home Sales Inch Higher in December," January 26, 2023.
[135] USITC DataWeb/Census digest FP002, accessed February 9, 2023.
[136] Lynch, "Consumers are Shifting Their Spending," May 28, 2022; Bahney, "After This Week's Fed Rate Hike," December 16, 2022.

Minerals and Metals

Changes in 2022 from 2021:

- **U.S. total exports increased by $18.1 billion (10.6 percent) to $188.1 billion**
  - **U.S. domestic exports increased by $9.3 billion (7.2 percent) to $139.7 billion**
  - **U.S. re-exports increased by $8.7 billion (22.1 percent) to $48.4 billion**
- **U.S. general imports increased by $28.7 billion (11.0 percent) to $290.1 billion**

The value of U.S. domestic exports of minerals and metals increased by $9.3 billion (7.2 percent) to $139.7 billion in 2022 (table MM.1).[137] The largest increases in U.S. exports occurred among steel-mill products (up 2.5 billion or 21.2 percent), aluminum-mill products (up 1.2 billion or 28.8 percent), certain base metals and chemical elements (up 1.2 billion or 33.8 percent), and miscellaneous products of base metal (up 1.1 billion or 11.6 percent). The largest decrease was for precious metals and non-numismatic (investment rather than collector) coins (down 1.7 billion or 4.2 percent).[138] In terms of destinations, the largest increases in U.S. exports were to Switzerland (up $3.5 billion or 35.3 percent), Mexico (up $3.3 billion or 15.2 percent), and Canada (up $2.2 billion or 7.5 percent). Collectively, these three countries represented almost the entire overall $9.3 billion increase in exports. The largest decline in U.S. exports was to the United Kingdom (down $3.1 billion or 22.1 percent).

The value of U.S. general imports of minerals and metals increased by $28.7 billion (11.0 percent) to $290.1 billion in 2022 (table MM.2).[139] Significant increases in imports occurred among steel-mill products (up $8.9 billion or 26.7 percent), natural and synthetic gemstones (up $5.0 billion or 22.7 percent), and unwrought aluminum (up $3.8 billion or 29.5 percent). A significant decrease in imports occurred among precious metals and non-numismatic coins (down $10.5 billion or 22.0 percent). In terms of suppliers, the largest increase in U.S. imports of minerals and metals was from Canada, from which U.S. imports rose by $3.3 billion (7.8 percent) to $46.1 billion. Imports also increased from other leading sources, such as Mexico (up $3.1 billion or 11.1 percent), India (up $3.0 billion or 17.4 percent), and China (up $2.9 billion or 8.2 percent). Collectively, these four countries represent 42.9 percent of the overall $28.7 billion increase in U.S. imports. By contrast, imports decreased sharply from Switzerland (down $2.6 billion or 45.1 percent) to $3.1 billion. The decline in Swiss imports was driven entirely by a decrease in the value of precious metals and non-numismatic coins.

The increase in the value of minerals and metals exports was heavily influenced by rising prices—globally and within the sector—evidenced by larger value increases than quantity increases for most

[137] The Minerals and Metals sector consists of 45 product digests. Each USITC sector digest encompasses various 8-digit subheadings in the *Harmonized Tariff Schedule of the United States* (HTS).data table. Except where otherwise noted, the export data used in this section are for domestic exports. For more information on trade terminology, please refer to Lundquist, "Special Topic: Trade Metrics," June 2015; USITC DataWeb/Census, digests MM001-045, accessed February 8, 2023.
[138] "Precious metals" include gold, silver, and platinum-group metals in unrefined or refined unwrought, semi-manufactured, or waste and scrap forms. "Non-numismatic coins" are valued for the precious-metal content rather than as historical or collectors' items.
[139] USITC DataWeb/Census, digests MM001-045, accessed December 21, 2022.

digests within the minerals and metals sector. Rising auto production in Canada and Mexico also played an important role in rising U.S. exports, because many product categories within the minerals and metals sector are important inputs for vehicle production (e.g., steel-mill products, aluminum products, certain products of base metals, and certain precious metals). Similarly, the rise in U.S. import value was influenced by higher prices and increased domestic production of transportation equipment—auto production in the United States rose by 9.4 percent in 2022.[140]

U.S. Domestic Exports

Exports of steel-mill products—e.g., hot-rolled steel coil and plate, reinforcing bar (rebar) and wire rod—increased by $2.5 billion (21.2 percent) to $14.2 billion in 2022 (table MM.1).[141] The rising value of steel-mill product exports was largely driven by higher prices[142] rather than a significant increase in quantity. The value of steel-mill product exports rose by 21.2 percent, but the quantity rose by only 0.8 percent. Rising global prices for steel-mill products occurred as a reported decrease in global steel demand of 2.3 percent in 2022 was more than offset by a decline in production of 4.2 percent.[143] According to the World Steel Association, high inflation rates, aggressive monetary tightening by central banks, and a slowdown in the Chinese economy drove the fall in steel demand.[144] The fall in global production was driven by declining production in China and Japan, the largest and third-largest global steel producers, respectively. In China, a slowing economy driven by its zero-COVID policy and reduced confidence in the real estate market were primary drivers. Japanese production fell because of reduced downstream auto production brought about by a global microchip shortage.[145] The largest value increase in U.S. steel-mill product exports occurred for plates, sheets, and strips of carbon and alloy steels, which are widely used in the auto manufacturing sector. This product group represented 45.4 percent of the increase in steel-mill product exports.[146] Although global motor vehicle sales decreased 1.0 percent in 2022,[147] auto production in Mexico and Canada—key U.S. steel markets—rose by 10.8 percent and 10.2 percent, respectively, in 2022.[148] Not surprisingly, the largest increases in U.S. exports of steel-mill products were to Mexico (up $998.8 million or 20.5 percent) and Canada (up $967.8 million or 18.7 percent). Collectively, the two countries represented 79.1 percent of the growth in U.S. steel-mill product exports.[149]

[140] Wards Intelligence, *North America Auto Production*, January 19, 2023.
[141] USITC DataWeb/Census, digest MM025, accessed December 21, 2022.
[142] The average value per kilogram among the top 10 export categories rose 36.0 percent in 2022. USITC DataWeb/Census, digest MM025, accessed December 21, 2022.
[143] WSA, "December 2022 Crude Steel Production," January 21, 2023, 2; WSA, "Worldsteel Short Range Outlook October 2022," October 19, 2022, 1.
[144] WSA, "Worldsteel Short Range Outlook October 2022," October 19, 2022, 1.
[145] Nikkei Asia, "World crude steel output sees first decline in seven years," *Nikkei*, February 1, 2023.
[146] DataWeb/Census, digest MM025, accessed December 21, 2022.
[147] Wards Intelligence, *World Vehicle Sales, December 2022*, January 31, 2023.
[148] Wards Intelligence, *North America Auto Production*, January 19, 2023.
[149] DataWeb/Census, digest MM025, accessed December 21, 2022.

Table MM.1: Leading changes in U.S. domestic exports, 2018–22
In millions of dollars and percentages.

Product group (digest)	2018 (million $)	2019 (million $)	2020 (million $)	2021 (million $)	2022 (million $)	Absolute change, 2021–22 (million $)	Percentage change 2021–22 (%)
Precious metals and non-numismatic coins	27,247	25,203	31,673	41,754	40,011	-1,743	-4.2
Steel-mill products	11,770	9,943	8,143	11,741	14,227	-2,486	21.2
Miscellaneous products of base metal	9,414	9,324	8,058	9,639	10,757	1,118	11.6
Copper and related articles	7,586	6,447	5,396	8,517	8,796	279	3.3
Iron and steel waste and scrap	5,910	5,326	4,800	7,639	7,547	-92	-1.2
Aluminum-mill products	5,594	4,895	3,838	4,235	5,457	1,222	28.8
Unwrought aluminum	3,432	2,857	2,707	4,445	4,995	550	12.4
Certain base metals and chemical elements	5,008	5,101	3,791	3,574	4,782	1,208	33.8
Cement, stone, and related products	4,071	3,891	3,065	3,738	4,210	472	12.6
Industrial fasteners of base metal	3,860	3,875	3,192	3,554	4,123	569	16.0
All other product groups	31,167	29,975	26,331	31,525	34,785	3,260	10.3
Total	115,058	106,838	100,995	130,362	139,689	9,327	7.2

Source: USITC DataWeb/Census, accessed February 16, 2023.
Notes: Export values are based on free along ship value, U.S. port of export. Calculations are based on unrounded data.

Aluminum-mill product exports rose by nearly $1.2 billion (28.8 percent) to $5.5 billion. Rising prices were the leading contributor to the value increase, though the quantity exported did increase by 10.6 percent. Within this category, aluminum plate, sheet, and strip accounted for more than half the export growth, with an increase of $696.8 million.[150] U.S. exports of aluminum-mill products benefited from the continued broad global economic recovery following the COVID-19 pandemic as well as from increasing demand for aluminum inputs as recyclable and sustainable materials.[151] In particular, as an important input for auto production, the growth in U.S. export value for aluminum-mill products was also driven by rising auto production in Mexico and Canada, which rose by 10.8 and 10.2 percent, respectively, in 2022.[152] In fact, the largest increases in exports of aluminum-mill products were to Mexico and Canada, which rose by $355.0 million (or 19.4 percent) and $317.4 million (or 21.8 percent) in 2022, respectively.[153]

U.S. exports of miscellaneous products of base metal rose by $1.1 billion (11.6 percent) to $10.8 billion in 2022. Within this category, which includes intermediate metal products used in the production of a breadth of industrial goods, exports of articles of iron or steel not elsewhere specified or indicated (articles of iron or steel, n.e.s.o.i.) accounted for the largest increase and rose by $372 million (10.9

[150] DataWeb/Census, digest MM038, accessed December 21, 2022.
[151] *Toto*, "North American Aluminum Demand Continues to Increase," December 2, 2022; Kamczyc, "Demand for Aluminum Grows," May 25, 2022; and Awan, "Report Reveals Global Aluminum Demand to Reach New Highs," March 23, 2022.
[152] Wards Intelligence, *North America Auto Production*, January 19, 2023.
[153] DataWeb/Census, digest MM038, accessed December 21, 2022.

percent). The rising export value of for such articles was driven by growth in both export volumes and unit value, which increased by 3.4 percent and 7.4 percent, respectively.[154] The largest increases in exports of miscellaneous products of base metal by country were to Mexico and Canada, which increased by $644 million and $228 million, respectively.[155] Products of base metal are used broadly in manufacturing, including motor vehicle production—as noted earlier, motor vehicle production in Canada and Mexico rose strongly in 2022.[156] These two countries have consistently been the top two destinations for U.S. exports from this category.

U.S. exports of certain base metals and chemical elements increased by $1.2 billion (33.8 percent) to $4.8 billion in 2022. Within this digest, the largest increase was in wrought titanium, which rose by $237 million (36.0 percent) to $899 million.[157] Most of the increase went to the United Kingdom, France, and Germany. Each of these countries is a major manufacturing site for aircraft engines,[158] which is the leading end use for titanium products.[159] Exports of nickel bars, rods, profiles, and wire also rose significantly in 2022, by more than $177 million. China remained the largest U.S. export market for base metals and chemical elements at $621 million, an increase of $78 million (14.4 percent) from 2021. The largest increase for a single country was to France, with an increase of $172 million (71.9 percent) to $411 million. By contrast, domestic exports to Russia dropped $12.1 million (77.9 percent) to 3.4 million amid the ongoing military conflict with Ukraine.[160]

The precious metals and non-numismatic coins accounted for the largest decline among U.S. exports of minerals and metals, falling by $1.7 billion (4.2 percent) to $40.0 billion in 2022. Driving this decline in value were lesser export volumes augmented by lower prices[161] for most types of precious metals-containing ash, waste, and scrap, down by $2.0 billion (13.3 percent);[162] platinum-group metals (PGMs), down by $1.3 billion (24.4 percent); and silver, down by $846 million (38.6 percent).[163] Lesser volumes of precious metals were available in 2022 for both domestic consumption and export as a result of lower

[154] USITC DataWeb/Census, digests MM001-045, accessed December 21, 2022.
[155] DataWeb/Census, digest MM031, accessed December 21, 2022.
[156] Wards Intelligence, *North America Auto Production*, January 19, 2023.
[157] DataWeb/Census, digest MM041, accessed December 21, 2022.
[158] Airbus, "Airbus in the United Kingdom" (accessed July 24, 2023).
[159] TMS Titanium, *Titanium and the Aerospace Industry*, (accessed February 7, 2023).
[160] DataWeb/Census, digest MM025, accessed December 21, 2022.
[161] The average annual London Bullion Market Association (LBMA) afternoon price fix for gold was relatively flat in 2022, falling by only $1.29 per troy ounce or 0.1 percent, compared to the prior year. By contrast, the average annual LBMA afternoon price fix for silver fell during 2022, by $3.41 per troy ounce or 16.6 percent, compared to the prior year. LBMA, "LBMA Precious Metals Prices" (accessed January 20, 2023). Average annual prices for PGMs fell to varying extents in 2022 from the prior year: platinum (down by $128.81 per troy ounce or 11.7 percent), palladium (by $285.67 or 11.9 percent), rhodium (by $4,613.07 or 22.9 percent), iridium (by $612.69 or 12.1 percent), and ruthenium (by $12.23 or 2.2 percent). The average annual price for osmium was not readily available. Johnson Matthet, "JM Base Prices" (accessed January 20, 2023); DataWeb/Census, digest MM020, accessed December 21, 2022.
[162] For 2022, precious metals and non-numismatic coins also included certain electrical and electronic waste and scrap of HTS heading 8549, for recovering precious and other metals, that were added to the HTS, effective January 27, 2022. USITC, *Harmonized Tariff Schedule of the United States (2022) Basic Edition*, January 2022, 68.
[163] The leading U.S. silver export declines were refined silver grains and nuggets, down by $669 million (77.4 percent); and semi-manufactured silver, by $169 million (25.7 percent).

output by U.S. mines[164] and refineries.[165] In particular, for PGMs, domestic mine output was disrupted in June by overflowing rivers that impeded access to the underground Stillwater Mine in Montana.[166] Moreover, fewer PGMs were recovered domestically from scrapped catalytic converters because drivers retained rather than sold their older motor vehicles. Rising consumer-loan interest rates and supply-chain disruptions for automakers limited their options for purchasing new vehicles.[167] Partially offsetting these declines were higher export volumes of gold, drawn from existing inventory, which drove up the export value by $2.5 billion (10.8 percent).[168] Higher bullion exports reflect continued acquisitions of gold by foreign central banks to augment their monetary reserves, but at an accelerated pace in a year of both geopolitical uncertainty and escalating inflation.[169] Precious-metals exports shifted away from the global refining, trading, and fabricating centers in United Kingdom (down by $3.4 billion or 28.4 percent) and Hong Kong (down by $1.6 billion or 74.7 percent) for those in Switzerland (up by $3.4 billion or 34.7 percent), which is also a major global banking center, and India (up by $1.0 billion or 244.0 percent).[170]

U.S. General Imports

The value of imports of steel-mill products rose by $8.9 billion (26.7 percent) to $42.2 billion in 2022 (table MM.2), and the volume fell by 534,000 metric tons (−1.9 percent) to 28.2 million metric tons.[171] The much larger change in value than quantity reflects factors similar to those that drove up prices, discussed in the exports section. Rising global and domestic inflation and tight monetary policy led to higher prices. Reduced domestic production of steel-mill products, which, according to the World Steel Association, fell by 6.1 percent in 2022, increased import demand for these products.[172] This was reflected in the data that showed imports of finished steel goods like pipe and tube increased in value

[164] In 2022, U.S. mined gold output fell by 17 metric tons (9.1 percent) to 170 metric tons compared to the prior year's level. Sheaffery, "Gold," January 2023, 80. By contrast, U.S. mined silver output rose by 80 metric tons (7.8 percent) to 1,100 metric tons compared to the prior year's level. George, "Silver," January 2023, 160. Nevertheless, U.S. mined platinum output fell by 720 kilograms (17.9 percent) to 3,300 kilograms and palladium output fell by 2,700 kilograms (19.7 percent) to 11,000 kilograms compared to the prior year's level. Schulte, "Platinum-Group Metals," January 2023, 134.

[165] In 2022, U.S. refined primary (mined) and secondary (recovered scrap) gold output fell by 12 metric tons (4.6 percent) to 250 metric tons compared to the prior year's level. Sheaffery, "Gold," January 2023, 80. Similarly, U.S. refined silver output fell by 128 metric tons (4.5 percent) to 2,700 metric tons compared to the prior year's level. George, "Silver," January 2023, 160.

[166] Sibanye-Stillwater, "Update on the Impact of Regional Flooding," June 24, 2022; Sibanye-Stillwater, "Flood Event in Montana Affects the Stillwater Mine," June 14, 2022.

[167] WPIC, "Platinum Quarterly Q4 2022," March 8, 2023, 12; Cowley, *PGM Market Report*, May 2022, 13. See also the U.S. motor-vehicles trade in the "Transportation Products" section of this working paper.

[168] The leading U.S. gold export increases were refined bullion, up by $1.5 billion (7.8 percent); refined grains and nuggets, by $646 million (145.7 percent); and unrefined doré, by $454 million (14.8 percent). DataWeb/Census, digest MM020, accessed December 21, 2022.

[169] Net purchases of gold bullion by central banks reached 1,136 metric tons in 2022, which was 686 metric tons (152 percent) more than for the prior year, and the highest level in 55 years since 1967. WGC, "Gold Demand Trends Full Year and Q4 2022," January 31, 2023, 12–13.

[170] Nieuwenhuijs, "The Mechanics of the Global Gold Market," October 7, 2021; LBMA, "Good Delivery Current List - Gold" (accessed February 13, 2022). DataWeb/Census, digest MM020, accessed December 21, 2022.

[171] USITC DataWeb/Census, digest MM025, accessed December 21, 2022.

[172] WSA, "Total Production of Crude Steel" (accessed February 22, 2023.

and imports of semifinished steel, like billets and slabs, declined sharply. The increase in the volume and value of imports of higher value finished steel products[173] and a decrease in the value and volume of imports of lower value semifinished products explain why the value of steel-mill product imports rose sharply, despite a decline in overall quantity of imported steel-mill products. Imports of semifinished steel[174] fell hardest from Brazil (down 776.8 million or 39.4 percent) and Russia (down 711.8 million or 80.3 percent), the latter of which has been subject to heavy sanctions since its invasion of Ukraine.[175] The largest increases in imports of steel-mill products were from South Korea (up $1.3 billion or 44.2 percent), Mexico (up $1.2 billion or 23.4 percent), and Germany (up $826 million or 71.7 percent).

Table MM.2: Leading changes in U.S. general imports, 2018–22
In millions of dollars and percentages.

Product group (digest)	2018 (million $)	2019 (million $)	2020 (million $)	2021 (million $)	2022 (million $)	Absolute change, 2021–22 (million $)	Percentage change 2021–22 (%)
Steel-mill products	29,592	23,994	16,719	33,294	42,187	8,892	26.7
Natural and synthetic gemstones	26,389	22,028	13,593	22,211	27,259	5,048	22.7
Unwrought aluminum	11,428	9,717	7,623	12,778	16,553	3,775	29.5
Aluminum-mill products	7,304	6,992	5,258	7,432	10,610	3,178	42.8
Certain base metals and chemical elements	6,473	6,191	4,825	5,929	9,103	3,174	53.5
Miscellaneous products of base metal	19,642	19,478	18,362	23,785	26,091	2,306	9.7
Metal construction components	4,162	4,562	4,695	5,876	7,857	1,981	33.7
Ferroalloys	3,579	2,621	1,773	3,243	5,058	1,814	55.9
Industrial fasteners of base metal	5,887	5,694	4,933	6,255	8,047	1,793	28.7
Cement, stone, and related products	9,123	8,838	8,273	10,519	11,905	1,386	13.2
All other product groups	91,000	87,632	117,530	130,009	125,392	-4,617	-3.6
Total	214,579	197,747	203,584	261,329	290,060	28,731	11.0

Source: USITC DataWeb/Census, accessed February 16, 2023.
Notes: Import values are based on U.S. customs value. Calculations are based on unrounded data.

[173] The increase in imports of finished steel products coincided with strong U.S. downstream steel demand from industries such as oil and gas, automotive, and construction. Although still trailing pre-pandemic levels, the number of U.S. domestic active oil and gas rotary (drilling) rigs (a leading indicator of activity in the energy sector) increased by 51.3 percent in 2022 compared with 2021. This was reflected in imports of pipe and tube, which increased by 76.8 percent (or $4.3 billion) in 2022. Likewise, U.S. motor vehicle production rose by 12.4 percent from 2021 to 2022. Wards Intelligence, *North America Auto Production*, January 19, 2023,. The growth in auto production contributed to rising imports of galvanized sheet products as imports of flat rolled products coated with tin or zinc represented the two largest value increases in HTS-8 categories in 2022. Demand in the construction sector rose as well, with the value of U.S. construction spending increasing by 10.2 percent in 2022. This spending increase helped drive a 39.4 percent (or $1.2 billion) increase in rebar imports in 2022. DataWeb/Census, digest MM020, accessed December 21, 2022.

[174] Data on imports of semifinished steel are for the HTS code 720712, which is defined as "Semifinished Products Of Iron Or Nonalloy Steel, Under 0.25% (Wt.) Carbon, Rectangular Cross Section, Width Not Less Than Twice The Thickness."

[175] Treasury, "U.S. Treasury Announces Unprecedented & Expansive Sanctions," February 24, 2022.

Imports of natural and synthetic gemstones rose by $5.0 billion (22.7 percent) to $27.3 billion in 2022. In particular, imports of nonindustrial (gem-quality) diamonds that are worked (cut and polished) but not mounted or set (loose) rose by $2.5 billion (11.6 percent) to $23.7 billion,[176] reflecting a shift toward more larger sized and fewer smaller sized gemstones.[177] Higher prices were observed across all diamond sizes entering the U.S. market[178] because sales of higher-end pieces outperformed all other precious-jewelry price categories.[179] Several market trends and global events exerted upward pressure on diamond prices in 2022.[180] The year began with constricted diamond supplies; inventories were previously drawn down in 2021 to decade-low levels as the precious-jewelry market recovered from the 2020 pandemic-driven disruptions to supply chains and retailing activities.[181] In addition, shipments of mined rough diamonds from Russia, the world's largest source,[182] were significantly disrupted to the major global diamond-cutting and -trading centers after the invasion of Ukraine by sanctions[183] imposed on Russia's diamond-mining operations[184] and its major commercial banks.[185] Overall U.S. diamond jewelry sales continued the robust trends of the past two years[186] into 2022, but sales growth declined later in the year, with fewer purchases but greater preferences for higher-end jewelry pieces.[187] With low domestic mine output, the United States is almost entirely dependent on import sources for

[176] Higher U.S. import values for gem-quality diamonds weighing more than one-half carat each, up by $2.8 billion (15.4 percent), far exceeded the lower values for those weighing one-half carat or less, down by $388.6 million (14.1 percent). DataWeb/Census, digest MM019, accessed December 21, 2022.
[177] The import volume of such diamonds weighing more than one-half carat each was down by 147,404 carats (3.3 percent) compared to the volume of those weighing one-half carat or less, which was down by 1.7 million carats (21.1 percent). DataWeb/Census, digest MM019, accessed December 21, 2022.
[178] The average unit value for imported diamonds weighing more than one-half carat each rose by $806.57 (19.3 percent) to $4,976.48 per carat, compared to those weighing one-half carat or less, which rose by $30.98 per carat (8.9 percent) to $379.25 per carat. DataWeb/Census, digest MM019, accessed December 21, 2022.
[179] Golan, "First Half of 2022: Jewelry Sales Rose," July 27, 2022; Golan, "Diamond and Jewelry Retail Sales Dwindled in September," October 14, 2022; Kavilanz, "Expect Big Holiday Sales on Everything But the Bling," September 26, 2022.
[180] Freedman, "De Beers' Rough Prices Rise 23% in 2022," February 2, 2023.
[181] Kavilanz, "Key Supply of Diamonds Caught Up in Russia Sanctions," March 14, 2022; Worthy Staff, "2022 Diamond Prices: Why Now is the Best Time to Sell," June 19, 2022.
[182] Olson, "Gemstones," January 2023, 1.
[183] Kavilanz, "Key Supply of Diamonds Caught Up in Russia Sanctions," March 14, 2022; Worthy Staff, "2022 Diamond Prices: Why Now is the Best Time to Sell," June 19, 2022.
[184] On March 11, 2022, the President banned importation of nonindustrial diamonds, among other products originating in Russia. The U.S. Treasury's Office of Foreign Asset Controls (OFAC) extended prohibitions against transactions of new debt and equity financing for Russian entities, on April 7, 2022, to the parastatal ALROSA diamond mining group. EOP, "Prohibiting Certain Imports, Exports, and New Investment," March 11, 2022; Treasury, "The United States Sanctions Major Russian State-Owned Enterprises," April 7, 2022; Treasury, OFAC, "Directive 3 Under Executive Order 14024," February 24, 2022.
[185] Treasury, "U.S. Treasury Announces Unprecedented & Expansive Sanctions Against Russia,," February 24, 2022; Treasury, OFAC, "Directive 2 Under Executive Order 14024," February 24, 2022; Treasury, OFAC, "Directive 3 Under Executive Order 14024," February 24, 2022; Collins, Mattingly, Liptak, and Judd, "White House and EU Nations Announce Expulsion," February 26, 2022; Blenkinsop, "EU Bars 7 Russian Banks From SWIFT," March 2, 2022; Rebucci, "SWIFT Sanction on Russia," March 4, 2022. For further information, also see the "Macroeconomic Trends in 2022" section of this working paper.
[186] Golan, "US Holiday Jewelry Sales Predicted to Rise 40%," November 29, 2021; Graff, "2021 Will Be the 'Year of Jewelry,'" December 2, 2021; Fedow, "Jewelry Sales Climb 32% Over the Holidays," December 30, 2021; Zimnisky, "US Consumer Diamond Demand In 2022 Is Poised to Remain Resilient," April 19, 2022.
[187] Golan, "First Half of 2022: Jewelry Sales Rose," July 27, 2022.

gemstones.[188] The largest increases for U.S. imports of natural and synthetic gemstones in 2022 were recorded from Israel (up by $1.3 billion or 25.3 percent), Belgium (up by $1.1 billion or 60.4 percent), and India (up by $351 million or 2.8 percent).[189] These countries are the major global centers for cutting and trading diamonds (located in Tel Aviv,[190] Antwerp,[191] and Surat and Mumbai,[192] respectively)[193] and for colored gemstones (in Jaipur, India).[194]

Imports in the unwrought aluminum category[195] rose by $3.7 billion (or 29.5 percent) in 2022, driven largely by an increase in the value of imports of semifinished goods, including ingots and billets. U.S. producers of wrought aluminum use imported ingots and billets to manufacture and deliver items such as aluminum plate, sheet, foil, and extruded products to downstream industries. The total volume of imports in the unwrought aluminum category actually decreased by 5.7 percent (232,165 metric tons) in 2022, indicating that the rise in import value was due to a significant increase in prices.[196] Although some of this price increase is attributed to rising demand, supply constraints were also a contributing factor. Surging global energy prices led to increased production costs and the eventual idling of smelters across Europe in late 2021 and early 2022.[197] In March 2022, aluminum prices reached a high of nearly $3,500/metric ton shortly after Russia's invasion of Ukraine; by contrast, aluminum prices in March 2021 were only $2,200/metric ton.[198] Russia accounts for approximately 5 percent of global primary unwrought aluminum production.[199]

Precious metals and non-numismatic coins accounted for the largest decline among U.S. imports of minerals and metals, falling by $10.5 billion (22.0 percent) to $37.1 billion in 2022.[200] Most of this decline in value was accounted for by lesser import volumes combined with lower prices for most types of PGMs, resulting in a $4.6 billion (24.8 percent) drop in imports.[201] The drop in PGM imports reflected sharply rising net outflows from exchange-traded fund (ETF) holdings that overwhelmed improvements in North American demand in the automotive, industrial, jewelry, and investment-items sectors.[202] In

[188] Olson, "Gemstones," January 2023, 1.
[189] DataWeb/Census, digest MM020, accessed December 21, 2022.
[190] IDI, "About the Israeli Diamond Industry" (accessed February 7, 2023).
[191] Beldiamond, "Why is Antwerp the Diamond Capital of the World?" accessed February 7, 2023; Epstein, "About AWDC" (accessed February 7, 2023).
[192] BDB, "About Us" (accessed February 7, 2023); CNT Editorial Staff, "Surat: Where the World's Diamonds Find a Home," August 8, 2022; IDTC, "About Us" (accessed February 7, 2023); SDB, "About Us" (accessed February 7, 2023).
[193] YB Soul, "Top 5 Diamond Exchanges of the World" (accessed February 7, 2023).
[194] GemsBiz, "Know Why Jaipur is So Famous for Gemstones & Beads," December 17, 2022; SBGL Editorial Team, "Gemstone Industry in Jaipur, India," August 4, 2022.
[195] The unwrought aluminum category includes unwrought aluminum products (e.g., semifinished aluminum such as ingots and billets), as well as inputs into the production of unwrought aluminum products such as bauxite, alumina, and aluminum scrap.
[196] DataWeb/Census, digest MM020, accessed December 21, 2022.
[197] Home, "Column: Europe's power crunch sparks aluminum smelter meltdown," January 6, 2022.
[198] World Bank, "Impact of the War in Ukraine on Commodity Markets," April 2022, 1.
[199] Van Veen, "Russia and Aluminum Supply Chains," June 2022, 1–2.
World Bank, "The Impact of the War in Ukraine on Commodity Markets," April 2022.
[200] DataWeb/Census, digest MM020, accessed December 21, 2022.
[201] The leading U.S. PGM import decline was unwrought rhodium, down by $2.4 billion (26.2 percent).
DataWeb/Census, digest MM020, accessed December 21, 2022.
[202] WPIC, "Platinum Quarterly Q4 2022," March 8, 2023, 13–16, 24–25.

addition, U.S. imports were disrupted in 2022 from the world's two leading PGM producers,[203] because South Africa continued experiencing unreliable electric-power supplies and potential labor unrest[204] and by uncertainties over potential sanctions impacts on Russia.[205] Likewise, imports of gold fell by $4.3 billion (30.8 percent)[206] in concert with declining domestic purchases of precious jewelry as consumer expenditures shifted away from luxury goods, driven in part by cessation of government support programs and economic uncertainty.[207] In addition, price pressure on gold from rising U.S. Department of the Treasury yields and a strengthening U.S. dollar contributed to net outflows of gold from ETFs after the first quarter of 2022.[208] Partially offsetting these declines were rising imports of non-numismatic coins, up by $1.1 billion (26.0 percent), because the U.S. Mint sold significantly fewer silver bullion coins[209] and U.S. investors sought more non-legal-tender silver or PGM medallions issued by foreign governments and private mints.[210] Leading import decreases were recorded from precious-metals refining and trading centers in Switzerland (down by $2.9 billion or 61.7 percent) and mining and refining centers in South Africa (by $2.8 billion or 32.2 percent), Germany (by $887 million or 21.8 percent), Canada (by $870 million or 14.0 percent), Mexico (by $857 million or 15.1 percent), and Russia (by $759 million or 29.3 percent).[211] Leading import increases were recorded from Australia (up by $495 million or 34.8 percent), which is a major mine producer of gold and silver[212] and an issuer of non-numismatic coins.[213]

[203] Schulte "Platinum-Group Metals," January 2023, 135.
[204] Auctus, "Platinum Production Falls," November 4, 2022; Bloomberg, "South Africa's Top Miner Fears Blackouts Will Threaten Platinum Supply," January 26, 2023; McKay, "SA Platinum Production to Fall Below Pre-Covid-19 Levels," May 17, 2023.
[205] Raymond, Sterck, and Clifford, "Platinum Essentials," March 2022.
[206] The leading U.S. gold import declines were high-purity (more than 99.95 percent by weight) gold bullion, down by $2.1 billion (43.5 percent); and minted gold bars, by $1.5 billion (59.0 percent). DataWeb/Census, digest MM020, accessed December 21, 2022.
[207] WGC, "Gold Demand Trends Full Year and Q4 2022," January 31, 2023, 6.
[208] WGC, "Gold Demand Trends Full Year and Q4 2022," January 31, 2023, 7–8.
[209] In Fiscal Year (FY) 2022, the U.S. Mint reported significantly lower sales of silver bullion coins, down by 20.1 million troy ounces (55.9 percent) to 15.9 million ounces compared with sales recorded in FY 2021. By contrast, the U.S. Mint sold more gold bullion coins, up by 270,000 troy ounces (18.8 percent) to 1.7 million troy ounces, and more platinum bullion coins, up by 5,000 troy ounces (6.7 percent) to 80,000 troy ounces during this same annual period. U.S. Mint, *2022 Annual Report*, February 2023, 17.
[210] U.S. imports of non-legal-tender precious-metal coins, other than of gold, rose from $44 million in 2021 to $2.2 billion in 2022. USITC DataWeb/Census, digest MM025, accessed December 21, 2022.
[211] For a list of precious-metals refiners and assayers worldwide currently accredited as meeting the fineness and product-quality standards of the LBMA and LPPM see LBMA, "Good Delivery Current List – Gold;" LBMA, "Good Delivery Current List – Silver;" LPPM, "Good Delivery, Platinum List;" and LPPM, "Good Delivery, Palladium List." DataWeb/Census, digest MM020, accessed December 21, 2022.
[212] Sheaffer, "Gold," January 2032, 81; and George, "Silver," January 2023, 161.
[213] The Perth Mint, located in the capital city of the State of Western Australia, issues legal-tender bullion coins and collector coins, along with non-legal-tender collector and personalized medallions. Perth Mint, "Bullion" (accessed February 13, 2023); Perth Mint, "Collector Coins" (accessed February 13, 2023); Perth Mint, "Personalised Medallions" (accessed February 13, 2023).

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