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U.S. Trade Performance and Position in Global Meat, Poultry, and Dairy Exports

Danielle J. Ufer, Samantha Padilla, and Noah Link

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Abstract

The emergence of new animal product suppliers, new and amended trade agreements, changes in consumer preferences, and growth in consumption among developing markets have influenced the global trade performance and position of U.S. agricultural commodities over the past two decades. Exports represent a significant market for U.S. animal agricultural industries and products, with global market volatility and competition directly affecting U.S. producers. The purpose of this study was to determine the position and competitiveness of U.S. meat, poultry, and dairy exports relative to major competitors from 2000 to 2021. The authors conducted an overview analysis of global animal product trade and U.S. competitiveness in aggregate meat and dairy trade, identifying key competitors, markets, trade events, barriers, and agreements. The U.S. market position and export competitiveness of four major animal products—beef, pork, chicken, and select dairy products—were analyzed using trade indices and export shares. Authors also identified influential market and trade events and trade agreements that affected the U.S. position in the four commodity markets. This report contributes to the understanding of how global changes have affected animal commodities.

Keywords: Beef, pork, chicken, dairy, U.S. agricultural exports

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Danielle J. Ufer and Samantha Padilla are research agricultural economists with USDA, Economic Research Service (ERS). Noah Link was part of the Pathways Summer Internship Program with the USDA, ERS.

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A report summary from the Economic Research Service *April 2023*

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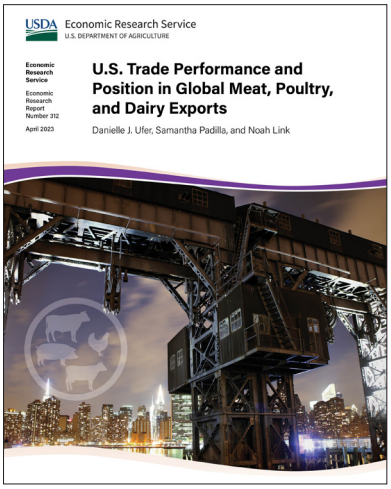
What Is the Issue?



The United States is one of the top global producers and a key exporter of meat and dairy products. However, in recent years, several other competitors have also capitalized on growing demand for these products. A complex global trade environment, characterized by bilateral and multilateral trade agreements, sanitary and phytosanitary trade barriers, trade sanctions, trade disputes, and Coronavirus (COVID-19) pandemic-induced production disruptions, created both opportunities and threats to the competitiveness of the United States and other major exporters in animal products trade.

What Did the Study Find?

The United States remains a top competitor in the trade of animal products, though the global market is shifting to create opportunities and threats to U.S. competitiveness. Total U.S. animal product exports reached over $36 billion in 2021, representing more than 18 percent of U.S. agricultural trade. U.S. competitiveness is strong in East Asian, Southeast Asian, and North American markets, supported by multilateral trade agreements and strong exports despite pandemic disruptions to domestic industries. The United States is a leading global competitor in the four major animal agricultural commodity markets analyzed in this study: beef, pork, chicken, and dairy. However, global competitors continue to pose a challenge to U.S. export performance across the four major animal commodities:

- Beef: The United States leads the world in beef production and since 2006 has been among the top three global beef exporters by value, exporting over $9.4 billion of beef in 2021. Compared with major competitors, including Australia and New Zealand, U.S. beef trade performance is heavily influenced by high domestic consumption. Bovine spongiform encephalopathy (BSE) has historically posed risk, since U.S. access to foreign markets can be lost if BSE is discovered on U.S. operations, as well as opportunity for U.S. beef trade, as sporadic foreign cases limit competitors' market access.
- Pork: The United States is the second largest exporter of pork behind the European Union. East Asian markets (e.g., Japan, China, and South Korea) support strong U.S. pork exports. Non-tariff trade barriers and the threat of African swine fever (ASF) pose risks to strong U.S. pork trade performance, though opportunities may arise for U.S. pork producers as competitors also face the threat of ASF.

- Chicken: U.S. chicken exports have more than doubled since 2000, exceeding $4.4 billion in 2021. U.S. chicken exports and destinations have experienced much volatility since 2000, with trade barriers, trade disputes, and the impacts of highly pathogenic avian influenza (HPAI). Current major markets for U.S. chicken include China, Mexico, and Canada. The top competitor for chicken exports is Brazil.
- Dairy: The United States is a top dairy producer in several major categories, exporting over $4.7 billion in major milk and dairy commodities in 2021. The United States has steadily grown over the last two decades to be a strong net exporter of dairy products, with the European Union and New Zealand as primary competitors supported in part by strong exports of cheese and dry whole milk powder, respectively. U.S. competitiveness in dairy products is category-dependent, with strong performance in cheese and dry skim milk product exports.

How Was the Study Conducted?

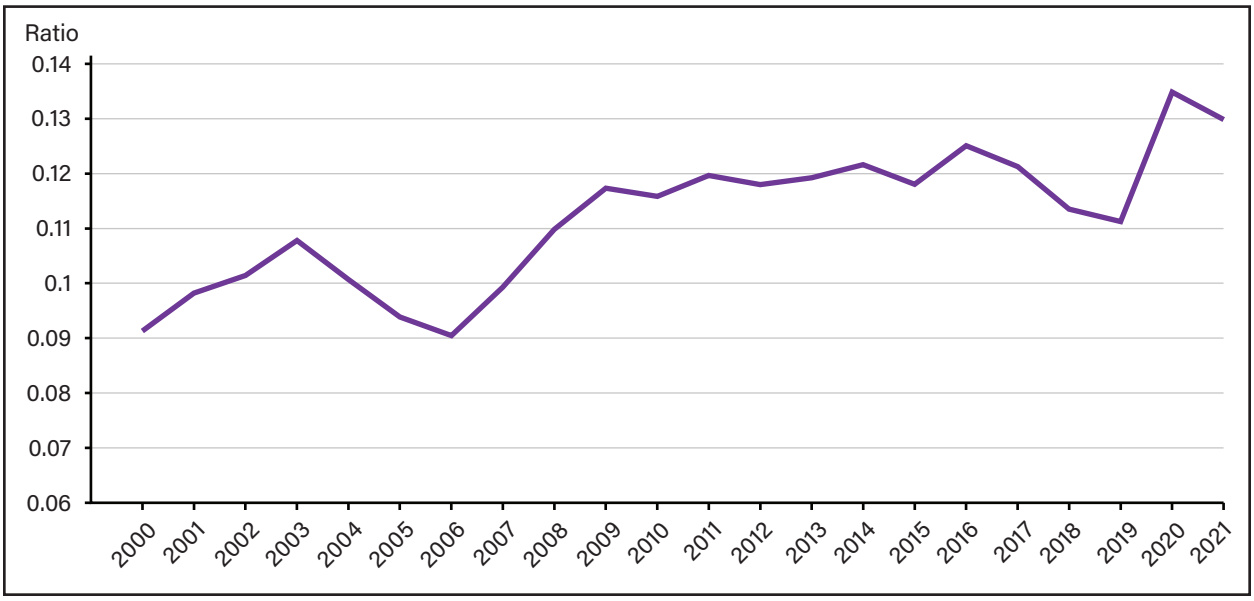
The study drew on two main sources of data to analyze the trade performance of the United States. Authors relied on the USDA, Foreign Agricultural Service's Production, Supply, and Distribution database to calculate exports-to-production indices for four animal commodities. Authors also used the Trade Data Monitor (TDM) interface to calculate export and import market shares to further understand U.S. trade performance.

U.S. Trade Performance and Position in Global Meat, Poultry, and Dairy Exports

Introduction

The United States plays a key role in meeting global demand for several commodities as a major agricultural producer and exporter. As of 2019, the U.S. agricultural sector contributed $1.11 trillion to the U.S. gross domestic product (GDP) with over 20 percent of all farm products exported (USDA, FAS, 2020).[1] From 2000 to 2021, the value of U.S. agricultural and related product exports grew an average of 5.8 percent annually, reaching roughly $191.9 billion in 2021 (GATS, 2022).[2] Agricultural exports increased in prominence in the U.S. trade portfolio over the last 21 years. U.S. agricultural exports comprised nearly 13 percent of U.S. total exports in 2021 (figure 1). Demand for animal-origin agricultural products has particularly grown in recent years as global economies continued to develop, thus increasing consumption of meat and dairy products. Consequently, these products represent an important element of U.S. agricultural exports.

Figure 1
Ratio of U.S. agricultural exports to U.S. total exports, 2000–21



Note: Total U.S. agricultural exports are as defined by USDA, Foreign Agricultural Service's Global Agricultural Trade System (GATS) Bulk, Intermediate & Consumer Oriented (BICO) Harmonized System 10 (HS-10) Agricultural & Related Products aggregation.

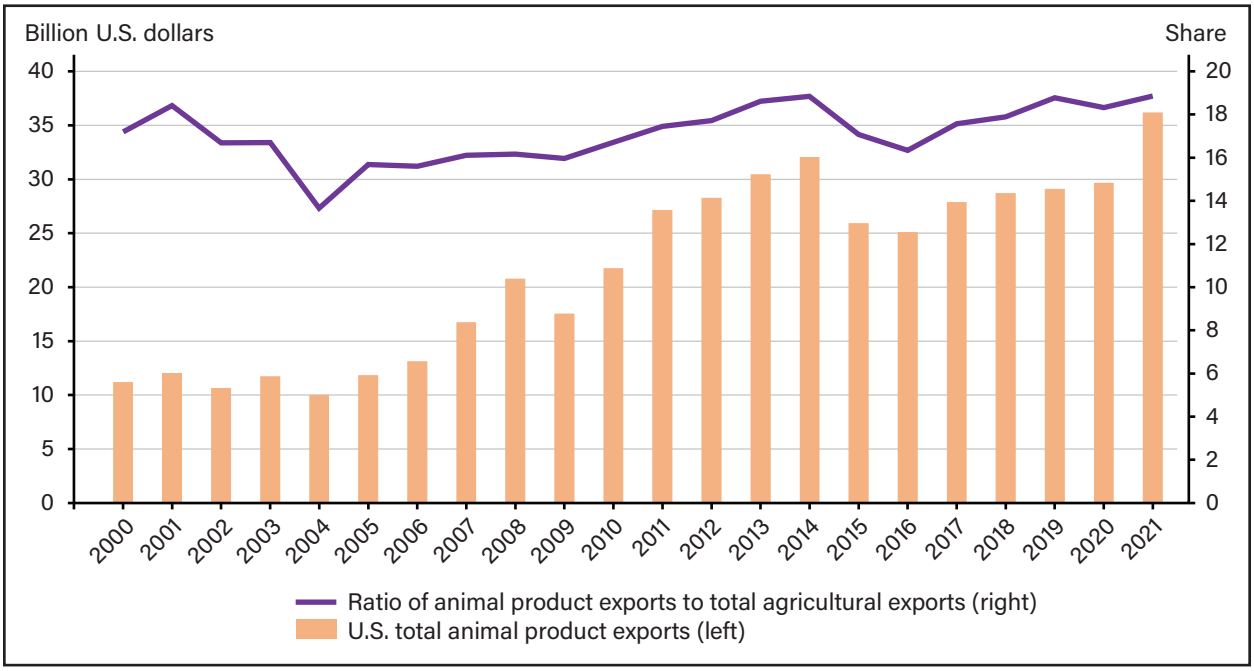
Source: USDA, Economic Research Service using data from Trade Data Monitor (TDM); and USDA, Foreign Agricultural Service, GATS.

[1] All values in this report are nominal values for the years presented unless otherwise noted.

[2] For figures 1 and 2, total U.S. agricultural exports are as defined by USDA, Foreign Agricultural Service, Global Agricultural Trade System (GATS) Agricultural & Related Products aggregation and total animal product exports are defined by the GATS Bulk, Intermediate & Consumer Oriented (BICO) Harmonized System 10 (HS-10) categorizations of Animal Fats, Live Animals, Hides & Skins, Beef & Beef Products, Pork & Pork Products, Poultry Meat & Products, Meat Products NESOI (not elsewhere specified or indicated), Eggs & Products, and Dairy Products.

The bulk of U.S. agricultural exports are nonanimal product commodities. However, total animal product exports as a ratio of total U.S. agricultural exports have remained strong over the past 21 years (figure 2). In 2021, total animal-origin agricultural products comprised more than 18 percent of total U.S. agricultural exports. The value of total U.S. animal product exports has grown substantially since 2000, totaling over $36.1 billion in 2021. Major animal product commodity groups include the dairy commodities of butter, cheese, dry skim milk products, dry whole milk powder, and fluid milk and the major meat commodities of beef, pork, and chicken.[3]

Figure 2
Total U.S. animal product exports by value and ratio of U.S. animal agricultural exports to U.S. total agricultural exports, 2000–21



Note: Total U.S. agricultural exports are as defined by USDA, Foreign Agricultural Service, Global Agricultural Trade System (GATS) Bulk, Intermediate & Consumer Oriented (BICO) Harmonized System 10 (HS-10) Agricultural & Related Products aggregation and total animal product exports are defined by the categories of Animal Fats, Live Animals, Hides & Skins, Beef & Beef Products, Pork & Pork Products, Poultry Meat & Products, Meat Products NESOI (not elsewhere specified or indicated), Eggs & Products, and Dairy Products.

Source: USDA, Economic Research Service using data from USDA, Foreign Agricultural Service, GATS.

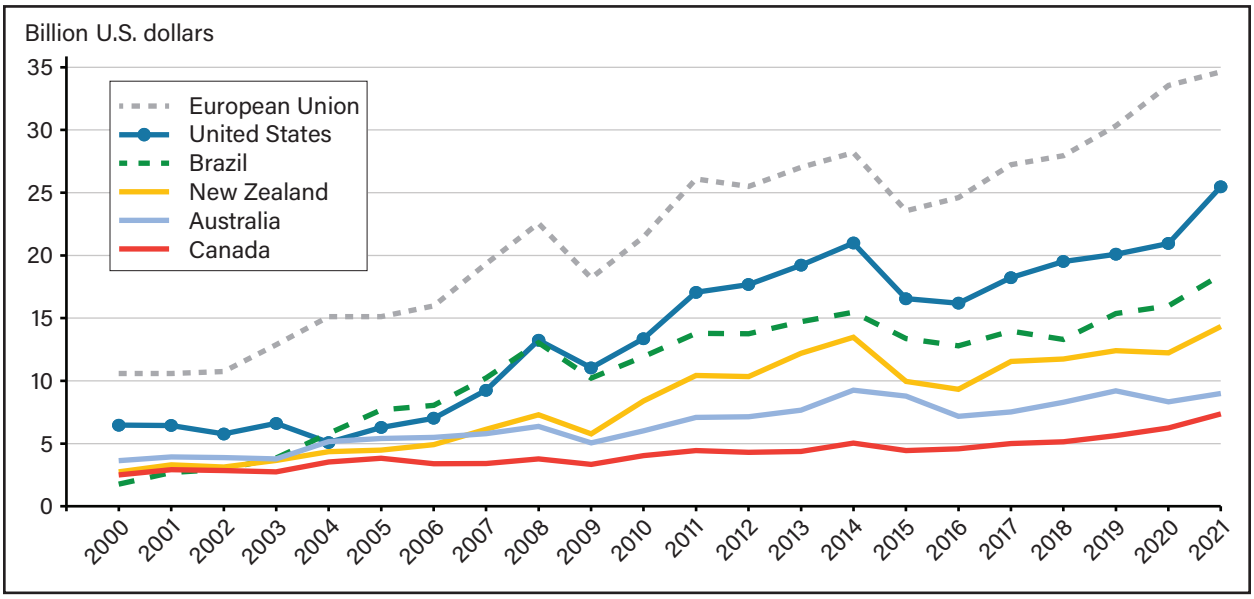
Meat and dairy exports are increasingly substantial contributors to the U.S. agricultural trade position and competitiveness. The emergence of new suppliers, world events, new and amended trade agreements, and the growth of consumption in developing markets have influenced the trade performance of U.S. meat and dairy over the past two decades. This report examines the competitiveness of global trade of U.S. animal agriculture for major animal commodities. These include beef, pork, chicken, and select dairy products—fluid milk, butter, cheese, dry skim milk products, and dry whole milk powder. Authors constructed profiles of U.S. trade performance for each commodity using export data and indices of trade performance and discuss major trade events and world events, competitors, and the position of the United States in the global market from 2000–21. Two trade metrics are used to strengthen the commodity-level analysis.

[3] Harmonized System (HS) Codes for each of these commodity groups are provided in the relevant commodity profiles listed later in the report. Animal product commodity groups are defined using the USDA, Foreign Agricultural Service's Production, Supply and Distribution definitions and HS Codes. While they represent a major commodity globally consumed and traded, lamb and mutton are excluded from this analysis as the United States is not a large producer.

The United States and Global Animal Product Trade

The United States has secured a top global market position as a primary producer and exporter of many animal agricultural commodities. However, competition from emerging markets and economies has increased in the last 21 years. The European Union (EU) has consistently exceeded the United States in the value of major animal agricultural exports (figure 3).[4]

Figure 3
Value of major animal product commodity exports by country, 2000–21



EU = European Union.

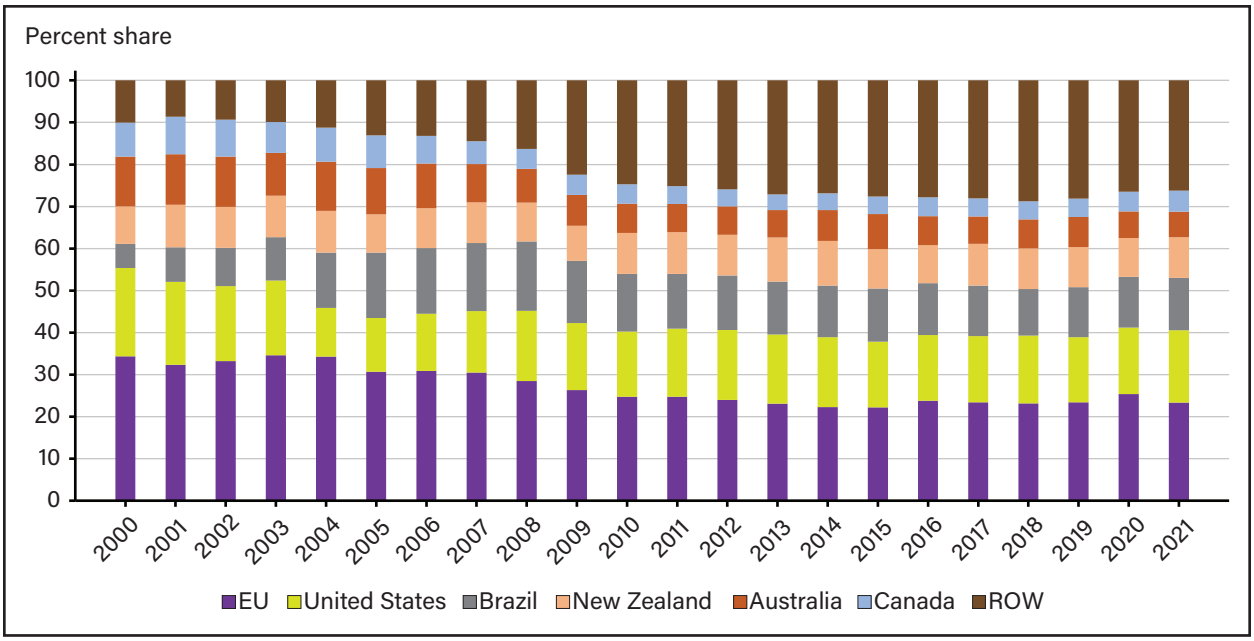
Note: No data are available through the Trade Data Monitor (TDM) interface on EU values for 2000 and 2001 or on New Zealand values before 2007. Data for EU values in 2000 and 2001 were collected from Eurostat and data for New Zealand values from 2000–2006 were collected from Stats NZ. The EU grouping does not include the United Kingdom. Major animal product commodities include USDA, Foreign Agricultural Service's Production, Supply and Distribution (PSD) categories of beef, pork, chicken, and select dairy commodities of butter, cheese, dry skim milk products (nonfat dry milk), dry whole milk powder, and fluid milk.

Source: USDA, Economic Research Service using data from TDM, Eurostat and Stats NZ.

Other competitors, including Brazil, Australia, and New Zealand, have closely followed U.S. export trends in recent years. In 2021, the world export value of beef, pork, chicken, and select dairy commodities totaled $148.1 billion. The EU held the highest share of these animal product markets in 2021, 23.4 percent, compared with the U.S. share of 17.2 percent (figure 4). Countries following the United States in market share included Brazil (12.5 percent), New Zealand (9.7 percent), Australia (6.1 percent), and Canada (5.0 percent). These market shares have remained relatively consistent since 2010, indicating a stable organization of the global animal products export market for these commodities.

[4] All values reported for the European Union refer to external trade only and are exclusive of the United Kingdom.

Figure 4
Percent share of global exports of major animal product commodities by country, 2000–21



EU = European Union; ROW = Rest of world.

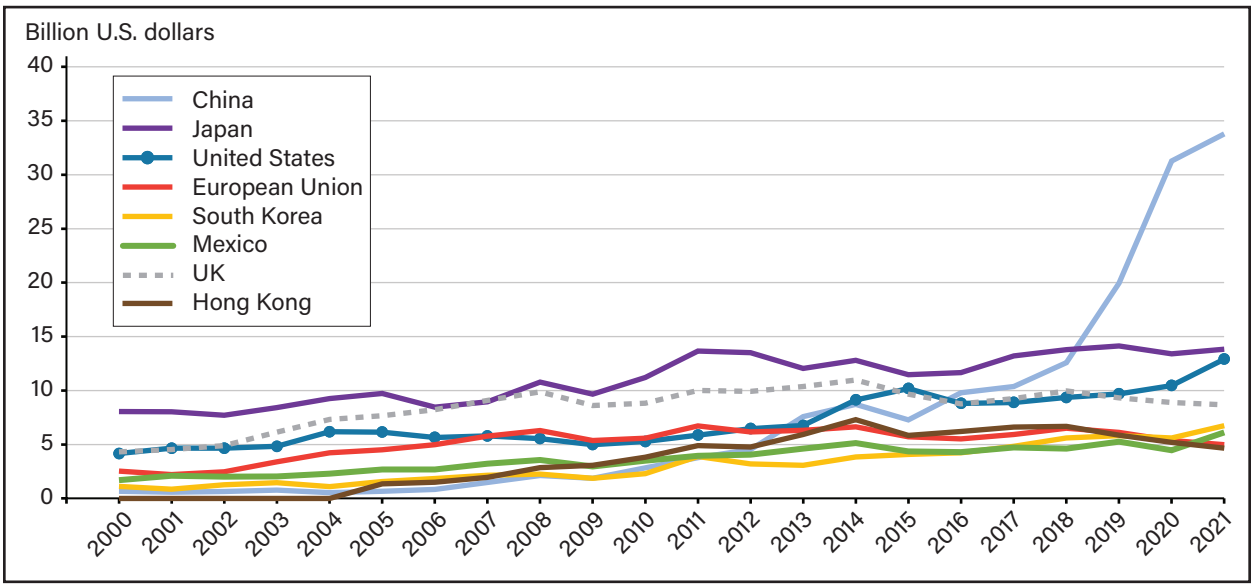
Note: No data are available through the Trade Data Monitor (TDM) interface on EU values for 2000 and 2001 or on New Zealand values before 2007. Data for EU values in 2000 and 2001 were collected from Eurostat and data for New Zealand values from 2000-2006 were collected from Stats NZ. Major animal product commodities include USDA, Foreign Agricultural Service's Production, Supply and Distribution (PSD) categories of beef, pork, chicken, and select dairy commodities of butter, cheese, dry skim milk products (nonfat dry milk), dry whole milk powder, and fluid milk.

Source: USDA, Economic Research Service using data from TDM, Eurostat and Stats NZ.

Current and Growing Markets for Major Animal Commodities

Growth in global animal product exports has been supported by the increasing consumption of animal products in major global import markets. The largest importers of meat and dairy commodities include China, Japan, the United States, the United Kingdom (UK), the EU, South Korea, and Mexico. Strong growth in East Asian markets, particularly China, has represented a substantial opportunity for continued and increasing animal product trade for the United States and other trade partners. In 2021, China imported nearly $33.8 billion in beef, pork, chicken, and select dairy commodities from all trade partners; Japan imported $13.8 billion; and South Korea imported $6.7 billion in these four commodities (figure 5). Total Chinese imports of major animal product commodities saw unprecedented growth—particularly from 2017 to 2021—growing by 225.7 percent over those 5 years. Growth in animal product imports to China were largely driven by African swine fever's decimation of China's hog herd and subsequent demand for other animal proteins.

Figure 5
Total imports of major animal product commodities by country, 2000–21



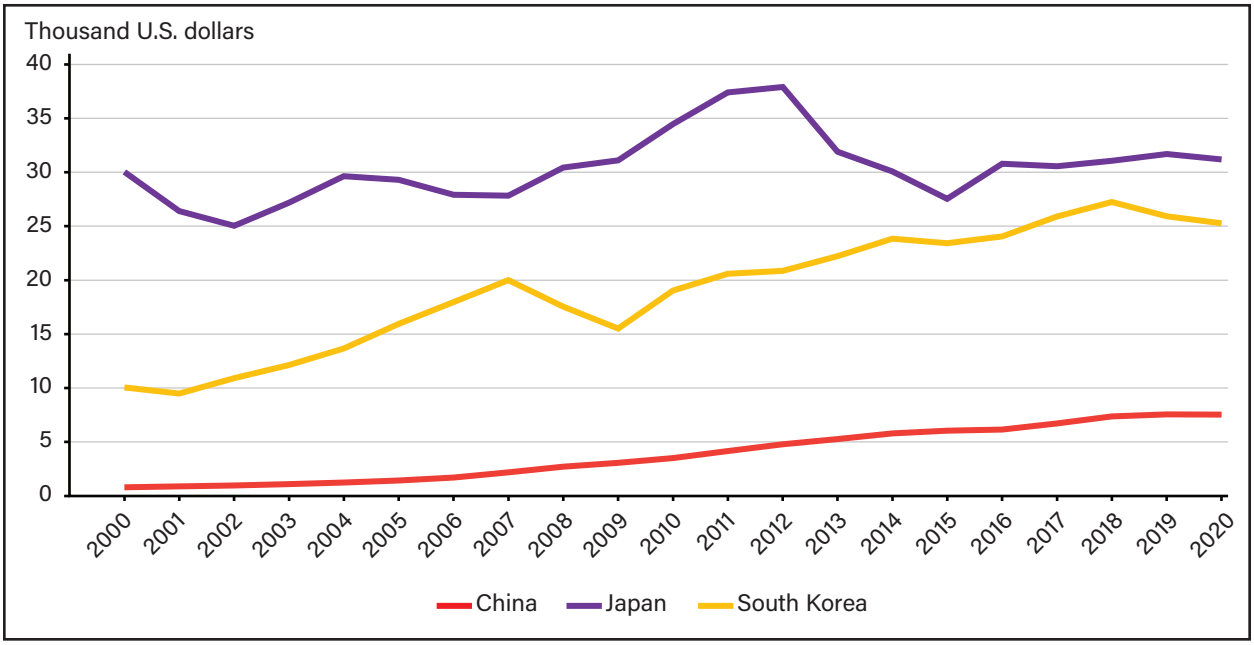
EU = European Union; UK = United Kingdom.

Note: No data are available through the Trade Data Monitor (TDM) interface on EU values for 2000 and 2001 or on UK values before 2009. Data for EU values in 2000 and 2001 and UK values from 2000-09 were collected from Eurostat. The EU grouping does not include the UK. Major animal product commodities include USDA, Foreign Agricultural Service's Production, Supply and Distribution (PSD) categories of beef, pork, chicken and select dairy commodities of butter, cheese, dry skim milk products (nonfat dry milk), dry whole milk powder and fluid milk.

Source: USDA, Economic Research Service using data from TDM and Eurostat.

Increases in meat demand in the East Asian region—particularly China and South Korea—were driven by a variety of factors. Some of the most notable factors included economic growth and increasing incomes, which led to an emerging middle class and subsequent increases in per capita meat consumption. Additionally, already strong demand in Japan's mature market further contributed to total market opportunities in East Asia. China's per capita income growth has been the most consistent of these three markets, with an average real annual growth of 12 percent and total real growth from 2000 to 2020 of 842 percent (figure 6).

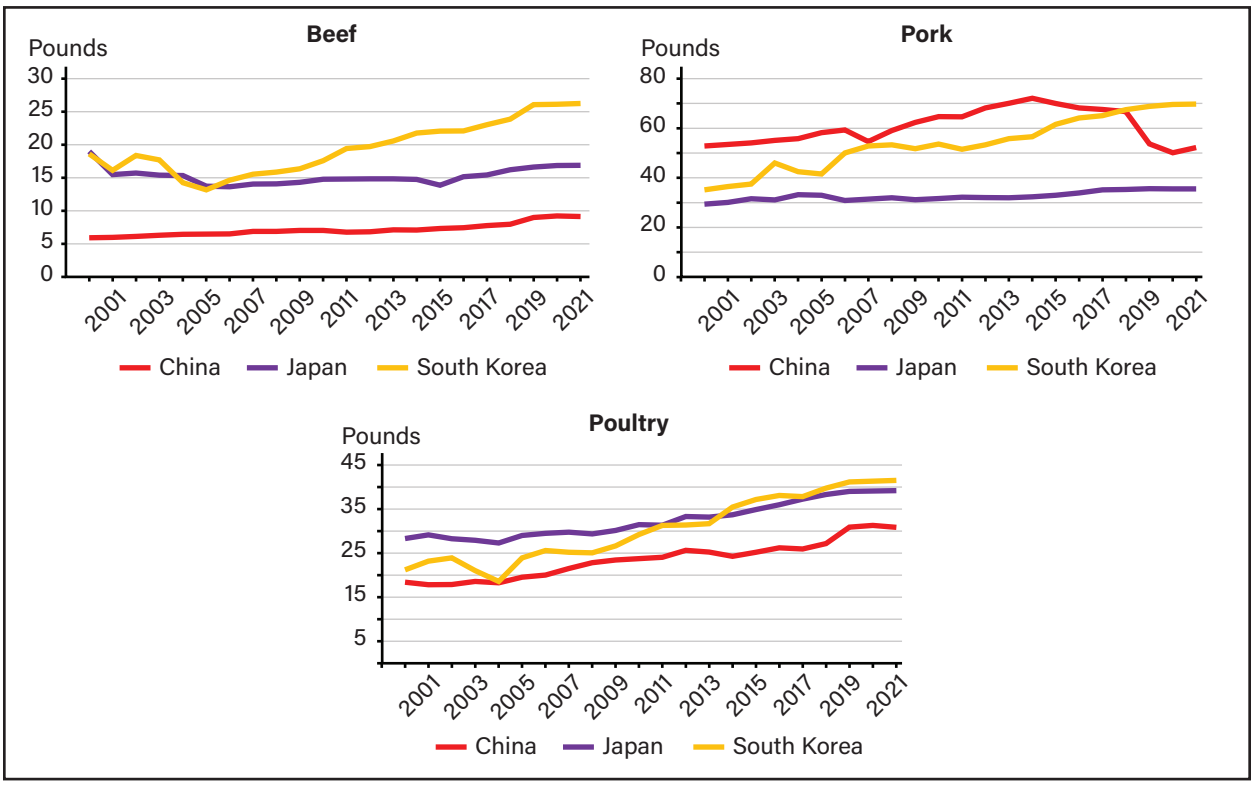
Figure 6
Per capita income (U.S. dollars) in East Asian countries, 2000–20



Source: USDA, Economic Research Service using data from the World Bank, 2022 Adjusted Net National Income Per Capita (current U.S. dollars).

In South Korea, per capita income more than doubled in the last 20 years. Growth in per capita meat consumption, in conjunction with population growth, similarly drove the overall growth in animal product imports in East Asian markets, specifically China and South Korea. In 2000, beef, pork, and poultry consumption in China, South Korea, and Japan ranged from 75 to 78 pounds per capita (figure 7). By 2021, per capita meat consumption reached more than 91 pounds in Japan, 92 pounds in China, and nearly 138 pounds in South Korea. In contrast to South Korea and China, Japan's per capita incomes and total meat consumption remained relatively consistent over the past two decades even as population declined, supporting large total animal product imports but not substantial growth. While overall meat demand in East Asia has grown almost continuously since 2000, per capita consumption has shown how these consumer markets are vulnerable to the impacts of animal disease. From 2003 to 2006, per capita meat consumption in South Korea, particularly beef, decreased coinciding with global bovine spongiform encephalopathy (BSE) outbreaks. More recently, China's per capita pork consumption declined following the 2018 outbreak of African swine fever (ASF) and the subsequent reduction in China's pork production. While China's growth in meat demand has been relatively volatile since 2000, meat demand in South Korea has consistently increased year-over-year since 2005 with annual growth ranging from 0.4 percent to 14.8 percent. However, for China, with an estimated population of 1.4 billion in 2020 (World Bank, 2022), even small increases in demand and per capita meat consumption can result in substantial opportunities for exporters.

Figure 7
Per capita meat consumption (in pounds) for beef, pork, and poultry in major East Asian markets, 2000–21



Source: USDA, Economic Research Service using data from the Organisation for Economic Co-operation and Development and the Food and Agriculture Organization of the United Nations, 2021 Agricultural Outlook.

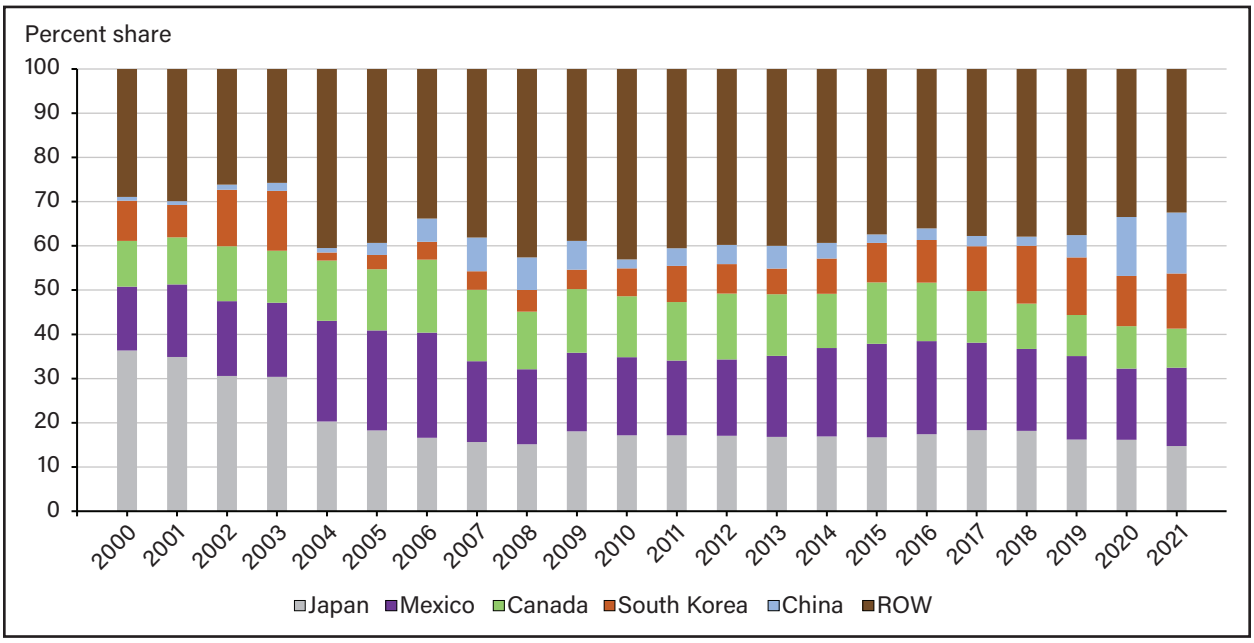
Within global animal agricultural trade, several countries act simultaneously as a major exporter and major importer of meat and dairy products. The total combined imports of major meat and dairy commodities to the United States, UK, and EU reached $26.6 billion in 2021. Unlike some agricultural commodities such as feed grains—which are often relatively consistent across exporters—significant differentiation in quality and preparation methods in different countries partially explains this phenomenon in animal products. For example, U.S. and EU cheese products differ markedly in production traits, including the mix of cheese varieties produced, as do U.S. grain-fed beef products relative to other major producers with grass-fed systems such as New Zealand or Uruguay.

Major U.S. Export Markets

The most substantial markets for major U.S. animal agricultural commodity exports are concentrated in East Asia and North America. Collectively, Japan, China, and South Korea received 41.0 percent of U.S. meat and dairy commodity exports in 2021 (figure 8). In 2021, U.S. animal product trade was supported in those three East Asia markets through bilateral trade agreements. Exports to Canada and Mexico, supported by the North American Free Trade Agreement (NAFTA) first and then the United States-Mexico-Canada Agreement (USMCA)[5] have constituted an average of 31.3 percent of total U.S. exports of major animal product commodities since 2000.

[5] The North American Free Trade Agreement (NAFTA) went into effect in 1994 and established a free trade zone between the United States, Canada, and Mexico. It was subsequently replaced by the United States-Mexico-Canada Agreement (USMCA), which entered into force in July 2020.

Figure 8
Export market shares of major U.S. animal product commodity exports, 2000–21



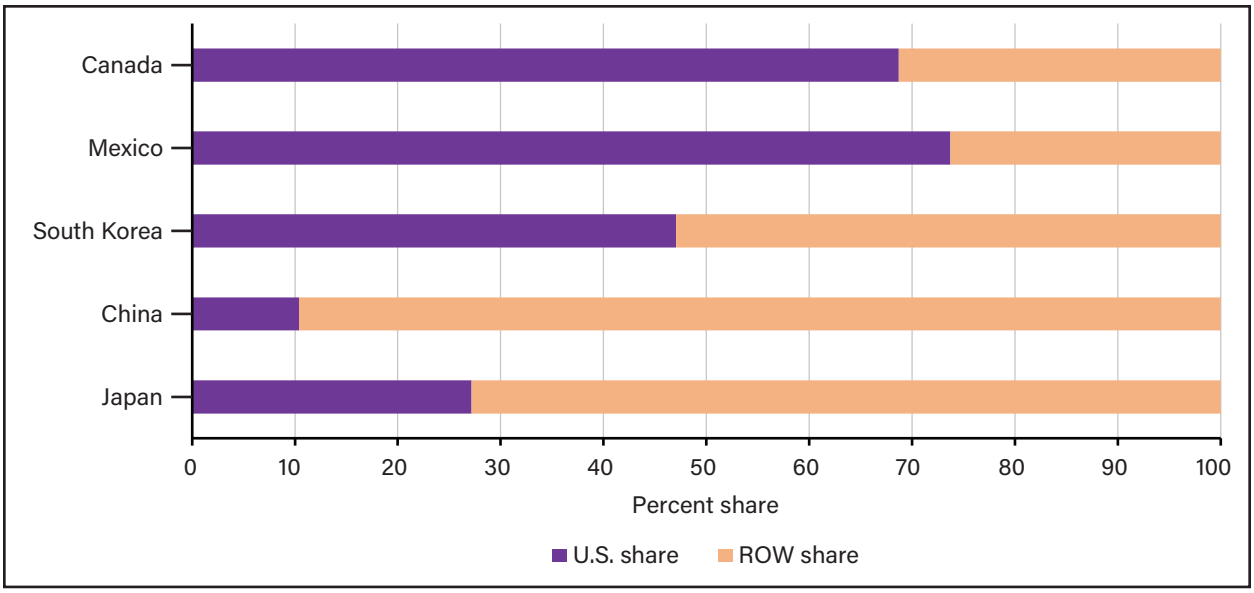
ROW = Rest of world.

Note: Major animal product commodities include USDA, Foreign Agricultural Service's Production, Supply and Distribution (PSD) categories of beef, pork, chicken, and select dairy commodities of butter, cheese, dry skim milk products (nonfat dry milk), dry whole milk powder, and fluid milk.

Source: USDA, Economic Research Service using data from Trade Data Monitor (TDM).

In 2021, Canada, China, Japan, Mexico, and South Korea received more than two-thirds of the total major U.S. meat and dairy commodity exports. In addition to these five countries as primary destinations for U.S. exports, the United States has been a strong competitor in several of these markets. For example, the U.S. market share of major animal product commodities imported by Mexico has exceeded 72.0 percent of total value since 2011. In 2021, the United States provided more than 73.7 percent of Mexican meat and dairy commodity imports (figure 9). The U.S. market share of Canada's animal product imports has been similarly competitive. In 2021, more than 68.7 percent of Canada's imports of major animal product commodities originated in the United States. The U.S. position in East Asian markets also indicated strong competitiveness—particularly in Japan and South Korea—where the U.S. share of animal product imports accounted for 27.2 percent and 47.1 percent, respectively, in 2021. The smallest market share the United States held in a key export market—by aggregated value of beef, pork, chicken, and select dairy commodity exports—was in China. In China, the U.S. market share remained less than 10 percent from 2014 to 2020 and reached 10.4 percent in 2021. Despite this relatively low share, China was the third largest market for U.S. animal commodities, demonstrating the magnitude of China's total market, where even a small market share represents tremendous economic opportunity.

Figure 9
Import value share of major animal product commodities for top U.S. export destinations in 2021



ROW = Rest of world.

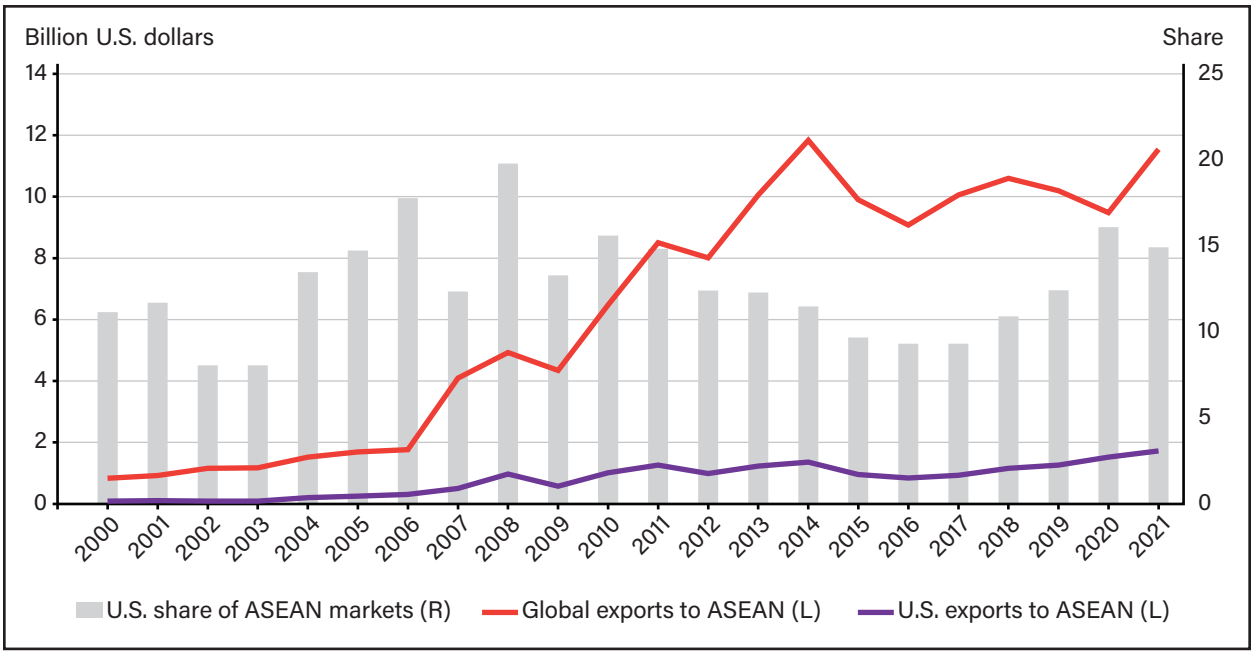
Note: Import value shares are calculated using U.S. exports and total imports, by value, for each country. Major animal product commodities include USDA, Foreign Agricultural Service's Production, Supply and Distribution (PSD) categories of beef, pork, chicken, and select dairy commodities of butter, cheese, dry skim milk products (nonfat dry milk), dry whole milk powder, and fluid milk.

Source: USDA, Economic Research Service using data from Trade Data Monitor (TDM).

Emerging markets present opportunities for increasing exports in animal products trade. One example is the growth of U.S. animal product commodity exports to the Association of Southeast Asian Nations (ASEAN) markets. U.S. meat and select dairy product exports to ASEAN members grew from less than $100 million in 2000 to more than $1.7 billion in 2021 (figure 10). Annual export growth since 2017 has averaged 15.4 percent, though this is from a decade-low value of $846 million in 2016. Increasing exports to Indonesia, Malaysia, the Philippines, and Vietnam drove growth in total U.S. export value of these commodities to the ASEAN region. As with imports to East Asia, disease impacts in domestic industries in ASEAN countries may have contributed to growing imports.[6] For example, U.S. pork exports to Vietnam doubled from the first half of 2020 to the second half in response to ASF-induced domestic supply shortages (USDA, FAS, 2021c). The growth of U.S. exports amid dramatically increasing global exports to the ASEAN region demonstrates a maintained competitive status in these markets. The U.S. market share in ASEAN countries from 2000–21 ranged from 8.1 percent in 2002–03 to 19.8 percent in 2008 and averaged 12.7 percent. Although these individual markets are small relative to the global import leaders, when aggregated they represented opportunities to improve the U.S. trade position in the global arena.

[6] Diseases of recent global importance, including African swine fever (ASF), porcine reproductive and respiratory syndrome (PRRS), and highly pathogenic avian influenza (HPAI) have had reported detection and outbreaks in several ASEAN countries, including Vietnam, the Philippines, and Thailand.

Figure 10
U.S. and global exports of major animal product commodities to Southeast Asian countries, 2000–21



Note: The Association of Southeast Asian Nations (ASEAN) member countries include Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam. Global and U.S. export values to ASEAN countries are derived from total imports reported by each ASEAN member nation with the exception of Vietnam where import data is unavailable; total reported exports to Vietnam are used instead. Major animal product commodities include USDA, Foreign Agricultural Service's Production, Supply and Distribution (PSD) categories of beef, pork, chicken, and select dairy commodities of butter, cheese, dry skim milk products (nonfat dry milk), dry whole milk powder, and fluid milk.

Source: USDA, Economic Research Service using data from Trade Data Monitor (TDM).

Global Trade Events, Regulations, and Agreements Impacting Animal Agricultural Trade

Total exports, growing and emerging markets, and domestic production are all essential elements of trade potential and competitiveness. However, the global trade regulatory environment and trade events also exert an influence. Two major components in particular affected trade competitiveness in animal agricultural commodities. The first is animal diseases and production practices and their attendant sanitary and phytosanitary or substance restriction trade regulations. The second is bilateral and multilateral trade agreements. Additionally, the Coronavirus (COVID-19) pandemic posed challenges to global trade stemming from supply chain disruptions.

Animal Disease, Production Practices, and Sanitary and Phytosanitary Trade Barriers

Animal diseases significantly affecting trade generally have posed a threat to domestic industries, human health, or both. Over the past two decades, major animal diseases with global economic impacts on trade included but were not limited to bovine spongiform encephalopathy (BSE) or "Mad Cow Disease," highly pathogenic avian influenza (HPAI), and—most recently—African swine fever (ASF). Sanitary and phytosanitary (SPS) measures, which are designed to ensure food safety and protect domestic industries and environments from pests and diseases, are often instituted in response to these or similarly threatening diseases. For example, the U.S. HPAI outbreak in 2014–15 resulted in trade restrictions of varying degrees from more

than 50 countries on various poultry products, including broiler meat, eggs, and turkey (Ramos et al., 2017). Restrictions resulted in an estimated 12.2-percent reduction in U.S. broiler exports in 2015 (MacLachlan et al., 2022). The resurgence of HPAI in the United States in 2022 could pose similar threats to U.S. exports. Similarly, the United States lost access to Japan's and South Korea's markets, among many others, following the 2003 discovery of BSE. Before losing access, Japan and South Korea received more than 60 percent of U.S. beef exports, by value, in 2003. The risk of facing SPS barriers in the event of domestic animal disease outbreaks can limit the trade competitiveness of an otherwise strong exporter and have long-term impacts. Even for short-term bans, a market absence can create an opportunity for competitors to capture market share which can be difficult to recapture upon market reentry (Chen et al., 2020).

In addition to animal diseases, SPS measures are leveraged to limit market access for products from specific production systems, improving the competitiveness for countries employing alternative systems. For example, the maximum residue limits on growth-promoting substances like ractopamine and beta-adrenergic agonists in red meat production has limited U.S. access in markets like China and the EU. These substance restrictions have created precarious circumstances for U.S. beef and pork exports to several major markets, including China, Russia, and South Korea (Centner et al., 2014). SPS measures over common substances used in production can threaten the competitiveness of animal product exports and induce competitive advantages for countries that generally eschew the use of such substances. The competitive advantages given by or lost to such measures can often result in controversy and contention regarding their use. This is especially true when international scientific bodies recognize restricted substances as safe, such as when the World Health Organization and Food and Agriculture Organization of the United Nations "Codex Alimentarius" (Food Code) recognized the safety of ractopamine in meat below maximum residue levels (U.S. Trade Representative, 2021a). Controversy over SPS measures can also occur when market access remains restricted even after a country's industry has been declared as low or negligible risk for a disease, as the United States was for BSE by the World Organization for Animal Health for several years before regaining access to some major markets.

Trade Agreements and Disputes

The global trade environment is affected by the framework of bilateral and multilateral trade agreements among major trading partners. These agreements usually confer preferential treatment for partners for various individual or aggregated product groups, a status that entails reduced or eliminated tariffs relative to a country's general tariff schedule. Tariff reductions—especially alongside reductions of non-tariff barriers—can impart a comparative advantage through preferential market access, with reduced tariffs translating to reduced costs to import products. Therefore, tariff reductions can potentially make imported commodities more competitive in an importing market, both among domestic products and exporting competitors' products. The United States had 20 free trade agreements in force in 2022, including the Dominican Republic-Central America Free Trade Agreement (CAFTA-DR), a multilateral agreement with 5 Central American countries and the Dominican Republic; the U.S.-Korea Free Trade Agreement (KORUS); and the United States-Mexico-Canada Agreement (USMCA). Additionally, U.S. trade agreements with Japan (U.S.-Japan Trade Agreement) and China (U.S.-China Phase One Economic and Trade Agreement (Phase One Agreement)), both implemented in 2020, greatly increased marketing opportunities in East Asia's markets for U.S. animal agricultural commodities. The U.S.-Japan Trade Agreement mirrored the provisions of the Comprehensive and Progressive Trans-Pacific Partnership (CP-TPP), a multilateral agreement among 11 nations with Pacific borders, bringing the United States back to a similar standing as those 11 Pacific competitors in Japan's market. The first stage of the U.S.-Japan Trade Agreement eliminated or reduced tariffs on $7.2 billion of U.S. food and agricultural exports with scheduled tariff reductions on $2.9 billion of products

including fresh and frozen beef and pork (USTR, 2019b). More recent negotiations also clarified the parameters of the U.S.-Japan Trade Agreement's safeguard mechanism policy for some U.S. beef products, further increasing the efficiency and reliability of U.S. exporters' market access through the agreement.[7]

Specific provisions of the Phase One Agreement increased U.S. competitiveness in China's market beyond the common provisions of free trade agreements by generating a 2-year commitment from China to import $80 billion of U.S. food, agricultural, and seafood products. While Chinese imports of these products increased significantly following the Phase One Agreement, some of this increase was likely driven by factors unrelated to trade policy including China's swine herd recovery in the wake of ASF and the resulting increased feed demand. Further, agricultural imports fell 18 percent below the targeted commitment for 2020. This shortfall in 2020 complicated the assessment of the Phase One Agreement's impact on U.S. agricultural export competitiveness in China (Muhammad et al., 2021).

Where trade agreements can increase the trade opportunities in specific markets, trade disputes and politically motivated policies (e.g., embargoes) can limit competitiveness. For the United States, some notable examples include the 2014 economic sanctions imposed on Russia in response to the invasion and annexation of Crimea and the trade dispute with China from 2018 until the start of the Phase One Agreement in 2020. Although these actions can often arise as a means of political communication or punishment over non-trade issues, or as an attempt to broker more favorable trade arrangements, they can exert a significant impact on trade competitiveness. For example, the Russian sanctions of 2014 resulted in the total loss of U.S. market access in Russia for U.S. chicken exports, a market worth $306 million in 2013. Retaliatory tariffs levied on the United States by China caused an estimated reduction of $27 billion in total agricultural exports to China, of which nearly $646 million was accrued in annualized pork export losses (Morgan et al., 2022). When applied to competitors, such policies can create opportunities for increasing U.S. competitiveness. In 2021, political tensions between China and Australia led to a trade dispute that restricted Australia's access to China's beef market (Patton and Polansek, 2021). These tensions compounded the U.S. advantage over Australia since Australia's beef processors must individually receive approval for export to China, while provisions of the Phase One Agreement grant China's recognition of USDA, Food Safety Inspection Service's (FSIS) standards. Thus, all FSIS-approved processors can export beef to China. China's restrictions on Australia's beef imports expanded opportunities for U.S. beef exports already established by Australia's previous export difficulties caused by severe drought affecting Australia's beef production in 2018–19. This is just one example of how a trade dispute between trading partners can affect other trading partners.

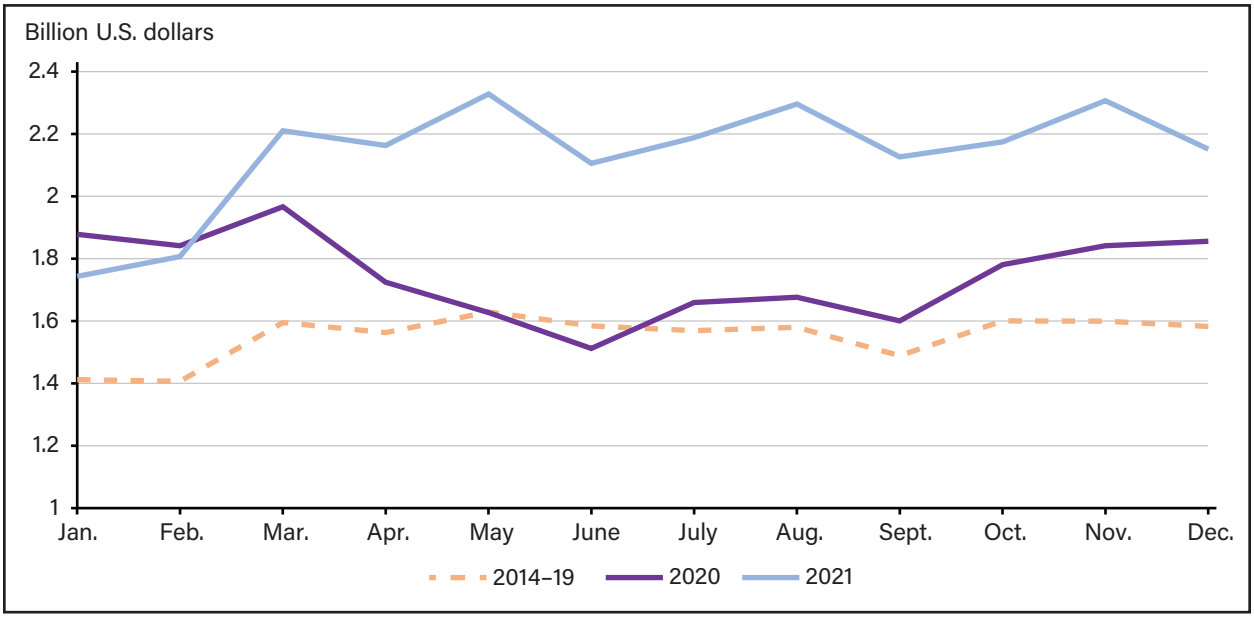
Pandemic-Associated Challenges to Trade Competitiveness

The global trade environment has dictated many opportunities and threats for animal agricultural commodities. However, production-level events and policies can also affect export competitiveness. The COVID-19 pandemic is one example of a significant influence on domestic supply chains that can impact trade competitiveness. The pandemic had unprecedented impacts on the world economy and U.S. agricultural industries. U.S. domestic industries faced several pandemic-related challenges, especially in the earliest days from March to June 2020. The most notable challenges were labor constraints in processing plants and transportation bottlenecks. Spreading COVID-19 infections in workers in the meat processing sector led to reduced slaughter capacity, processing bottlenecks, and slowed production with the U.S. pork-processing sector

[7] Safeguard mechanisms allow trade to operate under an agreed upon set of conditions until a trigger event occurs, at which point an alternative, more restrictive trade structure goes into force. In the case of the U.S.-Japan Trade Agreement beef provisions, the safeguard was originally defined with a quantity trigger of 242,000 metric tons in the first full year of the agreement's enforcement, increasing incrementally for the life of the agreement. Negotiations to increase the trigger level culminated in the agreement to implement a three-trigger mechanism that ties safeguard tariff triggers to U.S. historical beef imports (until 2027) and CP-TPP member beef imports in addition to the quantity trigger defined in the original agreement text (USTR, 2022).

operating at 65 percent of expected capacity at the height of the crisis (Padilla et al., 2021; Vaiknoras et al., 2022). These disruptions, in conjunction with other pandemic shocks to macroeconomic variables, resulted in reduced total agricultural trade in individual markets like Mexico (Zahniser, 2022). Another pandemic-induced challenge for U.S. trade was transportation disruptions, particularly backlogs at ports and trucking constraints. Despite these issues, pandemic shocks to total U.S. animal agricultural exports were largely outweighed by U.S. supply chain resiliency and strong export opportunities in markets such as China (Arita et al., 2022). These opportunities were partly driven by China's effort to rebuild its domestic pork industry following ASF outbreaks. Overall, U.S. monthly exports in major meat and dairy commodities in 2020 and 2021 were consistent with or exceeded the 5-year monthly averages from 2014–19 (figure 11).

Figure 11
U.S. monthly major animal product commodity exports



Note: Major animal product commodities include USDA, Foreign Agricultural Service's Production, Supply and Distribution (PSD) categories of beef, pork, chicken, and select dairy commodities of butter, cheese, dry skim milk products (nonfat dry milk), dry whole milk powder, and fluid milk.

Source: USDA, Economic Research Service using data from Trade Data Monitor (TDM).

Commodity Profiles: Trade Measures and Data Sources

Authors used a trade index and commodity market shares to quantify and evaluate trade competitiveness and market position.[8] These measures consisted primarily of the exports-to-production ratio, or export propensity, and individual export and import market shares as well as global market shares. The exports-to-production ratio is a trade-cum-production index that places trade performance in the context of a country's size and agricultural productivity overall. The exports-to-production ratio displays the degree to which each country produces for export markets (Mikic and Gilbert, 2009). The ratio was calculated with volumes of

[8] Although the Revealed Comparative Advantage (RCA) index (Balassa, 1965) has generally served as the most frequently used index of trade performance, the authors used alternative measures for several reasons outlined in Appendix A.

total production and exports for each commodity using data from the USDA, Foreign Agricultural Service's (FAS) Production, Supply and Distribution (PSD) database.[9] Market shares were calculated as the proportion of a contributing country's exports, by value, to total or global exports.[10] Import market shares for a given country or destination were calculated using the respective country's reported import data, rather than exporting countries' reported exports to the destination market. These shares represented export and import shares and values over time of key countries and were derived using data from the Trade Data Monitor (TDM) database.

Beef

The value of global beef trade remained the highest of all meats traded worldwide, with global exports totaling $49.5 billion in 2021.[11] As with other meat products, global demand for beef has increased in recent years, particularly with the growth of a larger middle class in emerging economies including China (Smith et al., 2018).

The United States has been the global leader in beef production with an average annual production of approximately 11.8 million metric tons over the last decade. With global beef production at 58.2 million metric tons in 2021, U.S. beef represented about 22 percent of total global production. This production share was consistent with U.S. production shares over the last 10 years, which have ranged from 18.8 to 21.9 percent per year. In comparison, other leading beef producers include Brazil, the EU, China, India, Argentina, and Australia, whose production shares ranged from 3.1 percent (Australia) to 15.7 percent (Brazil) in 2021. High feed grain availability and an efficient grain-fed production system and supply chain characterized the United States' position as a global leader in beef production and exports (USDA, ERS, 2021). Primary competitors of the United States in the global beef market have included Argentina, Canada, Brazil, Australia, and the EU. In addition, New Zealand and Uruguay are major contributors to global exports, although these countries generally have traded a differentiated, grass-fed product due to their pasture-based production systems. India has been a major producer and exporter as well; however, India's beef market is different from other major players as India's beef generally has come from culled dairy water buffalo (Landes et al., 2016). This has differentiated Indian beef, or carabeef, as a lower quality product relative to meat from dedicated beef breeds raised in other countries.

Figure 12a depicts the value of beef exports for major exporters. Total exports have trended upward over the past 21 years, reaching $49.5 billion in 2021, with U.S. exports having increased concurrently and exceeding $9.4 billion in 2021. However, Australia's and Brazil's exports also grew over the same period as beef exports from Brazil outpaced U.S. exports from 2004 to 2014 and again in 2019–20. Nevertheless, the United States regained its top-exporter position in 2021. A key driver in the shift from 2004 to 2014 was the impact of the discovery of BSE in the United States, which severely limited international market access, and reduced U.S. exports by more than 80 percent in 2003–04. Although several major export destinations for Brazil's beef differed from key U.S. export markets, Brazil became a competitor with the United States

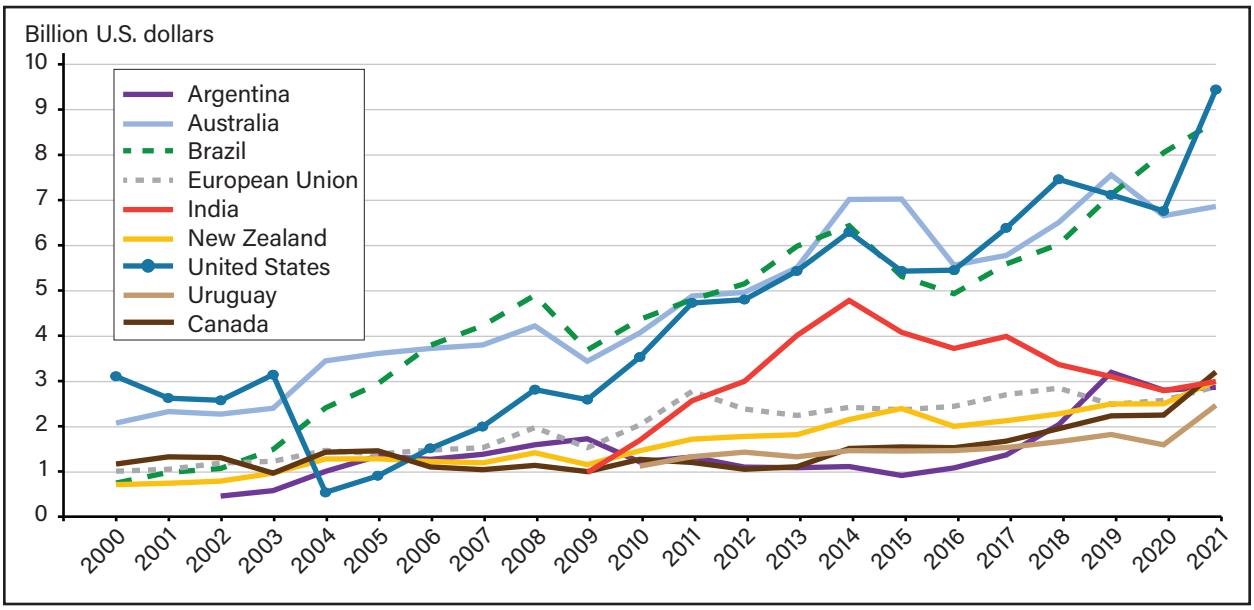
[9] Each commodity is defined in the PSD database using HS codes that can be more limited in scope than other analyses may use for the same commodity categories. For example, PSD dairy categories, apart from fluid milk, only include butter, cheese, dry whole milk powder, and dry skim milk powder, while excluding some potentially large dairy product categories such as infant formula, whey, casein, yogurt, and ice cream. In this report, we limit our analysis to these PSD categories for consistency and because they remain representative of the commodities they cover.

[10] Unless otherwise noted, all shares and values reported are by value in U.S. dollars.

[11] The beef category includes the following HS codes: 020110—carcasses and half-carcasses of bovine animals, fresh or chilled; 020120—meat of bovine animals, cuts with bone in (other than half or whole carcasses), fresh or chilled; 020130—meat of bovine animals, boneless, fresh or chilled; 020210—carcasses and half-carcasses of bovine animals, frozen; 020220—meat of bovine animals, cuts with bone in (other than half or whole carcasses), frozen; 020230—meat of bovine animals, boneless, frozen; 021020—meat of bovine animals, salted, in brine, dried or smoked; and 160250—meat or meal offal of bovine animals, prepared or preserved, NESOI (not elsewhere specified or indicated).

in China's beef market. Despite losing global market share, U.S. beef exports recovered to levels similar to top competitors Brazil and Australia. Major destinations for U.S. beef since 2000 have been Japan, South Korea, Mexico, and Canada. In addition, China rapidly rose as a major U.S. beef export destination in 2021 (figure 12b). Together, these five markets received more than 77 percent of U.S. beef exports. In the top East Asian destination markets for U.S. beef, major competitors and suppliers include several of the top global beef exporters—Canada, Argentina, Australia, New Zealand, Uruguay, and Brazil.

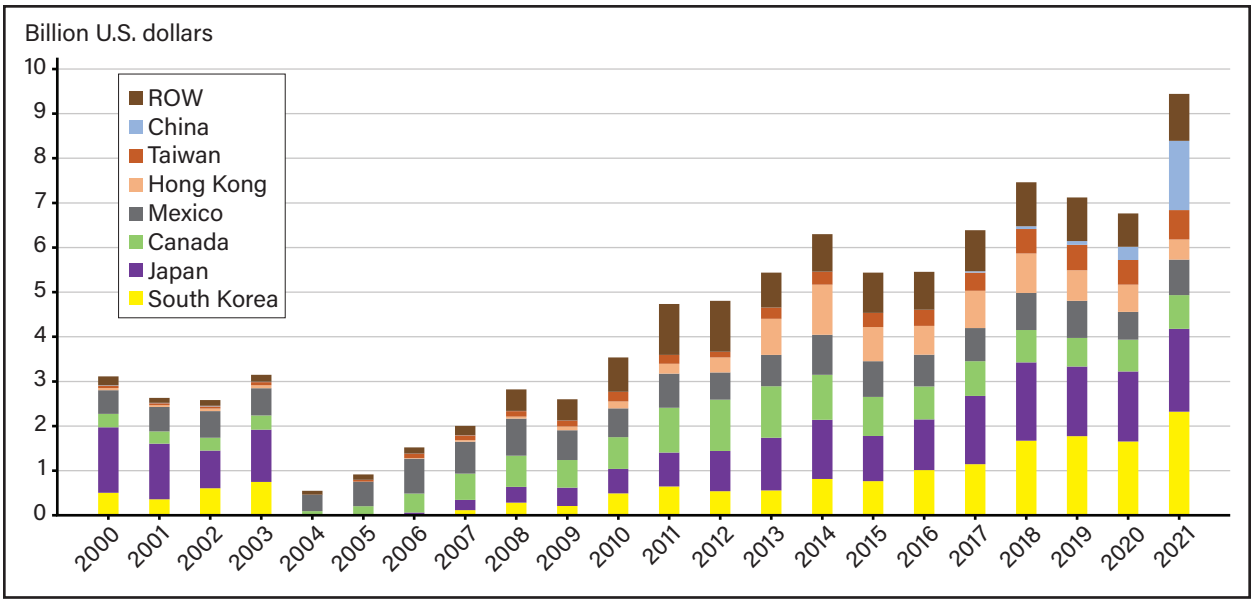
Figure 12a
Beef exports for top global exporters, 2000–21



Note: No data are available through the Trade Data Monitor (TDM) interface on European Union (EU) values for 2000 and 2001, on New Zealand values before 2007, on India values before 2009, on Argentina values before 2002, or on Uruguay values before 2010. Data for EU values in 2000 and 2001 were collected from Eurostat and data for New Zealand values from 2000–2006 were collected from Stats NZ. The EU grouping does not include the United Kingdom. Beef trade is defined using the USDA, Foreign Agricultural Service's Production, Supply and Distribution (PSD) beef category which includes the following Harmonized System codes: 020110, 020120, 020130, 020210, 020220, 020230, 021020, and 160250.

Source: USDA, Economic Research Service using data from Trade Data Monitor (TDM), Eurostat, and Stats NZ.

Figure 12b
U.S. beef exports by destination, 2000–21



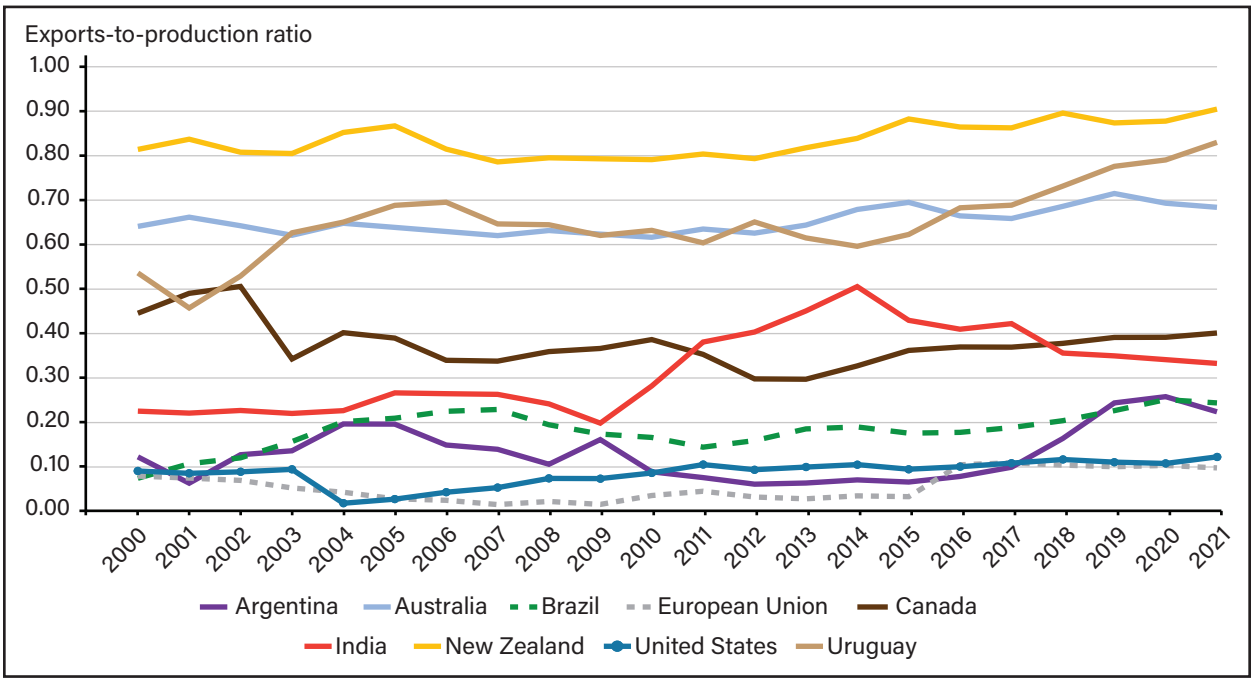
ROW = Rest of world.

Note: No data are available through the Trade Data Monitor (TDM) interface on European Union (EU) values for 2000 and 2001, on New Zealand values before 2007, on India values before 2009, or on Uruguay values before 2010. Data for EU values in 2000 and 2001 were collected from Eurostat and data for New Zealand values from 2000–2006 were collected from Stats NZ. The EU grouping does not include the United Kingdom. Beef trade is defined using the USDA, Foreign Agricultural Service's Production, Supply and Distribution (PSD) beef category which includes the following Harmonized System codes: 020110, 020120, 020130, 020210, 020220, 020230, 021020, and 160250.

Source: USDA, Economic Research Service using data from Trade Data Monitor (TDM), Eurostat, and Stats NZ.

Figure 13 shows the exports-to-production ratio of top beef exporters over time and illustrates how top exporters fall into two main groups: export-oriented producers and domestic consumption-oriented producers. The export-oriented producers include Australia, New Zealand, and Uruguay, all of which have high-export propensity values averaging above 50 percent for the last two decades. These countries export over half of their annual beef production, with New Zealand exporting as much as 90 percent of production in some years.

Figure 13
Exports-to-production ratio of top global beef exporters, 2000–21



Note: Beef trade is defined using the USDA, Foreign Agricultural Service's Production, Supply and Distribution (PSD) beef category which includes the following Harmonized System codes: 020110, 020120, 020130, 020210, 020220, 020230, 021020, and 160250.

Source: USDA, Economic Research Service using USDA, Foreign Agricultural Service, Production, Supply and Distribution database.

In contrast, domestic consumption-oriented producers are the United States, Argentina, Brazil, the EU, and India. Exports-to-production ratios for these countries are below 30 percent on average, indicating more than 70 percent of beef production is destined for domestic markets with exports constituting a secondary market. Both Brazil and the United States have remained top exporters and competitors in the global beef market even though their beef industries are mostly oriented toward domestic markets.

Trade Events and U.S. Relative Competitiveness in the Global Beef Market

U.S. trade competitiveness in the beef market has been influenced by several important trade events and agreements. The effects of BSE on the global beef market were among the most significant events from the last 21 years. First recognized in the UK in 1986, BSE created a food safety crisis for the UK and several of its primary export destinations due to the then-uncertain link to variant Creutzfeldt-Jakob Disease in humans. The BSE crisis resulted in export and trade bans on UK beef throughout the 1990s. USDA announced the first-discovered case of BSE in the United States in December 2003, which led to similar trade restrictions, reinforced by later cases discovered in 2005 and 2006 (Mathews et al., 2016). The United States lost access to multiple markets, including China, Japan, and South Korea—in some cases for over a decade—despite the World Organization for Animal Health (WOAH) recognizing the United States as having negligible risk status for BSE since 2013 (USDA, ERS, 2021). Japan restored limited access in 2005 for beef derived from cattle with tight age restrictions and Japan increased access in 2013 (Mathews et al., 2016). Brazil and China lifted restrictions on U.S. beef imports in 2016 and 2017, respectively (USDA, FAS, 2016; USDA, FAS, 2017).

Despite restoration of market access in recent years, U.S. beef competitiveness experienced an initially slow recovery in many markets in part because U.S. beef had higher prices than competitors which slowed market penetration (USDA, FAS, 2021a). Surges in U.S. beef exports to China, however, represented a more

rapid recovery in 2021. Figure 14 shows the top four beef importers in the world since 2017—excluding the United States—and the U.S. share of each country's market. Although the United States has supplied more than one-third of Japan's imported beef market and half of South Korea's market, the U.S. share of China's import market remained below 3 percent until 2020, then surged to 10.5 percent in 2021. The United States encountered strong competition that developed in major beef import markets during the absence of U.S. beef exports, which was a challenge during market share recovery (USDA, FAS, 2017). Recovering a competitive market position required that U.S. beef exporters navigate often stringent import-eligibility protocols and tariffs and work to develop consumer demand for products of U.S. origin. However, the United States' strong performance in well-established markets, such as South Korea and Japan, demonstrated that U.S. beef exporters could foster and maintain foreign demand for U.S. beef, which encourages prospects for U.S. beef competitiveness in emerging markets.[12]

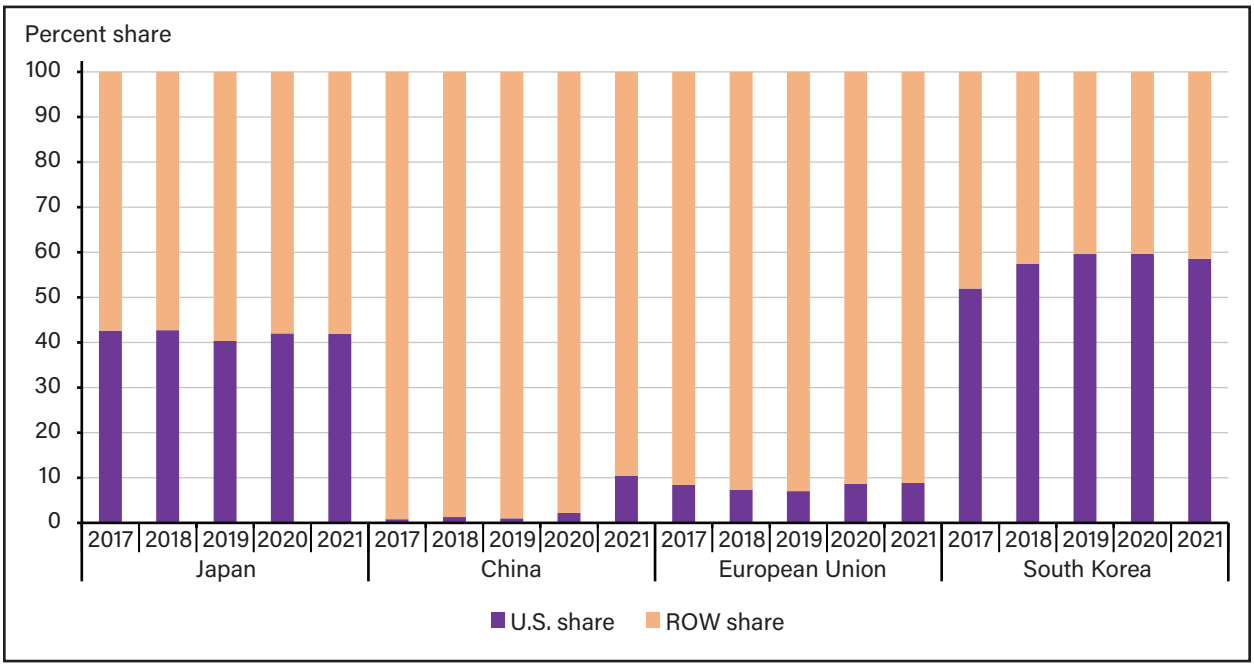
Figure 14 shows another large market where U.S. beef exhibited relatively low competitiveness: the EU. The EU imports over $2 billion in beef each year, yet since 2016, U.S. beef exports to this market have remained below $210 million, representing 8 percent, on average, of the EU market. One barrier to U.S. beef entering the EU has been a 1981 policy, which prohibited using substances with a hormonal action for growth promotion in farm animals. The EU updated and reinforced the rule in 2003, which further limited the acceptable circumstances under which hormonal growth promotants (HPGs) and beta-agonists[13] may be used in livestock production (Johnson, 2015). Though some U.S. beef production meets this standard and is eligible for export to the EU, the majority of the U.S. beef production system relies on HPGs and beta-agonists to increase efficiency, thus disqualifying the products for EU export (Samuelson et al., 2016).[14] Similar restrictions on these substances in other countries, such as China's ban on ractopamine, posed additional risks for U.S. animal product export competitiveness, including beef (Baylor, 2021). However, the Phase One Agreement between the United States and China included a provision for the reconsideration of restrictions for several substances, including ractopamine, which could expand U.S. beef exports to China for beef produced with these growth-promoting substances. Removal of trade barriers to China's market could have a substantial impact on U.S. beef exports. Beckman et al. (2022) found that the full removal of China's trade barriers could result in a 44.8 percent increase in U.S. beef exports to China.

[12] In the specific cases of South Korea and Japan, the additional impacts of shocks to competitor production, such as the impacts of the 2018–19 drought on Australia's beef production and improvements in trade policy, including the progress of tariff reductions from the U.S.-Korea Free Trade Agreement (KORUS) and U.S.-Japan Trade Agreement schedules in advance of competitors' reductions, have helped solidify a strong performance for U.S. beef exports.

[13] Beta-agonists, or beta-adrenergic agonists, are non-hormonal compounds that redirect the metabolism of fat and muscle fibers, resulting in increased carcass weight gain, lean muscle proportion, and feed efficiency (Centner et al., 2014).

[14] In addition to substance restrictions, U.S. beef exports to the EU are limited by tariff rate quotas (TRQs). In 2020, U.S. access under these TRQs was expanded with an incrementally increasing high quality beef (HQB) quota from 18,500 metric tons in 2020 to 35,000 metric tons over the next 7 years, as well as expanded "Hilton quota" provisions for additional U.S. beef and bison exports (USDA, FAS, 2022b). However, these exports remain subject to EU substance restrictions.

Figure 14
U.S. market share for top global beef importers, 2017–21



ROW = Rest of world.

Note: Beef trade is defined using the USDA, Foreign Agricultural Service's Production, Supply and Distribution (PSD) beef category which includes the following Harmonized System codes: 020110, 020120, 020130, 020210, 020220, 020230, 021020, and 160250.

Source: USDA, Economic Research Service using data from Trade Data Monitor (TDM).

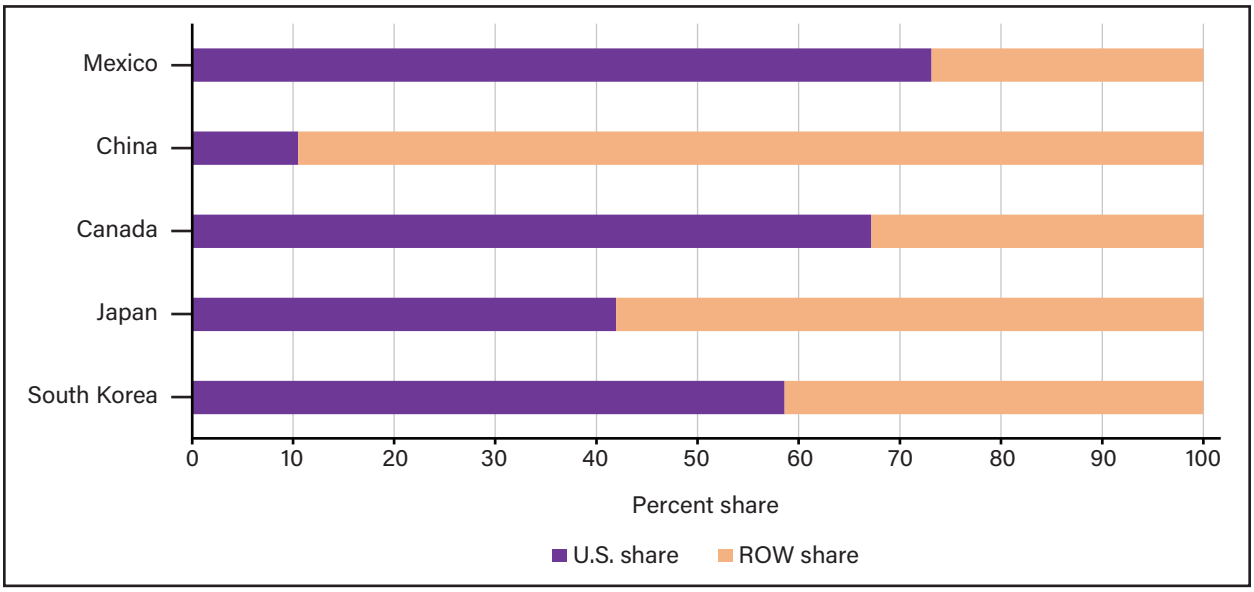
In addition to non-tariff trade barriers that limited U.S. access to some top global markets, trade policy has also restricted opportunities for U.S. beef in global markets, most recently and significantly in China. In response to increased U.S. tariffs on manufactured goods and other products due to Section 232 and Section 301 investigations,[15] China increased tariffs on U.S. beef by 25–30 percent. The increase resulted in tariffs, including MFN duties, on U.S. beef ranging from 42–55 percent in 2018, which limited opportunities for trade (USDA, FAS, 2018; Morgan et al., 2022). Following the Phase One Agreement between the United States and China, China instituted a tariff exclusion process for U.S. beef and beef product exporters for retaliatory tariffs, allowing for exemptions of the Section 301 tariffs. Additionally, the Phase One Agreement required a substantial increase in Chinese imports of U.S. agricultural goods, including beef. Moreover, the Phase One Agreement expanded U.S. beef access by eliminating age restrictions on cattle slaughtered for export and officially recognizing the U.S. traceability system.

Despite variable performance in export destinations for the United States, there has been evidence of very strong U.S. beef export competitiveness and trade performance. Figure 15 presents the share of beef imports in the top five destinations for U.S. beef in 2021. Approximately 67 percent of Canada's beef imports and 73 percent of Mexico's beef imports were from the United States. Close geographic proximity to these markets as well as the North American Free Trade Agreement (NAFTA) and United States-Mexico-Canada Agreement (USMCA) helped create and maintain these market shares. Similarly, declining tariffs in South Korea's market as a provision of the U.S.-Korea Free Trade Agreement (KORUS) reduced barriers to beef

[15] In 2017, under the Trade Expansion Act of 1962, the United States initiated Section 232 investigations into whether the nature and quantity of aluminum and steel imports posed a threat to U.S. national security. In the same year and under the same act, the United States began Section 301 investigations into whether China's policies on intellectual property and technology transfer were unreasonably burdensome or restrictive for U.S. commerce (Morgan et al., 2022).

trade and increased access for U.S. beef products. Full implementation of the provisions outlined in KORUS are scheduled for 2026 when tariffs on beef will reach zero percent and the beef safeguard measures will expire. Furthermore, the scheduled tariff reductions within KORUS for U.S. beef place the United States at an advantage over Australia's and New Zealand's agreements, which could grant the United States greater competitiveness through 2026. Trade policy also affected the status of U.S. beef in Japan's market where the United States supplied more than 40 percent of beef imports in 2021. Although several key competitors, including Australia, Canada, and New Zealand, enjoyed preferential market access under the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CP-TPP), U.S. competitiveness in Japan's market has been maintained through the U.S.-Japan Trade Agreement. Beginning in 2020, the U.S.-Japan Trade Agreement required tariff reductions on U.S. fresh, chilled, and frozen beef from 38.5 to 9 percent over 15 years, which is similar to provisions in CP-TPP. In addition, the U.S.-Japan Trade Agreement has stipulated the elimination of tariffs on U.S. processed beef products in 5 to 15 years (USTR, 2019a).

Figure 15
U.S. share of top U.S. export destinations for beef, 2021



ROW = Rest of world.

Note: Beef trade is defined using the USDA, Foreign Agricultural Service's Production, Supply and Distribution (PSD) beef category, which includes the following Harmonized System codes: 020110, 020120, 020130, 020210, 020220, 020230, 021020, and 160250.

Source: USDA, Economic Research Service using data from Trade Data Monitor (TDM).

Pork

The United States became a net exporter of pork[16] in 1995 and has maintained this status. A large proportion of pork consumption and production occurs in the EU, China, Japan, South Korea, the United States, and Canada. The United States is the third largest pork producer in the world—behind China and the EU. In 2021, the United States produced more than 12.5 million metric tons of pork, which was equivalent to 11.7 percent of total global production. Since 2016, pork exports have comprised 23.2 percent of total U.S. pork production annually, on average, and in 2020, pork exports reached 25.7 percent.

The EU has functioned as a key competitor in the global pork export market. Spain, Germany, the Netherlands, and Denmark have been the EU countries responsible for producing the largest share of pork exports. In 2020, exports from these four EU countries accounted for more than 79 percent of the EU's external pork exports and 76 percent in 2021. Other top pork exporters include Canada, Brazil, and Mexico. In 2021, more than 34 percent of Canada's pork exports were destined for the United States. However, Canada has been a major competitor in China's, Japan's, and South Korea's pork import markets since Canada also holds several advantages in production and trade agreements similar to the U.S. position across these three markets.[17] Historically, China had maintained a sizeable export share. However, in recent years, China's growing domestic demand and the impacts of diseases like ASF and foot and mouth disease (FMD) have significantly limited China's domestic production and export opportunities. Figure 16a depicts the value of pork exports over the last 21 years from major exporters. As with beef, total exports and their value have trended upwards since 2000, reaching over $29 billion globally in 2021. The EU's lead in the export market has been established firmly with exports nearly doubling the United States' in 2021. Nevertheless, U.S. pork exports have trended upward with total exports reaching nearly $7 billion in 2021 (Figure 16b). As with beef, the primary destinations for U.S. pork included China, Japan, Mexico, Canada, and South Korea, accounting for nearly 80 percent of U.S. pork exports in 2021.

[16] The following HS codes are included in the pork category: 020311—carcasses and half-carcasses of swine, fresh or chilled; 020312—meat of swine, hams, shoulders and cuts thereof, with bone in, fresh or chilled; 020319—meat of swine, NESOI (not elsewhere specified or included), fresh or chilled; 020321—carcasses and half-carcasses of swine, frozen; 020322—meat of swine, hams, shoulders, and cuts thereof with bone in, frozen; 020329—meat of swine, NESOI, frozen; 021011—hams, shoulders, and cuts thereof, of swine, bone in, salted, in brine, dried or smoked; 021012—meat of swine, bellies (bacon, etc.) and cuts thereof, salted, in brine, dried or smoked; 021019—meat of swine, NESOI, salted, in brine, dried or smoked; 160241—hams and cuts thereof of swine, prepared or preserved, NESOI; 160242—shoulders and cuts thereof of swine, prepared or preserved, NESOI; and 160249—meat, meat offal or mixtures of swine, prepared or preserved, NESOI.

[17] Canada's pork production benefits from Government agricultural support and geographic advantage on par with the United States' for export to East Asia. In addition, Canada has existing free trade agreements, which include both Japan (under the CP-TPP) and South Korea (Canada-Korea Free Trade Agreement (CKFTA)).

Figure 16a
Pork exports for top exporters, 2000–21

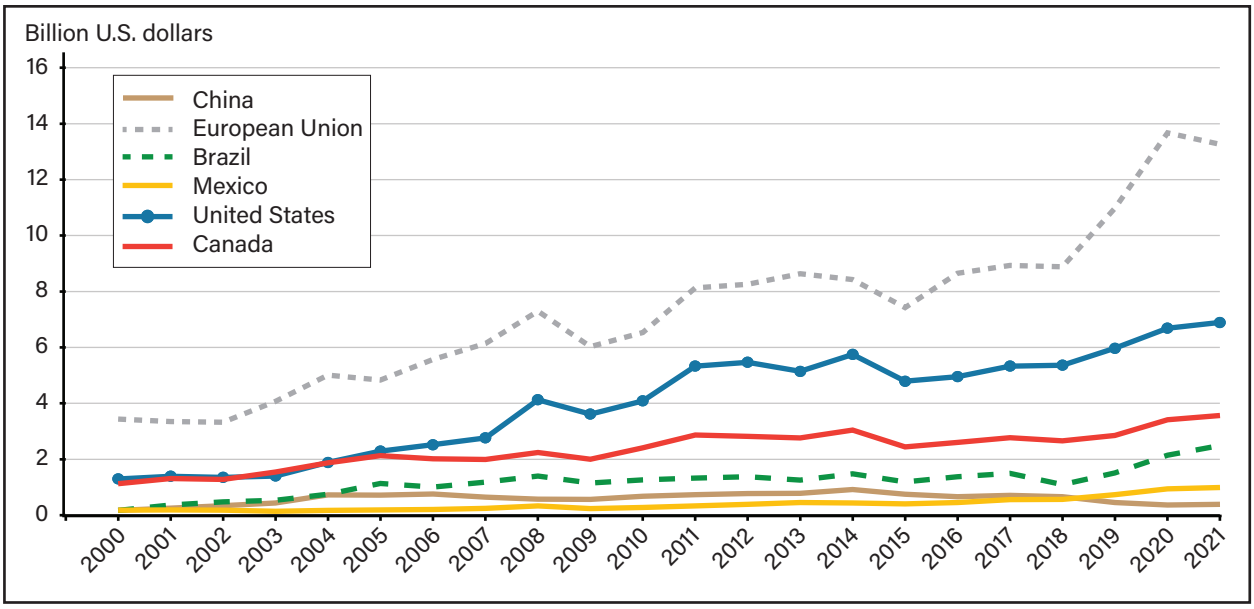
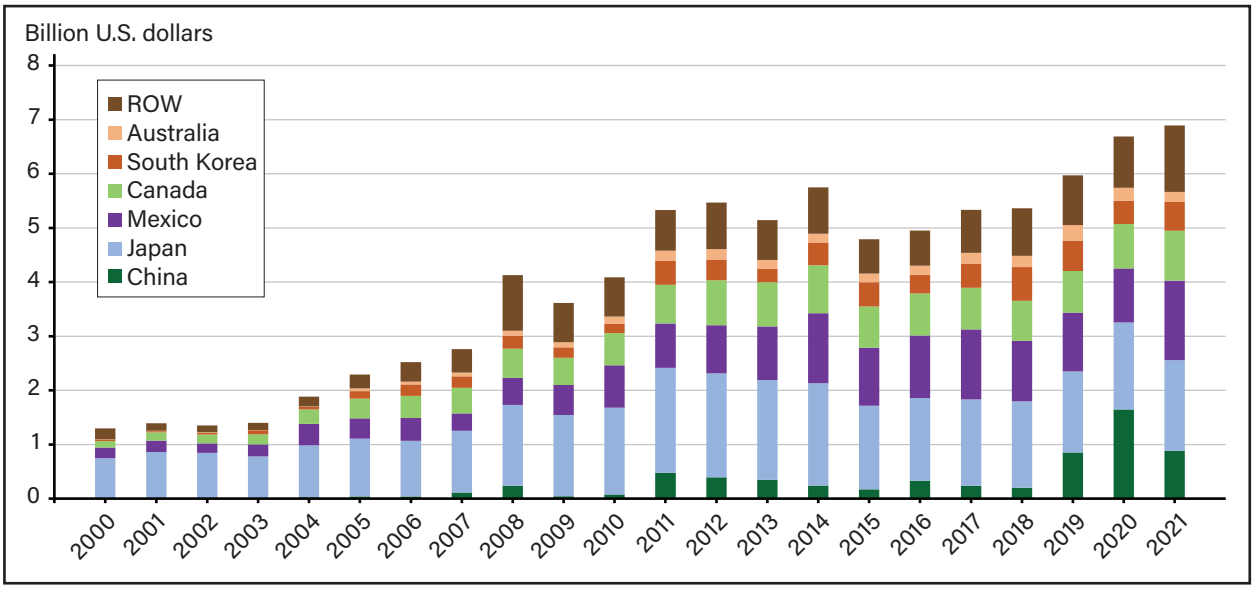


Figure 16b
U.S. pork exports by destination, 2000–21



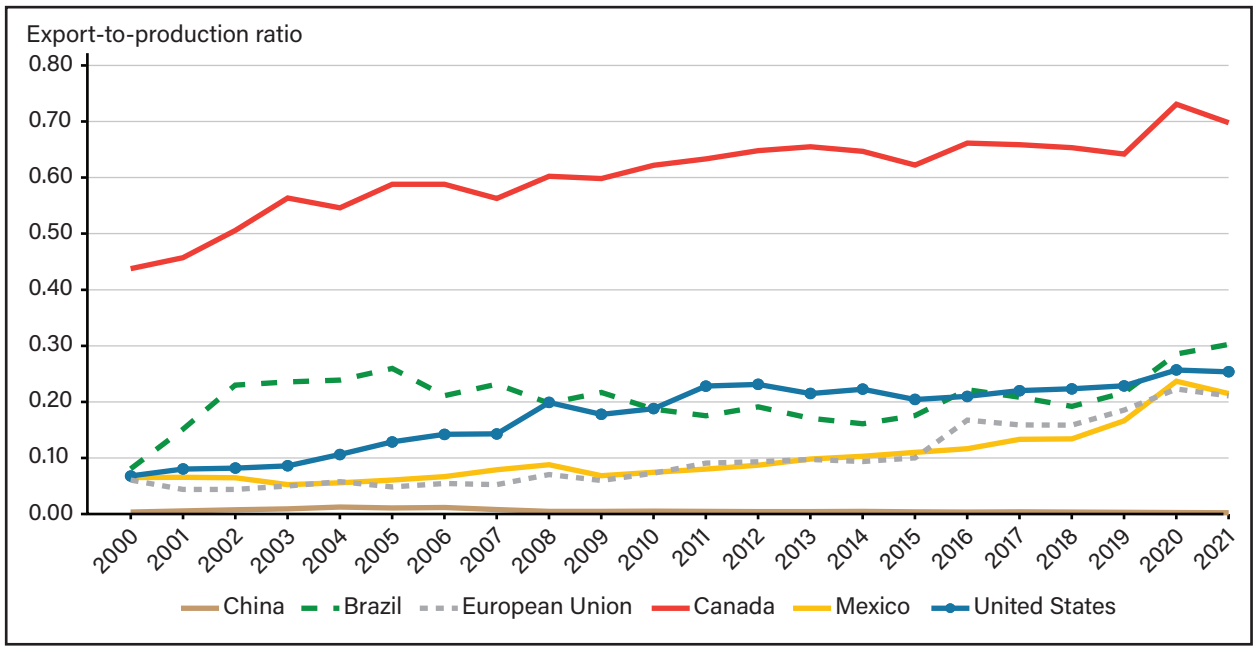
ROW = Rest of world.

Note: No data are available through the Trade Data Monitor (TDM) interface on European Union (EU) values for 2000 and 2001. Data for EU values in 2000 and 2001 were collected from Eurostat. The EU grouping does not include the United Kingdom. Pork trade is defined using the USDA, Foreign Agricultural Service's Production, Supply and Distribution (PSD) pork category, which includes the following Harmonized System codes: 020311, 020312, 020319, 020321, 020322, 020329, 021011, 021012, 021019, 160241, 160242, and 160249.

Source: USDA, Economic Research Service using data from TDM and Eurostat.

Figure 17 presents the exports-to-production ratio for major pork exporters over the past two decades. A pattern emerged among top exporters for relatively low exports-to-production ratios, largely staying below 31 percent across the 21-year period but trending upward in recent years. Despite substantial trade participation, the United States, Brazil, Mexico, and the EU have all consistently consumed approximately 70 percent or more of their domestic pork production, indicating an absence of trade specialization. Conversely, Canada's exports-to-production ratio has been consistently higher, averaging well above 50 percent for the last 21 years and above 60 percent for the last 10 years. Canada's exports-to-production ratio has indicated a greater degree of industry dependence on the global market.

Figure 17
Exports-to-production ratios of top pork exporters, 2000–21



Note: Pork trade is defined using USDA, Foreign Agricultural Service's Production, Supply and Distribution (PSD) pork category which includes the following Harmonized System codes: 020311, 020312, 020319, 020321, 020322, 020329, 021011, 021012, 021019, 160241, 160242, and 160249.

Source: USDA, Economic Research Service using data from USDA, Foreign Agricultural Service Production, Supply and Distribution database.

Trade Environment and U.S. Competitiveness

The global pork trade environment experienced several significant changes in the last 21 years. As with the beef market, animal disease played a critical role in shaping trade, though the pork market was affected differently than the beef market. Changes in China's pork market highlighted the impacts of animal disease on trade. In the early 2000s, China was a net exporter of pork despite exporting less than 1 percent of production per year on average and China's pork imports were nearly negligible. However, in 2006, Chinese pork imports began to grow rapidly, more than tripling from 50,000 metric tons in 2006 to 169,000 metric tons in 2007 and reaching over 2 million metric tons by 2016. China's conversion to a substantial net importer followed a severe outbreak of porcine reproductive and respiratory syndrome (PRRS) in 2006, which drastically reduced China's hog population and led to high domestic prices and increased imports (Gale et al., 2012). Increasing domestic demand and a growing middle class also supported China's trade position shift (USDA, FAS, 2017). In August 2018, ASF was found in China and, with a resurgence in late 2020, it decimated China's swine herd, dramatically increasing dependence on pork imports (USDA, FAS, 2021b; USDA, FAS, 2020).

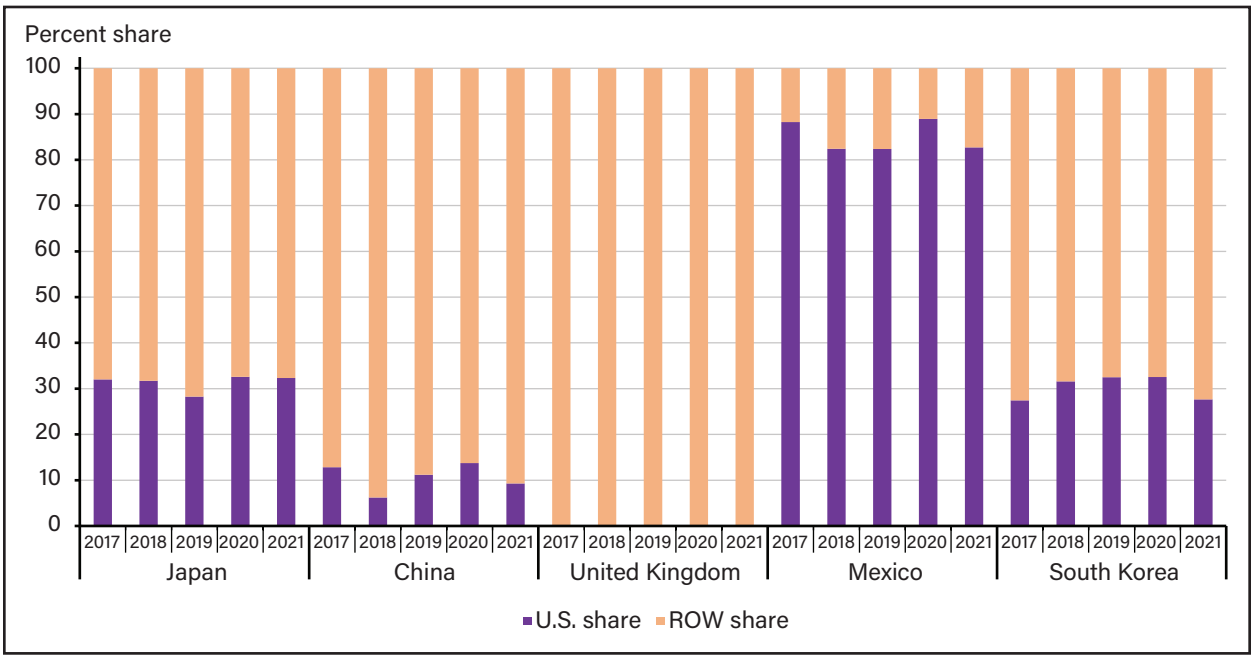
The reduction in China's swine herd decreased domestic consumption from 67 pounds per capita in 2018 to 50 pounds in 2020. China's reduced swine herd prompted unprecedented pork imports globally and from the United States specifically. Although China was already a top pork importer before the 2018 ASF outbreak, pork imports more than doubled in value from $2 billion in 2018 to $4.5 billion in 2019, then more than doubled again to $11.9 billion in 2020. U.S. pork exports to China grew even faster during this time, more than tripling from $129 million in 2018 to $507 million in 2019 and again to more than $1.6 billion in 2020. Unlike BSE, which poses a human health concern, ASF has not been shown to be contagious to humans and primarily presents a threat to domestic industries.

The United States' ASF-free status preserves existing trade relationships, particularly in China's market. However, the pork industry's vulnerability to ASF also represents a risk to U.S. competitiveness. The identification of a case of ASF in the United States would result in rapid loss of access to China's market. For example, the September 2020 discovery of ASF in wild boars in Germany—one of China's top foreign pork sources—and the subsequent discovery in Germany's domestic hogs resulted in China banning pork imports from Germany (Reuters, 2021; Hogan, 2022). The impacts were substantial, reducing Germany's share of China's pork import market from 14.8 percent in 2019 to 10.6 percent in 2020. As the ban continued, Germany's access to China's pork market was effectively eliminated with a market share below 0.1 percent through 2021 and 2022. In addition to PRRS and ASF, global pork production and trade can also be influenced by other transmissible diseases like foot and mouth disease (FMD), porcine epidemic diarrhea (PED), and classical swine fever (CSF). In recent history, these transmissible diseases affected the industries and trade opportunities of major competitors and markets including several EU countries, the United Kingdom, and China (Beltran-Alcrudo et al., 2019).

Production practices can also limit trade opportunities for major importing countries. Figure 18 shows the top global pork importers and the share of their pork imports coming from the United States. For more than a decade, U.S. pork has been nearly absent in the United Kingdom. In part, this was due to the proximity and availability of pork from the EU, which has supplied the bulk of UK pork imports. In the midst of Brexit policy implementation, the UK worked to maintain the animal production and import standards held by the EU, including rules on production practices (USDA, FSIS, 2021). U.S. pork exports to European markets have been limited by restrictive tariff rate quotas (TRQs) and non-tariff SPS barriers. The World Trade Organization (WTO) member quotas for EU pork imports were less than 71,000 metric tons in 2014 and little progress in EU market access has been made since (Arita et al., 2014). Relatively high in-quota tariffs further discouraged trade since EU pork TRQ fill rates were below 20 percent from 2010 to 2012 (Beckman et al., 2021) and below 12 percent in 2013 (Arita et al., 2014). Among the most prominent non-tariff challenges for U.S. pork exports to the European market is a ban on the use of growth-promoting substances.[18] Such substances, particularly ractopamine, were widely used in U.S. pork production in the past. China also implemented a ractopamine ban. In response to ractopamine-based trade barriers, several of the largest U.S. pork processors pledged to eliminate ractopamine use, either in their production or processing facilities, in coming years (Polansek, 2019).

[18] While not a current official trade barrier for U.S. pork, EU animal welfare standards, which include a prohibition on the use of gestation crates or stalls (EU Council Directive 2008/120/EC) represent another potential non-tariff trade barrier for U.S. pork. Ongoing deliberations for increasing EU animal welfare rules under the Green Deal Farm to Fork Strategy proposals, as well as previous inclusion of animal welfare considerations in bilateral trade cooperation with Argentina, New Zealand, Chile, and Brazil indicate a potential for future restrictions on U.S. pork prospects in the European market. A few segments of U.S. pork production are slowly shifting toward EU standards, in part due to multiple U.S. States enacting policies prohibiting crates and stalls in some stages of pork production; however, the majority of operations continue to use practices that are unacceptable in the EU market.

Figure 18
U.S. percent share of top global pork export markets, 2017–21



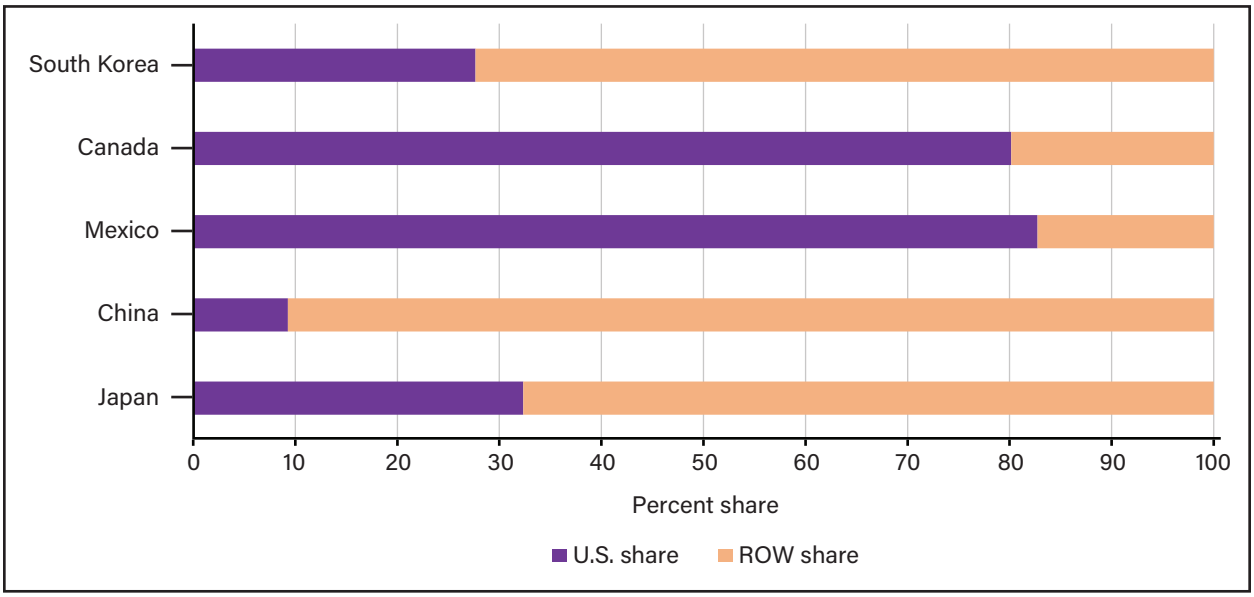
ROW = Rest of world.

Note: Pork trade is defined using USDA, Foreign Agricultural Service's Production, Supply and Distribution (PSD) pork category which includes the following Harmonized System codes: 020311, 020312, 020319, 020321, 020322, 020329, 021011, 021012, 021019, 160241, 160242, and 160249.

Source: USDA, Economic Research Service using data from Trade Data Monitor (TDM).

Although U.S. trade in pork is limited in some markets, U.S. pork exports are thriving elsewhere. Figure 19 presents the market shares for the top U.S. pork export destinations in 2021. While the U.S. import market share in China of 9 percent is lower than the U.S. shares in other major markets, the size of total imports and increased demand for pork made China a substantial export market. Market share was halved in 2018 due to trade disputes with China, though it recovered due to exemptions for Section 301 retaliatory tariffs and, in 2020, exceeded pre-trade war levels. This share could potentially increase in the future because of developments in the Phase One Agreement and the increasing eligibility of U.S. pork due to changing domestic practices.

Figure 19
U.S. percent share of top U.S. pork export destinations, 2021



ROW = Rest of world.

Note: Pork trade is defined using USDA, Foreign Agricultural Service's Production, Supply and Distribution (PSD) pork category, which includes the following Harmonized System codes: 020311, 020312, 020319, 020321, 020322, 020329, 021011, 021012, 021019, 160241, 160242, and 160249.

Source: USDA, Economic Research Service using data from Trade Data Monitor (TDM).

In addition to China, trade agreements have supported the United States' performance in other top export destinations. Through NAFTA and subsequently USMCA, trade barriers to Mexico and Canada were eliminated and, in 2020, the United States supplied more than 80 percent of imported pork, by value, to both Mexico and Canada. With Mexico functioning as the second largest global pork importer by volume in 2021 and the largest in 2019, strong market shares in North American markets demonstrated substantial U.S. competitiveness in global pork trade. While U.S. shares by value in South Korea and Japan were lower compared with Mexico and Canada, the United States has remained a strong competitor in these markets. In 2021, the United States supplied approximately one-third of the imported pork in South Korea's and Japan's markets. U.S. competitiveness has been, in part, the result of trade agreements. For example, KORUS provisions removed tariffs on more than 90 percent of U.S. pork by 2016. However, other competitors also benefited from trade agreements in South Korea. The EU—the top competitor for South Korea's market share— implemented the South Korea-EU Free Trade Agreement (KOREU) in 2011, which offered similar tariff-reduction benefits.

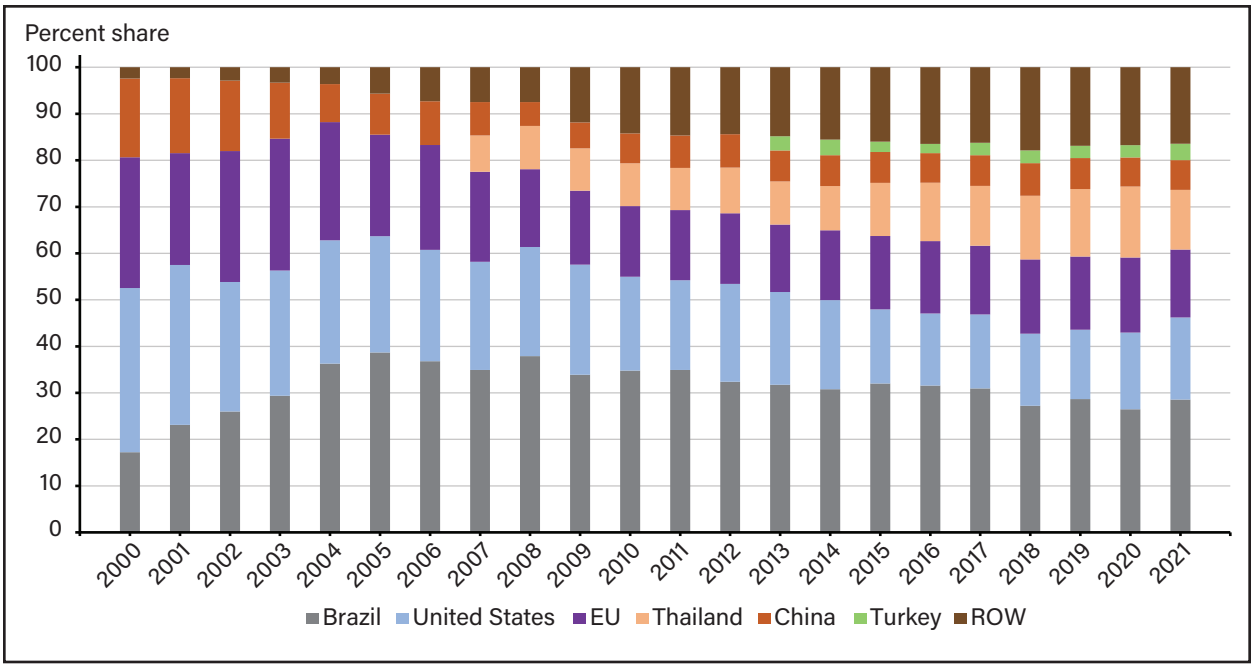
Japan is the largest export market for U.S. pork by value and recent developments in the U.S.-Japan Trade Agreement will support continued strong market opportunities in Japan. As with beef, the U.S.-Japan Trade Agreement placed the United States on equal footing with the member nations of CP-TPP, establishing tariff elimination and reduction schedules on U.S. pork products over a 9-year implementation period. Japan's safeguards on U.S. pork products are scheduled to be phased out by the end of year 10 of the trade agreement (USTR, 2019c). In addition, geographic proximity has provided advantages for U.S. exports to Japan. The United States has been a leading exporter of fresh and chilled pork to Japan's market since U.S. pork exports can reach Japan more quickly than exports from Japan's more geographically distant partners. With a 33-percent market share of Japan's fresh pork imports (USDA, FAS, 2022a), the United States has thus been able to more readily deliver than some key competitors, such as the EU.

Chicken

Over the last two decades, the popularity of chicken meat[19] has increased drastically, surpassing beef as the most popular source of protein in the United States. From 2000 to 2020, per capita consumption of poultry meat increased 53 percent worldwide while beef and pork consumption decreased by 5 percent and 6 percent, respectively (OECD, 2021).

As a result of changing demand and consumption, the value of global chicken exports increased over the last 21 years. In 2021, global chicken exports were valued at $25 billion, a 21-percent increase from 2015 and a 40-percent increase from 2010. The value of U.S. chicken exports increased by 34 percent from 2015 to 2021 (TDM, 2022), but the U.S. share of global exports (in terms of value) decreased compared with the mid-2000s. Two main reasons account for the loss of U.S. market share (figure 20). First, other strong competitors entered the global chicken trade market. For example, Brazil has captured the largest portion of the chicken export market since 2003.

Figure 20
Shares of chicken exports for top exporters, 2000–21



EU = The European Union; ROW = Rest of world.

Note: No data are available through the Trade Data Monitor (TDM) interface on European Union (EU) values for 2000 and 2001, on Thailand values before 2007, or on Turkey values before 2013. Data for EU values in 2000 and 2001 were collected from Eurostat. Chicken trade is defined using the USDA, Foreign Agricultural Service's Production, Supply and Demand (PSD) chicken category which includes the following Harmonized System Codes: 020711, 020712, 020713, 020714, and 160232.

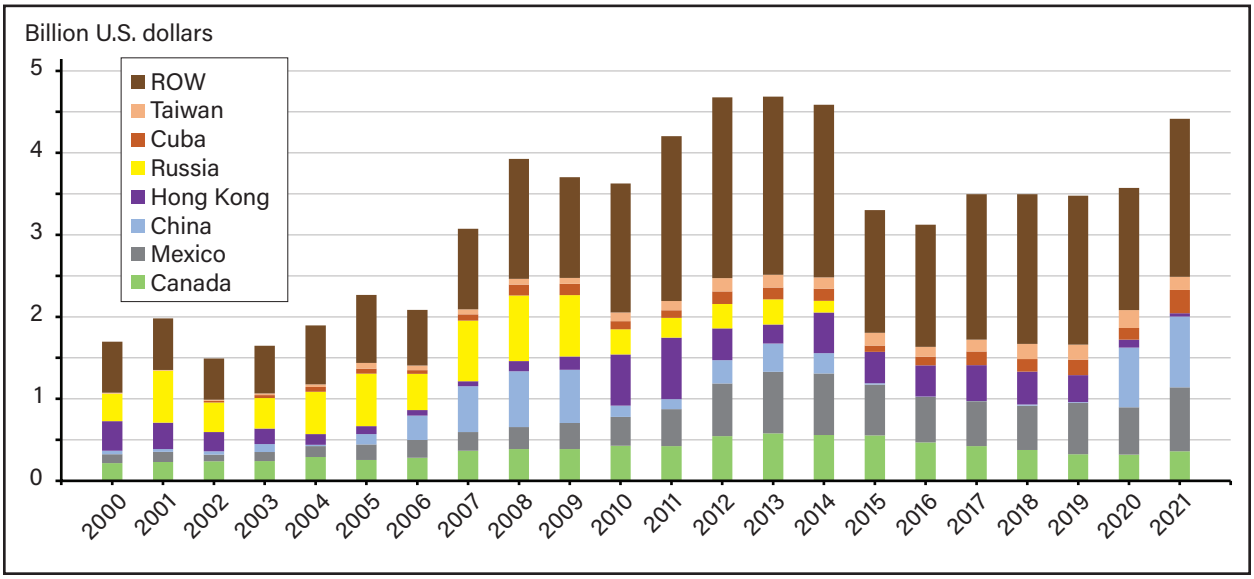
Source: USDA, Economic Research Service using data from Trade Data Monitor (TDM) and Eurostat.

[19] Consistent with the aggregation of the USDA, Foreign Agricultural Service PSD database the following HS codes are included in the chicken category: 020711—meat and edible offal of chickens, not cut in pieces, fresh or chilled; 020712—meat and edible offal of chickens, not cut in pieces, frozen; 020713—chicken cuts and edible offal (including livers) fresh or chilled; 020714—chicken cuts and edible offal (including livers) frozen; and 160232—prepared or preserved chicken meat, meat offal or blood, NESOI.

Brazil's increased global market share has been consistent with Brazil's increased poultry production due to low corn prices and inexpensive labor (Davis et al., 2013). The value of total chicken exports from the EU has remained relatively steady since 2011, following a decade of growth from 2000 to 2010. Smaller producers, such as Thailand, became top exporters, capturing about 13 percent of total export shares in 2021. Another reason for a decreased market share is that U.S. exports to Russia declined in the last two decades, despite surging U.S. chicken exports to smaller markets (Davis et al., 2013). In 2000, Russia imported 20 percent of U.S. chicken exports and 21 years later, U.S. chicken exports to Russia dropped to zero because of Russia's 2014 ban on importing agricultural products from the United States and the EU. In response to economic sanctions imposed by the United States when Russia seized Crimea in 2014, Russia banned many U.S. and EU animal products including chicken from August 2014 to the end of 2021. Additional tensions between the United States and Russia over the 2022 Russian military invasion of Ukraine diminished prospects for resuming U.S. exports to Russia. While Russia has been a small market for U.S. agricultural products—less than 1 percent of U.S. agricultural exports since 2012—the ban had a significant effect on the EU and world prices for banned products, which included meat and dairy products, fruit, vegetables and processed foods in addition to chicken (Liefert et al., 2019).

As shown in Figures 21a and 21b, the top three export destinations for U.S. chicken in 2021 were China, Mexico, and Canada. Together, these markets received more than $2 billion in U.S. chicken exports in 2021, which accounted for more than 45 percent of total U.S. chicken exports. Under the United States-Mexico-Canada Agreement (USMCA), Canada will provide new access for U.S. chicken and egg exports, potentially increasing the share of U.S. chicken destined for Canada. The agreement also maintained zero tariffs on agricultural goods traded between the United States and Mexico. The United States increased its share of chicken exports to Mexico and China. The share of U.S. chicken exported to China grew from 2 percent (by value) in 2000 to 19 percent in 2021. Smaller markets jointly purchased 45 percent of U.S. chicken exports in 2021 with each individually importing 1–4 percent of all U.S. chicken exports (figure 21b).

Figure 21a
U.S. chicken exports by destination, 2000–21

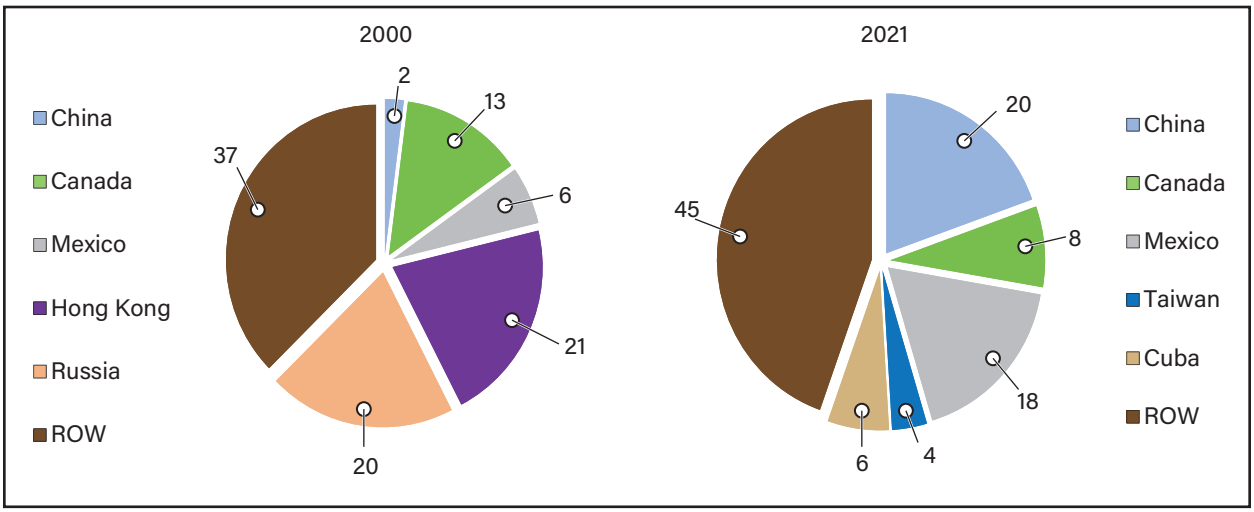


ROW = Rest of world.

Note: Chicken trade is defined using the USDA, Foreign Agricultural Service's Production, Supply and Demand (PSD) chicken category, which includes the following Harmonized System Codes: 020711, 020712, 020713, 020714, and 160232.

Source: USDA, Economic Research Service using data from Trade Data Monitor (TDM).

Figure 21b
Top importers of U.S. chicken exports in 2000 and 2021 (percent)



ROW = Rest of world.

Note: Chicken trade is defined using the USDA, Foreign Agricultural Service's Production, Supply and Demand (PSD) chicken category, which includes the following Harmonized System Codes: 020711, 020712, 020713, 020714, and 160232.

Source: USDA, Economic Research Service using data from Trade Data Monitor (TDM).

U.S. chicken exports grew moderately from 2000 to 2005. From 2007 to 2012, growth accelerated and peaked at $4.67 billion in 2012. Between 2014–15, there was a 28-percent decline in the value of U.S. chicken exports. This decline was due in part to the 2014–15 highly pathogenic avian influenza (HPAI) outbreak, the largest animal health emergency in U.S. history (USDA, APHIS, 2021). While the outbreak primarily affected table-egg laying chickens (or "layers") and turkeys, many countries restricted imports of all U.S. poultry products. Broiler meat[20] accounted for the majority of export losses due to lower volumes to China, South Korea, Cuba, and Mexico, which had restricted imports of U.S. poultry meat during and after the outbreak (Ramos et al., 2017). The effects of the outbreak negatively affected chicken exports even after the outbreak subsided. For example, because of the HPAI outbreak, China imposed a ban on U.S. chicken from 2015 to 2019, in addition to anti-dumping duties on poultry in place since 2010. Since 2015, U.S. chicken exports have remained relatively steady, though the value of chicken exports did not recover to the levels seen during the 2000–10 growth period before the outbreak. While data are not yet available for trade impacts, the 2022 HPAI outbreak may pose similar challenges for U.S. trade opportunities and exports as the 2014–15 outbreak did, as the 2022 outbreak also reduced U.S. poultry production. USDA, Animal and Plant Health Inspection Service (APHIS) reported confirmed HPAI detection in 46.4 million birds from February to September 2022. Other countries such as China, Mexico, and South Korea have limited imports from affected U.S. counties (Slizovskiy, 2022).

In 2018, Canada, China, the EU, India, Mexico, and Turkey implemented retaliatory tariffs on almost all U.S. agricultural exports, including chicken. Canada imposed a 10-percent tariff on U.S. chicken, whereas China's tariffs ranged from 2.5 to 30.0 percent, depending on the chicken product. Grant et al. (2021) found these tariffs did not appear to have a strong effect on the value of chicken exports, though this is attributable to China's negligible imports of U.S. chicken given other existing trade barriers. In 2020, the signing of the Phase One Agreement with China—along with China's subsequent adoption of exemptions on retaliatory tariffs of U.S. chicken products—led to an 8,466-percent increase in the value of U.S. exports to China, relative to 2019 exports of $8.5 million.

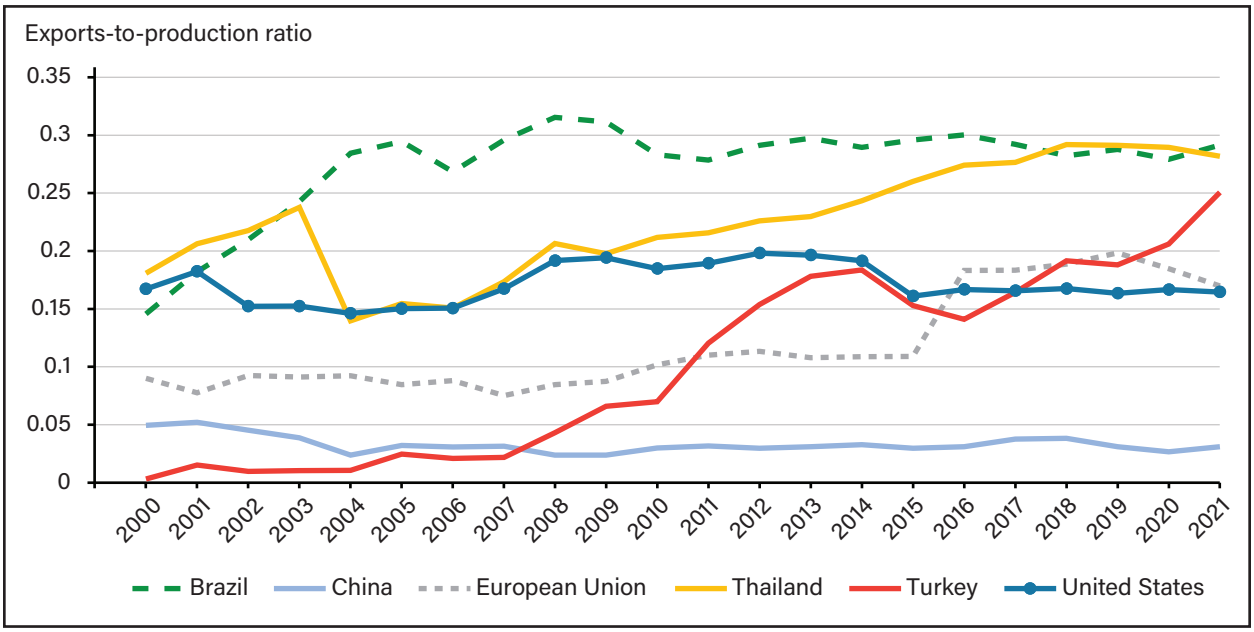
[20] Broiler meat provides virtually all U.S. chicken meat consumed in and exported from the United States.

Relative U.S. Competitiveness in the Global Chicken Trade

The exports-to-production index is used to assess relative U.S. competitiveness in global chicken trade. This index is developed using the total chicken exports of a respective country divided by its total production of chicken products.

Figure 22 shows the exports-to-production ratios for top global chicken producers. Thailand and Turkey have large increases in export propensity over the last two decades. This is a sign that these countries increasingly take their chicken production to the international market. While Brazil's export propensity index grew significantly between 2000 and 2005, this ratio has remained constant in the last decade and higher than other top chicken producers. In 2021, Brazil exported 29 percent of its chicken production, followed by Thailand (28 percent) and Turkey (25 percent).

Figure 22
Exports-to-production ratios for top global chicken producers, 2000–21



Note: Chicken trade is defined using the USDA, Foreign Agricultural Service's Production, Supply and Demand (PSD) chicken category which includes the following Harmonized System Codes: 020711, 020712, 020713, 020714, and 160232.

Source: USDA, Economic Research Service using data from the USDA, Foreign Agricultural Service, Production, Supply and Distribution database.

Export propensity for chicken products in the United States has fluctuated between 15 and 20 percent in the last 21 years, with a 3-percentage point decline in 2014–15 during the HPAI outbreak. Since then, the percent of chicken production exported has been close to 16 percent, less than before the outbreak when an average of 19 percent of production was exported from 2008 to 2014. Although the United States is a top chicken producer, other countries have higher exports-to-production ratios that have increased over time, reflecting the U.S. focus on the domestic market.

Select Dairy Products

As with other animal products, U.S. dairy[21] production ranks among the highest in the world. Total annual U.S. milk production has exceeded 90 million metric tons since 2012 with milk production reaching over 102 million metric tons in 2021. Among the major dairy product categories for export are butter, cheese, dry skim milk products, and dry whole milk powder. In 2021, total U.S. milk and dairy product exports for these categories were worth over $4.7 billion. The United States was the third largest producer of milk in 2020, producing 15.6 percent of global milk supply. In this context, milk refers to unprocessed milk that is later transformed into fluid beverage milk or manufactured dairy products like butter and cheese. In 2021, India was the top global milk producer (30.3 percent) followed by the EU (22.9 percent). India, the EU, and the United States are also the top three butter producers, generating 55.9 percent, 18.9 percent, and 8.4 percent of global butter production, respectively. The United States has held a higher global production share in other key dairy product categories such as cheese (28.4 percent) and dry skim milk products (24.8 percent). The United States ranked ninth in global dry whole milk powder production with less than 2 percent of world supply in 2021.

The EU has been the strongest competitor to the United States in the global dairy market. Other major competitors included New Zealand, Australia, and Belarus. Together, these five exporters account for more than 69 percent of global dairy trade in these categories in 2021. The EU and New Zealand alone accounted for nearly 60 percent. Figure 23a depicts the exports from each of the top dairy exporters. New Zealand has maintained a relatively strong, upward trending export value over time. As relatively smaller exporters, the export values from Belarus and Australia have not changed substantially over the last 13 years (Belarus) to 21 years (Australia). In contrast, exports from the EU and, to a lesser extent, the United States grew over time. Other competitors and global producers of note have been Argentina and India. Although Argentina is not a strong overall dairy exporter, it has had strong exports in specific dairy categories, including cheese and dry whole milk powder. Despite high production, the bulk of Indian dairy product is destined for domestic markets, with India holding an average share of the global export market of less than 1 percent by value since 2009.

Consistent with other animal product commodities, major destinations for U.S. exports of these select dairy commodities have been concentrated in East Asia's and North America's markets (figure 23b). In 2021, more than half of U.S. exports of these dairy commodities went to five destinations. South Korea, Japan, and China received more than 15 percent of U.S. dairy exports in these categories in 2021 while Canada and Mexico together received in excess of 35 percent. Additionally, Southeast Asian countries' share of U.S. exports grew in recent years, with Vietnam, Indonesia, and the Philippines accounting for a combined 16.6 percent of U.S. exports of these commodities in 2021.

[21] Consistent with the aggregation of the USDA, Foreign Agricultural Service's Production, Supply and Distribution database, the following Harmonized System codes are included in the dairy category: 040510—butter; 040590—fats and oils derived from milk, NESOI (not elsewhere specified or included); 0406—cheese and curd; 040221—milk and cream, concentrated, not sweetened, in powder, granules, or other solid forms, of a fat content, by weight, exceeding 1.5 percent; 040229—milk and cream, concentrated, sweetened, in powder, granules, or other solid forms, of a fat content, by weight, exceeding 1.5 percent; 0401—milk and cream, not concentrated nor containing added sweetening; and 040210—milk and cream, concentrated, whether or not sweetened, in powder, granules, or other solid forms, of a fat content, by weight, not exceeding 1.5 percent.

Figure 23a
Dairy export values for top global exporters, 2000–21

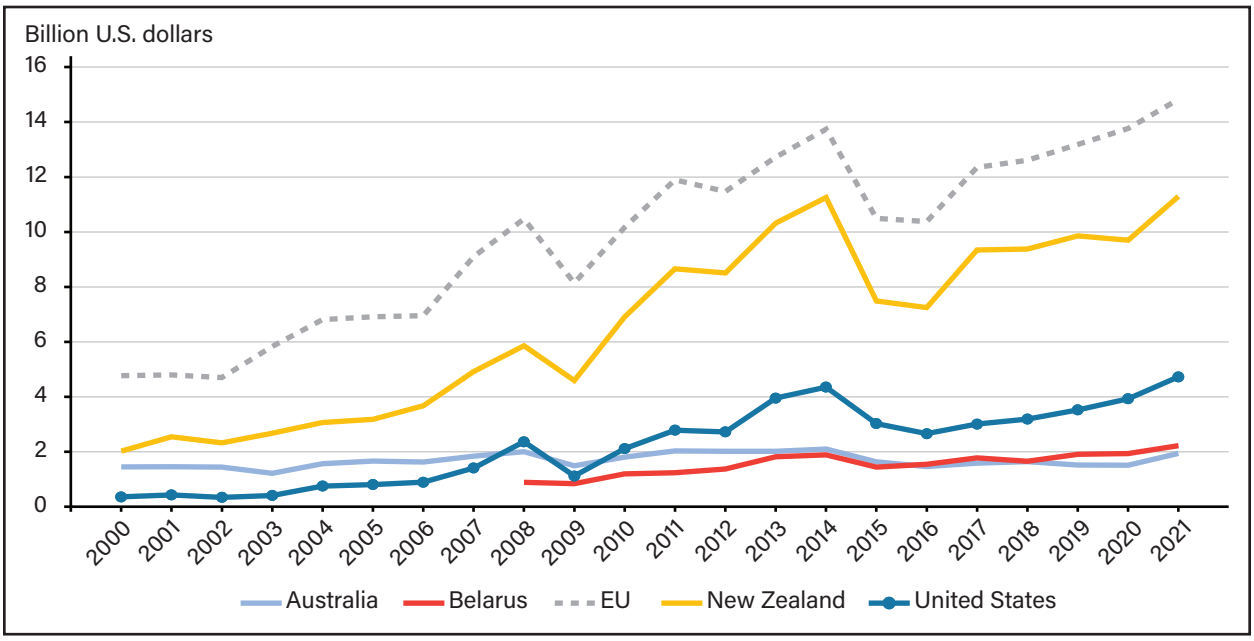
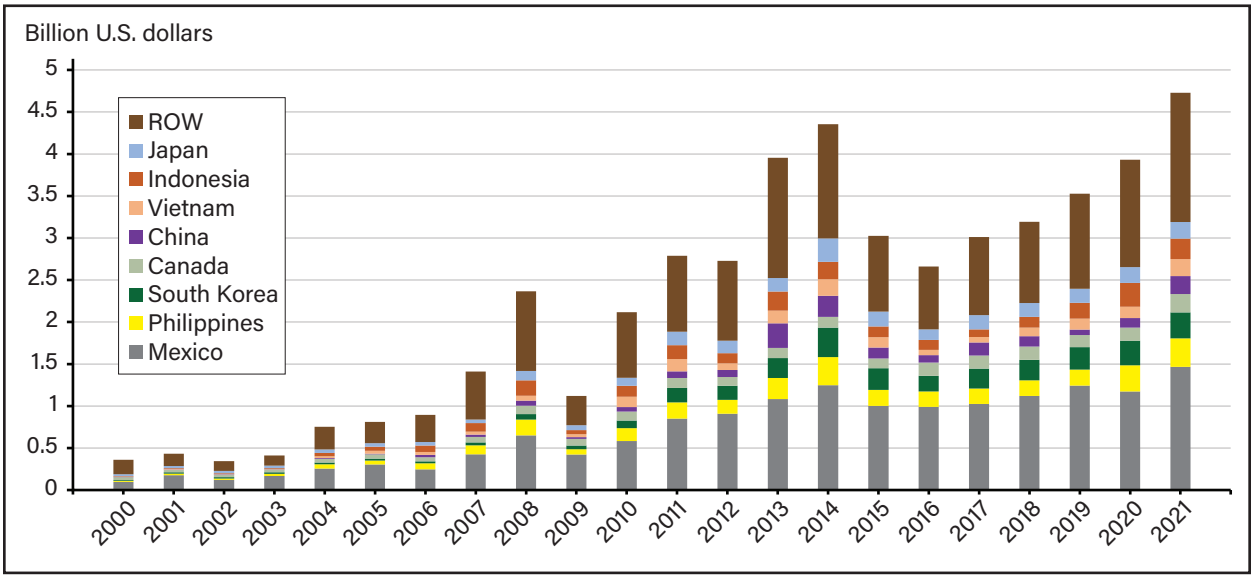


Figure 23b
U.S. select dairy commodity exports by destination, 2000–21



ROW = Rest of World.

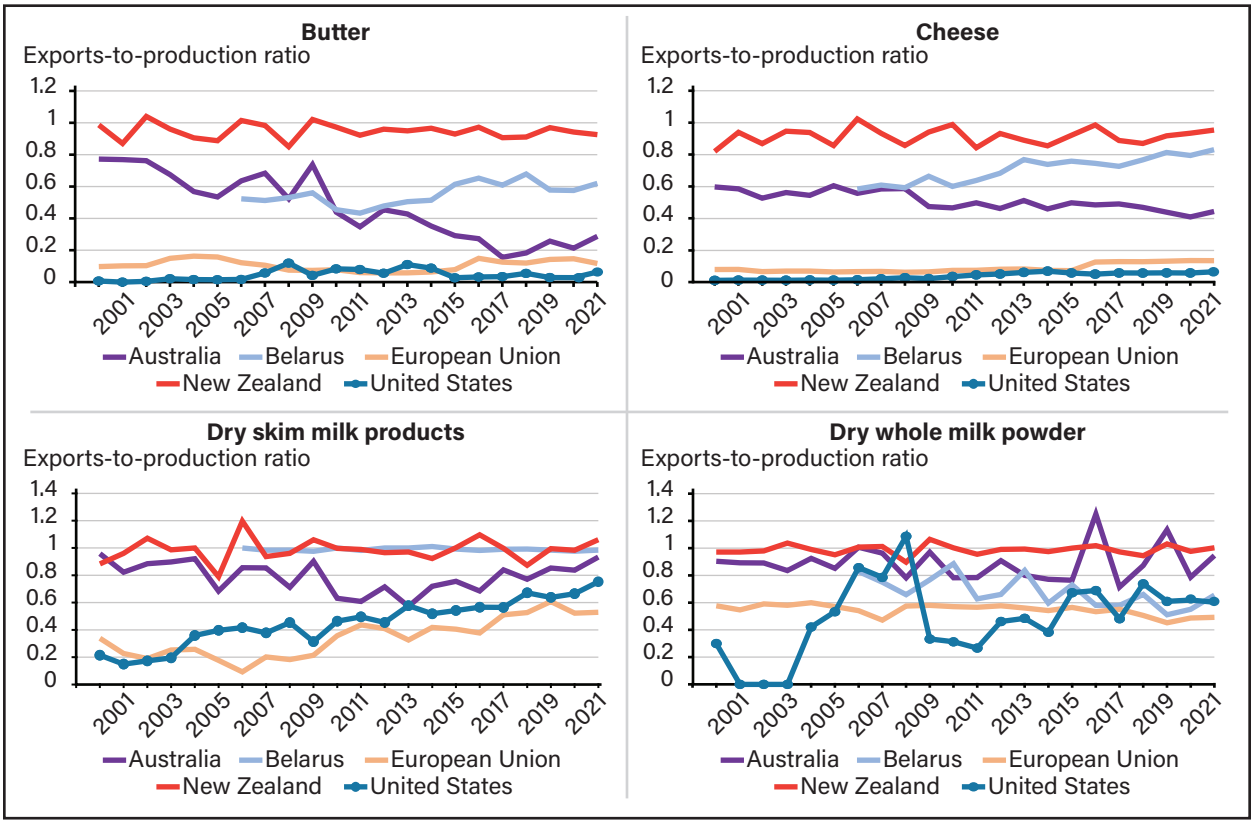
Note: No data are available through the Trade Data Monitor (TDM) interface on European Union (EU) values for 2000 and 2001, on New Zealand values before 2007, or on Belarus values before 2008. Data for EU values in 2000 and 2001 were collected from Eurostat and data for New Zealand values from 2000–2006 were collected from Stats NZ. The EU grouping does not include the United Kingdom. Select dairy commodities include butter, cheese, dry skim milk products, dry whole milk powder, and fluid milk. These dairy products are defined using the USDA, Foreign Agricultural Service's Production, Supply and Distribution (PSD) categories, which include the following Harmonized System codes: 040510 (butter), 040590 (butter), 0406 (cheese), 040221 (dry whole milk powder), 040229 (dry whole milk powder), 0401 (fluid milk), and 040210 (dry skim milk products).

Source: USDA, Economic Research Service using data from Trade Data Monitor (TDM), Eurostat and Stats NZ.

A notable fluctuation in global trade occurred in 2015 and 2016 when the total value of dairy exports declined relative to previous years. A variety of factors contributed to decreased agricultural trade during 2015–16, including several events that led to a localized recession in the energy and agricultural sectors (Irwin, 2018). In particular, U.S. exports also decreased due to weak global dairy demand, especially in China before 2016, and a strong U.S. dollar making U.S. dairy products more expensive and less attractive relative to competitors (Cessna et al., 2016). In addition, many major dairy-exporting countries imposed political and trade sanctions on Russia following the 2014 crisis in Crimea. This led to Russia placing countersanctions on dairy imports from the United States, Australia, the EU, and the UK, among others (Cessna et al., 2016). Although the magnitude of the impacts of Russia's countersanctions on global agricultural trade is uncertain, they have shaped the distribution of exports among top dairy exporters and limited major exporters' access to Russia, one of the largest dairy import markets in the world. As a result, most Belarusian dairy exports enter the Russian market and are not in direct competition with products from the United States, the EU, the UK, or Australia.

Figure 24 illustrates the exports-to-production ratios of top dairy exporters for butter, cheese, dry skim milk products, and dry whole milk powder from 2000–21. Major exporters are sorted into either high-propensity exporters, which include New Zealand, Belarus, and Australia, or low-propensity exporters, which include the United States and the EU. The high-propensity exporters have exported more than half their domestic production of these four dairy categories since 2000—excluding Australian cheese. For New Zealand, nearly all domestic dairy product production is destined for export each year. New Zealand's high exports-to-production ratios distinguished its dairy industry as the most export-oriented in the world. This indicates that New Zealand is also the most vulnerable to the fluctuations of the global market, having the highest relative dependence on global dairy commodity prices and market opportunities. In contrast, both the United States and the EU had lower exports-to-production ratios over the last two decades, particularly for cheese and butter, exporting less than 20 percent of domestic production each year. So, the U.S. dairy industry has been more insulated from global market fluctuations for these two commodities, although the EU, one of its top competitors, has remained in a similar position. Exports-to-production ratios for U.S. dry skim milk products and dry whole milk powder have trended upward since 2000, reaching values in excess of 60 percent in 2021. For the United States, upward trending exports-to-production ratios over the last 21 years indicated a slowly growing export orientation, driven in part by expanding demand in East and Southeast Asia (Cessna et al., 2016; Cessna and Davis, 2020).

Figure 24
Exports-to-production ratio of top dairy exporters for butter, cheese, dry skim milk products, and dry whole milk powder, 2000–21



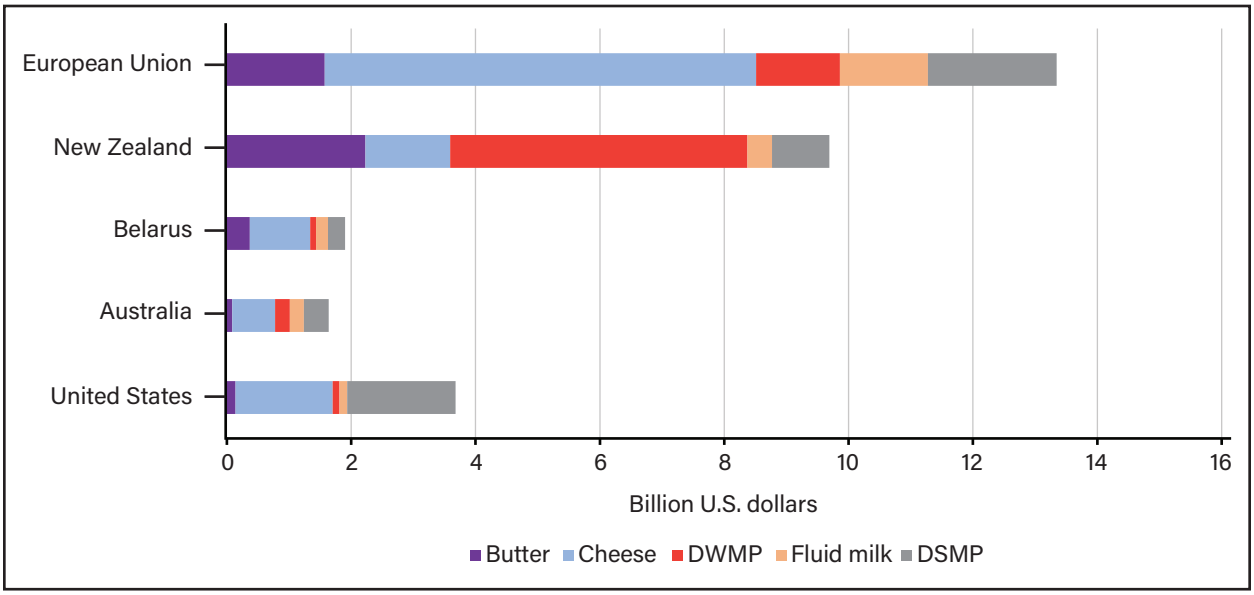
Note: No data are available through from USDA, Foreign Agricultural Service's (FAS) Production, Supply and Distribution (PSD) database on Belarus values before 2006. The European Union (EU) grouping does not include the United Kingdom (UK). Dairy trade is defined using the Production, Supply and Distribution (PSD) dairy categories, which include the following Harmonized System codes: 040510 (butter), 040590 (butter), 0406 (cheese), 040221 (dry whole milk powder), 040229 (dry whole milk powder), and 040210 (dry skim milk products).

Source: USDA, Economic Research Service using data from the USDA, Foreign Agricultural Service, Production, Supply and Distribution database.

Trade Events and U.S. Relative Competitiveness in the Global Dairy Market

U.S. performance in the global dairy market has varied depending on the dairy product category. Figure 25 shows average dairy exports by value for each dairy commodity category for the top dairy exporters from 2017–21. The U.S. position in the dairy commodity market is clearly visible in the dry skim milk products market, with total exports comparable with the EU, the global leader, and ahead of New Zealand's exports. Similarly, despite New Zealand's overall dairy exports for these commodities far exceeding U.S. exports, its lead was achieved primarily through exports of dry whole milk powder—the smallest of the U.S. dairy categories covered in this report. In comparison, the United States exports a higher total value of cheese than New Zealand—with a higher value of cheese exports on average—second to the EU. Aside from New Zealand, the relative shares of total dairy exports making up each category were approximately equivalent across major exporters. Cheese and dry skim milk products generally made up the largest markets by value whereas fluid and dry whole milk powder have made up the smallest markets by value. The portfolio breakdown of dairy trade by category demonstrates the United States and New Zealand targeted different segments of the global dairy market for these select commodities. For markets more actively targeted by the United States (i.e., cheese and dry skim milk products), the United States has been competitive with New Zealand's global dairy trade.

Figure 25
Average export value by dairy commodity, 2017–21



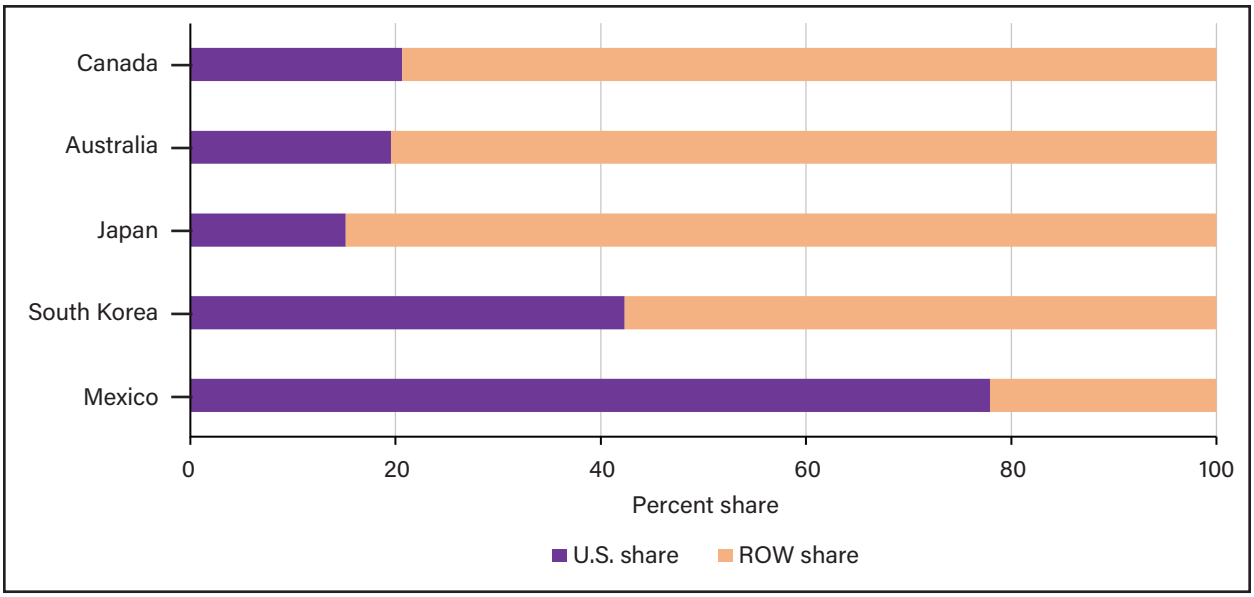
DWMP = Dry whole milk powder; DSMP= Dry skim milk products.

Note: Dairy commodities are defined using the USDA, Foreign Agricultural Service's Production, Supply and Distribution (PSD) dairy categories, which include the following Harmonized System codes: 040510 (butter), 040590 (butter), 0406 (cheese), 040221 (dry whole milk powder), 040229 (dry whole milk powder), 0401 (fluid milk), and 040210 (dry skim milk products).

Source: USDA, Economic Research Service using data from Trade Data Monitor (TDM).

Figure 26 presents the U.S. shares of the top five export destinations for U.S. cheese in 2021. Similar to other animal products, the United States' top export destinations for cheese are Canada, Mexico, Japan, South Korea, and Australia. U.S. cheese has dominated Mexico's cheese import market and comprised nearly 78 percent of total imports. Although not as dominant in South Korea's market, the United States still maintained a substantial market share by providing South Korea's cheese market with more than 42 percent of cheese imports. U.S. shares in Canada and Australia have been subject to greater competition from EU and New Zealand cheese exports, though the United States has maintained approximately one-fifth of those markets.

Figure 26
U.S. share of top U.S. cheese export destinations in 2021



ROW = Rest of world.

Note: Cheese trade is defined using the USDA, Foreign Agricultural Service's Production, Supply and Distribution (PSD) cheese category, which includes the following Harmonized System code: 0406.

Source: USDA, Economic Research Service using data from Trade Data Monitor (TDM).

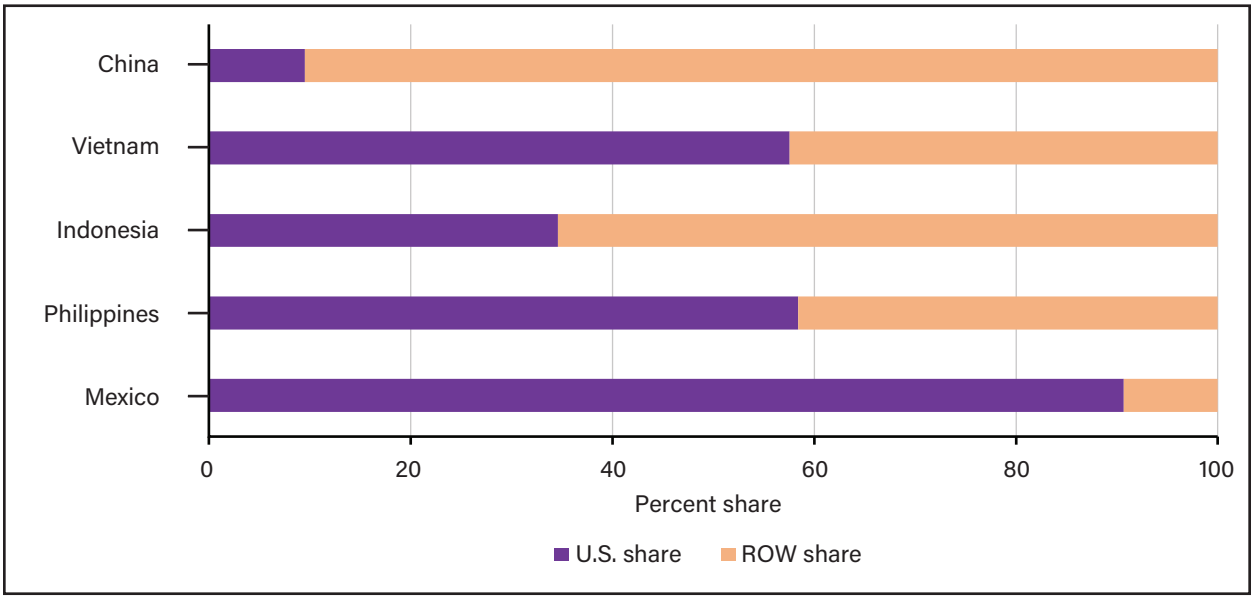
U.S. competitiveness in the global cheese market is supported by several trade agreements with top export destinations. The USMCA continued zero tariffs for U.S. dairy products exported to Mexico, as previously established under NAFTA, and expanded U.S. access to Canada's markets in several ways. The agreement instituted exclusive tariff rate quotas (TRQs) for U.S. dairy which—by year 6 of the agreement—will cover more than 49,000 metric tons of dairy products in categories other than fluid milk and will continue growing incrementally until year 19 of the agreement (USTR, 2019d).[22] While these provisions are still being progressively implemented, USMCA stipulations promised expanded access to Canada's market for U.S. dairy exports, including a 12,500-metric ton TRQ for cheese by year 6 of the agreement to ultimately reach 14,226 metric tons in and after year 19, or the full implementation of USMCA (USTR, 2019d). Despite the promised access, the first official enforcement action filed for USMCA centered on Canada's reservation of a portion of dairy TRQs exclusively for processors in Canada (USTR, 2021b). In January 2022, the USMCA panel ruled in the United States' favor, however, the United States viewed Canada's implementation of measures as not in full compliance with its USMCA obligations and made a second request for dispute settlement consultations in May 2022.

U.S. participation in trade agreements across the Pacific also increased their competitiveness. The U.S.-Japan Trade Agreement, which entered into force January 2020, balanced the competition between U.S. products and the products of CP-TPP member nations including Australia, New Zealand, and Canada—as well as the EU—which has its own Economic Partnership Agreement with Japan. Under the U.S.-Japan Trade Agreement, more than 80 percent of U.S. dairy exports will receive preferential tariff treatment. Japanese cheese tariffs, which have been as high as 40 percent, are scheduled for elimination over a 15-year period (USTR, 2019b). Additional provisions for the dairy industry will continue to expand market opportunities in Japan and increase U.S. competitiveness in one of its top export destinations for dairy products.

[22] U.S. dairy products included under the USMCA tariff rate quotas (TRQs) included the select dairy commodities analyzed in this report as well as several other categories including yogurt and buttermilk, concentrated and condensed milk, and ice cream, among others. Following quota year 6 of the agreement, most categories' TRQs will grow at a rate of 1 percent for an additional 13 years (USTR, 2019d).

In comparison with the cheese market, the United States has been more competitive in the dry skim milk products market with more substantial market shares in its top export destinations. Figure 27 presents the U.S. shares for the top five export destinations for U.S. dry skim milk products in 2021. Mexico's dry skim milk product imports come predominantly (i.e., more than 90 percent) from the United States. The U.S. share of top markets in Southeast Asia exceeded 57 percent in the Philippines and Vietnam and 34 percent in Indonesia. The United States held high market shares in other markets in Southeast Asia as well. For example, the U.S. share of Malaysia's market—the United States' sixth largest market for dry skim milk products in 2021—exceeded 27 percent. The U.S. share of China's import market also grew substantially in 2021, reaching nearly 10 percent from a 2020 market share of 5.5 percent. These market shares demonstrate strong U.S. performance in the dry skim milk products market, as Mexico, Indonesia, the Philippines, and Malaysia have regularly ranked globally among the top five importers for dry skim milk products since 2016.

Figure 27
U.S. share of top dry skim milk products export destinations, 2021



ROW = Rest of world.

Note: Dry skim milk products trade is defined using the USDA, Foreign Agricultural Service's Production, Supply and Distribution (PSD) nonfat dry milk category which includes the following Harmonized System code: 040210.

Source: USDA, Economic Research Service using data from Trade Data Monitor (TDM).

U.S. performance in overall dairy trade indicated room for improvement. From 2017 to 2021, the top dairy importers (by value) included China, the UK, the EU, and Russia. Since 2014, political countersanctions have prohibited U.S. access to Russia's dairy market. The U.S. share of these other major markets is small. U.S. exports to China have constituted less than 3.6 percent of China's imports since 2016 and less than 2 percent in 2019 and 2020. The primary competitors to the United States in China's dairy import market are New Zealand and Australia, which collectively accounted for more than 70 percent of China's dairy imports and both benefit from FTAs with China. U.S. dairy exports to China have been subject to restrictive regulatory requirements, including inspection and quarantine requirements, which have limited U.S. market access (USTR, 2020). However, provisions of the Phase One Agreement have required China's recognition of the U.S. food safety system of oversight for dairy. In addition, the Phase One agreement has required an overall increase in agricultural imports from the United States thus increasing U.S. dairy products' competitiveness and market access in China. Major competitors holding preferential market access through trade agreements

has limited U.S. competitiveness in this major market. U.S. performance in the EU and UK has been poor relative to the size of their respective markets with less than 2 percent of dairy imports in these select categories to the EU and UK originating from the United States in 2021. One recent contributor to this performance and U.S. competitiveness in the EU market is retaliatory import tariffs on U.S. products, including dairy products. The EU instituted these tariffs in response to U.S. tariffs imposed in October 2019 following an ongoing trade dispute related to large civilian aircraft (Livestock Dairy and Poultry Outlook, 2021). These retaliatory measures were suspended until 2026 and so should restore the lost market access for U.S. dairy products. Nevertheless, U.S. competitiveness in these markets was severely limited by the substantial reciprocal trade shares held and geographic proximity between the EU and UK.

Conclusion

Authors conducted a commodity-level analysis for four major animal agricultural commodities (beef, pork, chicken, and select dairy products) using trade indices and export shares to assess the United States' export position in global markets. Influential market and trade events and trade agreements that affected the U.S. position in each commodity market were identified. This report contributes to the understanding of how global changes affected different commodities, as opposed to aggregate effects on the agricultural sector. For a table illustrating key findings from the report see appendix, Summary of U.S. Rank, Export Value, Destinations, Competitors, and Key Challenges in Major Animal Commodity Markets, 2021.

The United States holds a strong position in several global animal product markets as a major producer and exporter. However, tariffs and restrictions affected beef, pork, chicken, and select dairy exports over the last 21 years. Current measures indicate strong U.S. competitiveness in the global beef market. Decreased restrictions and set import goals in China's market through the Phase One Agreement—along with decreasing Japanese and South Korean tariffs—point to expected growth in East Asia's markets. Continued growth in East Asia's and Southeast Asia's demand for animal products could also expand opportunities for U.S. dairy exports. U.S. pork trade performance is strong in Canada, Mexico, and in some key markets in East Asia, with potential for improvement in China and Europe especially if China's domestic production continues to struggle with widespread disease among swine herds. U.S. industry-led initiatives to increase production of pork eligible for export to markets with hormone-like growth substance restrictions may increase overall U.S. pork competitiveness and expand opportunities in Europe's and China's markets.

Trade agreements and negotiations may also affect future U.S. exports and competitiveness in the global dairy market. Future challenges to USMCA could slow the growth of U.S. dairy in Canada's market, while increased adherence to the agreed-upon terms should result in more open markets. U.S. dairy exports to Mexico continue to be strong under USMCA. U.S. chicken exports have more than doubled since 2000, exceeding $4.4 billion in 2021. The popularity of chicken in the United States and across the world contributed to production increases. However, U.S. chicken exports and destinations have experienced volatility since 2000, with political trade barriers, trade disputes, and the impacts of highly pathogenic avian influenza (HPAI).

This report discusses the current position and competitiveness of several major U.S. animal product commodities in global trade, however the analysis is subject to limitations. Authors limited the analysis to measures of value, rather than volume, for nearly all metrics and market shares except the exports-to-production ratios. While this allowed for consistency in comparing the position and performance of various animal commodities, it did not consider global financial market dynamics and the potential impacts on total quan-

tities of exported products. Authors used nominal values which can be confounded by inflationary factors when making comparisons. This report is limited to select animal product commodities and categorizations as determined by the USDA, Foreign Agricultural Service Production, Supply, and Distribution database definitions. Although this encompasses the primary animal product commodities of interest in U.S. trade, it neglects several other animal products which, in aggregate, represent a global market of significant size. Furthermore, in contrast to grain and oilseed commodities which tend toward greater homogeneity across competitors, differentiation in animal product commodity quality on the basis of geographic origin and production practices can complicate comparisons of competitiveness of various exporters. Opportunities exist for greater exploration of U.S. competitiveness in global trade of animal products and commodities.

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Appendix: Summary of U.S. Rank, Export Value, Destinations, Competitors, and Key Challenges in Major Animal Commodity Markets, 2021

Animal commodity	U.S. rank in the global market, 2021	U.S. export value, 2021	Top U.S. export destinations, 2021	Major competitors	Key recent challenges
Beef	1st	$9.4 billion	Canada, China, Mexico, Japan, South Korea	Argentina, Australia, Brazil, Canada, EU, New Zealand, Uruguay	BSE, growth promoting substance restrictions, U.S.-China trade dispute
Pork	2nd	$6.9 billion	Canada, China, Mexico, Japan, South Korea	Brazil, Canada, EU, Mexico	Growth promoting substance restrictions, ASF threat, U.S.-China trade dispute
Chicken	2nd	$4.4 billion	Canada, China, Cuba, Mexico, Taiwan	Brazil, China, EU, Thailand, Turkey	HPAI, political trade sanctions
Dairy	3rd (total), 2nd (cheese), 1st (dry skim milk products)	$4.7 billion (total), $1.8 billion (cheese), $2.5 billion (dry skim milk products)	Canada, China, Indonesia, Japan, Mexico, Philippines, South Korea, Vietnam	Australia, Belarus, EU, New Zealand	USMCA dispute, political trade sanctions and retaliatory tariffs

BSE= bovine spongiform encephalopathy

HPAI = highly pathogenic avian influenza

USMCA = United States-Mexico-Canada Agreement

Note: EU refers to European Union. U.S. rank in the international market is defined by total value of the specified commodity's exports. Animal product commodities are categorized by Production, Supply and Distribution (PSD) categories of beef, pork, chicken, and select dairy commodities of butter, cheese, dry skim milk products (nonfat dry milk), dry whole milk powder, and fluid milk.

Source: USDA, Economic Research Service using data from Trade Data Monitor.