Journal of Agricultural and Resource Economics 47(3):477–494 ISSN: 1068-5502 (Print); 2327-8285 (Online)

doi: 10.22004/ag.econ.322853

2022 WAEA Presidential Address: Agricultural Trade Disputes

Stephen Devadoss

Agricultural trade has been historically beset with a plethora of interventions by WTO member countries, which have led to numerous disputes. These trade disputes involve prolonged litigations and resolution processes, and during this time, trade barriers continue to exist. Furthermore, considerable resources are spent litigating these disputes which give rise to pervasive directly unproductive activities, resulting in significant inefficiencies and welfare loss. In this WAEA presidential address, I (i) review the WTO dispute settlement process, (ii) provide an up-to-date catalog of agriculture disputes, (iii) summarize major disputes involving the United States, (iv) present a detailed analysis of the US–China trade war, and (v) examine the benefits of global agricultural trade liberalization.

Key words: agriculture, disputes, GATT, trade, WTO

Introduction

Agricultural trade has historically been beset with a plethora of interventions by many World Trade Organization (WTO) member countries. The first seven rounds of the General Agreement on the Tariffs and Trade (GATT) primarily dealt with trade regulations related to manufacturing goods and excluded agricultural trade. Since agriculture was not governed by GATT rules, interventionistic agricultural policies were not brought to the GATT Dispute Settlement Body (DSB). The eighth round of GATT–the Uruguay Round–was the first to bring agriculture into multilateral trade negotiations. In 1994, GATT transitioned into the World Trade Organization (WTO). Once agricultural trade became governed by WTO rules, and with a large number of domestic and trade policies implemented by various countries, cases brought to the WTO DSB escalated. As of May 2022, the WTO has received 612 dispute petitions (World Trade Organization, 2022b). These disputes fall under several categories: GATT 1994,[1] antidumping, subsidies and countervailing duties, agriculture, agreement establishing the WTO, safeguards, technical barriers to trade, sanitary and phytosanitary standards, import licensing, trade-related investment measures (TRIMs), trade-related intellectual property rights (TRIPS), protocol of accession, and general agreement on trade in services (GATS). Figure 1 illustrates the number of cases under each of these categories.

More recently, the US–China trade war caused several rounds of tariff retaliations that were highly disruptive to global trade. Though the Phase One deal was supposed to lessen trade tensions

Stephen Devadoss (stephen.devadoss@ttu.edu) is the Emabeth Thompson Endowed Professor in the Department of Agricultural and Applied Economics at Texas Tech University.
I gratefully thank the valuable research assistance by Nathan Holtman and Chase Hall and the editorial assistance by William Ridley and Zach Hebbard. This work is supported by the USDA National Institute of Food and Agriculture, Agricultural and Food Research Initiative Competitive Program, Agriculture Economics and Rural Communities, grant #2020-67023-30962.

Review coordinated by Jeffrey J. Reimer.

[1] GATT 1994 covers various provisions in the General Agreement on Tariffs and Trade set forth in the final act of 1947. Consequently, the larger number of disputes (507) violating the provisions of GATT 1994 have originated from many different countries.

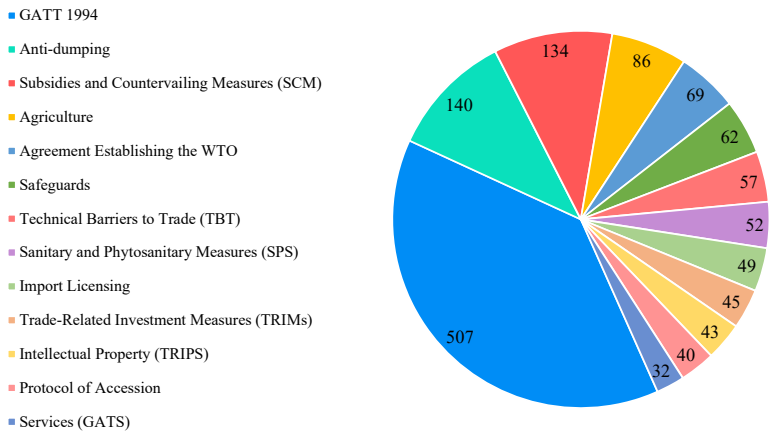

Figure 1. Major Categories in Dispute Settlement Cases

Notes: Because some cases can fall under more than one category, the sum of these cases is greater than 612.
Source: World Trade Organization.

between the two large economies, the tariffs imposed by both countries continue to exist and hamper bilateral trade. This war was particularly detrimental to US agricultural exports as China specifically targeted major commodities (soybeans, pork, fruits, nuts, and cereals) that heavily depend on the Chinese market.

Trade disputes generally involve prolonged litigations and resolution processes; during these periods of time, trade barriers continue to exist and affect trade. Furthermore, considerable resources are spent while litigating these disputes, which lead to directly unproductive (DUP) activities and result in significant inefficiencies and welfare loss (Bhagwati, 1982). This WAEA presidential address (i) reviews the WTO dispute settlement process, (ii) presents an up-to-date catalog of the agricultural disputes, (iii) discusses major disputes involving the United States, (iv) presents a detailed analysis of the US–China trade war, and (v) examines the benefits of global agricultural trade liberalization.

The rest of the paper is organized as follows. The supplemental online appendix presents the dispute settlement process in the WTO. Section 2 discusses three of the most common cases involving frequent WTO disputes. Section 3 identifies the number of bilateral disputes among major trading partners. Section 4 covers four well known WTO agricultural disputes involving the United States: US-EU Beef Hormone Case, US-EU Banana Dispute, US-Japan Apple Dispute, and US-Brazil Cotton Dispute. Section 5 describes the spillover effects of Boeing-Airbus dispute and the ensuing punitive tariffs and collateral damages to agricultural commodity trade. Section 6 covers the US–China Trade War and the resulting disruptions in commodity trade. Section 7 presents results of global trade reform of elimination of domestic subsidies, tariffs, and export subsidies. The final section concludes.

Common Cases of WTO Disputes

Under various categories of disputes, presented in Figure 1, three areas–agriculture, antidumping (AD), and subsidies and countervailing duties (CVD)–are the most contentious for disputes. Here, I briefly present the underlying causes for frequent filings for litigations with the WTO in these three areas.

Agriculture

The Uruguay Round (UR) commitment, which took effect in 1995 and ended in 2000 for developed countries and 2004 for developing countries, covered four areas ripe for agricultural disputes: (i) the Agreement on Agriculture, (ii) members' adherence to meet commitments on domestic support, market access, and export subsidies, (iii) sanitary and phytosanitary measures, and (iv) issues related to least-developed and net food-importing developing countries (World Trade Organization, 2022a). The goal of the UR agreement is to move toward free-market-oriented policies in agricultural trade and domestic supports.

The agreement on domestic policies allows members to implement less trade-distorting policies and also help rural economies to be vibrant, particularly in developing countries. The domestic support policies are measured under the total aggregate measurement of support (AMS), which includes product-specific and nonproduct-specific subsidies that are not exempt from reduction commitments. The AMS has to be reduced by 20% for developed countries and 13.3% for developing countries. Some policies (e.g., green box policies, which include spending on research, food security, pest and disease control; direct payments to producers; and environmental programs) are exempt from UR reduction commitments.

Market access provisions convert non-tariff measures to equivalent tariffs through the tariffication process and called for all tariffs to be reduced by an average of 36% for developed countries over a six-year period and 24% for developing countries over a ten-year period. The tariffication process also establishes a minimum level of tariff rate quota if current imports are below 3% of domestic consumption, and this quota is to be expanded to 5% over the trade liberalization period. Safeguard measures are put in place to curtail the surge of imports by imposing additional duties.

Under the export subsidy agreements, developed countries must reduce the value of exports by 36% and the quantity of exports by 21% of the 1986–1990 base period. Developing countries are required to implement two-thirds of the reductions required of developed countries over a 10-year period. If countries increase export subsidies after 1986–1990 but before the implementation of the UR period, then the 1991–1992 level will be the base period. In addition, "peace" provisions under the subsidy agreements will also be exempt for a period of 9 years.

Countries often violate the provisions under the Uruguay Round, providing ammunition for the affected countries to petition the WTO against the offending countries.

Antidumping

Dumping occurs when an exporting country sells its products at a price below its domestic price or cost of production, causing material injuries to the industry in the importing country. Dumping is possible only under two economic conditions. First, when firms operate under imperfectly competitive markets, these firms are capable of setting prices instead of taking them as given. Second, markets should be segmented; otherwise, arbitragers will buy from a lower-priced market and resell in the exporting country. If a country dumps its commodities and causes loss to the industries in the importing country, then the importing country can take remedial measures by imposing antidumping duties (AD), which is generally the difference between the price or cost in the exporting country and the import price in the importing country (Casey, 2022). The economic damage to the injured industry in the importing country should be evaluated by accounting for all economic conditions.

In the first two decades after the establishment of GATT, countries very rarely imposed ADs, largely because the tariff rates during these years were generally high, which made it difficult for an exporting country to sell below its domestic price. Only a few advanced countries (e.g., the United States, the European Union, Canada, and Australia) opted to implement AD duties. However, starting in the 1990s, the number of ADs levied proliferated. There are many reasons for the frequent

filing of AD cases: more countries have become members of the WTO and are subject to AD measures if they dump in other WTO member countries, tariffs have come down significantly in recent decades and greater market access makes it possible for countries to dump, AD agreements were revised in the Uruguay Round to make policies regarding dumping and the retaliatory measures more transparent, and the WTO has streamlined policies in litigating AD cases so that concerned parties are fully aware of the provisions.

Frequent users of AD investigations are often the top targets of AD investigations. Between 1995 and 2018, China led all countries, with 1,269 AD initiations against it, followed by the Republic of Korea with 417 and the United States with 283 (Casey, 2020). ADs are the most commonly used remedy among WTO members. In 2020, $18.2 billion of imports by the United States were considered for AD/CVD (countervailing duty) measures (Casey, 2022).

If the margin of dumping is small or negligible, then the AD investigation is terminated. Antidumping is generally viewed as economically inefficient, but these policies can lend themselves to trade liberalization by forcing exporting countries not to undertake unfair trade policies (Casey, 2020). Furthermore, firms operating under imperfect competition tend to sell in foreign markets at a price below the domestic price to establish a foothold. Such price discrimination by exporters may be a legitimate business strategy that can lead to exporters selling in each others' markets. Such two-way trade or cross-hauling is known as reciprocal dumping and commonly observed in international trade (Brander, 1981).

Subsidies and Countervailing Duties

An importing country can impose a countervailing duty (CVD) on imports when an exporting country provides WTO-inconsistent subsidies, exports the subsidized commodities, and causes material injuries to the industries in the importing country by selling at a lower price than its domestic price. These CVDs are meant to offset damages caused by the exporting countries' subsidies. Article VI of GATT 1994 allows for these remedial measures to rectify the unfair trade practices of exporting countries. In determining the injury to the domestic industry, a careful evaluation should account for all relevant economic factors, including reduction in production, sales, prices, market share, productivity, and profits. The duties levied should be less than the subsidy provided by the exporting country. Only actionable subsidies (those that cause economic damage to the industries in the importing country) are countervailable. The importing country can maintain the CVD as long as is necessary to counteract the subsidies that are inflicting injuries. While economists believe these remedial measures are generally inefficient, they may pave the way for trade liberalization by forcing the exporting countries to cut down their harmful subsidies, resulting in fairer competition.

Starting in the 1970s, the imposition of CVDs by various countries escalated because of increased world trade, reduction in overall tariffs through various rounds of GATT negotiations, greater oversight by importing countries, and permissible counteraction under Article VI of GATT. Yet only a few countries (24 out of 159 WTO member countries) have frequently imposed CVD measures (Casey and Wong, 2021). Between 1995 and 2020, the United States was the leading user of CVD measures, with 173, followed by the European Union with 45, Canada with 36, and Australia with 16. The leading target for US CVD measures is China, largely because of Chinese state-owned enterprises receiving subsidies and the nonmarket economy.

Many thousands of CVD cases have been filed over the last few decades. Some notable examples of CVD cases between the United States and Canada include: (i) US case against durum wheat from Canada (Alston, Gray, and Sumner, 1994), (ii) US CVD case against Canadian softwood lumber (Devadoss, 2008), (iii) US CVD case against Canadian hogs and pork (Moschini and Meilke, 1992), and (iv) Canadian CVD case against US corn (Meilke and Sarker, 1997). Since most of the CVD cases are initiated by countries' national administrative protection agencies (e.g., the United States International Trade Commission and the Canadian International Trade Tribunal), the investigations

Table 1. Selected Bilateral Disputes Filed with the WTO

	AR	AU	BR	CA	CL	CN	EU	IN	ID	JP	KR	MX	RU	TH	US	Total
AR			1		6		6								5	18
AU				1		2	2	2			1				2	10
BR	2			4		1	8	1	2			1		1	11	31
CA			1			4	9	1		1	2				20	38
CL	1						2					1			2	6
CN		1					5								16	22
EU	8	1	5	6	3	11		11	3	6	4	3	6	1	35	101
IN	1		1				7								11	20
ID	1	2					3				1				3	10
JP	1		2	2		3	1	2	2		5		1		8	27
KR							3			3					14	20
MX	1					4	3								10	18
RU							4								2	6
TH							4								5	9
US	5	4	4	8	1	23	20	8	4	6	6	7	1			97
Total	20	8	14	21	10	48	77	25	11	16	19	12	6	2	144	

Notes: Complainant is in the first column, and respondent is in the top row. AR: Argentina, AU: Australia, BR: Brazil, CA: Canada, CL: Chile, CN: China, EU: European Union, IN: India, ID: Indonesia, JP: Japan, KR: South Korea, MX: Mexico, RU: Russia, TH: Thailand, and US: United States.

undertaken by these agencies tend to be in favor of supporting and providing protection to domestic industries. Consequently, CVDs not only create inefficiencies and lower economic welfare, they also hurt downstream producers and consumers (Marvel and Ray, 1995). In view of biased investigations by national administrative protection agencies, Meilke and Sarker (1997) proposed that all CVD and AD cases should be litigated through the WTO Dispute Settlement Body (DSB).

Next, we move toward a number of bilateral disputes involving leading countries and specific disputes.

Number of Bilateral Disputes

Table 1 presents the number of bilateral disputes filed with the WTO by major trading partners. The first column presents the countries that filed the cases (i.e., complainants) and the first row presents the responding countries, (i.e., respondents). It is clear the United States and the European Union are heavily involved in filing litigation with the WTO. Furthermore, the United States and the European Union have petitioned more bilateral disputes than any other pair of countries because these two countries have a history of trading a large number and volume of commodities. Consequently, frequent trade disputes are common between these two countries, particularly issues related to nontariff barriers. In addition, the Boeing and Airbus disputes have been litigated for many decades, and each WTO ruling allows for retaliatory actions, addding fuel to the fire and creating more disputes (collateral damages of this dispute on agricultural commodities are discussed in a later section).

The United States has petitioned a total of 124 disputes against *all* WTO member countries, including 23 disputes against China, 20 against the European Union, 8 against India and Canada, and 7 against Mexico. The European Union has filed a total of 110 disputes against *all* WTO member countries, including 35 disputes have been against the United States, 11 against India, 11 against China, and 8 against Argentina. China has only engaged in disputes with the United States (16) and the European Union (5). Most of the Indian disputes are also against the United States (11). Countries that have many disputes against the United States are South Korea (14), Brazil (11), and Japan (8). Other countries that have filed a significant number of disputes against the European Union are Canada (9), Brazil (8), and Argentina (6). The large number of disputes against the United States and the European Union are because these two large economies conduct large volumes of trade vis-à-vis other countries and exert considerable influence on their trading partners. Next, we examine some major agricultural trade disputes involving the United States.

US Disputes Involving Agriculture

The United States has been involved in 35 agricultural disputes (for details, see the online supplement at www.jareonline.org)—7 as the respondent and 28 as the complainant—of which 13 have been resolved. Of these cases, some have been major both in terms of volume of trade and length of disputes and thus led to prolonged dispute settlement processes. Here, we briefly explain four major cases.

DS26 EU SPS and TBT Restrictions against US Meat Products Treated with Hormones

Starting in the early 1980s, the European Union (known at that time as the European Community) restricted imports of cattle and beef that had been treated with growth hormones and completely banned them in 1989. The United States claimed that the EU ban was not based on risk assessment and thus not consistent with the SPS Agreement of GATT Article V.1. Furthermore, the EU ban discriminated against imports from the United States, violating Article III of GATT, and did not apply to imports from other countries, violating Article I of GATT. In retaliation to the EU import ban, the United States imposed a 100% tariff on selected food products between 1989 and 1996, which was reinstated in 1999 (Johnson, 2017). Canada also joined the United States and both countries filed their cases with the WTO DSB in 1996. The European Union countered that the ban did not breach the SPS Agreement and that their risk assessment had found a scientific basis for the import ban. The European Union claimed that hormone-treated cattle were "not like" hormone-free cattle. Furthermore, the European Union did not allow the use of hormones in its domestic cattle, so it was not giving "less favorable treatment" to imports from the United States. The European Union also noted that this ban applied to imports from all countries, not just the United States. In addition, the European Union argued that because any potential health risks that could arise in the future from the consumption of beef treated with hormones were unknown, the restrictions were justified. The United States countered that, thus far, there was no scientific proof that hormone-treated beef posed any health risk.

For several decades, the United States and the European Union litigated through the WTO DSB, arbitration, and appeals (World Trade Organization, 1997, 1998). The DSB panel ruled in 1997 that (i) the EU regulations did not follow the risk assessment fully and were not consistent with Article V.1 of the Agreement on Sanitary and Phytosanitary Measures, (ii) the EU ban was a form of discrimination and inconsistent with Article V.5 of the Agreement, and (iii) the EU import bans were not in line with existing international standards and violated Article III.1 of the Agreement (Johnson, 2017). Consequently, the DSB panel ruled in favor of the United States and Canada and concluded that the European Union must comply with obligations under the SPS Agreement. In response to the WTO DSB rulings, the European Union conducted several risk assessment studies and claimed that potential human health risks exist from the consumption of hormone-treated meat.

The European Union then appealed the DSB panel's findings with the WTO Appellate Body, which upheld the original findings of the panel.

In 2008, under continued EU import restrictions and labeling requirements, the WTO recommended that the United States be permitted to prolong its trade sanctions. In 2009, the United States declared that it would consider additional EU products and countries for higher retaliatory tariff measures. In May 2009, the United States and the European Union signed a memorandum of understanding requiring the European Union to import US beef not treated with growth promotants and the United States to suspend retaliatory tariffs on some EU products. However, the dispute was not settled because the United States reinstated retaliatory tariffs in December 2016, and the European Union continues to ban US hormone-treated beef and allow only limited amount of imports without hormone treatments (Johnson, 2017). Thus both countries are prolonging this acrimonious trade war.

DS27 European Union for the Importation, Distribution, and Sale of Bananas

In 1993, when the European Union expanded, it established a single, unified, EU-wide regime known as the Common Market Organisation (CMO) to import primary products from former colonies. This policy favored imports of agricultural goods from ACP (African, Caribbean, and Pacific) colonial countries with the goal of helping these countries develop economically. These policies were established by the 1976 Lomé Convention, which allowed for a waiver of EU trade policies related to imports from ACP colonial countries so that these countries could "expedite [their] economic, cultural, and social development" (World Trade Organization, 1996).

This waiver also included EU banana imports from former colonies, which allowed for 857,000 tons of tariff-free imports from ACP countries. However, imports from non-ACP countries were subject to a 150% tariff. In particular, imports from Latin American countries were limited by a tariff-rate quota (TRQ) of 2.2 million tons, with 20%–30% in-quota tariffs, and an alarming 250% above-quota tariff. Furthermore, the European Union implemented a licensing scheme by allocating banana import quotas to EU distributors. Guyomard, Laroche, and Mouël (1999) analyzed the effects of these CMO policies on banana imports and the welfare of various EU countries. They found that countries such as Germany, which had freer market policies before the CMO, lost, and countries such as France, which had more restrictive policies prior to the CMO, benefited. In their spatial equilibrium analysis, all other exporting countries besides ACP countries were grouped into the rest of the world (ROW) exporters, so they did not explicitly examine the impacts of CMO policies on banana-exporting Latin American countries. In contrast, Kersten (1995), using a quadratic spatial programming model and explicitly accounting for Latin American countries, analyzed the CMO policies and found that Latin American countries lost export market share in the European Union, export tax revenues, and producer surplus as a result of CMO policies.

Ecuador, Guatemala, Honduras, Mexico, and three large US banana trading companies (Dole, Chiquita, and Del Monte) filed petitions with the WTO arguing that EU policies violated several articles of GATT (World Trade Organization, 1996). These petitions largely focused on three issues related to the European Union's (i) lower tariff on banana imports from ACP countries, (ii) allocation of import quotas, and (iii) licensing agreement to EU distributors. In 1997, the DSB found that EU policies violated WTO rules by discriminating against certain banana exporting companies. In 1999, the European Union expanded the TRQ to 2.553 million metric tons (MT) with 850,000 MT allocated to ACP countries. The DSB also found this new import policy to be illegal because setting quotas explicitly for ACP countries and the licensing scheme continued to discriminate against companies that exported bananas grown in Latin American countries (Hanrahan, 2001).

This dispute was settled in April 2001 with the understanding that from 2001 to 2006, the European Union would adopt quotas and licensing based on historical trade shares, which would enhance the exports from Latin American countries to the European Union; starting in 2006, all EU banana imports would be subject to only tariffs, not export licensing schemes. Furthermore, the

WTO arbitration panel ruled that the United States was eligible for compensation for $192 million in economic losses. This ruling allowed the United States to impose retaliatory tariffs of 100% on imports of goods from the European Union worth up to $192 million. The United States stopped this retaliatory tariff after 2006 when the European Union moved to only tariff-based imports. However, the European Union sought a 750,000 ton quota for ACP countries and received waivers of Article I (the most favored nation treatment prohibiting discrimination in imports) and Article XIII (nondiscriminatory administration of quantitative restrictions) from the WTO. Although the quotas for ACP countries' exports were lowered by the dispute resolution, ACP countries would nevertheless benefit because the waiver of Articles I and XIII would mitigate the negative impacts of the reduced quota.

DS245 Japanese SPS Measures Against Imports of US Apples

Japan has historically limited apple imports to protect its apple orchards from the introduction of pests and disease and domestic producers whose apple orchards are much smaller and may not survive import competition (Klinger, 1999). After several decades of futile attempts to open the market, Japan finally agreed in 1994 to allow apple imports from the United States. Even though the United States exported 8,935 metric tons in 1995 to Japan, exports dwindled thereafter (Calvin and Krissoff, 2005). The reasons for US apple growers' inability to export to Japan were (i) unwillingness by Japanese consumers to buy US Red and Golden Delicious; (ii) unexpected greater competition from Japanese producers; (iii) overly burdensome testing and protocol requirements; (iv) pest, disease, and chemical scares; and (v) lack of marketing efforts (Klinger, 1999).

Furthermore, Japan instituted several nontariff barriers (NTBs) based on phytosanitary protocols on apple imports from the United States beginning in the mid-1990s. Japan claimed that US apples were contaminated with fire blight disease, a bacterial infection that is not harmful to human health but causes infected apple trees to produce low yields and eventually die (World Trade Organization, 2003). This concern led Japan to impose NTBs on US apple imports, which included (i) strict conditions on harvesting, packaging, processing, and storage by the US apple industry; (ii) at least three inspections (when trees are blooming, when apples are 3 cm in size, and right before harvest) of apple orchards for fire blight disease during the growing season by both USDA representatives and a Japanese inspector; and (iii) a 545-yard buffer zone surrounding the fire blight-free US orchards. If fire blight occurred in an orchard or buffer zone, that orchard would be excluded from the export program. Oregon and Washington apple growers, who are the only ones exporting apples to Japan, were required to register their orchards every spring for these inspections.

The United States argued that these restrictions were unwarranted and Japan's claims were not based on scientific evidence because mature, symptomless fruits are not vectors for fire blight. Using a simple two-country model, Calvin and Krissoff (1998) estimated that the *ad valorem* tariff equivalent of these phytosanitary restrictions amounted to an annual average of 27.2% over the 3-year period between 1994/95 and 1996/97, with the highest rate of 51.4% in 1994/95. They found that as a result of these restrictions, average Japanese imports over the 3-year period fell by 22,100 metric tons annually, and the elimination of these trade barriers would result in a $70.9 million welfare gain in Japan as consumer surplus gains would outweigh producer surplus losses. Since considerable trade diversions and reallocations can occur in the world apple market in response to a policy change, it is more appropriate to use a multicountry model rather than a simple two-country model. Devadoss, Sridharan, and Wahl (2009) and Devadoss and Ridley (2014) presented a trade model that includes all major exporters and importers of apples in the global market.

Japan's NTB requirements not only increased production costs but also posed considerable risk. Even after incurring all the costs of inspections and disease prevention, any evidence of fire blight or unfavorable market conditions would exclude Japan as an export destination. As a result of this NTB, US exports to Japan declined 98%, from 10,450 MT in 1994 to only 115 MT in 2001 (US Department of Agriculture, 1996). The United States filed a case in 2002 with the WTO

to protest Japanese policies. In 2003, the WTO ruled that Japanese import barriers towards US apples were illegal and concurred with the US findings that Japanese restrictions were not based on scientific evidence (World Trade Organization, 2003). In its deliberations on this case, the WTO DSB panel gathered inputs from scientific experts and ruled in June 2005 that Japan's policies were not justifiable. Specifically, the WTO panel found that (i) disease-free apples do not harbor the bacteria, (ii) it is unlikely that even infected apples would transmit the disease, and (iii) Japan failed to find other forms of protecting its orchards from fire blight. The WTO's ruling removed requirements on registration by growers, buffer zoning, and inspection during the growing season. This ruling also allowed Californian apples to be exported to Japan. (Office of the US Trade Representative, 2005). Calvin and Krissoff (2005) estimated that the opening of the Japanese market would increase US exports by 190,876 MT or $144 million per year.

DS267 United States Subsidies on Upland Cotton

Starting in the late 1990s, the United States and Brazil fought contentiously over US cotton subsidies for domestic producers, exporters, and domestic mills. Domestic supports for cotton producers (e.g., direct payments, countercyclical production subsidies, marketing assistance loans, and loan deficiency payments)[2] are termed as actionable subsidies, which expand domestic production; other policies (e.g., export credit guarantees and Step 2 export subsidy program) are known as prohibitive subsidies, which expand exports and domestic mill use (Ridley and Devadoss, 2012). Export credit guarantee policies insured US banks for 98% of the principal and a portion of the interest when they provided loans to foreign importers of cotton, implicitly subsidizing US exports. The Step 2 program paid US exporters and domestic mill users the difference between the high US price and an index of North-European cotton prices. Consequently, this program helped exporters expand their foreign sales and domestic mills to buy US cotton for textile manufacturing.

These US policies boosted US cotton production and exports, which depressed the world price and hurt foreign cotton producers and exporters. Several studies estimated the adverse effects of US policies on world cotton price, with estimates ranging from a 3% decline in the world price (Tokarick, 2003) to 6%–14% by Gillson et al. (2022), Alston, Sumner, and Brunke (2007), Poonyth et al. (2004), and Pan et al. (2006). Schnepf (2014) illustrated that during most of the 1990s and early 2000s, US cotton subsidy outlays moved in the opposite direction of world cotton prices. These price-depressing effects were detrimental to other cotton exporters, particularly Brazil and some African cotton exporting countries (Benin, Burkina Faso, Chad, Mali, and Senegal).

Brazil, because of its rapid rise in cotton production and exports, is a major competitor of the United States in the world market (Ridley and Devadoss, 2022a) and petitioned to the WTO in 2002 (World Trade Organization, 2004). As summarized by (Schnepf, 2010), Brazil claimed that US production and export subsidies violated the WTO Agreement on Agriculture and the WTO Agreement on Subsidies and Countervailing Measures, causing damage to Brazilian cotton producers (also see Ridley and Devadoss, 2014). In 2004, the DSB found that the United States policies indeed violated WTO rules and instructed the United States to remove actionable subsidies of domestic supports and prohibitive subsidies of export credit guarantees and Step 2 payments. The United States appealed the DSB rulings, but the WTO Appellate Body rendered a similar verdict. Though the United States initially agreed to remove the policies, it did not follow through with its commitment by the 2005 deadline. As a result, Brazil requested that the WTO impose $2.5 billion in retaliatory tariffs: $1.5 billion for the damages inflicted on Brazilian producers by the US prohibitive subsides and $1 billion for actionable subsidies. However, the United States argued that Brazil's punitive countermeasures should cover only the losses incurred by Brazil, not by other cotton exporters. In response to the WTO ruling, the United States eliminated the Step 2 payments, but the 2008 Farm Bill continued some of the domestic subsidies and the WTO

[2] From the early 1990s to 2010, US cotton subsidy payments were almost as much as or more than the value of US cotton production (Schnepf, 2011).

Compliance Panel once again found that US policy changes were inadequate. In 2009, the WTO Arbitration Panel delivered the final verdict, allowing Brazil to impose $147.3 million annually in cross-sector retaliatory countermeasures in response to US actionable subsidies and a variable amount, based on US spending on its export credit guarantee program, in response to prohibitive subsidies.

In 2010, both countries agreed to a "Framework of Understanding," which called for the United States to send $12 million per month to compensate Brazilian cotton producers for damages caused by the US policies and for both countries to work together to find a permanent solution. This framework averted Brazilian punitive sanctions against the United States but blatantly excluded other cotton exporters in Africa (Benin, Burkina Faso, Chad, Mali, and Senegal), Australia, and Pakistan, which continued to endure the detrimental effects of US cotton policies (Blasco, Devadoss, and Stodick, 2009). Eventually, the United States modified its farm and trade policies over several years prior to and in the 2014 Farm Bill to be in WTO compliance. The United States modified its export guarantee program by removing the export subsidy in the 2005 and 2008 Farm Bills and eliminating the Step 2 Cotton Program in 2006. The 2014 Farm Bill singled out cotton by repealing many of the farm safety net programs and providing smaller loan rates for the marketing loan programs but maintained crop insurance programs. Furthermore, the new safety net programs introduced for other crops in the Farm Bill did not cover cotton. Rather, cotton was eligible for the Stacked Income Protection Plan (STAX), which is a revenue insurance policy (Devadoss and Luckstead, 2018).

In 2014, Brazil and the United States settled this long-lasting dispute. The agreement called for the United States to make a one-time payment of $300 million to Brazil and for Brazil to end the dispute and follow the WTO Peace Clause regarding cotton policies in the 2014 Farm Bill (see Devadoss and Luckstead, 2021). Given the arduous litigation process and visible worldwide attention it received, the US–Brazil cotton dispute has had significant influence on how domestic farm programs are formulated in global trade negotiation and remains a precedent for agricultural dispute settlements in the WTO (Schnepf, 2014).

Collateral Damages of Airbus-Boeing Fight

The US–EU dispute over US subsidies to Boeing and EU subsidies to Airbus is the longest-running litigation (ongoing since the 1970s) under GATT and the WTO, where each country claims that the other either directly or indirectly subsidizes its aircraft industry to assist in research & development, production, marketing, and tax exemptions. There were many rounds of suits and counter suits filed with the WTO by both countries. The DSB ruling in favor of each country in several rounds of litigations allowed each country to take repeated cross-sectoral retaliatory measures.[3] The United States and the European Union have used these opportunities to impose tariffs on other commodities unrelated to aircraft. Very often, such collateral tariffs inflict injuries to agri-food commodities such as wine and cheese (Schwarzenberg, 2021). For instance, the United States imposed a 25% tariff on wine imports from France, Germany, Spain, and the United Kingdom, and in 2020, the European Union announced its intention to impose 25% tariff on wine imports from the United States.

With wine being the most traded beverage in the world, it is an easy and prominent target for punitive retaliatory actions (Ridley, Luckstead, and Devadoss, 2022). Getting caught in the crossfire has had significant implications for wine producers and consumers who are not directly related to the Airbus–Boeing war. For instance, when the United States imposes tariffs on EU wine, restaurants have to pass on the higher prices to consumers, who may not be willing to pay for these high-priced wines, resulting in lost sales for the restaurants. Such collateral damages to agri-food sectors are an unnecessary infliction of injuries resulting from this dispute.

[3] See Schwarzenberg (2021) for key developments of repeated countermeasures.

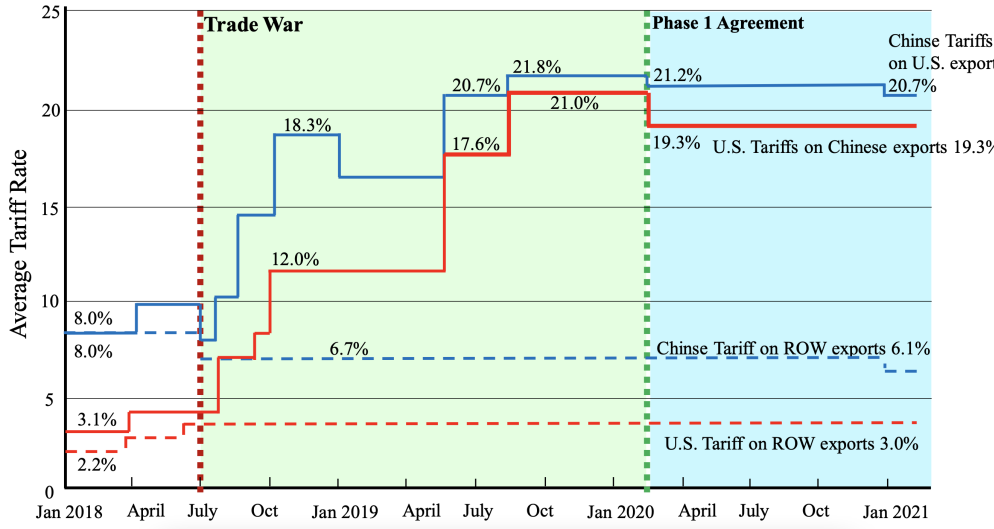

Figure 2. US–China Trade War Retaliatory Tariffs

Source: Peterson Institute for International Economics.

US–China Trade War

The United States and China have repeatedly engaged in trade squabbles, but conflict between these two countries escalated in January 2018 when the United States started imposing punitive tariffs on imports from China. The initial set of tariffs that the United States implemented against imports from China arose from several areas of trade, investment, and intellectual property concerns. First, based on a finding from the safeguard investigation under Section 201 of the US Trade Act of 1974, President Trump announced tariffs on imports of solar panels and washing machines from various countries on January 22, 2018. Though the United States did not single out Chinese goods explicitly, China retaliated with a 179% tariff, worth about $1 billion, on imports of US sorghum (Ridley and Devadoss, 2022b) and filed a complaint with the WTO DSB. Second, in view of security concerns over Section 232 of the US Trade Expansion Act of 1962, President Trump imposed tariffs on steel and aluminum imports from various countries on March 1, 2018. Though these tariffs were levied on imports from all countries, China responded with tit-for-tat tariffs on key US exports, including important agricultural commodities (e.g., pork, fruits).

Third, in response to a Section 301 investigation into unfair Chinese trade and investment practices, the Trump Administration implemented 25% duties on 818 Chinese goods. These trade restrictions were immediately met in kind by Chinese retaliatory tariffs on a vast number of products, including many US agricultural exports. These large-scale antagonistic tariffs were the major contentions that started the US–China trade war. This first set of List 1 tariff retaliations was followed by several rounds of back-and-forth tariff shots fired by both countries against each other. During this tariff war, both countries strategically targeted sectors involving significant bilateral trade volumes, with the United States initially focusing on Chinese industrial goods and China concentrating on US agricultural products. The initial July 2018 US tariffs of 25% on 818 Chinese goods at the 8-digit HTS level covered primarily industrial products, electronics, nuclear reactors, boilers, and high-tech goods. In response, Chinese tariffs of 25% targeted 545 major products in export-oriented US industries such as agriculture, specifically products such as soybeans, pork, fruits and nuts, and cereal crops, among others.

Right after the List 1 tariffs, more tariffs were imposed in quick succession by both countries, with List 2 tariffs in August 2018 and List 3 tariffs in September 2018.[4] These lists greatly expanded the breadth of the tariff war by covering hundreds of additional goods with US duties of 25% and Chinese duties of 5%–25%. The List 2 goods targeted by the United States included plastics and vehicles; those targeted by China covered optical, photo, technical, and medical apparatus; mineral fuels; oils; distillation products; plastics; and organic chemicals. Additional goods targeted under List 3 included furniture, lighting, and prefabricated products by the United States and nuclear reactors, boilers, and machinery by China. While the tariff escalation paused for 1 year, in September 2019, both countries renewed their retaliatory tariffs with additional List 4A tariffs on a wide range of goods. Furthermore, both countries threatened (but did not implement) to impose List 4B tariffs, covering almost all trade in both directions.

Figure 2 depicts the various rounds of retaliatory tariffs by both countries. Starting in January 2018, US tariffs—inclusive of the tariffs implemented under Section 201 on imports of solar panels and washing machines—averaged about 3.1% compared to Chinese tariffs on US goods of about 8.0%. In July 2018, the tariffs by both countries escalated substantially. The several rounds of back-and-forth tariff retaliations resulted in the tariff step functions in Figure 2. US tariffs rose from 3.1% in January 2018 to 21.0% in January 2020 in six steps. Similarly, China reacted with its own tariff increase, from 8.0% in January 2018 to 21.8% in January 2020 in eight steps. In total, the dispute resulted in bilateral tariffs imposed on $735 billion worth of goods traded between the two countries. Of this, the United States implemented import tariffs on goods from China valued at $550 billion, and China retaliated with import tariffs on US goods worth $185 billion (Wong and Koty, 2020).

In early 2020, both countries signed the Phase One agreement, which halted the spiraling tariff escalation. As per the agreement, China agreed to purchase, throughout 2020, $12.50 billion worth of US agricultural products above what it had purchased in 2017 (the year before the trade dispute started). However, China bought only $6.50 billion more in 2020 than it did in 2017 (Nigh and Nepveux, 2021). In spite of the Phase One agreement, many of the tariffs enacted by both countries between July 2018 and September 2019 continue to be enforced and trade between the countries is below that of the pre-trade war period.

Since the trade war started in early 2018, many agricultural economists have conducted impact analyses on various commodities using several trade modeling approaches. These studies have used data analyses with graphical illustrations, gravity equations, spatial equilibrium models, and computable general equilibrium models. Marchant and Wang (2018) spearheaded a special issue of *Choices* articles that analyzed the potential effects of US–Chinese tariffs on several agricultural commodity markets. Another series of *Choices* articles compiled by Grant and Sydow (2019) reported impacts of this trade dispute on specific agricultural commodities. Studies examined the impacts on various commodities including soybeans (Sabala and Devadoss, 2018; Adjemian et al., 2019; Hitchner, Menzie, and Meyer, 2019; Regmi, 2019; Adjemian, Smith, and He, 2021; Baryshpolets, Devadoss, and Sabala, 2022), cotton (Muhammad, Smith, and MacDonald, 2019; Sabala and Devadoss, 2021; Ridley and Devadoss, 2022a), pork (Nti, Kuberka, and Jones, 2019), sorghum (Sabala and Devadoss, 2022), and several other major agricultural commodities (Zheng et al., 2018; Grant et al., 2021; Morgan et al., 2022; Ridley and Devadoss, 2022b).

Because of the lost export revenues, US producers effectively lobbied the US government for production subsidies. The US government responded by implementing the Market Facilitation Program (MFP), which provided about $28 billion in production subsidies for many agricultural commodity producers from 2018 to 2019 (Glauber, 2021). Major commodities that received MFP payments include soybeans, cotton, corn, sorghum, wheat, dairy, and hogs. Some studies have examined the impacts of these subsidies on commodity markets (see Baryshpolets, Devadoss, and Sabala, 2022). Giri, Peterson, and Sharma (2018) and Janzen and Hendricks (2020) found that MFP payments more than compensated for any adverse impacts due to Chinese tariffs. Paulson,

[4] See Table 1 of (Ridley and Devadoss, 2022b) for the complete set of commodities targeted for List 1, 2, 3, 4A, and 4B tariffs by both countries.

Featherstone, and Hadrich (2020) and Glauber (2021) also noted that MFP subsidies could exceed WTO commitments under the domestic support provisions.

Global Agricultural Trade Liberalization

The evolution of agricultural trade in the second half of the 20th century, the Uruguay Round (UR), and the subsequent Doha Round negotiations have created an acute awareness of the importance of international agricultural trade and the inclusion of agriculture in global free trade agreements. Consequently, several studies have quantified the benefits of agricultural trade liberalization on global trade using computable general equilibrium (CGE) models. Brandão and Martin (1993) estimate the effects of partial agricultural trade liberalization based on four tiered scenarios: OECD country policy liberalization, developing country policy elimination, UR policies,[5] and global free trade. Implementing the RUNS (rural-urban/north-south) CGE model, Brandão and Martin (1993) estimated that OECD countries gain the most in terms of welfare, $63.3 billion, from UR policies, while developing countries gain only $19.7 billion. However, if developing countries participate fully in reforming their own trade and domestic policies, their welfare gains could grow nearly threefold to $56.4 billion. Further, when both developed and developing countries move toward free-market-oriented policies, total world welfare gains grow to $139.1 billion. Francois, McDonald, and Nordstrom (1995) and Harrison, Rutherford, and Tarr (1997) also implemented UR policies to determine the effects on world welfare using the WTO and multi-regional trade CGE models, respectively. Francois, McDonald, and Nordstrom (1995) found that total world welfare increased by $39.6 billion, where the most significant gains accrue to developed countries that participate in freer trade. However, Harrison, Rutherford, and Tarr (1997) predicted that the potential gains in welfare were much higher and world welfare could grow to $92.9 billion as a result of UR policies.

Following the completion of the Uruguay Round, some studies (Hertel and Martin, 2000; Anderson and Martin, 2005; Bouët et al., 2005; Beckman, 2021; Holtman, Aguiar, and Devadoss, 2022) have utilized the Global Trade Analysis Project (GTAP) CGE model to quantify the effects of further movement toward free agricultural trade. Hertel and Martin (2000), Anderson and Martin (2005), and Beckman (2021) found that further elimination of trade-distorting policies (e.g., tariffs, domestic supports, and export subsidies) benefits global trade. Additionally, if both developed and developing countries fully liberalized these policies, poorer countries would enjoy the largest percentage gains in real income. Bouët et al. (2005) emphasized that the removal of only agricultural production- and export-promoting policies, such as subsidies, in rich countries can lead to a welfare loss in poorer countries if that country is a net importer of food and agricultural products. For the full potential of a global free trade agreement to be realized, all countries should participate wholly in removing their interventionistic policies.

Utilizing GTAP, Holtman, Aguiar, and Devadoss (2022) analyzed the complete elimination of import tariffs, domestic supports, and export subsidies on global agricultural trade. They found that removing domestic subsidies would allow producers in both OECD and non-OECD countries to expand production in the sectors in which they enjoy comparative advantages. Further, the elimination of restrictive import barriers would allow trade flows between countries to expand significantly. In particular, the United States, India, Argentina, and Brazil—all major exporters of globally important agricultural commodities—would increase their exports. This signifies the benefits of freer trade to both developed and developing countries. If these trade distortions were removed, world prices of plant-based fiber, sugar, and paddy rice, all key agricultural commodities, would increase by 1%–3%, which benefits producers of these commodities. However, world prices of dairy products and vegetables, fruits, and nuts would decrease by 1.5% and 3.5%, respectively,

[5] Following the Dunkel proposal of the UR, Brandão and Martin (1993) utilized a tiered approach to liberalizing trade, which consisted of a tariffication of import barriers and average reductions of tariffs by 36%, export subsidies by 36%, and domestic supports by 20% for developed countries. However, developing countries received exemptions to reduce these levels by only two-thirds, and least-developed countries were not required to participate in rounds of liberalization.

which hurts producers but benefits consumers due to lower prices. Free trade would cause the prices of capital, labor, and natural resources to increase, indicating that the owners of these factors of production would benefit. However, removing domestic and export subsidies would cause land prices to plunge in major countries such as the United States and the European Union, which hurts landowners in these countries. Owners of this specific factor—land—in these countries are beneficiaries of high domestic interventionistic policies and tend to oppose freer market policies.

Despite the relatively small potential losses to some groups, world GDP and welfare would grow significantly if subsidies and tariffs were eliminated. Holtman, Aguiar, and Devadoss (2022) estimated that world welfare would increase by $60 billion (measured in equivalent variation) if all tariffs, production subsidies, and export subsidies were removed. The source of these gains would come from eliminating highly disruptive and inefficient domestic subsidies and trade restrictions. Consequently, there would be a more efficient allocation of resources and freer world trade at more favorable terms of trade (higher exporting prices and lower importing prices). Thus, the net effect from completing a global free trade agreement is overwhelmingly positive for both developed and developing countries, which highlights the urgency and need for a new global free trade agreement.

Conclusions

Trade disputes are very disruptive and create undue inefficiencies in production and consumption, decrease trade, distort world prices, and reduce global welfare. Unfortunately, these disputes in agricultural trade seem to have escalated since the Uruguay Round was brought into WTO negotiations. The world trade order was further thrust into disarray following President Trump's escalation of tariff wars and the retaliation by other countries (e.g., China, the European Union, India, Canada, Mexico, Japan, South Korea). Such disruptions in global trade only exacerbate the already existing inefficiencies created by earlier disputes.

Considering the disarray in global trade and the disruptive forces introduced by numerous recent trade conflicts, resolving these disputes through the WTO Dispute Settlement Process can bring order to global trade, which would be beneficial to all WTO-member countries. Also, collateral damages inflicted on industries unrelated to the disputes should be minimized. It is important for policy makers and also researchers to promote the benefits of freer trade and adherence to WTO policies.

The recent Russian invasion of Ukraine has further disrupted global trade, both because of the trade interruptions inflicted by the war and because of the trade sanctions imposed against Russia. These sanctions have led to substantially higher oil prices and fertilizer shortages. As a result, some countries, such as Russia and China, are restricting fertilizer exports, which is detrimental to agricultural commodity production. These trade wars and supply disruptions due to the COVID-19 pandemic and the Russia–Ukraine war have caused food prices to skyrocket.

Eliminating interventionistic domestic and trade policies, efficiently resolving trade disputes, and a freer world order in trade are paramount, particularly for the agricultural sector, to enhance global welfare. However, the current chaotic nature of political and economic turmoils does not bode well for the world trade order.

[First submitted July 2022; accepted for publication July 2022.]

References

Adjemian, M., S. Arita, V. Breneman, R. Johansson, and R. Williams. "Tariff Retaliation Weakened the U.S. Soybean Basis." *Choices* 34(2019):1–9. doi: 10.22004/ag.econ.301010.

Adjemian, M. K., A. Smith, and W. He. "Estimating the Market Effect of a Trade War: The Case of Soybean Tariffs." *Food Policy* 105(2021):102,152. doi: 10.1016/j.foodpol.2021.102152.

Alston, J. M., R. Gray, and D. A. Sumner. "The Wheat War of 1994." *Canadian Journal of Agricultural Economics* 42(1994):231–251. doi: 10.1111/j.1744-7976.1994.tb00021.x.

Alston, J. M., D. A. Sumner, and H. Brunke. *Impacts of Reductions in US Cotton Subsidies on West African Cotton Producers*. Boston, MA: Oxfam America, 2007.

Anderson, K., and W. Martin. "Agricultural Trade Reform and the Doha Development Agenda." *World Economy* 28(2005):1301–1327. doi: 10.1111/j.1467-9701.2005.00735.x.

Baryshpolets, A., S. Devadoss, and E. Sabala. "Consequences of Chinese Tariff on World Soybean-Complex Markets." *Journal of Agricultural and Applied Economics Association* 1(2022): 108–119. doi: 10.1002/jaa2.12.

Beckman, J. "How the Removal of Tariffs Would Impact Agricultural Trade." *Amber Waves* (2021). doi: 10.22004/ag.econ.311330.

Bhagwati, J. N. "Directly Unproductive, Profit-Seeking (DUP) Activities." *Journal of Political Economy* 90(1982):988–1002. doi: 10.1007/978-1-349-58802-2_392.

Blasco, L., S. Devadoss, and L. Stodick. "A General Equilibrium Analysis of the Effects of Doha Round Declaration and African Cotton Initiative on Zambian Cotton Sector." *Journal of International Trade & Economic Development* 18(2009):115–137. doi: 10.1080/09638190902757467.

Bouët, A., J.-C. Bureau, Y. Decreux, and S. Jean. "Multilateral Agricultural Trade Liberalisation: The Contrasting Fortunes of Developing Countries in the Doha Round." *World Economy* 28(2005):1329–1354. doi: 10.1111/j.1467-9701.2005.00736.x.

Brandão, A. S. P., and W. J. Martin. "Implications of Agricultural Trade Liberalization for the Developing Countries." *Agricultural Economics* 8(1993):313–343. doi: 10.1016/0169-5150(93)90040-J.

Brander, J. A. "Intra-Industry Trade in Identical Commodities." *Journal of International Economics* 11(1981):1–14. doi: 10.1016/0022-1996(81)90041-6.

Calvin, L., and B. Krissoff. "Technical Barriers to Trade: A Case Study of Phytosanitary Barriers and US-Japanese Apple Trade." *Journal of Agricultural and Resource Economics* 23(1998): 351–366. doi: 10.22004/ag.econ.31191.

———. *Resolution of the US-Japan Apple Dispute.* Washington, DC: US Department of Agriculture, Economic Research Service, 2005.

Casey, C. "Trade Remedies: Antidumping." CRS Report R46296, Congressional Research Service, 2020.

———. "Trade Remedies: Antidumping and Countervailing Duties." CRS Report IF10018, Congressional Research Service, 2022.

Casey, C., and L. Wong. "Trade Remedies: Countervailing Duties." CRS Report R46882, Congressional Research Service, 2021.

Devadoss, S. "An Evaluation of Canadian and US Policies of Log and Lumber Markets." *Journal of Agricultural and Applied Economics* 40(2008):171–184. doi: 10.1017/S1074070800028042.

Devadoss, S., and J. Luckstead. "Effects of the 2014 Farm Bill Policies on Cotton Production." *Journal of Agricultural and Applied Economics* 50(2018):169–187. doi: 10.1017/aae.2017.28.

———. "US–Brazilian Cotton Policies." *World Economy* 43(2021):2222–2236. doi: 10.1111/twec.12941.

Devadoss, S., and W. Ridley. "Effects of the Mexican Apple Tariff on the World Apple Market." *Review of Development Economics* 18(2014):763–777. doi: 10.1111/rode.12117.

Devadoss, S., P. Sridharan, and T. Wahl. "Effects of Trade Barriers on US and World Apple Markets." *Canadian Journal of Agricultural Economics* 57(2009):55–73. doi: 10.1111/j.1744-7976.2008.01138.x.

Francois, J. F., B. McDonald, and H. Nordstrom. "Assessing the Uruguay Round." In W. Martin and L.A. Winters, ed., *The Uruguay Round and Developing Economies,* World Bank, 1995, 117–214.

Gillson, I., C. Poulton, K. Balcombe, and S. Page. "Understanding the Impact of Cotton Subsidies on Devloping Countries." Working paper, Overseas Development Institute, London, UK, 2022.

Giri, A., E. W. F. Peterson, and S. Sharma. "The Impact of the Market Facilitation Program on US Soybean, Sorghum and Corn Producers." *Choices* 33(2018):1–7. doi: 10.22004/ag.econ.281159.

Glauber, J. "US Trade Aid Payments and the WTO." *Applied Economic Perspectives and Policy* 43(2021):586–603. doi: 10.1002/aepp.13109.

Grant, J., S. Arita, R. Johansson, C. Xie, and C. Emlinger. "Agricultural Exports and Retaliatory Trade Actions: An Empirical Assessment of the 2018/2019 Trade Conflict." *Applied Economic Perspectives and Policy* 43(2021):619–640. doi: 10.1002/aepp.13138.

Grant, J., and S. Sydow. "The Economic Impacts of Trade Retaliation on U.S. Agriculture: A One-Year Review." *Choices* 34(2019):1–3. doi: 10.22004/ag.econ.301007.

Guyomard, H., C. Laroche, and C. L. Mouël. "An Economic Assessment of the Common Market Organization for Bananas in the European Union." *Agricultural Economics* 20(1999):105–120. doi: 10.1111/j.1574-0862.1999.tb00557.x.

Hanrahan, C. "The U.S.-European Union Banana Dispute." CRS Report RS20130, Congressional Research Service, Washington, DC, 2001.

Harrison, G. W., T. F. Rutherford, and D. G. Tarr. "Quantifying the Uruguay Round." *Economic Journal* 107(1997):1405–1430. doi: 10.1111/j.1468-0297.1997.tb00055.x.

Hertel, T. W., and W. Martin. "Liberalising Agriculture and Manufactures in a Millennium Round: Implications for Developing Countries." *World Economy* 23(2000):455–455. doi: 10.1111/1467-9701.00284.

Hitchner, J., K. Menzie, and S. Meyer. "Tariff Impacts on Global Soybean Trade Patterns and U.S. Planting Decisions." *Choices* 34(2019):1–9. doi: 10.22004/ag.econ.301009.

Holtman, N., A. Aguiar, and S. Devadoss. "The Effects of Freer Trade on Global Agriculture." Working paper, Texas Tech University, 2022.

Janzen, J. P., and N. P. Hendricks. "Are Farmers Made Whole by Trade Aid?" *Applied Economic Perspectives and Policy* 42(2020):205–226. doi: 10.1002/aepp.13045.

Johnson, R. "The U.S.-E.U. Beef Hormone Dispute." CRS Report R40449, Congressional Research Service, Washington, DC, 2017.

Kersten, L. "Impacts of the EU Banana Market Regulation on International Competition, Trade and Welfare." *European Review of Agricultural Economics* 22(1995):321–335. doi: 10.1093/erae/22.3.321.

Klinger, D. R. "Comparing Apples to Oranges: Lessons from the Failure of US Apple Exports to Japan." *Pacific Rim Law and Policy Journal* 8(1999):131–160.

Marchant, M. A., and H. H. Wang. "Theme Overview: U.S.-China Trade Dispute and Potential Impacts on Agriculture." *Choices* 33(2018). doi: 10.22004/ag.econ.273328.

Marvel, H. P., and E. J. Ray. "Countervailing Duties." *Economic Journal* 105(1995):1576–1593. doi: 10.2307/2235119.

Meilke, K. D., and R. Sarker. "Four Case Studies of Agri-Food CVDs and a Proposal for Reforming National Administered Protection Agencies." *Agricultural Economics* 17(1997): 147–164. doi: 10.1016/S0169-5150(97)00022-4.

Morgan, S., S. Arita, J. Beckman, S. Ahsan, D. Russell, P. Jarrell, and B. Kenner. "The Economic Impacts of Retaliatory Tariffs on US Agriculture." Economic Research Report ERR-304, US Department of Agriculture, Economic Research Service, Washington, DC, 2022.

Moschini, G., and K. D. Meilke. "Production Subsidy and Countervailing Duties in Vertically Related Markets: The Hog-Pork Case between Canada and the United States." *American Journal of Agricultural Economics* 74(1992):951–961. doi: 10.2307/1243193.

Muhammad, A., A. Smith, and S. MacDonald. "How Has the Trade Dispute Affected the U.S. Cotton Sector?" *Choices* 34(2019):1–9. doi: 10.22004/ag.econ.301012.

Nigh, V., and M. Nepveux. "U.S., China Phase One Agreement–Year One." 2021. Available online at https://www.fb.org/market-intel/u.s.-china-phase-one-agreement-year-one [Accessed July 10, 2021].

Nti, F., L. Kuberka, and K. Jones. "Impact of Retaliatory Tariffs on the U.S. Pork Sector." *Choices* 34(2019):1–8. doi: 10.22004/ag.econ.301015.

Office of the US Trade Representative. "United States Succeeds in Removing Japan's Barriers to U.S. Apples." 2005. Press release, August 31.

Pan, S., S. Mohanty, M. Fadiga, and D. E. Ethridge. "The Impacts of US Cotton Programs on the World Market: An Analysis of Brazilian WTO Petition." *Journal of Cotton Science* 10(2006): 180–192. doi: 10.22004/ag.econ.31254.

Paulson, N. D., A. M. Featherstone, and J. C. Hadrich. "Distribution of Market Facilitation Program Payments and their Financial Impact for Illinois, Kansas, and Minnesota Farms." *Applied Economic Perspectives and Policy* 42(2020):227–244. doi: 10.1002/aepp.13055.

Poonyth, D., A. Sarris, R. Sharma, and S. Shui. "The Impact of Domestic and Trade Policies on the World Cotton Market." FAO commodity and trade policy research working paper 8, Food and Agriculture Organization of the United Nations, Rome, Italy, 2004.

Regmi, A. "Retalitory Tariffs on US Agriculture." Report to Congress R45903, Congressional Research Service, Washington, DC, 2019.

Ridley, W., and S. Devadoss. "Analysis of the Brazil-USA Cotton Dispute." *Journal of International Trade Law and Policy* 11(2012):148–162. doi: 10.1108/14770021211239668.

———. "US–Brazil Cotton Dispute and the World Cotton Market." *World Economy* 37(2014):1081–1100. doi: 10.1111/twec.12146.

———. "Competition and Trade Policy in the World Cotton Market and Implications for U.S. Cotton Exports." Working paper, University of Illinois Urbana-Champaign, Champaign, IL, 2022a.

———. "Determinants of Policy Responses in the US–China Tit-for-Tat Tariff War." Working paper, University of Illinois Urbana-Champaign, Champaign, IL, 2022b.

Ridley, W., J. Luckstead, and S. Devadoss. "Wine: The Punching Bag in Trade Retaliation." *Food Policy* 109(2022):102,250. doi: 10.1016/j.foodpol.2022.102250.

Sabala, E., and S. Devadoss. "Impacts of Chinese Tariff on World Soybean Markets." *Journal of Agricultural and Resource Economics* 44(2018):291–310. doi: 10.22004/ag.econ.287975.

———. "Spatial Equilibrium Analysis of Chinese Tariff on World Cotton Markets." *World Economy* 44(2021):2188–2202. doi: 10.1111/twec.13045.

———. "Analysis of Chinese Tariff on Sorghum Market under Varying Market Structure." *Journal of Agricultural and Resource Economics* 46(2022):1–15. doi: 10.22004/ag.econ.310522.

Schnepf, R. D. "Brazil's WTO case against the U.S. Cotton Program." CRS Report for Congress RL32571, Congressional Research Service, 2010.

———. "Brazil's WTO Case against the US Cotton Program." CRS Report for Congress RL32571, Congressional Research Service, 2011.

———. "The WTO Brazil-U.S. Cotton Case." CRS Report for Congress R43336, Congressional Research Service, 2014.

Schwarzenberg, A. "Boeing-Airbus Subsidy Dispute: Recent Developments." CRS Report IF11364, Congressional Research Service, Washington, DC, 2021.

Tokarick, M. S. "Measuring the Impact of Distortions in Agricultural Trade in Partial and General Equilibrium." Working Paper WP/03/110, International Monetary Fund, Washington, DC, 2003.

US Department of Agriculture. "Japan — Fresh Deciduous Fruit-Review of U.S. Apple Export Season in Japan." AGR Number JA6018, US Department of Agriculture, Foreign Agricultural Service, Washington, DC, 1996.

Wong, D., and A. C. Koty. "The US-China Trade War: A Timeline." 2020. *China Briefing*. Available online at https://www.china-briefing.com/news/the-us-china-trade-war-a-timeline/ [Accessed May 27, 2018].

World Trade Organization. "European Communities — Regime for the Importation, Sale and Distribution of Bananas." WTO Report WT/DS27/1, World Trade Organization, 1996.

———. "EC Measures Concerning Meat and Meat Products (Hormones) Complaint by the United States: Report of the Panel." WTO Report WT/DS26/R/USA, World Trade Organization, Washington, DC, 1997.

———. "EC Measures Concerning Meat and Meat Products (Hormones) Complaint by the United States: Appellate Body Report." WTO Report WT/DS26/AB/R, World Trade Organization, Washington, DC, 1998.

———. "Japan — Measures Affecting the Importation of Apples: Report of the Panel." Dispute settlement DS245, World Trade Organization, Washington, DC, 2003. Available online at https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds245_e.htm.

———. "United States — Subsidies on Upland Cotton: Report of the Panel." Dispute settlement DS267, World Trade Organization, Washington, DC, 2004. Available online at .

———. *Agreement on Agriculture*. Washington, DC: World Trade Organization, 2022a. Available online at https://www.wto.org/english/docs_e/legal_e/14-ag_01_e.htm.

———. "Dispute Settlement: The Disputes." 2022b. Available online at https://www.wto.org/english/tratop_e/dispu_e/find_dispu_cases_e.

Zheng, Y., D. Wood, H. H. Wang, and J. P. Jones. "Predicting Potential Impacts of China's Retaliatory Tariffs on the US Farm Sector." *Choices* 33(2018):1–6. doi: 10.22004/ag.econ.310522.

Journal of Agricultural and Resource Economics 47(3):S1–S5
ISSN 1068-5502

doi: 10.22004/ag.econ.322853

Online Supplement: 2022 WAEA Presidential Address: Agricultural Trade Disputes

Stephen Devadoss

Frequently, countries dispute over trade-distortive policies. When an aggrieved country is adversely affected by the policies of an offending country, it can file a case with the WTO. These cases go through several stages of litigation, as in any regular court proceedings. This appendix describes step-by-step these stages based on information largely drawn from the World Trade Organization (2022). Table S1 reports the number of complaints filed with the WTO, which are grouped under various stages depending on where the cases stand in the progression of the dispute settlement.

Consultation Process

The first stage of the dispute settlement process is the consultations. Similar to out-of-court settlement, one of the goals of the Dispute Settlement Understanding is to enable the concerned parties to amicably resolve the disputes by themselves without going through lengthy litigation. This goal starts with establishing consultations, which allows disputing countries to settle their conflict within 60 days. Of the 612 disputes, 180 are either resolved through or pending in consultations, which indicates the effectiveness of the consultation process to satisfactorily resolve the disputes.

Panel Establishment

The second stage is to establish a panel. If the complainant is not satisfied with the resolutions during the 60-day consultations period, it can petition the Dispute Settlement Body (DSB) to establish a panel to adjudicate the case. The responding country can also consider petitioning the DSB to protect its interests as it may view the filings by the complainant as unfair. The purpose of this adjudicative process is to legally settle the dispute, which is binding for both parties.

Composition of the Panel

The third stage is to form a panel with experts in the field to adjudicate the case. Since the panel members are not permanent, each dispute will be handled by three to five members proposed by the WTO Secretariat from a list of qualified specialists nominated by WTO member countries. Citizens of the parties involved with the case are barred from serving on this panel. Additionally, if the dispute involves a developing country, at least one of the panelists should be from another developing country. Very often, the involved parties make use of Article 8.6 of the Dispute Settlement Understanding to oppose certain panelists, and in such events, the WTO Secretariat will find replacement panelists. If such replacements are unsatisfactory to the parties involved, then the WTO Director-General will select the panel members. These panels work independently and do not represent the interests of any country.

Table S1. Current Status of Disputes Filed with the WTO

Current Status of Disputes	Number of Cases
In consultations	180
Panel established, but not yet composed	26
Panel composed	30
Panel report circulated	4
Panel report under appeal	17
Appellate body report circulated	0
Reports adopted, no further action required	37
Reports adopted, with recommendation to bring measures to conformity	46
Implementation notified by respondent	95
Mutually acceptable solution on implementation notified	23
Compliance proceedings ongoing	9
Compliance proceedings completed without finding of non-compliance	3
Compliance proceedings completed with finding of non-compliance	6
Authorization to retaliate requested	12
Authorization to retaliate granted	9
Authority for panel lapsed	17
Settled or terminated	104

Circulation of the Panel Report

The disputing parties can present their cases to the DSB panel. Based on the hearings, the panel will report its findings to the Dispute Settlement Body which should adopt the findings between 20-60 days after it circulates the report to the concerned parties. Adoption of the findings can be rejected if all disputing parties unanimously concur with rejection; in contrast, the report should be adopted even if one disputing country recommends adoption. If the concerned parties of the dispute do not appeal the panel's findings, then the DSB will adopt the panel report.

Panel Report under Appeal

If a disputing party decides to appeal to the Appellate Body, it should do so before the report is adopted by the DSB. Either the winning, losing, or both parties can file an appeal of all or individual panel findings because either party may not be satisfied with the panel findings. Then the case moves to the Appellate Body. The DSB forms the Appellate Body by appointing seven members who serve for four years with staggered appointments. The members of the Appellate Body should have expertise in international trade, law, and be familiar with the subject matter of the disputes. One of the seven members is elected to serve as the Chairman for a one-year term and the Chairman conducts the business of the Appellate Body. Among the seven members, three are selected randomly to handle each appeal. The members of the Appellate Body should operate impartially, independently, and with no conflicts of interest.

Appellate Body Report Circulated

The responsibility of the Appellate Body is to uphold the panel's report if it agrees with the panel's findings, modify the conclusions if it does not agree with the panel's justifications, or overturn the findings if it disagrees. If the Appellate Body reverses certain findings of the panel, then the complainant needs to initiate a new dispute settlement resolution.

Adoption of Reports, No Further Action Required

As noted in the "Circulation of the Panel Report," adoption of the report does not require consensus or majority approval of the disputing members. Since rejection of the report requires consensus of all parties to the dispute, a report has never been rejected in the history of the WTO dispute settlement process. For the report to be adopted, a WTO member should request to place the report for consideration in the upcoming meeting of the Dispute Settlement Body. At this meeting, the concerned parties or other members can register their objections to any unexpected conclusions of the panel. If parties do not appeal, then the Dispute Settlement Body adopts the report and the dispute moves to implementation stage.

Adoption of Reports, Recommendation to Bring Measures to Conformity

Once the Appellate Body finalizes the report, the Dispute Settlement Body should adopt the report within 30 days, and concerned parties should unconditionally accept the resolution. The adoption of the Appellate Body report implies that the panel report should also be considered since the findings of both reports can be understood only by examining them together.

Implementation

Once the Dispute Settlement Body adopts the panel report, it should ensure the implementation of the report by notifying the losing party of the rulings. The losing party should inform the Dispute Settlement Body within 30 days of its plan to follow the rulings and comply with WTO law to ensure the dispute is resolved. The losing party can request additional, but reasonable, time to implement the rulings as it may require time to adjust its policies.

Mutually Acceptable Solution on Implementation Notified

To ascertain a reasonable period of implementation time, Article 21.3 outlines one of three possibilities. First, the concerned member can propose the time periods which then has to be approved by the Dispute Settlement Body. Second, the dispute parties can come up with a mutually agreed time within the window of 45 days from the adoption of the reports. Third, if the first two possibilities do not materialize, an arbitrator can fix a time period for implementation. This arbitrator is generally chosen from the current or former Appellate Body. If the disputing parties do not agree with the choice of the arbitrator, then the director general appoints the arbitrator. The panel report is usually implemented by the arbitrator within the 15 months of the adoption of the reports. It is upon the implementing member to prove that the implementation period is reasonable and choose the approach for compliance.

Compliance Proceedings

When the disputing parties do not agree on whether the losing party fully complied and implemented the panel's recommendations, either the losing country or the complainant can ask for a panel to examine the compliance. The Dispute Settlement Body will first ask the original panel to look into the compliance. The parties can also appeal the compliance panel reports. The Appellate Body, in addition to examining whether the losing party fully complied or not, can also consider if the new measures are consistent with the agreement.

Table S2. Agricultural Disputes Involving the United States

Case	Short Description	Complainant	Respondent	Current Status
DS3	SPS and TBT Measures Against US Ag. Products	United States	Korea	In Consultations
DS5	SPS and TBT Measures Against US Ag. Products	United States	Korea	Mutually Satisfactory Solution
DS26	SPS and TBT Restrictions Against US Meat Treated with Hormones	United States	European Union	Mutually Satisfactory Solution
DS27	Regime for the Importation, Distribution, and Sale of Bananas	United States	European Union	Settled
DS35	Subsidies on Export of Hungarian Ag. Goods	United States	Hungary	Settled
DS41	SPS and TBT Measures Against US Ag. Products	United States	Korea	In Consultations
DS74	Restrictive Tariff Rate Quota Against US Pork and Poultry	United States	Philippines	Settled
DS76	Restrictive Tariff Rate Quotas Against US Ag. Products	United States	Japan	Mutually Satisfactory Solution
DS90	Import Licensing Regime Against US Ag. Goods and Textiles	United States	India	Measures Implemented
DS102	Measures Against US Pork and Poultry	United States	Philippines	Settled
DS103	Subsidies on Exports of Canadian Milk	United States	Canada	Mutually Satisfactory Solution
DS104	Subsidies on Exports of E.U. Processed Cheese	United States	European Union	In Consultations
DS108	Tax Treatment for Foreign Sales Corporations	European Union	United States	Mutually Satisfactory Solution
DS111	Restrictive Tariff Rate Quota for Argentinian Groundnuts	Argentina	United States	In Consultations
DS144	SPS and TBT Measures Against Canadian Swine, Cattle, and Grain	Canada	United States	In Consultations
DS161	Import Licensing Regime Blocking Imports of US Beef	United States	Korea	Measures Implemented
DS166	Safeguard Measures Against Imports of E.U. Wheat Gluten	European Union	United States	Reports Adopted
DS167	Countervailing Duty Investigation Against Canadian Live Cattle	Canada	United States	In Consultations
DS180	Reclassification of Canadian Sugar Syrups	Canada	United States	In Consultations
DS197	Establishment of Minimum Import Prices	United States	Brazil	In Consultations
DS198	Establishment of Minimum Import Prices	United States	Romania	Settled
DS203	Anti-Dumping Duties Against US Live Swine	United States	Mexico	In Consultations
DS210	Customs Duties Against Imports of US Rice	United States	Belgium	Settled
DS245	SPS Measures Against Imports of US Apples	United States	Japan	Mutually Satisfactory Solution
DS267	US Subsidies on Upland Cotton	United States	Brazil	Mutually Satisfactory Solution
DS275	Import Licensing Regime Against US Ag. Goods	United States	Venezuela	In Consultations
DS291	SPS and TBT Measures Impacting US Biotech Products	United States	European Union	Authorization to Retaliate
DS334	Import Licensing Regime Against Imports of US Rice	United States	Turkey	Measures Implemented
DS387	Government Incentives for US Ag. Products and Firms	United States	China	In Consultations
DS389	SPS and TBT Measures Against Imports of US Poultry Meat	United States	European Union	In Consultations
DS392	SPS Measures Against Imports of Chinese Poultry	China	United States	Reports Adopted
DS455	Import Licensing Regime Against US Ag. Products	United States	Indonesia	Panel Established
DS465	Import Licensing Regime Against US Ag. Products	United States	Indonesia	In Consultations
DS478	Import Licensing Regime Against US Ag. Products	United States	Indonesia	Authorization to Retaliate
DS511	Domestic Supports for Chinese Ag. Producers	United States	China	Authorization to Retaliate

Authorization to Retaliate

The compliant party can request the Dispute Settlement Body's approval to implement trade sanctions on the respondent if both parties have not come to a consensus on compensation within 20 days of the expiration of the reasonable period of time. The complainant can enforce countermeasures selectively to retaliate or sanction against the respondent. These sanctions are temporary, and the Dispute Settlement Body will oversee them until the implementation ends and the respondent fully complies with the rulings. These retaliations are the last resort of the dispute solutions because they cause considerable collateral damage and go against the WTO philosophy of removing trade barriers.

Authority for Panel Lapsed

Once the dispute is resolved, the panel ends its work.

Settled or Terminated

In the final step of the dispute resolution, the case is either satisfactorily settled or terminated upon mutual agreement by the parties.

Dispute Settlement Process in Limbo

Currently, the WTO dispute settlement process is in a state of crisis because the United States is blocking the appointment of members to the Appellate Body (Lester, 2022). The reason for the US actions are that the United States is generally concerned with the functioning of the Dispute Settlement Body and the United States claims judicial overreach by the Appellate Body. Because of these concerns, the United States is not allowing new appointments to the Appellate Body as terms of current members expire, which has stalled the Appellate Body from hearing appeals. As Lester (2022) observes that dispute settlement units provide ample opportunities to WTO members to facilitate dispute settlement processes fairly, so the US concerns seem to be unfound, which is evident from the lack of any US proposals to fix the problems in the dispute settlement process. Because of this stalemate, many of the WTO disputes are not being resolved.

References

Lester, S. *Ending the WTO Dispute Settlement Crisis: Where to from Here?* Winnipeg, MB: International Institute for Sustainable Development, 2022.

World Trade Organization. *The Process: Stages in a Typical WTO Dispute Settlement Case*. Washington, DC: WTO, 2022.