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Squash: Effect of Imports on U.S. Seasonal Markets, with a Focus on the U.S. Southeast

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Abbreviations and Acronyms

Item	Definition
AEWR	Adverse Effect Wage Rate
AMS	Agricultural Marketing Service (USDA)
AUV	average unit value
AVE	ad valorem equivalent
CAFTA-DR FTA	Dominican Republic-Central America-United States Free Trade Agreement
CES	constant elasticity of substitution
COP	cost of production
COVID-19	coronavirus disease 2019, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)
ERS	Economic Research Service (USDA)
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	Food and Agriculture Organization Statistics Division database
FAS	Foreign Agricultural Service (USDA)
FDA	U.S. Food and Drug Administration
FDCA	Federal Food, Drug, and Cosmetic Act
FDI	foreign direct investment
FFVA	Florida Fruit & Vegetable Association
FLC	farm labor contractor
FOB	free on board
FPAA	Fresh Produce Association of the Americas
FSMA	Food Safety Modernization Act (United States)
FTE	full-time equivalent
FY	fiscal year
GTA	Global Trade Atlas (database)
H-2A	H-2A Temporary Agricultural Program
ha	hectare (2.47 acres)
HS	Harmonized Commodity Description and Coding System
HTS	Harmonized Tariff Schedule of the United States
kg	kilogram(s)
MFN	most favored nation (tariff rates)
mt	metric ton(s)
NAFTA	North American Free Trade Agreement
NASS	National Agricultural Statistics Service (USDA)
NAWS	National Agricultural Worker Survey
NCRS	National Resources Conversation Service (USDA)
NTR	normal trade relations (rate)
SCBGP	Specialty Crop Block Grant Program (United States)
SCRI	Specialty Crop Research Initiative (United States)
SIAP	Agrifood and Fisheries Information Service (Mexico)
SQF	Safe Quality Food Program (global program)
TIPA	Texas International Produce Association
USD	U.S. dollar
USDA	U.S. Department of Agriculture
USITC	U.S. International Trade Commission
USMCA	United States-Mexico-Canada Agreement
USTR	The Office of the U.S. Trade Representative
WTO	World Trade Organization

Executive Summary

This report provides information and analysis on the U.S. fresh squash industry, and the effects of imports of squash on U.S. seasonal markets, with a particular focus on the U.S. Southeast. The U.S. fresh squash industry consists of two segments: summer squash and winter squash.[1] In the United States, both summer and winter squash are sold into the fresh market. A limited amount of squash is sold to food processing companies. Recently, industry representatives in the U.S. Southeast, who primarily grow summer squash, have reported increased competition from U.S. imports of squash for fresh consumption, as well as a decline in U.S. prices for these products. This report focuses on fresh summer squash as these are the primary varietals produced in the U.S. Southeast.

The largest squash-producing states, by volume, are California, Florida, Georgia, North Carolina, and Michigan. Nationally, production increased 15.2 percent between 2015 and 2020, with the top producing states seeing a combined increase of 47.5 percent, offsetting a 22.3 percent decrease in production in other states. Apparent consumption of squash in the United States increased by 172,257 mt (29.5 percent) between 2015 and 2020. U.S. consumer demand for squash has increased alongside other fresh vegetables as consumers increase vegetable consumption as part of a healthier diet.

The United States is a net importer of squash, with seasonal patterns in imports and domestic production. The United States is the largest importer of squash in the world with 493,832 mt of total imports in 2020. From 2015 to 2020, U.S. imports of fresh squash were mainly supplied by Mexico, which is profiled in this report along with the United States. Mexico supplied 96.1 percent of U.S. imports of fresh squash in 2020 and accounted for an annual average of 60.6 percent of U.S. domestic consumption during 2015–20.

Over 80 percent of U.S. imports from Mexico enter the country between November and the end of May, with nearly half entering December through March. U.S. imports overlap mainly with the U.S. Southeast harvest, which begins in the late fall in Georgia, moves to Florida in the winter, then moves back to Georgia in the spring and finally moves to North Carolina in late spring and early summer. These states produce primarily summer squash, though approximately one-third of North Carolina's production is winter squash. Squash-producing states outside the Southeast grow about the same amount of summer and winter squash, except for New York, Michigan, and Oregon, which primarily grow winter squash. States outside the Southeast harvest in the summer.

The Request

U.S. Trade Representative Robert Lighthizer requested this investigation in a letter received by the U.S. International Trade Commission (USITC or Commission) on December 7, 2020. The letter asked that the Commission conduct an investigation and prepare a report on the effects of imports on the domestic seasonal markets of all imports which fall within the Harmonized Tariff Schedule of the United States

[1] Both summer and winter squash are warm-season crops. Summer squash have a thin, edible skin and are typically harvested and consumed before full maturity. Summer squash include varieties such zucchini, yellow, crookneck, and scallop. In contrast, winter squash are harvested when they are fully mature and have a thick, hard rind, which allows them to be stored for several months. Winter squash include varieties such as acorn, spaghetti, butternut, and hubbard.

(HTS) subheading 0709.93.20, which consists of squash, fresh or chilled. The Trade Representative stated that the Commission's report should focus primarily on the 2015–20 period and include the following:

- Effect of imports on the domestic seasonal markets of the products in question, with particular focus on production and competitiveness of squash grown in the Southeastern United States.
- Recent trends in trade in squash between the United States and its trading partners, including information on seasonal patterns of trade.
- Descriptions of monthly price trends, including an analysis and comparison of the prices of domestically produced products and imported products in the U.S. market.

Approach

Based on the request from the Trade Representative, the Commission conducted three broad assessments of the U.S. fresh squash industry and major suppliers to the United States: (1) a cross-country comparison of competitiveness, (2) an analysis of U.S. imports and prices, and (3) an estimate of the economic impact of imports on seasonal markets. The report also provides detailed profiles of industries producing fresh squash in major supplier countries to the U.S. market (i.e., Mexico and the United States, with a focus on producers in the U.S. Southeast). The study took a different approach for each of the three requested assessments:

- The cross-country competitiveness framework compared the United States' fresh squash industry—with a focus on the U.S. Southeast—to the industry in Mexico, which is the major supplier of imports to the U.S. market, in terms of delivered cost, product differentiation, and reliability of supply.
- A descriptive analysis of monthly import trends was conducted using U.S. import data and an analysis of prices in the U.S. market was conducted using available price data. Along with information on the product mix of imports, this information was used to provide a comparison of U.S. prices and import prices in the U.S. market.
- A seasonal partial equilibrium model was used to assess the economic impact of U.S. imports on production, earnings, employment, and prices of the U.S. fresh market squash industry.

Cross-country Comparison of Competitiveness

Mexico and several regions within the United States are the main suppliers of summer squash for fresh consumption in the U.S. market; the competitiveness of these suppliers, however, varies. The Commission's research showed that at the national level, the U.S. summer squash industry is a high-cost producer of moderately differentiated products, supplying primarily zucchini, yellow squash and scallop squash (table ES.1). Analysis of the product originating in the U.S. Southeast showed similar results, with the industry being a high-cost producer of moderately differentiated products. Mexico is a low-cost supplier of more highly differentiated products, including zucchini, yellow squash, gray squash, and scallop squash, with a reputation for consistently high product quality and preferential packing and sorting. Both the United States, including the U.S. Southeast, and Mexico are broadly considered to be reliable suppliers to the U.S. market for summer squash, but not to an equal degree.

Table ES.1 Comparison of competitive factor categories for summer squash in selected countries and regions, 2015–20

Country	Delivered cost	Product differentiation	Reliability of supply
United States	High	Medium	High
Southeast	High	Medium	Medium
Mexico	Low	High	High

Source: Compiled by USITC staff.
Note: The comparison is based on squash for fresh consumption and does not consider competitive factors of squash for processing. For the United States, the national level competitive analysis considers the U.S. fresh market squash industry as a whole. The Southeast considers competitiveness of the industry in Florida, Georgia, and North Carolina.

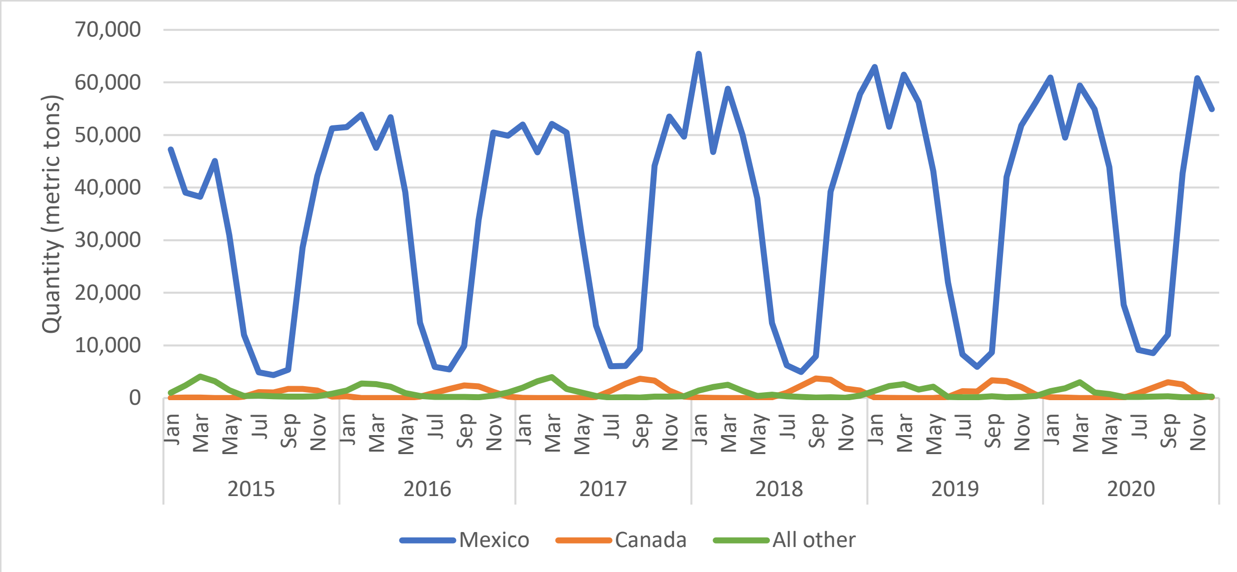
U.S. Import and Price Trends in the U.S. Market

Seasonal Import Trends

U.S. imports of squash are sourced primarily from Mexico and follow a clear seasonal pattern of higher volumes in November through May and lower volumes in June through October (figure ES.1). In particular, January through April tends to be the highest period for U.S. imports of squash from Mexico. In these months, the U.S. Southeast is harvesting squash, but there is little production in other regions of the United States. By contrast, from June through October of each year, northern regions of the United States are also harvesting squash, while U.S. Southeast squash production is limited. During 2015–20, between 81 and 84 percent of imports from Mexico in each year entered during the seven-month period from November through May. The remaining small share entered from June through October; imports are less prevalent during these months due to the ready availability of domestic squash, as well as the difficulty of growing squash in Mexico’s hot climate during the summer.

Figure ES.1 Monthly U.S. squash imports from Mexico, Canada, and all other sources, by quantity, 2015–20

In metric tons. Underlying data for this figure can be found in appendix F, tables F.6, F.7, F.8.



Source: USITC DataWeb/Census, imports for consumption, first unit of quantity, HTS subheading 0709.93.20, Pumpkins, squash and gourds (Cucurbita spp.): Squash, accessed February 26, 2021.

Despite this distinct seasonal pattern in U.S. imports from Mexico during 2015–20, imports from June–October have increased substantially over the past 30 years. Industry representatives have reported that improved growing methods in Mexico, such as increased use of irrigation, have resulted in a longer production season. This has led to an increase in imports from Mexico during June–October; these imports made up about 5 percent of the annual import total from Mexico in 1990 and 19 percent in 2020.

Price Trends for Summer Squash in the U.S. Market

Seasonality in the production of summer squash contributes to price variation. Because the various U.S. and Mexican squash-growing regions have different but overlapping production seasons, there are often short periods of high supply and low prices in the U.S. market (when production from many regions overlaps) and also periods of relatively scarce supply and higher prices (when few regions are shipping squash). In general, according to point of shipment data available from the U.S. Department of Agriculture's Agricultural Marketing Service,[2] the highest prices are reported at the end of the growing seasons, periods referred to as "shoulder periods." In particular, the main shoulder periods appear to occur during fall as well as the late spring (end of April through June), when production volumes are declining and, as a result, prices increase.

Even during the peak production season, however, prices vary widely. In part, variations are due to climate conditions, which limit the time in which farmers in the southeastern United States can plant,

[2] The limitations of these pricing data are described further in chapter 5. The main limitation is a lack of coverage of U.S. contract sales, which make up a large share of total U.S. sales of squash. Large retailers typically use contracts rather than purchasing at the wholesale markets.

and to rainy periods right before or during harvests, which can limit harvests or affect quality. As a result, there can be temporary gluts or shortages in production during the main production season, leading to price swings. Some of these temporary price swings are smoothed by the prevalence of contract sales, which can provide grower-shippers with a fixed price over longer periods of time.

Industry representatives throughout the supply chain generally agree that, while U.S. demand for summer squash is fairly consistent and strong year-round, buyers are price conscious, and squash prices tend to respond very quickly to sudden increases or decreases in supply. As a result, squash prices vary widely throughout the season and change daily.

The highly perishable nature of summer squash also contributes to prices that fluctuate quickly based on supply and demand, since summer squash cannot be held in inventory to smooth out supply. Overall, the available U.S. Department of Agriculture's (USDA) Agricultural Marketing Service (AMS) price data[3] suggest that the U.S. squash market is one in which domestic and imported product compete closely in most segments. Prices for domestic and imported squash are often very similar and tend to follow largely the same trends. In general, AMS data show imports from Mexico are often priced slightly below domestic squash at the point of shipment, but domestic squash are often priced slightly lower on the wholesale market (where the cost of freight is included in the price). These data suggest that relatively small components of total delivered cost, such as a longer shipping distance, can affect the comparison between domestic and imported squash prices.

Effect of Imports on U.S. Seasonal Markets

In order to estimate the economic effects of increased squash imports on the U.S. domestic market, the Commission developed and applied a partial equilibrium model of the U.S. seasonal market for fresh squash. Squash data are separated in the analysis into summer and winter varieties. The period 2000–20 is used to estimate the model, but the model results focus on the most recent six years (2015–20). Markets producing in each period, June through October and November through May, experienced increases in the growth rates of imports during specific years within the 2009–19 period. The partial equilibrium model simulates a counterfactual scenario in which the higher growth rates did not occur, and imports are reduced from 2009 onward.[4]

In this hypothetical scenario, the removal of above-average increases in imports from 2009 to 2019 would have had positive effects on U.S. production, revenue, and operating income in 2015–20. In such a scenario, lower squash import volumes would have led to higher import prices, and a shift towards consumption of domestic varieties after the relative import price change. This counterfactual would have led to higher prices of domestically produced squash and more output. Increases in output and prices would have led to increases in domestic revenue, operating income, and employment.

Model results show that for both summer and winter squash varieties, the hypothetical removal of the above-average increases in imports (the counterfactual) would have a larger effect during November–

[3] The limitations of this pricing data are described further in chapter 5. The main limitation is a lack of coverage of U.S. contract sales, which make up a large share of total U.S. sales of squash. Large retailers typically use contracts rather than purchasing at the whole sale markets.
[4] The June through October period corresponds with the harvest seasons for the majority of U.S. production. However, parts of Florida, Georgia, and California harvest primarily from November through May.

May. For summer squash, the hypothetical removal of the higher import growth rates during November–May would have increased U.S. producers' revenue by an average of $16.3 million, operating income by an average of $5.3 million, and domestic production by an average of 37.2 percent during the 2015–20 growing periods (table ES.2). For June–October, domestic revenue would have been $11.9 million higher on average absent the higher import growth years, operating income about $3.9 million higher, and domestic production 12.0 percent higher (table ES.3). The November–May effects impact a portion of Florida, Georgia, and California production, as those are the states that harvest during these months. Effects for winter squash varieties follow the same pattern but are smaller in magnitude (see table 6.3 and 6.4).

Table ES.2 Summer squash: estimated economic effects in November–May of a hypothetical reduction in U.S. imports, 2015–20
In percentages, thousands of metric tons, millions of dollars, and number of FTEs. Mt = metric tons; FTEs = full-time equivalent workers.

Period	Import price (%)	Import quantity (%)	Domestic price (%)	Domestic output (%)	Domestic output (1,000 mt)	Domestic revenue (million $)	Domestic operating income (million $)	Domestic employment (no. of FTEs)
Nov 2015–May 2016	23.81	−23.11	4.21	28.10	12.24	12.76	4.13	159
Nov 2016–May 2017	22.76	−23.11	3.88	25.65	11.77	12.29	3.98	150
Nov 2017–May 2018	30.53	−28.30	5.29	36.28	21.67	15.17	4.91	247
Nov 2018–May 2019	37.61	−33.29	6.44	45.43	33.36	19.83	6.42	400
Nov 2019–May 2020	39.91	−33.29	7.03	50.35	24.88	21.36	6.92	342
Average	30.92	−28.22	5.37	37.16	20.78	16.28	5.27	260

Source: USITC estimates.
Note: These numbers were simulated using a customized partial equilibrium model of the U.S. market for summer squash. They can be interpreted as the percent change and dollar-value change of model outcomes after removing the above-average increases in imports.

Table ES.3 Summer squash: estimated economic effects in June–October of a hypothetical reduction in U.S. imports, 2016–20

In percentages, thousands of metric tons, millions of dollars, and number of FTEs. mt = metric tons; FTEs = full-time equivalent workers.

Period	Import price (%)	Import quantity (%)	Domestic price (%)	Domestic output (%)	Domestic output (1,000 mt)	Domestic revenue (million $)	Domestic operating income (million $)	Domestic employment (no. of FTEs)
Jun–Oct 2016	16.85	−30.23	1.33	8.26	12.79	7.44	2.41	167
Jun–Oct 2017	21.06	−35.05	1.75	10.94	17.01	12.10	3.92	217
Jun–Oct 2018	21.19	−35.05	1.78	11.19	17.93	10.12	3.28	204
Jun–Oct 2019	25.43	−39.52	2.17	13.75	17.85	14.46	4.68	214
Jun–Oct 2020	26.66	−39.52	2.51	16.02	21.01	15.42	4.99	289
Average	22.24	−35.87	1.91	12.03	17.32	11.91	3.86	218

Source: USITC estimates.

Note: These numbers were simulated using a customized partial equilibrium model of the U.S. market for summer squash. They can be interpreted as the percent change and dollar-value change of model outcomes after removing the above-average increases in imports.

Industry Profiles

United States

The United States accounted for 2.7 percent of global squash, gourds, and pumpkin production in 2019 and was the seventh-largest producer globally. This production includes both winter and summer squash, which is produced in almost equal volumes nationally. The largest producing states, by volume, are California, Florida, Georgia, North Carolina, and Michigan. Nationally, production increased 15.2 percent over the 2015–20 period, while production in the Southeast region, including the states of Florida, Georgia, and North Carolina, grew by 36 percent over this period, faster than the rest of the country. Nationally, production growth was driven by a 14.8 percent increase in the area harvested, as yields were largely stable across the United States over the last six-year period. Between 2015 and 2020, the production of squash in the United States increased from approximately 273,000 metric tons (mt) to 314,000 mt and supplied approximately 40.2 percent of U.S. domestic consumption during this period. U.S. domestic squash production does not meet U.S. consumer demand, and imports are increasingly filling that gap.

The competitiveness of the U.S. summer squash industry varies significantly by region and can be evaluated by comparing the delivered costs, product differentiation, and reliability of supply of U.S. products against those of imports. Certain key factors contribute to the competitiveness of the U.S. summer squash industry in the U.S. market, including the large geographical dispersion of U.S. production, geographical proximity to the market, and consumer preferences for local produce. While squash produced in the United States have some advantages over imported products, there are a number of other factors—such as the relatively high costs of producing squash in the United States and the weather-related volatility of production in the U.S. Southeast—that limit the competitiveness of the

U.S. industry. The competitiveness of the U.S. Southeast varies somewhat from that of the United States as a whole. The Southeast has slightly less product differentiation and slightly lower reliability of supply, largely because of weather and pest pressures.

Mexico

Mexico accounted for 3.0 percent of global squash, gourds, and pumpkin production in 2019, and was the fifth-largest producer globally. Overall squash production, which averaged 770,426 mt per year between 2015 and 2020, has increased 3.7 percent over the period. Summer squash (*calabacita*) is the main type of squash grown in Mexico and accounts for about 80 percent of total squash production, with the remainder winter squash (*calabaza*). Over the 2015–20 period, production of summer squash increased by 8.1 percent, while production of winter squash decreased by 13.9 percent. Despite this divergence in production, there were variations in production of both types of squash within the period. Much of Mexico's climate is conducive to growing horticulture crops, including squash, although it does face water and weather pressures. The main squash-growing regions in Mexico are in the northwestern states of Sinaloa and Sonora and the central parts of the country, with states in these regions producing 70.3 percent of Mexico's squash in 2019.

Mexico's competitive advantages in the production of summer squash include a relatively low cost of production, which is driven by a favorable climate in its squash-growing region that lowers input costs and by the availability of comparatively low-cost labor. Mexican squash also enjoy a reputation for consistently high product quality. This reputation has been bolstered by investment from large produce exporters in production and packing improvements. The industry further benefits from its established relationships with U.S. buyers and investors, who consider Mexico's long production season and improved logistics important to ensuring reliable supply.

Chapter 1
Introduction

This report responds to the U.S. Trade Representative's (Trade Representative) request for information and analysis on the U.S. squash industry. Specifically, the Trade Representative asked that the report focus on the effects of imports of squash on U.S. seasonal markets and prices, and that it focus particularly on the U.S. Southeast.[5] The Trade Representative asked for an investigation and report in a letter dated December 4, 2020, under authority delegated by the President under section 332(g) of the Tariff Act of 1930.[6]

The U.S. fresh squash industry consists of two segments: summer squash and winter squash. In the United States, both summer and winter squash are sold into the fresh market.[7] A limited amount of squash is sold to food processing companies.[8] Recently, industry representatives in the U.S. Southeast have reported increased competition from U.S. imports of squash for fresh consumption, as well as a decline in U.S. prices for these products.[9]

Scope

This report covers imports which are classified within the Harmonized Tariff Schedule of the United States (HTS) under subheading 0709.93.20, which covers squash, fresh or chilled. The Trade Representative stated that the Commission's report should focus primarily on the 2015–20 period and include the following:

- Effect of imports on the domestic seasonal markets of the products in question, with particular focus on production and competitiveness of squash grown in the Southeastern United States.
- Recent trends in trade in squash between the United States and its trading partners, including information on seasonal patterns of trade.
- Descriptions of monthly price trends, including an analysis and comparison of the prices of domestically produced products and imported products in the U.S. market.

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[5] This report focuses on the impact on Florida, Georgia, and North Carolina, the only significant producers of fresh market squash in the Southeast. The Southeast more broadly includes Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee. See USDA, ARS, "Find a Location," accessed September 1, 2021.
[6] 19 U.S.C. § 1332(g).
[7] USDA, NASS, QuickStats, Squash, fresh and for processing - acres harvested, area harvested, fresh market and processing, accessed June 2, 2021. Geisler, "Squash," March 2019.
[8] Industry representatives, interviews by USITC staff, February 1, February 3, and August 10, 2021; Geisler, "Squash," March 2019.
[9] USITC, hearing transcript, April 8, 2021, 169–72 (testimony of William Brim, Lewis Taylor Farms), 181–82 (testimony of James Alderman, J. Alderman Farms), 183–85 (testimony of Salvatore Finocchiaro, S&L Beans, Inc.).

Approach

Based on the request from the Trade Representative, this report includes three broad assessments of the U.S. fresh squash industry and major suppliers to the United States: (1) a cross-country comparison of competitiveness, (2) an analysis of U.S. trade and prices, and (3) an estimate of the economic impact of imports on seasonal markets. The report also provides profiles of industries producing fresh squash in major supplier countries to the U.S. market (i.e., Mexico and the United States, with a focus on producers in the U.S. Southeast).

In preparing a cross-country assessment, the Commission used an agricultural competitiveness framework to compare the United States' fresh squash industry—with a focus on the U.S. Southeast—to the industry in Mexico, the major foreign supplier to the U.S. market. The framework connects analytic assumptions, parameters, and structures that define competitive conditions in agricultural trade (chapter 4). In addition, the Commission used available price data, along with information on the product mix of imports, to provide a descriptive comparison of prices of domestically produced and imported squash in the U.S. market (chapter 5). Finally, a seasonal partial equilibrium model was used to estimate the economic impact of U.S. imports from major supplier countries on production, earnings, employment, and prices of U.S. fresh squash in the U.S. market (chapter 6).

As requested, the report also includes country profiles (chapters 2–3) which contain descriptive information on the U.S. industry, with a focus on the U.S. Southeast industry, and the major foreign supplier of squash to the U.S. market, Mexico. These country profile chapters contain information on the factors present in each country's industry that contribute to its level of competitiveness. Information for the report was gathered by reviewing existing literature and conducting extensive interviews with sources knowledgeable about the industry. These sources included government officials; traders; academics; and representatives of firms, trade associations, and nongovernmental organizations, including those that represent the interests of agricultural workers. The Commission identified sources with expertise in each segment of the supply chain, from growers and importers to distributors and purchasers. In addition, Commission staff conducted interviews with third parties outside of industry to confirm data and obtain additional information. The Commission also obtained industry and product information from testimony provided at the Commission's public hearing by government officials and industry representatives, as well as written submissions.

Relevant production and trade data were collected from publicly available data sources, as well as from industry representatives and organizations outside of industry. Global production and trade data were obtained from the Food and Agriculture Organization of the United Nations (FAO), Global Trade Atlas, Mexico's Agri-Food and Fisheries Information Service (SIAP), and U.S. Department of Agriculture's (USDA) National Agricultural Statistics Service. Additional trade data came from the Commission's DataWeb, a database built on U.S. Census Bureau data. Pricing data for domestic fresh squash came from USDA's Agricultural Marketing Service. Primary sources for labor-related conditions and costs were labor union-affiliated nongovernmental organizations, academia, and industry sources.

Report Organization

Chapter 1 provides information on scope and approach for the report, data availability and limitations, global production and trade, an overview of fresh squash products, including squash types, production, trends, seasonality, and product standards and certifications. It also includes information on the agricultural competitiveness framework. Chapters 2 and 3 present profiles of the squash industry and market in the United States and the industry in Mexico, as well as a discussion of factors that contribute to each country's individual competitiveness in the U.S. market. Chapter 4 gives a cross country comparison of the United States and Mexico and their relative competitiveness vis-à-vis one another. Chapter 5 provides information on U.S. import and price trends, including information on seasonal patterns within each of these trends. Lastly, chapter 6 presents estimated economic effects of reduced U.S. imports of squash on U.S. production and prices of squash.

Data Availability and Limitations

Production

Global production data for squash are available from the FAO.[10] However, statistics by variety of squash are limited, and global production data include pumpkins and gourds. The USDA National Agricultural Statistics Service (NASS) reports U.S. production, as well as area harvested, which is also broken out by squash intended for the fresh market and for processing.[11] Statistics on production and area harvested for Mexico are available for 2015–20 from the government of Mexico's *Statistical Yearbook of Agricultural Production.*[12]

Trade

Global trade data presented in chapter 1, as well as import and export statistics presented in the Mexico country chapter and U.S. export statistics are for Harmonized Commodity Description and Coding System (HS) heading 0709.93, pumpkins, squash, and gourds, fresh or chilled, derived from IHS Markit's Global Trade Atlas. For analysis of squash in the U.S. market, U.S. import data at the Harmonized Tariff Schedule of the United States (HTS) 8-digit subheading level are broken out by pumpkins, squash, and gourds.[13] HTS data are not broken out by summer and winter squash. At the HTS 10-digit level, certified organic squash imports are recorded under separate statistical reporting numbers from those for conventional squash.[14] U.S. import data are derived from the USITC DataWeb.

[10] FAO, FAOSTAT database, "Squash: Production," accessed March 3, 2021.
[11] USDA, NASS, QuickStats, Squash Production, area harvested, and yield, accessed March 3, 2021.
[12] Government of Mexico, SIAP, *Anuario estadístico de la producción agrícola* (Statistical yearbook of agricultural production), accessed May 3, 2021.
[13] HTS 0709.93.10 (Pumpkins), 0709.93.20 (Squash), and 0709.93.30 (Gourds). HTS 0709.93.20 includes both summer and winter squash.
[14] HTS 0709.93.2010 (Certified organic) and 0709.93.2010 (Other).

Pricing

Pricing data used for the descriptions of monthly price trends, including an analysis and comparison of the prices of domestically produced products and imported products in the U.S. market, were sourced from the U.S. Department of Agriculture's Agricultural Marketing Service (AMS). These data include terminal market data and shipping point data, both of which include daily prices for different types and packaging types of squash in the U.S. market. The prices AMS collects represent a relatively small share of the U.S. market and have limited coverage of certain types of sales (e.g., contract sales). Further details on these limitations are discussed in chapter 5.

Global Production and Trade

Global squash, pumpkin, and gourd production fell from 25.7 million metric tons (mt) in 2015 to 22.9 million mt in 2019, a 10.9 percent decrease over the period.[15] China (8.4 million mt) was the largest global producer of squash, pumpkins, and gourds in 2019, followed by Ukraine (1.3 million mt), Russia (1.2 million mt), Spain (735,000 mt), and Mexico (679,000 mt).[16] However, each of these countries exported less than 1 percent of their total production in 2019, except for Mexico and Spain, which exported approximately 77 and 56 percent of production, respectively.[17]

Given the delicate nature of fresh and chilled squash, specifically that of summer squash, consumption and trade of fresh squash are concentrated around regional markets. Mexico is the largest exporter of squash, pumpkins, and gourds, accounting for one-third of global exports in 2019.[18] More than 95 percent of Mexico's exports go to the United States, with the remaining exports principally going to Japan and Canada. Spain is the second-largest exporter of squash, pumpkins, and gourds, accounting for 28.0 percent of global exports in 2019. The vast majority of these exports serve the European market. Canada is a net importer of squash, pumpkins, and gourds—exporting 36,838 mt and importing 57,660 mt in 2019. Virtually all exports of squash, pumpkins, and gourds from Canada are destined for the United States (99.9 percent).[19]

The United States is the largest importer of squash, pumpkins, and gourds, accounting for 33.9 percent of global imports in 2019, followed by France (10.4 percent), Germany (6.9 percent), Japan (6.0 percent), and the United Kingdom (5.1 percent).[20] Mexico is the largest source of U.S. imports of fresh squash, accounting for 96.1 percent of U.S. imports of squash in 2020, followed by Canada (2.0 percent). Mexico

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[15] Data from the Food and Agriculture Organization of the United Nations (FAO) does not disaggregate these data as between squash, pumpkins, and gourds. Total global production data are available only through 2019. FAO, FAOSTAT database, accessed March 8, 2021.

[16] India is also a major producer of squash, pumpkins, and gourds, but no data were reported by the FAO for India in 2019. The latest available production data for India are for 2017, when India produced 5.5 million mt, making it the second-largest global producer of squash, pumpkins, and gourds.

[17] Global export data are available only through 2019. IHS Markit, Global Trade Atlas database, accessed February 2, 2021.

[18] Global export data are available only through 2019. IHS Markit, Global Trade Atlas database, accessed February 2, 2021.

[19] IHS Markit, Global Trade Atlas database, HS subheading 0709.93, accessed March 30, 2021; Government of Canada, "Statistical Overview of the Canadian Vegetable Industry 2019," August 2020, 20, 27.

[20] IHS Markit, Global Trade Atlas database, HS subheading 0709.93, accessed March 30, 2021.

also accounted for the largest share of U.S. consumption of squash in 2020 (62.9 percent), while U.S. production of squash supplied 39.1 percent of U.S. consumption.[21]

Fresh Squash Products

"Fresh or chilled squash" includes squash intended for fresh consumption ("fresh market").[22] Within the squash category, there are two main types: summer squash and winter squash. Contrary to their names, the two varieties are not strictly grown or harvested in a particular season, and some regions are able to produce both simultaneously.[23] Both summer and winter squash are warm season crops, but summer squash are typically harvested before full maturity (approximately 40–50 days after planting) while winter squash are harvested when they are fully mature (approximately 80–120 days after planting).[24] As a result, summer squash are smaller, have a thin, edible skin, and are usually consumed while the fruit is immature, before the rinds and seeds begin to harden.[25] Due to its fragile nature, summer squash are intended for the market as quickly as possible after harvest. The window between picking and consumption is usually two weeks; however, to maintain maximum freshness it is recommended that they be stored in a refrigerator for no more than three to four days at 45 degrees to 50 degrees Fahrenheit and 85 to 90 percent humidity.[26] Summer squash varieties include zucchini, yellow, crookneck, and scallop.[27] In contrast, winter squash has a thick, hard rind, which allows it to be stored for several months.[28] Winter squash varieties include acorn, spaghetti, butternut, and hubbard.

A limited amount of squash is sold to food processing companies. This is primarily winter squash and may be used as an ingredient in processed food (e.g., butternut squash soup) or cut or diced (e.g., zucchini squash "noodles" or fresh, cubed squash). In totality, winter squash is the smaller of the two markets.[29] This report will primarily focus on fresh summer squash because they are the primary varietal produced in the U.S. Southeast and competing imports from Mexico are also summer squash.

[21] USITC DataWeb/Census, HTS 0709.93.20, accessed February 26, 2021; USDA, NASS, QuickStats, Squash production, accessed June 2, 2021.
[22] Squash are a species of Cucurbitaceae (or cucurbit), a family of plants which also includes melons, cucumbers, gourds, and more.
[23] Industry representative, interview by USITC staff, February 26, 2021.
[24] University of Georgia Extension, "Commercial Squash Production," accessed October 12, 2021.
[25] Geisler, "Squash," March 2019.
[26] University of Georgia Extension, "Commercial Squash Production," accessed October 12, 2021. Industry representative, interview by USITC staff, February 3, 2021; The Crop Profile/PMSP database, "Crop Profile for Squash in Florida," October 2002.
[27] These varieties of summer squash are commonly grown in the United States. Other varieties, such as the Mexican grey squash, are not commonly grown in the United States but are regularly grown and consumed in Mexico and other parts of the world. Mexican grey squash is also known as grey zucchini or Middle Eastern squash, and it has a pale green skin with flecks of green-grey color. Kitazawa Seed Co., "Grey Zucchini," accessed August 12, 2021; Geisler, "Squash," March 2019; USITC, hearing transcript, April 8, 2021, 317–18 (testimony of Jaime Chamberlain, Chamberlain Distributing, Inc.), 318–19 (testimony of Craig Slate, SunFed Produce).
[28] Geisler, "Squash," March 2019.
[29] Industry representative, interview by USITC staff, February 1, 2021.

Farm-level Squash Production

The two categories of squash have different production conditions. Summer squash (also referred to as soft squash) are quicker to harvest (40–50 days) than winter squash, possess a thinner skin, and cannot be stored for very long. These varieties can be planted every two weeks, and grow best when temperatures are between 75–85 degrees Fahrenheit during the day, and 60–70 degrees Fahrenheit at night.[30] Winter squash (also referred to as hard squash) take longer to harvest (80–120 days), have a thicker skin, and can be stored for longer periods of time. These varieties typically only have one harvest per year, and grow in a wider range of temperatures (50–90 degrees Fahrenheit).[31] Despite these differences, both categories of squash grow best when the soil ranges in temperature between 65 and 80 degrees Fahrenheit, and are susceptible to dying when exposed to frost, or consecutive days below 55 degrees or above 90 degrees Fahrenheit.[32]

Fresh market squash are generally manually planted in open fields and harvested by hand.[33] Summer squash are highly perishable and must be moved quickly from the farm to the end market. The window between picking and consumption is usually two weeks.[34] In comparison, winter squash have a much longer shelf life (several months) than summer squash, which also increases the variety of distribution methods that can be utilized.[35] The variety of squash cultivar chosen by growers is determined by factors including growing period, climate, yield per acre, resistance to disease, and quality of squash it produces. Different cultivars often do better in different climates and production systems.[36]

Industry representatives indicate that a vast majority of squash production is irrigated, with drip irrigation being the most common type of irrigation in many regions.[37] Drip irrigation uses small plastic tubes to drop water onto the soil at the root of the plant at a slow rate to maximize the benefit of the water being given to the plant while minimizing water being wasted.[38]

Overall, squash are a labor-intensive crop because production, including harvesting, is generally not mechanized and, therefore, depends on manual labor. However, labor requirements differ according to production practices used (e.g., trellising). For example, growing squash on the ground is less labor intensive than growing them vertically (e.g., on a trellis). “Vertical production” requires that squash

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[30] Southern Integrated Pest Management and USDA, “Crop Profile for Squash in Florida,” October 2002; Blue Book Services, “Squash,” accessed March 5, 2021.
[31] Harvest to Table, “How to Grow Winter Squash,” accessed March 1, 2021; industry representatives, interviews by USITC staff, February 3 and February 26, 2021; Blue Book Services, “Squash,” accessed March 5, 2021.
[32] Florkowska and Westerfield, “Homegrown Summer and Winter Squash,” August 2021; Southern Integrated Pest Management and USDA, “Crop Profile for Squash in Florida,” October 2002.
[33] Industry representative, interview by USITC staff, February 1, 2021.
[34] Industry representative, interview by USITC staff, February 3, 2021; The Crop Profile/PMSP database, “Crop Profile for Squash in Florida,” October 2002.
[35] USITC, hearing transcript, April 8, 2021, 141 (testimony of Dante Galeazzi, Texas International Produce Association); The Crop Profile/PMSP database, “Crop Profile for Squash in Florida,” October 2002.
[36] Industry representative, interview by USITC staff, May 28, 2021.
[37] Industry representatives, interviews by USITC staff, May 10 and 28, 2021.
[38] FAO, “Drip Irrigation,” accessed July 26, 2021; industry representative, interview by USITC staff, June 1, 2021; USITC, hearing transcript, April 8, 2021, 300 (testimony of Guillermo Martinez, Frello Fresh).

plants be trained to grow on a trellis system and then continually maintained.[39] Labor costs and availability are likely to influence a grower's decisions to use more or less labor-intensive practices. Specific information about labor use for squash production in the United States and Mexican industries is included in the country profile chapters of this report (chapters 2–3).

Seasonality

Fresh squash production in the United States and in squash-producing regions supplying the U.S. market depends on climate conditions. As a whole, the U.S. Southeast is able to produce fresh market squash year-round, though Florida and Georgia both see some gaps in production in the late summer months, while North Carolina's season covers the late spring through early fall but ceases in the winter (figure 1.1). The majority of California's fresh market production occurs in the southern part of the state, with some also occurring in the northern and central regions. Harvest seasons there vary by region, but cover most of the year except for December through mid-February. Michigan has a shorter production season, with harvests spanning the four-month period from July through October. Mexico harvests fresh market squash from September through mid-June. Mexico ceases to harvest during the summer months due to high heat and lack of water, while Florida's and Georgia's production cease in the summer due to high heat and humidity and related pest pressures. Meanwhile, North Carolina, California, and Michigan cease production when the weather is cold, as squash are susceptible to damage from frost.[40]

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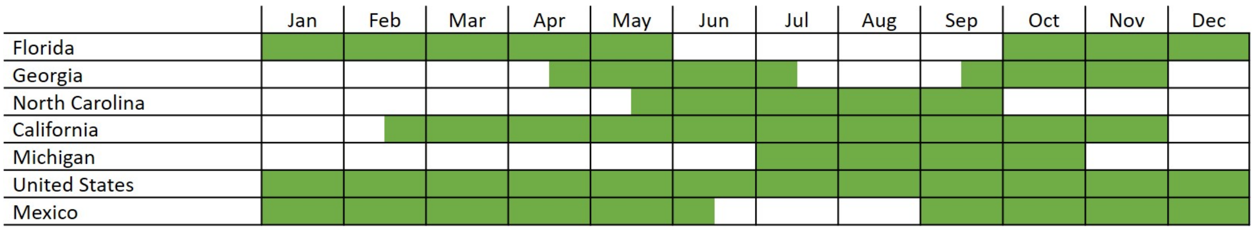
[39] Industry representative, interview by USITC staff, July 16 and August 10, 2021; industry representative, email to USITC staff, August 11, 2021.

[40] Squash production is possible in other states and countries that have the appropriate conditions for squash cultivation; the date ranges in figure 1.1 represent the season for the area where most open field commercial production takes place in each state or country.

Figure 1.1 Harvest seasons for fresh market summer squash

Shaded cells indicate months in which significant harvest is occurring based on typical commercial practices. Underlying data for this figure can be found in appendix F, table F.1.



Sources: Florida - FDACS, *Florida Agriculture by the Numbers*, 2019, 79; Freeman, et. al, "Chapter 7. Cucurbit Production," August 17, 2021. Georgia - Kemble, *Southeastern U.S. 2020 Vegetable Crop Handbook*, 2020, 92; Blue Book Services, "Squash," accessed September 2, 2021. North Carolina - Jones and Roos, "Planting and Harvesting Guide for Piedmont Vegetables and Herbs," accessed August 12, 2021; Kemble, *Southeastern U.S. 2020 Vegetable Crop Handbook*, 2020, 92; Blue Book Services, "Squash," accessed September 2, 2021; North Carolina Cooperative Extension, "Basics for Growing Squash," April 27, 2020. California - Blue Book Services, "Squash," accessed September 2, 2021; Michigan - Blue Book Services, "Squash," accessed September 2, 2021; Michigan State University Extension, "Summer squash is on its way; lock the doors," July 1, 2013. United States - Kemble, *Southeastern U.S. 2020 Vegetable Crop Handbook*, 2020, 92; Blue Book Services, "Squash," accessed September 2, 2021. Mexico – Blue Book Services, "Squash," accessed September 2, 2021; Panorama-Agro, "Guia de manejo de la calabacita," accessed September 2, 2021; HortiCultivos, "Producción de calabacita," accessed September 2, 2021; INIFAP, "Calabacita," accessed September 2, 2021.

Note: These seasons represent typical commercial practices, though seasons may be shortened due to extenuating weather events or extended if the grower chooses to employ certain production technologies. It should also be noted that demand may affect individual grower decisions to shorten or extend the harvest seasons. The Florida harvest season reflects practices in northern, southern, and central Florida, where most of Florida's squash production is located, as reported by the Florida Department of Agriculture and Consumer Services. The Georgia harvest season reflects practices in southern Georgia where most of Georgia's squash production is located. The North Carolina harvest season reflects practices in eastern North Carolina where most of North Carolina's squash production is located. The California harvest season reflects practices in the southern desert areas, the Central Valley, and the south-central coast where most of California's squash production is located. The Michigan harvest season reflects practices in the central, eastern, and southwestern lower peninsula of Michigan where most of Michigan's squash production is located. The Mexico harvest season reflects practices in Mexico using reported growing and harvest seasons by states producing fresh squash.

Supply Chain

Fresh market squash can be sold to fresh produce packers or distributors; to retailers or institutional buyers; or directly to consumers. Speed to market and temperature control throughout the transportation process determine the quality of the product at market and are the most important factors for logistics and transportation. Other buyer considerations include the timeliness of past deliveries and reliability of supply.[41]

Retailers in particular have additional buyer considerations. Retailers often consider whether the producer's package size offerings match what they are able to sell to the consumer.[42] Buyers prefer to have a mix of vegetables to offer and obtain this mix as efficiently as possible (e.g., from a single source or, if from multiple sources, ones in close proximity).[43] The retail grocery sector in the United States has heavily consolidated in recent years, increasing its pricing power and creating pressure on growers.[44] According to industry representatives, traceability technology now allows retailers to associate

[41] Industry representatives, interview by USITC staff, July 6, 2021.
[42] Industry representatives, interview by USITC staff, July 6, 2021.
[43] Industry representatives, interview by USITC staff, July 6, 2021; USITC, hearing transcript, April 8, 2021, 240 (testimony of Craig Slate, SunFed Produce).
[44] Industry representative, interview by USITC staff, March 9, 2021; government representative, email message to USITC staff, March 3, 2021.

individual fresh market squash with particular growers and track which growers have quality problems, creating a very high quality expectation.[45]

Product Standards and Certifications

Compliance with the U.S. Food Safety Systems

All squash, whether produced domestically or imported, are required to meet U.S. food safety and labeling standards. The U.S. Food and Drug Administration (FDA) has specific mandates concerning the safety of U.S. grown and processed food products as well as imported products. The agency has the authority to detain food, including imported products, if it is adulterated by various hazards and to take other actions, such as mandatory recalls, to enforce U.S. food safety standards.[46]

The Food Safety Modernization Act (FSMA) of 2011 expanded the FDA's food safety oversight through amendments to the Federal Food, Drug, and Cosmetic Act (FDCA) (21 U.S.C. §§ 301 et seq.).[47] The FDCA, as amended by FSMA, governs the safety of many U.S.-grown and imported food products, including squash.[48] For example, the Produce Safety Rule required under FSMA applies to both domestic and imported produce, including squash, and sets science-based minimum standards for the safe growing, harvesting, packing, and holding of fruits and vegetables grown for human consumption.[49] It also requires compliance with certain standards on water use, soil amendments, employee training, and sanitation. This rule further requires that all domestic produce farms that have sold an annual average of more than $250,000 over the past three years be subject to regular inspections, although the FDA has not yet established a rule for the frequency of inspection for fresh produce farms.[50]

In addition, FSMA requires U.S. importers and suppliers to verify the safety of their supply chains. In particular, the Foreign Supplier Verification program required under FSMA provides a mechanism for U.S. importers to verify that their suppliers meet U.S. food safety standards.[51] U.S. squash and imports must also comply with U.S. regulations regarding maximum residue levels for pesticides, although these are largely harmonized between the U.S. and Mexico and were not mentioned by U.S. growers as an important factor for competitiveness.

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[45] Industry representatives, interview by USITC staff, July 6, 2021.
[46] FDA, "FSMA Facts: Background on the FDA Food Safety Modernization Act," January 30, 2018.
[47] FDA prepared major substantive rules and guidance documents to implement FSMA from 2011 through 2015. FDA, "FSMA Rules and Guidance for Industry," December 7, 2016.
[48] FDA, "FSMA Facts: Background on the FDA Food Safety Modernization Act," January 30, 2018.
[49] Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption, 80 Fed. Reg. 74353 (November 27, 2015). For more information on Produce Safety Rule coverage and compliance dates see FDA, "FSMA Final Rule on Produce Safety," accessed March 23, 2021.
[50] FDA, "Produce Safety Inspections," December 20, 2019; government representative, interview by USITC staff, July 7, 2021.
[51] Foreign Supplier Verification Programs for Importers of Food for Humans and Animals, 80 Fed. Reg. 74225 (November 27, 2015) provides details on this supplier program; see also FDA, "Key Requirements: Final Rule on Foreign Supplier Verification Programs," May 11, 2017; USITC, hearing transcript, April 8, 2021, 85 (testimony of Dante Galeazzi, Texas International Produce Association).

USDA Marketing Standards

The USDA Agricultural Marketing Service (AMS) grading system is used to indicate the quality of fresh squash being sold in the U.S. market. Grading is voluntary. At the shipping point, a seller might order a grading inspection in order to ensure the quality of the product before shipping it to the end market customer. In the terminal market, purchasers may also order a grading inspection to ensure that the quality of the product meets the agreed upon standard. AMS graders indicate quality based on color, shape, size, and amount of damage (which may include decay, sunscald, and damage caused by scarring, yellowing, sunburn, dirt or foreign material, freezing, disease, insects, cuts, bruises, or other means). AMS designates fresh squash on a numeric scale in descending order of quality (U.S. No. 1 or U.S. No. 2). The distinction between grades is defined by the different tolerance levels of defects and size allowed within each grade.[52] In cases where there is a disagreement between a buyer and a seller about whether a product meets the agreed-upon grade, involved parties may seek assistance from the Secretary of Agriculture under the Perishable Agricultural Commodities Act to obtain a resolution.[53] AMS standards and grades are intended to primarily serve wholesale markets. Retailers may also have their own quality requirements in addition to these marketing standards.[54]

Voluntary Food Safety Programs

Good Agricultural Practices (GAP) and Good Handling Practices (GHP) are voluntary audit programs established by USDA to verify that fruits and vegetables are produced, packed, handled, and stored to minimize risks of microbial food safety hazards.[55] Suppliers often source squash and other fresh produce from growers and distributors certified under these programs to help ensure food safety. In addition, many retailers and service industry consumers of squash require suppliers to meet Global Food Safety Initiative (GFSI) standards. The GFSI is a global food safety benchmarking initiative under the auspices of the Consumer Goods Forum, an international group of retailers and manufacturers that recognizes various food safety certifications (e.g., Safe Quality Food or SQF) as meeting GFSI Standards.[56] Many growers and traders become certified by third-party certifiers as part of participation in these programs and, for example, to help U.S. importers establish eligibility to participate in FDA's Voluntary Qualified Importer Program.[57]

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52 USDA, "United States Standards for Grades of Summer Squash," September 6, 2016.

53 Perishable Agriculture Commodities Act, 7 U.S.C. §§ 499a et seq.; government representative, interview by USITC staff, July 13, 2021.

54 Government representative, interview by USITC staff, July 13, 2021.

55 USDA, AMS, "Good Agricultural Practices (GAP) & Good Handling Practices (GHP)," accessed July 28, 2021.

56 GFSI, "Certification: Achieving a GFSI Certificate," accessed March 23, 2021; SQFI, "About the SQF Program," March 23, 2021; Walmart requires all suppliers with a total annual revenue greater than $1 million to be certified by GFSI. Walmart and Sam's Club, "Food Safety Requirements for Food and Beverage Suppliers," 2017, 6.

57 FDA, as called for by FSMA, has a third-party certifier accreditation program through which FDA recognizes accreditation bodies to accredit third-party certification bodies to conduct food safety audits and issue certifications as noted in Accreditation of Third-Party Certification Bodies to Conduct Food Safety Audits and To Issue Certifications, 80 Fed. Reg. 74569 (November 27, 2015); industry representative, interview by USITC staff, April 28, 2021. Third-party certification bodies accredited under FDA's third-party accreditation program can issue food and facilities certifications required for participation in FDA's Voluntary Qualified Importer Program. 80 Fed. Reg. 74569.

Organic Certifications

As with quality grading standards, growers of squash use USDA-accredited certifiers to verify the organic status of their product.[58] USDA-certified organic goods must be grown without using certain chemicals or prohibited methods.[59] Retailers indicate that demand for organic squash is growing.[60] A recent survey conducted by Natural Grocers, a Colorado-based chain of organic grocery stores, indicated that consumers are purchasing organic produce to avoid pesticides and genetically modified organisms (GMOs), and because they believe it is more nutritious.[61] Increased demand and perceived benefits for organic product mean that organic growers can generally charge a higher price. However, certified organic squash still make up only a small portion of fresh squash consumption in the United States, and industry representatives indicate that the added costs required to produce organic sometimes outweigh the additional revenue.[62]

Competitiveness Framework

To analyze the competitive factors affecting the squash sectors across the countries that are major suppliers to the U.S. market, the Commission used a framework drawing together the analytical assumptions, parameters, and structures that define competitive conditions in food and agricultural trade.[63] Competitive conditions encompass the economic, institutional, and regulatory environment in which firms compete. Agricultural competitiveness is measured by comparing delivered costs, product differentiation, and supplier reliability for domestically produced goods against those of imports. Figure 1.2 shows how these three characteristics are affected by several competitive factors for agriculture. Government policies and the regulatory environment can affect competitiveness under these categories and information about them is presented in the country profiles.

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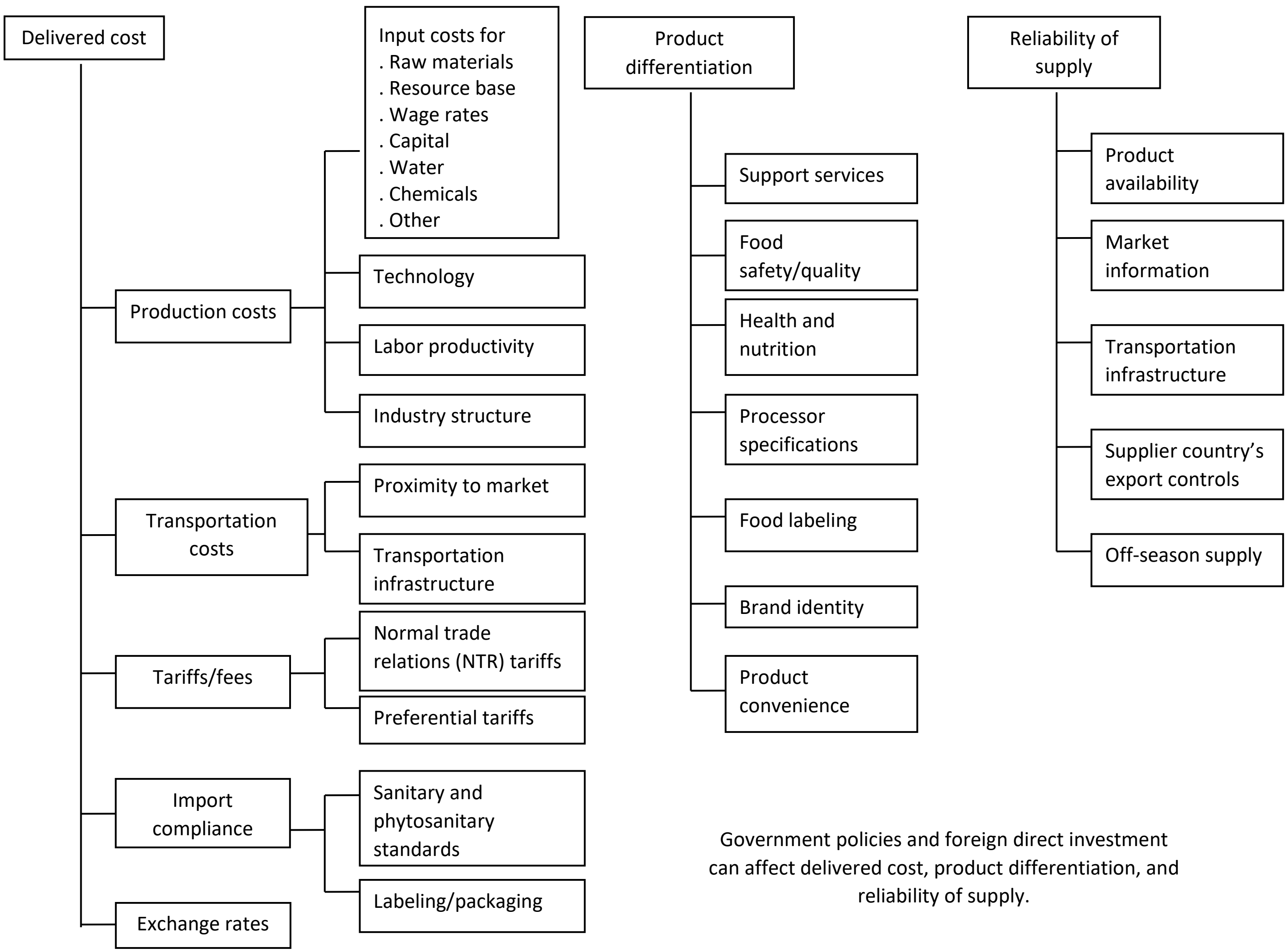
[58] To sell imported products as organic in the United States these products must be certified to either the USDA standard or an equivalent international standard. USDA, AMS, "Importing Organic Products Into the U.S.," accessed October 20, 2021.
[59] USDA, AMS, "Labeling Organic Products," accessed July 28, 2021.
[60] Industry representatives, interviews by USITC staff, May 9, 2021 and May 26, 2021.
[61] Natural Grocers by Vitamin Cottage, Inc., "The Top 3 Reasons Shoppers Buy Organic Produce," August 24, 2017.
[62] Industry representative, interview by USITC staff, June 24, 2021; USITC, hearing transcript, April 8, 2021, 223 (testimony of William L. Brim, Lewis Taylor Farms).
[63] The Commission uses Michael Porter's theory of competitive advantage as a starting point from which to develop a framework for analyzing competitive conditions affecting agricultural trade. For more information on this framework and its limitations, refer to USITC, *China's Agricultural Trade*, March 2011, E-3 to 3-8; Porter, *Competitive Strategy*, 1980, and Porter, *Competitive Advantage*, 1985.

Figure 1.2 Factors that affect competitiveness in agricultural markets



Source: Compiled by USITC staff.

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Chapter 2
The Industry and Market in the United States

The U.S. squash industry, which is primarily focused on serving the domestic market, is a relatively small part of the country's agriculture sector. Between 2015 and 2020, U.S. squash production increased by 15.0 percent, from approximately 273,000 metric tons (mt) to 314,000 mt and supplied approximately 40.2 percent of U.S. domestic consumption during this period.[64] U.S. domestic squash production is not sufficient to meet U.S. consumer demand, and imports are increasingly important in filling that gap.

The U.S. squash industry's competitiveness is negatively impacted by high labor costs, which increase overall delivered costs and may lower productivity and product differentiation by limiting the methods of production available to growers. Weather-related volatility, particularly in the Southeast, can also have negative impacts on quality and reliability of supply. However, the United States as a whole benefits from dispersed production across the country. This dispersed production helps to mitigate these climate risks and contributes to other advantages.

Production, Trade, and Consumption

Production

The United States accounted for 2.7 percent of global squash, pumpkin, and gourd production in 2019, and it was the seventh-largest producer globally.[65] U.S. annual production of squash averaged 329,548 mt between 2015 and 2020 (table 2.1).[66] This production includes both winter and summer squash, which at a national level is produced in almost equal volumes though this varies by state. The largest producing states, by volume, are California, Florida, Georgia, North Carolina, and Michigan. Nationally, production during this period fluctuated but ultimately increased 15.2 percent between 2015 and 2020, with the top producing states seeing a combined increase of 47.5 percent, offsetting a 22.3 percent decrease in production in other states. Production in the Southeast, including the states of Florida, Georgia, and North Carolina, grew by 36 percent over this period, faster than the rest of the country. While all three states in this region saw increases in production, North Carolina experienced the largest increase with production more than doubling over the period. Nationally, production growth appears to be driven by a 14.8 percent increase in the area harvested, as yields fluctuated but were largely stable across the United States from 2015 to 2020 (tables 2.2 and 2.3). In particular, the increase in area harvested was led by the southeastern region of the United States. Between 2015 and 2020, harvested

[64] USDA, NASS, *Vegetables 2017 Summary,* February 2018; USDA, NASS, *Vegetables 2018 Summary,* March 2019; USDA, NASS, *Vegetables 2019 Summary,* February 2020; USDA, NASS, *Vegetables 2020 Summary,* February 2021; official U.S. import statistics USITC DataWeb/Census, HTS subheading 0709.93.20, accessed July 20, 2021; and official U.S. export statistics using USITC DataWeb/Census, HTS subheading 0709.93, accessed July 20, 2021.
[65] FAO, FAOSTAT database, "Crops: Squash, Gourds, and Pumpkins," accessed March 3, 2021. FAO data for squash include gourds and pumpkins.
[66] USDA's NASS production data include squash only, not gourds and pumpkins.

area increased by 29.4 percent in this region, compared with an 8.7 percent increase in the rest of the United States. North Carolina saw the largest increase in area harvested and yield, growing 66.7 percent and 27.7 percent respectively.

Table 2.1 Squash: U.S. production, 2015–20
In metric tons and percentages; mt = metric tons.

Region	2015	2016	2017	2018	2019	2020
Florida (mt)	27,216	35,993	44,225	35,829	34,927	33,592
Georgia (mt)	19,051	26,943	23,201	22,281	20,140	20,890
North Carolina (mt)	10,659	11,077	12,320	27,783	25,945	22,680
Southeast (mt)	56,926	74,013	79,746	85,893	81,012	77,162
Michigan (mt)	50,530	101,242	95,980	86,818	78,018	78,834
California (mt)	39,190	70,760	59,375	47,106	66,224	60,328
All other states (mt)	126,235	123,944	128,185	115,502	96,207	98,057
All other regions (mt)	215,955	295,946	283,541	249,425	240,449	237,219
Total U.S. (mt)	272,881	369,959	363,287	335,318	321,461	314,380
Florida (%)	10.0	9.7	12.2	10.7	10.9	10.7
Georgia (%)	7.0	7.3	6.4	6.6	6.3	6.6
North Carolina (%)	3.9	3.0	3.4	8.3	8.1	7.2
Southeast (%)	20.9	20.0	22.0	25.6	25.2	24.5
Michigan (%)	18.5	27.4	26.4	25.9	24.3	25.1
California (%)	14.4	19.1	16.3	14.0	20.6	19.2
All other states (%)	46.3	33.5	35.3	34.4	29.9	31.2
All other regions (%)	79.1	80.0	78.0	74.4	74.8	75.5
All regions (%)	100.0	100.0	100.0	100.0	100.0	100.0

Source: USDA, NASS, *Vegetables 2017 Summary,* February 2018; USDA, NASS, *Vegetables 2018 Summary,* March 2019; USDA, NASS, *Vegetables 2019 Summary,* February 2020; USDA, NASS, *Vegetables 2020 Summary,* February 2021.
Note: USITC estimates for Florida and Georgia production in 2018 and 2020.

Table 2.2 Squash: U.S. area harvested, 2015–20
In hectares and percentages; ha = hectares.

Region	2015	2016	2017	2018	2019	2020
Florida (ha)	2,388	2,792	3,035	2,931	3,116	2,905
Georgia (ha)	1,214	1,457	1,335	1,406	1,497	1,393
North Carolina (ha)	971	1,497	1,133	1,416	1,781	1,619
Southeast (ha)	4,573	5,747	5,504	5,753	6,394	5,916
Michigan (ha)	2,266	3,764	3,723	3,521	3,480	3,197
California (ha)	2,185	3,157	3,116	2,711	2,954	2,833
All other states (ha)	6,633	5,989	6,232	6,145	4,775	6,022
All other regions (ha)	11,085	12,910	13,072	12,378	11,210	12,052
All regions (ha)	15,658	18,656	18,575	18,130	17,604	17,968
Florida (%)	15.2	15.0	16.3	16.2	17.7	16.2
Georgia (%)	7.8	7.8	7.2	7.8	8.5	7.8
North Carolina (%)	6.2	8.0	6.1	7.8	10.1	9.0
Southeast (%)	29.2	30.8	29.6	31.7	36.3	32.9
Michigan (%)	14.5	20.2	20.0	19.4	19.8	17.8
California (%)	14.0	16.9	16.8	15.0	16.8	15.8
All other states (%)	42.4	32.1	33.6	33.9	27.1	33.5
All other regions (%)	70.8	69.2	70.4	68.3	63.7	67.1
All regions (%)	100.0	100.0	100.0	100.0	100.0	100.0

Source: USDA, NASS, *Vegetables 2017 Summary,* February 2018; USDA, NASS, *Vegetables 2018 Summary,* March 2019; USDA, NASS, *Vegetables 2019 Summary,* February 2020; USDA, NASS, *Vegetables 2020 Summary,* February 2021.
Note: USITC estimates for Florida and Georgia production in 2018 and 2020.

Table 2.3 Squash: U.S. yields, 2015–20

In metric tons per hectare.

Region	2015	2016	2017	2018	2019	2020
Florida	11.4	12.9	14.6	12.2	11.2	11.6
Georgia	15.7	18.5	17.4	15.9	13.4	15.0
North Carolina	11.0	7.4	10.9	19.6	14.6	14.0
Southeast	12.4	12.9	14.5	14.9	12.7	13.0
Michigan	22.3	26.9	25.8	24.7	22.4	24.7
California	17.9	22.4	19.1	17.4	22.4	21.3
All other states	19.0	20.7	20.6	18.8	20.1	16.3
All other regions	19.5	22.9	21.7	20.2	21.4	19.7
United States	17.4	19.8	19.6	18.5	18.3	17.5

Source: USDA, NASS, *Vegetables 2017 Summary,* February 2018; USDA, NASS, *Vegetables 2018 Summary,* March 2019; USDA, NASS, *Vegetables 2019 Summary,* February 2020; USDA, NASS, *Vegetables 2020 Summary,* February 2021.
Note: USITC estimates for Florida and Georgia yield in 2018 and 2020.

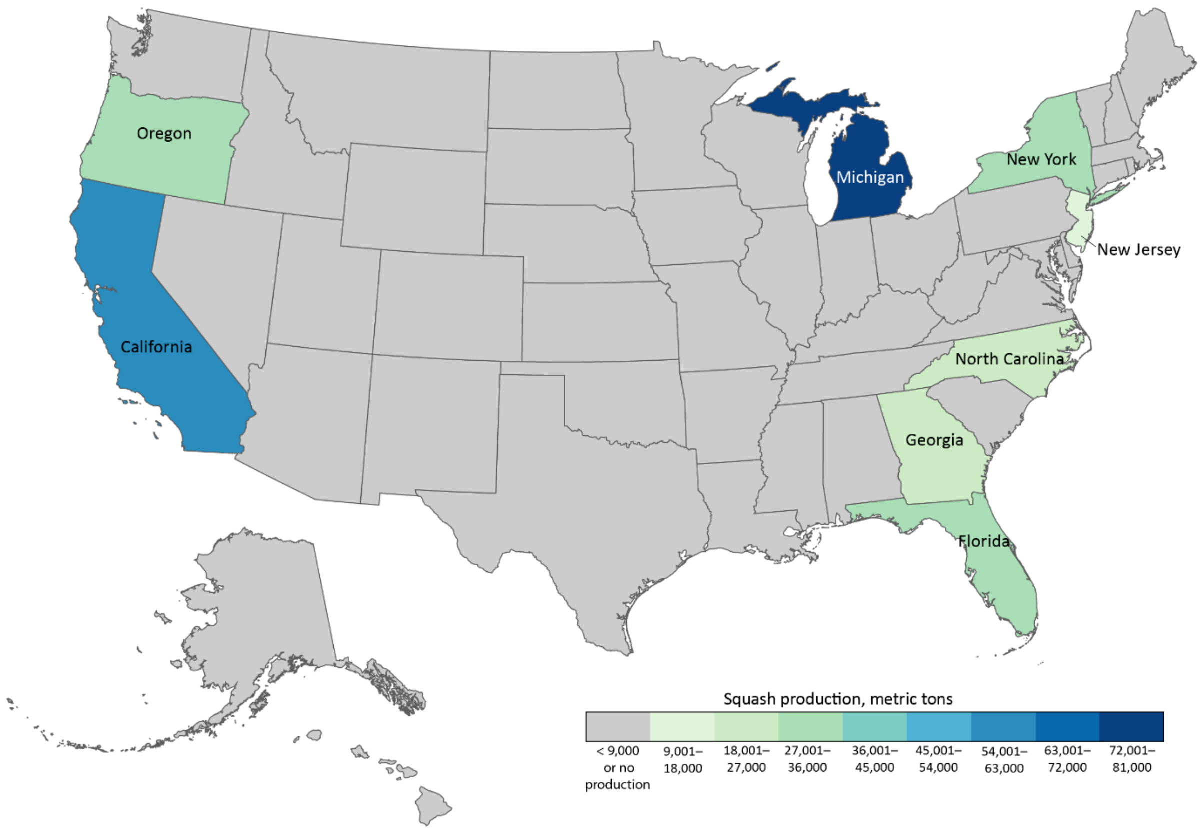
U.S. squash production takes place mainly in the Southeast, Michigan, and California. The states of Florida, Georgia, and North Carolina in the southeastern United States grow nearly 25 percent of the nation's squash (figure 2.1). The harvest season in this region begins in the late fall in Georgia, moves to Florida in the winter, then moves back to Georgia in the spring and finally to North Carolina in late spring and early summer.[67] These states primarily produce summer squash, though approximately one-third of North Carolina's production is winter squash.[68] Squash-producing states outside the Southeast grow about the same amount of summer and winter squash and harvest in the summer, except for New York, Michigan and Oregon, which primarily grow winter squash.[69]

According to the USDA, sales of certified organic fresh squash (both summer and winter) grown in the United States increased from approximately 27,700 mt in 2016 to 42,300 mt in 2019.[70] California, followed by Washington and Oregon, made up approximately 53.6 percent of all domestic organic fresh squash sales in 2019.[71] In the U.S. Southeast, Florida, South Carolina, and North Carolina were the largest producers of organic fresh squash, combining for approximately 15.1 percent of total domestic organic squash production sold.[72]

[67] USITC, hearing transcript, April 8, 2021, 159–60 (testimony of Dick Minor, Minor Brothers Farm); industry representatives, interviews by USITC staff, February 4, February 24, May 10, and October 5, 2021.
[68] USDA, NASS, QuickStats, Squash, Summer, Acres Harvested, Squash, Winter, Acres Harvested, accessed June 28, 2021.
[69] USDA, NASS, QuickStats, Squash, Summer, Acres Harvested, Squash, Winter, Acres Harvested, accessed June 28, 2021; Davis and Lucier, *Vegetable and Pulses Outlook: April 2021*, April 16, 2021; industry representative, interview by USITC staff, February 26, 2021.
[70] USDA, NASS, "2016 Certified Organic Survey," accessed October 29, 2021; USDA, NASS, "2019 Organic Survey (2017 Census of Agriculture Special Study)," accessed October 29,2021.
[71] According to the survey, sales of certified organic fresh squash grown in California totaled 14,443 mt; 5,555 mt for Washington; and 2,661 mt for Oregon. USDA, NASS, "2019 Organic Survey (2017 Census of Agriculture Special Study)," accessed October 29,2021
[72] Quantity sold of certified organic fresh squash grown in Florida totaled 2,665 mt; 1,731 mt for South Carolina; and 783 mt for North Carolina. Data for Georgia were suppressed for confidentiality reasons. USDA, NASS, "2019 Organic Survey (2017 Census of Agriculture Special Study)," accessed October 29, 2021.

Figure 2.1 Squash production in the United States, by state, 2020

In metric tons. Underlying data for this figure can be found in appendix F, table F.2.



Source: USDA, NASS, Squash Production Utilized in cwt (1 hundredweight = 100 pounds), accessed March 3, 2021.
Note: Includes production of both summer squash and winter squash. Georgia and Florida values are estimated.

Trade

The United States is the world's largest importer of squash.[73] Squash imports increased 33 percent by volume between 2015 and 2020, though imports decreased marginally between 2019 and 2020 (table 2.4). Mexico is the predominant source of U.S. squash imports, accounting for 96.1 percent of total U.S. imports of the crop in 2020. During 2020, 99.98 percent of U.S. imports of squash entered duty free under one of two U.S. free trade agreements.[74] U.S. imports from Canada and Mexico entered under the United States–Mexico–Canada Agreement (USMCA) (and its predecessor the North American Free Trade Agreement), while imports from the Dominican Republic, Guatemala, and Honduras, as well as other member countries, entered under the Dominican Republic–Central America Free Trade (CAFTA-DR)

[73] IHS Markit, Global Trade Atlas database, HS subheading 0709.93, accessed May 17, 2021; USITC DataWeb/Census, HTS subheading 0709.93.20, accessed February 26, 2021.
[74] USITC DataWeb/Census, HTS subheading 0709.93.20, accessed July 12, 2021. HTS subheading 0709.93.20 includes both summer and winter squash.

Agreement.[75] The remaining imports are subject to the U.S. normal trade relations (NTR) rate of duty (1.5 cents per kilogram) with an ad valorem equivalent of 0.7 percent.[76] U.S. imports of squash from Mexico, the majority of which are summer squash, increased by 35.8 percent from 2015 to 2020.[77] However, about half of that increase occurred between 2015 and 2016 when U.S. imports from Mexico increased by 18.9 percent. U.S. imports from Mexico are concentrated between November and May, with over 80 percent of the 474,603 mt imported in 2020 from Mexico to the United States occurring in these seven months (see chapter 5 for an in-depth analysis of seasonal trade trends).[78] The United States exports a small amount of squash (19,513 mt of exports in 2020), nearly all of which is destined for Canada.[79]

Imports of organic squash averaged about 24,200 mt from 2019–20 and represented approximately 4.9 percent of total imports of squash during the period.[80] The largest share of organic squash imports came from Mexico (97.5 percent), followed by Canada (1.8 percent).[81]

Table 2.4 Squash: U.S. imports for consumption, by source, 2015–20
In metric tons and percentages; mt = metric tons.

Import source	2015	2016	2017	2018	2019	2020
Mexico (mt)	349,320	415,210	415,317	437,704	470,431	474,603
Canada (mt)	7,817	9,279	13,011	14,020	12,125	9,646
Honduras (mt)	7,882	6,953	8,777	6,824	6,757	7,514
Guatemala (mt)	3,947	4,254	3,509	2,282	1,670	1,397
Dominican Republic (mt)	1,980	928	841	58	345	449
All other sources (mt)	1,199	494	311	627	2,807	222
All import sources (mt)	372,144	437,118	441,766	461,514	494,136	493,832
Mexico (%)	93.9	95.0	94.0	94.8	95.2	96.1
Canada (%)	2.1	2.1	2.9	3.0	2.5	2.0
Honduras (%)	2.1	1.6	2.0	1.5	1.4	1.5
Guatemala (%)	1.1	1.0	0.8	0.5	0.3	0.3
Dominican Republic (%)	0.5	0.2	0.2	0.0	0.1	0.1
All other sources (%)	0.3	0.1	0.1	0.1	0.6	0.0
All import sources (%)	100.0	100.0	100.0	100.0	100.0	100.0

Source: USITC DataWeb/Census, HTS subheading 0709.93.20, accessed February 11, 2021.

[75] CAFTA-DR is a free trade agreement between the United States and Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and the Dominican Republic. All parties signed CAFTA-DR on May 28, 2004, except the Dominican Republic, which signed in August 2004.

[76] USITC DataWeb/Census, HTS subheading 0709.93.20, accessed July 12, 2021. An ad valorem tariff is the most common tariff form, which means that the customs duty is calculated as a percentage of the value of the product. World Bank, "Forms of Import Tariffs," accessed July 1, 2021.

[77] Reportedly, the majority of the winter squash grown in Mexico are exported, primarily to the United States. Industry representative, email message to USITC staff, June 28, 2021; Government of Mexico, SIAP, *Anuario estadístico de la producción agrícola* (Statistical yearbook of agricultural production), accessed May 3, 2021.

[78] USITC DataWeb/Census, HTS subheading 0709.93.20, accessed February 26, 2021.

[79] U.S. export data include out of scope pumpkins and gourds. USITC DataWeb/Census, Schedule B subheading 0709.93, accessed February 11, 2021.

[80] USITC DataWeb/Census, HTS subheading 0709.93.2010 and 0709.93.2050, accessed October 28, 2021.

[81] Data are not available prior to July 2018, as the statistical breakout for organic squash, 0709.93.2010, was not available prior to this month. USITC DataWeb/Census, HTS subheading 0709.93.2010, accessed October 28, 2021.

Consumption

U.S. consumer demand for squash has increased alongside other fresh vegetables as consumers increase vegetable consumption as part of a healthier diet. For example, squash are generally increasing in popularity as consumers are using them more in their diets, including in specialty forms where they substitute winter squash and zucchini squash "noodles" for traditional grain-based pasta.[82] Both winter and summer squash feature prominently in popular diets, such as a ketogenic (keto) diet.[83] As part of the consumer trend towards more convenient produce products and packaging, it is not uncommon to see premade zucchini noodles and precut and sliced butternut squash in bags, some even containing other ingredients in the bag and marketed as "steam-in bag."[84] The apparent consumption of squash in the United States increased by 172,257 mt (29.5 percent) between 2015 and 2020 (table 2.5).[85] Per capita squash consumption increased by 0.5 kg (25.6 percent) over the period, outpacing the 3.7 percent increase for fresh vegetables.[86]

As noted above, U.S. domestic squash production does not meet U.S. consumer demand, and imports fill that gap. Although U.S. domestic shipments rose overall between 2015 and 2020, they fell from 2016 to 2020 as production decreased. Meanwhile, the rate of increase for imports (32.6 percent) from 2015 to 2020 exceeded U.S. production (15.2 percent), resulting in U.S. domestic shipments as a share of apparent consumption falling by 1.8 percentage points between 2015 and 2020. The United States imports product year-round but particularly during November through May when domestic production is not as readily available and generally limited to production in the Southeast. Imports, primarily from Mexico, accounted for an annual average of 60.6 percent of U.S. domestic consumption during 2015–20.

Table 2.5 Squash: Apparent consumption in the United States, 2015–20
In metric tons, kilograms, and percentages; mt = metric tons; kg = kilograms.

Item	2015	2016	2017	2018	2019	2020
Production (mt)	272,881	369,959	363,287	335,318	321,461	314,380
Imports (mt)	372,144	437,118	441,766	460,789	493,480	493,751
Exports (mt)	34,555	38,989	37,277	30,763	25,045	19,513
Apparent consumption (mt)	583,074	742,893	739,495	737,273	760,475	754,932
Per capita consumption (kg)	1.8	2.3	2.3	2.3	2.3	2.3
Imports share of apparent consumption (%)	63.8	58.8	59.7	62.5	64.9	65.4

Source: Official U.S. agricultural statistics published by NASS/USDA; official U.S. import statistics USITC DataWeb/Census, HTS subheading 0709.93.20, accessed July 20, 2021; and official U.S. export statistics using USITC DataWeb/Census, HTS subheading 0709.93, accessed July 20, 2021. UN, Department of Economic and Social Affairs, Population Division, World Population Prospects 2019 database, accessed May 10, 2021.
Note: HS subheading 0709.93 used for export data includes pumpkins and gourds in addition to squash.

[82] USITC, hearing transcript, April 8, 2021, 262 and 308 (testimonies of Lesley Sykes, The Sykes Company and Craig Slate, SunFed Farms); Blue Book Services, "Zucchini," accessed June 29, 2021; Koger, "Pero Family Farms Foods Recalls Fresh-Cut Butternut Squash Products," January 19, 2021.
[83] Bedosky, "10 Best Veggies to Eat on Keto," August 6, 2019.
[84] Koger, "Grower in Butternut Squash Recall Working with FDA," January 22, 2021; The Freedonia Group, "Ready-to-Eat Vegetable & Salad Trends Boost Value Demand for Related Packaging," May 5, 2021.
[85] Apparent consumption is calculated as production plus imports, minus exports.
[86] Davis and Lucier, *Vegetable and Pulses Outlook: April 2021*, April 16, 2021; Par, Bond, and Minor, *Vegetable and Pulses Outlook: April 2018*, April 27, 2018.

Industry Structure

The industry structure of the U.S. squash sector, including predominant production practices and marketing channels, varies across the major growing regions in the United States, often due to differing climates and growing seasons. In the Southeast specifically, the humid climate and unpredictability of weather limits the growing season to late fall through early spring. This creates unique pressures that negatively impact production and limits production primarily to summer squash (nearly 78 percent of Southeast squash acreage is dedicated to summer squash such as zucchini, yellow, and scallop).[87] As the Southeast is the focus of this study and primarily grows summer squash, the focus of the remainder of this chapter is on summer squash.

Industry Composition

The U.S. squash industry (both summer and winter squash) is composed of producers (growers), intermediaries (packers, shippers, importers, brokers, wholesalers), and customers (processors, food service, restaurants, retailers). Production of squash in the United States is fragmented, with small and medium-sized growers making up the majority of producers nationwide. However, a smaller subset of larger growers with farms of over 50 acres (20.2 hectares) in total operations account for more than half (57.9 percent) of all acres of U.S. squash production.[88] In most squash-producing states, the majority of production comes from these larger farms, though small to mid-sized farms comprise larger shares of total squash production in some states.[89]

Most fresh market summer squash producers in the United States are not vertically integrated with respect to stages further down the supply chain (such as marketing and distribution). Although some smaller growers also work together in “cooperatives” to share resources and meet larger supply needs.[90] Conversely, some larger producers are more likely to also be distributors, and/or own their own packing and transport operations, while many small growers outsource those activities to other firms.[91] Some larger growers may also have operations in multiple states or in Mexico in order to take advantage of the different growing seasons of each region and produce a supply of squash in more months out of

[87] For more information on climate-related pressures in the Southeast, see the competitiveness factors section of this chapter below. In 2017 (the most recent year to which the data are available), Florida, Georgia, South Carolina, and North Carolina have a combined 11,405 acres of summer squash, and 3,232 acres of winter squash. USDA, NASS, QuickStats, Summer Squash, Acres Harvested, Winter Squash Acres Harvested, accessed June 28, 2021; Geisler, “Squash,” March 2019.

[88] Based on available data from NASS, in 2017 there were more than 6,000 farms with squash production in the United States. Among the farms with 50 or more acres of farmland, the average acreage of squash production would be 127.4 acres. USDA, NASS, QuickStats, Squash: operations with area harvested; area harvested, fresh market and processing, accessed June 2, 2021. Note that this includes all squash production, not just summer squash.

[89] USDA, NASS, QuickStats, Squash, fresh and for processing—acres harvested, area harvested, fresh market and processing, accessed June 2, 2021.

[90] Industry representatives, interview by USITC staff, March 10, 2021.

[91] Industry representatives, interviews by USITC staff, March 10, 2021 and May 10, 2021.

the year.[92] However, one source notes that this type of integration is more common among California and Mexican squash growers than growers in the Southeast.[93] Regardless of size, most U.S. farms do not grow squash exclusively, and instead cultivate additional vegetable and berry crops alongside or sometimes in the same plots as squash.[94]

Production Systems and Practices

U.S.-produced squash are generally grown in open fields on beds using plastics (i.e., raised soil beds overlaid with thick sheets of plastic perforated for planting).[95] Greenhouses are rarely used for squash production in the United States.[96] Most U.S. squash are grown on the ground. Practices like trellising vines vertically are not a common practice, reportedly because of the additional labor required to implement and maintain them, which in the United States is costly.[97] Summer squash are hand-planted or seeded, and are hand-picked.[98] They can be picked multiple times per week in some parts of the United States during peak harvest.[99] Squash are also sometimes produced as a secondary crop after high-value crops such as tomatoes or eggplant.[100]

Generally speaking, drip irrigation is the preferred method for watering squash, as it allows for deep infiltration of water over a longer period of time, while keeping the leaves dry as the plants bloom and produce fruits.[101] In the Southeast, the use of drip irrigation predominates squash production in Georgia,[102] where growers estimate that the installation of irrigation can cost between $1,500 and

[92] USITC, hearing transcript, April 8, 2021, 316 (testimony of Craig Slate, SunFed Produce); industry representative, interview by USITC staff, August 10, 2021. Other examples of multi-location squash growing operations include http://vansolkemaproduce.com/our-company.cfm, https://www.4earthfarms.com/where-we-grow/where-we-grow/, and https://miedemaproduce.com/our-story/.
[93] Industry representative, interview by USITC staff, February 3, 2021.
[94] Industry representatives, interviews by USITC staff, February 1, February 24, March 9, and June 24, 2021.
[95] Industry representatives, interviews by USITC staff, February 1, March 10, and August 10, 2021; University of Florida, IFAS, "Summer Squash," accessed June 16, 2021.
[96] Greenhouse usage, generally across crop types, is limited in the Southeast due to high humidity and the frequent threat of hurricanes. This is true for production in Mexico as well. Squash are not generally grown in greenhouses because they can be difficult to pollinate indoors, and greenhouse space is generally reserved for crops that generate higher prices per pound than squash. Industry representative, telephone interview with USITC staff, July 6, 2021.
[97] Industry representatives, interviews by USITC staff, July 16, 2021 and August 10, 2021; industry representative, email to USITC staff, August 11, 2021.
[98] Industry representatives, interviews by USITC staff, February 1, March 10, and August 10, 2021; University of Florida, IFAS, "Summer Squash," accessed June 16, 2021.
[99] Industry representative, interview by USITC staff, July 23, 2021.
[100] University of Florida, IFAS, "Summer Squash," accessed June 16, 2021.
[101] Industry representative, interview by USITC staff, August 10, 2021; Butler, "GardenZeus Guide to Watering Squash," September 1, 2016.
[102] Industry experts estimate that over 80 percent of all crops in Georgia use drip irrigation, including nearly all production of summer squash. Industry representatives, interview by USITC staff, May 10, 2021.

$1,700 per acre.[103] Drip lines require frequent replacement.[104] Some growers elsewhere in the Southeast also reportedly use center pivot irrigation and seep irrigation, specifically in Florida.[105] This is likely due to differences in the fixed and variable costs of center pivot versus drip irrigation, as well as the soil in a particular area.[106]

Some growers in the Southeast face unique obstacles that can impact squash farm irrigation. For example, due to water use restrictions, which apply to 70 percent of Florida's land, squash growers in the state have had to develop plans to upgrade their irrigation systems and, at times, consider alternative water-supply projects and technologies. These plans can include installing a more efficient irrigation system, adding a groundwater filtration system to remove chlorides caused by saltwater intrusion, or hiring consultants to assist with securing water-use permits.[107] These challenges have reportedly imposed significant fixed costs on growers.[108]

Packing

Most U.S. production of summer squash is field-packed, although "shed packing" is also frequently used and typically considered to be a more effective practice in guaranteeing consistent product quality.[109] During harvest, growers field pack their product—washing, grading, sorting, and boxing squash in the field as the squash are picked and then immediately transferred to be cooled overnight and shipped to the buyer the following day.[110] Some larger, more vertically integrated, growers do their own "shed packing," by bringing squash to a field house to be washed and cooled to remove field heat, which can extend product life relative to field packing. Following a cooling period, squash are separated and graded by size and quality; and packed and shipped to the buyer. Other growers without packing houses may send their squash to a warehouse to be packed. Summer squash grown in the United States are cooled by hydrocooling and/or refrigeration, with refrigeration being the more common cooling method due to the prevalence of field packing.[111] Some packers may also utilize newer technology like modified

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[103] Industry representative, interview by USITC staff, May 10, 2021; industry representative, email message to USITC staff, August 19, 2021.

[104] Industry representatives indicate that drip lines must be replaced after one or two crop cycles, and that the cost of drip materials has been increasing in recent years. Industry representatives, interviews by USITC staff, May 21, July 23, August 8, and August 27, 2021.

[105] Industry sources note that the breakdown of drip versus seep irrigation in Florida is difficult to estimate but do note that seep irrigation is more common in South Florida than elsewhere in the state. Industry representative, email message to USITC staff, August 27, 2021; Seal et al., "Summer Squash Production in Miami-Dade County, Florida," March 6, 2019.

[106] Industry representative, interview by USITC staff, July 23, 2021; academic professionals, interview by USITC staff, May 21, 2021; academic professional, email message to USITC staff, August 6, 2021; industry representative, email message to USITC staff, August 27, 2021.

[107] Issuance of these permits is predicated on the requirement that the agricultural producer implement and employ conservation measures and continually seek to improve the efficiency of their irrigation systems.

[108] Government official, email message to USITC staff, June 2, 2021.

[109] Industry representatives, interviews by USITC staff, February 1, May 28, 2021, and October 4, 2021.

[110] Industry representative, interviews by USITC staff, February 1, February 3, February 24, March 1, and May 10, 2021. In addition, some growers reportedly may send product to "packing houses" to be cooled and packaged overnight.

[111] Industry representatives, interviews by USITC staff, February 3, February 24, March 1, and May 10, 2021.

atmosphere packaging (MAP) bags, but these are costly and not as common in the Southeast.[112] Product is packed into crates, sometimes even with individual stickers that promote the state of production to differentiate the product as locally grown (see the Government Programs section for more details on state marketing programs). Once squash are harvested and packed, they enter the cold chain and are shipped as soon as possible (ideally the same day or next day) to the buyer.

Supply Chain

U.S.-produced squash are grown on farms, harvested, and packed to be sold through various channels, including retailers, food processors, foodservice and restaurants, vegetable packers, or directly to consumers based on a variety of factors.[113] The most common distribution channel for fresh summer squash in the United States is the fresh market (both retail and foodservice), with a smaller portion destined for food processing (products like squash noodles and baby food).[114] In Florida and North Carolina, production of summer squash is exclusively destined for the fresh market, while in Georgia more than 97 percent of squash is sold to the fresh market.[115] Geographic distribution is also somewhat limited as summer squash markets in the United States appear to be somewhat distinct from one another; for example, squash produced in Florida and elsewhere in the Southeast is rarely sold west of the Mississippi River, and California squash rarely supplies the southeastern market.[116]

Producers may use brokers as intermediaries to sell to wholesalers (packers) and/or hotels, restaurants, and institutional service buyers.[117] They may also sell directly to retailers if the producer is large enough or may sell directly to consumers through local farmers markets.[118] Institutional buyers of squash reportedly prefer contract pricing arrangements, and prioritize contracts that offer cheaper prices. These buyers are said to favor year-round contracts to ensure steady supplies—and this fact coupled with the large size of orders can make it difficult for some U.S. producers to sell directly to these market channels.[119]

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[112] Industry representative, interview by USITC staff, February 24, 2021.
[113] Industry representatives, interviews by USITC staff, February 1 and August 10, 2021.
[114] Industry representatives, interviews by USITC staff, February 1, February 3, and August 10, 2021; Geisler, "Squash," March 2019.
[115] According to 2017 data (most recent data available), 100 percent of Florida and North Carolina squash acres harvested were for the fresh market. USDA, NASS, QuickStats, Summer Squash Acres Harvested, Winter Squash Acres Harvested, accessed June 28, 2021. In addition, reportedly approximately 85 percent of Georgia squash is sold into retail, while in Florida a greater share of production may be sold into food service. Industry representative, interview by Commission staff, February 3, 2021; industry representative, email message to USITC staff, May 26, 2021; USDA, NASS, QuickStats, Squash Production, Area Harvested, and Yield, accessed June 15, 2021.
[116] Industry representative, interviews by USITC staff, February 3, April 30, and June 24, 2021. This may be due in part to the fact that most production of summer squash in the United States is intended for the fresh market, and fresh market squash has a relatively short window of perishability.
[117] Institutional service buyers include schools, universities, and jails.
[118] Industry representatives, interviews by USITC staff, February 24 and May 26, 2021.
[119] Industry representative, interviews by USITC staff, February 24 and May 26, 2021.

U.S. squash industry representatives have reported increasing consolidation of the retail buyers of their product in recent years, contributing to industry challenges.[120] Growers at the U.S. International Trade Commission's hearing noted that this trend of industry consolidation has provided buyers more leverage in contract negotiations with growers, which has reportedly made establishing initial relationships with these companies more challenging as they compete with other growers for a shrinking number of buyers.[121]

Cost of Production

The cost of production for summer squash in the United States is largely impacted by labor costs. Using U.S. squash cost of production estimates, labor costs (including preharvest and harvest labor) represent about 34 percent of the total costs of squash production per acre.[122] Other major input cost shares included irrigation (about 11 percent), plant materials including seeds and transplants (about 6 percent), plant protection costs including pesticides, fungicides, and herbicides (about 9 percent),[123] and fertilizer

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[120] Industry representatives, interviews with USITC staff, March 1 and August 10, 2021; USITC, hearing transcript, April 8, 2021, 314–15 (testimony of Rod Sbragia, Tricar Sales and Bret Erickson, J&D Produce). Literature looking at consolidation has also noted this trend for grocery stores at the local and national level in the United States from 2002 to 2012. Smith, "The Evolution of U.S. Retail Concentration," January 11, 2021.
[121] USITC, hearing transcript, April 8, 2021, 314–15 (testimony of Rod Sbragia, Tricar Sales and Bret Erickson, J&D Produce).
[122] Cost of production estimates come from enterprise budgets developed by agricultural extension departments across several regions of the United States (although they are concentrated in the. Southeast). These budgets reflect the costs to cultivate an acre of hand-planted and hand-harvested squash for the fresh market, grown on plastic using drip irrigation. These estimates are based on the costs of squash production across five different enterprise budgets compiled between 2014 and 2021. Except if noted, the share of total production presented is the median value for these costs across the five budgets used. Across the five budgets, the cost of labor ranged between 20 and 37 percent, plant materials between 1 and 8 percent, irrigation between 5 and 15 percent, fertilizer between 4 and 6 percent, and plant protection between 1 and 14 percent. These budgets reflect a multitude of open field squash production practices across several regions of the United States. As such, certain line-item costs may not appear in all budgets or may reflect different input requirements across different production practices. These ranges for input cost categories are best understood as differences in input cost shares across practices rather than variation in prices across regions or over time. University of Wisconsin Extension, Center for Dairy Profitability, *Summer Squash Market Non-Irrigated Budget*, March 2014; University of Georgia, Agricultural and Applied Economic Cooperative Extension, *2021—Double Cropped Squash on Plastic Budget*, 2021; University of Kentucky, Center for Crop Diversification, *Yellow Crookneck Squash*, 2017; The Alabama Cooperative Extension System, *Enterprise Planning Budget Summary: Summer Squash*, 2021; Clemson University, Cooperative Extension, *Yellow Squash for Fresh Market - Irrigated*, May 29, 2020.
[123] The types of agrichemicals included in the plant protection cost of production estimates varied widely, which contributes to a range of cost shares. Estimates from the University of Georgia and Clemson University included fumigants and nematicides, whereas the other three budgets summarized did not. Academic representatives noted greater pest prevention expenses are incurred in the Southeast because pest pressures are intensified by high volumes of vegetable production (as is the case in Florida and Georgia), which provide more opportunities for pests to propagate and spread to other plants. Academic professional, email to USITC staff, September 9, 2021.

costs (about 4 percent).[124] Squash growers reported that the current break-even cost of production of a standard 0.5 bushel box of squash was about $8–$10.[125]

After harvest, the costs of packaging, marketing, and distribution can be significant for U.S. squash growers, and can impact the domestic supply chain of U.S. squash. The University of Georgia found that these costs could represent as much as 37.6 percent of the total cost of growing and selling squash.[126] Other recent estimates provided by growers indicate that the break-even cost of a box of squash inclusive of distribution costs was about $16, or double the cost of production at the grower level.[127] Southeastern growers have reported increases in packaging prices and freight rates in recent years, with one news source citing a 17 percent increase in the price of packaging from November 2020 to May 2021.[128] Estimates of the cost of production per kilogram of zucchini for U.S. producers are included in chapter 4 (table 4.3).

Labor

Squash—as with any hand-harvested and hand-planted fruit or vegetable crop with multiple pickings—are labor-intensive to produce, and thus particularly sensitive to the availability of labor.[129] U.S. farms draw their labor force from the U.S. domestic workforce[130] or from temporary foreign worker programs, either recruiting workers directly or using a farm labor contractor (FLC). Farm laborers may be paid hourly or by piece rate, and this unit of pay may vary within a farm during the same season.[131] Wage rates are further discussed below under Factors Affecting Competitiveness. A shortage of domestic labor in the U.S. agriculture sector has been reported over the years by farmers in surveys, news reports, and congressional testimony.[132] However, squash growers in the Southeast reported that they have not experienced issues finding labor in recent years, as they rely on temporary migrant workers from the

[124] Other costs of production featured in some of the five budgets but not listed above include marketing and advertising, machinery, equipment repair, fuel, insurance, land costs, and other miscellaneous factors. Due to variance across budgets, ranges do not add up to 100 percent.
[125] A bushel box of summer squash typically weighs about 18 kg to 19 kg. University of Arkansas, Cooperative Extension Service, *Vegetable Weights Per Bushel*, July 23, 2013; University of Georgia Extension, *Weights and Processed Yields of Fruits and Vegetables in Retail Containers*, January 2014; industry representatives, interviews by USITC staff, March 10 and August 27, 2021.
[126] University of Georgia, Agricultural and Applied Economic Cooperative Extension, *2021—Double Cropped Squash on Plastic Budget*, 2021.
[127] Industry representative, interview by USITC staff, March 10, 2021; USITC, hearing transcript, April 8, 2021, 68 (testimony of Charles Hall, Georgia Fruit and Vegetable Growers Association); Caleb Burgin, written submission to USITC, April 1, 2021.
[128] Prices for recycled paper—an important source of wood fiber for the packaging industry and used to make boxes—and corn, a main ingredient in the glue that holds the containers together, rose considerably in 2021. Chipman, "High Package Costs Hit Food Makers as Recycled Paper, Corn Soar," May 7, 2021; industry representatives, interviews by USITC staff, March 10 and May 10, 2021.
[129] Rutledge and Taylor, "California Farmers Change Production Practices," 2019; Zahniser et al., "Farm Labor Markets in the United States and Mexico," November 2018, 4.
[130] Note that domestic workers may include workers of both authorized and unauthorized work status.
[131] Industry representative, interview by USITC staff, May 10, 2021.
[132] For a summary of dynamics of the U.S. agricultural labor supply, see Zahniser et al., "Farm Labor Markets in the United States and Mexico," November 2018.

H- 2A Temporary Agricultural Program (H-2A visa program) (see box 2.1).[133] Growers have noted recent temporary disruptions to their agricultural labor supply have occurred due to bureaucratic delays associated with the administration of the program.[134]

In addition, there have been some COVID-19-related delays to procuring labor through the H-2A program reported over the past year across the U.S. agricultural sector,[135] although U.S. government agencies worked to amend regulations to support the usage of the program throughout the pandemic at levels equivalent or higher to those of the previous year.[136]

Because agricultural labor demand for open field vegetable production is seasonal, domestic workers in the past have relocated throughout the year to follow the peak harvest seasons in each region. A labor representative in the Southeast reported that domestic agricultural workers are now tending to transition to local work in other industries.[137] In part in response to this trend, the use of H-2A labor among U.S. growers has been growing steadily in recent years.[138] Under the program, U.S. farms recruit workers from abroad (typically Mexico) and contract with them for temporary agricultural work, either alongside domestic workers or other H-2A recruits. The reliability of labor supply that this structure provides makes the H-2A program popular with growers,[139] while the higher wage compared to that of agricultural jobs in other countries makes the program popular with participating foreign agricultural

[133] 8 U.S.C. § 1188; USITC, hearing transcript, April 8, 2021, 73 (testimony of Mike Joyner, Florida Fruit and Vegetable Growers Association), 79 (testimony of Dick Bowman, J&J Family of Farms), 97 (testimony of Marie Bedner, Bedner Growers), and 103 (testimony of Charles Hall, Georgia Fruit and Vegetable Growers Association); Luckstead and Devadoss, “The Importance of H-2A Guest Workers in Agriculture,” 2019, 1.
[134] Industry representative, interview by USITC staff, May 10, 2021.
[135] The U.S. Embassy in Mexico announced that it would suspend routine immigrant and nonimmigrant visa services effective March 18, 2020 due to COVID-19 pandemic concerns. As of August 16, 2021, the U.S. Embassy notes on its website that “applicants may experience significant delays for visa appointments.” U.S. Embassy and Consulates in Mexico, “Status of U.S. Consular Operations in Mexico in Light of COVID-19,” accessed October 26, 2020; Miller, “U.S. Moves to Protect Labor Supply After Embassy in Mexico Halts Visa Processing,” March 16, 2020. Individual reports of tighter COVID-19 pandemic-related travel restrictions, border controls, and embassy closures impacting the movement and processing of H-2A workers began early in the pandemic and have continued into 2021. Weinrab and Ingwersen, “U.S. Farmers Scramble for help as COVID-19 Scuttles Immigrant Workforce,” July 2, 2020; Petrovic, “Pandemic Impacts Work Visas, Causing Delays in Hiring Seasonal Workers,” April 10, 2021; Karst, “Suppliers Point to Government Policy as One Reason behind Labor Shortage,” April 29, 2021.
[136] On April 20, 2020, the U.S. Citizenship and Immigration Services, the government agency responsible for clearing H-2A guest workers, amended regulations to expedite processing of employer petitions allowing them to hire workers with valid H-2A status that were currently in the United States at the time, and to extend the three-year maximum allowable period of stay for cleared H-2A workers. 85 Fed. Reg. 21739 (April 20, 2020). USDA, “DHS and USDA Move to Protect American Farmers and Ensure Continued Flow of America’s Food Supply,” April 15, 2020. With these adjustments in place, the program set records for the number of H-2A positions certified in April–June 2020 compared to the same period in previous years, and increased the number of positions certified for previous fiscal year by 8 percent. Nigh, “Coronavirus No Match for H-2A Demand,” August 20, 2020; USDOL, ETA, OFLC, *H-2A Temporary Agricultural Labor Certification Program—Selected Statistics, FY 2020*, September 30, 2020.
[137] Industry representative, interview by USITC staff, March 10, 2021.
[138] Castillo et al., *Examining the Growth in Seasonal Agricultural H-2A Labor*, August 2021, 2.
[139] Industry representatives, interviews by USITC staff, March 1 and May 10, 2021; government official, interview by USITC staff, September 13, 2021.

workers. A 2020 estimate found that H-2A workers comprised about 10 percent of all U.S. crop farmworkers.[140]

Although the number of H-2A workers used in squash production is difficult to estimate on a national or state-by-state basis because of the way the data are collected,[141] applications for fruit and vegetable H- 2A workers comprised 5.4 percent of all positions certified under the program across the entire U.S. agricultural sector in fiscal year (FY) 2019.[142]

Florida and Georgia have made increasing use of the H-2A program in recent years, with research suggesting that of all the agricultural sectors in Florida, berry and vegetable growers have comprised an increasing share of the state's H-2A labor employers.[143] Georgia and Florida led the country in the number of H-2A visa certifications: 29,480 and 33,598 H-2A visa holders, respectively, or about 11.4 and 13.0 percent of all H-2A visa certifications issued nationally in 2019. These states have seen a 69.5 and 47.2 percent increase in the number of H-2A positions that employers are certified to hire since FY 2016.[144]

[140] Costa and Martin, *Coronavirus and Farmworkers—Farm Employment, Safety Issues, and the H-2A Guestworker Program*, March 24, 2020; Honig, "Farmers Are Seeking More Temporary H-2A Workers," November 5, 2018.
[141] The U.S. Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW) tracks wage and employment for certain agricultural subsectors. However, because the QCEW is based on unemployment insurance records, it does not capture certain small farm employers exempt from participation in the unemployment insurance system and may not count H-2A workers as part of the agricultural employment totals in certain states. Castillo et al., *Examining the Growth in Seasonal Agricultural H-2A Labor*, August 2021, 8. The U.S. Department of Labor (DOL) releases data for H-2A applications submitted for certification, which contain a data entry field for the primary crop that H-2A workers are being recruited to cultivate and harvest. (See, for example, USDOL, ETA, *H-2A FY2019 Disclosure File*, accessed September 23, 2021.) However, because most growers grow more than one crop, it is difficult to ascertain from these applications exactly how many workers recruited under applications for non-squash crops are working in squash production. Government official, interview by USITC staff, September 13, 2021.
[142] Note that the fruit and vegetable worker category is separately reported from that of certain select fruits and vegetables like apples (4.8 percent), melons (4.6 percent), corn (3.8 percent), and tomatoes (2.4 percent), and from that of nursery and greenhouse workers (3.8 percent). Remaining individual crops account for less than 2.4 percent of the total but cumulatively account 42 percent of H-2A worker categories. USDOL, ETA, OFLC, *H-2A Temporary Agricultural Labor Certification Program—Selected Statistics, FY 2019*, September 30, 2019. DOL groups H-2A applications listing squash as the primary crop under the broader fruits and vegetables category. Government official, interview by USITC staff, September 13, 2021.
[143] During FY 2015, citrus workers comprised 51 percent of all H-2A workers in Florida, compared to 84 percent in FY 2012, reflecting an increasing number of vegetable, blueberry, and strawberry growers participating in the H-2A program. Roka and Guan, "Farm Labor Management Trends in Florida, USA—Challenges and Opportunities," 2018, 81.
[144] USDOL, ETA, OFLC, *H-2A Temporary Agricultural Labor Certification Program—Selected Statistics, FY 2016*, September 30, 2016; USDOL, ETA, OFLC, *H-2A Temporary Agricultural Labor Certification Program—Selected Statistics, FY 2019*, September 30, 2019. From these certifications, Georgia and Florida had 18,918 and 32,731 admissions of H-2A visa holders into their states, respectively, in FY 2019. USDHS, *Yearbook of Immigration Statistics 2019 —Nonimmigrants 2019 Supplementary Tables*, accessed October 15, 2020. Admissions measure the number of times a visa holder entered the state, which could be multiple times within the year. Note too that H-2A workers may fill more than one job on a single visa—a recent study approximated that 2017 H-2A visa holders filled about 1.2 jobs on average per visa. Martin, "The Role of the H-2A Program in California Agriculture," 2019, 2.

Growers in the Southeast have noted that the cost savings of using domestic labor compared to H-2A labor has been diminishing.[145] This is likely due to rising domestic agricultural wages driven by competition for the domestic workers from other U.S. industry sectors.[146] The regulations and costs required of the H-2A program are summarized in box 2.1.

Box 2.1 H-2A Program Description and Costs

In response to grower reports of labor shortages among domestic workers dating as far back at the 1940s, U.S. policymakers have established formal arrangements permitting agricultural employers to hire foreign seasonal farmworkers on a temporary basis.[a] The latest iteration of this arrangement, the H-2A temporary work visa program for agricultural workers, was established in 1986. Continued and growing use of this program emphasizes the importance of labor in vegetable production and the high cost these growers are willing to pay to ensure a reliable labor supply.

Hiring Process

Between 60 and 75 days before the start of the season, a grower or farm labor contractor (FLC) submits an agricultural job order to the state workforce agency. Submissions include a crop- and activity-specific job order that specifies the number of workers requested, the job responsibilities, minimum wage and hours offered, benefits to be paid by the employer, and start and end dates of the contract. Submission of the agricultural job order initiates a recruitment process for domestic workers and notifies the state workforce agency of the grower or FLC's intent to file a future application for H-2A workers. At least 45 days before the start date of work in the job order, the grower or FLC will also submit the job order and an H-2A Application for Temporary Employment Certification to the U.S. Department of Labor.[c] If the number of job referrals of domestic workers from state workforce agencies is not sufficient to meet labor demand as stated in the job order and the employer's job order is found to meet all of the H-2A program requirements, the U.S. Department of Labor will issue a temporary labor certification to the employer at least 30 days before the start of work.[d] Once the temporary labor certification process is completed, a petition for nonimmigrant worker visas is submitted to the U.S. Department of Homeland Security's Citizenship and Immigration Services. The agency conducts background checks on recruited foreign guest workers awaiting admittance to the United States in their home country.[e] Once these guest workers are cleared, the U.S. Department of State issues them H-2A visas.

Program Requirements

Before hiring guest workers, employers must prove that the employment is temporary (10 months or less) or seasonal, that no qualified U.S. workers are available to perform the job, and that employment of guest workers will not adversely impact the earnings of domestic workers performing similar tasks. If the employer is hiring H-2A workers, they must offer domestic workers the same level of benefits, wages, and working conditions as offered to H-2A workers.[f]

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[145] Industry representative, interview by USITC staff, May 10, 2021.

[146] Industry representative, interviews by USITC staff, March 10, 2021 and October 4, 2021; Zahniser et al., "Farm Labor Markets in the United States and Mexico Pose Challenges for U.S. Agriculture," November 2018, 6, 40. Note that changes to federal and state minimum wage rates also affect the legal wage for domestic agricultural laborers who are covered by the Fair Labor Standards Act, both on farms that do and do not participate in the H-2A program, as explained in discussion of adverse effect wage rate (AEWR) in text box 2.1.

Employment Costs

Worker wages: Farms hiring H-2A workers are required to pay a wage that is the highest of (1) the Adverse Effect Wage Rate (AEWR), (2) the prevailing hourly wage or piece rate, (3) the agreed-upon collective bargaining wage, or (4) the federal or state minimum wage.[g] H-2A workers are also guaranteed payment equal to at least 75 percent of the total contracted amount, regardless of whether there is sufficient work over the contract period to reach that amount.[h]

Worker benefits: Farms are required to provide certain benefits to H-2A workers, such as housing at no cost that meets local health and safety standards, workers' compensation, meals (or a facility at which to prepare meals), transit from the worker's home country and—if the worker completes the contract—back to the worker's home country, and daily transportation to and from the worksite.[i]

Payroll taxes and healthcare: Employers are also responsible for payments required by federal and state employment laws, paying for health insurance coverage if their business is large enough, and for workers' compensation for both domestic and H-2A workers.[j] Employers will also pay payroll taxes (Social Security, Medicaid, and federal and state unemployment insurance) on the wages of domestic workers. Some states like California also require payment of state unemployment insurance taxes on H-2A workers as well.[k]

Operational Costs

While not included in the direct payment of wages and benefits to workers in the H-2A program, employers are responsible for all pre-employment expenses associated with the H-2A application and recruitment process. These costs include filing and visa fees, any fees charged by or bond expenses[l] incurred by FLCs, and advertising costs to recruit domestic workers. These costs may vary depending on the application and whether a grower is using a FLC in its recruitment efforts. Grower organizations in certain states offer services to help farms file for H-2A visas. Some of these organizations, like the North Carolina Growers Association, even serve as joint employers with growers, helping to allocate workers during their visa term to member farms with the greatest labor need.[m]

Enforcement

The U.S. Department of Labor audits and inspects farms and FLCs for compliance with program requirements and can impose fines of up to $118,000 (as of January 2021) for employer violations as well as requiring back pay on wages or benefits owed to H-2A or domestic workers or, in extreme cases, revocation of the employer's labor certification and/or debarment of the FLC.[n] Among vegetable growers, the U.S. Department of Labor has found instances of growers using both foreign and domestic labor and paying domestic workers less than H-2A workers, in violation of the program rules.[o] One labor representative indicated that in practice, some of these violating employers were using the large consistent supply of H-2A workers as leverage to bargain down the wages of more vulnerable domestic workers.[p]

[a] Luckstead and Devadoss, "The Importance of H-2A Guest Workers in Agriculture," 2019, 1.
[b] Government official, interview by USITC staff, September 13, 2021. For a recent detailed accounting of these costs, see Roka and Guan, "Farm Labor Management Trends in Florida, USA," 2018; USDA, "H-2A Visa Program," accessed July 27, 2021.
[c] Local recruitment of domestic workers must continue until halfway through the job order contract period. If domestic workers are hired prior to the contract's start date, the U.S. Department of Labor (USDOL) reduces the requested number of foreign guest workers one-for-one. If domestic workers are hired after the contract's start date, employers have the option of retaining foreign guest workers or sending them home. USDOL, ETA, "H-2A Temporary Agricultural Program," accessed July 27, 2021.
[d] 20 CFR § 655.100-167.
[e] Though most H-2A visas for vegetable production are only issued for four–five months, foreign workers may work within the United States on H-2A visas for up to three years if their employers use visa extensions. Some growers may try to recruit foreign workers from a pool of workers who are on currently H-2A job orders with other growers, hiring them once the H-2A workers' current contract period expires. In these

instances, employers may negotiate among each other to decide who will cover the cost of the workers inbound and outbound transportation costs. Castillo et al., *Examining the Growth in Seasonal Agricultural H-2A Labor*, August 2021, 30; government official, interview by USITC staff, September 13, 2021.
[f] 20 CFR § 655.122.
[g] 20 CFR § 655.120(a). There are exceptions to this rule for certain livestock and herding occupations. The Adverse Effect Wage Rate (AEWR) is determined by the USDOL, Office of Foreign Labor Certification annually. The wage is derived from the combined annual average gross hourly wage of field and livestock workers as measured in the USDA Farm Labor Survey. The wage is set at a rate such that it will not adversely affect the employment opportunities of U.S. workers for each state. 86 Fed. Reg. 10996 (February 23, 2021); 20 CFR § 655.100. About 95 percent H-2A jobs are being paid the AEWR. Government official, interview by USITC staff, September 13, 2021. The prevailing hourly wage rate is determined by state workforce agencies to be prevailing in the area in accordance with state-based wage surveys. 20 CFR § 655.1300. A collective bargaining wage rate exists if the job opportunity is covered by a collective bargaining agreement that was negotiated at arm's length between the union and the employer 20 CFR § 655.10(b)(1).
[h] 20 CFR § 655.122(h)(4)(i).
[i] 20 CFR § 655.122(d)-(h).
[j] The 2019 AEWR to minimum wage ratio was 133 percent in Florida and 154 percent in Georgia. Nigh, "H-2A and the AEWR We Were," March 15, 2019. Under the regulations promulgated under the authority of the Affordable Care Act (ACA), an employer is required to provide health insurance to full-time employees if average number of monthly employees is greater than 50. The employer in this instance is the grower if labor is hired directly or is the FLC if it is used to recruit farm labor for a grower. H-2A workers qualify for ACA-compliant plans and can enroll in their employer's coverage if provided. There is a no-coverage penalty of $2,000 per year (adjusted for inflation) for each of the employer's full-time employees (excluding the first 30), which some growers may risk if the cost of coverage is higher. 26 CFR § 54.4980H-2, 4.
[k] State of California, Employment Development Department, *Information Sheet - Types of Employment*, accessed July 27, 2021; Martin and Schimmer, "Foreign Persons with Certain Visas and Their California Employers Beware," July 1, 2005, 3.
[l] FLCs are required to purchase a bond with each H-2A application (grower-employers are exempt from this requirement). The bond ensures that all financial obligations owed to the H-2A workers are fully met by the FLC. While the amount of the bond increases by the number of workers being requested, the overall cost of an individual bond depends on the asset level and prior employment history of the FLC petitioner. Roka, Simnitt, and Farnsworth, "Pre-Employment Costs Associated with H-2A Agricultural Workers," May 4, 2017, 342.
[m] Charlton et al., "Can Wages Rise Quickly Enough to Keep Workers in the Fields?" 2019; North Carolina Growers Association, "How We Help," accessed July 20, 2021.
[n] Government official, interview by USITC staff, September 13, 2021; USDOL, WHD, "H-2A: Temporary Agricultural Employment of Foreign Workers," accessed July 26, 2021. For examples of penalties imposed in recent violations, see USDOL, WHD, "U.S. Department of Labor Finds Florida-Based Farm Labor Contractor Violated," March 5, 2020; USDOL, WHD, "South Florida H-2A Employer Pays $21K," May 12, 2021.
[o] USDOL, WHD, "Maine Tomato Grower Pays $337K in Back Wages, Penalties After U.S. Department of Labor Investigation," March 30, 2021.
[p] Labor representative, interview by USITC staff, March 10, 2021.

Finally, unauthorized labor still makes up a large share of the U.S. agriculture workforce, despite the growing use of the H-2A program and efforts by states like Georgia to pass laws discouraging the employment of unauthorized workers.[147] According to the most recent public data available from the National Agricultural Worker Survey (NAWS), in the southeastern United States, the share of laborers in agriculture with unauthorized work status was 42 percent in FY 2015–16, compared to 34 percent in the Midwest and 56 percent in California.[148] A follow-up report on the FY 2017–18 NAWS data (which was not publicly released as of this writing) noted that 36 percent of the hired crop workforce nationally had no work authorization, compared to 49 percent in FY 2015–16.[149] Unauthorized farm workers tend to receive lower wages compared to legal workers, which may further lower labor costs for some U.S.

[147] Luckstead and Devadoss, "The Importance of H-2A Guest Workers in Agriculture," 2019. Georgia requires that private employers participate in the U.S. Department of Homeland Security's E-Verify program to confirm the U.S. work eligibility of their employees. State of Georgia, Illegal Immigration Reform and Enforcement Act of 2011.
[148] USDOL, ETA, "Table 5. Hired Crop Worker Demographics Characteristics, Midwest Estimates, Six Periods," accessed July 26, 2021; USDOL, ETA, "Table 9. Hired Crop Worker Demographics Characteristics, Southeast Estimates, Six Periods," accessed July 26, 2021; USDOL, ETA, "Table 13. Hired Crop Worker Demographics, California Estimates, Six Periods," accessed July 26, 2021. An exact share of laborers in agriculture with unauthorized work status is difficult to calculate, with other estimates ranging from 24 to 70 percent. Passel and Cohn, "Unauthorized Immigrant Workforce is Smaller, but with More Women," November 27, 2018. Center for American Progress, "Protecting Undocumented Workers on the Pandemic's Front Lines," December 2, 2020. Zahniser et al., "Farm Labor Markets in the United States and Mexico," November 2018, 5.
[149] Ornelas et al., *Findings from the National Agricultural Workers Survey (NAWS) 2017–2018*, March 2021, 83.

producers.[150] None of the available data sources—NAWS data, DOL's H-2A application data, and the USDA Farm Labor Survey[151]—provide breakouts for the number of workers employed in the U.S. squash industry specifically.

Government Regulations and Programs

Regulations

Squash are subject to agricultural sector-wide regulations regarding food safety, environment, and labor concerns. While most food safety regulations are set and standardized at the federal level, the environmental and labor policy in the United States can vary more widely at the state level. All U.S. growers must comply, for example, with the Food, Drug and Cosmetic Act (FDCA), as amended by the Food Safety Modernization Act, and its implementing regulations (see chapter 1).[152] At the state level, environmental laws exist to regulate access to agricultural inputs, like land[153] and water.[154] Other environmental standards set at the federal level regulate the emissions intensity from farm equipment.[155] As previously discussed, labor laws at the state and national level regulate wages and benefits paid to agricultural laborers, as well tax and working condition requirements of the employer.[156] For example, as discussed in box 2.1 above, there are a number of requirements and processes governing the use of H-2A labor.

Programs to Assist Growers

There are several grant programs available at the federal and state levels that squash growers may access to help offset the cost of adopting new production technology and practices. For example, the USDA National Resources Conservation Service (NRCS) provides grant funding to support conservation

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[150] Bowers and Chand, "An Examination of Wage and Income Inequality," 2018, 182; Scott, Mhairi Hale, and Padilla, "Immigration Status and Farmwork," April 2, 2021, 1; Richards, "Immigration Reform and Farm Labor Markets," July 2021, 1059.

[151] The USDA's NASS Farm Labor Survey is conducted semiannually by NASS in cooperation with the U.S. Department of Labor. It provides the basis for quarterly and annual estimates of employment and wages for all workers directly hired by U.S. farms and ranches (excluding Alaska). Farms and ranches in the sample are asked to provide payroll and employment data for their workforce—unauthorized workers should, in principle, be included in payroll and employment estimates. Zahniser et al., "Farm Labor Markets in the United States and Mexico Pose Challenges for U.S. Agriculture," November 2018, 7.

[152] 21 U.S.C. §§ 301 et seq.

[153] See for example State of Florida, "Everglades Forever Act," Chapter 373.4592 (1994); MDARD, "The Farmland and Open Space Preservation Program," accessed July 27, 2021.

[154] See for example California Department of Water Resources, "Sustainable Groundwater Management Act (SGMA)," accessed July 27, 2021; FDACS, *Water Quality/Quantity*, 2015; Florida Department of Environmental Protection, "Basin Management Action Plans (BMAPs)," accessed July 27, 2021; Carr, *State of Georgia v. State of Florida*, June 26, 2020, 37.

[155] EPA, "Regulations for Emissions from Heavy Equipment," accessed September 27, 2021.

[156] See for example Whaley, "New Overtime Rules for Ag Workers," February 28, 2019, and the Affordable Care Act. Changes to the AEWR calculation methodology that would have impacted 2021 H-2A wages were issued in November 2020 but suspended by a February 2021 injunction. 85 Fed. Reg. 70445 (November 5, 2019); 86 Fed. Reg. 10996 (February 23, 2021).

programs to protect soil and water quality.[157] Programs to assist with the cost of new production technologies also exist at the state level through state-funded grants[158] or cost sharing.[159]

U.S. squash growers also benefit from certain government programs that fund research projects to enhance the competitiveness of specialty crops, although these programs do not fund growers individually and represent a small share of total government spending on agriculture overall. The two largest of these programs that apply to the domestic production of squash are the Specialty Crop Block Grant Program (SCBGP) and the Specialty Crop Research Initiative (SCRI), which totaled $72.5 million and $80 million spent in grants, respectively. Under the 2018 Farm Bill, the average annual spending on U.S. agriculture from 2019–23 is $85.6 billion.[160] In FY 2020, 7 of 687 SCBGP-funded projects involved the cultivation of squash (totaling $581,026), and 1 of 23 SCRI-awarded projects involved the cultivation of cucurbits (i.e., cucumbers and squash) (totaling $7 million).[161]

At the individual grower level, U.S. specialty crop growers have access to several different federal programs to insure against crop losses in the event of natural disasters or poor yields, and, more recently, federal programs that compensate growers for disruptions to their marketing channels in the event of a pandemic or, for some crops, in response to foreign trade policy.[162] Compensation programs

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[157] NRCS also provides recovery assistance for property damaged by natural disasters. USDA, NRCS, "NRCS Conservation Programs," accessed July 27, 2021.

[158] Notably, the Georgia Department of Agriculture states that it does not offer any grants of state funds to agricultural producers. GDA, "Grants," accessed July 27, 2021. For examples in other states, see CDFA, "State Water Efficiency and Enhancement Program," accessed July 27, 2021; MDARD, "Value-Added and Regional Food Systems Grants," accessed July 27, 2021.

[159] Government official, email message to USITC staff, June 4, 2021; FDACS, OAWP, "Agricultural Best Management Practices," accessed July 27, 2021.

[160] USDA, AMS, "Specialty Block Crop Grant Program," accessed July 27, 2021; USDA, NIFA, "Specialty Crop Research Initiative (SCRI)," accessed July 27, 2021; USDA, AMS, *Transportation and Marketing*, November 17, 2020. In 2021, $97 million of additional funding was made available for the SCBGP through H.R. 133 Stimulus Funding as part of USDA's Pandemic Assistance initiative to mitigate the impact of COVID-19 on the U.S. food system. Unlike the $72.9 million in Farm Bill funding which must be spent down within FY 2021, the $97 million is available until expended. USDA, AMS, *USDA AMS Specialty Crops Program Newsletter*, May 4, 2021; USDA NIFA, *Request for Pre-Application*, October 15, 2019; Hall, "Letter to the Honorable K. Michael Conaway, Chairman of the U.S. House Committee on Agriculture," December 11, 2018; USDA, ERS, "Farm Bill Spending," February 1, 2021. There are also programs and policies supporting the competitiveness specialty crop producers under the Horticulture Title (Title X) in the Farm Bill. Many of these may benefit U.S. squash growers, including support for farmers markets, data and information collection, education on food safety and biotechnology, market development and promotion initiatives, and provisions related to USDA's National Organic Program. Johnson, "2018 Farm Bill Primer: Specialty Crops and Organic Agriculture," September 23, 2019.

[161] USDA, AMS, *Specialty Crop Block Grant Program Fiscal Year 2020 Description of Funded Projects*, November 17, 2020; USDA, NIFA, "Current Research Information Services," accessed July 27, 2021; USDA, NIFA, "Current Research Information System— PROJ NO: MICL08593—CUCCAP 2," accessed July 27, 2021.

[162] P.L. 75–430; P.L. 96–365; Rosch, "Federal Crop Insurance: A Primer," February 18, 2021; 7 U.S.C. 1508(b),(c),(h); USDA, FSA, "Disaster Assistance," May 2020; USDA, FSA, "2017 Wildfires and Hurricanes Indemnity Program (WHIP)," accessed July 27, 2021; USDA, "Specialty Crops and the Coronavirus Food Assistance Program," accessed July 27, 2021; USDA, "Coronavirus Food Assistance Program 2 for Specialty Crop Producers," accessed July 27, 2021; USDA, "Market Facilitation Program," accessed July 27, 2021. Squash were/are eligible commodities under all of these programs with the exception of the Market Facilitation Program. Participation in programs like crop insurance by U.S. squash growers has been minimal because the cost of the insurance premiums is too high to

related to COVID-19 disruptions appear to be popular among squash growers, especially with growers in Florida. As of June 2021, $10.6 billion of Coronavirus Food Assistance Program (CFAP) 1 payments had been allocated to growers, with $941 million paid out for specialty crops. Within specialty crop payments, $23.6 million has been paid out for squash losses (with 53.0 percent of this amount going to growers in Florida).[163]

Finally, growers in the Southeast and across the United States participate in various state-level marketing programs aimed at providing product differentiation and brand recognition to locally grown produce. These agricultural marketing programs, are funded through a mix of grower membership fees, allocations from state budgets, and sometimes state agriculture departments.[164] The programs often produce some recognition for local growers and locally grown products in retail store shelves.[165] Each of the previously mentioned major squash-producing states maintains a marketing program to provide recognition for their state's locally grown crops.[166] For example, "Fresh from Florida" has a $5–6 million budget, with 100 retail partners worldwide in approximately 10,000 outlet locations. Membership in the program enables attendance at trade shows and export-focused events, and support for some product-specific campaigns.[167] Another program called "Georgia Grown" owns a promotional trademark and charges industry stakeholders a usage fee. The program also connects growers with potential customers (retailers, restaurants, and schools).[168] Both Georgia and Florida programs include logos and separate sections in grocery stores nationwide. [169]

Factors Affecting Competitiveness

The competitiveness of the U.S. summer squash industry varies significantly by region and, as described in chapter 1 of this report, can be evaluated by comparing the delivered costs, product differentiation, and reliability of supply of U.S. products against those of imports. Certain key factors contribute to the competitiveness of the U.S. summer squash industry in the U.S. market, including the large geographical dispersion of U.S. production, geographical proximity to the market, and consumer preferences for local produce. While squash produced in the United States has some advantages over imported products,

justify given their assessment of likelihood of events that would trigger payout. Government officials in the Southeast reported that if squash growers had purchased insurance, it was most likely NAP insurance coverage. NAP provides financial assistance to producers of uninsurable crops when low yields, loss of inventory, or prevented planting occur due to natural disasters. No federal crop insurance policies were taken out to cover squash acreage from 2014 to 2020. Government official, interview by USITC staff, May 4, 2021; government official, email message to USITC staff, June 2, 2021; FDIC, USDA, RMA, *Commodity Year Statistics for 2020 - Nationwide Summary by Commodity/State*, accessed July 26, 2021.

[163] USDA, "Coronavirus Food Assistance Program 1 Data," accessed July 27, 2021.

[164] Government officials, interviews by USITC staff, March 13 and May 4, 2021.

[165] Academic representative, interview by USITC staff, March 13, 2021.

[166] For more information on these various state programs, see https://georgiagrown.com/; https://www.followfreshfromflorida.com/; https://www.ncfarmfresh.com/index.asp; https://californiagrown.org/; https://michigangrown.org/.

[167] Government official, interview by USITC staff, May 4, 2021.

[168] Government official, interview by USITC staff, May 5, 2021.

[169] GDA, "Georgia Grown: Grocery," accessed October 25, 2021; FDACS, "Fresh from Florida," accessed October 25, 2021. Logos are part of these programs in North Carolina and California as well. NCDACS, "AG'S COOL: Goodness Grows in North Carolina," accessed October 25, 2021; State of California, "California Grown: Download Center," accessed October 25, 2021.

there are a number of other factors—such as the relatively high costs of producing squash in the United States and the weather-related volatility of production in the Southeast—that limits the competitiveness of the U.S. industry. In addition to the factors discussed below, environmental regulations and programs at the state and federal level noted above could affect grower competitiveness. These regulations and programs may impact growers negatively, if they impose additional production costs that growers in other countries may not face, or positively, if they help U.S. growers to mitigate farm losses. Key factors affecting the competitiveness of the U.S. and Southeast industries are identified below and compared to those of foreign suppliers in chapter 4.

Higher labor costs increase U.S. delivered costs and may lower productivity and product differentiation.

The cost of labor is an especially impactful competitiveness factor for labor-intensive, perishable crops such as summer squash. U.S. labor costs are higher than those of Mexico, the leading exporter of squash to the United States, which contributes to higher relative costs of production in the United States.[170] USDA's National Agriculture Statistics Service (NASS) report shows that U.S. hired field workers (inclusive of H-2A and domestic workers) in agriculture received $15.19 per hour in April 2021, compared to $10-$20 per day in Mexico.[171] Wage rates for field workers in Florida and the rest of the Southeast were $12.30 per hour and $12.08 per hour, respectively, over the same time period.[172] Furthermore, agricultural wages for domestic and H-2A workers have been driven up in recent years due to the growing use of the H-2A program (as a result of a reported shortfall of domestic labor), the calculation methodology of the AEWR (the minimum wage for H2A workers), and changes to minimum wage laws, further raising production costs.[173] With production systems reliant on labor-intensive hand-planting and hand-harvesting practices, U.S. squash growers have few means of substituting labor for other

[170] Industry representative, interview by USITC staff, February 3, 2021.

[171] Reportedly, in Mexico, as of 2021, workers in the squash industry reportedly earned about $10-$12/day, although if paid by the piece they can earn $15-20/day. Calculated monthly rate based on a 6-day work week (26 days work month). USITC, hearing transcript, April 8, 2021, 96 (testimony of Richard Bowman, J&J Family of Farms); 264 (testimony of Rob Sbragia, Tricar Sales, Inc.); USDA, NASS, *Farm Labor*, May 26, 2021. For a more detailed discussion of labor in Mexico, see chapter 3.

[172] USDA, NASS, *Farm Labor*, May 28, 2020. As noted above, the USDA NASS Farm Labor Survey collects data to derive employment and wage estimates for directly hired U.S. farm workers (i.e., those workers recruited by the farm itself and not by farm labor contractors), which should, in principle, include hired unauthorized workers. Under this assumption, the average wages presented above should be inclusive of those paid to unauthorized workers. Note that these are the average wage rates only, and do not include mandatory operational and pre-employment costs associated with hiring H-2A workers, or the employer's share of payroll taxes.

[173] The national AEWR grew by an average of 3 percent year-on-year from 2012 to 2019. The AEWR for Florida and Georgia grew by 9 and 11 percent, respectively, from 2015 to 2020, whereas the AEWR in some other parts of the country saw growth of up to 27 percent over the same time period. Nigh, "H-2A and the AEWR We Were," March 15, 2019; Nigh, "2019 H-2A Sets Records, While a 2020 AEWR Wage Increase Approaches," November 27, 2019. Similar to the AEWR, average gross wages for directly hired U.S. farmworkers grew by 25.1 percent from 2015 to2020, while the growth rate was 12.0 percent and 10.4 percent in Florida and other southeastern states, respectively, over the same time period. USDA, NASS, *Farm Labor*, May 21, 2015, 5,7; USDA, NASS, *Farm Labor*, May 28, 2020, 3, 5.

productivity-enhancing inputs (such as mechanization) to help relieve labor cost pressures.[174] As labor is the largest single share of all input costs of producing summer squash, labor costs sizably affect the delivered cost of U.S. summer squash.

Furthermore, vegetable growers reportedly face challenges securing enough domestic labor, and this is especially true for growers in the Southeast due to the hot and humid climate.[175] According to an industry representative, because some growers have also historically utilized unauthorized migrant workers (considered part of the domestic labor force), federal and state policies aimed at curbing illegal immigration in recent years have made employing sufficient labor for these labor-intensive crops more difficult.[176] In order to have sufficient labor U.S. farmers (in the Southeast and elsewhere) rely heavily on the H-2A program to recruit foreign seasonal workers. Reliance on this program imposes additional administrative costs on employers to receive and maintain certification,[177] and can make employers vulnerable to certain changes in U.S. workforce and immigration policy. For example, despite robust government efforts to support the usage of the H-2A program throughout the pandemic, there have been reports of some delays in obtaining labor in the agriculture sector prompted by U.S. policy related to the COVID-19 pandemic (such as border closures and delays in H-2A authorizations).[178]

High labor costs in the United States can also negatively impact the differentiation of U.S. products in terms of quality, as it limits how U.S. producers grow and pack their summer squash. Production practices (like trellising and more frequent harvesting) or distribution features (like more attentive grading and packing) that might improve average product quality of a squash crop but require additional labor are often not affordable for growers to implement. This can result in quality differences that can make U.S. product less appealing to U.S. retail customers compared to Mexican imported products.[179] For example, the prevalence of field packing limits producers' ability to use both hydrocooling and packing materials that can extend the shelf life of squash. Some retail purchasers reportedly even have different sets of standards for purchases of imports versus domestically grown summer squash.[180]

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[174] Industry representative, interview by USITC staff, February 3, 2021; USITC, hearing transcript, April 8, 2021 15, 17–20 (testimony of The Honorable Nicole Fried, Commissioner of Agriculture, Florida Department of Agriculture and Consumer Services).
[175] Labor representative, interview by USITC staff, March 10, 2021. USITC, hearing transcript, 16, 20 (testimony of Commissioner Nicole Fried, Florida Department of Agriculture and Consumer Services).
[176] USITC, hearing transcript, 61 (testimony of Lance Jungmeyer, Fresh Produce Association of the Americas).
[177] See text box 2.1 for a summary of these costs.
[178] Karst, "Suppliers Point to Government Policy as One Reason behind Labor Shortage," April 29, 2021.
[179] USITC, hearing transcript, 59, 62 (testimony of Lance Jungmeyer, Fresh Produce Association of the Americas); industry representatives, interviews by USITC staff, February 1, May 9, May 24, August 10, 2021. U.S. growers have stated that there is no discernable difference in the quality of the domestic versus imported products. See USITC, hearing transcript, 73 (testimony of Michael Joyner, Florida Fruit and Vegetable Association), 136–37 (testimonies of Dick Bowman, J&J Farms; Michael Joyner, Florida Fruit and Vegetable Association; and Adams Lee, counsel for Fresh Produce Association of the Americas).
[180] Industry representative, interview by USITC staff, February 1, 2021.

Dispersed production throughout the United States mitigates climate-related risks, improves product differentiation, and contributes to freight cost advantages.

Production of summer squash occurs throughout the United States in various geographic regions with varying climates and production seasons. This leads to a high reliability of supply (in terms of product variety and seasonal offerings). As mentioned previously, the U.S. squash industry produces summer squash in most months of the year due to the different geographic regions of the major producing states, this situation creates differing growing windows from state to state and minimizes the impact that any sort of disruption one state/region might face would otherwise have on the national supply of summer squash.[181] This provides some safety net in terms of U.S. squash production throughout the year.

Dispersed production also means access for U.S. squash as "locally grown" products to several different markets. Growers everywhere in the United States will experience import competition throughout the year; however, their proximity to local customers combined with the desire of buyers and consumers for locally grown produce and the highly perishable nature of summer squash means that growers can maintain their competitiveness in local markets by differentiating their product as fresher, locally grown-branded produce. Close geographic proximity to markets can also reduce freight costs compared to imported product.[182]

The Southeast climate brings unique challenges such as a limited growing season, amplified pest pressures, and hurricanes.

While dispersed U.S. squash production helps mitigate concerns regarding the reliability of supply on a national level, there are some significant production limitations in the Southeast due to its high humidity and unique climate. Most importantly, Southeast growers can only produce summer squash in certain months of the year (during late fall through late spring), which largely overlaps with Mexico's production season for summer squash.[183] This creates increased competition for Southeast growers and can reportedly have a negative impact on the profitability of the region's production.[184]

Pest pressure also appears to be disproportionately burdensome in the Southeast, which has an adverse impact on production costs, product quality, and reliability of supply. Production of summer squash in

[181] For example, while hurricane season poses a unique challenge to the Southeast, the same is not true of California or Michigan. Industry representative, interview by USITC staff, February 24, 2021.
[182] Industry representatives, interviews by USITC staff, August 10, 2021 and October 5, 2021.
[183] Zucchini squash is a primary summer squash produced in both the Southeast and in Mexico. USITC, hearing transcript, April 8, 2021, 30 (testimony of Minister Gerardo Lameda, Embassy of Mexico); industry representative, interview by USITC staff, March 9, 2021.
[184] Government official, interview by USITC staff, April 27, 2021; industry representative, interview by USITC staff, July 23, 2021.

the Southeast is particularly susceptible to climate-related diseases, pests, and viruses.[185] Such pest and disease pressures elevate production costs due to greater pesticide use requiring additional applications.[186] For example, in Georgia some growers have teams that “scout and spray” their fields, on a weekly or even sometimes daily basis.[187] In Florida, 100 percent of acreage must be regularly fumigated due to pests and fields must be sprayed once or twice a week with fungicides, insecticides, or both, leading to higher pest control costs than Mexico or California.[188]

Finally, the Southeast’s disproportionately high rainfall and the potential for severe hurricanes pose unique challenges to the Southeast, as there is some overlap between hurricane season and the summer squash growing months.[189] This is because the flooding brought on by the rainy season of the year and/or hurricanes (as well as the potential damage these cause) can impact the farmland long after the weather-related event has passed.[190] Additionally, there are limited options for growers in terms of a safety net for losses due to weather-related events in the Southeast; one hearing participant noted that crop insurance has major limitations, and is often not cost effective versus just taking on the risk of natural disasters.[191]

[185] Southeast squash production is vulnerable to diseases such as milt, mildew, and rot; pests including aphids, pickleworms, squash bugs, and squash vine borers; and viruses (specifically in Florida) such as papaya ringspot virus and the zucchini yellow mosaic virus. Industry representative, interview by USITC staff, February 3, 2021; Blue Book Services, “Squash,” accessed April 20, 2021; Seal et al., “Summer Squash Production in Miami-Dade County, Florida,” March 6, 2019.
[186] Industry representatives, interviews by USITC staff, February 3, February 24, and August 10, 2021.
[187] Industry representative, interview by USITC staff, May 10, 2021.
[188] Industry representatives, interviews by USITC staff, February 3, February 24, 2021.
[189] USITC, hearing transcript, 114–115 (testimony of Marie Bedner, Bedner Growers) 117–18 (testimony of Gene McAvoy, University of Florida); academic professional, interview by USITC staff, April 30, 2021.
[190] While hurricanes generally occur outside of the growing season for U.S. squash, and multiple sources have noted that the impacts of hurricanes on squash production directly are minimal due to this overlap, it is worth noting that two recent hurricanes (Hurricane Michael in 2018 and Hurricane Irma in 2017) did both negatively impact the squash growing seasons in Georgia and Florida respectively due to destroying farmlands, over-dampening the soil, and damaging irrigation systems. Industry representative, email message to USITC staff, May 26, 2021; Hodges et al., “Economic Losses of Hurricane Irma on Agriculture in Florida Counties,” August 17, 2018.
[191] Government official, interview by USITC staff, May 4, 2021.

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Chapter 3
The Industry in Mexico

The Mexican squash industry is a small export-oriented part of the country's agricultural sector focused heavily on supplying summer squash varieties to the U.S. market. The world's largest exporter of squash, Mexico's production of summer squash is centered in the country's arid northwestern region, where it is often grown alongside other fruits and vegetables intended for export to the United States. Mexico's squash exports to the United States, most of which are green zucchini and yellow straightneck varieties, have grown steadily during 2015–20 due to strong U.S. demand and Mexico's competitive advantages in producing the crop, particularly at times of the year when U.S. domestic production is low.

Mexico's competitive advantages include a relatively low cost of production, which is driven by a favorable climate that lowers input costs, and by the availability of comparatively low-cost labor. Mexican squash also enjoys a reputation for consistently high product quality. This reputation has been bolstered by investment from large produce exporters in production and packing improvements. The industry further benefits from its established relationships with U.S. buyers and investors, who consider Mexico's long production season and improved logistics important to ensuring reliable supply to the U.S. market.

Production, Trade, and Consumption

Production

Mexico supplied 3.0 percent of global squash, gourds, and pumpkin production in 2019, and was the fifth-largest producer globally.[192] Much of Mexico's climate is conducive to growing horticulture crops, including squash, although it does face water and weather pressures.[193] Overall squash production, which averaged 770,426 metric tons (mt) per year between 2015 and 2020, has increased 3.7 percent over the period (table 3.1). Summer squash (*calabacita*) is the main type of squash grown in Mexico and accounts for about 80 percent of total squash production, with the remainder winter squash (*calabaza*).[194] Over the 2015–20 period, production of summer squash increased by 8.1 percent, while production of winter squash decreased by 13.9 percent. There were variations in production volume of both types of squash within the period. Between 2015 and 2016, there was a 20.3 percent increase in total squash production, and then it was largely stable until 2019–20 when total production decreased by 14.2 percent.[195] These changes appear to be driven by variations in harvested area (table 3.2) and

[192] FAO, FAOStat database, Crops: Squash – Production, accessed March 3, 2021.
[193] Pratt and Ortega, *Protected Agriculture in Mexico*, May 2019, 6.; USITC, hearing transcript, April 8, 2021, 239 (testimony of Craig Slate, SunFed Produce).
[194] Government of Mexico, SIAP, Anuario estadístico de la producción agrícola database*:* Calabaza; Calabacita (Statistical yearbook of agricultural production database)*,* accessed May 3, 2021.
[195] Government of Mexico, SIAP, Anuario estadístico de la producción agrícola database*:* Calabaza; Calabacita (Statistical yearbook of agricultural production database), accessed May 3, 2021.

yields (table 3.3). The 2020 decline was likely due to production disruptions from a freeze in February 2020.[196]

Table 3.1 Squash: Mexican production, by product type, 2015–20
In metric tons and percentages; mt = metric tons.

Product type	2015	2016	2017	2018	2019	2020
Summer squash (mt)	545,710	641,817	636,364	643,738	689,985	589,705
Winter squash (mt)	133,135	174,943	160,222	161,074	131,292	114,574
All products (mt)	678,845	816,760	796,587	804,811	821,277	704,279
Summer squash (%)	80.4	78.6	79.9	80.0	84.0	83.7
Winter squash (%)	19.6	21.4	20.1	20.0	16.0	16.3
All products (%)	100.0	100.0	100.0	100.0	100.0	100.0

Source: Government of Mexico, SIAP, Anuario estadístico de la producción agrícola database*:* Calabaza; Calabacita (Statistical yearbook of agricultural production database), accessed May 3, 2021.
Note: USITC estimate for 2020 winter squash production.

Table 3.2 Squash: Mexican area harvested, by product type, 2015–20
In hectares and percentages; ha = hectares.

Product type	2015	2016	2017	2018	2019	2020
Summer squash (ha)	26,223	27,971	28,647	30,146	26,833	25,584
Winter squash (ha)	7,965	8,750	7,964	8,032	7,109	5,672
All products (ha)	34,188	36,721	36,611	38,177	33,941	31,256
Summer squash (%)	76.7	76.2	78.2	79.0	79.1	81.9
Winter squash (%)	23.3	23.8	21.8	21.0	20.9	18.1
All products (%)	100.0	100.0	100.0	100.0	100.0	100.0

Source: Government of Mexico, SIAP, Anuario estadístico de la producción agrícola database*:* Calabaza; Calabacita (Statistical yearbook of agricultural production database), accessed May 3, 2021.
Note: USITC estimate for 2020 winter squash area harvested.

Table 3.3 Squash: Mexican yields, by product type, 2015–20
In metric tons per hectare.

Product type	2015	2016	2017	2018	2019	2020
Summer squash	20.8	22.9	22.2	21.4	25.7	23.0
Winter squash	16.7	20.0	20.1	20.1	18.5	20.2
All products	19.9	22.2	21.8	21.1	24.2	22.5

Source: Government of Mexico, SIAP, Anuario estadístico de la producción agrícola database*:* Calabaza; Calabacita (Statistical yearbook of agricultural production database), accessed May 3, 2021.
Note: USITC estimate for 2020 winter squash yield.

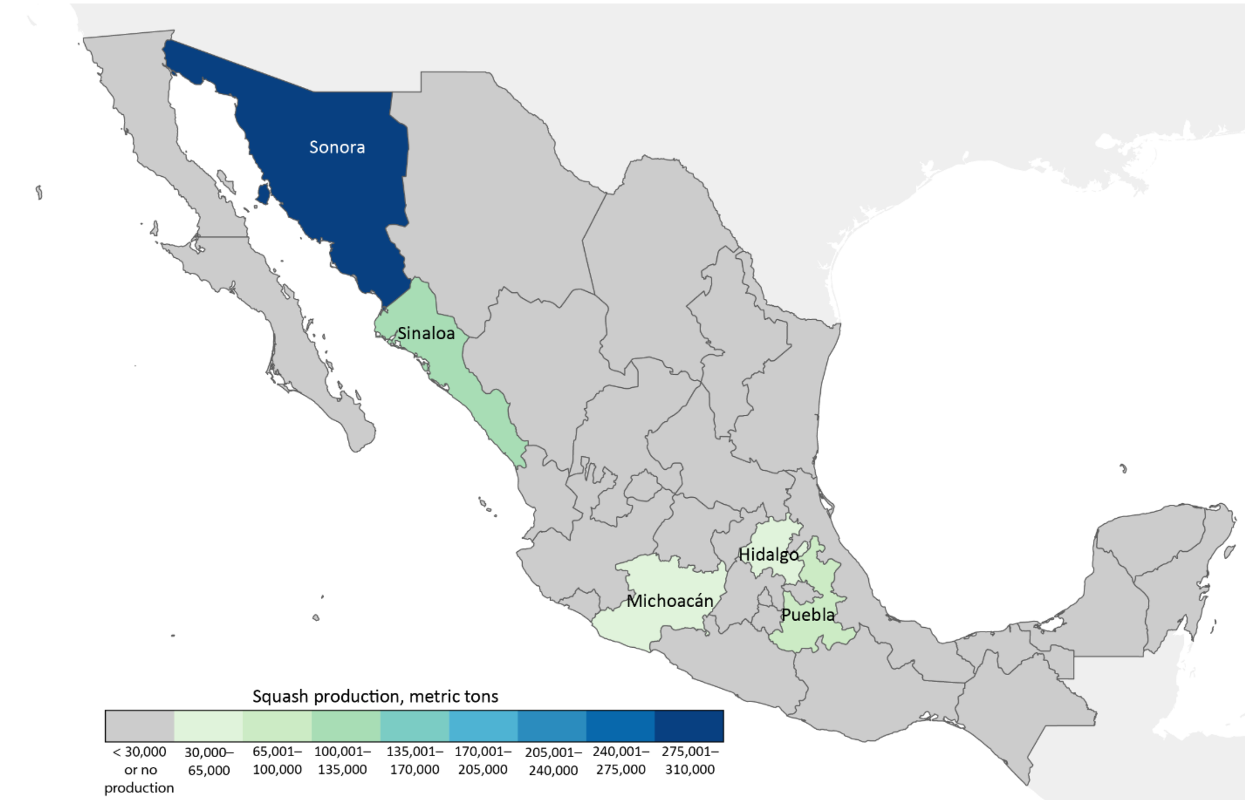
The main squash-growing regions in Mexico are in the northwest and central parts of the country, with states in these regions producing 70.3 percent of Mexico's squash in 2019. As seen in figure 3.1, the states of Sinaloa and Sonora in northwest Mexico were the largest producing states for squash in 2019. Summer squash is the main type of squash grown in both states, and in 2019 was 95.6 percent of squash production in Sinaloa and 65.4 percent in Sonora (73.1 percent of total production in the two states).[197] The harvest season in this region runs from the fall through spring.[198] Similarly, the focus in the central

[196] Industry representative, email message to USITC staff, August 11, 2021.
[197] Government of Mexico, SIAP, Anuario estadístico de la producción agrícola database*:* Calabaza; Calabacita (Statistical yearbook of agricultural production database), accessed May 3, 2021.
[198] Industry representative, interview by USITC staff, March 9, 2021.

Mexican states of Michoacán, Puebla, and Hidalgo is also on summer squash, which constitutes 96.8 percent of all squash grown in the region.[199]

Figure 3.1 Squash production in Mexico, by state, 2019

In metric tons. Underlying data for this figure can be found in appendix F, table F.3.



Source: Government of Mexico, SIAP, *Anuario estadístico de la producción agrícola*: *Calabaza; Calabacita* (Statistical yearbook of agricultural production database), accessed May 3, 2021.

Trade

Mexico is the largest exporter of squash, gourds, and pumpkins in the world, with 547,450 mt exported in 2020.[200] On average, nearly 65 percent of production is exported annually.[201] As seen in table 3.4, exports grew between 2015 and 2020, increasing by 32.2 percent over the period. In 2020, 94.1 percent

[199] These states are Puebla, Michoacán, and Hidalgo. Government of Mexico, SIAP, Anuario estadístico de la producción agrícola database*:* Calabaza; Calabacita (Statistical yearbook of agricultural production database), accessed May 3, 2021.
[200] Much of this is likely squash as the United States received 95 percent of Mexico's squash, gourds, and pumpkins exports on average during 2015–20, and 90 percent of U.S. imports of under this category are squash. IHS Markit, Global Trade Atlas, HS subheading 0709.93, accessed May 11, 2021; USITC DataWeb/Census, HTS subheading 0709.93.20, accessed February 11, 2021; Government of Mexico, SIAP, Anuario estadístico de la producción agrícola database*:* Calabaza; Calabacita (Statistical yearbook of agricultural production database), accessed May 3, 2021.
[201] Government of Mexico, SIAP, Anuario estadístico de la producción agrícola*:* Calabaza; Calabacita (Statistical yearbook of agricultural production database), accessed May 3, 2021; IHS Markit, Global Trade Atlas, HS subheading 0709.93, accessed May 11, 2021.

of exports went to the United States. Exports to the United States increased by 31.6 percent from 2015 to 2020. Reportedly, most exports from Mexico to the United States are summer squash, which is consistent with the larger share of Mexican production devoted to summer squash.[202] Japan was the second-largest export destination for Mexican squash, gourds and pumpkins, accounting for 5.9 percent of total exports. Exports to Japan grew by 46.7 percent over the period. Mexico is a minor importer of squash, gourds, and pumpkins, ranking 23rd globally in 2020 with 1,945 mt imported, entirely from the United States.

Table 3.4 Pumpkins, squash, and gourds: Mexican exports, by destination market, 2015–20
In metric tons and percentages; mt = metric tons; n.c. = not calculable; ** = rounds to less than 0.1.

Destination market	2015	2016	2017	2018	2019	2020
United States (mt)	391,388	461,597	482,404	482,197	497,851	515,003
Japan (mt)	21,898	22,823	24,930	24,163	25,570	32,115
Canada (mt)	179	442	269	648	270	311
All other markets (mt)	624	678	2,785	576	0	20
All destination markets (mt)	414,089	485,540	510,387	507,584	523,691	547,450
United States (%)	94.5	95.1	94.5	95.0	95.1	94.1
Japan (%)	5.3	4.7	4.9	4.8	4.9	5.9
Canada (%)	**	0.1	0.1	0.1	0.1	0.1
All other markets (%)	0.2	0.1	0.5	0.1	n.c.	**
All destination markets (%)	100.0	100.0	100.0	100.0	100.0	100.0

Source: IHS Markit, Global Trade Atlas, HS subheading 0709.93, accessed May 7, 2021.
Note: HS subheading includes pumpkins, squash, and gourds.

Consumption

Apparent consumption of squash in Mexico was relatively flat between 2015 and 2019, averaging 296,798 mt per year, and then fell by 46.8 percent in 2020 to 158,774 mt (table 3.5). Per capita consumption likewise was relatively steady between 2015 and 2019, averaging 2.4 kg, before dropping 47.9 percent in 2020. The average over the period was 2.2 kg—comparable to the 2.3 kg average in the United States. In 2020, Mexico's total consumption as well as per capita consumption fell significantly due to a drop in production and an increase in exports. Production was likely disrupted by a freeze in February 2020.[203]

Both winter and summer squashes are consumed in Mexico, such as in soups or as side dishes.[204] In addition, the seeds and flowers from the squash are also eaten.[205] The main type of summer squash consumed in Mexico is called "grey squash," of which a small but increasing amount is exported to the United States.[206] Although there is some limited domestic consumption of yellow squash and green zucchini, the majority are grown for export to the United States.[207] On average over the period, 35.3 percent of total squash production in Mexico was destined for domestic consumption.

[202] Industry representative, email to USITC staff, August 11, 2021.
[203] Industry representative, email to USITC staff, August 11, 2021.
[204] WorldCrops, "Calabacita," January 26, 2017; Mangan, Barros, "Calabaza," January 26, 2017.
[205] WorldCrops, "Calabacita," January 26, 2017; Mangan, Barros, "Calabaza," January 26, 2017.
[206] USITC, hearing transcript, April 8, 2021, 317 (testimony of Jaime Chamberlain, Chamberlain Distribution); WorldCrops, "Calabacita," January 26, 2017.
[207] Industry representative, interview by USITC staff, May 28, 2021; WorldCrops, "Calabacita," January 26, 2017.

Table 3.5 Squash: apparent consumption in Mexico, 2015–20
In metric tons, kilograms, and percentages; mt = metric tons; kg = kilograms.

Item	2015	2016	2017	2018	2019	2020
Production(mt)	678,845	816,760	796,587	804,811	821,277	704,279
Imports (mt)	1,506	1,856	1,446	1,535	659	1,945
Exports (mt)	414,089	485,540	510,387	507,584	523,691	547,450
Consumption (mt)	266,262	333,075	287,645	298,761	298,245	158,774
Per capita consumption (kg)	2.2	2.7	2.3	2.4	2.3	1.2
Percent of production exported (%)	61.0	59.4	64.1	63.1	63.8	77.7

Source: Government of Mexico, SIAP, Anuario estadístico de la producción agrícola database (Statistical yearbook of agricultural production database), accessed May 3, 2021; IHS Markit, Global Trade Atlas, HS subheading 0709.93, accessed May 7, 2021; UN, Department of Economic and Social Affairs, Population Division, World Population Prospects 2019 database, accessed May 10, 2021.
Notes: HS subheading 0709.93 includes pumpkins and gourds in addition to squash. Mexico export data do not break out domestic Mexican exports from re-exports. “Re-exports” are exports of foreign goods in the same state as previously imported. See UN International Trade Statistics Knowledgebase, “Re-exports and Re-imports,” accessed October 6, 2021.

Industry Structure

Mexican producers of summer squash, which makes up the majority of Mexican exports to the United States and is the focus of this study and the rest of the chapter, often grow the crop on diversified vegetable farms, as a complement to other crops such as tomatoes, peppers, and cucumbers. These crops all complement each other because they thrive in the same temperatures and have similar handling requirements, so they can be rotated to provide a more diverse income stream.[208] Many of these farms are either owned by large produce companies or operate under contracts with them. Some of these produce companies are headquartered in the United States and have invested in squash production in Mexico in order to take advantage of the growing conditions there and ensure year-round supply in the U.S. market.[209] With these investments often come improvements in infrastructure, like installation of drip irrigation, on Mexican vegetable farms.[210]

The main Mexican production season for summer squash is from late September to early May, since it is often too hot in western Mexico to grow squash at the height of summer. This long season overlaps in large part with squash production in the U.S. Southeast, which runs from late fall to early summer.[211] The Mexican growing season also complements U.S. production in other regions, with several U.S. squash-producing regions supplying the U.S. market during the Mexican low season (from May to September). This ensures a consistent year-round supply in the U.S. market.[212]

Sonora and Sinaloa, adjacent states in northwestern Mexico, are the main squash-growing states, as noted above. In 2019, Sonora supplied 37 percent of total Mexican squash production by volume and Sinaloa supplied 13 percent, and production in both states increased in the 2015–19 period. One industry representative indicated that land costs are higher in Sinaloa and that there is more competition from higher-margin crops like tomatoes and peppers, making Sonora more attractive for squash.[213] After Sonora and Sinaloa, the third-largest squash-producing state is Puebla, which is south of

[208] Industry representatives, interviews by USITC staff, March 9 and July 7, 2021.
[209] Industry representatives, interview by USITC staff, July 7, 2021.
[210] Industry representative, interview by USITC staff, March 9, 2021.
[211] See chapter 2 for additional detail on growing seasons in various U.S. regions.
[212] FPAA, written submission to USITC, March 29, 2021, 10.
[213] Industry representative, interview by USITC staff, March 9, 2021.

Mexico City, in the interior of the country. Puebla supplied 9 percent of production in 2019, and its production was flat between 2015 and 2019.[214]

Industry Composition

As a result of the investments of major produce companies, the supply chain for squash between Mexico and the United States has become more integrated and displaced what was traditionally an industry dominated by family farms in Sinaloa.[215] Some of these major produce companies grow squash on land that they own in Mexico, and others contract with squash growers. One industry representative estimated that perhaps 60 percent of squash production in Mexico is done directly by large, multinational grower-shipper companies, with the other 40 percent done under contract with outside growers.[216] In either case, the export-oriented nature of the industry results in a structure in which the average farm is larger and able to fill demand from major buyers. While squash-specific data on farm size are not available, data are available for tomatoes; much of the squash crop is likely grown by the same diversified producers that grow tomatoes (or by other produce companies with a similar structure and size), as noted above. The average size of an export-oriented tomato grower's total land holdings in Sinaloa is estimated to be about 640 hectares (this total may be spread across multiple farms.) [217] Some Mexican growers that produce squash under contracts with exporting companies may have smaller operations on average than those observed in these vertically integrated operations.[218]

Production System

Squash are generally grown in open fields in Mexico, which may sometimes include the use of temporary shade structures. In 2020, less than 1 percent of Mexico's squash crop was grown in more substantial protected agricultural environments, such as greenhouses.[219] Squash are not generally grown in greenhouses for two primary reasons. First, squash can be difficult to pollinate under protected agriculture. Second, greenhouse space is generally reserved for crops that generate higher prices per pound than squash. However, some industry representatives indicate that more squash may be greenhouse grown in the future, as demand continues to grow, and agricultural science resolves challenges related to pollinating squash indoors.[220]

Production Practices

Production practices for export-oriented squash production in Mexico are driven by the favorable climate that high desert environments, such as those in Sonora and Sinaloa, provide. Irrigation is a necessity for growing squash in arid environments. Throughout Mexico, less than 4 percent of squash

[214] Government of Mexico, SIAP, Anuario estadístico de la producción agrícola database (Statistical yearbook of agricultural production database), accessed May 3, 2021.
[215] Government official, email message to USITC staff, March 3, 2021.
[216] Industry representative, email message to USITC staff, August 11, 2021.
[217] Escobar, Martin, and Stabridis, "Farm Labor and Mexico's Export Produce Industry," 58.
[218] Industry representative, email message to USITC staff, August 23, 2021.
[219] Government of Mexico, SIAP, Anuario estadístico de la producción agrícola database (Statistical yearbook of agricultural production database), accessed May 3, 2021.
[220] Industry representative, interview by USITC staff, July 6, 2021.

production is unirrigated, and this production tends not to be in the main export-oriented growing areas.[221] Sources of water for drip irrigation tend to be readily available in Sonora and Sinaloa via the network of dams, reservoirs, and irrigation canals, and, as noted elsewhere, investors are sometimes willing to install drip irrigation systems to support export-oriented production. Other production practices that enhance quality, such as the use of shade structures, are also in use among zucchini and yellow squash growers in Mexico.[222] Squash destined for export are commonly vertically grown (i.e., using trellises), which protects the shape and color of the squash.[223] Summer squash must be hand harvested, and the harvest stage is the most labor-intensive part of production, as described in the cost of production section below.

Packing

After harvest, the squash are sent to a packing house to be cooled and packaged for export. The cooling process for squash intended for export, which needs to have a longer shelf life than squash intended for domestic consumption, often has two steps. First, the squash are submerged in cold water to bring the temperature down quickly. Next, the squash are air chilled. This two-step process is necessary for summer squash that will be shipped to the United States because they are particularly prone to spoilage due to their soft flesh.[224] An additional quality-preserving layer is often added when the squash are subsequently packed in modified atmosphere packaging (MAP). MAP, which uses specialty plastic films and bags to control the respiration of the squash, is favored by U.S. retailers and is in common use among Mexican squash exporters.[225] Often, MAP is used to bundle two or three summer squash together in a single consumer-ready package. Overall, these packing practices for squash are relatively labor intensive and rely on Mexico's supply of available workers to fill positions in packing houses.[226]

Supply Chain

Preparing squash for transport to the United States requires several steps. First, the squash (which is already typically packed in MAP) is loaded into an insulated shipping box.[227] Next, the shipping boxes are combined to form a pallet before being loaded into a refrigerated truck, in a configuration that allows cool air to circulate.[228] Delays or breaks in the cold chain during the loading, transport, or unloading processes can cause the squash to experience temperature swings resulting in damage to the vegetables.[229] Speed to market and temperature control throughout the transportation process

[221] Government of Mexico, SIAP, Anuario estadístico de la producción agrícola database (Statistical yearbook of agricultural production database), accessed May 3, 2021.
[222] Industry representative, email to USITC staff, August 11, 2021.
[223] Industry representative, email to USITC staff, May 28, 2021.
[224] Industry representative, interview by USITC staff, July 6, 2021.
[225] Industry representative, interview by USITC staff, July 6, 2021.
[226] Industry representatives, interview by USITC staff, May 28, 2021.
[227] Hecht, "Shipping Vegetables from Mexico to USA," August 16, 2019.
[228] Hecht, "Shipping Vegetables from Mexico to USA," August 16, 2019; Vigneault et al., "Transportation of Fresh Horticultural Produce," 2009, 12.
[229] PMA, "Transportation," August 1, 2016.

determine the quality of the product at market and are the most important factors for logistics and transportation.[230]

Squash consistently rank among the top five fruits and vegetables (by volume) transported by truck to the United States from Mexico.[231] Freight rates for refrigerated truck transport from Mexico to the United States are reportedly similar for all fruits and vegetables, so rates for fresh produce are applicable to fresh market summer squash. These rates show some seasonal variation, with a decline in the third quarter of most calendar years, likely due to the wide availability of domestic produce in most regions of the United States during this period.[232] Freight rates were particularly high in 2018 due to (1) a shortage of truck drivers, which was exacerbated by implementation of a required electronic logging device system in the United States, and (2) high fuel prices.[233] In the second quarter of that year, rates reached $3.21/mile, compared to an average for the 2015–20 period of $2.52/mile.[234]

According to industry representatives, freight rates can have a significant impact on the price of imported squash, as described in additional detail in chapter 5.[235] One analysis similarly found that because refrigerated trucks are a fuel-intensive form of transportation compared to rail and ocean shipping, the wholesale prices of fresh produce are sensitive to changes in fuel prices (which are a major component of freight rates). This is particularly true for U.S. markets, such as the U.S. East Coast, that are the furthest distance from Mexican growing regions. However, this analysis also found that fuel prices affected wholesale prices less in seasons when there was more competition from vegetables grown within the U.S. region, since this competition limited the ability of sellers to pass fuel price increases (and, by extension, freight price increases) on to buyers.[236]

The majority of squash shipped from Mexico to the United States are sent by refrigerated truck through the border crossing at Nogales, Arizona. The other major points of entry for squash are California and Texas (primarily the border crossings at Hidalgo and Laredo). While these points of entry in Texas have handled an increasing share of fresh produce shipped to the United States over the past two decades, this shift has not extended to squash; just over 80 percent of squash was shipped through Arizona consistently throughout the past 20 years.[237]

Once they cross the border, boxes of squash may be mixed with other types of produce, such as eggplant and cucumbers. Retail buyers prefer to have a mix of vegetables to offer and obtain this mix as efficiently as possible (e.g., from a single source or, if from multiple sources, ones in close proximity). These mixed produce shipments are then distributed from the point of import to buyers throughout the

[230] PMA, "Transportation," August 1, 2016.
[231] USDA, AMS, "Mexico Transport Cost Indicator Report," May 2021.
[232] USDA, AMS, Agricultural Refrigerated Truck Quarterly Datasets, accessed June 16, 2021.
[233] Sterk, "Truck Freight Rates Continue to Climb," October 12, 2018.
[234] USDA, AMS, Agricultural Refrigerated Truck Quarterly Datasets, accessed June 16, 2021.
[235] Industry representatives, interviews by USITC staff, August 10, 2021.
[236] Volpe, Roeger, and Leibtag, "How Transportation Costs Affect Fresh Fruit and Vegetable Prices," November 2013.
[237] USDA, AMS, Agricultural Refrigerated Truck Quarterly Datasets, accessed June 16, 2021.

United States.[238] Almost all of the summer squash Mexico grows is for fresh market consumption, so retail stores are the major buyers.[239]

Cost of Production

The cost of production (COP) for squash in Mexico is largely impacted by labor costs, and particularly labor costs at the harvest stage. Other variable costs, such as agrichemical and irrigation costs, appear to be relatively low. The data presented in this section are derived from a wide range of sources, including industry representatives and the Mexican government. However, all are indirect sources of information, based either on secondhand accounts or on primary data for crops other than squash. No direct, detailed information on the costs of producing squash in Mexico were available.

As in other squash-producing countries, Mexican squash are hand-harvested, since machine harvesting would damage the delicate skin of summer squash. This means that the harvesting stage is likely one of the costliest parts of the production process, since the labor required to harvest vegetables by hand can be extensive. While direct cost data for squash are not available, the case of asparagus (a similarly fast-growing crop that must be harvested by hand, is prone to spoilage, and has a short shelf life) is illustrative.[240] Mexican government data show that the harvest stage for asparagus grown in Sonora and Sinaloa was by far the biggest contributor to labor costs for that crop, followed by manual weeding.[241] In all, labor made up about 29 percent of variable costs involved in the production of asparagus in Sonora.

Given the arid climate, pest pressures are naturally relatively low in northwestern Mexico, which reduces the need for agrichemical inputs and the labor needed to apply them to the squash crop.[242] This means that while agrichemicals are priced similarly on a per-unit basis in Mexico and the United States,[243] the total cost is lower in Mexico since less of the input is generally needed. For example, COP information submitted by one hearing witness suggests that the costs per acre for pesticides for squash production in Mexico may be less than half of what they are in the U.S. Southeast ($410/acre in the United States Southeast vs. $200/acre in Mexico).[244]

Irrigation costs as a share of total cost of production appear to be similar to or slightly lower than those in the United States. Mexican government COP information for other fruits and vegetables grown under open field conditions in Sonora and Sinaloa suggests that the total cost of irrigation varies widely, ranging from 3 to 33 percent of total per-acre costs.[245] This compares with irrigation representing 16 percent of per-acre costs for U.S. squash producers, as noted in chapter 2. The direct cost of water in Sonora and Sinaloa appears to be quite modest, and production in both states is supported by a system

[238] Industry representatives, interview by USITC staff, July 6, 2021; USITC, hearing transcript, April 8, 2021, 240 (testimony of Craig Slate, SunFed Produce).
[239] Industry representative, interview by USITC staff, July 6, 2021.
[240] There are also key differences between squash and asparagus, such as the use of trellises in squash production, but data were not available for any crops that were similar to squash in these additional respects.
[241] Government of Mexico, FIRA, Agrocostos database, accessed August 2, 2021.
[242] USITC, hearing transcript, April 8, 2021, 239 (testimony of Craig Slate, SunFed Produce).
[243] Industry representative, email message to USITC staff, August 23, 2021.
[244] Burgin Farms, written submission to USITC, April 2, 2021.
[245] Government of Mexico, FIRA, Agrocostos database, accessed August 2, 2021.

of dams and irrigation canals that provide water to farms.[246] As a result, the majority of irrigation-related expenses for drip-irrigated crops like squash are not water costs, but rather the purchase of materials to operate drip irrigation systems, such as the disposable drip tape (i.e., temporary water lines used in the system) that may need to be replaced every year. The cost of these materials can be substantial. For example, COP data for asparagus in Sonora showed that drip tape alone made up nearly 22 percent of the variable costs involved in production of the crop.[247] Estimates of the cost of production per kilogram of zucchini for Mexican producers are included in chapter 4, table 4.3.

Delivered Costs

Other factors that influence delivered costs of summer squash are not captured in these proxy COP data, especially for products intended for export. These can include costs related to packing, transport, marketing, and compliance with standards. Packing material costs for squash are likely higher than for some other vegetables since squash are typically packed in MAP, as described above. Due to these elevated costs for squash, proxy data for other crops like asparagus are not useful here. Transport costs, which are a major share of delivered cost (reportedly ranking below only on-farm labor as a contributor to total delivered cost),[248] are influenced by additional factors such as fuel costs and distance to the end market (see supply chain section above).[249] In addition, as noted in chapter 1, Mexican squash must meet export market food safety and quality standards. Compliance with these standards also raises costs, though these compliance costs are likely similar for all countries producing for the same market.

Labor

Labor needs for squash production in Mexico are generally highest during the planting and harvesting stages of production.[250] At other stages of production, workers are also needed to maintain plants on trellises (e.g., pruning, guiding the vines, preventing disease from spreading) and for tasks such as applying agrichemicals. According to one study, open field production of tomatoes in Mexico requires 21 to 30 workers/ha, a figure that is likely similar for squash.[251] The work is mostly low-skilled, manual labor, and it is primarily done by men.[252] While many of the workers are paid a fixed wage by the day, harvest crews are sometimes paid a piece rate.[253] One industry representative estimated that approximately 90 percent of workers in the squash industry in northwestern Mexico come from within the local area, with some finding year-round work in the sector and others working seasonally.[254]

Information from industry representatives and other sources suggests that the provision of non-wage benefits to workers, and the benefits provided, can vary widely. In Mexico, such benefits may include

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[246] Government official, interview by USITC staff, June 7, 2021.
[247] Government of Mexico, FIRA, Agrocostos database, accessed August 2, 2021.
[248] Industry representative, email message to USITC staff, August 23, 2021.
[249] The role of freight costs in squash pricing is described in detail in chapter 5.
[250] Industry representative, email message to USITC staff, August 23, 2021.
[251] The authors state that evidence indicates that the same conditions exist for open field cucumbers, which likely means squash would be similar. Pratt and Ortega, *Protected Agriculture in Mexico*, May 2019, 20–21.
[252] Pratt and Ortega, *Protected Agriculture in Mexico*, May 2019, 21.
[253] Industry representative, email message to USITC staff, August 23, 2021.
[254] Industry representative, email message to USITC staff, August 23, 2021.

transportation, meals, medical care, school for workers' children, and housing. Producers that retain workers year-round may be more likely to offer these benefits, whereas those hiring seasonal workers may provide fewer of them. However, in the interest of retention and due to competition for workers in Mexico, producers that hire repeat/returning seasonal workers may also provide some benefits.[255] Labor costs, including wages, are further discussed below under Government Programs and Regulations and Factors Affecting Competitiveness.

Foreign Investment and Financing

While the overall scale is relatively small, foreign investment, particularly by U.S. businesses, has benefited squash exports.[256] The United States is a major source of foreign investment in the overall Mexican food and agricultural sector.[257] Over the last decade ending in 2019, U.S. foreign direct investment (FDI) in the sector appears to range between $8 billion and $12 billion, a small share (between 1 and 5 percent) of which may have gone to crop production.[258] A major driver of investments in horticulture crops is to provide year-round supplies of product to end customers, especially in the United States.[259]

FDI likely to benefit the Mexican squash industry targets export-oriented crop production and postharvest handling. The foreign firms investing in operations in Mexico can often include distributors that have vertically integrated operations geared toward export.[260] For example, U.S. firm Chamberlain Distributing reports a long history of investment in Mexico, including supporting research for seeds and packing materials, providing grower education, financing irrigation and field technology, and investing in chillers and grading sorters (for postharvest handling).[261] Similar types of investment have also been noted by other U.S. firms.[262] Additionally, some U.S. companies will provide financing to Mexican producers, who have long faced high borrowing costs and difficulty in obtaining loans domestically, for a

[255] Industry representatives, interviews by USITC staff, April 29, July 2, July 6, and August 11, 2021.
[256] Less than 1 percent of total foreign direct investment (FDI) in Mexico was in the agriculture, forestry, and fishing sector during 2000–2018. Canales, Andrango, and Williams, "Mexico's Agricultural Sector: Production Potential," 2019.
[257] During 2009–18, about 58 percent of FDI in Mexico agriculture sector was estimated to be from the United States. Government of Mexico, SIAP, *Análisis de la inversión extranjera directa* (Analysis of foreign direct investment), February 2019, 5.
[258] The majority of U.S. agricultural FDI in Mexico was for grains and oilseed milling and the beverage sector. USITC staff calculations based on years with available data during 2010–19. In some years certain information was suppressed to protect business proprietary information. USDA, ERS, "Mexico Trade & FDI," March 12, 2021.
[259] Government official, interview by USITC staff, June 1, 2021; USITC, hearing transcript, April 8, 2021, 258, 289 (testimony of Jamie Chamberlain, Chamberlain Distributing); Canales, Andrango, and Williams, "Mexico's Agricultural Sector: Production Potential," 2019.
[260] Industry representative, email message to USITC staff, June 28, 2021; industry representatives, interview by USITC staff, July 6, 2021.
[261] Chamberlain Distributing, an Arizona-based distributor of fruits and vegetables, reports a 50-year investment history in Mexico. They estimate recent annual investments of between $2 and $3 million. USITC, hearing transcript, April 8, 2021, 254, 258 (testimony of Jamie Chamberlain, Chamberlain Distributing).
[262] Industry representatives, interviews by USITC staff, July 2 and July 6, 2021; government official, interview by USITC staff, June 1, 2021; FPAA post-hearing written submission, April 15, 2021, Exhibit 10.

shipping commitment.[263] Such financing can include loans or advances to cover packaging or labor costs (known as “pick and pack” advances).[264] One U.S. investor noted that their firm targets financing at medium to large growers for products with established markets.[265]

Government Programs and Regulations

Mexico has had a long and evolving history of federal government programs supporting the agriculture industry; however, most existing government programs do not currently support vegetable growers. Current programs reflect the priorities of the administration under Mexican president Andrés Manuel López Obrador, who took office in 2018. These programs target primarily smallholders (less than 20 hectares) producing staple crops such as corn and beans, with an emphasis on producers in the southern and central states of Mexico.[266] In addition, the current administration has significantly reduced its overall budget for agricultural support programs due to austerity measures. Crop insurance programs have ended or been significantly reduced in recent years and farmer support programs that had previously been available to vegetable producers, including capital investment assistance for irrigation technology, are no longer in place.[267]

Past programs, including those under the previous administration of Enrique Peña Nieto (2012–18), provided broader agriculture support. Programs impacting horticulture were not product-specific but were available to producers of key fruit and vegetable crops, with a small share benefiting those cultivating squash.[268] While the various programs were designed to provide benefits throughout supply chains, capital investment assistance programs were of particular relevance to fresh fruit and vegetable production.[269] This type of support likely lowered the barriers to accessing capital, which can be hard to obtain in Mexico, accelerating technology adoption, particularly for modern irrigation equipment (as noted below). This type of government support for enhanced technology can have longer-term effects compared to one-time benefits such as direct payments and crop insurance support.

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[263] Industry representatives, interview by USITC staff, May 27, 2021; USITC, hearing transcript, April 8, 2021, 105 (testimony of Dante Galeazzi, Texas International Produce Association).
[264] Industry representative, email message to USITC staff, June 28, 2021.
[265] Industry representative, interview by USITC staff, May 28, 2021.
[266] USDA, FAS, *Mexico Announces New Ag Support Programs*, April 5, 2019, 2; USDA, ERS, “Mexico Policy,” September 16, 2020; OECD Library, *Agricultural Policy Monitoring and Evaluation 2020: Mexico*, 2020.
[267] USDA, FAS, *Drought Conditions in Mexico and Its Effect on Agriculture*, June 3, 2021, 6; government official, interview by USITC staff, June 7, 2021; *Mexico News Daily*, “Farmers Plead for Federal Government Support as Drought Takes Its Toll,” May 4, 2021.
[268] Scheitrum, *Examining Agricultural Support and Subsidies in the U.S. and Mexico*, July 2, 2020, 11; Wu et al., “Government Support in Mexican Agriculture,” 2018, 1–11.
[269] Scheitrum, *Examining Agricultural Support and Subsidies in the U.S. and Mexico*, July 2, 2020, 10–12; Wu et al., “Government Support in Mexican Agriculture,” 2018, 1–11; CRS, *Efforts to Address Seasonal Agricultural Import Competition in the NAFTA Renegotiation*, December 7, 2017, 1–10.

For irrigation technology support, most, if not all, of the capital investment cost-sharing programs were directed to fruit and vegetable crops, including squash.[270] As noted above, 96 percent of squash production in Mexico is irrigated, likely financed from a mix of both private and public funding. Support amounts were issued on a per-project basis with fixed amounts per hectare. Between 2014–16, the support amounts ranged from 10,000 to 15,000 pesos (about $496/ha to $744/ha), depending on the type of technology.[271] Support for irrigation rose from 1.3 billion pesos ($64.5 million) in 2013 to 1.7 billion pesos ($84.3 million) in 2016.[272]

Minimum Wage

Beyond agriculture support programs, the Mexican government—especially under the López Obrador administration—has put forth new policies impacting minimum wages, including those received by agricultural workers.[273] In particular, the general minimum wage, which covers most agricultural field laborers and packing house workers in Mexico, increased 75.8 percent between 2015 and 2020, reaching 123.22 pesos ($6.11 USD) per day (figure 3.2).[274] Much of this growth occurred under the López Obrador administration. Up through 2020, both agricultural day laborers and packhouse workers were subject to the general minimum wage rates for most of the country. In 2019, a separate minimum wage rate was established for the Free Northern Border Zone to make the region's wage rates more in line with wage rates in the United States and to curb migration.[275] This zone encompasses municipalities in a 25 km strip south of the U.S.-Mexico border, including parts of the major squash-growing state of

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[270] Government support for irrigation technology under the Enrique Peña Nieto administration was provided through the Irrigation Technology subprogram of the Program for the Promotion of Agriculture. The administration of Felipe Calderón (2006–2012) directed support for irrigation technology through the Irrigation Technology subprogram of the Support Program for Investments in Equipment and Infrastructure under the 2007–12 National Development Plan. Wu et al., "Government Support in Mexican Agriculture," 2018, 1–11.

[271] Types of irrigation systems that were supported between 2014 and 2016 included multi-floodgate irrigation systems, sprinkler irrigation systems, micro sprinklers, and drip irrigation, as well as drainage systems. In 2013, subsidy amounts ranged from 10,000 to 20,000 pesos (about $496 to $922/ha depending on annual exchange rate) per hectare. Wu et al., "Government Support in Mexican Agriculture," 2018, 1–11. IMF, Exchange rates: Representative rates: Mexico: January 1, 2013 to December 31, 2013, accessed June 16, 2021. Annual average exchange rates were calculated for each year.

[272] Financial support is the same for all crops; data or estimates of the share of funding given to squash growers are not available. Wu et al., "Government Support in Mexican Agriculture," 2018, 1–11.

[273] Industry representatives indicate that export-oriented squash producers likely pay higher wages than the minimum rates required by Mexican law. Wage rates in the squash industry are described in additional detail in the "Factors Affecting Competitiveness" section below.

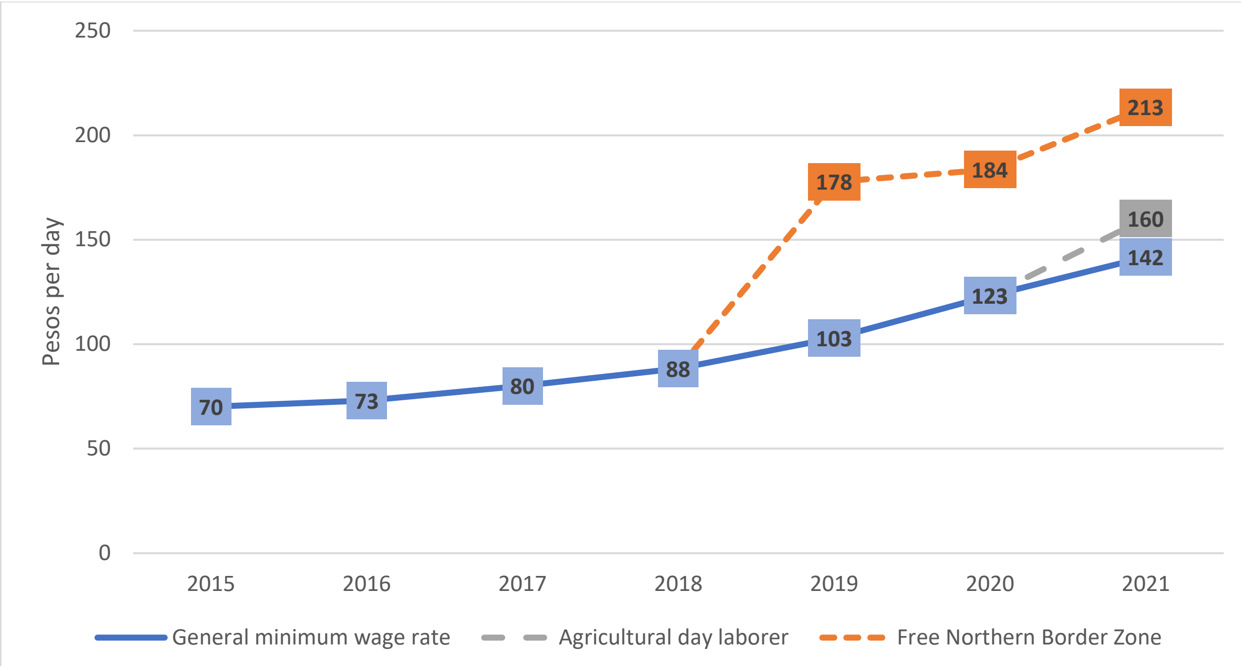
[274] As of 2021, Mexico has three types of minimum wages: (a) a professional minimum wage for 61 designated professions across a broad range of sectors, including manufacturing and automotive; (b) a general minimum wage for the Free Northern Border Zone; and (c) the general minimum wage which applies to all other workers. Government of Mexico, Conasami, "Los Salarios Mínimos (2021)," December 23, 2020; Diario Oficial de la Federación, Resolución del H. Consejo de Representantes de la Comisión Nacional de los Salarios Mínimos (Official Gazette of the Federation, Resolution of the H. Council of Representatives of the National Commission of Minimum Wages), December 23, 2020; All exchange rates in this section based on IMF, Exchange rates: Representative rates: Mexico: January 1, 2021 to July 27, 2021, accessed July 27, 2021.

[275] Nikolewski, "New President of Mexico," December 31, 2018; Diario Oficial de la Federación, Resolución del H. Consejo de Representantes de la Comisión Nacional de los Salarios Mínimos (Official Gazette of the Federation, Resolution of the H. Council of Representatives of the National Commission of Minimum Wages), December 26, 2018.

Sonora. In addition, in 2021, a professional minimum wage was established for agricultural day laborers, increasing the minimum wage to 160.19 pesos ($7.94 USD) per day.[276]

Figure 3.2 Minimum wage rates in Mexico, 2015–21

In pesos per day. Underlying data for this figure can be found in appendix F, table F.4.



Source: Government of Mexico, CONASAMI, Tabla de Salarios Mínimos: 2015–21 (Minimum Wage Table), accessed October 1, 2021.

Factors Affecting Competitiveness

As described in chapter 1 of this report, competitiveness of summer squash can be measured by comparing delivered costs, product differentiation, and supplier reliability for U.S. products against those of imports. Mexico is a highly competitive producer of fresh market summer squash in the U.S. market. In all three areas of competitiveness—delivered cost, product differentiation, and reliability of supply—the Mexican industry has advantages over other competitors. Although there are some factors that reduce the industry’s competitiveness (such as the cost of transporting squash over a longer distance, noted above), the positive factors generally outweigh the negative factors. This competitiveness is demonstrated in part by the increased prevalence of Mexican squash in the U.S. market between 2015 and 2020. Key factors affecting the competitiveness of the Mexican industry are identified below and compared to those of foreign suppliers in chapter 4.

[276] Prior to 2021, only poultry farm managers and agricultural machinery operators were included among agriculture-related professions with established minimum wages. Wage rates for packhouse workers were, and continue to be, subject to the general minimum wage.

Mexico's naturally favorable climate and supply of relatively low-cost labor lower its overall delivered cost.

Favorable Climate

Mexico's naturally favorable climate in its squash-growing region contributes to lower delivered cost, since it results in lower pesticide needs and lower labor costs for weed and pest management. U.S. industry sources have confirmed that they need to use pest management measures, such as annual fumigation, that are unnecessary in Mexico.[277] As a result, agrichemical input costs, as well as the amount spent on labor to apply these products, is less than in the United States. The favorable climate also lowers cost per unit by improving yields. Mexican growers report that they face relatively few events of low temperatures and excess rainfall that can lower squash yields and quality.[278]

Availability of Labor at Relatively Low Cost

Low wages are a competitive advantage for Mexican producers. In addition to lowering the total cost of production, low wage rates allow for more labor-intensive practices such as more frequent picking and more customization in packing, all of which can enhance product quality and differentiation. While wage rates for squash workers can vary, overall, wage rates in Mexico are low compared to the United States. Average monthly earnings in the Mexican agriculture sector are 8.6 percent of those in the U.S. agriculture sector.[279] However, export-oriented fruit and vegetable farms in Mexico generally pay higher wages than the minimums required under Mexican law and are more likely to provide benefits to workers. For example, in 2018, workers on export-oriented produce farms in Mexico likely earned about $214/month, compared to a national average for agricultural laborers of $165/month, and were much more likely to be enrolled in Mexico's healthcare and pension systems.[280] Similarly, industry representatives report wages of about $10–$12 a day (roughly $260–$312 a month), with those being paid by piece earning $15–$20 a day (roughly $390–$520 a month).[281] These wage rates of $10 to $12 per day are roughly equivalent to (or in some cases, slightly less than) what comparable workers in the United States earn in one hour.[282] Also, a small share of workers in the vegetable industry (4–5 percent by one estimate) are reportedly paid less than minimum wage which may further lower labor costs for some Mexican producers.[283]

Workers to produce and pack squash are also generally more available in Mexico than in the United States. One factor that increases labor availability in Mexico is the fact that squash tend to be grown

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[277] See chapter 2 for additional detail. Industry representative, interview by USITC staff, February 3, 2021.
[278] Government of Mexico, written submission to USITC, March 29, 2021, 6.
[279] ILO, ILO Stat Explorer database, Mean Nominal Hourly Earning of Employees by Sex and Occupation, accessed March 31, 2021.
[280] Rural Migration News, "Workers on Mexico's Export Farms," November 19, 2019.
[281] Monthly rate based on a six-day work week (26 days worked a month). USITC, hearing transcript, April 8, 2021, 96 (Richard Bowman, J&J Family of Farms); 264 (Rob Sbragia, Tricar Sales, Inc.).
[282] See chapter 2 (United States).
[283] Escobar, Martin, and Stabridis, *Farm Labor and Mexico's Export Produce Industry*, October 2019, 133.

throughout most of the year, which is reportedly more attractive to workers than the short seasonal work for squash-growing in the United States.[284] Still, some industry representatives report that workers are sometimes difficult to find in Mexico given competition from higher paying jobs in the manufacturing and service sectors.[285]

While still low, agricultural wage rates have generally been increasing in Mexico as they have been in the United States.[286] This is partly due to the long-term tightening of labor supply in Mexico, which is primarily caused by increased competition with other sectors, including manufacturing. In addition, employers face competition from other agricultural work in both the United States (where wages are higher) and Mexico (where competition across horticultural products can lead to crops having different wage rates).[287] In addition to these market forces, minimum wages in Mexico have been rising, and a minimum wage was established for agricultural day laborers in 2021 (see the Government Programs section above).[288]

Mexico's squash industry has a reputation among buyers for high and consistent quality.

According to industry representatives, while U.S.-grown squash are considered a high-quality product, the most distinct difference between Mexican and U.S.-grown squash is in the consistency of product quality, with the Mexican product generally regarded by buyers as having a highly consistent size, shape, and color, as well as a longer shelf life, compared to the U.S. product.[289] The ability of Mexican producers to offer consistent product size is in part because the Mexican squash crop is harvested more frequently than in the U.S. Southeast, resulting in the smaller sizes that are generally preferred by buyers.[290] The longer shelf life is mostly due to the fact that Mexican squash are almost always shed-packed, whereas squash from the U.S. Southeast are more often field-packed, as confirmed by some domestic producers.[291] Shed packing allows producers to cool the squash more quickly, extending its shelf life. It also enables more precise sorting and grading than can be done in the field.[292] Shed packing also makes it easier for producers to use quality-preserving packaging, such as MAP. Finally, some squash producers have taken advantage of the favorable climate for organic production practices in northwestern Mexico, allowing them to serve the small but growing market for certified organic

[284] Industry representative, interview by USITC staff, July 6, 2021.
[285] FPAA, written submission to USITC, April 27, 2021, 16.
[286] Real agricultural wages in Mexico rose by about 12.5 percent between 2015 and 2019. Escobar et. al., "Farm Workers in Mexico's Export Agriculture," November 2020, 1-2.
[287] Iliff, "Mexico's Boom Strains Labor Markets, Infrastructure for Suppliers," September 9, 2016; USITC, hearing transcript, April 8, 2021, 264 (Craig Slate, SunFed Produce); industry representative, interview by USITC staff, May 28, 2021; Escobar, Martin, and Stabridis, *Farm Labor and Mexico's Export Produce Industry*, October 2019, 133–35; 153.
[288] Government of Mexico, CONASAMI, Tabla de Salarios Mínimos: 2021 (Minimum Wage Table), accessed October 1, 2021.
[289] Industry representatives, interviews by USITC staff, May 26 and August 10, 2021.
[290] FPAA, written submission to USITC, March 29, 2021, 16.
[291] Industry representatives, interviews by USITC staff, February 3 and May 28, 2021.
[292] FPAA, written submission to USITC, March 29, 2021, 14.

squash.[293] Combined, these advantages in delivering high-quality squash have enabled Mexican producers to deliver squash that meets retailers' purchasing standards, which are reportedly high and have become stricter over time.[294]

Much of the investment in quality-enhancing technology in the Mexican squash industry has been supplied by multinational North American produce companies, which may establish branches in Mexico or enter into supply contracts with Mexican producers. As noted in the investment section above, U.S. companies often provide financial assistance to these Mexican partners by financing crop production, funding packaging investments, or contributing to labor costs.[295] Investment from major produce firms has enabled Mexico's industry to add quality-enhancing infrastructure to squash production, such as availability of high-productivity seeds,[296] irrigation, on-farm cooling (packing houses), and use of MAP. This has led to a reputation for consistently high product quality (i.e., high product differentiation). It also improves reliability of supply since the MAP keeps squash viable for up to 4 weeks.[297]

A long production season, proximity to markets, and long-established relationships with buyers enhance Mexico's reliability as a supplier.

Seasonal Advantages

Mexico's long growing season ensures that it can fill seasonal gaps in supply that cannot be fully filled by any U.S. producing regions. Even though the Florida growing season overlaps with Mexico's during the winter months, Florida cannot supply enough product to meet U.S. demand during these months, so even Florida growers are known to supplement their supply with imports from Mexico.[298] In this way, Mexico's reliability of supply is a major competitive advantage. According to the government of Mexico, its squash production has expanded specifically to fill gaps in U.S. supply in the context of rising demand from U.S. consumers.[299] This year-round demand is the main driver for the expansion of the Mexican squash-growing season to cover a longer portion of the year, as described in chapter 2.

Proximity to Market

The proximity of the main growing regions to the western United States mean that Mexican squash enjoys an advantage in markets in the western United States relative to squash grown in the southeastern United States. Mexican squash can often reach these markets faster than squash grown in the eastern United States can (and as chapter 2 notes, distribution of squash within the United States is often divided between the eastern and western portions of the country).[300] In addition, infrastructure

[293] Industry representative, interview by USITC staff, March 9, 2021; USITC, hearing transcript, April 8, 2021, 318 (Craig Slate, SunFed Produce).
[294] Industry representative, interview by USITC staff, July 7, 2021.
[295] FPAA, written submission to USITC, April 27, 2021, 22.
[296] Government of Mexico, written submission to USITC, March 29, 2021, 4.
[297] Industry representative, interview by USITC staff, February 24, 2021.
[298] Industry representative, interview by USITC staff, February 24, 2021.
[299] Government of Mexico, prehearing submission, March 29, 2021, 6–7.
[300] Government of Mexico, prehearing submission, March 29, 2021, 6–7.

investments in Mexico have reduced the time it takes to reach the U.S. border and supply the eastern and central United States in addition to the western U.S. markets.[301] These factors contribute to Mexico's ability to consistently supply high-quality squash, since the shelf life of squash is short, and quality deteriorates quickly.[302]

Relationships with Buyers

Because larger grower-shipper firms (rather than smaller producers) are predominant in Mexico's squash-growing sector, the industry benefits from the established relationships these firms have with retail buyers. Industry representatives report that retail buyers look for suppliers who can provide produce of high quality in large volumes on a consistent basis throughout the year. These buyers often purchase squash on long-term contracts, and these contracts are often awarded to suppliers who demonstrate strong reliability of supply. One retail buyer stated that ensuring supply of squash every day of the year is their top priority.[303] While Mexico does have an "off-season" during the summer, when little squash are produced and exported, the scale of production and long season provide a competitive advantage in establishing contracts with buyers who prioritize consistent supply.

[301] For example, the Durango Highway (Mexican Federal Highway 40D) was completed in 2013.
[302] Government of Mexico, prehearing submission, March 29, 2021, 8.
[303] Industry representative, interview by USITC staff, May 26, 2021.

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Chapter 4
Cross-country Comparison of Competitiveness

Several countries, including the United States, supply the U.S. market with summer squash for fresh consumption, with Mexico being the dominant foreign supplier. The competitiveness of these suppliers, however, varies. The Commission's research showed that the United States as a whole, and the U.S. Southeast are both high-cost producers of moderately differentiated products, supplying primarily zucchini, yellow squash, and scallop squash. Mexico is a low-cost supplier of more highly differentiated products, including zucchini, yellow squash, gray squash, and scallop squash with a reputation for consistently high product quality and preferential packing and sorting. Both Mexico and the United States, including the Southeast, are reliable suppliers.

This chapter includes a cross-country comparison that draws from chapters 2–3 of the report, which assess the competitive strengths and weaknesses of the summer squash industries in the United States, with a focus on the U.S. Southeast and Mexico.[304] It identifies and evaluates several key competitive factors for summer squash in a qualitative framework (described in chapter 1). The comparison of competitive factors in this chapter focuses on summer squash.

Competitive factors influence the ability of an industry to supply products with the characteristics demanded by buyers, who base their purchasing decisions on three primary criteria: delivered cost, product differentiation, and reliability of supply. For summer squash, delivered cost reflects the cost to produce squash, including fixed costs, and variable costs such as labor, seed, chemical inputs, packing, transportation, trade, and compliance costs. Product differentiation refers to the ability to provide summer squash in the varieties and packaging wanted by buyers and with the desired product characteristics, e.g., shape, coloring, size, or cultivation method (organic or conventional). Reliability of supply refers to the ability of suppliers to deliver an agreed-upon quantity of product to a specified location at a contracted time, which can depend on the weather, the type of production system used, the efficiency of supply chains, the functioning of marketing information systems, and other supply and production factors.

Industry Comparison

Comparing industry orientation (home market or export market), production systems and practices, and yields can give an idea of the relative strengths and weaknesses of a country's industry compared with its competitors. The Mexican squash industry is highly export oriented, with an average of 67.7 percent of annual production exported during 2018–20 (table 4.1). The United States focuses on the domestic market, with only 7.8 percent of production exported during the same period (table 4.1). Mexican yields

[304] In 2020, Mexico accounted for 96.1 percent of the U.S. imports of squash. This includes imports of both summer and winter squash. USITC DataWeb/Census, HTS subheading 0709.93.20, accessed February 11, 2021.

were about 25 percent higher than national U.S. yields and 67 percent higher than yields in the U.S. Southeast (table 4.1). This is because growers in Mexico tend to harvest more frequently and have lower pest pressure and risk of weather damage due to a semiarid climate (table 4.1). Production practices that enhance yields are also fairly common among zucchini and yellow squash growers in Mexico, including the use of trellises and shade structures.[305]

U.S. growers face greater climate risks (e.g., excessive rains) and pest pressures that contribute to lower yields. Most U.S. production is also usually on the ground rather than using trellises, so does not benefit from yield gains from vertical cultivation practices. Further, U.S. growers tend to harvest less frequently compared to growers in Mexico. These climate risks, pest pressures, and different growing practices contribute to lower U.S. productivity of 18.1 mt per hectare nationwide, and 13.5 mt per hectare in the Southeast (table 4.1). These yields are for all squash and could also be affected by differences in the prevalence of production of winter squash in the United States compared to Mexico.[306] The U.S. Southeast region has slightly lower yields compared to national U.S. yields, in part because of greater pest pressures tied to climate conditions in the Southeast.[307]

Table 4.1 Squash: Industry summary of production, area harvested, and yield, selected countries and regions, 2018–20 average

Production and exports are in metric tons (mt), yield is in metric tons per hectare (mt/ha), and export to production ratio is in percentages; n.a. = not available.

State/Country	Production (mt)	Yield (mt/ha)	Exports (mt)	Exports to production ratio (%)
United States	323,720	18.1	25,107	7.8
Southeast	81,356	13.5	n.a.	n.a.
Mexico	776,789	22.5	526,242	67.7

Source: USDA, NASS, Vegetables Summaries 2017, 2018, 2019, and 2020; official U.S. domestic export statistics using USITC DataWeb/Census, Schedule B subheading 0709.93, accessed august 17, 2021; Government of Mexico, SIAP, Anuario estadístico de la producción agrícola: Calabaza; Calabacita (Statistical yearbook of agricultural production database), accessed May 3, 2021; IHS Markit, Global Trade Atlas database, HS subheading 0709.93, accessed May 7, 2021.

Notes: A three-year average is used because of annual fluctuations in production and yields. The Southeast includes competitiveness of the industry in Florida, Georgia, and North Carolina. Mexican and U.S. national and regional production and yields include summer and winter squash. HS subheading 0709.93 used for export data includes pumpkins and gourds in addition to summer and winter squash. Export to production ratios include exports of pumpkins, gourds, and summer and winter squash, although pumpkins and gourds comprised a small share of exports under HS subheading 0709.93 (e.g., about 1 percent U.S. imports from Mexico during 2018–20. USITC DataWeb/Census, HTS subheading 0709.93.10/20/30, accessed September 9, 2021).

Competitive Factor Comparison

To analyze the competitive factors affecting the summer squash sectors in the two countries that are major suppliers to the U.S. market, the Commission used a framework that draws together various

[305] Industry representative, email correspondence with USITC staff, August 11, 2021.

[306] Summer squash accounts for approximately 80 percent of total squash acreage in Mexico, 53 percent in the United States nationally, and 75 percent in the Southeast United States. Government of Mexico, SIAP, Anuario estadístico de la producción agrícola: Calabaza; Calabacita (Statistical yearbook of agricultural production database), accessed May 3, 2021; USDA, NASS, Quickstats, Census, Squash, Summer–Acres Harvested; and Squash, Summer–Acres Harvested, accessed September 9, 2021.

[307] Industry representatives, interview by USITC staff, February 3, February 24, 2021, May 10, 2021.

aspects of the competitive conditions in food and agricultural trade.[308] This framework is introduced in chapter 1 of this report, which includes figure 1.2 that illustrates which competitive factors for agriculture contribute to delivered costs, product differentiation, and reliability of supply.

The level competitiveness of producers in each of the selected countries and regions in terms of delivered cost, product differentiation, and reliability of supply of domestic production of summer squash is summarized in table 4.2. Countries and regions have been assigned one of three broad designations—high, medium, or low—on each factor in terms of their competitiveness in the U.S. market. The competitive factor categories are based on data and information largely available for all countries and summarized from the country profiles in chapters 2–3. Assessments for the United States are at the national level, with a separate assessment for the Southeast (Florida, Georgia, and North Carolina), the focus of this study. Competitiveness assessments focus on summer squash sold in the U.S. market. These assessments are inherently subjective, based on analysis by Commission staff of the factors described below using available data, hearing testimony, and communication with industry experts.

- **Delivered cost** assessments were largely based on the cost of producing summer squash (fixed costs and variable costs such as labor and seed and chemical input costs); costs for packing, storing, and transporting the squash; and other transaction costs, such as tariffs and exchange rate effects. A high delivered cost makes producers less competitive.
- **Product differentiation** was assessed based on producers' ability to deliver products desirable to buyers and end consumers, such as squash with desirable traits, including uniform shape, size, and color and longer shelf life. The ability to supply different varieties of squash and certified organic product was also considered, along with products' branding and packaging. High product differentiation makes producers more competitive.
- **Reliability of supply** was evaluated by considering the volume of exported squash as compared to domestic production and consumption (for Mexico); variability in year-to-year production and exports; the prevalence of year-round supply; off-season production; and the quality of market infrastructure and logistics chains. High reliability of supply makes producers more competitive.

Table 4.2 Comparison of competitive factor categories for summer squash in selected countries and regions, 2015–20

Country or region	Delivered cost	Product differentiation	Reliability of supply
United States	High	Medium	High
Southeast	High	Medium	Medium
Mexico	Low	High	High

Source: Compiled by USITC staff.
Note: The comparison is based on summer squash and does not consider competitive factors of winter squash. For the United States, the national level competitiveness analysis considers the U.S. summer squash industry as a whole. The Southeast analysis considers competitiveness of the industry in Florida, Georgia, and North Carolina.

[308] The Commission uses Michael Porter's theory of competitive advantage as a starting point from which to develop a framework for analyzing competitive conditions affecting agricultural trade. For more information on this framework and its limitations, refer to USITC, *China's Agricultural Trade*, March 2011, E-3 to 3-8; Porter, *Competitive Strategy*, 1980 and Porter, *Competitive Advantage*, 1985.

Delivered Cost

Delivered cost for summer squash includes fixed and variable costs of production for growing, harvesting, and packing squash together with costs of delivering the product to the specified location. Fixed costs can include land costs and other capital expenses, and variable costs include input costs (labor for sowing, harvesting and packing, seeds, and chemicals), boxes and labels, certifications, and shipping and storage costs. Delivered costs are affected by the types of production system and practices used, productivity/yields, the variety of squash being produced, shipping distances, and freight costs. These costs are spread among the different players in the supply chain.

Although precise comparisons of delivered cost are difficult to make, given the gaps and uncertainties in available data and differences in the types and characteristics of squash supplied, it is possible to classify the profiled industries into broad categories in terms of delivered cost based on the in-depth analyses in chapters 2–3 and production cost estimates and shipping point price comparisons in this section (table 4.2). As shown in table 4.2, the United States, including the U.S. Southeast, is considered a high-cost producer of summer squash and Mexico a low-cost producer. This assessment is based on a number of information sources including available comparable data for the United States and Mexico for the costs of production (as reported by growers in both countries) as well as shipping point prices.

Cost of production data for zucchini presented in table 4.3 show the United States is a higher-cost producer than Mexico.[309] High labor costs are a primary contributor to higher production costs in the United States and are further discussed below. In the United States, high labor costs contribute to lower productivity and product differentiation as most growers do not use labor-intensive growing practices that can increase yields (e.g., trellising or more frequent harvesting) and improve the appearance of the product (e.g., trellising and more precise packing and sorting). The industry in Mexico benefits from lower labor costs relative to the United States, which is especially important for a labor-intensive crop such as summer squash. The United States ranks above Mexico in delivered costs largely because of higher labor cost.

Lower production costs in Mexico can on average be offset by higher freight costs to reach the U.S. market, as reported by industry and indicated by USDA Agricultural Marketing Service data on terminal market prices (table 4.3), and this may be particularly true in the U.S. markets that are a greater distance from the Mexican growing regions.[310] U.S. product benefits from lower freight rates when supplying local markets compared to product from Mexico, which primarily enters through Arizona and Texas and can reach markets across the United States.

[309] Cost of production data includes cost to grow, harvest, and pack squash but does not include distribution or delivery costs and therefore is distinct from delivered costs discussed in the previous paragraph.
[310] Freight cost effects will vary by terminal market, with freight costs for Mexican product to reach terminal markets in the western United States being lower than freight costs to reach elsewhere in the United States, such that for markets in the western United States freight costs are generally low enough that they do not offset Mexico's production cost advantage. Terminal market prices are average prices at terminal markets across the United States and include freight costs to respective markets.

Table 4.3 Cost of production and price estimates for zucchini from selected countries
In U.S. dollars per kg; n.a. = not available.

Country or region	Cost of Production	AMS shipping point price, 2019 average	AMS terminal market price, 2019 average
United States	0.38–0.44	0.86	1.19
Southeast	0.38–0.44	0.82	1.23
Mexico	0.23–0.31	0.84	1.39

Sources: Industry representative, interview with USITC staff, March 10, 2021; USITC, hearing transcript, April 8, 2021, 176 (testimony of Caleb Burgin, M.F. Burgin, Inc.); industry representative, email message to USITC staff, October 11, 2021; USDA, AMS, Shipping point data for zucchini, medium, accessed June 3, 2021; USDA, AMS, terminal market data for green zucchini, accessed June 3, 2021.
Notes: Costs of production estimates are reported by industry representatives and are generally the costs to grow, harvest, and pack a box of zucchini converted from dollars per bushel box to dollars per kg assuming that a bushel box of summer squash weighs about 18 kg to 19 kg. Cost per kg varies by yield per acre, and costs generally decrease as yields increase. Variation in yields per acre may in part explain differences in cost per kg. Shipping point and terminal market prices are based on voluntary surveys and represent a small share of sales in the U.S. market. More information on the limitations of these data are presented in chapter 5.

Production Cost Shares

Production cost data availability and reliability vary between the two countries. Government surveys of actual production costs incurred by growers are often not conducted for specialty crops such as squash, and such squash data were not available for the United States or Mexico. Instead, the following analysis used “cost and return” worksheets or “budgets” for establishing squash production and growing squash (in the United States) or a proxy from a similar horticultural crop with similar production systems (open field asparagus in Mexico) that were developed and published by universities, researchers, or government agencies. [311] Cost and return worksheets typically represent hypothetical costs for the production of a given product in a specific area or region grown under specific growing conditions described in the worksheet. The Commission obtained these data for the United States and Mexico from separate sources, since common surveys or data sources were not available, likely making them less reliable for comparison purposes. While comparing costs internationally can be complicated by differences in cost definitions, in the treatment of establishment costs and time requirements, in the product types and production systems used, and the year when the estimates were made,[312] the following analysis compares the shares of individual line items in the budgets in an effort to reveal the specific costs that are driving overall costs of squash production in the United States and Mexico.

In terms of cost shares, labor accounts for the largest single portion of costs that are directly comparable for both countries (table 4.4). Labor cost shares are similar across both countries, although with a slightly higher range in the United States, likely because of higher U.S. wage rates (see

[311] For the United States, University of Wisconsin Extension, Center for Dairy Profitability, *Summer Squash Market Non-Irrigated Budget*; University of Georgia, Agricultural and Applied Economic Cooperative Extension, *2021—Double Cropped Squash on Plastic Budget*, 2021; University of Kentucky, Center for Crop Diversification, *Yellow Crookneck Squash*, 2017; Alabama Cooperative Extension System, *Enterprise Planning Budget Summary: Summer Squash*, 2021; Clemson University, Cooperative Extension, *Yellow Squash for Fresh Market - Irrigated*, May 29, 2020; Chipman, “High Package Costs Hit Food Makers as Recycled Paper, Corn Soar;” May 7, 2021. For Mexico, Government of Mexico, FIRA, Agrocostos: Sistema de Costos Agrícolas, Espárrago Mantenimiento (Sonora 2019), accessed August 2, 2021.
[312] USITC, *Conditions of Competition for Certain Oranges and Lemons*, July 2006, 3–15 to 3–16. For a broader discussion of challenges of international comparisons of costs of production, see USDA, Chapter 11 (“International Comparisons”), in *Commodity Costs and Returns Estimation Handbook: A Report of the AAEA Task Force on Commodity Costs and Returns*, February 2, 2000.

comparison in Labor Costs section below). However, since Mexican growers use more labor-intensive production practices, the differences in wage rates are not fully reflected in differences across labor cost shares of production.

Other significant costs include irrigation for both the United States and Mexico, plant protection products for the United States, and fertilizer for Mexico. The cost of irrigation appears high in open fields using drip irrigation driven by material costs of replacing tape-based drip irrigation. Indications are that plant protection products are a small share of production costs in Mexico because of reduced pest pressures from the arid climate in northwestern Mexico. While the share of production costs spent on plant protection products is the same in the table (9 percent), the types of agrichemicals included in the U.S. cost of production estimates varied, which contributed to a wide range of cost shares. Estimates from universities in the U.S. Southeast had higher cost estimates, which could be an indication that greater pest pressures in the Southeast lead to higher plant protection product costs. As a result, plant protection products may account for a larger share of the cost of production in the United States than reported in the table, especially the U.S. Southeast where climate-related pest pressures are high. With the notable exception of labor, certain production costs per acre are reportedly similar in the United States and Mexico, including seeds and chemical inputs, as well as packing materials.[313] However, because of higher yields in Mexico, unit costs may be lower for those growers.

Table 4.4 Production cost shares for summer squash and a proxy (asparagus) for major cost categories for selected countries
In percentages.

Category	United States	Mexico
Labor	34	29
Irrigation	10	22
Fertilizer	4	22
Plant protection products	9	9
Other	40	18

Sources: For the United States, University of Wisconsin Extension, Center for Dairy Profitability, Summer Squash Market Non-Irrigated Budget; University of Georgia, Agricultural and Applied Economic Cooperative Extension, 2021- Double Cropped Squash on Plastic Budget, 2021; University of Kentucky, Center for Crop Diversification, Yellow Crookneck Squash, 2017; The Alabama Cooperative Extension System, Enterprise Planning Budget Summary: Summer Squash, 2021; Clemson University, Cooperative Extension, Yellow Squash for Fresh Market—Irrigated, May 29, 2020; Chipman, "High Package Costs Hit Food Makers as Recycled Paper, Corn Soar, May 7, 2021." For Mexico, Government of Mexico, FIRA, Agrocostos: Sistema de Costos Agrícolas, Espárrago Mantenimiento (Sonora 2019), accessed August 2, 2021.
Notes: Shares are based on costs per acre or hectare. Note that overall costs will vary based on yield. U.S. cost shares are median values and do not sum to 100; while Mexican cost shares do not sum to 100 due to rounding. Certain line items may not appear in all budgets or may reflect varying production practices by region. Line items included in the "Other" row are not consistent across the budgets examined for both countries, but in terms of median values, no single line item accounts for a share larger than 13 percent. Capital costs and packaging costs are not included. U.S. estimates are based on the median value for the costs shares of total production of summer squash across five different enterprise budgets compiled between 2014 and 2021. Other costs for U.S. estimates include outside services (custom hire), equipment repair, fuel, insurance, interest, land charges, machinery, marketing advertising, overhead/management, plastic mulch, stakes, and twine. Mexican cost shares are a proxy crop for summer squash and are based on data for open field grown asparagus production in Sonora using drip irrigation. The cost of irrigation for Mexico includes both direct water costs, which are very small, and the cost of materials to maintain the drip irrigation system. Other costs for asparagus include mostly outside services such as aerial application of plant protection products and transportation of harvesting equipment.

313 Industry representatives, interviews by USITC staff, July 2, 2021, July 6, 2021.

Labor Costs

Labor costs are the single largest contributor to the delivered cost of summer squash (table 4.4). However, as with other cost comparisons, comparing labor costs across countries is not entirely straightforward. How labor costs are measured and valued is critical for establishing costs of production and for accurately portraying labor's relative share of the total cost of production.[314] Adjustments for currency valuation and the cost of living may be necessary. These labor cost comparisons face other data limitations, including the highly heterogenous characteristics of farms, farmers, and agricultural wage workers; and the structure of the worker-employer relationship across and within countries.[315]

The International Labour Organization (ILO) publishes data on average wages and earnings across broad employment categories among the two countries highlighted in this study and are presented in table 4.5.[316] Hourly earnings for U.S. skilled agricultural, forestry, and fishery workers are significantly higher in both nominal terms and purchasing power parity terms (PPP) (table 4.5).[317] Wage rates reported by the ILO for agricultural, forestry, and fishery workers are similar to those reported for squash workers by industry representatives.[318]

Table 4.5 Hourly earnings for skilled agricultural, forestry, and fishery workers in selected countries, 2019

In U.S. dollars. PPP = 2017 purchasing power parity.

Country	Hourly earnings (nominal)	Hourly earnings (PPP)
Mexico	1.38	2.47
United States	15.07	15.07

Source: ILO, Mean Nominal Hourly Earning of Employees by Sex and Occupation, accessed August 17, 2021.
Note: Data for hourly earnings are from separate databases with different data sources and year availability. Mexico uses the International Standard Classification of Occupations, but the United States uses a nonstandard national classification. The ILO does not provide data for Canada in this data series. Nominal totals are converted to U.S. dollars using exchange rates. PPP totals are converted to U.S. dollars using 2017 purchasing power parity rates for private consumption expenditures. PPP rates are currency conversion rates that account for differences in price levels between countries to equalize purchasing power of different currencies.

[314] Discussion in the following two paragraphs is based on AAEA's handbook on estimating commodity costs and returns. AAEA Task Force on Commodity Costs and Returns, *Commodity Costs and Returns Estimation Handbook*, February 1, 2000, 8-1**.** The American Agricultural Economics Association has since changed its name to the Agricultural and Applied Economics Association, which has kept the acronym AAEA.

[315] Labor costs comparisons are further complicated by countries' differing reliance on two distinct types of farm labor: (1) hired labor without farm ownership claims, and (2) unpaid farm labor and salaried farm labor having ownership claims. AAEA Task Force on Commodity Costs and Returns, *Commodity Costs and Returns Estimation Handbook*, February 1, 2000, 8-1.

[316] The terms and conditions of employment vary tremendously, with work categories that affect how waged agricultural workers are regulated and paid (e.g., permanent full-time workers, seasonal workers, piece-rate workers). Changes in the labor market structures along with variable and deficient application of labor laws, create a situation where employees may find themselves without the explicit and implicit protections of a worker-employee relationship. Hurst, *Agricultural Workers and their Contributions*, 2007, 23–32.

[317] PPP is helpful for evaluating wages given different price levels between countries. Hourly earnings are still approximately six times higher in the United States than in Mexico in PPP terms (table 4.5).

[318] Industry representatives reported that workers in the Mexican squash industry reportedly earned about $10–$12/day. In the United States, equivalent workers' wages average about $15/hour (inclusive of H-2A and domestic workers). USITC, hearing transcript, April 8, 2021, 96 (testimony of Richard Bowman, J&J Family of Farms), 291 (testimony of Bret Erickson, J&D Produce, Inc.); USDA, NASS, *Farm Labor*, May 26, 2021.

Shipping Costs

Shipping costs contribute to delivered cost, vary by supplier and destination, and are volatile. In the U.S. market, domestic and imported summer squash are generally transported in refrigerated trucks or containers. Truck freight is the most common form of transportation for both domestic and imported product, although some imports arrive via sea freight.[319] Comparative advantages for shipping costs can shift depending on the location of the point of delivery in the United States. U.S. squash can have a large freight cost advantage in their localized market compared to imported products. For example, U.S. squash produced in the Southeast have a freight cost advantage in markets in the U.S. Southeast relative to imports from Mexico, and product from New Jersey has a freight cost advantage in the Philadelphia and New York regions compared to products from Mexico. Similarly, squash from Mexico have more competitive freight rates in the western United States compared to squash from the U.S. Southeast.

Product Differentiation

A country's ability to supply a broad range of premium products with desirable characteristics increases its ability to compete via product differentiation. As shown previously in table 4.2, based on the qualitative and quantitative information presented in the previous chapters, both Mexico and the United States supply similar varieties of summer squash, including zucchini and yellow squash. Mexican product is seen as more highly differentiated through a consistent, high-quality product, owing to the use of trellising, more frequent harvesting, and premium packing and packaging techniques (figure 4.1).[320] Mexico also supplies some certified organic squash. The United States, including the U.S. Southeast, also supplies high-quality squash that is considered a premium, "locally grown" product in the localized market (figure 4.1). However, U.S. product is grown on the ground, and overall does not consistently have the same level of quality or premium packing and packaging that Mexico achieves through labor-intensive growing and packing practices.[321]

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[319] Industry representatives, interviews by USITC staff, July 2, 2021, July 16, 2021.
[320] Industry representatives, interviews by USITC staff, August 10, 2021; industry representative, interview by USITC staff, May 26, 2021; FPAA, written submission to USITC, March 29, 2021, 14; industry representative, interview by USITC staff, July 7, 2021.
[321] Industry representative, interview by USITC staff, February 3, 2021; FPAA, written submission to USITC, March 29, 2021, 14.

U.S. squash crops also face greater climate risks that can lower product quality, such as heavy rains and winds. Although organic squash production appears to be a lesser focus for producers across both countries, industry representatives indicate that demand for these products is growing. Both countries seem to be equipped to serve the organic market to an extent. While U.S. production of organic squash primarily takes place on the West Coast, U.S. southeastern growers who currently face high production costs for organic product due to pest pressures may be able to increase organic production if higher demand were to allow for a price premium to offset these costs.[322]

Figure 4.1 Varieties and production methods for summer squash supplied to the U.S. market by country or region

A shaded cell in a column under a particular product means that this country's or region's product is supplied in significant quantities to the U.S. market. A blank cell indicates that it is not supplied, or only supplied in small quantities. Underlying data for this figure can be found in appendix F, table F.5.

Country or region	Premium packing and packaging	Trellising and frequent harvesting	Locally grown	Organic
United States			■	■
Southeast			■	
Mexico	■	■		■

Source: Compiled by USITC.
Note: There is some production of organic squash in the Southeast and use of premium packing and packaging in the United States, as a whole, but they do not rise to the level of a competitive advantage.

Purchasers look at product characteristics as well as cost in making their buying decisions. The more differentiated the product, the more likely it is that product characteristics will be the basis of the purchasing decision, potentially making delivered cost less important. Similar products are differentiated from one another according to factors such as actual and perceived quality, brand identity, packaging, and labeling. Summer squash grown in favorable weather climates with production practices such as trellising and more frequent harvesting have more consistent quality and sizes. Packing practices that are more labor intensive and capital intensive result in product with more uniform sizes, more tightly packed into boxes, and with a longer shelf life, which is desirable to buyers. Organic certification is another factor that can differentiate summer squash. Additionally, U.S. buyers place a premium on locally grown produce, with state-level marketing programs promoting local fruits and vegetables in retail stores.

Product differentiation is considered high in Mexico because of highly consistent size, shape, and color, as well as a longer shelf life.[323] The ability of Mexican producers to offer consistent product size is in part because the Mexican squash crop is harvested more frequently than in the U.S. Southeast, resulting in

[322] Sales of certified organic U.S. domestic fresh squash (both summer and winter) increased approximately 50 percent between 2016 and 2019, with states outside of the Southeast seeing the largest increases. There is some production of organic squash in the U.S. Southeast, but it does not rise to the level of a competitive advantage. USDA, NASS, "2016 Certified Organic Survey," accessed October 29, 2021; USDA, NASS, "2019 Organic Survey (2017 Census of Agriculture Special Study)," accessed October 29,2021. USITC DataWeb/Census, HTS subheading 0709.93.2010, accessed October 28, 2021.
[323] Industry representatives, interviews by USITC staff, August 10, 2021; industry representative, interview by USITC staff, May 26, 2021.

the smaller sizes that are preferred by buyers.[324] The longer shelf life is mostly due to the fact that Mexican squash are almost always shed-packed.[325] Shed packing allows producers to cool the squash more quickly, extending its shelf life. It also enables more precise sorting and grading than can be done in the field.[326] Mexican product is also commonly packed using quality-preserving packaging, such as modified atmosphere packaging (MAP), which is easier to implement in packing sheds than in the field and has increasingly been requested by retailers.[327] Product differentiation is slightly lower in the United States because of less consistent quality and sizing and limited use of premium packing and packaging. Many of the main squash-producing regions in the United States, including the U.S. Southeast, have humid climates and are subject to heavy rains which can negatively affect squash quality. U.S. growers also harvest less frequently because of high labor costs, which can result in larger and/or less consistent sizing. Nonetheless, U.S. products are better positioned for the U.S. market in terms of preferences for locally grown compared to imported products.

Reliability of Supply

Reliability of supply refers to the ability of a supplier to deliver a specified quantity of a product of a particular quality to a given location at a contracted time. The inherent risks in agricultural production, which can impact both the quantity and quality of supply, make this competitiveness factor particularly important for purchasers. Several aspects affect reliability of supply for seasonal, perishable products like summer squash. Particularly important is the ability to supply consistent quality and quantities of product despite weather fluctuations and pest pressure. Additionally, the ability to be a year-round supplier, including the ability to supply during the off-season, is important for competitiveness. Geographic location of production and the length of the growing season affect the reliability of supply of summer squash. If all the production of a country is concentrated in one small area, an adverse weather event may severely limit supplies. The reliability of the supply chain, including storage and transportation infrastructure as well as market information systems, is also important. To be a reliable supplier to the export market, a country must have an exportable surplus. Export-focused industries with consistent levels of exports tend to be considered more reliable suppliers.

Both the United States, including the U.S. Southeast, and Mexico are broadly considered to be reliable suppliers to the U.S. market for summer squash, but not to an equal degree. Mexico and the United States (nationally) are highly reliable suppliers, designated as “high” for reliability of supply (table 4.2), while the U.S. Southeast is considered a reliable supplier designated as “medium” for reliability of supply (table 4.2). Mexico has a semiarid climate and diverse growing areas, which lessen the risk for damage to crop quality and yields from weather events or pest outbreaks. The Mexican industry is highly export oriented, with consistent levels of exports to the United States, representing about 65 percent of annual

[324] FPAA, written submission to USITC, March 29, 2021, 16.
[325] Industry representative, interview by USITC staff, February 3, 2021.
[326] FPAA, written submission to USITC, March 29, 2021, 14.
[327] MAP uses specialty plastic films and bags to control the respiration of the squash. Often, MAP is used to bundle 2 or 3 summer squash together in a single consumer-ready package. Industry representatives, interview by USITC staff, May 28, 2021.

production on average during 2015–20.[328] The Mexican industry is able to supply product during nine months of the year, including from late fall to early spring, the off-season for much of the United States.[329] Similar to Mexico, the U.S. industry is a year-round supplier because it is geographically spread out among regions with different harvest seasons.[330] This lengthens the growing season and reduces production risks from regional weather events and pest breakouts. The U.S. Southeast alone is only a moderately reliable supplier largely because of the significant risk to product quality and yields from weather-related events and pest pressures.[331] This is particularly significant because of the region's hot, humid, and rainy climate.

[328] Government of Mexico, SIAP, Anuario estadístico de la producción agrícola: Calabaza; Calabacita (Statistical yearbook of agricultural production database), accessed May 3, 2021; IHS Markit, Global Trade Atlas database, HS subheading 0709.93, accessed May 7, 2021. HS subheading includes pumpkins, squash and gourds.

[329] Reflects harvest seasons in Mexico using reported growing and harvest seasons by states producing fresh squash. Blue Book Services, "Squash," accessed July 14, 2021.

[330] Harvest seasons in the United States were determined using reported growing and harvest seasons by states producing fresh squash. Kemble, Southeastern U.S. 2020 Vegetable Crop Handbook, 2020; Blue Book Services, "Squash," accessed July 14, 2021. See also figure 1.1.

[331] Industry representative, interview by USITC staff, May 26, 2021; industry representatives, interview by USITC staff, May 10, 2021; USITC, hearing transcript, April 8, 2021, 117–118 (testimony of Gene McAvoy, University of Florida); industry representatives, interview by USITC staff August 10, 2021.

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Chapter 5
U.S. Import and Price Trends

The analysis in this chapter includes information on the recent trends in U.S. imports of squash, including information on seasonal trends in these imports.[332] It also describes monthly price trends for summer squash in the United States, including an analysis and comparison of U.S. produced (grown) and imported summer squash in the U.S. market. As noted in the request for this report, the trade and price analysis, when possible, focuses on the southeastern United States, which has been defined in this report as three states: Florida, Georgia, and North Carolina. These states primarily grow summer squash, so the analysis in this chapter focuses solely on varieties of summer squash. However, the import trend discussion in this chapter includes both summer squash and winter squash because the Harmonized Tariff Schedule of the United States (HTS) classification structure does not differentiate between these two types.

U.S. squash imports are sourced primarily from Mexico and follow a clear seasonal pattern of higher volumes in the months from November through May and lower volumes in the months from June through October. Mexico can supply squash (including winter squash) year-round, and the volume of imports from Mexico in the months from June through October has increased over the past few decades.

Industry representatives throughout the supply chain generally agree that, while U.S. demand for squash is fairly consistent and strong year-round, buyers are price conscious, and squash prices tend to respond very quickly to sudden increases or decreases in supply. As a result, squash prices vary widely throughout the season and change daily.[333] The highly perishable nature of squash also contributes to prices that fluctuate quickly based on supply and demand, since summer squash cannot be held in inventory to smooth out supply.[334]

This chapter uses the USDA's Agricultural Marking Service (AMS) pricing data, which are highly regarded sources of pricing information but still have many limitations described in detail in this chapter. Overall, the available price data shown below suggest that the U.S. squash market is one in which domestic and imported product compete closely in most segments. Prices for domestic and imported squash are often very similar and tend to follow largely the same trends. In general, AMS data show imports from Mexico are often priced slightly below domestic squash at the point of shipment, but domestic squash are often priced slightly lower on the wholesale market (where the cost of freight is included in the price). This suggests that relatively small components of total delivered cost, such as a longer shipping distance, can affect the comparison between domestic and imported squash prices.

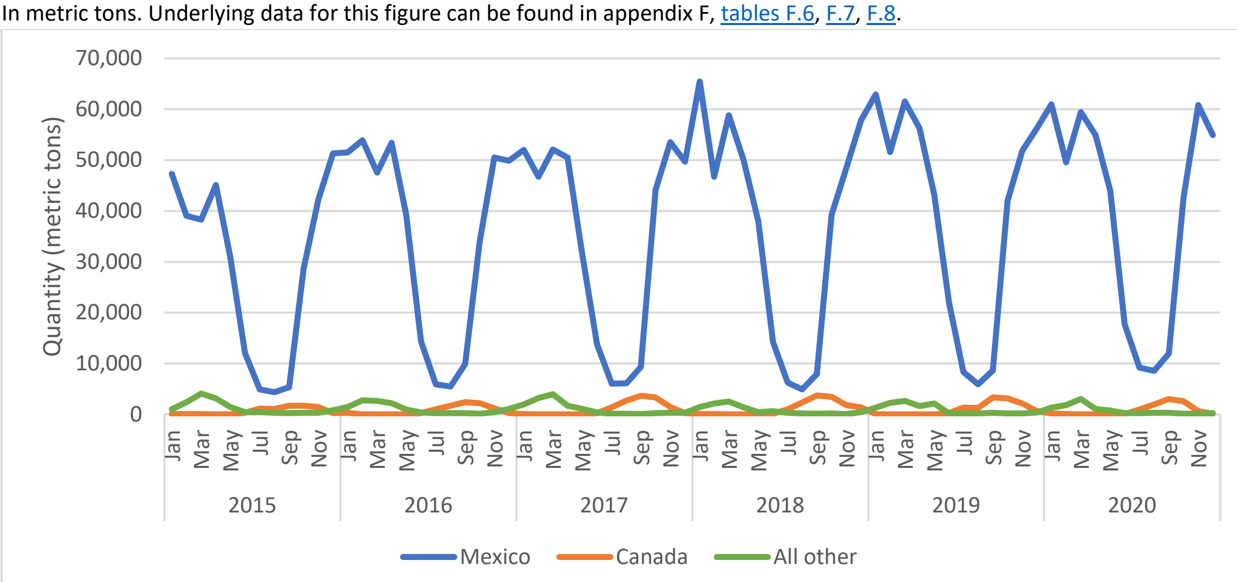
[332] Harmonized Tariff Schedule (HTS) subheading 0709.93.20, squash, fresh or chilled, will be referred to as squash throughout this chapter.
[333] USITC, hearing transcript, April 8, 2021, 304 (testimony of Rod Sbragia, Tricar Sales, Inc.); USITC, hearing transcript, April 8, 2021, 226 (testimony of Brian Robinson, BTR Farms).
[334] FPAA, written submission to USITC, April 15, 2021, 4, 13.

Seasonal Import Trends

U.S. imports of squash predominantly come from Mexico; they are generally at their highest volume during the months of November through May and reach their lowest levels during the period from June through October (figure 5.1). In particular, January through April tends to be the period with the highest U.S. imports of squash from Mexico. From November through May, the U.S. Southeast is harvesting squash, but there is little production in other regions of the United States. By contrast, from June through October of each year, northern regions of the United States are also harvesting squash. During 2015–20, between 81 and 84 percent of imports from Mexico in each year entered during the seven-month period from November through May. The remaining smaller share entered during the period from June through October; imports are less prevalent during these months due to the ready availability of domestic squash, as well as the difficulty of growing squash in Mexico's hot climate during the summer.[335]

Figure 5.1 Monthly U.S. squash imports from Mexico, Canada, and all other sources, by quantity, 2015–20

In metric tons. Underlying data for this figure can be found in appendix F, tables F.6, F.7, F.8.



Source: USITC DataWeb/Census, imports for consumption, first unit of quantity, HTS 0709.93.20, accessed February 26, 2021.

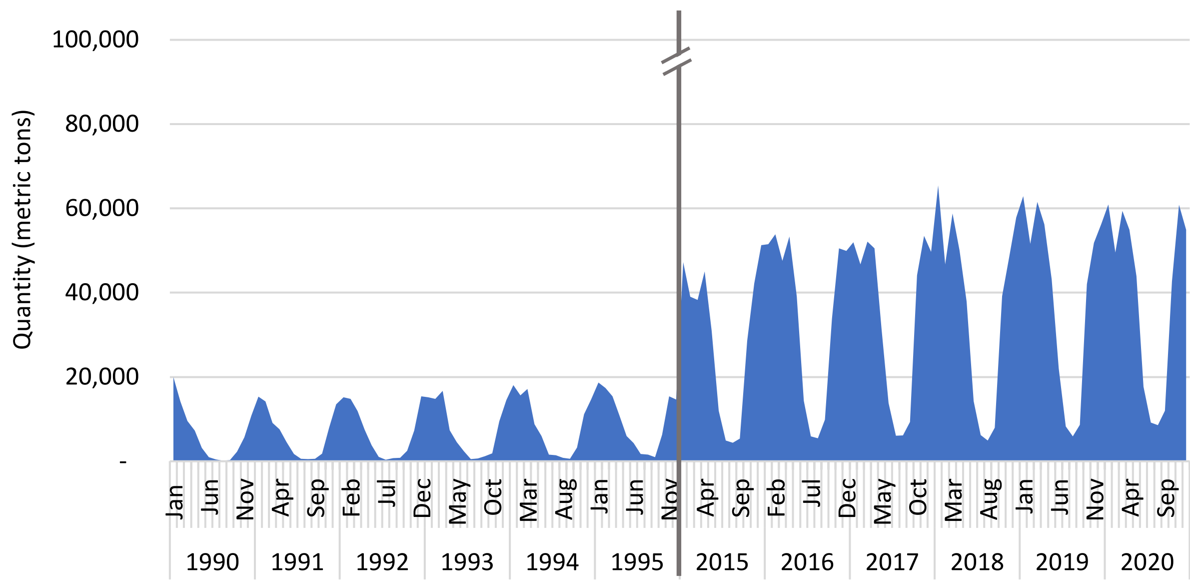
Seasonal trade trends vary for squash imports from partners other than Mexico, all of which are minor suppliers to the U.S. market. U.S. imports from Honduras and Guatemala (which are the largest sources of squash imports after Mexico and Canada and account for most of the "all other" volume in figure 5.1), peak in the spring (generally March and April), which overlaps closely with the main squash import period from Mexico. Imports from Canada, however, typically peak in September, which is usually a low month for imports from Mexico and Central America.

[335] USITC DataWeb/Census (HTS subheading 0709.93.20; accessed May 12, 2021). See chapter 3 for additional detail on the climate and growing season in Mexico.

Despite this distinct seasonal pattern in U.S. imports from Mexico during 2015–20, imports from June through October have increased substantially over the past 30 years (figure 5.2). Industry representatives have reported that improved growing methods in Mexico, such as increased use of irrigation, have resulted in a longer production season.[336] This has led to an increase in imports from Mexico during the period from June through October; these imports made up about 5 percent of the annual total in 1990 and 19 percent in 2020.

Figure 5.2 Monthly U.S. squash imports from Mexico, by quantity, 1990–95 and 2015–20

In metric tons. Underlying data for this figure can be found in appendix F, table F.9.



Source: USITC DataWeb/Census, imports for consumption, first unit of quantity, HTS 0709.90.20 (for 1990–95) and HTS 0709.93.20 (for 2015–20), accessed June 10, 2021.

Seasonal Price Trends

Seasonality in the production of summer squash contributes to price variation. Because the various U.S. and Mexican squash-growing regions have different but overlapping production seasons, there are often short periods of high supply and low prices in the U.S. market (when production from many regions overlaps) as well as periods of relatively scarce supply and higher prices (when few regions are shipping squash). The highest prices are reported during transitional seasons referred to as "shoulder periods."[337] In particular, the fall as well as the late spring (end of April through June) are reportedly the main shoulder periods in which production volumes are declining and, as a result, prices increase.[338] These shoulder period price increases were not always apparent in the AMS shipping point data presented

[336] USITC, hearing transcript, April 8, 2021, 184 (testimony of Salvatore Finocchiaro, S&L Beans, Inc.). A Herfindahl-Hirschman Index also demonstrates that imports from Mexico have become less concentrated within certain months, with an index of 1631 in 1990 and 1057 in 2020. Staff calculation, USITC DataWeb/Census, HTS 0709.90.20 (1990–95) and HTS 0709.93.20 (2015–20), accessed June 10, 2021.
[337] USITC, hearing transcript, April 8, 2021, 304 (testimony of Rod Sbragia, Tricar Sales, Inc.).
[338] USITC, hearing transcript, April 8, 2021, 304 (testimony of Rod Sbragia, Tricar Sales, Inc.).

below, but such increases may be more prevalent in certain market segments or regions, as industry sources suggest. In U.S. import data, these shoulder months also show a clear transitional pattern in terms of the volume shipped from Mexico to the United States, as seen above and in chapter 2.

Even outside of these shoulder periods, however, prices vary widely. In part, variations are due to climate conditions, which limit the time in which farmers in the southeastern United States can plant to a brief period, and rainy periods right before or during harvests, which can limit harvests or affect quality. As a result, there can be temporary gluts or shortages in production during the main production season, leading to price swings.[339] Some of these temporary price swings are smoothed by the prevalence of contract sales, which can provide grower-shippers with a fixed price over longer periods of time, as described in the next section.

Types of Squash Sales and Implications for Pricing

In the United States there are several different ways that squash can be bought and sold, and the sales type affects pricing. The two main types are advance contracts and spot market sales.[340] Contracts are often favored by retailers looking to ensure a consistent and predictable supply.[341] The share of product that is sold under contract varies by grower or distributor. One distributor reported using contracts for about 45 percent of the squash they import and would prefer to use them for a higher share if it were possible.[342] Two U.S. growers reported that about half of their sales are under contracts and the other half are sold on the spot market.[343]

There is reportedly a great deal of variation in the duration and structure of squash contracts, and this variation affects price trends. Some contracts can be shorter, multi-week contracts, and others last multiple years.[344] Larger buyers often want longer term contracts, with a minimum of three months in duration, though most of their contracts are six months or longer.[345] Retailers seek year-round supply and are often willing to pay higher prices under contracts that cover the entire year. Accordingly, some

[339] USITC, hearing transcript, April 8, 2021, 304 (testimony of Rod Sbragia, Tricar Sales, Inc.).
[340] Spot market sales sometimes include open-ticket and consignment sales, described below. USITC, hearing transcript, April 8, 2021, 145 (testimony of Richard Bowman, J&J Family of Farms); USITC, hearing transcript, April 8, 2021, 145 (testimony of Marie Bedner, Bedner Growers); USITC, hearing transcript, April 8, 2021, 145 (testimony of Lance Jungmeyer, Fresh Produce Association of the Americas); USITC, hearing transcript, April 8, 2021, 194–95 (testimony of William L. Brim, Lewis Taylor Farms); USITC, hearing transcript, April 8, 2021, 195–96 (testimony of Sam Watson, Chill C Farms); USITC, hearing transcript, April 8, 2021, 305 (testimony of Guillermo Martinez, Frello Fresh, LLC).
[341] Industry representatives, interviews by USITC staff, August 10, 2021; USITC, hearing transcript, April 8, 2021, 246 (testimony of Guillermo Martinez, Frello Fresh, LLC).
[342] USITC, hearing transcript, April 8, 2021, 285–86 (testimony of Jaime Chamberlain, Chamberlain Distributing).
[343] USITC, hearing transcript, April 8, 2021,195 (Sam Watson, Chill C Farms), USITC, hearing transcript, April 8, 2021, 196 (testimony of James M. Alderman, J. Alderman Farms)
[344] USITC, hearing transcript, April 8, 2021, 145 (testimony of Richard Bowman, J&J Family of Farms); USITC, hearing transcript, April 8, 2021, 145–46 (testimony of Lance Jungmeyer, Fresh Produce Association of the Americas); USITC, hearing transcript, April 8, 2021, 194 (testimony of William L. Brim, Lewis Taylor Farms).
[345] USITC, hearing transcript, April 8, 2021, 287 (testimony of Craig Slate, SunFed Produce); industry representative, interview by USITC staff, March 10, 2021.

representatives report that the price received depends on the duration of the contract, with the per-unit price received by grower-shippers under a 6-month contract being much lower than the price under a 12-month contract with a buyer.[346] In addition, while many contracts have a fixed price, others are simply a commitment to purchase a certain volume of squash at the prevailing price on the date of delivery.[347] Different growers may negotiate different contract prices with the same retailer over the same time period.[348] Industry representatives report that the increasing consolidation of buyers, for both the retail and food service sectors, has impacted their ability to negotiate favorable contract and pricing terms, as these larger buyers have increased market power.[349]

It is unclear from publicly available information whether prices in squash contract sales are generally higher, lower, or comparable to prices in spot market sales. One industry representative with experience buying squash under contract estimated that the contract price had been higher than the spot market price about 54 percent of the time during the previous two years.[350] In some cases, contracting may allow retailers to obtain lower prices than they would for the same product on the spot market, because they are committing to purchase a substantial volume of squash over a long period. However, some industry representatives noted that contract prices can sometimes be higher than spot market prices because retailers typically have quality standards that some of the product available in other markets would not meet. Because of these potential quality differences, the products sold in the two markets may not be directly comparable, resulting in different prices.[351]

Some industry representatives report that contracting with buyers does not guarantee a purchase, because contracted purchases are typically only a portion of any buyer's overall supply of squash. When prices decline, buyers may choose to buy on the spot market rather than under an existing contract.[352] This is possible both because buyers do not always fulfill contract obligations; even when they do, commitments to purchase a certain volume of squash are often for the duration of the contract and not in any particular week.[353] As a result, some U.S. growers report that if prices of imported products are lower, buyers with whom they have contracted may inform them that they will not be accepting any U.S. deliveries that week.[354] Alternatively, some U.S. growers report that buyers might quote them the

[346] USITC, hearing transcript, April 8, 2021, 306 (testimony of Jaime Chamberlain, Chamberlain Distributing).
[347] USITC, hearing transcript, April 8, 2021, 197 (testimony of William L. Brim, Lewis Taylor Farms) and 305–7 (testimony of Jaime Chamberlain, Chamberlain Distributing).
[348] USITC, hearing transcript, April 8, 2021, 307 (testimony of Jaime Chamberlain, Chamberlain Distributing).
[349] USITC, hearing transcript, April 8, 2021, 315 (testimony of Bret Erikson, J&D Produce); industry representative, interview by USITC staff, March 10, 2021.
[350] Industry representative, email correspondence with USITC staff, October 1, 2021.
[351] Industry representative, interview by USITC staff, June 24, 2021; USITC hearing transcript, April 8, 2021, 205 (testimony of James M. Alderman, J. Alderman Farms).
[352] Not all growers agree with this assessment, however, with one grower noting that they have legal recourse if their buyer does not fulfill the contract and buy their production. USITC, hearing transcript, April 8, 2021, 188–9 (testimony of Caleb Burgin, Burgin Farms); USITC, hearing transcript, April 8, 2021, 194 (testimony of William L. Brim, Lewis Taylor Farms); USITC, hearing transcript, April 8, 2021, 195 (testimony of Sam Watson, Chill C Farms); USITC, hearing transcript, April 8, 2021, 251 (testimony of Rod Sbragia, Tricar Sales, Inc.).
[353] USITC, hearing transcript, April 8, 2021, 188–89 (testimony of Caleb Burgin, M. F. Burgin, Inc. d/b/a Burgin Farms).
[354] USITC, hearing transcript, April 8, 2021, 188–89 (testimony of Caleb Burgin, M.F. Burgin, Inc. d/b/a Burgin Farms).

price to purchase the same product from Mexico, and growers will meet it, even if it is below their cost of production, to prevent a complete loss of the sale.[355]

Spot market sales are transactions made on a daily basis. The sales are also known as free on board (f.o.b.) sales because the agreed price is typically based on the day's f.o.b. price as reported by AMS, which does not include the cost of transport.[356] However, while the f.o.b. price is the basis for negotiation in the spot market, the cost of freight also affects total delivered cost and can be a factor in the choice buyers make when selecting a source. For example, one wholesaler in the Northeast reported that they have no need to purchase squash from Mexico during the summer months because high-quality squash produced within the Northeast region is readily available and significantly cheaper due to the freight savings.[357] Another wholesaler reported that even though grower-shippers always seek to receive the reported f.o.b. price when they sell on the spot market, numerous other factors can affect whether they are able to get that price for their squash.[358] Spot market sales are the type most heavily represented in AMS pricing data, as described in the next section.

Spot market sales arrangements can sometimes include consignment and what industry representatives refer to as "open ticket" sales.[359] In a consignment arrangement, goods are transferred to a third party for sale; for squash, this is typically a wholesaler, but the shipper retains ownership until the sale is complete.[360] In the open-ticket arrangement, the product is sent to the buyer without a set price, and the price is determined upon the buyer's receipt of the product. This practice is risky for producers because it leaves all pricing power in the buyer's hands. U.S. producers, exporters, and wholesalers generally agreed that this sales channel is considered a last resort and is not prevalent.[361]

Price Data Sources and Limitations

The main data source for information on prices of squash in the U.S. market is AMS, which collects pricing data at the shipping point and terminal markets, and through voluntary reporting from telephone and in-person interviews with sellers and buyers.[362] These data are available for a wide range of fresh market agricultural products, including squash, and allow for monthly analysis as well as the ability to differentiate by squash type and other characteristics.

In some investigations, particularly when AMS data are not available for a product, the Commission has used import average unit values (AUVs) to consider pricing trends for imported agricultural products. However, U.S. import AUVs are not used in this investigation's pricing analysis. U.S. import AUV data are

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[355] USITC, hearing transcript, April 8, 2021, 189–90 (testimony of Caleb Burgin, M.F. Burgin d/b/a Burgin Farms); USITC, hearing transcript, April 8, 2021, 194 (testimony of William L. Brim, Lewis Taylor Farms); USITC, hearing transcript, April 8, 2021, 196 (testimony of James M. Alderman, J. Alderman Farms).
[356] For additional details on USDA's definition of the f.o.b. price, see USDA AMS, "Common Types of Sales," accessed October 6, 2021.
[357] Industry representative, interview by USITC staff, August 10, 2021.
[358] Industry representative, interview by USITC staff, August 10, 2021.
[359] Western Growers, "Price After Sale," October 31, 2013.
[360] Industry representatives, interviews by USITC staff, February 3, 2021, and August 10, 2021; Investopedia, "Consignment," updated October 28, 2020; Western Growers, "Price After Sale," October 31, 2013.
[361] USITC, hearing transcript, April 8, 2021, 284 (testimony of Rod Sbragia, Tricar Sales, Inc.) and 285 (testimony of Jaime Chamberlain, Chamberlain Distributing, Inc.).
[362] USDA, AMS, Market News, "Fruit and Vegetable, Help, Types of Reports," accessed June 11, 2021.

not reliable for squash because the HTS subheading used for squash combines all varieties, including summer and winter squash. Additionally, prices can vary widely within the same variety of squash, depending on size and packaging type.

USDA AMS Data

Shipping Point

AMS's shipping point data cover the major fruit and vegetable growing areas and are prices of products sold on the open market by the first handlers at the point of production (for domestic products) or the port of entry (for imports).[363] The prices include brokerage fees and commission, U.S. Customs and Border Protection fees and duties, packaging, and freight costs prior to first sale paid by the shipper or the seller.[364] AMS considers these prices to represent the most uniform level of trading.[365]

The main limitation of the shipping point data are that the prices AMS collects represent a limited share of the U.S. market. This is because shipping point data do not fully reflect the growing portion of the market that is served by contract sales. To the extent contract sales are reported to AMS as part of the collection of shipping point data, they are reported only on the day the contract is established and do not affect average shipping point prices thereafter.[366] As a result, shipping point data reflect mostly spot market sales.[367]

Industry representatives also report that shipping point pricing data may not reflect actual prices, in part because the data are based on a limited number of market participants who voluntarily report prices.[368] The representatives also report concerns resulting from AMS's policy to protect confidentiality of sources by generally not publishing prices unless three or more sellers are reporting. They note that due to grower consolidation and the number of different varieties and packaging sizes, AMS may be limited in the prices it can report.[369] Some representatives also note that AMS does not use invoices of actual sales to confirm reported prices.[370]

[363] USDA, AMS, Market News, "Fruit and Vegetable, Help, Types of Reports," accessed June 11, 2021; USDA, AMS, Market News, "Fruit and Vegetable, Help, Shipping Point Report vs. Terminal Report," accessed June 11, 2021. Brokers fees are included in the shipping point prices.
[364] USDA, AMS, Market News, "Fruit and Vegetable, Help, Shipping Point Report vs Terminal Report," accessed June 11, 2021.
[365] USDA, AMS, Market News, "Fruit and Vegetable, Help, Types of Reports," accessed June 11, 2021.
[366] Government official, interview by USITC staff, May 21, 2021; government official, email message to USITC staff, June 22, 2021; FPAA squash, written submission to USITC, March 29, 2021, 75.
[367] Government official, interview by USITC staff, May 21, 2021.
[368] USITC, hearing transcript, April 8, 2021, 306 (testimony of Guillermo Martinez, Frello Fresh, LLC); FPAA, written submission to USITC, March 29, 2021, 74.
[369] FPAA, written submission to USITC, March 29, 2021, 75; industry representative, interview by USITC staff, March 9 and April 28, 2021.
[370] USITC, hearing transcript, April 8, 2021, 333 (testimony of Jaime Chamberlain, Chamberlain Distributing).

Terminal Market

AMS's terminal market reporters record prices at terminal (wholesale) markets in 13 major U.S. cities where products are sold by wholesalers to buyers in wholesale lots.[371] The buyers at U.S. wholesale markets sometimes include major retailers, but are more often smaller retailers, restaurants, and institutions (e.g., schools and jails).[372] Terminal market data reflect the spot market prices wholesalers receive for sales of product that are less than a carload or truckload and are the prices of sales by first receivers.[373] While the terminal market reports sometimes include bulk orders by large retailers, they do not include true contract sales.[374]

The main limitation of terminal market data in analyzing price trends is that the prices contained in this report are less uniform than at the shipping point and represent a relatively small share of sales of produce made through the terminal markets (or any other wholesale channel).[375] Wholesale prices include freight charges and various other markups, thus are less of a direct measure of prices compared to shipping point data. An increased prevalence of direct retailer-grower or retailer-shipper contracts means that the AMS terminal market report represents only a small share of total sales in the U.S. market. The wholesale market share has been declining over time, and U.S. industry and academia reported that as early as 2000 less than 30 percent of the national volume of produce was sold through the wholesale markets.[376] The top eight grocery retailers are reported to account for more than 50 percent of U.S. retail food sales, and much of their supply does not move through terminal markets because large retailers now purchase the bulk of their produce directly from growers.[377] Product intended for food service also travels through the wholesale markets less frequently than in the past, and some industry representatives report that a significant share of U.S. Southeast production is intended for the food service industry.[378]

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371 USDA, AMS, Market News, "Fruit and Vegetable, Help, Types of Reports," accessed June 11, 2021; USDA, AMS, Market News, "Fruit and Vegetable, Help, Shipping Point Report vs Terminal Report," accessed June 11, 2021.
372 Industry representatives, interviews by USITC staff, August 10, 2021; USDA, AMS, Market News, "Fruit and Vegetable, Help, Terminal Report Availability," accessed October 11, 2021.
373 USDA, AMS, Market News, "Fruit and Vegetable, Help, Types of Reports," accessed June 11, 2021; USDA, AMS, Market News," Fruit and Vegetable, Help, Shipping Point Report vs Terminal Report," accessed June 11, 2021.
374 FPAA, written submission to USITC, April 15, 2021, 4–5 and 11; FPAA, written submission to USITC, March 29, 2021, 118; government officials, interviews by USITC staff, May 21 and June 22, 2021.
375 The terminal market data shares some of the same limitations as the shipping point data, i.e., a lack of contract prices, limited coverage of certain locations, and voluntary non-confirmed reports of prices. An additional limitation of the terminal market data is that some produce may travel through other wholesale markets beyond the 13 terminal markets AMS covers.
376 FPAA, written submission to USITC, April 15, 2021, 12; Cook, "The U.S. Fresh Produce Industry: An Industry in Transition," 2002, 18; government official, interview by USITC staff, September 3, 2021.
377 USDA, ERS, "Retail Trends," May 25, 2021; FPAA, written submission to USITC, April 15, 2021, 12.
378 Industry representative, interview by USITC staff, February 3, 2021. The following hearing witness used squash as an example but is also generally talking about the changing relationship between growers and buyers and the trend of more direct sales to chain stores and food service customers. USITC, hearing transcript, April 8, 2021, 256 (testimony of Jaime Chamberlain, Chamberlain Distributing, Inc.).

Comparisons of U.S. Domestic and Imported Squash Prices Using USDA AMS Data

The analysis below focuses on AMS data for zucchini and yellow straightneck squash, varieties that are popular with U.S. consumers and are widely grown by producers in Mexico and the United States. Data are limited for two additional varieties of summer squash that are less commonly grown in both Mexico and the United States. These are yellow crookneck squash, which are primarily grown in the United States, and grey squash, which are primarily grown in Mexico.

Because buyers generally prefer smaller summer squash, the most competitive segment of the market (with the highest prices) is the market for small and medium squash. Reflecting these preferences, prices for small (green) zucchini and yellow straightneck squash can often be double those for medium-large, on a per-pound basis. Pricing data for summer squash larger than medium size are not available for all months because the market for these larger sizes is limited. As a result, the remainder of the analysis will focus only on small- and medium-sized summer squash.

Prices for squash vary widely throughout the year as seasons change and as supply from different U.S. and import sources become more or less available. The AMS shipping point average prices for small- and medium-sized, U.S.-grown zucchini and yellow straightneck squash ranged from $0.24 to $1.59 per pound during 2015 to 2020.[379] Mexican-grown squash of the same sizes and varieties had similar prices but ranged even more widely, from $0.19 to $1.77 per pound. Prices were similar among all products, regardless of origin, but were somewhat higher on average for small ($0.58 per pound) than for medium ($0.50 per pound) summer squash, and for yellow straightneck squash ($0.60 per pound) than for zucchini ($0.49 per pound).

According to AMS terminal market data, when average prices for squash from the U.S Southeast and Mexico sold in wholesale markets are compared, the prices track very closely to one another. The AMS average terminal market prices for U.S.-grown zucchini ranged from $0.39 to $1.50 per pound from 2015 to 2020, and the prices for Mexican-grown zucchini in the same markets ranged from $0.40 to $1.71 per pound.[380]

AMS Shipping Point Price Comparison

AMS shipping point data for medium zucchini reveal that the prices for imported and domestic product rise and fall together during many months of the year. However, imported zucchini were priced lower than the domestic product roughly twice as often as the opposite situation; of the 53 months with available data shown in figure 5.3, imported product prices were lower in 25 of them, while domestic product was priced lower in 12. In 16 of the months, domestic and imported product prices were identical or nearly so. For the 19 remaining months, no imported product prices are available because the low volume of imports and/or small number of shippers during Mexico's low season excluded those months from AMS coverage.

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[379] See supplemental price level tables in appendix F for more information.

[380] See supplemental price level tables in appendix F for more information.

Figure 5.3 Average monthly price difference between foreign and domestic medium-sized zucchini, AMS shipping point, 2015–20

In dollars per pound. Red cells and a negative value (minus sign) indicate that the imported product price in the specific month and year was lower than the domestic price. The darker the shade, the lower the foreign price comparatively. When the cell is blue and no minus sign is present, the imported product price was higher than the domestic price. The darker the shade, the higher the imported product price comparatively. White cells indicate a negligible difference. n.a. = not available. Underlying data for this figure can be found in appendix F, table F.10.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	-0.03	0.05	-0.09	0.01	0.06	n.a.	n.a.	n.a.	n.a.	-0.02	0.16	0.00
2016	-0.08	-0.24	0.03	-0.02	-0.02	n.a.	n.a.	n.a.	n.a.	-0.09	-0.07	0.01
2017	-0.03	0.00	0.02	-0.05	0.14	0.07	n.a.	n.a.	0.30	-0.02	-0.07	-0.01
2018	-0.17	-0.08	0.01	-0.04	0.16	-0.09	n.a.	n.a.	n.a.	-0.16	0.01	-0.04
2019	-0.08	-0.03	-0.05	0.01	0.08	-0.03	n.a.	n.a.	n.a.	-0.06	0.02	0.11
2020	0.06	-0.05	0.27	0.00	0.00	-0.29	n.a.	n.a.	n.a.	-0.21	-0.07	-0.09

Source: USDA, AMS, Market News, custom report, shipping point report, zucchini, medium, accessed June 3, 2021.
Note: Imports included in the figure are exclusively from Mexico. Data for domestic production include the states of Florida, Georgia, Michigan, North Carolina, and South Carolina.

For medium yellow straightneck squash, the number of months in which domestic product prices were lower than imported product prices was almost equal to the number of months in which the opposite was true. For this squash type, in the months for which data were available, the domestic product was priced lower in 18 of 50 months and the imported product was priced lower in 21 of the 50 months (figure 5.4). The prices were identical or nearly so in 11 of the months. For the 22 remaining months, similarly to zucchini, no imported product prices are available because the low volume of imports and/or small number of shippers during Mexico's low season excluded those months from AMS coverage.

Figure 5.4 Average monthly price difference between foreign and domestic medium-sized yellow straightneck squash, AMS shipping point, 2015–20

In dollars per pound. Red cells and a negative value (minus sign) indicate that the imported product price in the specific month and year was lower than the domestic price. The darker the shade, the lower the foreign price comparatively. When the cell is blue and no minus sign is present, the imported product price was higher than the domestic price. The darker the shade, the higher the imported product price comparatively. White cells indicate a negligible difference. n.a. = not available. Underlying data for this figure can be found in appendix F, table F.11.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	0.26	-0.10	0.08	-0.02	-0.09	n.a.	n.a.	n.a.	n.a.	-0.06	0.21	0.11
2016	0.22	-0.36	-0.04	0.01	-0.13	n.a.	n.a.	n.a.	n.a.	-0.18	0.06	0.00
2017	0.04	-0.03	0.08	0.00	-0.17	n.a.	n.a.	n.a.	0.20	-0.20	0.00	-0.04
2018	-0.15	0.01	0.04	-0.06	0.22	0.18	n.a.	n.a.	n.a.	-0.06	0.15	-0.03
2019	-0.12	-0.14	-0.04	-0.02	0.05	n.a.	n.a.	n.a.	n.a.	-0.07	0.17	0.25
2020	-0.07	0.18	0.38	0.03	-0.15	n.a.	n.a.	n.a.	n.a.	-0.18	-0.01	-0.18

Source: USDA, AMS, Market News, custom report, shipping point report, yellow straightneck, medium, accessed June 3, 2021.
Note: Imports included in the figure are exclusively from Mexico. Data for domestic production include the states of Florida, Georgia, Michigan, North Carolina, and South Carolina.

For small zucchini, imported product prices tended to be lower than domestic product prices across the greatest number of months, compared to the other products shown in this analysis. However, as with the other products, price movement appears to be closely linked in many months, with prices of imported and domestic products rising and falling together. Of the 53 months with available data shown in figure 5.5, imported product prices were lower in 36 of them, domestic product prices were lower in 11, and prices were at or near identical levels in 6 months. For the 19 remaining months, no imported product prices are available because the low volume of imports and/or small number of shippers during Mexico's low season excluded those months from AMS coverage.

Figure 5.5 Average monthly price difference between foreign and domestic small-sized zucchini, AMS shipping point, 2015–20

In dollars per pound. Red cells and a negative value (minus sign) indicate that the imported product price in the specific month and year was lower than the domestic price. The darker the shade, the lower the foreign price comparatively. When the cell is blue and no minus sign is present, the imported product price was higher than the domestic price. The darker the shade, the higher the imported product price comparatively. White cells indicate a negligible difference. n.a. = not available. Underlying data for this figure can be found in appendix F, table F.12.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	-0.06	0.03	-0.07	-0.05	0.03	n.a.	n.a.	n.a.	n.a.	-0.04	0.14	0.00
2016	-0.08	-0.28	0.00	-0.07	-0.07	n.a.	n.a.	n.a.	n.a.	-0.12	-0.15	0.00
2017	-0.06	-0.03	-0.04	-0.07	0.10	0.06	n.a.	n.a.	0.25	-0.06	-0.16	-0.07
2018	-0.17	-0.12	-0.02	-0.07	0.16	-0.12	n.a.	n.a.	n.a.	-0.09	-0.06	-0.11
2019	-0.10	-0.12	-0.10	-0.04	0.06	-0.07	n.a.	n.a.	n.a.	-0.13	-0.03	0.09
2020	-0.17	-0.15	0.15	-0.06	0.04	-0.31	n.a.	n.a.	n.a.	-0.25	-0.16	-0.19

Source: USDA, AMS, Market News, custom report, shipping point report, zucchini, small, accessed June 3, 2021.
Note: Imports included in the figure are exclusively from Mexico. Data for domestic production include the states of Florida, Georgia, Michigan, North Carolina, and South Carolina.

For small yellow straightneck squash (figure 5.6), the imported product was priced lower in 26 of the 50 months with available data, and the domestic product was priced lower in 14 months. In 10 of the months, imported and domestic squash were at or near identical prices. In the remaining 22 months, no data were available due to the low volume of imports, as noted above.

Figure 5.6 Average monthly price difference between foreign and domestic small-sized yellow straightneck squash, AMS shipping point, 2015–20

In dollars per pound. Red cells and a negative value (minus sign) indicate that the imported product price in the specific month and year was lower than the domestic price. The darker the shade, the lower the foreign price comparatively. When the cell is blue and no minus sign is present, the imported product price was higher than the domestic price. The darker the shade, the higher the imported product price comparatively. White cells indicate a negligible difference. n.a. = not available. Underlying data for this figure can be found in appendix F, table F.13.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	0.23	-0.09	0.05	-0.06	-0.16	n.a.	n.a.	n.a.	n.a.	-0.06	0.15	0.06
2016	0.18	-0.36	-0.10	-0.01	-0.22	n.a.	n.a.	n.a.	n.a.	-0.21	-0.01	-0.02
2017	-0.03	-0.06	0.05	-0.01	-0.16	n.a.	n.a.	n.a.	0.20	-0.22	-0.07	-0.08
2018	-0.12	0.02	0.02	-0.10	0.22	0.17	n.a.	n.a.	n.a.	-0.04	0.11	-0.03
2019	-0.15	-0.16	-0.09	-0.02	-0.01	n.a.	n.a.	n.a.	n.a.	-0.10	0.10	0.26
2020	-0.06	0.10	0.23	-0.04	-0.14	n.a.	n.a.	n.a.	n.a.	-0.22	-0.08	-0.20

Source: USDA, AMS, Market News, custom report, shipping point report, yellow straightneck, small, accessed June 3, 2021.
Note: Imports included in the figure are exclusively from Mexico. Data for domestic production include the states of Florida, Georgia, Michigan, North Carolina, and South Carolina.

There was no strong seasonal pattern observed in which domestic or imported summer squash were priced lower in the U.S. market. In most of the months when both products were present in the market, there were some years when the domestic squash was priced lower and others when the imported squash was priced lower.

One key exception was the month of October. In that month, imported zucchini and yellow straightneck squash were priced lower than domestic squash in every year during 2015–20, and for both medium and small varieties.[381] In a separate analysis of the degree of divergence between prices of domestic and imported product, prices of imported squash also tended to fall furthest below domestic prices (as a share of the domestic price) in October. For example, imported medium zucchini were priced lower than the domestic product in October of every year between 2015 and 2020, and were more than 20 percent lower in three of these years. As noted above, October is part of a shoulder period when Mexican production is ramping up and, as a result, imports from Mexico rise very quickly in the U.S. market at a time when squash in the Southeast is still being harvested.

A less clear exception was the month of April. In that month, the domestic product was never priced significantly lower than the imported product in any year, across all varieties (i.e., the imported product was usually priced lower than the domestic product). However, the imported and domestic product prices were closer than they were in October (and were nearly identical in some cases).

AMS Terminal Market Price Comparison

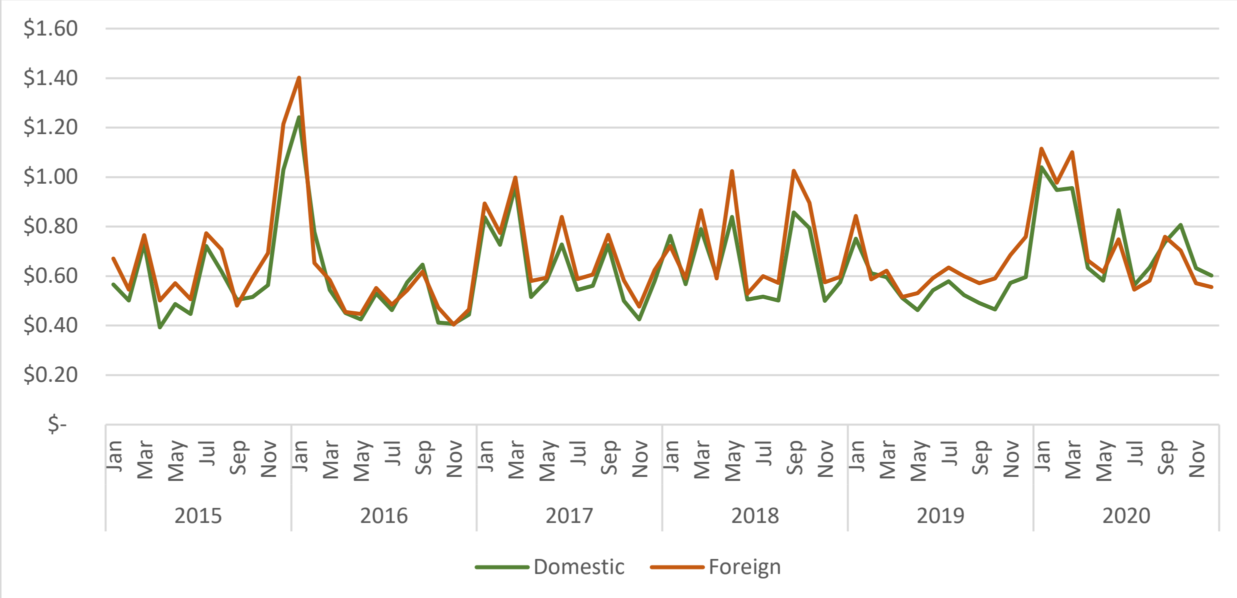
Compared to shipping point data, terminal market data represent prices at a later point in the supply chain and, in many cases, for a different set of buyers that may have different considerations in their purchasing decisions. As a result, pricing comparisons between domestic and imported squash in the terminal markets can look very different than comparisons made based on shipping point data.

In general, domestic and imported prices follow the same patterns in the terminal markets and appear to be closely linked, but domestic squash are most often priced below imports. For medium zucchini, the domestic product was priced lower in 58 of 72 months in the terminal markets, while the imported product was priced lower in just 14 of the months (figure 5.7). According to industry representatives familiar with terminal market transactions, this higher pricing of imports versus domestic product primarily reflects the additional transportation costs involved in shipping the squash a greater distance.[382] However, these industry representatives also noted that Mexican squash quality is very consistent, and some stated that product quality differences may play some role in the price difference, albeit a smaller role than the transportation cost difference.[383]

[381] In two of the years for medium zucchini, the prices were nearly identical.
[382] Industry representatives, interviews by USITC staff, August 10, 2021.
[383] Industry representatives, interviews by USITC staff, August 10, 2021.

Figure 5.7 Prices of Mexican and U.S. medium-sized zucchini in U.S. terminal markets, 2015–20

In dollars per pound. Underlying data for this figure can be found in appendix F, table F.14.



Source: USDA, AMS, Market News, custom report, terminal market report, green zucchini, accessed June 3, 2021.

Unlike shipping point data, terminal market price data include freight rates, which can also factor into buyers' purchasing decisions. Because buyers are price conscious and respond to freight-based differences in price, U.S. Southeast growers may be less likely to sell to the Pacific Northwest than to the Northeast since California growers can reach the Pacific Northwest faster and with lower freight costs. For this reason, growers in the Southeast were traditionally the primary suppliers in the Northeast and, to some extent, the Midwest. U.S. growers report, however, that this traditional pattern no longer holds because the low prices of imports from Mexico compensate for the higher freight costs in transporting product from Mexico to these regions.[384]

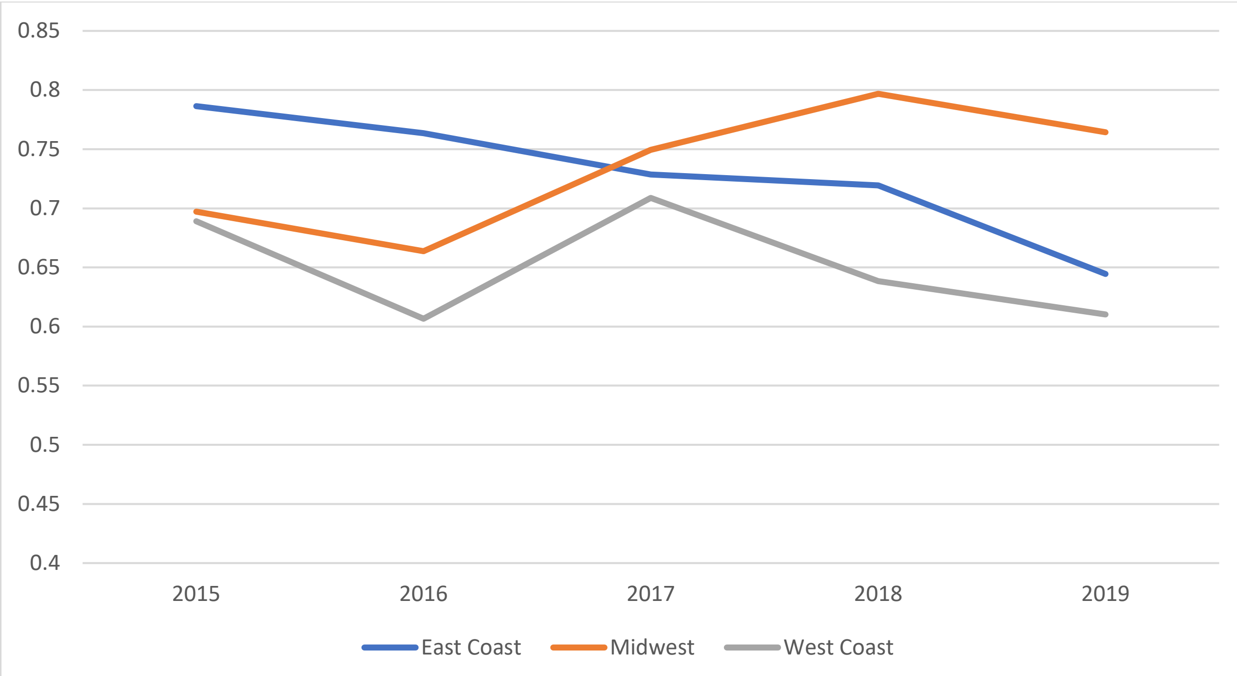
Because of the importance of freight costs, it can be useful to compare the prices for U.S. or Mexican squash in only the terminal markets closest to them. The southeastern U.S. squash industry has stated that they believe Mexican producers may be trying to undercut them on price. In part, they believe Mexican squash are sometimes priced higher in terminal markets in California than in markets on the East Coast, even though the transportation costs are lower from Mexico to California.[385] At the USITC hearing, some of these U.S. producers stated that they believe this form of price competition in the East Coast terminal markets, where U.S. and Mexican product compete most directly, is intended to drive U.S. producers out of the market.[386] As seen in figure 5.8, on an annual basis, Mexican squash appears to be priced slightly lower in West Coast terminal markets than in East Coast markets, as would be expected given the lower transportation costs. However, the gap between the West Coast and East Coast prices narrowed between 2015 and 2019. The size of the gap in any given year may be driven in

[384] USITC, hearing transcript, April 8, 2021, 187 (testimony of Brian Robinson, BTR Farms).
[385] USITC, hearing transcript, April 8, 2021, 131 (testimony of Adams Lee, counsel of Fresh Produce Association of the Americas).
[386] USITC, hearing transcript, April 8, 2021, 130 (testimony of Michael Joyner, Florida Fruit and Vegetable Association).

part by freight rates.[387] For example, the gap was the smallest in 2017, when freight rates were at their lowest during the period.

Figure 5.8 Prices of Mexican zucchini (all sizes) in U.S. terminal markets by region, 2015–19

In dollars per pound. Underlying data for this figure can be found in appendix F, table F.15.



Source: USDA, AMS, custom report, terminal market report, green zucchini, accessed June 3, 2021.
Note: East Coast terminal markets included are Atlanta, Baltimore, Boston, Miami, New York, and Philadelphia. Midwest terminal markets are Chicago, Dallas, and Detroit. West Coast terminal markets are Los Angeles and San Francisco. Data for 2020 are not included because San Francisco terminal market prices were not available for that year.

[387] See the chapters on the United States and Mexican industries for additional analysis of freight rates as a factor affecting competitiveness.

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Chapter 6 Effects of Imports on the U.S. Squash Industry

This chapter estimates the economic effects of increased squash imports on the U.S. domestic market, with special emphasis placed on seasonal effects. In this section, we develop and apply a partial equilibrium model of the U.S. seasonal market for fresh squash. Squash data are separated in the analysis into summer and winter varieties.[388] Markets producing in each period, June–October and November–May, experienced increases in the growth rates of imports during specific years within 2009–19 (also referred to in this chapter as the "high-growth years"). A counterfactual scenario is simulated using the partial equilibrium model, in which the increase in growth rates in those years did not occur, and imports are lower from 2009 onward. The period 2000–2020 is used to estimate the model, but the model results focus on the most recent six years (2015–20).[389]

Economic effects of the high-growth years are modeled to reflect seasonal implications: the months from June through October encompass the harvesting periods for most U.S. states that produce squash; and the months from November through May, the harvesting periods in parts of Florida, Georgia, and California. We modeled the industry based on these periods as we were requested to analyze the effect of imports on the domestic seasonal markets. Seasonality is an important feature in this analysis due to the prominence of imports from Mexico during November–May and differences in regional harvesting times. A large volume of U.S. imports during November–May competes with domestic production primarily from a few states in the U.S. Southeast. From June through October, the lower volume of U.S. imports competes with squash from a majority of producing states.

The hypothetical removal of above-average increases in imports from 2009 to 2019 would have had positive effects on U.S. production, revenue, and operating income in 2015–20. In such a scenario, lower squash import volumes would have led to higher import prices, and a shift towards consumption of domestic varieties after the relative import price change. This counterfactual would have led to higher prices of domestically produced squash and more output, as U.S. farmers would have increased

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[388] This analysis uses modified import data from the Harmonized Tariff Schedule of the United States (HTS) under the 8-digit subheading 0709.93.20. The HTS code is a basket category for all squash varieties. Country-level estimates for production of summer squash and winter squash were used to allocate the data between summer and winter squash. The percent of Mexican squash production that is summer squash ranges between 79 percent to 84 percent, depending on the year. While summer squash is the focus of the other chapters in this report (because it is a more important product for the U.S. Southeast), chapter 6 modeled effects of imports on both summer and winter squash varieties. This is because winter squash was important for the U.S. Southeast in years before the 2015–20 investigation window, and lower imports could lead to more gains in production of winter squash in this region.

[389] The Commission developed a customized partial equilibrium model for this investigation that uses estimates of squash production and imports by harvesting periods, a departure from other investigations with models that use annual data. Technical details of the model, detailed calculations used to construct data inputs, and sensitivity analyses with different parameter combinations are included in appendix E of this report.

production due to higher prices. Increases in output and prices would have led to increases in domestic revenue, operating income, and employment.

For both summer and winter squash varieties, the hypothetical removal of the above-average increases in imports (the counterfactual) would have a larger effect during November–May. For summer squash, the hypothetical removal of the higher import growth years during November–May would have increased U.S. producers' revenue by an average of $16.3 million per period, operating income by an average of $5.3 million per period, and domestic production by an average of 37.2 percent per period during the previous five growing periods. For summer squash June–October effects, domestic revenue would have been $11.9 million higher on average absent the higher import growth years, operating income about $3.9 million higher, and domestic production 12.0 percent higher. The November–May effects impact a portion of Florida, Georgia, and California production, as those are the states that harvest during these months. Effects for winter squash varieties follow the same pattern but are smaller in magnitude.

Description of the Model

The model developed for this report is a partial equilibrium model of the U.S. fresh squash market. Summer and winter squash products are modeled separately. Consumers purchase both domestically produced and imported fresh squash varieties that are differentiated by source and are imperfectly substitutable, with consumer preferences represented by constant elasticity of substitution demands. Many producers compete in a perfectly competitive domestic industry.[390] The model has three parameters that are held constant across all years: a constant elasticity of substitution between foreign and domestic sources, a supply elasticity for domestic producers, and a price elasticity of total industry demand. All other model parameters are year-specific and calibrated to industry data.

The model estimates economic effects during two major harvesting periods in the United States, June–October and November–May. Monthly U.S. production data are not generally available, so information about state-level harvesting seasons, along with state-level data, were used to estimate U.S. production data inputs by month. A majority of the squash-producing states produce during June–October; only Florida, Georgia, and California have some fresh squash production during the November–May period.

The model is calibrated with an estimate of actual summer and winter squash domestic production and import volumes for both the June–October and November–May periods between 2015 and 2020. The model then considers a counterfactual where above-average import growth did not occur. This involves first identifying the observed above-average growth rates in imports and reducing the growth rates in the identified higher growth years to calculate a counterfactual level of imports for the model. New equilibrium prices and quantities are estimated absent the above-average growth to quantify the economic effects on producers and consumers. This approach implicitly assumes that the historical increases in imports were driven by supply conditions in the exporting countries, not by changes in the U.S. market. This approach also assumes that the volume of imports has an impact on prices and domestic production, but the volume of imports does not in turn react to conditions in the domestic

[390] Perfect competition is a reasonable assumption for this market because there are a large number of fresh market squash producers. As discussed in chapter 2, USDA NASS estimated that there were over 6,000 fresh market squash producers in 2017.

market. Economic effects presented in the following sections of this chapter are calculated as the percent change between actual data and the counterfactual scenario where there is no above-average growth in imports.

Model Limitations

There are a few limitations to the modeling approach. First, the counterfactual in the model, which was chosen to illustrate the effects of increased imports on U.S. producers, is one of several potentially relevant scenarios that could be analyzed within this modeling framework. The counterfactual was chosen as relevant based on hearing testimony and separate discussions with industry participants. The approach does not identify any specific events in this chapter that caused the above-average growth in imports during the higher growth years; it simply identifies above-average growth rates in imports and adjusts the import volumes to construct the counterfactual. Discussion on factors affecting import growth can be found in chapter 2 on the U.S. squash industry, and chapter 3 on the squash industry in Mexico.

Second, due to limitations in data on investment, the model is static, i.e., it estimates the economic effects for each year separately. Therefore, the model does not account for any increased investment that may have occurred due to higher prices that led to increased domestic production in later years.

Third, the months included in each period are not perfect measures of the U.S. harvest seasons and may shift slightly from year to year depending on weather and other factors. Seasonal production data were not available and were estimated using available state production data and information about state harvesting periods.[391] The state seasonal production may also change over time or be affected by annual weather fluctuations, with some states that typically produce in November–May shifting some harvest to June–October, and vice versa. Assumptions that states harvest consistently in the same months from year to year were necessary to arrive at estimates of seasonal production, given the lack of publicly available data.

Finally, employment data were not available, so the number of full-time equivalent workers (FTEs) were estimated using per-acre labor hour estimates and total squash acreage in the United States from U.S. Department of Agriculture (USDA) National Agricultural Statistics Service (NASS).[392] This employment estimate is not reflective of actual labor in the industry, which can be seasonal or short-term in nature.

Data and Trends

Several sources of data were used in the economic model. U.S. domestic squash production data for the years modeled (2015–20) were obtained from USDA NASS. The domestic production data were then split into summer and winter varieties using an estimate of the product mix in the United States during the years modeled. Monthly domestic production data, a key data requirement for a seasonal model, are generally not available and must be estimated. The portion of the annual domestic production data attributable to June through October and November through May are estimated using available state

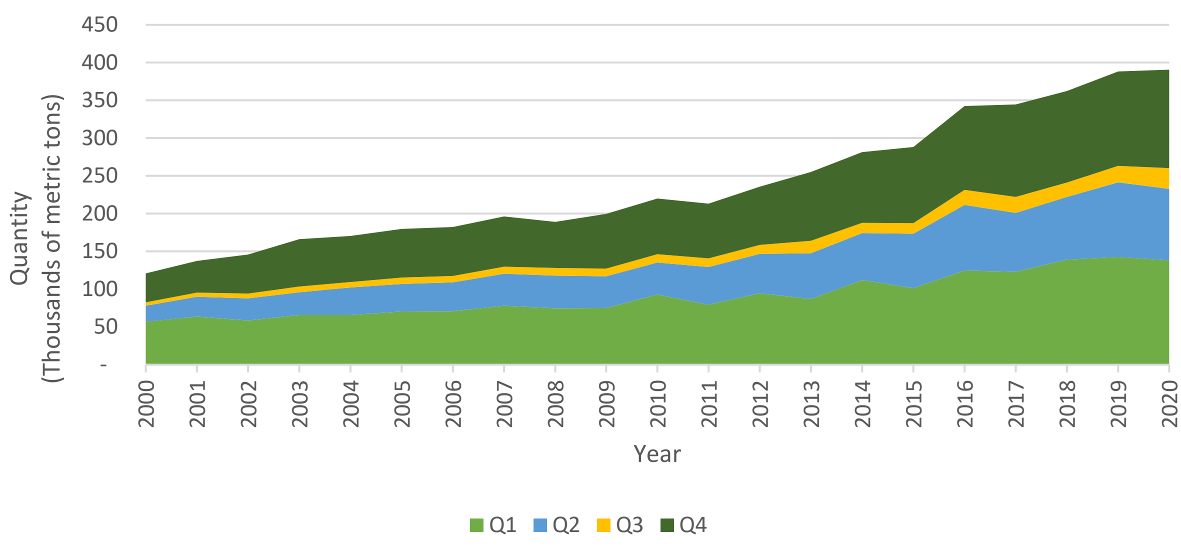
[391] Harvest seasons by major growing state and trading partner can be found in figure 1.1 in chapter 1.
[392] More information about the FTEs calculation and underlying assumptions can be found in the technical modeling appendix.

production data and information about state-level harvesting months. Export data from 2015 to 2020 were subtracted from domestic production to isolate squash production that was both produced and consumed in the United States.

Import data for 2015–20 were used in the model as the alternative variety to domestic production. The squash HTS subheading 0709.93.20 does not separately capture summer and winter squash varieties, so import data were split into summer and winter using an estimate of production shares by major trading partner. To illustrate trends in U.S. imports over time, estimated quarterly import data are shown below in figures 6.1 and 6.2. Imports during the first, second, and fourth quarters had the greatest increases in volume, with the fourth and first quarters mostly aligning with the November–May period and the second and third quarters with the June–October period.

Figure 6.1 Summer squash: U.S. imports, by volume and by quarter, 2000–2020

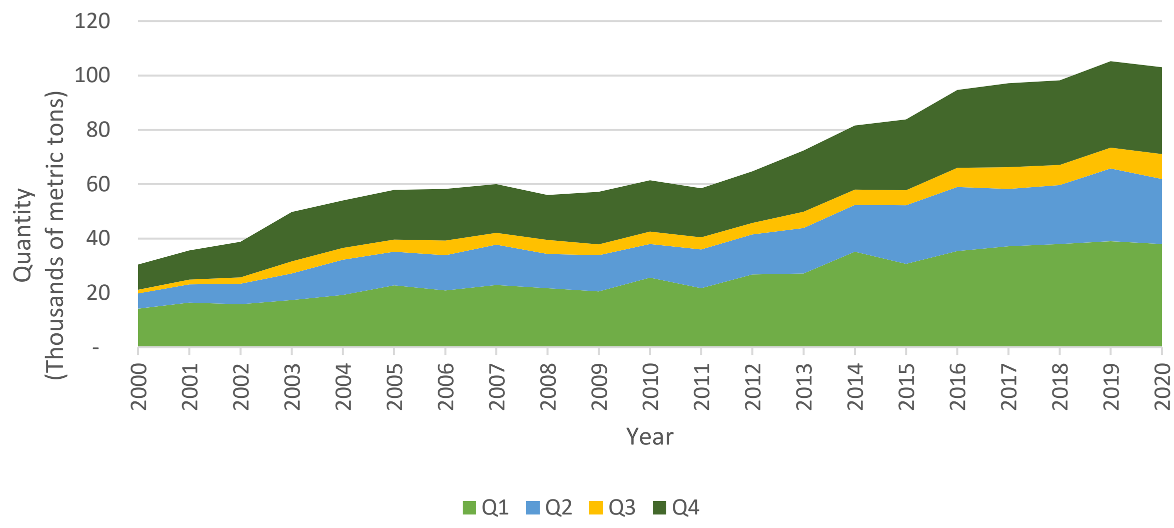
In thousands of metric tons. Underlying data for this figure can be found in appendix F, table F.16.



Source: USITC DataWeb/Census, HTS 8-digit subheading 0709.93.20, accessed June 2021, and USITC estimates to split into summer and winter varieties based on estimates of exporting countries' relative production of winter and summer squash.

Figure 6.2 Winter squash: U.S. imports, by volume and by quarter, 2000–2020

In thousands of metric tons. Underlying data for this figure can be found in appendix F, table F.17.



Source: USITC DataWeb/Census,HTS 8-digit subheading 0709.93.20, accessed June 2021, and USITC estimates to split into summer and winter varieties based on estimates of exporting countries' relative production of winter and summer squash.

The counterfactual level of imports was calculated by reducing the actual import volumes for harvest periods with above-average growth rates. First, growth rates were calculated for each harvest period from 2000 to 2020. Then, seasonal growth rates for each year were compared to the average seasonal growth rate for the 20-year period. For harvest periods identified as having above-average growth, the level of imports was reduced to lower the growth rate by the difference between the average growth rate from 2000–2020 and the average growth rate between the higher-growth years.[393] These counterfactual growth rates were then used to generate a counterfactual level of imports (figure 6.3 and 6.4) absent the above-average growth years.[394] Because the focus of the study is for the period 2015–20, only the counterfactual level of imports from 2015 to 20 were modeled.

The historical higher growth in imports of summer squash was larger in June–October. Average import growth for June–October from 2000 to 2020 was 8.5 percent, whereas average import growth during November–May was 5.4 percent over the same 20-year period. The higher growth years during June–October were between 2009 and 2019, with an average growth rate of 16.6 percent. In November–May, the higher growth years were identified as between 2010 and 2019, with an average growth rate of 12.7 percent.

For winter squash varieties, the historical higher growth in imports was also larger in June–October. Average import growth for June–October from 2000 to 2020 was 9.3 percent, whereas average import growth during November–May was 5.7 percent over the same 20-year period. The higher growth years during June–October were between 2011 and 2019, with an average growth rate of 14.3 percent. In

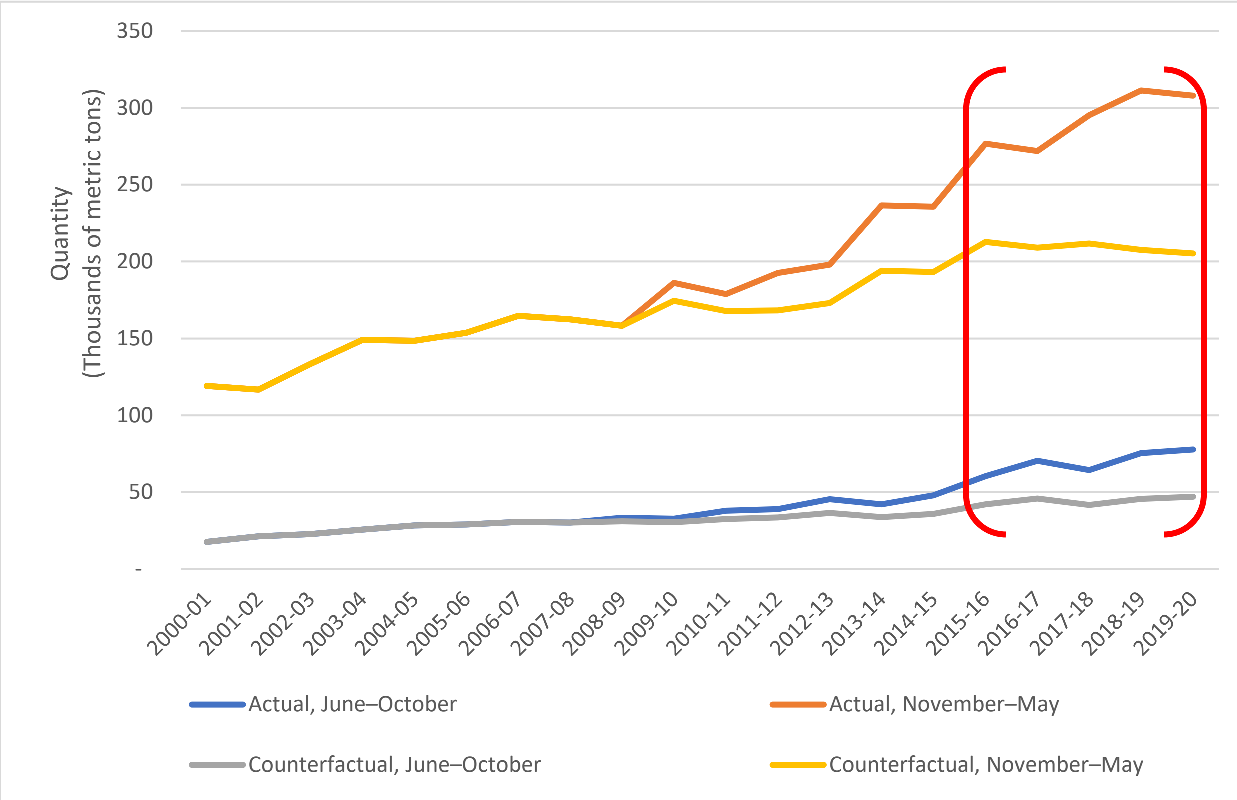
[393] See figure E.1 in the technical appendix for a visual representation of this process.

[394] Growth rates that were below the average were not adjusted. This means that the counterfactual level of imports grew at the same rate as actual imports during the growing seasons with below-average growth rates.

November–May, the higher growth years were identified as between 2010 and 2019, with an average growth rate of 10.2 percent.

Figure 6.3 Summer squash: Actual and counterfactual U.S. import volumes from 2000 to 2020 for both June–October and November–May

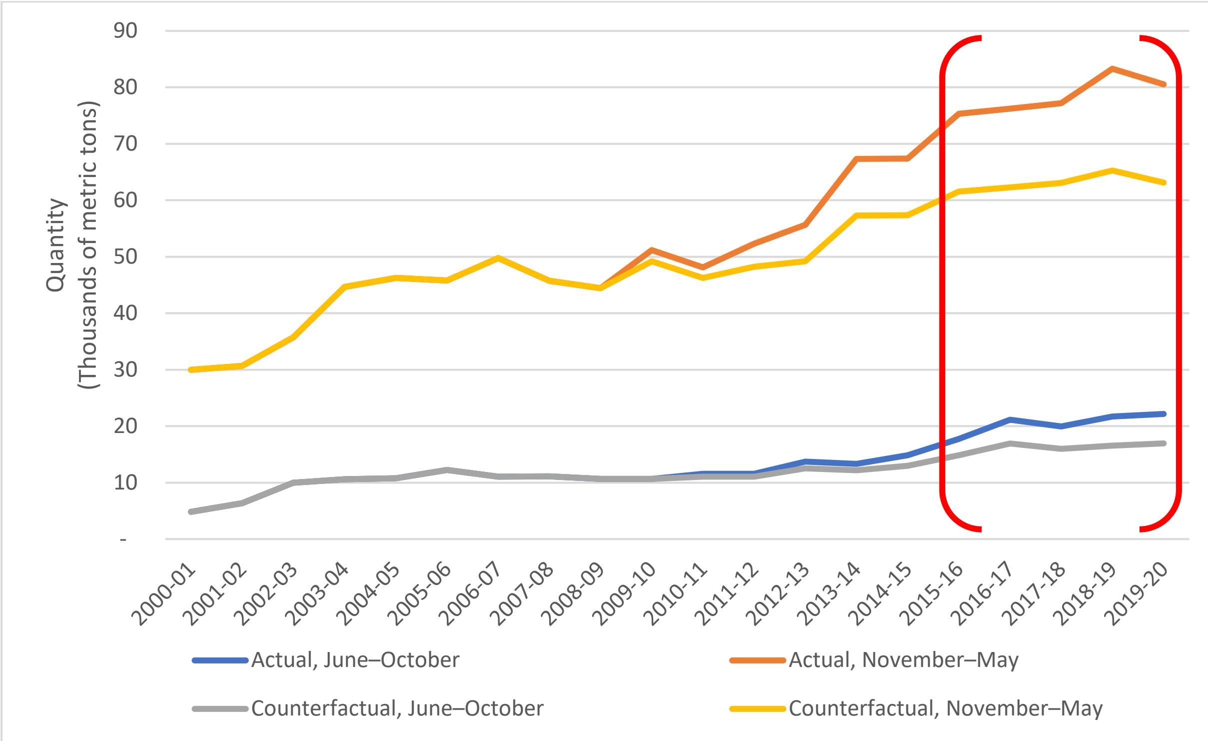
In thousands of metric tons. Underlying data for this figure can be found in appendix F, table F.18.



Source: USITC DataWeb/Census,HTS 8-digit subheading 0709.93.20, accessed June 2021, and USITC estimates.
Note: The years modeled are bracketed.

Figure 6.4 Winter squash: Actual and counterfactual U.S. import volumes from 2000 to 2020 for both June–October and November–May

In thousands of metric tons. Underlying data for this figure can be found in appendix F, table F.19.



Source: USITC DataWeb/Census, HTS 8-digit subheading 0709.93.20, accessed June 2021, and USITC estimates.
Note: The years modeled are bracketed.

Estimated Economic Effects of Imports on U.S. Squash Producers

Summer Squash

In the scenario where higher import growth is removed in the November–May period, domestic output would have been about 37.2 percent higher on average, compared to a 12.0 percent increase in domestic output in June–October (tables 6.1 and 6.2). Effects are larger on average during November–May because of the larger import penetration rate. Because imports supply a larger share of the U.S. market, a reduction in imports will shift more demand to domestic producers.[395] In the counterfactual, domestic revenue and operating income would be about $16.3 million and $5.3 million higher respectively, in November–May, compared to $11.9 million and $3.9 million in June–October. The percent increase in domestic prices is more than double in November–May (5.4 percent) compared to

[395] Percent changes are also larger because they are starting from a smaller base, so it may also be helpful to view the changes in output in metric tons for magnitude. The level change in output is also included in tables 6.1 and 6.2.

June–October (1.9 percent). Since producers in the U.S. Southeast are directly competing with imports in November–May, the price effects would have principally affected them.

The magnitude of the economic effects depends on several key factors. First, the bigger the import reduction, the more demand that will shift to domestically produced varieties, which will have larger impacts on U.S. producers' revenue, operating income, and employment. Second, in this model with constant elasticity of substitution demand, initial market shares have a large effect on price and quantity responses. If imports are the dominant source of supply (high import market share), then a change in imports will have a large effect on the U.S. aggregate price, and potentially a large effect on how U.S. producers respond. If imports are a minor source of supply (low import market share), then the same change in the value of imports would have a smaller effect on prices and result in a more muted response by U.S. producers.

The third factor that impacts the magnitude of effects is the consumer willingness to shift product sourcing after a relative price change. Higher willingness to shift sourcing after a relative increase in import prices leads to larger domestic price and output changes. If sources of supply are estimated to be less substitutable, then an increase in the price of imports will lead to a smaller shift in demand to the domestic variety. Finally, the ability of the U.S. industry to scale up production of summer squash after prices increase impacts how domestic supply will change. If U.S. suppliers can easily shift acreage from other products to fresh squash production, and harvest the same acreage multiple times per growing period, then the domestic supply response will be greater than if production schedules are relatively rigid.

Table 6.1 Summer squash: estimated economic effects in June–October of a hypothetical reduction in U.S. imports, 2016–20

In percentages, thousands of metric tons, millions of dollars, and number of FTEs. mt = metric tons; FTEs = full-time equivalent workers.

Period	Import price (%)	Import quantity (%)	Domestic price (%)	Domestic output (%)	Domestic output (1,000 mt)	Domestic revenue (million $)	Domestic operating income (million $)	Domestic employment (no. of FTEs)
Jun–Oct 2016	16.85	−30.23	1.33	8.26	12.79	7.44	2.41	167
Jun–Oct 2017	21.06	−35.05	1.75	10.94	17.01	12.10	3.92	217
Jun–Oct 2018	21.19	−35.05	1.78	11.19	17.93	10.12	3.28	204
Jun–Oct 2019	25.43	−39.52	2.17	13.75	17.85	14.46	4.68	214
Jun–Oct 2020	26.66	−39.52	2.51	16.02	21.01	15.42	4.99	289
Average	22.24	−35.87	1.91	12.03	17.32	11.91	3.86	218

Source: USITC estimates.

Note: These numbers were simulated using a customized partial equilibrium model of the U.S. market for summer squash. They can be interpreted as the percent change and dollar-value change of model outcomes after removing the above-average increases in imports.

Table 6.2 Summer squash: estimated economic effects in November–May of a hypothetical reduction in U.S. imports, 2015–20

In percentages, thousands of metric tons, millions of dollars, and number of FTEs. mt = metric tons; FTEs = full-time equivalent workers.

Period	Import price (%)	Import quantity (%)	Domestic price (%)	Domestic output (%)	Domestic output (1,000 mt)	Domestic revenue (million $)	Domestic operating income (million $)	Domestic employment (no. of FTEs)
Nov 2015–May 2016	23.81	−23.11	4.21	28.10	12.24	12.76	4.13	159
Nov 2016–May 2017	22.76	−23.11	3.88	25.65	11.77	12.29	3.98	150
Nov 2017–May 2018	30.53	−28.30	5.29	36.28	21.67	15.17	4.91	247
Nov 2018–May 2019	37.61	−33.29	6.44	45.43	33.36	19.83	6.42	400
Nov 2019–May 2020	39.91	−33.29	7.03	50.35	24.88	21.36	6.92	342
Average	30.92	−28.22	5.37	37.16	20.78	16.28	5.27	260

Source: USITC estimates.

Note: These numbers were simulated using a customized partial equilibrium model of the U.S. market for summer squash. They can be interpreted as the percent change and dollar-value change of model outcomes after removing the above-average increases in imports.

Winter Squash

The economic effects of the winter squash higher import growth years are presented in tables 6.3 and 6.4. The percent change in domestic output is larger on average during the November–May period, in part because the percentage changes are calculated from a very small base. Domestic revenues and operating income effects, in value terms, are larger during June–October. The average value change in domestic revenue for the period modeled, for example, is a $0.74 million increase, had there been no higher growth years in imports in the market. In comparison to the summer squash model results, these effects are smaller in magnitude, and show a slightly different trend, with dollar values higher in June–October than November–May.

Table 6.3 Winter squash: estimated economic effects in June–October of a hypothetical reduction in U.S. imports, 2016–20

In percentages, thousands of metric tons, millions of dollars, and number of FTEs. mt = metric tons; FTEs = full-time equivalent workers.

Period	Import price (%)	Import quantity (%)	Domestic price (%)	Domestic output (%)	Domestic output (1,000 mt)	Domestic revenue (million $)	Domestic operating income (million $)	Domestic employment (no. of FTEs)
Jun–Oct 2016	6.81	−16.42	0.34	1.35	2.17	1.32	0.43	25
Jun–Oct 2017	8.65	−19.94	0.47	1.91	2.92	2.25	0.73	37
Jun–Oct 2018	8.50	−19.94	0.41	1.67	2.73	1.99	0.64	31
Jun–Oct 2019	10.72	−23.63	0.63	2.54	2.64	2.80	0.91	43
Jun–Oct 2020	10.49	−23.63	0.54	2.18	3.33	3.00	0.97	40
Average	9.03	−20.71	0.48	1.93	2.76	2.27	0.74	35

Source: USITC estimates.

Note: These numbers were simulated using a customized partial equilibrium model of the U.S. market for winter squash. They can be interpreted as the percent change and dollar-value change of model outcomes after removing the above-average increases in imports.

Table 6.4 Winter squash: estimated economic effects in November–May of a hypothetical reduction in U.S. imports, 2015–20

In percentages, thousands of metric tons, millions of dollars, and number of FTEs. mt = metric tons; FTEs = full-time equivalent workers.

Period	Import price (%)	Import quantity (%)	Domestic price (%)	Domestic output (%)	Domestic output (1,000 mt)	Domestic revenue (million $)	Domestic operating income (million $)	Domestic employment (no. of FTEs)
Nov 2015–May 2016	19.55	−18.28	4.07	17.29	1.90	1.63	0.53	23
Nov 2016–May 2017	19.57	−18.28	3.46	14.56	1.35	1.39	0.45	17
Nov 2017–May 2018	19.71	−18.28	3.92	16.62	1.75	1.38	0.45	20
Nov 2018–May 2019	24.54	−21.64	5.61	24.41	3.46	2.66	0.86	56
Nov 2019–May 2020	23.94	−21.64	5.47	23.73	2.39	2.35	0.76	28
Average	21.46	−19.62	4.51	19.32	2.17	1.88	0.61	29

Source: USITC estimates.

Note: These numbers were simulated using a customized partial equilibrium model of the U.S. market for winter squash. They can be interpreted as the percent change and dollar-value change of model outcomes after removing the above-average increases in imports.

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Appendix A
Request Letter

DOCKET NUMBER
3512
OFFICE OF THE SECRETARY
INT'L TRADE COMMISSION

RECEIVED
December 7, 2020
OFFICE OF THE
SECRETARY
U.S. INT'L TRADE
COMMISSION

THE UNITED STATES TRADE REPRESENTATIVE
EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON

December 4, 2020

The Honorable Jason Kearns
Chair
United States International Trade Commission
500 E Street, SW
Washington, DC 20436

Dear Chair Kearns:

On September 1, 2020, the Office of the United States Trade Representative ("USTR") and the Departments of Agriculture ("USDA") and Commerce ("Commerce") announced a comprehensive plan to support American producers of seasonal and perishable fruits and vegetables. The plan resulted from hearings conducted by USTR, USDA, and Commerce on trade practices that might be contributing to unfair pricing of seasonal and perishable agricultural products in the United States. We received more than 300 written submissions, and more than 60 witnesses testified at two days of hearings. A transcript of the hearings and copies of written submissions are available at www.regulations.gov under Docket ID: USTR-2020-0010.

Among the Administration actions identified in the plan were the requests by USTR for the Commission to commence investigations into blueberries, strawberries, and bell peppers, that were the subjects of my September 29 and November 3 letters to you. The plan also noted that USTR, USDA, and Commerce would continue to monitor the seasonal and perishable fruit and vegetable industries and to consider potential future investigations.

To that end, under authority delegated by the President to the United States Trade Representative, and pursuant to section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)), I request that the Commission conduct additional investigations into cucumbers and squash, and to prepare reports for cucumbers and squash as requested below. Specifically, the products in question consist of all imports that fall within the product descriptions under the following statistical reporting categories in the Harmonized Tariff Schedule of the United States:

- for cucumbers: 0707.00 (cucumbers and gherkins, fresh or chilled); and
- for squash: 0709.93.20 (squash, fresh or chilled).

I respectfully request that the investigations and reports focus on the effect of imports on the domestic seasonal markets of the products in question, with particular focus on production and competitiveness of cucumbers and squash grown in the Southeastern United States. I would like the reports to also include information on recent trends in trade in these products between the United States and its trading partners, including information on seasonal patterns of trade. Furthermore, I also request that the reports include descriptions of monthly price trends for these products in the United States, including an analysis and comparison of the prices of domestically produced products and imported products in the U.S. market, and I would like the reports to focus primarily on the 2015-2020 time period.

I request that the Commission transmit its reports no later than 12 months following receipt of this request. It is my desire that the Commission's reports will be made available to the public in their entirety, and therefore the reports should not include any business confidential information.

I appreciate the Commission's assistance and cooperation in this matter.

Sincerely yours,

Robert E. Lighthizer

Appendix B
Federal Register Notice

61. San Marino
62. Serbia
63. Singapore
64. Slovakia
65. Slovenia
66. Solomon Islands
67. South Africa
68. South Korea
69. Spain
70. St. Vincent and the Grenadines
71. Sweden
72. Switzerland
73. Taiwan
74. Thailand
75. Timor-Leste
76. Turkey
77. Tuvalu
78. Ukraine
79. United Kingdom
80. Uruguay
81. Vanuatu

Pursuant to the authority provided to the Secretary of Homeland Security under sections 214(a)(1), 215(a)(1), and 241 of the Immigration and Nationality Act (8 U.S.C. 1184(a)(1), 1185(a)(1), and 1231), I am designating, with the concurrence of the Secretary of State, nationals from the following countries to be eligible to participate in the H–2B nonimmigrant worker program:

1. Andorra
2. Argentina
3. Australia
4. Austria
5. Barbados
6. Belgium
7. Brazil
8. Brunei
9. Bulgaria
10. Canada
11. Chile
12. Colombia
13. Costa Rica
14. Croatia
15. Czech Republic
16. Denmark
17. Ecuador
18. El Salvador
19. Estonia
20. Fiji
21. Finland
22. France
23. Germany
24. Greece
25. Grenada
26. Guatemala
27. Honduras
28. Hungary
29. Iceland
30. Ireland
31. Israel
32. Italy
33. Jamaica
34. Japan
35. Kiribati
36. Latvia
37. Liechtenstein
38. Lithuania
39. Luxembourg
40. Madagascar
41. Malta
42. Mexico
43. Monaco
44. Mongolia
45. Montenegro
46. Mozambique
47. Nauru
48. The Netherlands
49. New Zealand
50. Nicaragua
51. North Macedonia (formerly Macedonia)
52. Norway
53. Panama
54. Papua New Guinea
55. Peru
56. Philipinnes
57. Poland
58. Portugal
59. Romania
60. San Marino
61. Serbia
62. Singapore
63. Slovakia
64. Slovenia
65. Solomon Islands
66. South Africa
67. South Korea
68. Spain
69. St. Vincent and the Grenadines
70. Sweden
71. Switzerland
72. Taiwan
73. Thailand
74. Timor-Leste
75. Turkey
76. Tuvalu
77. Ukraine
78. United Kingdom
79. Uruguay
80. Vanuatu

This notice does not affect the current status of aliens who at the time of publication of this notice hold valid H–2A or H–2B nonimmigrant status. Aliens currently holding such status, however, will be affected by this notice should they seek an extension of stay in H–2 classification, or a change of status from one H–2 status to another, for employment on or after the effective date of this notice. Similarly, aliens holding nonimmigrant status other than H–2 status are not affected by this notice unless they seek a change of status to H–2 status.

Nothing in this notice limits the authority of the Secretary of Homeland Security or his designee or any other federal agency to invoke against any foreign country or its nationals any other remedy, penalty, or enforcement action available by law.

The Senior Official Performing the Duties of the Deputy Secretary, Kenneth T. Cuccinelli II, having reviewed and approved this document, is delegating the authority to electronically sign this document to Ian J. Brekke, who is the Senior Official Performing the Duties of the General Counsel for DHS, for purposes of publication in the **Federal Register**.

Ian J. Brekke,

Senior Official Performing the Duties of the General Counsel.

[FR Doc. 2021–00671 Filed 1–12–21; 8:45 am]

BILLING CODE 4410–10–P

INTERNATIONAL TRADE COMMISSION

[Investigation Nos. 332–584]

Squash: Effect of Imports on U.S. Seasonal Markets, With A Focus on the U.S. Southeast

ACTION: Notice of investigation and scheduling of a public hearing.

SUMMARY: Following receipt on December 7, 2020, of a request from the U.S. Trade Representative (USTR), under section 332(g) of the Tariff Act of 1930, the U.S. International Trade Commission (Commission) instituted Investigation No. 332–584, *Squash: Effect of Imports on U.S. Seasonal Markets, with a Focus on the U.S. Southeast.* The USTR asked that the investigation cover all imports that fall within the product description of U.S. Harmonized Tariff Schedule subheading 0709.93.20 (squash, fresh or chilled).

DATES:

March 25, 2021: Deadline for filing requests to appear at the public hearing.

March 29, 2021: Deadline for filing prehearing briefs and statements.

April 1, 2021: Deadline for filing electronic copies of oral hearing statements.

April 8, 2021: Public hearing.

April 15, 2021: Deadline for filing post-hearing briefs and statements.

April 27, 2021: Deadline for filing all other written submissions.

December 7, 2021: Transmittal of Commission report to the USTR.

ADDRESSES: All Commission offices, including the Commission's hearing rooms, are located in the U.S. International Trade Commission Building, 500 E Street SW, Washington, DC. All written submissions should be addressed to the Secretary, U.S. International Trade Commission, 500 E Street SW, Washington, DC 20436. The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at *https://edis.usitc.gov.*

FOR FURTHER INFORMATION CONTACT: Project Leader Lesley Ahmed (*lesley.ahmed@usitc.gov* or 202–205–3459), Deputy Project Leader Fernando Gracia (202–205–2747 or *fernando.gracia@usitc.gov*) for information specific to these investigations. For information on the legal aspects of this investigation, contact William Gearhart of the Commission's Office of the General Counsel (202–205–3091 or *william.gearhart@usitc.gov*). The media should contact Margaret O'Laughlin, Office of External Relations (202–205–1819 or *margaret.olaughlin@usitc.gov*). Hearing-impaired individuals may obtain information on this matter by contacting the Commission's TDD terminal at 202–205–1810. General information concerning the Commission may also be obtained by accessing its website (*https://www.usitc.gov*). Persons with mobility impairments who will need special assistance in gaining access to the Commission should contact the Office of the Secretary at 202–205–2000.

Background: As requested by the USTR, the Commission in its report will focus on the effect of imports on the domestic seasonal markets of squash, with a particular focus on production and competitiveness of such products grown in the Southeastern United States. In particular, the USTR asked that the report:

(1) Include information on recent trends in trade in these products between the United States and its trading partners, including information on seasonal patterns of trade;

(2) include descriptions of monthly price trends for these products in the United States, including an analysis and comparison of the prices of domestically produced and imported products in the U.S. market; and

(3) focus primarily on the 2015–2020 time period.

The USTR requested that the Commission transmit its report no later than 12 months following receipt of this request. In his request letter, the USTR stated that his office intends to make the Commission's report available to the public in its entirety and asked that the Commission not include any confidential business information.

Public Hearing: A public hearing in connection with this investigatio will be held beginning at 9:30 a.m. on April 8, 2021, nusing a videoconference platform. More detailed information about the hearing, including how to participate, will be posted on the Commission's website at (*https://usitc.gov/research_and_analysis/what_we_are_working_on.htm*). Once on that web page, scroll down to Investigation No. 332–583, *Cucumbers: Effect of Imports on U.S. Seasonal Markets, with a Focus on the U.S. Southeast,* and click on the link to ''Hearing Information.'' Interested parties should check the Commission's website periodically for updates.

Requests to appear at the public hearing should be filed with the Secretary no later than 5:15 p.m., March 25, 2021, in accordance with the requirements in the ''Written Submissions'' section below. All prehearing briefs and statements should be filed not later than 5:15 p.m., March 29, 2021. To facilitate the hearing, including the preparation of an accurate written transcript of the hearing, oral testimony to be presented at the hearing must be submitted to the Commission electronically no later than noon, April 1, 2021. All post-hearing briefs and statements should be filed no later than 5:15 p.m., April 15, 2021. Post-hearing briefs and statements should address matters raised at the hearing. For a description of the different types of written briefs and statements, see the ''Definitions'' section below.

In the event that, as of the close of business on March 25, 2021, no witnesses are scheduled to appear at the hearing, the hearing will be canceled. Any person interested in attending the hearing as an observer or nonparticipant should check the Commission website in the preceding paragraph for information concerning whether the hearing will be held.

Written Submissions: In lieu of or in addition to participating in the hearing, interested parties are invited to file written submissions concerning this investigation. All written submissions should be addressed to the Secretary, and should be received not later than the dates provided for in this notice. All written submissions must conform to the provisions of section 201.8 of the Commission's Rules of Practice and Procedure (19 CFR 201.8), as temporarily amended by 85 FR 15798 (March 19, 2020). Under that rule waiver, the Office of the Secretary will accept only electronic filings at this time. Filings must be made through the Commission's Electronic Document Information System (EDIS,). No in-person paper-based filings or paper copies of any electronic filings will be accepted until further notice. Persons with questions regarding electronic filing should contact the Office of the Secretary, Docket Services Division (202–205–1802), or consult the Commission's Handbook on Filing Procedures.

Definitions of Types of Documents That May Be Filed; Requirements: In addition to requests to appear at the hearing, this notice provides for the possible filing of four types of documents: Prehearing briefs, oral hearing statements, posthearing briefs, and other written submissions.

(1) *Prehearing briefs* refers to written materials relevant to the investigation and submitted in advance of the hearing, and includes written views on matters that are the subject of the investigation, supporting materials, and any other written materials that you consider will help the Commission in understanding your views. You should file a prehearing brief particularly if you plan to testify at the hearing on behalf of an industry group, company, or other organization, and wish to provide detailed views or information that will support or supplement your testimony.

(2) *Oral hearing statements (testimony)* refers to the actual oral statement that you intend to present at the public hearing. *Do not* include any confidential business information in that statement. If you plan to testify, you must file a copy of your oral statement by the date specified in this notice. This statement will allow Commissioners to understand your position in advance of the hearing and will also assist the court reporter in preparing an accurate transcript of the hearing (*e.g.,* names spelled correctly).

(3) *Post-hearing briefs* refers to submissions filed after the hearing by persons who appeared at the hearing. Such briefs: (a) Should be limited to matters that arose during the hearing, (b) should respond to any Commissioner and staff questions addressed to you at the hearing, (c) should clarify, amplify, or correct any statements you made at the hearing, and (d) may, at your option, address or rebut statements made by other participants in the hearing.

(4) *Other written submissions* refer to any other written submissions that interested persons wish to make, regardless of whether they appeared at the hearing, and may include new information or updates of information previously provided.

There is no standard format that briefs or other written submissions must follow. However, each such document must identify on its cover (1) the type of document filed (*i.e.,* prehearing brief, oral statement of (name), post-hearing brief, or written submission), (2) the name of the person or organization filing it, and (3) whether it contains confidential business information (CBI). If it contains CBI, it must comply with the marking and other requirements set out below in this notice relating to CBI. Submitters of written documents (other than oral hearing statements) are encouraged to include a short summary of their position or interest at the beginning of the document, and a table of contents when the document addresses multiple issues.

Confidential Business Information: Any submissions that contain confidential business information must also conform to the requirements of section 201.6 of the Commission's Rules of Practice and Procedure (19 CFR 201.6). Section 201.6 of the rules requires that the cover of the document and the individual pages be clearly marked as to whether they are the ''confidential'' or ''non-confidential'' version, and that the confidential business information is clearly identified by means of brackets. All written submissions, except for confidential business information, will be made available for inspection by interested parties.

As requested by the USTR, the Commission will not include any confidential business information in its report. However, all information, including confidential business information, submitted in this investigation may be disclosed to and used: (i) By the Commission, its employees and Offices, and contract personnel (a) for developing or maintaining the records of this or a related proceeding, or (b) in internal investigations, audits, reviews, and evaluations relating to the programs, personnel, and operations of the Commission including under 5 U.S.C. Appendix 3; or (ii) by U.S. government employees and contract personnel for cybersecurity purposes. The Commission will not otherwise disclose any confidential business information in a way that would reveal the operations of the firm supplying the information.

Summaries of Written Submissions: Persons wishing to have a summary of their position included in the report that the Commission sends to the USTR should include a summary with their written submission and should mark the summary as having been provided for that purpose. The summary should be clearly marked as ''summary for inclusion in the report'' at the top of the page. The summary may not exceed 500 words, should be in MS Word format or a format that can be easily converted to MS Word, and should not include any confidential business information. The summary will be published as provided if it meets these requirements and is germane to the subject matter of the investigation. The Commission will list the name of the organization furnishing the summary and will include a link to the Commission's Electronic Document Information System (EDIS) where the full written submission can be found.

By order of the Commission.

Issued: January 8, 2021.

Lisa Barton,

Secretary to the Commission.

[FR Doc. 2021–00565 Filed 1–12–21; 8:45 am]

BILLING CODE 7020–02–P

INTERNATIONAL TRADE COMMISSION

[Investigation Nos. 332–583]

Cucumbers: Effect of Imports on U.S. Seasonal Markets, With A Focus on the U.S. Southeast

ACTION: Notice of investigation and scheduling of a public hearing.

SUMMARY: Following receipt on December 7, 2020, of a request from the U.S. Trade Representative (USTR), under section 332(g) of the Tariff Act of 1930, the U.S. International Trade Commission (Commission) instituted Investigation No. 332–583, *Cucumbers: Effect of Imports on U.S. Seasonal Markets, with a Focus on the U.S. Southeast.* The USTR asked that the investigation cover all imports that fall within the product description of U.S. Harmonized Tariff Schedule subheading 0707.00 (cucumbers, including gherkins, fresh or chilled).

DATES:

March 25, 2021: Deadline for filing requests to appear at the public hearing.

March 29, 2021: Deadline for filing prehearing briefs and statements.

April 1, 2021: Deadline for filing electronic copies of oral hearing statements.

April 8, 2021: Public hearing.

April 15, 2021: Deadline for filing post-hearing briefs and statements.

April 27, 2021: Deadline for filing all other written submissions.

December 7, 2021: Transmittal of Commission report to the USTR.

ADDRESSES: All Commission offices, including the Commission's hearing rooms, are located in the U.S. International Trade Commission Building, 500 E Street SW, Washington, DC. All written submissions should be addressed to the Secretary, U.S. International Trade Commission, 500 E Street SW, Washington, DC 20436. The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at *https://edis.usitc.gov.*

FOR FURTHER INFORMATION CONTACT: Project Leader Lesley Ahmed (*lesley.ahmed@usitc.gov* or 202–205–3459), or Deputy Project Leader Kelsi Van Veen (202–708–3086 or *kelsi.vanveen@usitc.gov*) for information specific to these investigations. For information on the legal aspects of this investigation, contact William Gearhart of the Commission's Office of the General Counsel (202–205–3091 or *william.gearhart@usitc.gov*). The media should contact Margaret O'Laughlin, Office of External Relations (202–205–1819 or *margaret.olaughlin@usitc.gov*). Hearing-impaired individuals may obtain information on this matter by contacting the Commission's TDD terminal at 202–205–1810. General information concerning the Commission may also be obtained by accessing its website (*https://www.usitc.gov*). Persons with mobility impairments who will need special assistance in gaining access to the Commission should contact the Office of the Secretary at 202–205–2000.

Background: As requested by the USTR, the Commission in its report will focus on the effect of imports on the domestic seasonal markets of cucumbers, including gherkins, with a particular focus on production and competitiveness of such products grown in the Southeastern United States. In particular, the USTR asked that the report:

(1) Include information on recent trends in trade in these products between the United States and its trading partners, including information on seasonal patterns of trade;

(2) include descriptions of monthly price trends for these products in the United States, including an analysis and comparison of the prices of domestically produced and imported products in the U.S. market; and

(3) focus primarily on the 2015–2020 time period.

The USTR requested that the Commission transmit its report no later than 12 months following receipt of this request. In his request letter, the USTR stated that his office intends to make the Commission's report available to the public in its entirety and asked that the Commission not include any confidential business information.

Public Hearing: A public hearing in connection with this investigation will be held beginning at 9:30 a.m. on April 8, 2021, using a videoconference platform. More detailed information about the hearing, including how to participate, will be posted on the Commission's website at (*https://usitc.gov/research_and_analysis/what_we_are_working_on.htm*). Once on that web page, scroll down to Investigation No. 332–583, *Cucumbers: Effect of Imports on U.S. Seasonal Markets, with a Focus on the U.S. Southeast,* and click on the link to ''Hearing Information.'' Interested parties should check the Commission's website periodically for updates.

Appendix C
Calendar of Hearing Witnesses

CALENDAR OF PUBLIC HEARING

Those listed below appeared in the United States International Trade Commission's hearing via videoconference:

Subjects: Cucumbers: Effect of Imports on U.S. Seasonal Markets with a Focus on the U.S. Southeast

Squash: Effect of Imports on U.S. Seasonal Markets with a Focus on the U.S. Southeast

Inv. Nos.: 332-583 and 332-584, respectively

Date and Time: April 8, 2021 - 9:30 a.m.

STATE GOVERNMENT APPEARANCE:

The Honorable Nicole Fried, Commissioner of Agriculture, Florida Department of Agriculture and Consumer Services

EMBASSY AND FOREIGN GOVERNMENT APPEARANCES:

Embassy of Canada
Washington, DC

Nadia Bourély, Minister Counsellor

Glen Snoek, Marketing and Economic Policy Analyst, Ontario Greenhouse Vegetable Growers

Andre Solymosi, General Manager, British Columbia Vegetable Marketing Commission

Ron VanDamme, Vice Chair, Ontario Processing Vegetable Growers

Jocelyn Gibouleau, President, Les Productions Margiric Inc.

Mathieu Boucher, Deputy Director, Horticulture Division, Agriculture and Agri-Food Canada

Embassy of Mexico
Government of Mexico
Washington, DC

Minister Gerardo Lameda, Head of the Trade Office

PANEL #1: ACADEMIA, TRADE ASSOCIATIONS, AND COUNTY GOVERNMENT

ORGANIZATION AND WITNESSES:

University of Florida IFAS
Southwest Florida Research and Education Center
Immokalee, FL

Gene McAvoy, Associate Director for Stakeholder Relations

University of Florida IFAS
Gulf Coast Research and Education Center
Wimauma, FL

Zhengfei Guan, Associate Professor

Harris Bricken McVay, LLP
Seattle, WA
on behalf of

Fresh Produce Association of the Americas (“FPAA”)

Lance Jungmeyer, President, FPAA

Adams Lee) – OF COUNSEL

Georgia Fruit & Vegetable Growers Association
LaGrange, GA

Charles T. Hall, Jr., Executive Director

Florida Fruit & Vegetable Association (“FFVA”)
Maitland, FL

Michael Joyner, President, FFVA

Marie Bedner, Owner, Bedner Growers, Inc.

Richard "Dick" Bowman, Director of Farming, J&J Family of Farms

Texas International Produce Association
Mission, TX

Dante L Galeazzi, Chief Executive Officer and President

Dade County Farm Bureau
Homestead, FL

James R. Pierce, Jr., Executive Director
Economic Resources Department of Miami-Dade County

Cutler Bay, FL

Charles LaPradd, Agricultural Manager

PANEL #2: GROWERS, PACKERS, AND DISTRIBUTORS FROM THE U.S. SOUTHEAST

ORGANIZATION AND WITNESSES:

Chill C Farms
Moultrie, GA

Sam Watson, Managing Partner

Minor Brothers Farm
Andersonville, GA

Dick Minor, Partner

BTR Farms
Moultrie, GA

Brian Robinson, Chief Executive Officer

Lewis Taylor Farms
Tifton, GA

William L. Brim, President and Chief Executive Officer

J. Alderman Farms, Inc.
Boynton Beach, FL

James M. Alderman, President

M. F. Burgin, Inc. d/b/a Burgin Farms
Wauchula, FL

Caleb Burgin, President

Sasha Burgin, Secretary/Treasurer

S & L Beans, Inc.
Homestead, FL

Salvatore Finocchiaro, Farmer from Miami-Dade County,
Dade County Farm Bureau

PANEL #3: GROWERS, PACKERS, AND DISTRIBUTORS OUTSIDE OF THE U.S. SOUTHEAST

ORGANIZATION AND WITNESSES:

J&D Produce Inc.
Edinburg, TX

Bret Erickson, Senior Vice President, Business Affairs

SunFed Produce
Rio Rico, AZ

Craig Slate, President and Chief Executive Officer

Frello Fresh, LLC
Rio Rico, AZ

Guillermo Martinez, Chief Executive Officer

Tricar Sales, Inc.
Rio Rico, AZ

Rod Sbragia, Director, Sales and Marketing

Chamberlain Distributing, Inc.
Nogales, AZ

Jaime Chamberlain, President

The Sykes Company
Rio Rico, AZ

Lesley Sykes, Vice President

- END -

Appendix D
Summary of Views of Interested Parties

Appendix D includes summaries of written submissions prepared by interested parties as well as the names of interested parties who filed written submissions in the investigation but did not file a written summary.
The Commission has not edited the written summaries. A full copy of each written submission is available in the Commission's Electronic Document Information System (EDIS) (https://edis.usitc.gov/). A public hearing was held for the investigation on April 8, 2021, and the transcript of the hearing is available on EDIS.

Written Submissions

Fresh Produce Association of the Americas

The Fresh Produce Association of the Americas ("FPAA") strongly opposes any requests for the imposition of additional duties or other trade remedy measures on imports of squash. The Commission collected information and data regarding the supply and demand conditions in the U.S. market for squash that clearly demonstrates that any requests for trade relief should not be granted.

First, because squash has different growing seasons in different regions, most Mexican squash is imported in the winter months when most U.S. squash producers are not producing squash. Mexico's squash import volumes decrease in the summer months during the growing season of most states. Only Florida has a growing season that overlaps with Mexico, but Florida growers do not represent the experience of the entire domestic squash industry and cannot meet total U.S. market demand during its growing season.

Second, Mexican squash has a clear quality advantage over U.S. squash in terms of consistency of grading, sizing, and washing, primarily because Mexican squash is shed-packed while U.S. squash is field-packed. This quality consistency is a significant advantage for retail customers who offer price premiums not just for better Mexican product quality but also better supply logistics. Most Southeast U.S. squash growers have not innovated and still produce, pack and sell as decades before.

Third, over the past five years the data does not show any significant loss of U.S. sales volume or market share or underselling by Mexican imports of squash. Contrary to the anecdotal testimony of certain domestic growers, the U.S. import statistics and USDA AMS data shows stable Mexican import volumes with only slight annual increases corresponding to the growth in U.S. population and consumer demand, but with consistent seasonal trends with highest import volumes in the winter and early spring and a sharp decrease in import volumes during the summer. Squash is perishable, with pricing subject to variable, rapid and frequent market swings.

Fourth, Southeast U.S. growers elsewhere have highlighted the problems caused by the lack of availability or high cost of U.S. agricultural labor, damage from hurricanes or tropical storms, encroaching real estate development, or the impact of COVID-19. But here before the Commission they ignore or discount their own prior statements about these problems and instead unreasonably blame only Mexican imports. Imposing duties or otherwise restricting Mexican imports will not solve any of these other problems that are more significant causes of the Southeast U.S. growers' current condition.

The growth of Mexican agriculture, including squash, has been funded primarily from private investment, not from Mexican government subsidies. Any previous Mexican government subsidies for protected agriculture and other innovations were declared as non-distortive (“green box”) and have been discontinued. Many U.S. companies, including those from the Southeast U.S., have invested directly in Mexico so they can be in the marketplace year-round, helping increase per capita consumption.

Border Trade Alliance

No written summary. Please see EDIS for full submission.

Confederación de Asociaciones Agrícolas del Estado de Sinaloa, A.C., Consejo Agrícola de Baja California, A.C., Asociación Mexicana de Horticultura Protegida, A.C. and Asociación de Productores de Hortalizas del Yaqui y Mayo, and Asociación de Organismos de Agricultores del Norte de Sonora, A.C.

No written summary. Please see EDIS for full submission.

Congress of the United States

Members: Austin Scott, Darren Soto, Rick W. Allen, Jack Bergman, Sanford D. Bishop, Jr., Kat Cammack, John H. Rutherford, Mario Diaz-Balart, Daniel Webster, Brian Mast, Scott Franklin, Frederica S. Wilson, Alcee L. Hastings, Bill Huizenga, A. Drew Ferguson, Dan Kildee, W. Gregory Steube, Jody Hice, Stephanie Murphy, Carlos Gimenez, Debbie Wasserman Schultz, Lisa McClain, Fred Upton, Val Demings, Bill Posey, Neal Dunn, Earl L. “Buddy” Carter, David Scott, Ted Deutch, Al Lawson, Jr.

No written summary. Please see EDIS for full submission.

Florida Department of Agriculture and Consumer Services

No written summary. Please see EDIS for full submission.

Florida Fruit & Vegetable Association (“FFVA”)

No written summary. Please see EDIS for full submission.

Georgia Fruit and Vegetable Growers Association

No written summary. Please see EDIS for full submission.

Government of Canada

No written summary. Please see EDIS for full submission.

Government of Mexico

No written summary. Please see EDIS for full submission.

Michigan Farm Bureau

No written summary. Please see EDIS for full submission.

M.F Burgin, Inc.

No written summary. Please see EDIS for full submission.

University of Florida IFAS

No written summary. Please see EDIS for full submission.

Appendix E
Modeling

This appendix provides a technical description of the economic model. The first section describes the model's structural features. The second section describes the data and parameter inputs of the model. The third section details the approach used to econometrically estimate the elasticity of substitution. The last section reports a set of additional model runs under alternative assumptions to illustrate the sensitivity of estimated economic effects to these assumptions.

Technical Description of the Model

Chapter 6 used a customized partial equilibrium model of the U.S. fresh squash market to simulate the effects of increased imports on the U.S. industry. Consumers in the market have non-nested constant elasticity of substitution (CES) demands for both imported and domestic squash varieties with imperfect substitution across sources. Total imports are aggregated into two varieties (summer squash and winter squash), implying that consumers do not differentiate between fresh squash from different import sources within these varieties.[396] Equations (1) through (3) represent the price index (P), demand for domestic varieties (q_d), and demand for imported varieties (q_i). The price elasticity of total industry demand is denoted as γ. The elasticity of substitution is σ, which represents consumers' willingness to shift between squash from foreign and domestic varieties in response to a change in relative prices. The parameter b is a demand shifter and k is total expenditure in the industry.

$$P = (p_d^{1-\sigma} + b\, p_i^{1-\sigma})^{1/1-\sigma} \qquad (1)$$

$$q_d = k\, P^{\gamma} (\frac{p_d}{P})^{-\sigma} \qquad (2)$$

$$q_i = k\, b\, P^{\gamma} (\frac{p_i}{P})^{-\sigma} \qquad (3)$$

The model assumes that there is a large number of producers who compete in a perfectly competitive industry. The domestic supply curve (equation 4) is upward sloping and governed by a domestic price elasticity of supply (ε_d). The parameter a is a supply shifter. The quantity of imports is exogenous, set to the calculated counterfactual level q_c (equation 5).[397]

$$q_d = a\, p_d^{\varepsilon_d} \qquad (4)$$

$$q_i = q_c \qquad (5)$$

Domestic revenue is calculated as the domestic price times domestic quantity. The change in operating income is approximated by calculating the change in revenue divided by the elasticity of substitution. This relationship can be formally derived in a monopolistic competition model with CES preferences, which is a similar formulation to the perfect competition model used here.[398] The change in domestic employment—the number of full-time equivalent (FTE) employees—is calculated as the baseline number of FTEs multiplied by the percent change in domestic quantity, thus moving in proportion to domestic output.

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[396] Consumers do not differentiate between squash from different countries of import; the imported varieties are aggregated. An alternative model structure could differentiate between each country of import, but this would have limited impact on the domestic results.

[397] The term exogenous in this paragraph should be interpreted as a variable that is determined outside of the model and imposed on the level of imports in the model.

[398] Ahmad, "Conducting Profitability Analysis in Partial Equilibrium Models with Monopolistic Competition," July 2019.

First, actual data are used to calibrate the model in the baseline. Second, a counterfactual level of imports is exogenously imposed in the model to illustrate the economic effects of increased imports on the U.S. market. The counterfactual level of imports is calculated as the level of imports in the market had there not been above-average growth since the year 2000. The calculation is described in the next section below.

The model was run five separate times per season, once for each period in the 2015–20 investigation window. There are no dynamic links between years, like inventory storage, in the model. They are not likely to be important, because the products have a relatively short shelf life.

Detailed Description of the Model Inputs

Domestic squash production for U.S. consumption was estimated as total squash production by season, using U.S. Department of Agriculture (USDA) National Agricultural Statistics Service (NASS) data, less domestic exports. Domestic production data was first split into summer and winter varieties with an estimate of the product mix during the 2015–20 window, with summer squash representing 53 percent and winter squash representing 47 percent of total production. Monthly squash production data are generally not available, so the seasonal production data were estimated using information about each state's harvest season (table E.1 and E.2). For Florida, 65 percent of squash production was allocated to November–May.[399] Half of Georgia production was allocated to June–October and half to November–May, based on conversations with Georgia industry. California production was also allocated between periods with approximately 25 percent in the November–May period and 75 percent in the June–October period. Production from the rest of the states was included in June–October. Some states production data were not disclosed in the USDA NASS dataset, including data for Georgia and Florida, so these state-level production quantities were estimated from USDA Agricultural Marketing Service shipment data for each year. Data are listed in table E.1 and E.2.

Domestic employment data are not generally available for individual agricultural products. An estimate of FTEs was estimated using information about per-acre labor hours and acreage data from USDA NASS. The per-acre number of labor hours needed to produce summer and winter squash varieties was multiplied by the total number of acres in the United States to calculate the total number of labor hours for all regions. Next, the number of FTEs was calculated assuming a full-time equivalent employee is working eight hours a day, five days a week, and 52 weeks per year. The FTEs were then split between the June–October and November–May periods using production shares. FTEs are used to match the time aggregation in the model but are not representative of actual employment in the industry. Actual employment figures are likely to be much higher, with seasonal and part-time workers common in this industry.

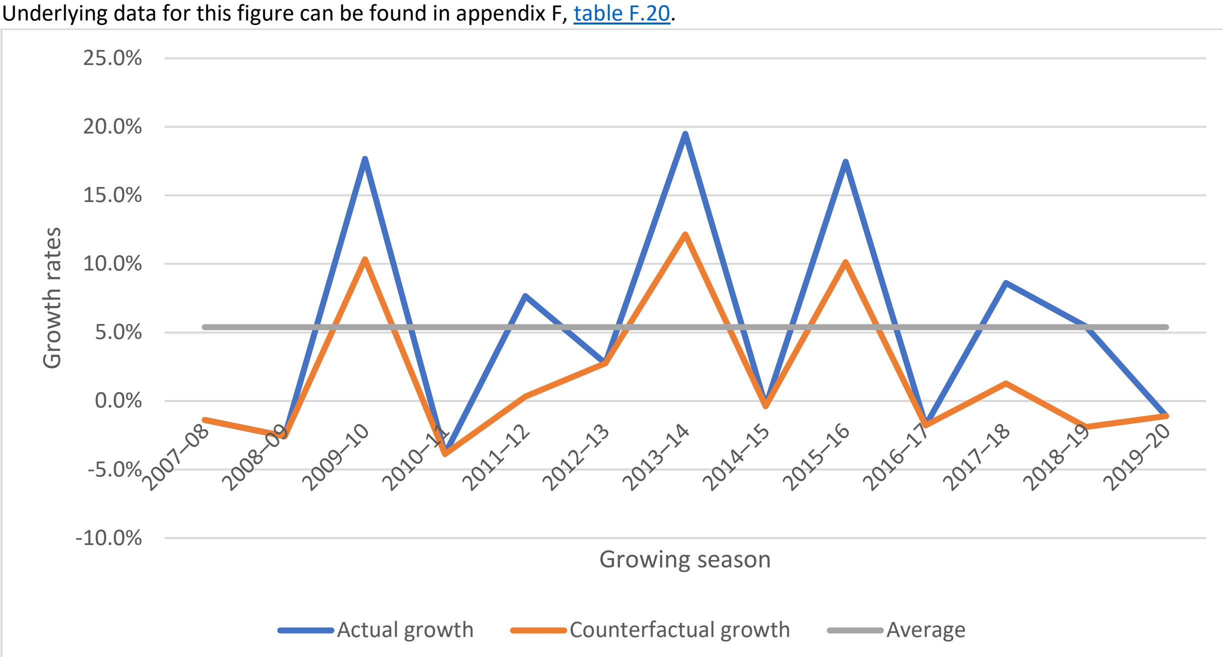
Actual imports volumes and values by month were obtained from USITC's DataWeb. Imports were split into summer and winter varieties by major trading partner, using an estimate of the share of production in each country. We assume that the share of production of summer and winter squash in each country is reflective of the share in imports. U.S. imports of squash from Mexico were split into summer and winter varieties with summer squash shares ranging from 79 percent to 84 percent. U.S. imports of squash from Canada were split with a summer squash share of 53 percent, reflecting the assumption that Canada summer and winter squash shares are similar to the U.S. split. A 5 percent summer squash share was used for all other trading partners.

[399] Note that for some of the years, there was no Florida production of winter squash.

The counterfactual level of imports was calculated by reducing the actual imports volumes for harvest periods with above-average growth rates. First, growth rates were calculated for each harvest period from 2000–2020. Second, periods were identified as being above the average growth rate for the 20-year period. For periods identified as having above-average growth, the growth rate was lowered by the difference between the average growth rate from 2000 to 2020 and the average growth rate between the high-growth years (figure E.1). This brings the average growth rate of the high-growth period down to the average growth rate of other years while still allowing for variation between years. The simulation then creates a counterfactual level of imports for each harvest period from the beginning of the high-growth years to 2020 based on the import volume of the prior year and the new counterfactual growth rate in the high-growth years. Imports continue to grow in the counterfactual, but the above-average increases are removed.

Figure E.1 Example of actual and counterfactual import growth rates during high-growth period for November–May, summer squash

Underlying data for this figure can be found in appendix F, table F.20.



Source: USITC DataWeb/Census, HTS 8-digit subheading 0709.93.20, accessed June 2021, and USITC estimates.

For summer squash, the high-growth periods for June–October were during the years 2009, 2011, 2013, 2015, 2016, 2017, and 2019. The high-growth periods for November–May were during 2009–10, 2011–12, 2013–14, 2015–16, 2017–18, and 2018–19. For winter squash, the high-growth periods for June–October were during 2011, 2013, 2015, 2016, 2017, and 2019. The high-growth periods for November–May were during 2009–10, 2011–12, 2012–13, 2013–14, 2015–16, and 2018–19.

The counterfactual scenario does not correspond to any analysis of specific policy alternatives. Instead, the counterfactual scenario was chosen based on aggregate import trends. More information on country-specific factors that impacted overall U.S. import trends can be found in the country profiles chapters.

Table E.1 Seasonal data inputs used in the summer squash model, 2015–20
In millions of dollars, metric tons, and numbers. mt = metric tons; FTEs = full-time equivalent workers.

Seasonal data input	2015–16	2016–17	2017–18	2018–19	2019–20
June–October domestic production (million $)	76.7	93.9	76.8	89.2	81.5
June–October domestic production (mt)	154,942	155,457	160,147	129,863	131,127
June–October imports (million $)	40.2	56.5	47.5	59.8	65.8
June–October imports (mt)	60,354	70,443	64,317	75,485	77,747
June–October counterfactual imports (mt)	42,110	45,752	41,773	45,656	47,024
June–October exports (mt)	1,484	2,006	1,704	1,789	1,714
June–October employment (no. of FTEs)	2,017	1,987	1,829	1,557	1,807
November–May domestic production (million $)	38.1	40.2	34.9	36.2	35.1
November–May domestic production (mt)	43,548	45,894	59,733	73,432	49,404
November–May imports (million $)	262.9	216.0	234.4	240.7	318.7
November–May imports (mt)	276,670	271,773	295,183	311,228	307,771
November–May counterfactual imports (mt)	212,734	208,969	211,641	207,621	205,314
November–May exports (mt)	3,974	4,990	4,428	3,140	2,058
November–May employment (no. of FTEs)	567	586	682	881	681

Source: USITC estimates, as described above.

Table E.2 Seasonal data inputs used in the winter squash model, 2015–20
In millions of dollars, metric tons, and numbers. mt = metric tons; FTEs = full-time equivalent workers.

Seasonal data input	2015–16	2016–17	2017–18	2018–19	2019–20
June–October domestic production (million $)	77.7	93.9	95.1	87.9	109.8
June–October domestic production (mt)	160,460	152,639	163,722	103,986	152,576
June–October imports (million $)	12.3	17.2	15.1	18.1	19.2
June–October imports (mt)	17,746	21,144	19,943	21,694	22,163
June–October counterfactual imports (mt)	14,832	16,927	15,966	16,568	16,925
June–October exports (mt)	1,316	1,779	1,511	1,587	1,520
June–October employment (no. of FTEs)	1,910	1,915	1,864	1,695	1,844
November–May domestic production (million $)	7.4	7.5	6.5	8.5	7.7
November–May domestic production (mt)	11,009	9,297	10,536	14,179	10,080
November–May imports (million $)	66.9	55.5	59.4	106.6	78.7
November–May imports (mt)	75,310	76,236	77,162	83,300	80,545
November–May counterfactual imports (mt)	61,545	62,302	63,059	65,271	63,112
November–May exports (mt)	3,524	4,425	3,927	2,785	1,825
November–May employment (no. of FTEs)	131	117	120	231	122

Source: USITC estimates, as described above.

The model has three parameters that are held constant across all years: the constant elasticity of substitution between foreign and domestic sources, the industry price elasticity of demand, and a domestic supply elasticity (table E.3). The elasticity of substitution is estimated using the trade cost method and further described in the next section.

The summer squash model assumes a moderate value for the domestic supply elasticity, six, for several reasons. First, summer squash have a relatively short (45 day) growing season and producers can easily adjust production by changing the number of times a crop is harvested. There are relatively few costs to produce summer squash in terms of soil preparation, and farmers do not require specialized farm equipment. There are also several states with different growing conditions that are suitable for growing the product. The winter squash model assumes a domestic supply elasticity of 4, for several reasons. The growing time between planting and harvesting winter squash is longer than for summer squash varieties, between 90 and 120 days, depending on the specific variety. Because winter squash spends more time in the ground, and since producers can only harvest one crop per growing region, a lower domestic supply elasticity is used in the model. The industry price elasticity of demand is set to −1, which implies that the overall expenditure (price times quantity) in a year does not change with price. This assumption is common in similar models and has been found to hold for many types of products.

Table E.3 Parameter inputs used in the model

Parameter	Value	Source
Seasonal elasticity of substitution	3.09	USITC estimate, using econometric model described in next section
Seasonal domestic supply elasticity, summer squash	6	USITC estimate, based on length of growing season, costs, and technology requirements
Seasonal domestic supply elasticity, winter squash	4	USITC estimate, based on length of growing season, costs, and technology requirements
Industry price elasticity of demand	−1	USITC estimate

Source: USITC estimates.

Econometric Approach to Estimate the Elasticity of Substitution

The elasticity of substitution is a model parameter that describes how consumers shift sourcing after a relative price change. A higher value means that the products are more substitutable, or less differentiated, leading to larger estimated effects of imports on the domestic market. It is an important parameter in trade policy models with CES demands because the magnitude can significantly impact model predictions.[400]

The squash substitution elasticity was estimated using the trade cost method described in Riker (2020).[401] The econometric method assumes a non-nested CES structure, with one parameter describing substitutability across all sources of supply.[402] The method uses variation in international trade costs, such as freight costs and tariffs, to identify the elasticity of substitution across sources of imports. Monthly panel import data from 2016 to 2020 were obtained from the U.S. International Trade Commission's DataWeb and are disaggregated by product, source country, customs district of import entry, month, and year. The measure for international trade costs is the ratio between the landed duty-paid value of imports and the customs value, and includes international freight costs, tariffs, and other import charges. The estimation uses country-time and district-time fixed effects to control for variation in prices and other demand factors, including the price index, producer prices, and total expenditures. Monthly data were aggregated into the two harvest periods for the model, so the time element in the fixed effects is referring to the June–October and November–May periods. Table E.4 reports the substitution elasticity point estimate and standard error of the estimate.

[400] For example, McDaniel and Balistreri (2003) show that the value of the elasticity of substitution can have a significant effect on welfare gains or losses in trade policy simulations.
McDaniel and Balistreri, *A Review of Armington Trade Substitution Elasticities*, 2003.
[401] Riker, *A Trade Cost Approach to Estimating the Elasticity of Substitution*, July 2020.
[402] In theory, a nested CES structure could be used, with a separate elasticity of substitution between domestic and imported aggregates. There was no reason to believe that the domestic varieties are substantially different than the imported varieties, so a non-nested CES model was used in this analysis.

Table E.4 Estimated elasticity of substitution for squash, fresh or chilled

Product and HTS subheading	Point estimate	Standard error
Squash, fresh or chilled (0709.93.20)	3.0880	2.5610

Source: USITC estimate.

Sensitivity Analyses

This section reports additional sensitivity analyses under alternative assumptions about model parameters. First, data are aggregated to an annual time frame and economic effects are estimated without seasonality (table E.5 and E.6). A new counterfactual level of imports is calculated, following the same procedure described above but by instead analyzing annual growth rates instead of growth rates by period. Economic effects are not an aggregate of the main chapter results, because the counterfactual level of imports on an annual basis is different than when calculated by growing period. Results are also different because the estimated elasticity of substitution is different with an annual time frame.[403]

Table E.5 Summer squash: sensitivity analysis using an annual time frame
In percentages, millions of dollars, and number of FTEs. FTEs = full-time equivalent workers.

Year	Import price (%)	Import quantities (%)	Domestic price (%)	Domestic output (%)	Domestic revenues (million $)	Operating income (million $)	Domestic employment (no. of FTEs)
2015	10.2	−15.4	2.4	15.2	16.6	3.9	329
2016	12.5	−18.7	2.9	18.9	23.7	5.5	487
2017	11.9	−18.7	2.7	17.1	25.2	5.9	439
2018	12.9	−18.7	3.0	19.7	23.8	5.5	493
2019	15.3	−22.1	3.5	23.2	32.4	7.5	566
2020	16.5	−22.1	4.0	26.4	36.3	8.4	656
Average	13.2	−19.3	3.1	20.1	26.3	6.1	495

Source: USITC estimates.
Note: These numbers were simulated using a customized partial equilibrium model of the U.S. market for summer squash. They can be interpreted as the percent change and dollar-value change of model outcomes after removing the above-average increases in imports.

[403] Even if the annual model were to use the same parameter values and an aggregated counterfactual that matched the seasonal model, results would still differ because the model is nonlinear.

Table E.6 Winter squash: sensitivity analysis using an annual time frame
In percentages, millions of dollars, and number of FTEs. FTEs = full-time equivalent workers.

Year	Import price (%)	Import quantities (%)	Domestic price (%)	Domestic output (%)	Domestic revenues (million $)	Operating income (million $)	Domestic employment (no. of FTEs)
2015	7.2	−15.4	1.6	6.4	6.6	1.5	109
2016	9.0	−18.7	2.0	8.1	9.6	2.2	165
2017	8.4	−18.7	1.7	6.8	9.5	2.2	137
2018	9.0	−18.7	2.0	8.1	9.2	2.1	160
2019	9.9	−22.1	1.9	7.8	10.2	2.4	149
2020	10.5	−22.1	2.2	8.9	11.6	2.7	175
Average	9.0	−19.3	1.9	7.7	9.4	2.2	149

Source: USITC estimates.
Note: These numbers were simulated using a customized partial equilibrium model of the U.S. market for winter squash. They can be interpreted as the percent change and dollar-value change of model outcomes after removing the above-average increases in imports.

Next, the domestic supply elasticity is altered to show the sensitivity in the summer squash seasonal model to this parameter value (table E.7). A value of five is used in the "low supply elasticity" case, a value of six is used in the "chapter 6 result" case, and a value of seven is used in the "high supply elasticity case." Economic effects are reported in table E.7, showing that the higher the supply elasticity, the more able U.S. producers are to scale up production after a shift in demand. Results vary by elasticity assumption but are not substantially different for each of the three scenarios.[404]

Table E.7 Sensitivity analysis under different domestic supply elasticity assumptions, summer squash November–May results for illustration
In percentages, millions of dollars, and number of FTEs. FTEs = full-time equivalent workers.

Result	Import price (%)	Import quantities (%)	Domestic price (%)	Domestic output (%)	Domestic revenues (million $)	Operating income (million $)	Domestic employment (no. of FTEs)
Low supply elasticity (5)	31.18	−28.22	6.15	34.99	15.83	5.12	244
Chapter 6 result (6)	30.92	−28.22	5.37	37.16	16.28	5.27	260
High supply elasticity (7)	30.72	−28.22	4.77	38.88	16.63	5.39	272

Source: USITC estimates.
Note: These numbers were simulated using a customized partial equilibrium model of the U.S. market for summer squash. They can be interpreted as the percent change and dollar-value change of model outcomes after removing the above-average increases in imports.

Finally, the sensitivity of the shares used to split California production of summer squash into two periods, June–October and November–May, is tested.[405] In the main chapter, 25 percent of California production is included in November–May and 75 percent in June–October. This sensitivity analysis first shifts all California production into November–May, and then shifts all California production into June–October, to test the two extreme cases. If all of California production were harvested in November–May, domestic output for November–May would be about 32.2 percent higher in the counterfactual

[404] The change in import quantities in table E.7 is the same for all three simulations. This is because imports are treated as exogenous in the model; changing the supply elasticity does not affect the counterfactual level of imports that was calculated outside the model.
[405] This sensitivity analysis focuses in on California because California shares have the least amount of supporting evidence of all seasonal production shares.

scenario, compared to 37.2 percent shown in the main chapter results. If all of California production were harvested in June–October, domestic output for November–May would be about 39.1 percent higher in the counterfactual scenario. Thus, the percent change in domestic output in November–May would be likely to fall between 32.2 percent and 39.1 percent. The other economic outcomes have similar ranges and are omitted for brevity.

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Appendix F
Data Tables for Figures and Supplemental Data Tables

Data Tables for Figures

Table F.1 Harvest seasons for fresh market summer squash
This table corresponds to figure 1.1.

	Harvest season
Florida	October through May
Georgia	Second half of April through first half of July, and second half of September through November
North Carolina	Second half of May through September
California	Second half of February through November
Michigan	July through September
United States	January through December
Mexico	September through first half of June

Sources: Florida - FDACS, *Florida Agriculture by the Numbers*, 2019, 79; Freeman, et. al, "Chapter 7. Cucurbit Production," August 17, 2021. Georgia - Kemble, *Southeastern U.S. 2020 Vegetable Crop Handbook*, 2020, 92; Blue Book Services, "Squash," accessed September 2, 2021. North Carolina - Jones and Roos, "Planting and Harvesting Guide for Piedmont Vegetables and Herbs," accessed August 12, 2021; Kemble, *Southeastern U.S. 2020 Vegetable Crop Handbook*, 2020, 92; Blue Book Services, "Squash," accessed September 2, 2021; North Carolina Cooperative Extension, "Basics for Growing Squash," April 27, 2020. California - Blue Book Services, "Squash," accessed September 2, 2021; Michigan - Blue Book Services, "Squash," accessed September 2, 2021; Michigan State University Extension, "Summer Squash Is on Its Way," July 1, 2013. United States - Kemble, *Southeastern U.S. 2020 Vegetable Crop Handbook*, 2020, 92; Blue Book Services, "Squash," accessed September 2, 2021. Mexico – Blue Book Services, "Squash," accessed September 2, 2021; Panorama- Agro, "Guia de manejo de la calabacita" (Summer squash handling guide), accessed September 2, 2021; HortiCultivos, "Producción de calabacita" (Production of summer squash), accessed September 2, 2021; INIFAP, "Calabacita," (Summer squash) accessed September 2, 2021.
Note: These seasons represent typical commercial practices, though seasons may be shortened due to extenuating weather events or extended if the grower chooses to employ certain production technologies. It should also be noted that demand may affect individual grower decisions to shorten or extend the harvest seasons. The Florida harvest season reflects practices in northern, southern, and central Florida, where most of Florida's squash production is located, as reported by the Florida Department of Agriculture and Consumer Services. The Georgia harvest season reflects practices in southern Georgia where most of Georgia's squash production is located. The North Carolina harvest season reflects practices in eastern North Carolina where most of North Carolina's squash production is located. The California harvest season reflects practices in the southern desert areas, the Central Valley, and the south-central coast where most of California's squash production is located. The Michigan harvest season reflects practices in the central, eastern, and southwestern lower peninsula of Michigan where most of Michigan's squash production is located. The Mexico harvest season reflects practices in Mexico using reported growing and harvest seasons by states producing fresh squash.

Table F.2 Squash production in the United States, by state, 2020
In metric tons. This table corresponds to figure 2.1.

State	2020
California	60,328
Florida	66,224
Georgia	50,122
Michigan	78,834
New Jersey	12,923
New York	32,386
North Carolina	22,680
Oregon	30,958

Source: USDA, NASS, Squash Production Utilized in cwt (1 hundredweight = 100 pounds), accessed March 3, 2021.
Note: Includes production of both summer squash and winter squash. Georgia and Florida values are estimated.

Table F.3 Squash production in Mexico, by state, 2019
In metric tons (mt). This table corresponds to figure 3.1.

State	2019
Sonora	303,062
Sinaloa	104,159
Puebla	77,441
Michoacán	48,034
Hidalgo	44,692
Jalisco	28,495

State	2019
Zacatecas	22,609
Morelos	22,047
Guanajuato	19,021
Yucatán	18,195
México	16,365
Baja California Sur	14,597
Chihuahua	13,449
Oaxaca	13,250
Guerrero	12,406
San Luis Potosí	11,348
Baja California	9,901
Nuevo León	9,680
Coahuila	7,504
Aguascalientes	6,416
Durango	5,369
Veracruz	3,321
Nayarit	1,839
Quintana Roo	1,821
Campeche	1,485
Querétaro	1,437
Ciudad de México	1,065
Tamaulipas	1,008
Tabasco	525
Colima	381
Tlaxcala	356
Total production	821,277

Source: Government of Mexico, SIAP, *Anuario estadístico de la producción agrícola*: *Calabaza; Calabacita* (Statistical yearbook of agricultural production database; winter squash; summer squash), accessed May 3, 2021.

Table F.4 Minimum wage rates in Mexico, 2015-21

In pesos per day. n.a. = not applicable. This table corresponds to figure 3.2.

	2015	2016	2017	2018	2019	2020	2021
General minimum wage rate	70	73	80	88	103	123	142
Free northern border zone	n.a.	n.a.	n.a.	n.a	178	184	213
Agricultural day laborer	n.a.	n.a.	n.a.	n.a.	n.a.	n.a	160

Source: Government of Mexico, CONASAMI, Tabla de Salarios Mínimos: 2015–21 (Minimum Wage Table: 2015–21), accessed October 1, 2021.

Table F.5 Varieties and production methods for summer squash supplied to the U.S. market by country or region

This table corresponds to figure 4.1. A "Yes" in a column under a particular product means that this country's or region's product is supplied to the U.S. market. A "No" indicates that it is not supplied, or only supplied in small quantities.

Country or region	Premium packing and packaging	Trellising and frequent harvesting	Local grown	Organic
United States	No	No	Yes	Yes
Southeast	No	No	Yes	No
Mexico	Yes	Yes	No	Yes

Source: Compiled by USITC.

Note: There is some production of organic squash in the United States, but it does not rise to the level of a competitive advantage.

Table F.6 Monthly U.S. squash imports from Mexico, by quantity, 2015
In metric tons. This table corresponds to figure 5.1 and figure ES.1.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	47,278	39,050	38,284	45,070	30,949	11,999	4,892	4,359	5,358	28,584	42,195	51,303
2016	51,491	53,902	47,551	53,371	39,144	14,333	5,906	5,465	9,872	33,804	50,488	49,882
2017	52,004	46,702	52,101	50,508	31,418	13,789	6,045	6,132	9,297	44,137	53,499	49,684
2018	65,453	46,752	58,811	50,010	37,941	14,235	6,201	4,925	7,960	39,212	48,396	57,807
2019	62,936	51,571	61,509	56,240	43,144	21,999	8,293	5,939	8,635	42,014	51,848	56,302
2020	60,931	49,533	59,422	54,907	43,931	17,699	9,174	8,549	11,979	42,717	60,829	54,932

Source: USITC DataWeb/Census, imports for consumption, first unit of quantity, HTS 0709.93.20, accessed February 26, 2021.

Table F.7 Monthly U.S. squash imports from Canada, by quantity, 2015
In metric tons. This table corresponds to figure 5.1 and figure ES.1.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	55	76	70	0	0	290	1,114	1,077	1,725	1,726	1,422	262
2016	306	0	0	0	0	262	985	1,704	2,381	2,201	1,170	270
2017	43	0	0	0	5	223	1,391	2,680	3,649	3,309	1,444	268
2018	82	37	0	0	0	150	1,009	2,336	3,720	3,477	1,795	1,412
2019	78	4	0	0	0	236	1,308	1,264	3,342	3,163	2,118	611
2020	172	86	0	0	1	68	957	1,959	3,013	2,609	648	134

Source: USITC DataWeb/Census, imports for consumption, first unit of quantity, HTS 0709.93.20, accessed February 26, 2021.

Table F.8 Monthly U.S. squash imports from all other sources, by quantity, 2015
In metric tons. This table corresponds to figure 5.1 and figure ES.1.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	1,935	4,685	7,914	6,066	2,861	754	756	629	494	563	602	1,556
2016	2,779	5,452	5,046	4,264	1,889	716	463	419	462	248	848	2,177
2017	3,937	6,367	7,892	3,382	2,103	712	198	239	155	469	526	585
2018	2,819	4,218	4,986	2,768	797	1,001	444	373	215	312	111	911
2019	2,681	4,521	5,196	2,232	2,651	386	309	294	587	338	350	807
2020	2,596	3,652	6,005	2,086	1,438	433	427	554	659	254	282	556

Source: USITC DataWeb/Census, imports for consumption, first unit of quantity, HTS 0709.93.20, accessed February 26, 2021.

Table F.9 Monthly U.S. squash imports from Mexico, by quantity,1990–95 and 2015–20
In metric tons. This table corresponds to figure 5.2.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1990	19,964	14,206	9,555	7,244	3,170	955	424	99	315	2,269	5,655	10,827
1991	15,343	14,224	9,088	7,614	4,573	1,764	559	508	571	1,825	7,986	13,479
1992	15,153	14,833	11,939	7,488	3,768	1,056	366	767	820	2,524	7,282	15,378
1993	15,192	14,822	16,706	7,321	4,535	2,430	528	637	1,174	1,888	9,519	14,533
1994	18,098	15,637	17,157	8,787	6,018	1,582	1,457	820	576	3,286	11,175	14,664
1995	18,669	17,391	15,436	10,770	6,026	4,299	1,712	1,571	983	6,291	15,433	14,636

Source: USITC DataWeb/Census, imports for consumption, first unit of quantity, HTS 0709.90.20 (for 1990–95) and HTS 0709.93.20 (for 2015–20), accessed June 10, 2021.

Table F.10 Average monthly price difference between foreign and domestic medium-sized zucchini, Agricultural Marketing Service (AMS) shipping point, 2015–20
In dollars per pound. **n.a. = not available.** This table corresponds with figure 5.3.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	-0.03	0.05	-0.09	0.01	0.06	n.a.	n.a.	n.a.	n.a.	-0.02	0.16	0.00
2016	-0.08	-0.24	0.03	-0.02	-0.02	n.a.	n.a.	n.a.	n.a.	-0.09	-0.07	0.01
2017	-0.03	0.00	0.02	-0.05	0.14	0.07	n.a.	n.a.	0.30	-0.02	-0.07	-0.01

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2018	-0.17	-0.08	0.01	-0.04	0.16	-0.09	n.a.	n.a.	n.a.	-0.16	0.01	-0.04
2019	-0.08	-0.03	-0.05	0.01	0.08	-0.03	n.a.	n.a.	n.a.	-0.06	0.02	0.11
2020	0.06	-0.05	0.27	0.00	0.00	-0.29	n.a.	n.a.	n.a.	-0.21	-0.07	-0.09

Source: USDA, AMS, Market News, custom report, shipping point report, zucchini, medium, accessed June 3, 2021.
Note: Imports included in the figure are exclusively from Mexico. Data for domestic production include the states of Florida, Georgia, Michigan, North Carolina, and South Carolina.

Table F.11 Average monthly price difference between foreign and domestic medium-sized yellow straightneck squash, Agricultural Marketing Service (AMS) shipping point, 2015–20
In dollars per pound. n.a. = not available. This table corresponds with figure 5.4.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	0.26	-0.10	0.08	-0.02	-0.09	n.a.	n.a.	n.a.	n.a.	-0.06	0.21	0.11
2016	0.22	-0.36	-0.04	0.01	-0.13	n.a.	n.a.	n.a.	n.a.	-0.18	0.06	0.00
2017	0.04	-0.03	0.08	0.00	-0.17	n.a.	n.a.	n.a.	0.20	-0.20	0.00	-0.04
2018	-0.15	0.01	0.04	-0.06	0.22	0.18	n.a.	n.a.	n.a.	-0.06	0.15	-0.03
2019	-0.12	-0.14	-0.04	-0.02	0.05	n.a.	n.a.	n.a.	n.a.	-0.07	0.17	0.25
2020	-0.07	0.18	0.38	0.03	-0.15	n.a.	n.a.	n.a.	n.a.	-0.18	-0.01	-0.18

Source: USDA, AMS, Market News, custom report, shipping point report, yellow straightneck, medium, accessed June 3, 2021.
Note: Imports included in the figure are exclusively from Mexico. Data for domestic production include the states of Florida, Georgia, Michigan, North Carolina, and South Carolina.

Table F.12 Average monthly price difference between foreign and domestic small-sized zucchini, Agricultural Marketing Service (AMS) shipping point, 2015–20
`In dollars per pound. n.a. = not available. This table corresponds with figure 5.5.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	-0.06	0.03	-0.07	-0.05	0.03	n.a.	n.a.	n.a.	n.a.	-0.04	0.14	0.00
2016	-0.08	-0.28	0.00	-0.07	-0.07	n.a.	n.a.	n.a.	n.a.	-0.12	-0.15	0.00
2017	-0.06	-0.03	-0.04	-0.07	0.10	0.06	n.a.	n.a.	0.25	-0.06	-0.16	-0.07
2018	-0.17	-0.12	-0.02	-0.07	0.16	-0.12	n.a.	n.a.	n.a.	-0.09	-0.06	-0.11
2019	-0.10	-0.12	-0.10	-0.04	0.06	-0.07	n.a.	n.a.	n.a.	-0.13	-0.03	0.09
2020	-0.17	-0.15	0.15	-0.06	0.04	-0.31	n.a.	n.a.	n.a.	-0.25	-0.16	-0.19

Source: USDA, AMS, Market News, custom report, shipping point report, zucchini, small, accessed June 3, 2021.
Note: Imports included in the figure are exclusively from Mexico. Data for domestic production include the states of Florida, Georgia, Michigan, North Carolina, and South Carolina.

Table F.13 Average monthly price difference between foreign and domestic small-sized yellow straightneck squash, Agricultural Marketing Service (AMS) shipping point, 2015–20
In dollars per pound. n.a. = not available. This table corresponds with figure 5.6.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	0.23	-0.09	0.05	-0.06	-0.16	n.a.	n.a.	n.a.	n.a.	-0.06	0.15	0.06
2016	0.18	-0.36	-0.10	-0.01	-0.22	n.a.	n.a.	n.a.	n.a.	-0.21	-0.01	-0.02
2017	-0.03	-0.06	0.05	-0.01	-0.16	n.a.	n.a.	n.a.	0.20	-0.22	-0.07	-0.08
2018	-0.12	0.02	0.02	-0.10	0.22	0.17	n.a.	n.a.	n.a.	-0.04	0.11	-0.03
2019	-0.15	-0.16	-0.09	-0.02	-0.01	n.a.	n.a.	n.a.	n.a.	-0.10	0.10	0.26
2020	-0.06	0.10	0.23	-0.04	-0.14	n.a.	n.a.	n.a.	n.a.	-0.22	-0.08	-0.20

Source: USDA, AMS, Market News, custom report, shipping point report, yellow straightneck, small, accessed June 3, 2021.
Note: Imports included in the figure are exclusively from Mexico. Data for domestic production include the states of Florida, Georgia, Michigan, North Carolina, and South Carolina.

Table F.14 Prices of Mexican and U.S. medium-sized zucchini in U.S. terminal markets, 2015–20
In dollars per pound. This table corresponds with figure 5.7.

Year	Month	Domestic	Mexican
2015	Jan	$0.57	$0.67
2015	Feb	$0.50	$0.55
2015	Mar	$0.73	$0.77
2015	Apr	$0.39	$0.50
2015	May	$0.49	$0.57
2015	Jun	$0.45	$0.51
2015	Jul	$0.72	$0.77
2015	Aug	$0.62	$0.71
2015	Sep	$0.50	$0.48
2015	Oct	$0.52	$0.59
2015	Nov	$0.56	$0.69
2015	Dec	$1.03	$1.21
2016	Jan	$1.24	$1.40
2016	Feb	$0.78	$0.65
2016	Mar	$0.54	$0.58
2016	Apr	$0.45	$0.46
2016	May	$0.42	$0.45
2016	Jun	$0.53	$0.55
2016	Jul	$0.46	$0.48
2016	Aug	$0.58	$0.54
2016	Sep	$0.65	$0.62
2016	Oct	$0.41	$0.47
2016	Nov	$0.41	$0.40
2016	Dec	$0.44	$0.47
2017	Jan	$0.84	$0.89
2017	Feb	$0.73	$0.77
2017	Mar	$0.96	$1.00
2017	Apr	$0.52	$0.58
2017	May	$0.58	$0.59
2017	Jun	$0.73	$0.84
2017	Jul	$0.54	$0.59
2017	Aug	$0.56	$0.61
2017	Sep	$0.72	$0.77
2017	Oct	$0.50	$0.58
2017	Nov	$0.42	$0.48
2017	Dec	$0.58	$0.62
2018	Jan	$0.76	$0.72
2018	Feb	$0.57	$0.59
2018	Mar	$0.79	$0.87
2018	Apr	$0.60	$0.59
2018	May	$0.84	$1.02
2018	Jun	$0.50	$0.53
2018	Jul	$0.52	$0.60
2018	Aug	$0.50	$0.57
2018	Sep	$0.86	$1.03
2018	Oct	$0.79	$0.90
2018	Nov	$0.50	$0.57
2018	Dec	$0.58	$0.60
2019	Jan	$0.75	$0.84

Year	Month	Domestic	Mexican
2019	Feb	$0.61	$0.59
2019	Mar	$0.60	$0.62
2019	Apr	$0.51	$0.52
2019	May	$0.46	$0.53
2019	Jun	$0.54	$0.59
2019	Jul	$0.58	$0.63
2019	Aug	$0.52	$0.60
2019	Sep	$0.49	$0.57
2019	Oct	$0.47	$0.59
2019	Nov	$0.57	$0.69
2019	Dec	$0.60	$0.76
2020	Jan	$1.04	$1.12
2020	Feb	$0.95	$0.98
2020	Mar	$0.96	$1.10
2020	Apr	$0.63	$0.66
2020	May	$0.58	$0.62
2020	Jun	$0.87	$0.75
2020	Jul	$0.56	$0.55
2020	Aug	$0.63	$0.58
2020	Sep	$0.74	$0.76
2020	Oct	$0.81	$0.70
2020	Nov	$0.63	$0.57
2020	Dec	$0.60	$0.56

Source: USDA, AMS, Market News, custom report, terminal market report, green zucchini, accessed June 3, 2021.

Table F.15 Prices of Mexican zucchini (all sizes) in U.S. terminal markets by region, 2015–19

In dollars per pound. This table corresponds with figure 5.8.

Region	2015	2016	2017	2018	2019
East Coast avg.	0.79	0.76	0.73	0.72	0.64
Midwest avg.	0.70	0.66	0.75	0.80	0.76
West Coast avg.	0.69	0.61	0.71	0.64	0.61

Source: USDA, AMS, custom report, terminal market report, green zucchini, accessed June 3, 2021.
Note: East Coast terminal markets included are Atlanta, Baltimore, Boston, Miami, New York, and Philadelphia. Midwest terminal markets are Chicago, Dallas, and Detroit. West Coast terminal markets are Los Angeles and San Francisco. Data for 2020 are not included because San Francisco terminal market prices were not available for that year.

Table F.16 Summer squash: U.S. imports, by volume and by quarter, 2000–2020

In metric tons. This table corresponds with figure 6.1.

Year	Q1	Q2	Q3	Q4
2000	56,840	21,436	4,409	38,438
2001	63,813	26,367	5,372	42,054
2002	58,599	29,344	6,355	51,796
2003	65,686	30,125	7,585	62,721
2004	66,075	36,117	7,463	60,706
2005	70,410	36,655	8,417	64,472
2006	71,156	38,062	8,447	64,694
2007	78,305	42,178	9,329	66,739
2008	74,691	43,269	9,999	61,046
2009	75,109	42,003	10,285	72,526
2010	92,875	42,655	10,840	73,837
2011	79,442	49,860	11,339	72,448
2012	94,517	52,411	11,763	76,956

Year	Q1	Q2	Q3	Q4
2013	87,168	60,657	16,208	91,044
2014	112,010	62,214	13,823	93,519
2015	101,605	71,832	13,984	100,946
2016	124,616	87,021	19,961	110,894
2017	122,860	77,950	21,534	122,254
2018	139,097	82,958	19,154	121,331
2019	142,680	98,826	21,719	125,004
2020	138,245	94,707	27,287	130,430

Source: USITC DataWeb/Census (HTS 8-digit subheading 0709.93.20), accessed June 2021, and USITC estimates to split into summer and winter varieties.

Table F.17 Winter squash: U.S. imports, by volume and by quarter, 2000–2020
In metric tons. This table corresponds to figure 6.2.

Year	Q1	Q2	Q3	Q4
2000	14,231	5,574	1,379	9,227
2001	16,408	6,731	1,758	10,697
2002	15,862	7,510	2,397	13,071
2003	17,345	9,790	4,506	18,116
2004	19,297	12,956	4,343	17,471
2005	22,828	12,285	4,553	18,261
2006	20,903	12,947	5,431	18,954
2007	22,922	14,833	4,424	17,885
2008	21,710	12,651	5,201	16,474
2009	20,519	13,299	4,117	19,310
2010	25,615	12,397	4,562	18,815
2011	21,763	14,275	4,378	18,119
2012	26,826	14,688	4,304	18,912
2013	27,169	16,715	5,973	22,560
2014	35,130	17,292	5,622	23,566
2015	30,723	21,521	5,594	25,939
2016	35,436	23,584	7,048	28,558
2017	37,124	21,134	7,980	30,930
2018	38,055	21,610	7,461	31,123
2019	39,026	26,760	7,673	31,792
2020	37,956	23,947	9,173	32,006

Source: USITC DataWeb/Census (HTS 8-digit subheading 0709.93.20), accessed June 2021, and USITC estimates to split into summer and winter varieties.

Table F.18 Summer squash: Actual and counterfactual U.S. import volumes from 2000 to 2020 for both June–October and November–May
In metric tons. This table corresponds with figure 6.3.

Year	Actual, June–October	Actual, November–May	Counterfactual, June–October	Counterfactual, November–May
2000–01	17,667	119,029	17,667	119,029
2001–02	21,190	116,689	21,190	116,689
2002–03	22,788	133,361	22,788	133,361
2003–04	25,613	149,049	25,613	149,049
2004–05	28,341	148,525	28,341	148,525
2005–06	28,951	153,613	28,951	153,613
2006–07	30,585	164,610	30,585	164,610
2007–08	30,258	162,350	30,258	162,350

Year	Actual, June–October	Actual, November–May	Counterfactual, June–October	Counterfactual, November–May
2008–09	33,434	158,164	30,992	158,164
2009–10	32,803	186,108	30,408	174,506
2010–11	37,832	178,906	32,616	167,753
2011–12	39,042	192,592	33,659	168,281
2012–13	45,479	197,891	36,493	172,911
2013–14	42,153	236,449	33,824	193,918
2014–15	48,020	235,535	35,803	193,169
2015–16	60,354	276,670	42,110	212,734
2016–17	70,443	271,773	45,752	208,969
2017–18	64,317	295,183	41,773	211,641
2018–19	75,485	311,228	45,656	207,621
2019–20	77,747	307,771	47,024	205,314

Source: USITC DataWeb/Census (HTS 8-digit subheading 0709.93.20), accessed June 2021, and USITC estimates.
Note: The years modeled were 2015–16 to 2019–20.

Table F.19 Winter squash: actual and counterfactual U.S. import volumes from 2000 to 2020 for both June–October and November–May

In metric tons. This table corresponds with figure 6.4.

Year	Actual, June–October	Actual, November–May	Counterfactual, June–October	Counterfactual, November–May
2000–01	4,830	29,976	4,830	29,976
2001–02	6,352	30,675	6,352	30,675
2002–03	9,992	35,714	9,992	35,714
2003–04	10,584	44,654	10,584	44,654
2004–05	10,747	46,263	10,747	46,263
2005–06	12,222	45,786	12,222	45,786
2006–07	11,076	49,758	11,076	49,758
2007–08	11,124	45,730	11,124	45,730
2008–09	10,663	44,446	10,663	44,446
2009–10	10,677	51,196	10,677	49,220
2010–11	11,587	48,101	11,052	46,244
2011–12	11,591	52,320	11,056	48,244
2012–13	13,719	55,676	12,531	49,194
2013–14	13,318	67,329	12,165	57,302
2014–15	14,866	67,373	12,969	57,340
2015–16	17,746	75,310	14,832	61,545
2016–17	21,144	76,236	16,927	62,302
2017–18	19,943	77,162	15,966	63,059
2018–19	21,694	83,300	16,568	65,271
2019–20	22,163	80,545	16,925	63,112

Source: USITC DataWeb/Census (HTS 8-digit subheading 0709.93.20), accessed June 2021, and USITC estimates.
Note: The years modeled were 2015–16 to 2019–20.

Table F.20 Example of actual and counterfactual import growth rates during high-growth period for November–May, summer squash

In percent (%). Average actual growth during the period was 5.4 percent. This table corresponds to figure E.1.

Year	Actual Growth	Counterfactual Growth
2007–08	-1.4	-1.4
2008–09	-2.6	-2.6
2009–10	17.7	10.3
2010–11	-3.9	-3.9
2011–12	7.7	0.3
2012–13	2.8	2.8
2013–14	19.5	12.1
2014–15	-0.4	-0.4
2015–16	17.5	10.1
2016–17	-1.8	-1.8
2017–18	8.6	1.3
2018–19	5.4	-1.9
2019–20	-1.1	-1.1

Source: USITC DataWeb/Census (HTS 8-digit subheading 0709.93.20), accessed June 2021, and USITC estimates.

Supplemental Data Tables

Table F.21 Average monthly prices, domestic medium zucchini, Agricultural Marketing Service (AMS) shipping point, 2015–20

In dollars per pound ($/lb)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	0.42	0.28	0.59	0.24	0.27	0.30	0.58	0.55	0.34	0.36	0.42	0.92
2016	1.19	0.50	0.36	0.24	0.24	0.39	0.33	0.46	0.54	0.28	0.27	0.25
2017	0.70	0.50	0.74	0.32	0.39	0.55	0.43	0.46	0.55	0.37	0.31	0.44
2018	0.55	0.37	0.59	0.48	0.59	0.36	0.40	0.38	0.61	0.71	0.32	0.39
2019	0.62	0.30	0.40	0.30	0.25	0.40	0.51	0.40	0.35	0.37	0.44	0.34
2020	1.02	0.77	0.61	0.31	0.34	0.72	0.38	0.49	0.59	0.48	0.44	0.31

Source: USDA, AMS, Shipping point data for zucchini, medium, accessed March 16, 2021.

Table F.22 Average monthly prices, foreign medium zucchini, Agricultural Marketing Service (AMS) shipping point, 2015–20

In dollars per pound ($/lb)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	0.39	0.33	0.5	0.25	0.33	n.a.	n.a.	n.a.	n.a.	0.34	0.58	0.92
2016	1.11	0.26	0.39	0.22	0.22	n.a.	n.a.	n.a.	n.a.	0.19	0.2	0.26
2017	0.67	0.5	0.76	0.27	0.53	0.62	n.a.	n.a.	0.85	0.35	0.24	0.43
2018	0.38	0.29	0.6	0.44	0.75	0.27	n.a.	n.a.	n.a.	0.55	0.33	0.35
2019	0.54	0.27	0.35	0.31	0.33	0.37	n.a.	n.a.	n.a.	0.31	0.46	0.45
2020	1.08	0.72	0.88	0.31	0.34	0.43	n.a.	n.a.	n.a.	0.27	0.37	0.22

Source: USDA, AMS, Shipping point data for zucchini, medium, accessed March 16, 2021.

Table F.23 Average monthly prices, domestic medium yellow straightneck, Agricultural Marketing Service (AMS) shipping point, 2015–20
In dollars per pound ($/lb)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	0.38	0.46	0.66	0.33	0.34	0.46	0.73	0.7	0.37	0.34	0.34	0.95
2016	1.49	1.25	0.82	0.42	0.37	0.49	0.34	0.5	0.71	0.42	0.37	0.32
2017	0.72	0.56	0.75	0.36	0.41	0.63	0.61	0.68	0.61	0.55	0.33	0.51
2018	0.58	0.45	0.61	0.53	0.58	0.39	0.38	0.36	0.56	0.43	0.29	0.54
2019	0.74	0.53	0.47	0.48	0.41	0.61	0.73	0.37	0.4	0.38	0.4	0.4
2020	1.04	0.94	0.84	0.3	0.54	0.81	0.46	0.66	0.77	0.47	0.59	0.55

Source: USDA, AMS, Shipping point data for yellow straightneck, medium, accessed March 16, 2021.

Table F.24 Average monthly prices, foreign medium yellow straightneck, Agricultural Marketing Service (AMS) shipping point, 2015–20
In dollars per pound ($/lb)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	0.64	0.36	0.74	0.31	0.25	n.a.	n.a.	n.a.	n.a.	0.28	0.55	1.06
2016	1.71	0.89	0.78	0.43	0.24	n.a.	n.a.	n.a.	n.a.	0.24	0.43	0.32
2017	0.76	0.53	0.83	0.36	0.24	n.a.	n.a.	n.a.	0.81	0.35	0.33	0.47
2018	0.43	0.46	0.65	0.47	0.8	0.57	n.a.	n.a.	n.a.	0.37	0.44	0.51
2019	0.62	0.39	0.43	0.46	0.46	n.a.	n.a.	n.a.	n.a.	0.31	0.57	0.65
2020	0.97	1.12	1.22	0.33	0.39	n.a.	n.a.	n.a.	n.a.	0.29	0.58	0.37

Source: USDA, AMS, Shipping point data for yellow straightneck, medium, accessed March 16, 2021.

Table F.25 Average monthly prices, domestic small zucchini, Agricultural Marketing Service (AMS) shipping point, 2015–20
In dollars per pound ($/lb)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	0.51	0.39	0.67	0.33	0.37	0.41	0.68	0.65	0.44	0.45	0.51	1.01
2016	1.28	0.59	0.46	0.33	0.32	0.47	0.42	0.58	0.66	0.38	0.36	0.33
2017	0.8	0.58	0.84	0.42	0.48	0.65	0.53	0.55	0.65	0.46	0.4	0.52
2018	0.65	0.47	0.69	0.57	0.68	0.46	0.49	0.47	0.71	0.83	0.41	0.48
2019	0.72	0.4	0.49	0.39	0.34	0.5	0.61	0.51	0.45	0.48	0.54	0.43
2020	1.11	0.87	0.76	0.4	0.42	0.83	0.48	0.59	0.7	0.56	0.53	0.4

Source: USDA, AMS, Shipping point data for zucchini, small, accessed March 16, 2021.

Table F.26 Average monthly prices, foreign small zucchini, Agricultural Marketing Service (AMS) shipping point, 2015–20

In dollars per pound ($/lb)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	0.45	0.42	0.6	0.28	0.4	n.a.	n.a.	n.a.	n.a.	0.41	0.65	1.01
2016	1.2	0.31	0.46	0.26	0.25	n.a.	n.a.	n.a.	n.a.	0.26	0.21	0.33
2017	0.74	0.55	0.8	0.35	0.58	0.71	n.a.	n.a.	0.9	0.4	0.24	0.45
2018	0.48	0.35	0.67	0.5	0.84	0.34	n.a.	n.a.	n.a.	0.74	0.35	0.37
2019	0.62	0.28	0.39	0.35	0.4	0.43	n.a.	n.a.	n.a.	0.35	0.51	0.52
2020	0.94	0.72	0.91	0.34	0.46	0.52	n.a.	n.a.	n.a.	0.31	0.37	0.21

Source: USDA, AMS, Shipping point data for zucchini, small, accessed March 16, 2021.

Table F.27 Average monthly prices, domestic small yellow straightneck, Agricultural Marketing Service (AMS) shipping point, 2015–20

In dollars per pound ($/lb)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	0.47	0.55	0.75	0.41	0.44	0.57	0.83	0.83	0.47	0.41	0.44	1.04
2016	1.59	1.35	0.91	0.51	0.46	0.59	0.44	0.61	0.8	0.52	0.46	0.41
2017	0.81	0.66	0.86	0.45	0.51	0.73	0.72	0.78	0.7	0.65	0.42	0.61
2018	0.67	0.54	0.7	0.63	0.68	0.49	0.48	0.46	0.67	0.52	0.39	0.64
2019	0.84	0.62	0.57	0.57	0.51	0.71	0.82	0.48	0.5	0.48	0.49	0.49
2020	1.14	1.04	0.99	0.39	0.63	0.91	0.57	0.75	0.87	0.56	0.69	0.65

Source: USDA, AMS, Shipping point data for yellow straightneck, small, accessed March 16, 2021.

Table F.28 Average monthly prices, foreign small yellow straightneck, Agricultural Marketing Service (AMS) shipping point, 2015–20

In dollars per pound ($/lb)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	0.7	0.46	0.8	0.35	0.28	n.a.	n.a.	n.a.	n.a.	0.35	0.59	1.1
2016	1.77	0.99	0.81	0.5	0.24	n.a.	n.a.	n.a.	n.a.	0.31	0.45	0.39
2017	0.78	0.6	0.91	0.44	0.35	n.a.	n.a.	n.a.	0.9	0.43	0.35	0.53
2018	0.55	0.56	0.72	0.53	0.9	0.66	n.a.	n.a.	n.a.	0.48	0.5	0.61
2019	0.69	0.46	0.48	0.55	0.5	n.a.	n.a.	n.a.	n.a.	0.38	0.59	0.75
2020	1.08	1.14	1.22	0.35	0.49	n.a.	n.a.	n.a.	n.a.	0.34	0.61	0.45

Source: USDA, AMS, Shipping point data for yellow straightneck, small, accessed March 16, 2021.