



# Imports Contribute to Year-Round Fresh Fruit Availability

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## Abstract

The rapid growth of fresh fruit imports since the 1990s has contributed significantly to the year-round availability of various fresh fruits in the U.S. market. This report analyzes the monthly shipment patterns of both aggregated fresh fruits and five major imported fresh fruits—grapes, avocados, oranges, strawberries, and apples. The seasonal relationships between imports and domestic products are found to be complementary—increased imports help to make up for seasonal shortfalls in domestic fruit production, which can help lower prices and smooth out price fluctuations in the domestic market.

**Keywords:** U.S. fresh fruit imports, production, consumption, seasonality

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# Introduction

U.S. consumers have benefited from an increased volume and variety of fresh fruit imports, particularly since the 1990s. The produce section in today's grocery store often has dozens, if not hundreds, of different fresh fruits on display all year around, which come from all corners of the globe (e.g., grapes from Chile, kiwi fruit from New Zealand, and mangoes from Mexico) as additions to domestic fresh fruit. Improved logistics, technology, and transportation have supported this increase in imports. The average value of U.S. imports of fresh fruit<sup>1</sup> has grown rapidly, rising from \$1.68 billion per year in 1990-92 to \$6.89 billion per year in 2010-12 in nominal dollars (or from \$1.24 billion to \$3.07 billion in real value, using prices indexed to 1982-84 levels).

The rapid growth of fresh fruit imports has affected many aspects of the U.S. fresh fruit market. Fruit production is usually seasonal, so this study examines the seasonal patterns of imported fresh fruits versus those of domestic crops, and the extent to which imports complement domestic products to supply the U.S. fresh fruit market year round. Some representative fresh fruit imports are included to show how, when, and where major foreign supplies enter the U.S. market, as well as an analysis of the aggregate (all fruits combined). The historical production levels of these fruits for fresh-market use are also examined for possible effect of imports on domestic products.

The basic data used in the analysis of the seasonal nature of fresh fruit markets are the average volume of monthly shipments during 2010-12 for imported and domestic fresh fruit. These data are from *Fresh Fruit and Vegetable Shipments*, issued by the Agricultural Marketing Service (AMS) of the U.S. Department of Agriculture (USDA). The domestic fresh fruit shipment data provided by the AMS are the only available source that depicts the monthly movement of U.S. domestic fresh fruit from major shipping points. Although these shipments do not represent the total movements of a commodity, they are still indicative of the monthly availabilities of domestic fresh produce in the wholesale market. Also, the *Global Trade Atlas* from Global Trade Information Services, Inc., an online database that provides trade data issued by the U.S. Census Bureau, supplements the AMS data in the analysis of trade patterns in U.S. fresh fruit imports. Other data used in the analysis include per capita consumption and production-related data from *Fruit and Tree Nuts, Situation and Outlook Yearbook*, issued by the Economic Research Service (ERS) of USDA. Additional production data from the National Agricultural Statistics Service (NASS) of USDA are also used.

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<sup>1</sup>To limit the scope of the analysis, the produce referred to in this study includes most of the general categories of fresh fruit—tropical, citrus, and noncitrus (including berries)—but excludes melons.

# Evolving U.S. Fresh Fruit Imports: An Overview

Tropical fruit (typically bananas) and counter-seasonal temperate fruit (typically grapes) have dominated U.S. fresh fruit imports for decades. During 2010-12, while bananas and grapes continued to account for the largest import shares, the composition of U.S. fruit imports was diverse, with other fruit varieties (including berries, other tropical fruit, avocados, citrus, apples and pears, and stone fruit) accounting for significant shares of U.S. fruit imports (table 1).

Nearly two-thirds of fresh fruit imports came from Mexico, Chile, and Costa Rica during this period. These countries represent the three major supply regions to the U.S. market for imported fresh fruit: the neighboring partners of the North American Free Trade Agreement (NAFTA), the Southern Hemisphere countries, and the equatorial countries. In this report, the Southern Hemisphere region includes the region's top fresh fruit suppliers to the United States—Chile, Argentina, Peru, New Zealand, Brazil, South Africa, and Australia. Similarly, the equatorial region includes Costa Rica, Guatemala, Ecuador, Colombia, and Honduras.

With the substantial increase in imports since the 1990s, the structure of the import mix has changed noticeably, with new types of fruit accounting for growing shares of U.S. imports. In particular, although bananas still remained the top U.S. fresh fruit import in 2010-12, their 28-percent value share of total fresh fruit imports was less than half of their nearly 60-percent share in 1990-92. The market share for other traditionally imported fruits, such as apples and pears, also declined (although less dramatically than for bananas). Meanwhile, the share for imports of berries, avocados, citrus, and other tropical fruits rose substantially (fig. 1).

Accordingly, the list of countries from which the United States imports fresh fruit has also shifted over the years, although the majority of U.S. fresh fruit imports continued to come from the above-

Table 1  
**Major U.S. fresh fruit imports, 2010-12**

Commodity	Average value	Share of total imports	Major suppliers
	<i>\$ million</i>	<i>Percent</i>	
Fresh fruit	6,893.6	100.0	Mexico (33%), Chile (19%), Costa Rica (11%)
Bananas	1,952.7	28.3	Guatemala (30%), Ecuador (22%), Costa Rica (19%), Colombia (12%), Honduras (10%)
Grapes	1,120.4	16.3	Chile (58%), Mexico (33%)
Berries	1,038.3	15.1	Mexico (58%), Chile (21%), Canada (14%)
Other tropical <sup>1</sup>	925.5	13.4	Costa Rica (45%), Mexico (30%)
Avocados	782.6	11.4	Mexico (86%), Chile (9%)
Citrus	508.8	7.4	Mexico (42%), Chile (17%), Spain (16%), South Africa (9%)
Apples and pears	241.4	3.5	Chile (43%), New Zealand (19%), Argentina (16%), Canada (9%)
Stone fruit <sup>2</sup>	154.8	2.2	Chile (92%)
Other fruit	169.0	2.5	

<sup>1</sup>Includes pineapples, mangoes, papayas, and durians.

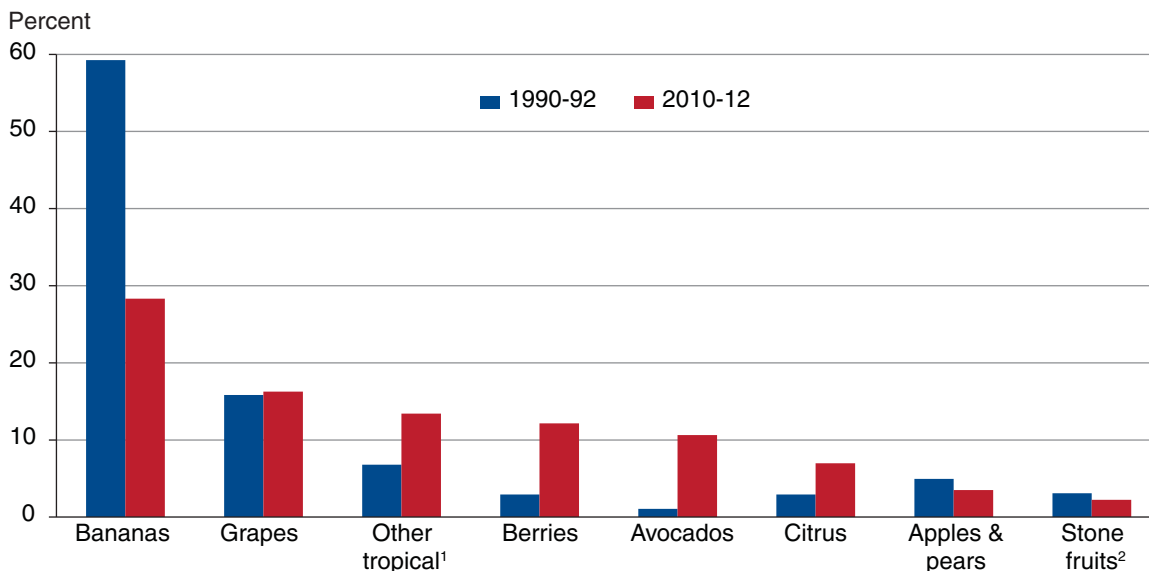
<sup>2</sup>Includes apricots, cherries, peaches, and plums.

Source: USDA, Economic Research Service analysis of data from Global Trade Information Services, Inc.

mentioned regions. Between 1990-92 and 2010-12, Mexico's share of the value of the U.S. fresh fruit import market increased dramatically from 13 percent to 33 percent (fig. 2). During the same period, the value share of U.S. fruit imports from the Southern Hemisphere region rose from 23 to 26 percent, while the share from the equatorial region declined sharply from 56 percent to less than 34 percent.

Figure 1

**Value shares of total U.S. fresh fruit imports by type**



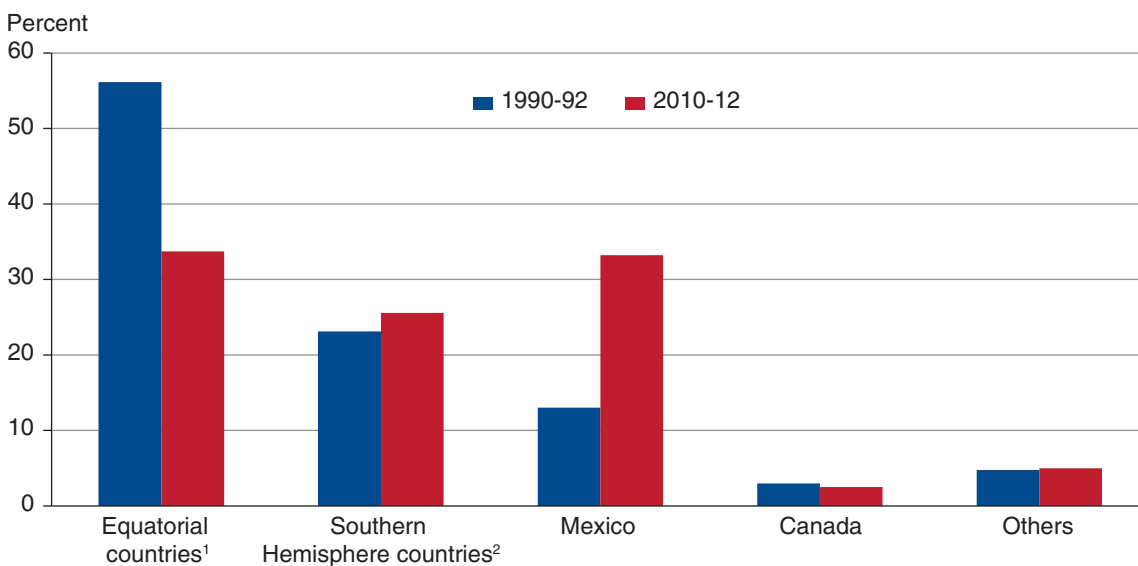
<sup>1</sup>Includes pineapples, mangoes, papayas, and durians.

<sup>2</sup>Includes apricots, cherries, peaches, and plums.

Source: USDA, Economic Research Service analysis of data from Global Trade Information Services, Inc.

Figure 2

**Value shares of total U.S. fresh fruit imports by region**



<sup>1</sup>Equatorial countries include Costa Rica, Guatemala, Ecuador, Colombia, and Honduras.

<sup>2</sup>Southern Hemisphere countries include Chile, Argentina, Peru, New Zealand, Brazil, South Africa, and Australia.

Source: USDA, Economic Research Service analysis of data from Global Trade Information Services, Inc.

Each major import supply region provides its own specialties to the U.S. market. For the neighboring NAFTA partners, while Canada continuously supplies cranberries (and, to a much lesser degree, apples), the vibrant Mexican produce industry has substantially raised its profile to become the leading supplier of U.S. fresh fruit imports since 2007.

The market share by value of Mexico's major fresh fruits in the U. S. import market in 2010-12 included avocados (86 percent), grapes (33 percent), various berries (97 percent—mainly blackberries and raspberries), lemons (91 percent), strawberries (99 percent), mangoes (56 percent), and papayas (72 percent). The warm climate, long growing season, and proximity to the United States have been Mexico's advantages over its rivals. Membership in NAFTA since 1994 has also stimulated Mexico's increasing presence in the U.S. fresh fruit import market—under NAFTA, tariffs for horticultural products were reduced and eventually eliminated in 2003. In addition, increased investments and improved farming methods and marketing have substantially contributed to the growth in exports from Mexico. One notable example is that, since the 1990s, Mexico's produce export industry has increasingly shifted from open-field production to protected culture, such as the open-type greenhouses or shade houses that are used in the berry industry (FAS, March 2013).

The Southern Hemisphere region—with its summer during the Northern Hemisphere's winter—has been the leading provider of U.S. counter-seasonal fresh fruit imports since the mid-1980s. Dominated by Chile, the region leads the U.S. import market in many fresh (mostly temperate) fruits, including grapes (67 percent of total market share by value in 2010-12), blueberries (72 percent), apples (86 percent), oranges (91 percent), kiwi fruit (73 percent), and stone fruit (93 percent).

Bananas are always the top fresh fruit export from the equatorial region even though other tropical fruits—notably pineapples and, to a much lesser degree, mangoes—have been added to the region's mix of commodity exports since the 1990s. In 2010-12, bananas made up nearly 80 percent of U.S. fresh fruit imports from the equatorial region and accounted for more than 90 percent of total U.S. banana imports by value.

## Relationships and Trends in Imported and Domestic Fresh Fruits

With a wide range of climates, the United States produces many fresh fruits (other than tropical fruits) and is one of the world's leading fresh fruit producers. California, taking advantage of its diverse geography and climates, is the Nation's largest producer of fresh-market fruit. The State is the Nation's leading producer of fresh-market grapes, oranges, strawberries, peaches, and avocados and a major producer of a variety of other fresh-market fruits (including apples and sweet cherries).

The United States is also a leading global importer of fresh-market fruit, particularly since the 1990s. To U.S. consumers, imports have been critical in providing tropical and off-season fresh-market fruit. Imports also make fruit available in varieties that differ from those domestically produced or provide new varieties for which domestic production cannot yet provide a year-round supply. In other cases, imports fill supply gaps resulting from occasional adverse weather or caused by the cyclical nature of fruit production.

Bananas, grapes, avocados, oranges, strawberries, and apples accounted for nearly two-thirds of the total value of U.S. fresh fruit imports in 2010-12 and encompass all the general categories of fresh fruit—tropical, citrus, and noncitrus (including berries). Each fruit has its own unique patterns of production, marketing, and trade, and this report analyzes the historical import patterns for these leading fresh fruits. Using AMS monthly shipment data for 2010-12, relationships between imported and domestic fruits are also analyzed by focusing on the fruits mentioned above except for bananas (because of their limited domestic production). Instead, an analysis for aggregate fresh fruit (excluding tropical fruit<sup>2</sup>) is included.

### *Bananas*

Although bananas have limited domestic production, we include this brief summary of historical import data because bananas are the primary fresh fruit imported and consumed in the United States. With little domestic production because of climate limitations, U.S. consumption of bananas has long depended almost totally on imports, mainly from the equatorial region. The volume of U.S. banana imports increased steadily until reaching a high in 1999. Thereafter, imports have remained mostly flat and even dropped to pre-1995 levels in 2009 (fig. 3a). However, banana imports were at an all-time high in 2012—average annual U.S. banana imports reached 4.47 million metric tons in 2010-12, a 30-percent increase from 3.44 million metric tons in 1990-92.

### *Grapes*

The United States is one of the world's leading producers and exporters of fresh-market grapes, even though grapes for fresh market represent only about 13 percent of the Nation's domestically grown and utilized grape production.<sup>3</sup> U.S. production of fresh-market grapes has increased substantially over the years—from 731,327 metric tons in 1990-92 to 900,585 metric tons in 2010-12, an increase of about 23 percent (ERS, 2013).

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<sup>2</sup>Tropical fruit is excluded in the discussion because of its limited domestic production, and because the supply of tropical fruit imports (dominated by bananas) is steady throughout the year.

<sup>3</sup>Most of the Nation's grape production, 90 percent of which comes from California, is for the processed grape industries that produce wine, raisins, juice, and canned fruit.

The United States, however, is also the number one importer of fresh-market grapes in the world—a classic example of the importance of imports to satisfy consumers’ off-season demand in the U.S. fresh produce market. The volume of U.S. fresh grape imports has generally gone up, particularly between the mid-1990s and mid-2000s (fig. 3b). After imports hit an all-time high in 2005, the trend slowed somewhat even though import levels remained high compared with the 1990s. Average annual grape imports reached 567,969 metric tons in 2010-12, up about 67 percent from 340,982 metric tons in 1990-92.

Chile and Mexico together supply more than 90 percent of U.S. imported grapes by volume. Chilean grape imports increased after the mid-1980s (when Chile’s fruit market matured into an export-oriented industry), which has been instrumental in making this item available to U.S. consumers throughout the year and turning the United States into a net importer of fresh-market grapes.

Grape imports from Mexico have also significantly increased in the U.S. market, particularly after Mexico’s membership in NAFTA took effect in 1994.<sup>4</sup> Although it faces growing competition from Mexico and some other suppliers, Chile has retained its position as the dominant supplier of U.S. imported fresh grapes. Chile’s share of U.S. grape imports by volume, however, dropped from 90 percent in 1990-92 to 68 percent in 2010-12, while Mexico’s share surged from 10 to 25 percent.

More than 90 percent of imported fresh-market grapes enter the United States in the winter and spring, while the shipment season for domestic fresh grapes is from May through December (fig. 4a). Shipments start to arrive from Chile beginning in December, when the U.S. supply begins to decline. Chilean grapes dominate the U.S. market from January through April, peaking in March and effectively ending by July. In May and June, U.S. fresh grapes again become available in limited supply from southeastern California. Fresh-market grapes are also imported from Mexico during the months when Chilean grape shipments drop off and before the largest volume of domestic grapes enters the market. From August to November, when central California’s grapes are harvested, the U.S. market experiences the largest supply of domestic fresh-market grapes.

## *Avocados*

Average annual U.S. avocado imports reached 420,954 metric tons in 2010-12, a 2,214-percent increase since 1990-92. U.S. avocado imports have overshadowed domestic production since 2005, when Mexico gained year-round access for shipment of its Hass avocados to 47 U.S. States (California, Florida, and Hawaii were off-limits to Mexican avocados until February 1, 2007, because of phytosanitary concerns). Before 2005, Chile was the leading foreign supplier for avocados. However, with new access to the U.S. market, Mexico—the biggest avocado producer and exporter in the world—has surpassed Chile to become the dominant foreign supplier of avocados to the United States (fig. 3c). In addition to being closer to the U.S. market than other producers, Mexico has the advantage of being a year-round grower of avocados. By volume, Mexico accounted for 81 percent of the U.S. market for imported avocados in 2010-12, compared with Chile’s 14 percent.

Avocados only grow in tropical and subtropical climates, and commercial avocado production in the United States is limited to California, Florida, and to a lesser extent, Hawaii. California, with its

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<sup>4</sup>Upon enactment of the North American Free Trade Agreement on January 1, 1994, the United States eliminated the seasonal tariffs on imports of fresh grapes from Mexico. The U.S. seasonal tariffs were \$1.41 per cubic meter from February 15 to March 31 and \$2.12 per cubic meter from July 1 to February 14; imports from Mexico already entered duty free during the rest of the year (FAS, July 2013).



nearly 90-percent share of the Nation's avocado production, grows mostly the thick, pebbly-skinned Hass variety (California Avocado Commission, 2013). In comparison, Florida—which produces much fewer avocados—grows smooth, thin-skinned varieties that do not ship as well as the Hass variety and are, thus, limited mainly to East Coast distribution (Pollack and Perez, 2006). In addition, avocados have a long picking season—a unique quality that allows producers to work with traders in order to harvest and ship avocados at the most optimal times of the year.<sup>5</sup> U.S. avocado production varies over the years; average production was 222,500 metric tons in 2010-12, up 36 percent from 1990-92 (ERS, 2013).

It appears that avocados from Mexico and Chile fit well with California's off-season needs, and the domestic and import shipment data show a clear complementary relationship between domestic production and imports (fig. 4b). The AMS monthly shipment data show that more than 70 percent of total domestic shipments occurred between May and September during 2010-12, and more than 70 percent of imported avocados arrived between October and April. In general, Mexico's avocado peak is from October to May, Chile's is from August to February, and California's is from May to September. The complementary relationship between imported and domestic crops has caused avocados to be more evenly distributed throughout the year than other fruits in this study.

It is also likely that the industry-funded program, *The Hass Avocado Promotion, Research, and Information Order*, contributes to the orderly marketing of avocados throughout the year (Carman et al., 2013). This distinguishing feature of the U.S. avocado industry is authorized under the Hass Avocado Promotion, Research, and Information Act of 2000. The Order, administered by the Hass Avocado Board (HAB) with oversight by AMS, became effective on September 9, 2002. The purpose of the program is to increase consumption of Hass avocados in the United States. The promotion programs under this Order include research, promotion, industry information, and consumer information needed for the maintenance, expansion, and development of domestic markets for Hass avocados. The program is funded by assessments on domestic and imported fresh Hass avocados, and domestic producers and importers pay the assessments (AMS, 2002). The HAB is composed of 12 members, 7 producers and 5 importers, and each member has an alternate (AMS, 2013). AMS reviewed the Order and found that its promotion programs have significantly helped to increase demand and maintain orderly marketing (Carman et al., 2013).

## Oranges

The volume of U.S. fresh-market orange imports has grown steadily since the 1990s, with occasional spikes when the U.S. crop experienced freezes (fig. 3d). Average annual fresh orange imports reached 108,842 metric tons in 2010-12, an increase of about 264 percent from 1990-92 (29,868 metric tons).

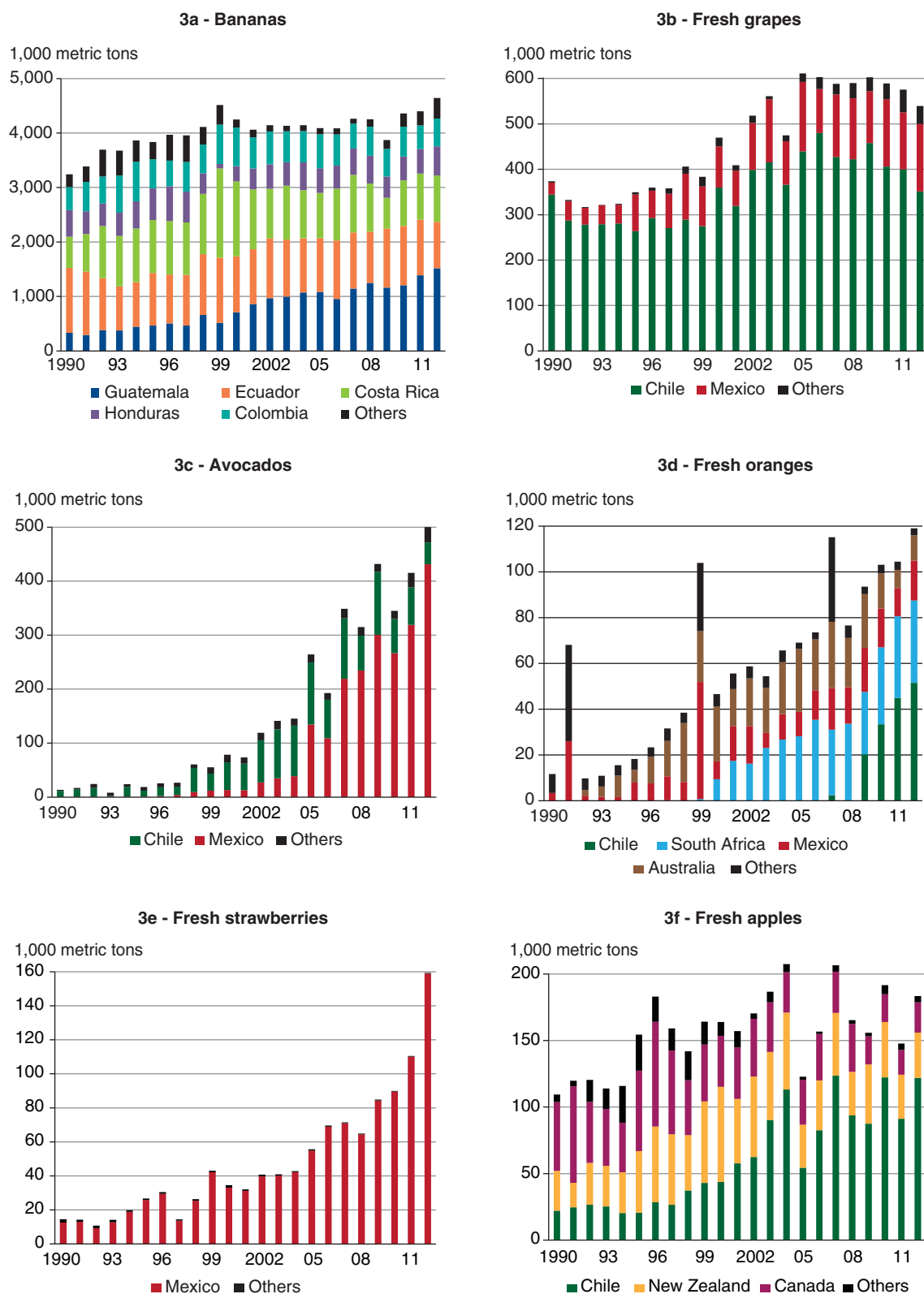
Among the major suppliers, Mexico is a longtime source. Since the 1990s, however, an increased volume of oranges from the Southern Hemisphere region has dominated the U.S. import market—the region accounted for 83 percent of total U.S. fresh orange imports by volume in 2010-12. Large fresh-market orange imports from the Southern Hemisphere region started in the early 1990s after Australia obtained phytosanitary clearance for its navel oranges from USDA's Animal and Plant

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<sup>5</sup>Avocados will not ripen while they are still attached to the tree; if picked when full grown and firm, avocados will ripen in 1 to 2 weeks at room temperature (Morton, 1987). Because avocados must be mature to ripen properly, the fruits of an avocado tree are not harvested at the same time, and the fruits can be left on the tree for extended periods (Crane et al., 2013).



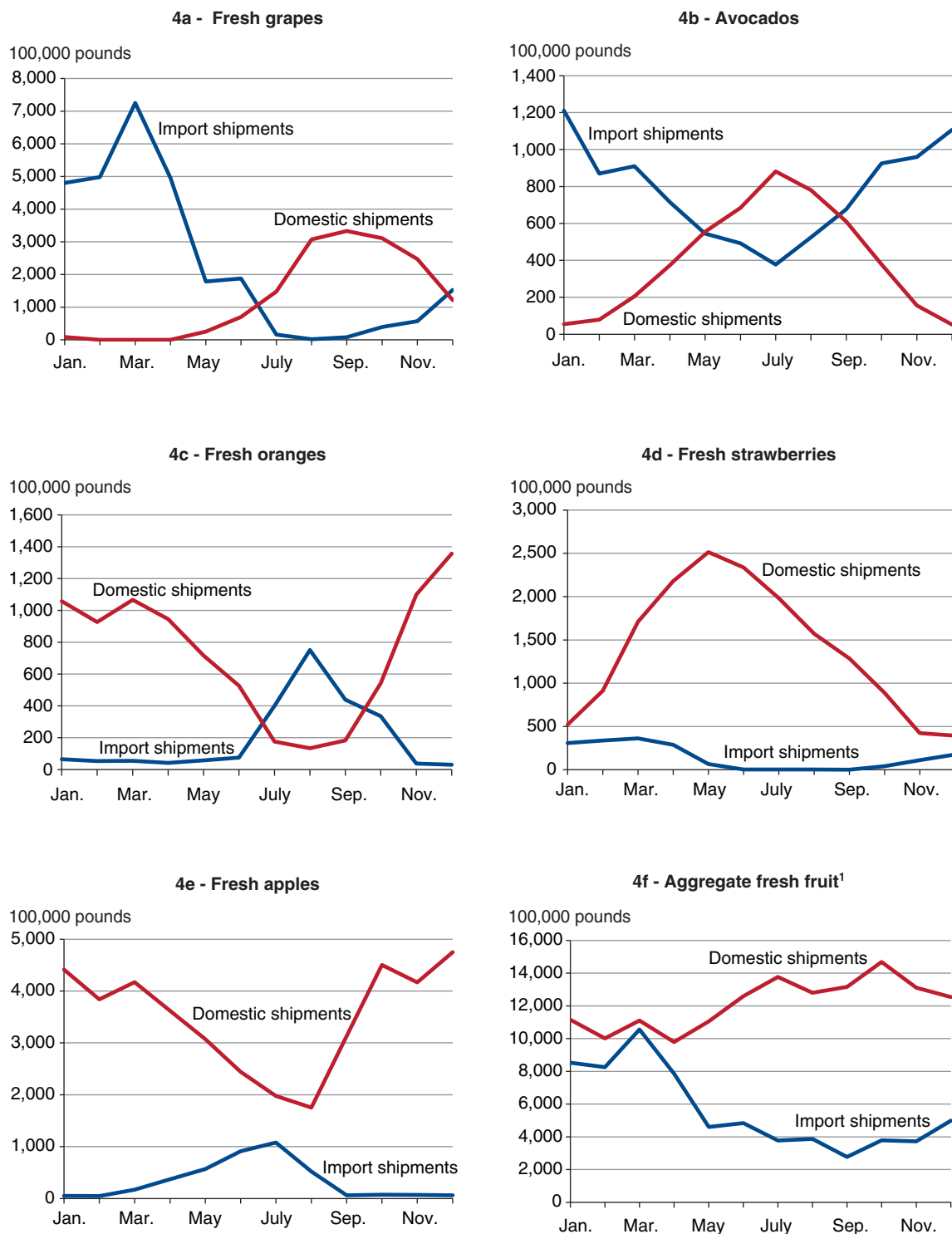
Figure 3  
Major U.S. fresh fruit imports by country



Source: USDA, Economic Research Service analysis of data from Global Trade Information Services, Inc.

Figure 4

# **Seasonal relationships between imported and domestic fruits (2010-12 average)**



<sup>1</sup>Excludes tropical fruit.

Source: USDA, Economic Research Service analysis of data from USDA, Agricultural Marketing Service.

Health Inspection Service (APHIS).<sup>6</sup> With strong U.S. year-round demand for fresh oranges, other Southern Hemisphere countries have become counter-seasonal suppliers during the summer months when domestic navel oranges are not available. South Africa obtained its approval from APHIS in 1999, as did Chile in 2009.

In terms of weight, oranges are the U.S.'s leading domestically grown fruit, and the United States is the second-largest orange producer in the world (after Brazil). As subtropical fruits, U.S. oranges are commercially grown primarily in two States—moist, warm Florida and dry, milder California. Florida oranges are used mainly for processing for juice—more than 95 percent of them during the 2010-12 crop years. Meanwhile, more than 80 percent of California oranges are for fresh consumption. Thus, although California accounts for only about 27 percent of the Nation's orange production—much less than Florida's 72 percent—California is the dominant supplier of domestic fresh-market oranges (85 percent of the U.S. supply) (ERS, 2013).

There are two major types of oranges for fresh consumption: navel oranges and Valencia oranges. Navel oranges are virtually seedless, peel and segment easily with flesh that is firm rather than watery, and are the most popular oranges for fresh consumption. According to NASS data, the navel-orange share of U.S. production of fresh-market oranges was 76 percent during the 2010-12 crop years. In comparison, Valencia oranges—thin skinned, containing occasional seeds, and with juicy and sweet pulp—accounted for 24 percent during the same period. As the Nation's top supplier of fresh-market oranges, California produced about 87 percent of fresh-market navel oranges and more than 81 percent of fresh-market Valencia oranges (NASS, May 2013).

The main season for domestic fresh-market oranges is from November through May, a time when California's navel oranges are in season. Domestic shipments of oranges fall substantially from June through October, even though the (much smaller) Valencia orange crop ripens later than navel oranges and is able to lengthen the marketing season somewhat for domestic oranges. In earlier years, when fresh orange imports still accounted for only a small portion of domestic consumption, Valencia oranges were a popular variety when navel oranges were out of season. Since the 1990s, however, some Southern Hemisphere countries have been able to market their navel oranges in the United States at the same time as domestic Valencia oranges, particularly during summer.

Because of seasonal production patterns, the bulk of Mexico's oranges arrive in the U.S. market from December through June, when U.S. supplies are relatively high, while the season for imports from the Southern Hemisphere countries is mainly from July through October—when U.S. supplies are relatively low. Overall, however, imported oranges show a strong seasonality—more than 80 percent of imported oranges arrive in the United States during July through October, complementing domestic production (fig. 4c). As a result, increased orange imports from the Southern Hemisphere countries have extended the retail season of navel oranges for U.S. consumers.

Due mainly to increased competition from increased imports and domestic navel oranges, orange juice, and other summer fruits (as well as weather and disease problems), U.S. production of fresh-market Valencia oranges has decreased by about 20 percent, from 602,400 metric tons in 1990-92 to 484,100 metric tons in 2010-12. Meanwhile, U.S. production of fresh-market navel oranges has

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<sup>6</sup> To safeguard agricultural and natural resources from the risks associated with the entry, establishment, and spread of plant pests and noxious weeds, the Animal and Plant Health Inspection Service regulates the importation of fresh produce with commodity-specific and production area-specific phytosanitary certificates, importation rules, and inspections (APHIS, 2013).

increased by about 47 percent, from 1.05 million metric tons to 1.54 million metric tons, during the same period (NASS, May 2013).

### *Strawberries*

U. S. fresh-market strawberry imports have grown rapidly, particularly since the middle of the last decade (fig. 3e). Average annual strawberry imports reached 119,915 metric tons in 2010-12, more than an 800-percent increase from 1990-92 (13,220 metric tons). The strong growth in fresh-market strawberry imports is mainly the result of the interplay of supply and demand. On the supply side, improvements in handling, packaging, and the supply chain (particularly since the 1990s) have revolutionized the marketing of all berries, which are among the most fragile fruits. On the demand side, health information supporting the nutritional benefits of berry consumption and berries' easy preparation for fresh consumption have boosted demand.

Mexico is nearly the only supplier of fresh-market strawberries to the United States. For a delicate product such as strawberries, Mexico's proximity to the U.S. market makes it hard for other countries to compete. It is a challenge to get strawberries from the field and keep them in good shape until they reach consumers; the berries must not be picked until fully ripe and they deteriorate easily once picked. In California, for example, strawberries are picked, sorted, and packed by hand in the field. After harvest, fresh strawberries are rushed to coolers and shipped within 24 hours on refrigerated trucks or air-freighted to their final destination (California Strawberry Commission, 2013).

Over the years, U.S. farmers have substantially expanded fresh-market strawberry production—from 428,123 metric tons per year in 1990-92 to 1.07 million metric tons in 2010-12, a 150-percent increase. Although strawberries can be grown in a wide range of climates, nearly 90 percent of U.S. fresh-market strawberries came from California during 2010-12. Meanwhile, Florida—the distant-second producer—accounted for less than 9 percent of the Nation's fresh-market strawberry production.<sup>7</sup> Both States showed an upward trend in strawberry production between 1990-92 and 2010-12—a 155-percent increase for California and a 52-percent increase for Florida. Simultaneously, the share of domestic fresh-market strawberries increased from 72 percent to more than 81 percent due to growing demand (ERS, 2013 and NASS, July 2013).

California has a longer growing season than other States, and strawberries can be picked nearly every month. California strawberry production occurs primarily along the central and southern coasts, extending about 500 miles from San Diego to the Monterey Bay. Coastal California's rich sandy soil and moderate, year-round temperatures, with warm sunny days and cool foggy nights, provide an excellent environment for growing strawberries. Strawberry production in California generally shifts between northern and southern California with the changing seasons. Harvesting begins in the fall and early winter in southern California and moves north as the season progresses. California's 12-month growing season contributes to higher strawberry yields per acre than in any other growing area (California Strawberry Commission, 2013).

However, according to AMS monthly shipment data, most of California's fresh-market strawberries are shipped in spring and summer—nearly 80 percent of all California strawberry shipments in 2010-12. Meanwhile, strawberries are marketed mainly in winter in Florida, with 97 percent of that State's fresh-market strawberries shipped from December to March. For the Nation as a whole,

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<sup>7</sup>The States covered in the National Agricultural Statistics Service's strawberry data have been reduced from 23 in the early 1970s to 10 today because of a reduction in small commercial production in many States.

the peak shipment season for domestic fresh-market strawberries is between April and June, when all of the growing districts are in full production and 42 percent of total annual domestic shipments for fresh-market strawberries occur. Summer also remains a big season for domestic strawberries, accounting for nearly 30 percent of annual shipments.

In comparison, imports—almost totally from Mexico—are much less important in the U.S. strawberry market, either in total or in any season. The small role of imports in this particular market (compared with other fruits discussed in this study) is likely because strawberries are relatively hard to ship. Imports, however, also show strong seasonality—59 percent of the volume arrived in winter and 21 percent in spring in 2010-12 (fig. 4d). In addition, although a substantial share of imported strawberries arrive roughly in the same season as those from Florida, fresh-market strawberry production in Florida shows no signs of decline over the years. In fact, from December through February, imports supplement domestic strawberries to provide consumers with fresh strawberries. For the Nation as a whole, despite a substantial increase in imports, most fresh-market strawberries consumed by Americans are still domestically produced—the United States is the world's largest producer of strawberries.

## *Apples*

As a household fresh-fruit staple, fresh-market apples have been an important imported fruit for decades, with the Southern Hemisphere countries and Canada the main import suppliers. The volume of apple imports generally grew during 1995-2004, but has showed no visible trend since then (fig. 3f). Average U.S. annual fresh-market apple imports were 174,274 metric tons in 2010-12, up about 50 percent since 1990-92 (116,517 metric tons).

Canada was traditionally the leading foreign fresh-market apple supplier to the United States, but was surpassed by New Zealand for most years after 1998. Eventually, however, both Canada and New Zealand were topped by Chile after 2001 as it successfully developed an export-oriented apple industry. Chile's market share reached 64 percent in 2010-12, while New Zealand's share was 21 percent and Canada's share was 12 percent.

U.S. production of fresh-market apples reached nearly 2.9 million metric tons per year early in this decade, up 13 percent from 1990-92. However, total apple production began a downward trend after peaking in 1994. Fresh-market apples account for a rising share of total apple production—nearly 68 percent in the early years of this decade, up from 56 percent in 1990-92 (ERS, 2013). It appears that fresh-market sales have provided better opportunities than processed uses for apple growers, especially since the late 1990s. The State of Washington accounts for more than 70 percent of the Nation's fresh-market apple production, even though commercial apples are grown in many States in the continental United States. Other top-producing States include New York, Michigan, Pennsylvania, California, and Virginia (NASS, July 2013).

To stay competitive in international markets and to continuously supply the large U.S. market, the U.S. apple industry has undergone consolidation and vertical integration since the late 1990s. In the process, two major trends have occurred. One is a dramatic change of the cultivar mix. For example, in the State of Washington, Red Delicious once dominated production and constituted as much as 70 percent of the State's fresh-market apples in 1990. Golden Delicious was second, at nearly 20 percent. In 2010, Red Delicious still had the greatest share of production but its share had dropped to 31 percent. This was followed by Gala at 20 percent, Fuji at 14 percent, Granny Smith at 12 percent, and Golden Delicious at 10 percent. The remaining varieties included Braeburn, Cripps

Pink, Jonagold, Cameo, Honeycrisp, and others. Another trend has been heavy investment in market infrastructure—for example, the dramatic expansion of controlled atmosphere (CA) storage over the years. Improved CA storage has enabled the industry to maintain the quality of apples for extended periods and spread sales across 12 months or more after harvest (Globalwise Inc., 2012).

Despite the U.S. apple industry's progress and its status as the second-largest apple-producing and exporting country in the world (after China), the United States is also among the world's largest importers, largely because of the demand for off-season apples and for specific apple varieties. Peak seasons for domestic fresh-market apple shipments are fall and winter, while spring and summer are the peak seasons for imported apples (fig. 4e). Southern Hemisphere countries, notably Chile and New Zealand, are the dominant providers of counter-seasonal apples, which enter the United States largely during the March-August period. Meanwhile, Canada is a consistent (but much smaller) year-round supplier that satisfies U.S. demand for specific varieties. McIntosh apples from British Columbia, in particular, have long been imported into States such as Washington and California, where this variety is not grown. In addition, Canada is nearly the sole foreign supplier to the United States from October to January, when abundant U.S. domestic apples are available and Southern Hemisphere countries are out of season for apple production.

### *Aggregate fresh fruit*

Throughout the year, imports (excluding tropical fruit) are significant in the U.S. fresh fruit market when domestic production is relatively low—starting in late fall, peaking in winter, and remaining strong in the spring. Imports remain important during summer and early fall, however, even though domestic production is at relatively high levels (fig. 4f). Thus, in addition to making up for seasonal shortages in production, imports augment domestic supplies to satisfy Americans' desire for an extensive array of fresh fruit year round.

Although imports have increased, it appears that, in the aggregate (all fruits combined), imports have grown mostly to satisfy increased consumption rather than to replace domestic production. According to USDA data, domestic production for fresh-market fruit has generally maintained or increased its level for the past two decades. Declines in production in recent years (from relatively high levels during 1994-2004) are mainly because of reduced output in the citrus sector due to weather and disease problems. Domestic fresh-market production for noncitrus fruit has, meanwhile, increased by more than 20 percent, from 5.63 million metric tons per year in 1990-92 to 6.87 million metric tons per year in the early part of this decade (ERS, 2013).



## Imports Reduce and Smooth Price Fluctuations

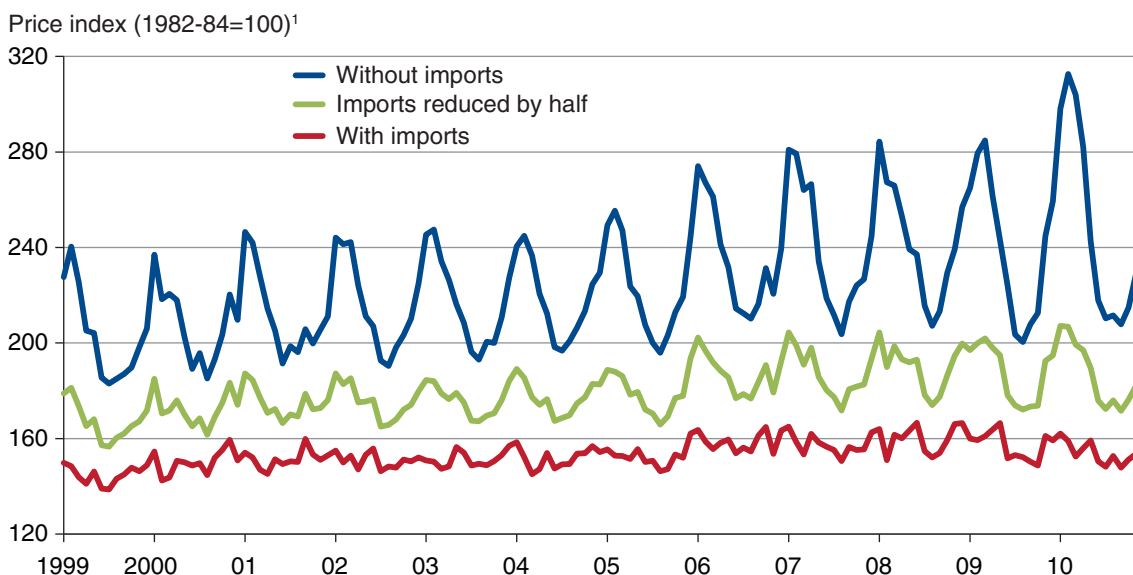
Imports have the potential to improve year-round supplies of various fresh fruits and provide benefits to consumers. Most domestically produced fruit is not only highly seasonal but may occasionally be in short supply due to weather and disease problems. Imports have the potential to offset such supply shortages and reduce fluctuations in retail prices.

To analyze these price effects, Huang and Huang (2012) estimated a set of monthly price equations as functions of quantities consumed for aggregated fresh fruit and vegetables and used the resulting equations to simulate the price effects of imports at various levels using 1999-2010 as the sample period. They examined three import scenarios:

- 1) Case 1: Imports maintained at actual past levels;
- 2) Case 2: Imports reduced by one-half from actual past levels; and
- 3) Case 3: No imports.

The results indicated that if there were no imports (Case 3), the average real retail price index for fresh fruit would increase from 153.4 percent to 225.4 percent (using prices indexed to 1982-84 levels), with price variation and volatility increasing from 3.86 percent to 12.02 percent. In Cases 1 and 2, both of which allowed imports, fresh fruit imports were found to effectively lower domestic prices and smooth out price fluctuations (fig. 5).

Figure 5  
**Simulated impact of imports on aggregate fresh fruit price volatility**



<sup>1</sup>Referring to index of monthly real prices of fresh fruit.

Source: Huang and Huang (2012); the source of the aggregate fresh fruit price index is from the Consumer Price Index, issued by the U.S. Department of Labor, Bureau of Labor Statistics.

## Growth in U.S. Fresh Fruit Consumption is Broad Based

Overall, Americans are now eating more fresh fruit than ever, with imports satisfying an increasing share of this demand, although the average American still does not consume the amount of fruits (and vegetables) currently recommended by the *Dietary Guidelines for Americans, 2010* (HHS and USDA, 2010). U.S. per capita use (as a proxy for consumption) of all fresh fruit grew between 1990-92 and 2010-12, from 93.4 pounds to 104.7 pounds. In particular, the use of many fruits increased during this period—blueberries (681-percent growth), papayas (441 percent), mangoes (252 percent), limes (213 percent), cherries (211 percent), pineapples (200 percent), avocados (189 percent), tangerines and tangelos (159 percent), and strawberries (116 percent). However, per capita use of a number of traditional fruits decreased, such as apples and oranges, or remained steady, such as bananas. Together, these top three fresh fruits consumed by the average American declined from about 55.7 percent of total fresh fruit use to 51.2 percent between these two periods (table 2).

Table 2

### Fresh fruit: Per capita use and import share

Commodity	Per capita use <sup>1</sup>		Import/total food use	
	1990-92	2010-12	1990-92	2001-12
	<i>Pounds</i>		<i>Percent</i>	
Total fresh fruit	93.4	104.7	36.3	49.0
Bananas	25.5	25.5	99.8	99.8
Apples	18.9	15.6	5.5	7.8
Oranges & temples	11.2	10.1	2.8	7.6
Grapes	7.4	7.9	37.7	50.1
Strawberries	3.5	7.5	3.4	11.2
Pineapples	2.0	5.9	51.6	99.9
Peaches & nectarines	1.7	4.8	9.4	70.3
Avocados	6.0	4.4	7.6	7.3
Tangerines & tangelos	1.6	4.0	11.0	24.6
Pears	2.6	3.3	3.5	10.0
Grapefruit	3.2	3.0	15.5	17.5
Lemons	5.4	2.6	1.2	1.8
Limes	0.8	2.5	61.1	101.0
Mangoes	0.7	2.4	96.3	99.9
Cherries	0.4	1.4	3.5	9.5
Papayas	0.2	1.3	13.2	49.5
Blueberries	0.2	1.1	31.7	96.0
Plums & prunes	1.6	0.8	13.4	25.4
Kiwi fruit	0.4	0.5	51.2	75.6
Apricots	0.1	0.1	7.0	8.2
Cranberries	0.1	0.1	0.3	0.0

<sup>1</sup>Per capita use is a proxy for per capita consumption.

Source: USDA, Economic Research Service.

Meanwhile, the import share of overall U.S. fresh fruit use expanded from 36.3 percent to 49 percent between 1990-92 and 2010-12. As noted, consumption of bananas, which have little or no commercial production in the United States, has long depended on imports. For many other fresh fruits, the import share of U.S. consumption increased between these periods, even for major domestically produced fruits such as apples and oranges. Also, the share of imported grapes (a typical seasonal product), for example, increased considerably in the American diet (from 37.7 percent to 50.1 percent).

Imports have been important to the rise in consumption for many relatively new fruits, such as avocados and kiwi fruit, and for some highly perishable fruit, such as strawberries and blueberries. For avocados, the import share of consumption increased from 9.4 percent to 70.3 percent, kiwi fruit from 51.2 percent to 75.6 percent, strawberries from 3.4 percent to 11.2 percent, and blueberries from 13.2 to 49.5 percent. In particular, berries—among the most fragile of all produce and, not long ago, very much a seasonal item—are now available nearly year round, in part through expanded domestic production but also because of increased imports.

The gains in consumption of fresh produce are associated with a number of institutional and economic factors. Consumer preferences have changed with rising incomes, and consumers now demand a year-round supply of a greater variety of fresh produce. At the same time, international trade agreements, improvements in the marketing infrastructure of highly perishable goods, and global cooperation among importers, handlers, and distributors have enabled fresh fruit to be imported in greater quantities. Another factor is growing recognition that diets rich in fruit (and vegetables)—good sources of vitamins, minerals, and fiber—are associated with reducing some chronic diseases and the rising problem of obesity. As evidence of the link between diet and health has grown, the health issues have increasingly influenced consumer preferences for fresh produce (Variyam and Golan, 2002).

Increasing American consumption of produce has been a mainstay of Federal dietary guidance for decades. Industry associations actively promote increased fresh fruit consumption by educating consumers about the nutritional aspects of their products—including avocados, blueberries, cranberries, and more recently, mangoes—and providing advice on ways to incorporate them into one's daily food diet. Meanwhile, imports have added to U.S. consumers' ability to fulfill fruit (and vegetable) consumption goals as currently recommended by the *Dietary Guidelines for Americans, 2010*.

## Conclusion

Since the 1990s, import growth has contributed to significant changes in the U.S. fresh fruit market. Aided by changes in logistics, technology, and transportation, various fresh fruits—highly perishable and largely seasonal in production—are shipped to the produce section in today’s U.S. grocery store all year around. This rapidly growing part of U.S. agricultural trade has provided the potential for American consumers to benefit not only from the increased volume and expanded variety of fresh fruit, but also from the year-round availability of various fresh fruits.

The fast growth of fresh fruit imports since the 1990s also reflects the evolving structure of the U.S. fresh fruit import market. While the share of fresh fruit imports represented by some traditional imports, such as bananas and apples, has declined, the share for some relatively new items, such as berries and avocados, has risen. Accordingly, the list of countries from which the United States imports fresh fruit has shifted over the years. However, the major portion of U.S. fresh fruit imports has continued to come from neighboring NAFTA partners (particular Mexico), from equatorial countries (for tropical fruit), and from Southern Hemisphere countries (for off-season fruit, imported particularly in the winter and spring seasons).

The monthly patterns of imported fresh fruit versus domestic crops, both in the aggregate and for several individual fresh fruits, reveal that imports complement domestically produced products and contribute to year-round supply in the U.S. fresh fruit market. In the aggregate (all fruits combined), for example, U.S. fresh fruit imports (except for tropical fruit that has minimal domestic counterparts) are significant in the U.S. fresh fruit market starting in late fall, peaking in winter, and remaining strong in spring—when domestic production is at a relative low point. Similarly, individual fruits—grapes, avocados, oranges, strawberries, and apples—each have their own distinct seasonal pattern but the complementary relationships between imports and domestic crops are evident.

Despite increased imports, domestic fresh-market production has maintained its level in the aggregate and even shown an upward trend in most of the five leading imported fresh fruits (even though production varies substantially from year to year). It appears that imports have grown mostly to satisfy increased consumption rather than to replace domestic production. However, for some specific products (such as Valencia oranges), U.S. production of fresh-market fruit has shown a downward trend since the 1990s.

While imports contribute to year-round fresh fruit availability, they likely also account for some of the increase in consumer demand. In the aggregate, fresh fruit imports lower domestic prices and smooth out price fluctuations—potential stimuli for increased consumer demand. Meanwhile, fresh fruit imports—which bring a wider selection of fresh fruit to U.S. consumers year round—have added to U.S. consumers’ ability to fulfill the goals of increasing fruit (and vegetable) consumption as recommended by current dietary guidelines, especially given preferences for fresh produce.

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