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The Importance of Trade to the U.S. Economy – With a Special Emphasis on Agriculture

By Dr. Robert Young

The American agricultural sector is very cognizant of the importance of trade. With the equivalent of almost two out of three rows of soybeans leaving the country, one in five hogs finding a place in a stomach somewhere outside of the United States or the need to bring in over $2 billion a year worth of avocados to satisfy our own consumer demand, agriculture and the food sector are intimately familiar with the concept of the global marketplace we operate in.

To give overall context, the United States imported $112 billion worth of agricultural goods (see the definition of "agricultural goods" discussed in detail below) compared to $2,229 billion worth of other goods and $542 billion of services, which means agricultural imports account for roughly 4 percent of overall U.S. imports. The country exported $137 billion in agricultural goods, $1,409 billion in other goods, as well as $798 billion in services, which means agricultural exports account for roughly 6 percent for overall U.S. exports.

Overall economic activity, or gross domestic product (GDP), in the United States totaled $19.485 trillion in 2017, the largest single market in the world. Unlike some other countries, it is spending by consumers that drives our economy to this massive size. Consumer spending on goods and services came in at $13.321 trillion in that same year, 68 percent of the overall economy.

The numbers certainly bear that out – that the United States is a "service economy." Services – housing, health care, transportation and recreation, among others – accounted for 69 percent of consumer spending. Spending on "stuff" then accounted for only 31 percent of consumer spending, or 21 percent of the overall GDP. Investment on structures, equipment, intellectual property, even houses contributed 17 percent of the economy, with government consumption at all levels (federal, state and local) of goods and services accounting for a similar 17 percent.

Quick arithmetic then says that *net* exports (also called the trade balance) actually lowered overall GDP by 3 percent. But looking at the numbers in that kind of simplistic addition and subtraction approach leaves a lot of information behind, and frankly, misses the importance of trade to our overall economy and economic well-being.

Imports, in the basic add and subtract approach to the economy, are considered as a reduction to GDP. These are good and services that we as a nation did not produce, but rather consume and therefore are subtracted from the total. Yet, in 2017, we imported the equivalent of 15 percent of our GDP, making it nearly as large as the federal, state *and* local government's consumption contribution to overall GDP. Exports, considered an add to overall GDP since products or services are being produced here in country, still contribute over $2.3 trillion to the economy, but are only 12 percent of GDP, 3 percent less than the contribution from imports.

Imports and Exports – It's Not Just a Bunch of Stuff

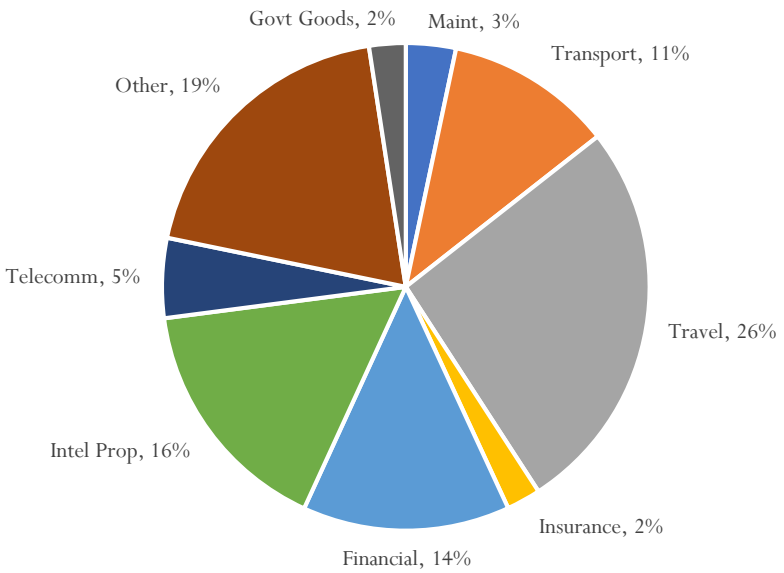
Trade is not just movement of goods – services account for the majority of exports from the United States. In 2017, services accounted for 35 percent of all exports – $814 billion. Travel and tourism accounted for over 25 percent of our trade in services, with charges for use of intellectual property and financial services amounting to another 30 percent of services trade.

On the import side, we do tend to be more focused on goods, rather than services. Goods accounted for 81 percent of imports in 2017. Transport and travel combined however added up to 44 percent of all services imports, with the proverbial "other" category accounting for another 19 percent. While intellectual property and licensing amounted to 16 percent of our services exports, they accounted for only 9 percent of our services imports.

Given the amount of recent conversation regarding protection of intellectual property, this is a very valuable portion of our services exports. While only 16 percent of our total export value, it is still $128 billion worth of revenue. The need to protect that property is no different than the protection of a real asset as frequently years of research and brand development have gone into the creation of that property.

This value of our services exports points out the nature of the United States economy versus that of much of the rest of the world. Our GDP is driven by services. As mentioned in earlier, nearly 70 percent of consumer spending is based on services. Taken as a portion of the overall economy, spending by consumers on services accounts for 47 percent of the GDP. Therefore, it is not surprising that we would be more focused on exporting services, rather than the goods the rest of the world can provide to us.

Figure 1: 2017 Exports of Services



Overall Imports and Exports –It is a Bunch of Stuff, as Well

The United States does import and export a lot of "stuff." In 2017, we imported $2.342 trillion and exported $1.546 trillion worth of goods, creating a trade deficit of $796 billion in goods. When discussing that much stuff, it takes some ordering system to try to organize such a massive amount of data. The U.S. Census Bureau collects and coordinates that data and classifies everything that comes in to the country in one of – wait for it – 37,981 categories. These are organized in a set of 10-digit codes – the more digits, the more precise the definition of the product. For example, there are 20 separate categories for "horses, asses, mules and hines – live;" separate categories for worms and "bait, other than worms;" and 30 categories of passenger-carrying vehicles over 1500 CCs.

This is classification system is called the Harmonized Commodity Description and Coding System, also known as the Harmonized System (HS). At the 6-digit level, the United Nations coordinates the definitions, following the pattern:

> The six digits can be broken down into three parts. The first two digits (HS-2) identify the chapter the goods are classified in, e.g. 09 = Coffee, Tea, Maté and Spices. The next two digits (HS-4) identify groupings within that chapter, e.g. 09.02 = Tea, whether or not flavoured. The next two digits (HS-6) are even more specific, e.g. 09.02.10 Green tea (not fermented). Up to the HS-6 digit level, all countries classify products in the same way (a few exceptions exist where some countries apply old versions of the HS).[1]

There are 99 categories at the two-digit level and the United States trades something in every one of those categories.

Imports: The top five categories for overall U.S. imports at the two-digit level have maintained the same order over the last three years.

TOP FIVE U.S. IMPORTS, BY HS CATEGORY

85	Electric Machinery Etc.; Sound Equip; TV Equip; Pts
84	Nuclear Reactors, Boilers, Machinery Etc.; Parts
87	Vehicles, Except Railway or Tramway, and Parts Etc.
27	Mineral Fuel, Oil Etc.; Bitumin Subst; Mineral Wax
30	Pharmaceutical Products

Category 85 includes virtually all electronic goods from batteries to the components to make cell phones and from vacuum cleaners to electric razors. At $351 billion, it alone counts for fully 15 percent of our imported goods. Breaking this category apart a little, the number one subcategory is telecommunications equipment and the number three subcategory is televisions.

This electrical/electronic equipment category is followed very closely by **category 84**. Don't let the "nuclear reactors" part of the title fool you. That just happens to be the first item in the category list. A little down the line are things like "automatic data processing machines," which we call computers today. Not surprising, those automatic data processing machines are the largest subcategory in this list.

Vehicles for transporting people and goods (**category 87** and third on the list) accounted for just over $200 billion in 2017. We also imported $65 billion worth of parts and accessories for those vehicles, as well as $296 million worth of baby carriages and strollers.

Category 27 includes crude oil and other oil. This is where our reliance on foreign oil comes home. Through time, oil imports have been one of the dominant factors in our overall good imports. From 2002 through 2008, HS category 27 surged, taking up almost 25 percent of all goods imports on a value basis, with crude oil imports amounting to $353 billion in 2008, more than we spend on all electronics imports today. Lower oil prices and an overall reduction in oil

imports have returned the category to the 8 percent range observed historically. But clearly, the price volatility and importance of crude oil to the U.S. economy can drive significant changes in the value of imports in this category from one year to the next.

While pharmaceuticals (**category 30**) consistently come in at number 5 on the list of top U.S. imports, they still amount to less than $100 billion or 4 percent of total goods imported.

Exports: Let's turn to our goods exports. It may seem a little strange, but the top five list of exports from the United States looks similar to the group of imports. A little flip in the ordering, but category 84, 85, 27 and 87 are all in the top five again. The new addition is category 88 – aircraft. Recognizing that the United States and Europe represent the two major producers of aircraft, it is probably not surprising that aircraft shows up as a top export category, but not as a top import one.

Recall that **category 84** includes those "automatic data processing machines." Like on the import side of the ledger, they make up the largest subcategory of exports under code 84, but our imports of this equipment are over three times as large as our exports.

While **category 85** may have been our number one import category, it ranks as our number two export specialty. Our export mix in this category is a little different than the import mix. While top on the list of imports was telecommunications equipment, the top of the list on exports are integrated circuits, which was number two on the import list. The same telecommunications equipment that ranked number one on imports is number two on the export list. While the United States is not even close to matching imports of telecommunications equipment ($112 billion in imports compared to $34 billion in exports), we do actually export more dollar value in integrated circuits than we import.

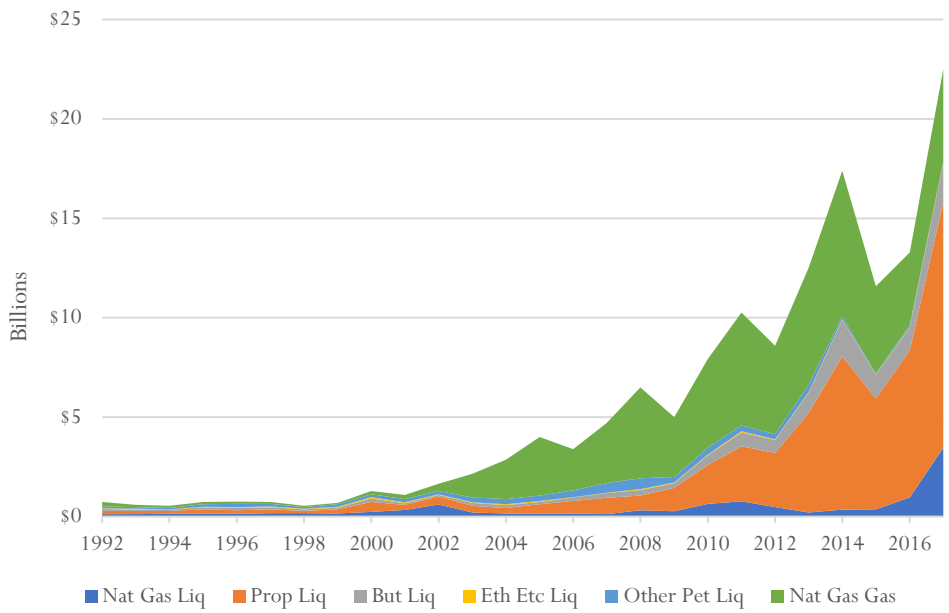
Category 27 (mineral fuel, oil etc.) has been a very dynamic sector over the last few years. Like the import side of the same category, there has been a great deal of volatility, driven as much by price as anything else. From a low end of $55 billion in 2009, the value of exports shot up to $156 billion in 2014. Fuel oil makes up the lion's share of these exports, with Texas being both the largest importer and exporter of the product. The emergence of the natural and other gas exports,

TOP FIVE U.S. EXPORTS, BY HS CATEGORY

84	Nuclear Reactors, Boilers, Machinery Etc.; Parts
85	Electric Machinery Etc.; Sound Equip; Tv Equip; Pts
27	Mineral Fuel, Oil Etc.; Bitumin Subst; Mineral Wax
88	Aircraft, Spacecraft, And Parts Thereof
87	Vehicles, Except Railway or Tramway, And Parts Etc.

however, has (probably a bad word to use here) exploded in the last few years. Propane exports have been particularly strong, with Mexico as the largest customer.

Figure 3: Value of U.S. Petroleum Gas Exports



The last two categories, planes (**category 88**) and vehicles (**category 87**), represent the epitome of the manufacturing sector. Both are large employers but also large export categories. The airplane sector has averaged over $130 billion of exports over the last three years, with the overall vehicle (not including trains) sector just under $130 billion. Because of reporting changes, the U.S. Department of Commerce trade data does not really allow for one to break out parts versus civilian airplanes, which represented $120 billion of that $130 billion total.

However, for the vehicles category, there is considerable detail. Out of that $130 billion in total exports, nearly $100 billion is in cars and parts for vehicles. The economic crash in 2008/2009 is evident in this data. Car export data was on a significant upward trend from 2006 through 2008, hitting over $50 billion in 2008. In 2009 however, exports dropped to less than $29 billion. It took until 2012 when car exports again exceeded the $50 billion mark. Car parts are also a major part of the categories total. With an integrated North American market, parts are frequently built here and then integrated in either Mexico or Canada. Car part exports have been over $40 billion since 2012, with trade in body parts approaching $10 billion and gear boxes nearly $8 billion.

Food and Agricultural Trade

It would not be much of an exaggeration to say that the United States imports food and exports agricultural goods. To be consistent with reports from the U.S. Department of Agriculture, it is helpful to look first at how "agricultural products" are defined in trade.

> Agricultural products, sometimes also referred to as "food and fiber" products, cover a broad range of goods from unprocessed bulk commodities like soybeans, feed corn, wheat, rice, and raw cotton to highly-processed, high-value foods and beverages like sausages, bakery goods, ice cream, beer and wine, and condiments sold in retail stores and restaurants.
>
> All of the products found in Chapters 1-24 of the U.S. Harmonized Tariff Schedule (except for fishery products in Chapters 3 and 16, manufactured tobacco products like cigarettes and cigars in Chapter 24, and spirits in Chapter 22) are considered agricultural products.

Agricultural products within these chapters generally fall into the following categories: grains, animal feeds, and grain products (like bread and pasta); oilseeds and oilseed products (like soybean oil and olive oil); livestock, poultry and dairy products including live animals, meats, eggs, and feathers; horticultural products including all fresh and processed fruits, vegetables, tree nuts, as well as nursery products, and beer and wine; unmanufactured tobacco; and tropical products like sugar, cocoa and coffee.

Certain other products outside of Chapters 1-24 are also considered agricultural products. The most significant are essential oils (Chapter 33), raw rubber (Chapter 40), raw animal hides and skins (Chapter 41), and wool and cotton (Chapters 51-52).

The major products derived from plants or animals which are not considered "agricultural" because of their manufactured nature are cotton thread and yarn; fabric, textiles and clothing; leather and leather articles of apparel; cigarettes and cigars; and spirits.

Figure 4: U.S. Agricultural Exports, Imports and Net Trade

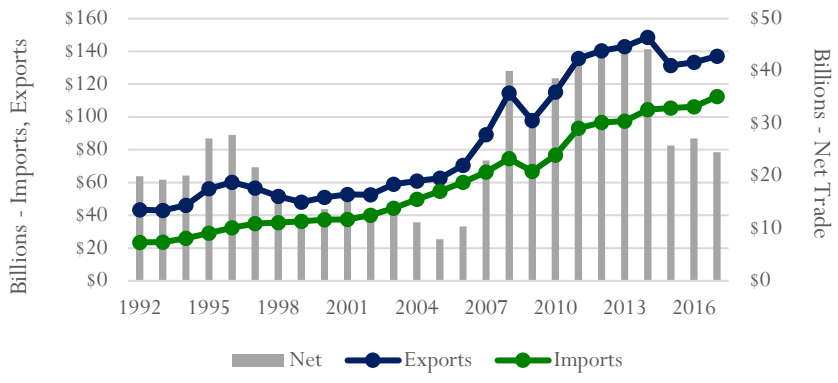


Figure 4 represents the *value* of agricultural trade, not the volume. Consequently, much of the surge in the value of exports in the mid to late 2000s is associated with significant price changes. But, there were also some noticeable volume shifts as well. To put numbers behind the graphics, in 2017 the United States exported $137 billion in agricultural goods, while importing $112 billion.

Exports: There are five HS categories that averaged exports in excess of $10 billion each between 2015 and 2017 – meat and edible meat offal (02), edible fruit & nuts (08), cereals (10), oilseeds (12) and food industry residues (23). Together, these five categories accounted for more than 60 percent of all agricultural exports.

TOP FIVE U.S. AGRICULTURAL EXPORTS, BY HS CATEGORY

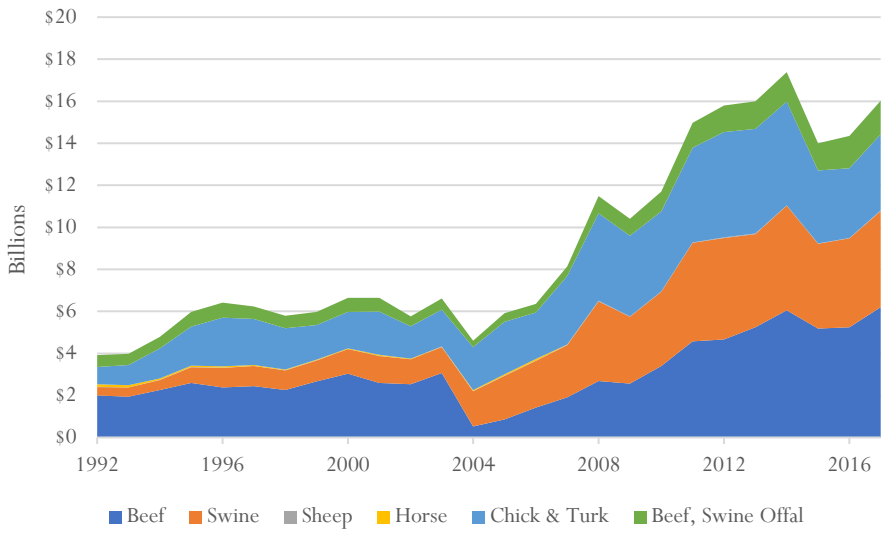
02	Meat and Edible Offal
08	Edible Fruit & Nuts
10	Cereals
12	Oilseeds
23	Food Industry Residues

Meat exports (**category 02**) have shown significant growth, particularly since the bovine spongiform encephalopathy (BSE or mad cow disease) outbreak in late 2003. Though it took a lot of work to pull beef exports back to pre-outbreak levels, product has been moving well over the last several years. While overshadowed by the U.S. meat exports, the United States as recently as 2006 shipped over $60 million of horse meat and product. The preclusion of federal inspection and thus essentially the elimination of horse processing facilities in the United States, however, knocked out supplies.

One of the overlooked categories of meat trade is that of "variety" cuts. Think tongue, hearts, livers, tripe and other parts of the animal we tend to not use – or only use in products like dog food – in the United States. Other countries however, often consider these delicacies. Take beef tongue

in Japan – the Japanese market, according to recent reports by the United States Meat Export Federation (USMEF), is willing to pay over $12 per tongue, and imports nearly 5,000 metric tons a month of the product. Or consider pork ears – the highest value domestically is mainly for pet treats, with value back to the producer of less than $1/pound; however, in China, those same ears are worth $2.30/pound, according to Jim Heartly of USMEF. It is estimated that 95 percent of pork stomachs, for example, are shipped outside the United States.

Figure 5: Meat and Offal Exports



It is important to understand this "what" of meat exports. We currently export 13 percent of beef production and lately have been shipping well over 20 percent of pork production out of the country. But, it is important to note that it is not that we export one out of every eight head of cattle or one in five head of pork. The proper way to view this is that out of *every* head of cattle, we export one eighth of that animal; likewise, one fifth of that hog is going to be consumed by a foreigner. U.S. producers do not ship whole animals overseas, but ship parts of those animals. Consequently, in the case of disease outbreaks, it is not that we can impose different inspection criteria to "exports" than we apply domestically.

We essentially ship parts of *every* animal that we process to other countries.

Working on down the list, there are some surprises in the edible fruit and nut category (**category 08**). The first surprise is that we ship over $14 billion worth of product in this group, with over half of that (53 percent) coming from nuts. In 2017, we exported $4.3 billion of almonds alone. Almond exports expanded substantively after 2009 when they were essentially frozen at $1.7-1.8 billion. While they peaked at $4.7 billion in 2015, they continue to hold at over $4 billion a year. Pistachios also accounted for $1.3 billion of export value in 2017. Citrus products, grapes and apples all had exports in excess of a billion dollars in 2017. Strawberries are even approaching half-a-billion in shipments.

Cereals (**category 10**) are probably what generally comes first to mind when thinking about agricultural exports. These include wheat, rye, barley, oats, rice, sorghum buckwheat, millet and corn. The 800-pound gorilla in this category is obviously corn, which frequently amounts to half of the value of exports for the group. Much of the volatility in the value of corn exports is driven by price changes, not necessarily the quantity of exports. Recall physical exports of corn dropped to 730 million bushels in the 2012/13 marketing year, but the price of corn averaged $6.89 for the same time period, giving a value of corn exports in 2012 of $9.7 billion and $6.9 billion in 2013. In the 2014/15 marketing year, the United States

shipped 1,864 million bushels with an average price of $3.70 per bushel. Corn exports were valued at $11.1 billion in 2014 and $8.7 in 2015. But, there have been significant swings in the actual volume of corn trade as well. Exports hit 2,437 million bushels in the 2007/08 crop year and as mentioned have dipped to as low as 730 million bushels in 2012/13.

Sorghum, while almost an order of magnitude less in volume that corn trade, has had some noticeable gains in recent years. Lack of supply as much as anything drove sorghum exports down to 63 million bushels in 2011/12. Clients with specific product needs, however, rediscovered the crop and trade jumped to over 350 million bushels in 2014/15.

As expected, the oilseed, etc. category (HS **category 12**) – and it is an important etc. – is dominated by soybeans. The category averaged $25.9 billion for 2015-2017 with soybean exports averaging $21.1 billion. Added to that is another $825 million from the export of soymeal. A little surprising – and part of that "etc." mentioned earlier – this category includes seeds for forages, fruits and vegetables. Vegetable seed exports averaged just under $650 million for 2015-2017, with tomato seeds worth nearly $150 million, onion seeds over $90 million, peppers over $50 million and even broccoli over $30 million. Another of those "etc." commodities included in the category are forages. Alfalfa and other hays and clover exports are a $1.4 billion industry.

Category 23, food industry residues, has maintained exports at or near the $10 billion mark for much of the past five years. Three subcategories – residues of starch manufacture, soybean oilcake and preparations used in animal feed – dominate the category at over 85 percent of the value. The residues of starch manufacture are those associated with ethanol byproducts.

While only just breaking through the $100 million mark in the early 2000s, this subcategory hit $4 billion in 2013 and has averaged right around $3 billion in 2015-2017. There is another subcategory for brewing or distilling byproducts that would also be associated with ethanol production that also averages over $2 billion.

Soybean oilcake exports have averaged $3.3 billion for the 2015-2017 period. Like those associated with starch manufacture, they also broke the $4 billion level in 2013, as well as 2014. One of the interesting subcategories is "preparations used in animal feeding" which includes dog and cat food for retail sale. We export over $1.3 billion of dog and cat food for retail sale.

Imports: Using the same definition of "agriculture products" on the import side, the United States brings in a significant amount across a number of categories.

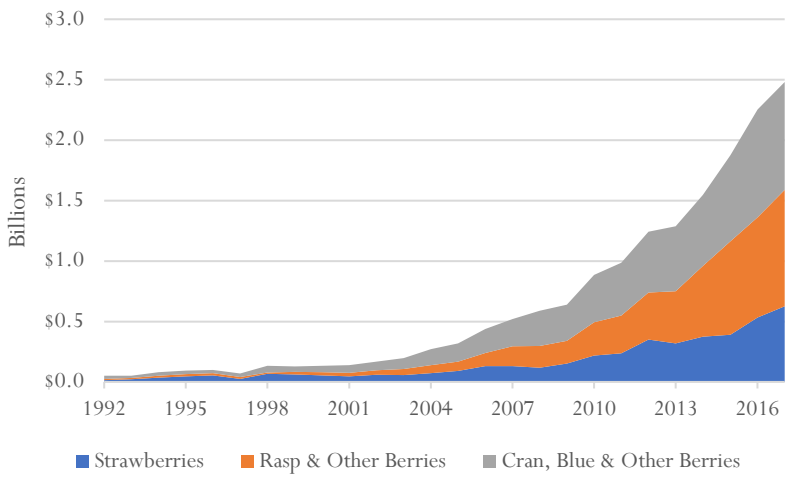
TOP FIVE U.S. AGRICULTURAL IMPORTS, \BY HS CATEGORY

08	Edible Fruit & Nuts
07	Edible Vegetables
02	Meat and Edible Offal
09	Coffee, Tea, Maté and Spices
20	Prepared Vegetables, Fruits Nuts or Other Plant Parts

The largest being HS **category 08**, edible fruit and nuts. For the 2015-2017 period, we imported an average of $15 billion worth of product. Taking that category apart, the largest subgroup includes dates, figs, pineapples, avocados, etc. Pineapple imports, somewhat surprisingly, were just over $600 million a year for 2015-2017. What was a little more eyebrow raising were avocado imports at $2.6 billion for 2017 alone. As recently as 2012, our avocado imports were only $860 million. Bananas have traditionally averaged just over $2 billion and have been fairly steady in that range.

One of the interesting areas are fresh berry imports. Strawberries, raspberries, blueberries, cranberries and others are approaching the $3 billion mark and show no signs of slowing down. The last ten years have seen this category add $2 billion in import value. One of the consumer advantages being the availability of these products on a year-round basis.

Figure 6: Fresh Berry Imports



With the exception of bananas as discussed earlier, this idea of significant expansion over the last ten years extends throughout this category. Ten years ago, fruit and nut imports came in at $7.1 billion. In 2017, that same figure was $16.6 billion.

If fruits are the largest category, no surprise that vegetables come in number two. Edible vegetables (HS **category 07**) imports averaged $9.3 billion a year in 2015-2017. Recognizing there are a large variety of product under that label, peppers, asparagus, tomatoes and various cucumbers all had imports in excess of $500 million in recent years. We even imported more than $250 million a year of frozen broccoli.

Meat imports (HS **category 02**) are next on order of magnitude list. Averaging $8.2 billion for 2015-2017, beef products of one form or another averaged $3.2 billion of that total. The split between fresh/chilled versus frozen beef does bounce around from one year to the next, with the fresh/chilled category just slightly over frozen. Within the frozen category, however, the overwhelming majority of product is boneless. As many are aware, we tend to import lean processing beef that is then mixed with the fatty trimmings from our own cattle to make hamburger of specific fat content. This adds value to the fat trimmings and meets a consumer product demand. U.S. animals better serve the fresh and chilled meat cut market and leave the lower end hamburger or ground product market to others.

Pork imports are just over $1.3 billion a year. Sheep and lamb imports are in the $800 million range and even goat meat imports are over $100 million.

Coffee fans unite. **Category 09** – coffee, tea, maté and spices – are the next largest category at just over $8 billion for the same three-year period. Of that, nearly $6 billion were coffee imports, with tea coming in at a weak $460 million. The various other spices, from pepper to vanilla, cinnamon to ginger, added up to another $1.5 billion a year.

Fifth in overall agricultural imports is HS **category 20**, prepared vegetables, fruits nuts or other plant parts. This includes all those olives, canned artichokes, fancy jams, etc. and totaled over $7.5 billion a year in the 2015-2017 period. One of the larger subcategories are imported frozen potatoes at almost $800 million a year. The non-frozen category includes over $400 million a year of olives. Apple juice imports, while still over $450 million per year in the

2015-2017 period, have been falling off considerably in value terms. After hitting a peak of $786 million in 2008, apple imports dropped hard in 2009, picked back up in 2012, but have steadily declined every year since and stood at only $421 million in 2017.

A few other honorable-mention import categories include HS19, prepared cereal, flour or starch. This category includes pasta, which have averaged $850 million a year in recent history. But the largest subcategory in HS19 is bread, pastry, cakes, etc. – read this as cookies – at $1.1 billion a year on average just in specifically designated "cookies" with another $450 million in "waffles and wafers," plus another $1.7 billion a year in various "pastry/cake/pudding" categories. We may not import significant quantities of flour, but we do like to import flour with sugar, eggs and other dairy products included.

Recall that the definition of "agricultural products" does not include "spirits," though beer and wine were. The overall value of HS22 imports, beverages, spirits and vinegar, exceeded $23 billion in 2017, making it one of the largest single food related categories. Beer imports alone were $5.1 billion, with wine imports at $5.9 billion.

Conclusion

This conversation has only scratched the surface of the overall complexity and breadth of U.S. trade in general. Trade is a multi-trillion portion of our whole economy. It is not the only driver, but it does represent a significant portion of that economy. The United States exports a great deal of product and services to the rest of the world.

Given the makeup of our economy, it is not surprising that we are able to operate a trade surplus in the services sector. That is where our competitive advantage lies. Nor is it surprising that we operate a trade deficit on the goods side. That is not necessarily where we have a comparative advantage given labor, regulatory and other limitations on our own domestic production.

For agriculture, the United States operates with a combination of soil and climate conditions, as well as transportation systems, that allow for large scale production at comparatively low costs, making us a world class supplier. It has also been recognized through time that there are situations where it is to our advantage to import product in order to enhance our own operations, rather than look totally at domestic sources. Importing live animals, for example, in order to maintain capacity utilization in both the beef and the pork sectors is an example. In turn, we often ship the finished meats back to the country that supplied the live animals. Importing lean beef to mix with our own trimmings in order to meet a consumer demand, as well as add value to our own lower value products, is another example.

This report has focused only on the various values of this wide range of product. It has not looked at the countries that either take our product or that ship them to us. That is the subject of another conversation.

About the Author: Dr. Young served as the chief economist at the American Farm Bureau Federation, a co-director of the Food and Agricultural Policy Research Institute (FAPRI) at the University of Missouri, and the chief economist of the U.S. Senate Committee on Agriculture, Nutrition and Forestry.

[1] Visit https://unstats.un.org/unsd/tradekb/Knowledgebase/50018/Harmonized-Commodity-Description-and-Coding-Systems-HS for more information.