BEYOND THE NUMBERS

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A historical look at soybean price increases: What happened since the year 2000?

By Ralph Mondesir

Agriculture and food manufacturing are important sectors in the U.S. economy, making up approximately 2.0 percent of U.S. gross domestic product in 2018.[1] Soybeans, with its ever growing list of uses, ranging from products intended for human and animal consumption to industrial products such as bio-diesel, paint, and plastics, has become one of the most valuable agricultural commodities in the United States.

Data from the U.S. Bureau of Labor Statistics (BLS) Producer Price Index (PPI) program show an overall increase in soybean prices over the past 20 years. From January 1999 to December 2018, prices increased by 61.7

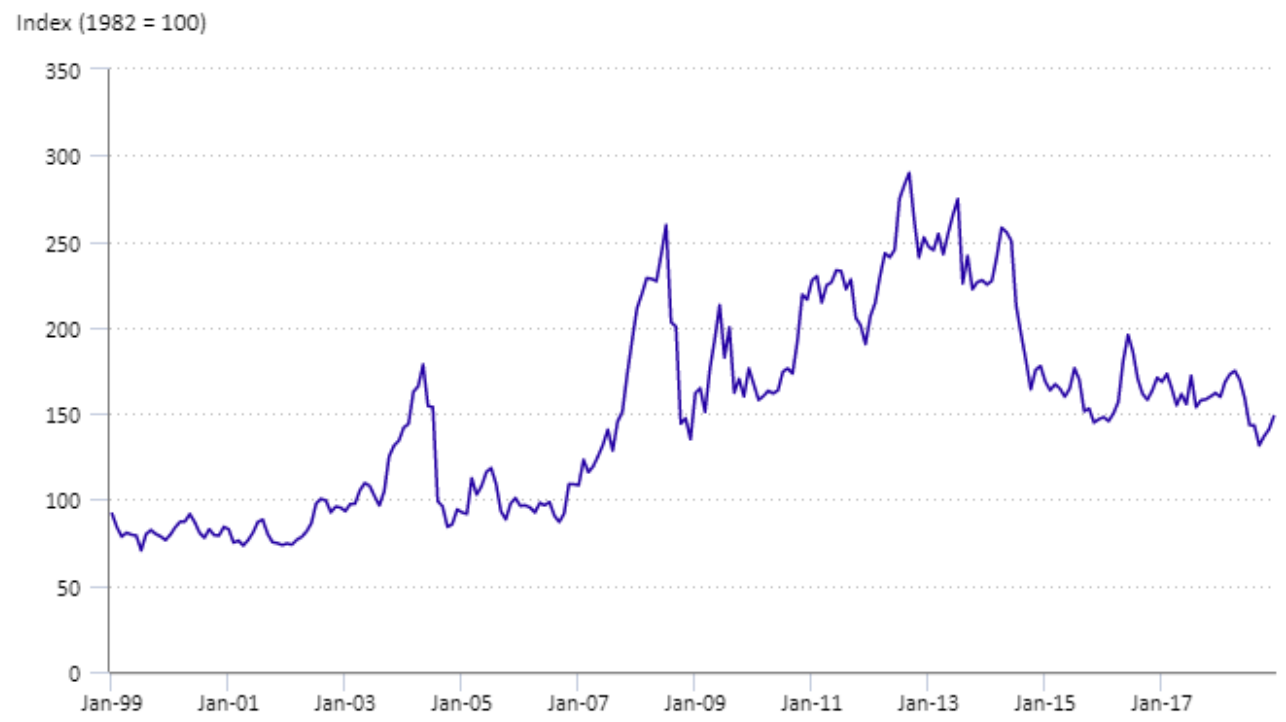
percent. This **Beyond the Numbers** article will focus on three periods (2003–04, 2006–08 and 2012–14) and examine the irregularities in the supply and demand for soybeans within each period. Each time frame includes various causes for the surge in the prices of soybeans.

First spike, 2003–04

From 1999 through 2002, soybean prices fluctuated within a moderately narrow range. However, as seen in Chart 1, the price of soybeans rose sharply in 2003 and continued unabated through May 2004. As a perishable commodity, soybean prices historically increase in response to tightening supplies from unforeseen factors such as extreme weather or rising demand from domestic or foreign buyers.[2]

In 2003, bad weather and pests had an impact on soybean harvests. Although spring provided excellent growing conditions, a summer drought in the Midwestern farm belt affected the soybean crop, reducing yield. As a result, the total soybean harvest for 2003 was 2.418 billion bushels, falling 576 million bushels short of May estimates by the United States Department of Agriculture (USDA).[3]

Chart 1. Producer Price Index for soybeans, 1999–2018

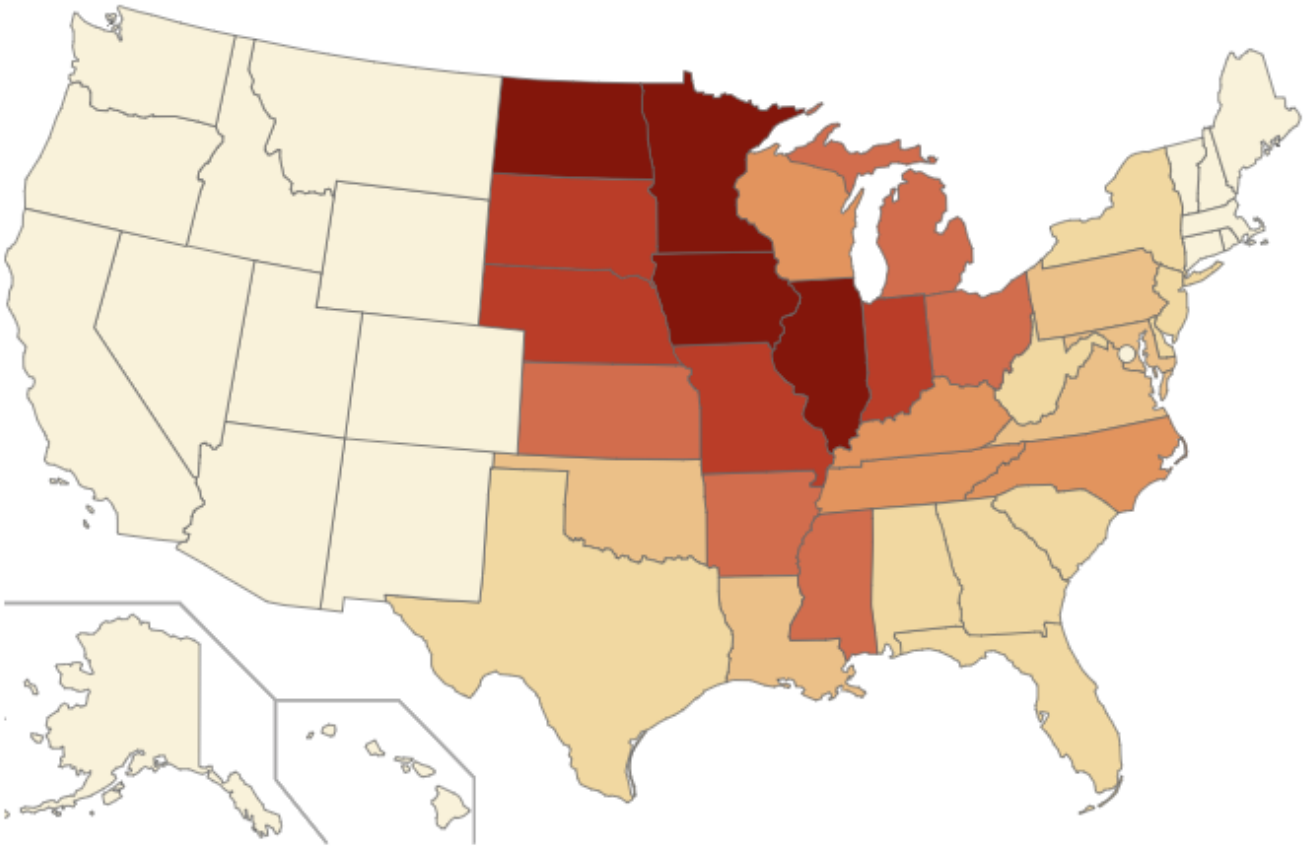


Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics.

According to the National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information, approximately 60 percent of the contiguous U.S. dealt with drought ranging from moderate to extreme over the 2002–03 period. NOAA data show that soybean farmers within the Midwest dealt with extremely dry weather—particularly in March and August 2003.[4] According to the USDA, top soybean-producing states such as Iowa, Illinois, and Minnesota experienced large drops in soybean output in 2003, compared with 2002. (See figure

1 for U.S. soybean acreage by state for 2018.) Southern Iowa, for example, experienced dry weather that started in May 2003, which was mainly responsible for lowering Iowa's soybean output by nearly 100 million bushels in 2003, compared with 2002.[5]

Figure 1. U.S. soybean acreage, by state, 2018



Hover over a state to see data.
Hover over legend items to see states in a category.
Source: U.S. Department of Agriculture's National Agriculture Statistical Services.

Although drought was the most significant factor in limiting supply, it was not the only problem for U.S. farmers in 2003. The crop was also affected by soybean aphids—small insects, native to Eastern Asia, that harm the plants by inhibiting photosynthesis, resulting in fewer pods and fewer seeds per pod. The first discovery of the soybean aphid in the United States was in Wisconsin in 2000; however, by 2003, soybean aphids were present in several neighboring states. The spread of aphids was aided by the cool, wet weather in the spring of 2003. By summer, lack of wind, rain, and a low number of native predators led to a sharp increase in the aphid population.[6] This

combination of drought and insect infestation dramatically reduced the 2003 soybean harvest, causing the upward trend in prices.

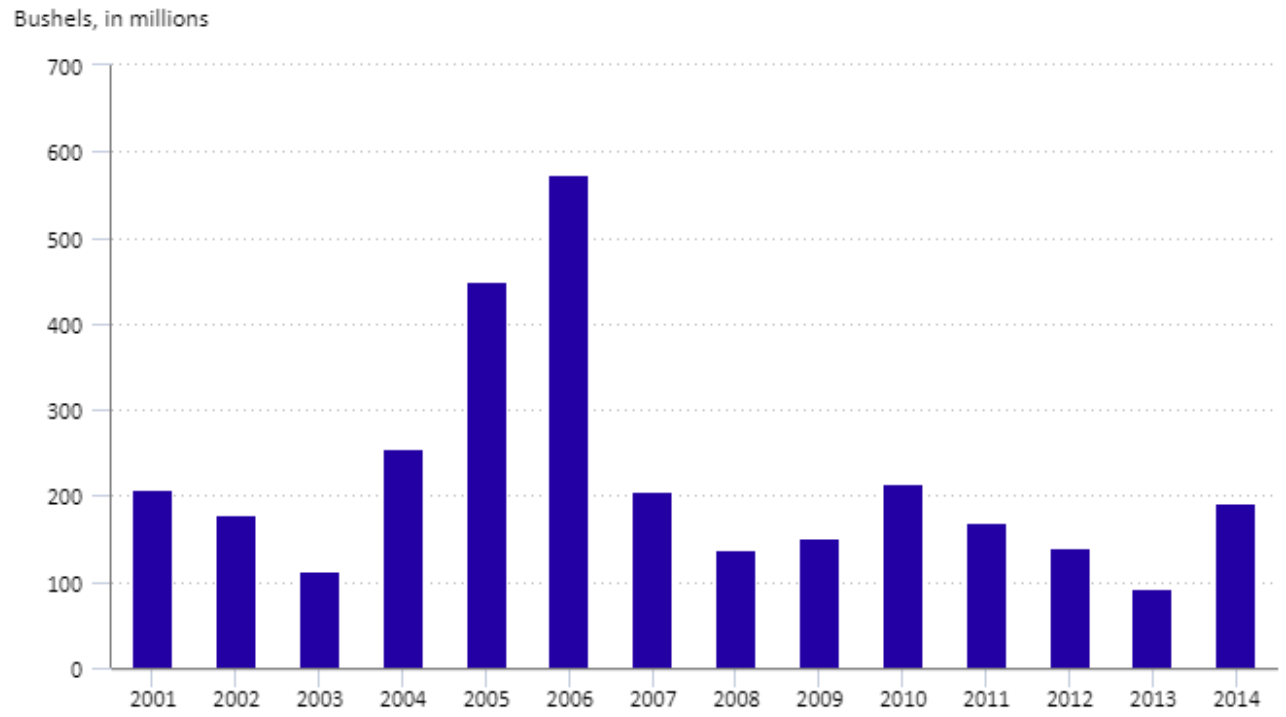
With supplies of soybeans lower than predicted in 2003, buyers rushed to purchase the remaining U.S. inventory to fulfill their agricultural and industrial needs. This came on top of the normal surge in demand experienced in the fall and winter from livestock producers looking to provide feed for their herds during the winter season when pastures are typically snow-covered.[7] In addition, China expanded its domestic poultry, hog, and aquaculture industries in 2003, which increased its demand for soybeans, causing further strain on the already limited supply.[8]

In January 2004, soybean beginning stocks—the amount of the commodity at the start of the season—were at 125 million bushels, approximately 28.1 percent less than beginning stocks in 2003. Less soybeans were exported in an effort to ration the remaining supply; however, prices continued to rise into 2004. Demand initially remained steady as processors and buyers absorbed the higher prices, but in early spring 2004, the higher prices caused demand to decrease, and even China started to cancel soybean orders as they turned to lower cost alternatives, such as canola, cottonseed, and bone meal.[9]

Second spike, 2006–08

After the initial price spike ended in 2004, a period of modest price fluctuations followed until the fall of 2006 when soybean prices, again, began to sharply increase and remain elevated through the spring of 2008. Unlike the events of 2003, the 2006 soybean season produced a record harvest. (See chart 2.) The 75.5 million acres of soybeans planted in 2006 produced a record 3.188 billion bushels.[10] Soybean ending stocks—defined as the amount of the commodity remaining in storage at the end of the growing season—were a record 575 million bushels. Despite the large harvest, soybean prices rose sharply in October and November 2006.[11]

Chart 2. Soybean ending stocks, in millions of bushels, 2001–14



Hover over chart to view data.
Note: Soybean ending stocks are the amount of the commodity in storage at the end of the growing season.
Source: U.S. Department of Agriculture, Economic Research Service.

Although the USDA reported that there was rainy weather in Indiana, Ohio, and Michigan that hampered the soybean harvest, as opposed to the previous price spike, insufficient supply was not the initial cause of the rise in prices. In this case, the increase was attributable to rising prices of corn and wheat. Like soybeans, corn and wheat are used for feed production. Corn and wheat production dropped while demand (especially from the burgeoning ethanol sector) was growing, pushing prices higher. As a result, soybean prices increased as demand for soybean meal (a substitute for corn and wheat-based feed) grew.[12]

In 2007, farmers planted less soybeans because corn had become the more valuable commodity. The USDA 2007 *Acreage* report stated that farmers planted 64.1 million acres of soybeans for the 2007 season—the lowest amount since 1995.[13] As a result, ending stocks for the 2007 season were estimated at 145 million bushels, well below the 575 million bushels from the previous season. The expected reduction in soybean supply contributed to the rising prices throughout the year. In addition, higher prices for both corn and wheat led to increased buying activity in the soybean market, as did poor harvest results for various other oilseeds (sunflower, cottonseed, peanut, and flaxseed). Livestock producers sometimes use cottonseed as a substitute for soybeans to feed cattle, hogs, and chickens. The USDA stated that the decline in output for these other oilseeds put greater demand on soybeans. Soybean prices would remain high into 2008, as excessive rainfall and below average temperatures in the Midwest slowed plantings.[14] Soybean prices finally dropped off in the late summer and early fall of 2008 when it became

apparent that the world economy was gripped by the Great Recession of 2007–09, and demand for all agricultural commodities softened.[15]

Third spike, 2012–14

The Great Recession eventually eased, and in September 2012, soybean prices reached a new high—increasing 27 percent from the previous year. The 2012 crop experienced both a reduction in planted acreage, as well as poor weather conditions that ultimately had an impact on output. The decline in acreage, coupled with dry soil conditions and hot temperatures created great stress on the soybean crop during summer and early fall of 2012.[16] Soybean prices eased in late fall 2012 and through early 2013 due to an improved harvest situation and mounting competition from South America. However, this was followed by another spike in prices during the spring of 2013, as excessive rainfall delayed plantings and supply forecasts were reduced.[17]

In addition, soybeans saw an increase in demand as feed markets sought a substitute away from corn in the wake of higher corn prices.[18] Export demand also increased, mostly from China, as dry conditions and port congestion in Brazil delayed plantings and postponed sales, further benefiting U.S. soybean farmers. An additional short spike in spring 2014 was due to higher demand as Brazilian shipments were delayed due to heavy rains, suspending harvest in one area while hot and dry weather lowered yields in another.[19] Soon after, the soybean index fell sharply as an increase in U.S. planted acreage and favorable summer weather conditions led to an excessive 2014 harvest.

Conclusion

The importance of soybeans to the overall farm economy has only grown with time.[20] Between 2002 and 2018, U.S. Census and the International Trade Administration data show that the export value of soybeans has grown from around 20 percent to more than 30 percent of all U.S. agriculture and livestock export sales.[21] Knowing what causes the rise and fall of prices within the soybean market is essential to understanding the health of the farm economy.

For the first price spike (2003–04), bad weather and insect infestation led to a shortage in supply, thereby raising prices. For the second spike (2006–08), an increase in demand caused prices to rise. This was later compounded by a supply reduction, induced by the 2007 drop in soybean acreage. The third spike (2012–14) was caused by a combination of both supply-side and demand-side factors. A reduction in U.S. acreage allocated to soybean production, coupled with extreme weather abroad that led to soybean shortages among foreign exporters, resulted in increased U.S. exports and higher prices. Though there are varied circumstances that lead to changes in the price of soybeans, most fluctuations can be explained by the simple dynamics of supply and demand.

This **Beyond the Numbers** article was prepared by Ralph Mondesir, economist in Office of Prices and Living Conditions, U.S. Bureau of Labor Statistics. E-mail: Mondesir.Ralph@bls.gov; telephone: (202) 691-7851.

RELATED ARTICLES

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NOTES

1 For more information on gross domestic product (GDP) by industry, see Gross Output by Industry from the U.S. Bureau of Economic Analysis (BEA), at https://apps.bea.gov/iTable/index_industry_gdpindy.cfm.

To obtain detailed BEA data providing percentages of GDP by industry group, at the website select "Access Underlying Detail Tables," then select "Value Added by Industry," and then select "Value Added by Industry as a Percentage of Gross Domestic Product (A)."

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[19] Mark Ash, “Oil crops outlook,” U.S. Department of Agriculture: Economic Research Service, March 12, 2014, report OCS-14c, https://downloads.usda.library.cornell.edu/usda-esmis/files/j098zb08p/js956j267/nc580q193/OCS-03-12-2014.pdf.

[20] For more information on the impact of tariffs on soybean shipments and prices, see https://farmdocdaily.illinois.edu/2018/09/evaluating-potential-long-run-impacts-of-chinese-tariff-on-us-soybeans.html and https://www.ers.usda.gov/webdocs/publications/93390/ocs-19f-01.pdf?v=3881.

[21] For data on export value of soybeans, see U.S. Census Bureau’s Economic Indicators Division Exports & Imports by NAICS Commodities at http://usatrade.census.gov.

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