The Evolving Role of the USDA in the Food and Agricultural Economy

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ABSTRACT

Since its inception in 1862, the US Department of Agriculture (USDA) has experienced dramatic growth and change, as has the industry it was set up to serve. The expanding, and sometimes conflicting, interests inherent in current USDA mandates came to a head during the most recent farm bill debate and pushed off passage for more than a year. Food writers and activists have proposed new agendas for the department. This paper first takes a step back and documents the changes that have occurred over time to US agriculture in general and to the USDA in particular, showing a diverse mix of current activities brought about by mission creep. The paper then reviews the academic research on the effects of selected USDA policies on agricultural producers and food consumers. Conventional economic justifications for government intervention along with public-choice analyses of intervention are discussed in light of selected USDA programs and the changes witnessed in agriculture over the past century. The paper concludes by highlighting some of the challenges and conflicts that exist with the current USDA mandates and asks what changes might be justified on economic efficiency grounds.

JEL codes: Q1, N5, H11

Keywords: agriculture, farming, farm bill, food, public choice

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Since its inception in 1862, the dramatic change and growth in the US Department of Agriculture (USDA) reflect not only changes in the industry it was originally set up to serve but also a complex web of responsibility created by numerous advocacy groups and an expansion of its mission. With an annual budget of around $150 billion (over $100 million of which goes toward food and nutrition assistance programs and over $20 million of which goes to farm support programs)[1] and more than 100,000 employees (or about 1 federal employee for every 20 farms),[2] the USDA's mission has expanded into contentious areas that extend well beyond the department's historical focus on farmer support and domestic agriculture. Those new areas are related to the environment, nutrition, rural development, lending, food safety, public health, and food assistance, just to name a few examples. In fact, the USDA currently runs the National Finance Center, which provides human resource and payment services for the rest of the federal government, and until 2009, it ran a graduate school.

The expanding, and sometimes conflicting, interests inherent in the USDA's mandates came to a head during the most recent farm bill debate. The Agricultural Act of 2014 (the 2014 Farm Bill), which authorizes USDA programs through 2018, was finally signed into law in February 2015. However, it was two years late, because the previous farm bill had expired in 2012.[3] The delay resulted from the difficulty that competing factions usually affected by the bill had in reaching a compromise. In recent decades, political support for the farm bill has been maintained by a coalition of rural farm interests that support farm programs and urban legislators who support food assistance programs.[4] That

1. USDA, *FY 2015 Budget Summary and Annual Performance Plan*.
2. US Census Bureau, *Statistical Abstract of the United States: 2012*, August 2011.
3. Congress passed temporary extensions of the 2012 bill. If the farm bill officially lapses, policy reverts to the 1949 Farm Bill, the last permanent farm bill legislation.
4. David Orden and Carl R. Zulauf, "Political Economy of the 2014 Farm Bill," *American Journal of Agricultural Economics* 87 (2015): 1298–311.

"almost three-quarters of [survey] respondents supported separating the food stamp program from the farm bill and debating its merits separately from farm support and subsidies."

political equilibrium was disrupted by fiscal conservatives worried about the costs of farm and food assistance programs accompanied by a cacophony of other advocacy groups interested in such issues as obesity, sustainability, international development, organic practices, hunger, food safety, animal welfare, the environment, and more. The final result was a bill that attempted to give a least something to many of the competing groups, resulting in a law that President Obama called a "Swiss army knife" that "multitasks."[5]

Congress has also sought advice about USDA reorganization. The 2014 Farm Bill included a mandate for the National Academy of Public Administration to recommend a new undersecretary for trade and foreign affairs.[6] The academy's 2015 report suggested the first reorganization of USDA in more than a decade. Its recommendations were to eliminate three current undersecretaries and replace them with three new undersecretaries focused on (1) trade and market development, (2) health and safety, and (3) farm services and risk management.

Consumers themselves have also expressed strong, if sometimes conflicting, opinions about agricultural policy. When asked to prioritize spending among six major expenditure categories at the USDA, survey respondents preferred reallocations from food assistance programs and farm support to food safety and research and education

5. David Jackson, "Obama Signs Farm Bill," *USA Today*, February 7, 2014. A host of federal and state policies that affect agricultural producers are outside the farm bill and the USDA. For example, ethanol policies are enforced by the Environmental Protection Agency, and they have arguably had as big an effect on agricultural markets in recent years as have any USDA policies. See, for example, Michael Roberts and Wolfram Schlenker, "Identifying Supply and Demand Elasticities of Agricultural Commodities: Implications for the US Ethanol Mandate," *American Economic Review* 103, no. 6 (2013): 2265–95. As another example, state property taxes often favor agricultural producers over other types of landowners. See John E. Andersen, Seth H. Giertz, and Shafiun N. Shimul, "The Spread of Use-Value Assessment Programs for Agricultural Land across the United States," Mercatus Center at George Mason University, Arlington, VA, December 9, 2015.
6. National Academy of Public Administration, *Advancing U.S. Agricultural Trade: Reorganizing the U.S. Department of Agriculture*, October 2015.

activities.[7] Nonetheless, other studies have shown relatively high levels of public support for farm subsidies, particularly those targeting small farmers, on the basis of the (probably inaccurate) belief that the subsidies help ensure a secure food supply.[8] One survey during the most recent farm bill debate revealed low levels of support for monetary cuts to food assistance programs, such as the Supplemental Nutrition Assistance Program (SNAP—otherwise known as "food stamps"), but high levels of support for stricter restrictions on the programs. Perhaps most interesting was that almost three-quarters of respondents supported separating the food stamp program from the farm bill and debating its merits separately from farm support and subsidies.[9]

Of course, public opinion does not necessarily equate with economically efficient policies, but it must be acknowledged that public opinion shapes and constrains political decisions. Well-known authors and food activists, for example, have recently argued for a policy overhaul focusing more on food than on the farm. Writing in the *Washington Post*, Mark Bittman, Michael Pollan, and their colleagues proposed a whole suite of new policies that would guarantee, among other things, "access to healthy food," "fair wages" for food workers, lower carbon emissions, stricter animal welfare practices, and farm policies that "support our public health and environmental objectives."[10] The irony is that the USDA is already moving toward implementing many of these policies.

Not only are the pressures and demands of food activists and taxpayers affecting USDA activities, the courts are affecting them as well. In the summer of 2015, the Supreme Court—in a vote of eight to one—struck down a 1940s-era USDA marketing order that forced producers to give up a portion of their raisins to the Raisin Administrative Committee in an effort to artificially raise prices.[11] Justice Elena Kagan was quoted as saying that the court's task was to decide whether "this marketing order is a taking or it's just the world's most outdated law."[12] Other commodities are affected by marketing orders, though it is unclear to what extent the latest ruling will affect orders on other commodities like milk,

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7. Brenna D. Ellison and Jayson L. Lusk, "Taxpayer Preferences for USDA Expenditures," *Choices* 26, no. 2 (2011).
8. Brenna D. Ellison, Jayson L. Lusk, and Brian C. Briggeman, "Taxpayer Beliefs about Farm Income and Preferences for Farm Policy," *Applied Economic Perspectives and Policy* 32, no. 2 (2010): 338–54; Brenna D. Ellison, Jayson L. Lusk, and Brian C. Briggeman, "Other-Regarding Behavior and Taxpayer Preferences for Farm Policy," *BE Journal of Economic Analysis & Policy* 10, no. 1 (2010): 1–29.
9. Jayson L. Lusk, "Public Opinion about the Food Stamp Program," *FarmdocDaily*, Department of Agricultural and Consumer Economics, University of Illinois, October 18, 2013.
10. Mark Bittman et al., "How a National Food Policy Could Save Millions of American Lives," *Washington Post*, November 7, 2014.
11. Horne et al. v. Department of Agriculture, 576 U.S. __ (2015).
12. Adam Liptak, "Supreme Court Hears Appeal in Raisin Case," *New York Times*, April 22, 2015.

walnuts, tomatoes, onions, and oranges.[13] This case is certainly not the first or only USDA program to be challenged in a court of law. In fact, agricultural programs have been legally challenged since the birth of agricultural support programs, which were ushered in during the Great Depression.[14] Legal pressures have come not only from within the United States but also from other countries, as perhaps best exemplified by World Trade Organization rulings against certain features of the US cotton subsidy program and against mandatory origin labeling laws for meat.[15]

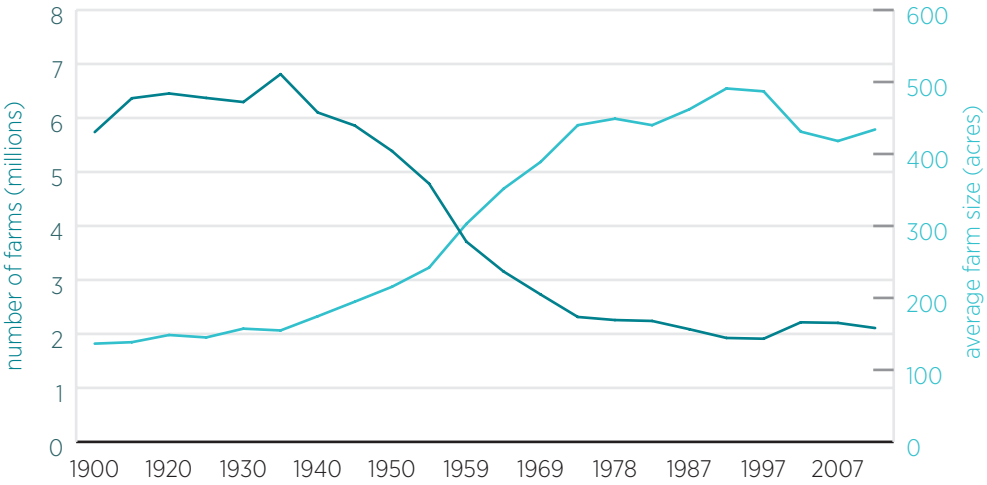
This paper proceeds as follows. First, it takes a step back and documents the dramatic changes that have occurred over time to US agriculture, notably increasing farm size and specialization and the concentration of production among a few relatively large farms. After examining the growth of the department, it then briefly reviews the academic research on selected USDA policies, including the effects of farm subsidies, SNAP, and agricultural research on food prices, food security, and farm profits. Although economic justifications have been offered for certain USDA programs, they often fail to hold up under scrutiny and, in some cases, are far less relevant today than in the past. Public choice considerations help explain the existence and persistence of farm subsidies, and these issues are discussed in the penultimate section. Finally, the paper concludes by highlighting some of the challenges and conflicts inherent in the current makeup of the USDA and asking what the future may hold for the department.

US AGRICULTURE, PAST AND PRESENT

The agricultural economy in the United States has witnessed dramatic change over the past century. Even with the massive increases in agricultural output (e.g., corn, wheat, and cotton yields increased by roughly 600 percent, 350 percent, and 430 percent, respectively, from 1900 to 2014), the number of Americans engaged in agriculture has plummeted. An understanding of the dramatic changes in agriculture is necessary to comprehend the historical focus of the USDA and to evaluate its current activities.

13. For a full list of commodities covered, see the links at the USDA Market News web page, http://www.ams.usda.gov/rules-regulations/moa.
14. Jim Chen, "The Story of *Wickard v. Filburn*: Agriculture, Aggregation, and Commerce" (Legal Studies Research Paper No. 2008-40, University of Louisville Law School, Louisville, KY, 2008).
15. World Trade Organization, "United States—Subsidies on Upland Cotton," WTO Case DS267, 2002; World Trade Organization, "United States—Certain Country of Origin Labelling (COOL) Requirements," WTO Case DS384, 2008.

FIGURE 1. NUMBER OF FARMS AND FARM SIZE OVER TIME



Note: After 1997, the USDA adjusted the figures for coverage.

Source: USDA Census of Agriculture.

Changes in Farm Households

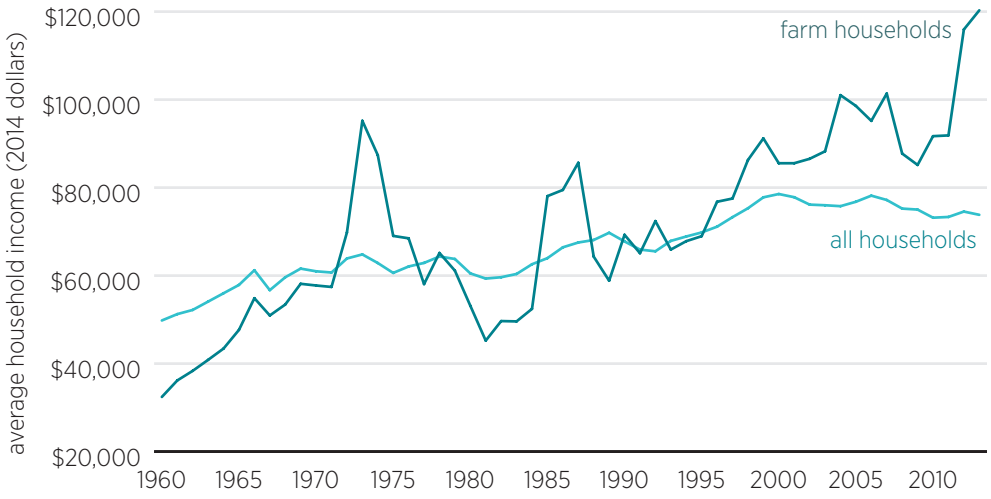
In 1900, just under 40 percent of the total US population lived on farms, and 60 percent lived in rural areas. Today, the respective figures are only about 1 percent and 20 percent. Moreover, agriculture is now less important with regard to the overall economy. Although total agricultural output has grown massively, the rest of the economy has grown faster. Agriculture accounted for 7.7 percent of GDP in 1930 but only 0.7 percent in 2000.[16]

The United States had between six and seven million farms from 1910 to 1940 (figure 1). A sharp decline in the number of farms occurred from the 1940s to the 1980s. At the same time, the average farm size more than doubled, from about 150 acres to around 450 acres. In short, today there are fewer but larger farms than there were in the past.

Figure 2 reports the average household income of farm households compared with all US households from 1960 to 2014. Whereas farm households earned lower incomes than other households before the 1970s, since the mid-1990s, farm households have consistently earned more than other US households. For several years after 2000, average annual farm household income was at

16. USDA Economic Research Service, *Price Spreads from Farm to Consumer*, 2015.

FIGURE 2. HOUSEHOLD INCOME OVER TIME IN 2014 DOLLARS

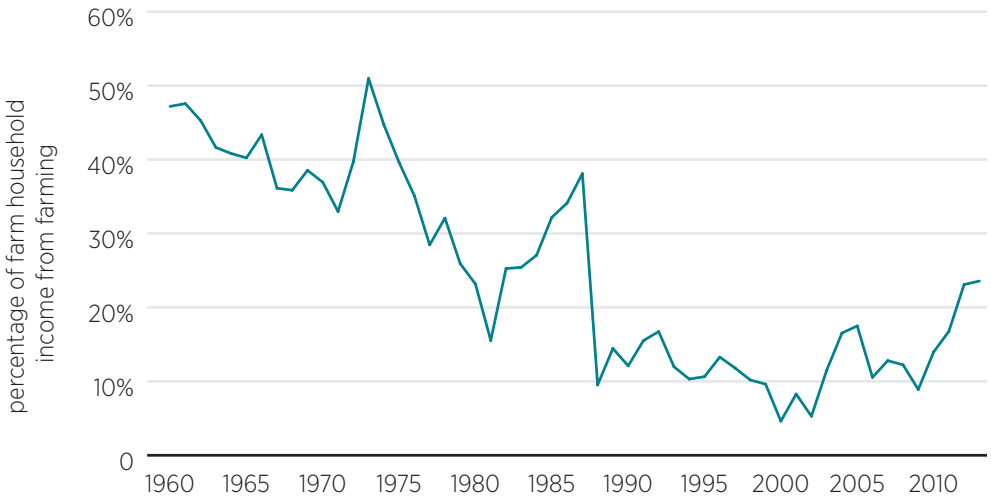


Source: USDA Economic Research Service, *Price Spreads from Farm to Consumer*, 2015.

least $20,000 more than that of all US households. In addition to earning higher incomes, farm households today tend to have substantially higher net worth than the average US household. Census data indicate that the mean (median) net worth of all US households in 2012 was $338,950 ($68,800). By contrast, the mean (median) net worth of farm households in 2014 was $915,210 ($802,000). Thus, farm households have, on average, 170 percent higher net worth than the average US household. In 2012, 98 percent of farm households had a net worth that exceeded the net worth of the median US household.[17] None of those income and wealth comparisons consider differences in cost of living, which would likely further widen the gap between farm households and the average US household, as cost of living is likely lower in rural areas than in urban areas. Moreover, the differences do not account for possible discrepancies in income reported on surveys or even to the Internal Revenue Service. For example, economists Naomi Feldman and Joel Slemrod calculate that income of farms that is reported to the IRS is understated by a factor of 3.87 relative to income of households whose

17. US Census Bureau, *Statistical Abstract of the United States: 2012*, August 2011; US Census Bureau, "Wealth and Asset Ownership," http://www.census.gov/people/wealth/; US Census Bureau, "Farm Household Well-Being," last updated May 2, 2016.

FIGURE 3. PERCENTAGE OF FARM HOUSEHOLD INCOME FROM FARMING OVER TIME



Source: USDA Economic Research Service, *Price Spreads from Farm to Consumer*, 2015.

wages and salaries are reported directly to the IRS.[18] Recent declines in commodity prices are likely to bring farm income down from the high shown in figure 2, but not by so much that farm income falls below average US household income. For the past 20 years, farm households as a group have been in relatively good financial standing compared with the average US household.

Farm household incomes have become more diversified over time in the sense that the percentage of household income from farming has steadily declined (aside from the increase in 2011–2012 from higher commodity prices). In 1960, almost half the income earned by farm households came from farming. By 2000, it reached a low of about 5 percent before rebounding to about 20 percent (figure 3). So while farms have become more specialized (growing fewer commodities than they did in the past), the household income of farmers has become more diversified and less reliant on farm income.

Some of the apparent income diversification likely comes from the way farms are defined by the USDA. Table 1 shows the distribution of farms in the United States by total sales. Twenty percent of farms have total sales of

18. Naomi E. Feldman and Joel Slemrod, "Estimating Tax Noncompliance with Evidence from Unaudited Tax Returns," *Economic Journal* 117, no. 518 (2007): 327–52.

TABLE 1. SIZE OF FARMS AND VALUE OF PRODUCTION IN 2012

Farm type (by total sales)	Percentage of all farms	Percentage of production value	Percentage of all acres farmed
Less than $1,000	20.3	0.0	6.9
$1,000 to $2,499	11.2	0.1	1.9
$2,500 to $4,999	11.0	0.2	2.3
$5,000 to $9,999	11.8	0.4	3.5
$10,000 to $24,999	12.9	1.1	6.1
$25,000 to $49,999	7.7	1.4	5.8
$50,000 to $99,999	6.4	2.4	7.8
$100,000 to $249,999	6.7	5.8	13.7
$250,000 to $499,999	4.5	8.6	13.6
$500,000 to $999,999	3.7	13.8	14.4
$1,000,000 or more	3.9	66.2	24.0

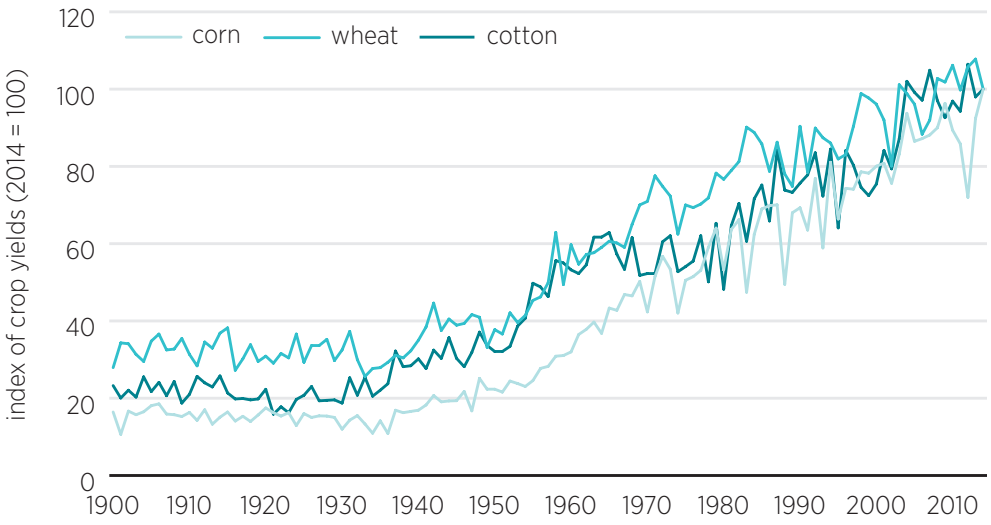
Source: USDA Census of Agriculture.

less than $1,000, and 67 percent of farms have total sales of less than $25,000. Those small farms account for only a small share of the value of agricultural output. In fact, farms with total sales of less than $25,000 (more than half of all farms) account for less than 1 percent of the value of agricultural output while farming 20.7 percent of the acreage. By contrast, 7.5 percent of the larger farms (those with more than $500,000 in sales) account for 80 percent of the value of agricultural output while farming only 38.4 percent of the land. These data suggest that much of the information the USDA reports on farms fails to correspond with businesses that have any substantive level of output and that the farms are run by households for which the vast majority of income comes from nonfarm sources.

Changes in Prices and Productivity

The changes in the number and composition of farms over time are partly attributable to changes in technology and market conditions. Figure 4 shows an index of yields for corn, wheat, and cotton. Corn yields in 1900 were only 18 percent of what they were in 2014. In 1900, wheat yields were only about 30 percent of what they were in 2014. With the adoption of tractors, synthetic fertilizers, and improved seeds, yields began climbing after World War II. Yield growth has continued until today, although the rate of growth has slowed somewhat in recent decades.

FIGURE 4. INDEX OF CROP OUTPUT PER UNIT OF LAND (YIELD)

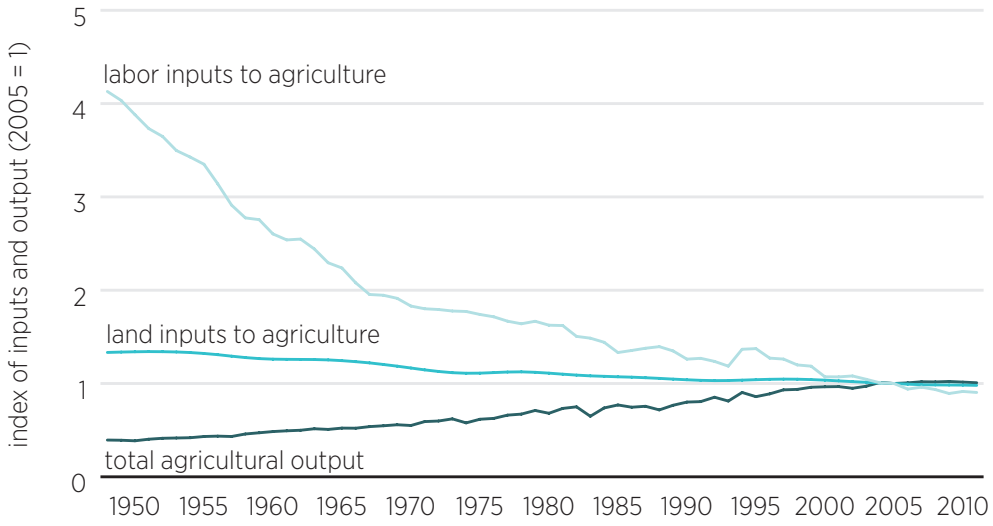


Source: USDA National Agricultural Statistics Service.

It is possible to achieve higher output by increasing the volume of the inputs used. However, total agricultural output has more than doubled since 1948, while key agricultural inputs have fallen (figure 5). More output with fewer inputs implies increased productivity. In 1948, the amount of labor used in agriculture was four times what it is today. As figure 5 shows, the United States produces more agricultural output today, despite using less land and substantially less labor.

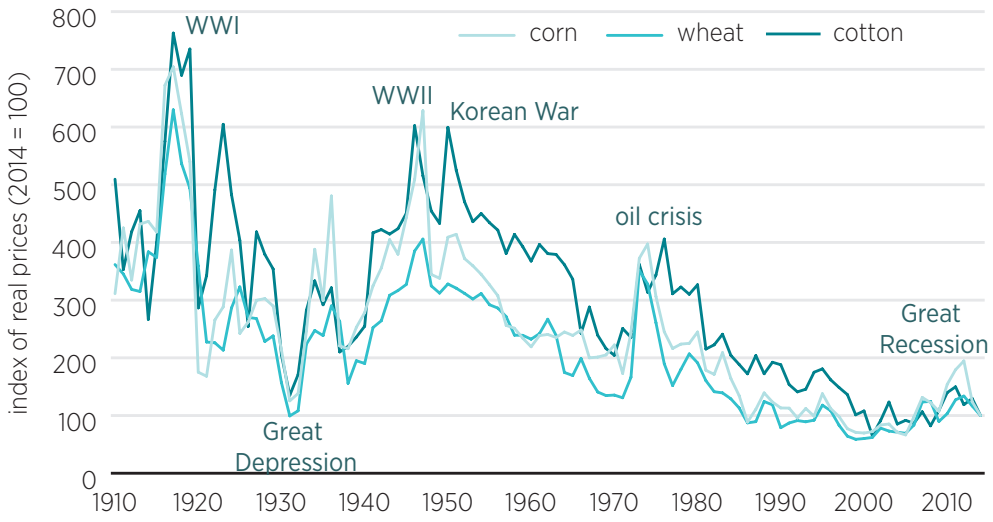
Increasing productivity leads to falling prices. Figure 6 shows an index of real prices from 1910 to 2014 for corn, wheat, and cotton. Before the 1950s, prices for those commodities were routinely three to six times higher than they are today. Around World War I, as production in Europe fell, farm commodity prices in the United States reached a high (prices were seven times higher than they were in 2015). When production in Europe resumed after the war, prices fell dramatically. The peak prices around 1910 became known as "parity prices" in the ensuing years when the first farm support programs were introduced. But rather than ideal prices to be achieved, the data in figure 6 suggest that the so-called parity price outcomes observed during that period were an aberration and not the norm. The beneficiaries of falling agricultural prices have been food and fiber consumers. Farmers face lower prices today than in the past, but as

FIGURE 5. INDEX OF FARM INPUT AND OUTPUT



Source: USDA Economic Research Service, "Agricultural Productivity in the U.S.," 2015.

FIGURE 6. REAL PRICES RECEIVED BY FARMERS



Source: USDA National Agricultural Statistics Service.

the preceding figures reveal, they have more output to sell, resulting in higher net incomes.

USDA PAST AND PRESENT

The USDA was initially created to secure and supply new seeds for farmers. Food safety concerns brought about by muckraking novels added public health objectives in the early 1900s. Then, with the Great Depression, the USDA took on a host of farm income support responsibilities. Lyndon B. Johnson's Great Society added antipoverty and nutrition programs to the list of USDA activities. Among various other issues, environmental objectives have been added in recent decades. This section discusses the expanding mission of the department.

Background

Abraham Lincoln signed into law the act that established the Department of Agriculture in 1862, but the organization's original objectives were quite different from those today. The original act reads,

> *Be It Enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That there is hereby established at the seat of government of the United States a Department of Agriculture, the general designs and duties of which shall be to acquire and to diffuse among the people of the United States useful information on subjects connected with agriculture in the most general and comprehensive sense of that word, and to procure, propagate, and distribute among the people new and valuable seeds and plants.[19]

The USDA was created as an extension of the US Patent Office with the primary purpose of collecting seeds from abroad and distributing them to US farmers.

Food safety, financial support for farmers, and environmental objectives were not a part of the USDA's initial focus. American farmers received little to no direct financial help from the federal government until the Great Depression. Even during the financial crises of the mid-1890s, then secretary of agriculture J. Sterling Morton did not acquiesce to demands for subsidies from sugar beet farmers. Morton said, "Those who raise corn should not be taxed to encourage those

19. An Act to Establish a Department of Agriculture, ch. 72, 12 Stat. 387 (1862).

who desire to raise beets. The power to tax was never vested in the Government for the purpose of building up one class at the expense of the other classes."[20]

Congress's first attempt at agricultural support began with the McNary-Haugen Farm Relief Act introduced during the 1920s to fix the prices of certain crops to the "parity," pre–World War I levels. Congress passed the bill, but President Calvin Coolidge vetoed it, echoing the sentiments of Morton by saying the passing of the bill "would establish bureaucracy on such a scale as to dominate not only the economic life but the moral, social, and political future of our people."[21] Coolidge also remarked that he did not believe "the farmers of America would tolerate the precedent of a body of men chosen solely by one industry who, acting in the name of the Government, shall arrange for contracts which determine prices, secure the buying and selling of commodities, the levying of taxes on that industry, and pay losses on foreign dumping of any surplus."

A major change in the mission of the USDA came in response to food safety issues. Upton Sinclair's 1906 novel *The Jungle* was a precipitating factor in Congress's passing the Federal Meat Inspection Act as well as the Pure Food and Drug Act. Soon after, the Poultry Products Inspection Act, the Humane Methods of Slaughter Act, and the Egg Products Inspection Act all were passed, and enforcement fell to the USDA.

The Great Depression led to other major changes in the mission of the USDA. Herbert Hoover established the Farm Board, which created price floors for wheat and cotton. When market prices fell below 80 cents per bushel for wheat and 20 cents per pound for cotton, the federal government would step in to buy the crop, pay to store it, and hope to resell it later when prices rebounded. The program immediately had unintended consequences. Farmers who grew other crops were now incentivized to grow wheat and cotton because of the price guarantees. The resulting overproduction lowered prices below the floor and resulted in the government's buying the excess crops and quickly exhausting the program's $500 million budget. After only two years of buying surpluses, the government finally just gave them away or sold them on the world market for significant losses.

Agricultural Policy after the New Deal

As a part of the New Deal, the Roosevelt administration ushered in the Agricultural Adjustment Act of 1933. The act attempted to prop up prices by reducing

20. James C. Olson, *J. Sterling Morton: Pioneer Statesman, Founder of Arbor Day* (Lincoln: University of Nebraska Press, 1942) 358–59.
21. Burton W. Folsom, "The Origin of American Farm Subsidies," *Freeman*, April 1, 2006.

supply. Farmers who agreed not to plant particular crops, or to kill off livestock, received subsidies. Prices for crops were pegged to the "parity" prices of 1910. As a result, the program raised the prices of everything from bread to shirts for consumers. In 1936, the Supreme Court ruled that the Agricultural Adjustment Act was unconstitutional, stating that "a statutory plan to regulate and control agricultural production is a matter beyond the powers delegated to the federal government."[22]

Nonetheless, other programs that were enacted were upheld by the courts. For example, instead of subsidizing farmers not to plant crops, a similar program subsidized farmers who grew crops like alfalfa that would not be sold on the market. When those programs were challenged on constitutional grounds, the Supreme Court ruled in favor of protecting the newly formed agricultural programs, invoking the Commerce Clause.[23] One of the most notable cases was that of Ohio farmer Roscoe Filburn, who was prosecuted by the federal government for growing more wheat than his allotment. Even though he planned to use the wheat only on his own farm, the Supreme Court ruled that he violated the Agricultural Adjustment Act of 1938.[24] By growing more wheat than his allotment, Filburn indirectly depressed prices, according to the Court. His wheat was destroyed.[25]

The Agricultural Adjustment Act of 1938 replaced the Agricultural Adjustment Act of 1933 and was designed to work around the Supreme Court's objections to the original law. Whereas the 1933 act could be considered the first farm bill, the 1938 act was the first created with the intention of being updated every five years. Since that time, new farm bills have been created on a routine, periodic basis right up to the most recent Agricultural Act of 2014. The 2014 Farm Bill authorizes USDA programs through 2018.

"Ohio farmer Roscoe Filburn . . . was prosecuted by the federal government for growing more wheat than his allotment. Even though he planned to use the wheat only on his own farm, the Supreme Court ruled that he violated the Agricultural Adjustment Act of 1938."

22. United States v. Butler, 297 U.S. 1 (1936).
23. Chen, "Story of *Wickard v. Filburn*."
24. Wickard v. Filburn, 317 U.S. 111 (1942).
25. Chen, "Story of *Wickard v. Filburn*."

The mission of the USDA has steadily expanded since the 1930s. The 1950s introduced flexible (as opposed to fixed) price supports for commodities and temporarily introduced the Conservation Reserve Program. The 1970s witnessed the inclusion of rural development objects along with target prices and deficiency payments for commodities. The biggest change during that period coincided with the advent of Lyndon B. Johnson's Great Society. Johnson's administration charged the USDA with overseeing programs meant to promote the well-being of the poorest of Americans through food stamps and commodity distribution programs. As the next section will reveal, that change ultimately caused a dramatic increase in the size of the USDA's budget. Temporary versions of the food stamp program existed before the 1960s, but Lyndon Johnson reestablished the program as a pilot project, and it was made permanent in 1964. Those early versions of the program required participants to buy stamps, essentially changing the relative price of food (and thus perhaps having a larger effect on farmers). It wasn't until the mid-1970s that the program rolled out nationwide and participants were no longer required to purchase food stamps.

In the 1980s, commodity loan programs were introduced to offset the effect of government-owned grain storage, and the Conservation Reserve Program was reestablished. The so-called Freedom to Farm bill in 1996 brought about more planting flexibility for farmers, allowing greater responsiveness to market prices. It also introduced direct payments that were based on historical (rather than current) production levels. In recent years, crop insurance has played an increasingly important role in USDA farm programs.[26]

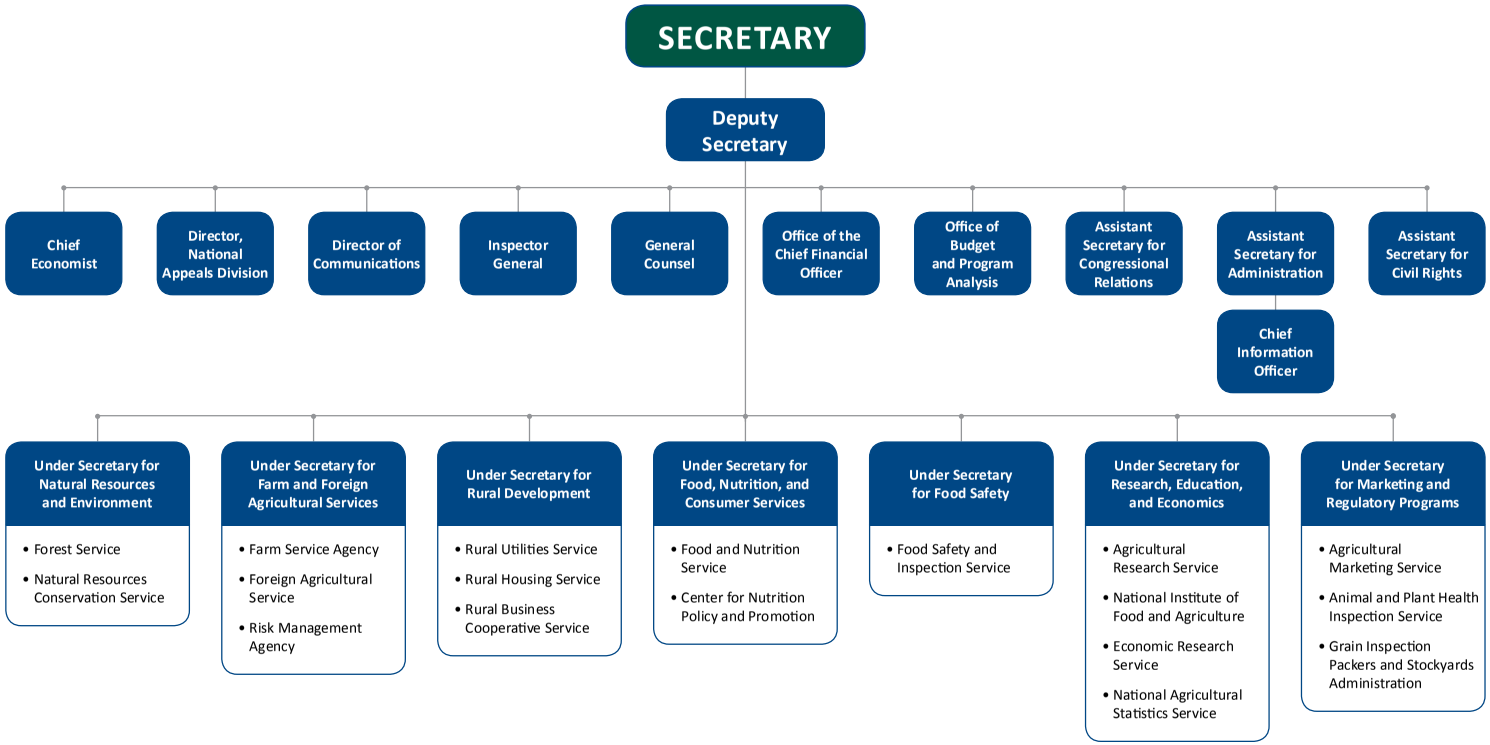
The USDA Today

Today, the USDA engages in numerous activities. The department has 17 different agencies and 18 different offices (figure 7). The agencies are organized under seven politically appointed under secretaries responsible for (1) natural resources and the environment; (2) farm and foreign agricultural services; (3) rural development; (4) food, nutrition, and consumer services; (5) food safety; (6) research, education, and economics; and (7) marketing and regulatory programs.

The 17 USDA agencies are the (1) Agricultural Marketing Service; (2) Agricultural Research Service; (3) Animal and Plant Health Inspection Service; (4) Center for Nutrition Policy and Promotion; (5) Economic Research Ser-

26. These and other developments are discussed in more detail by Carolyn Dimitri, Anne Effland, and Neilson Conklin, *The 20th Century Transformation of U.S. Agriculture and Farm Policy*, USDA Economic Research Service, Economic Information Bulletin No. 3, June 2005.

FIGURE 7. USDA ORGANIZATION CHART



Source: Created by the USDA.

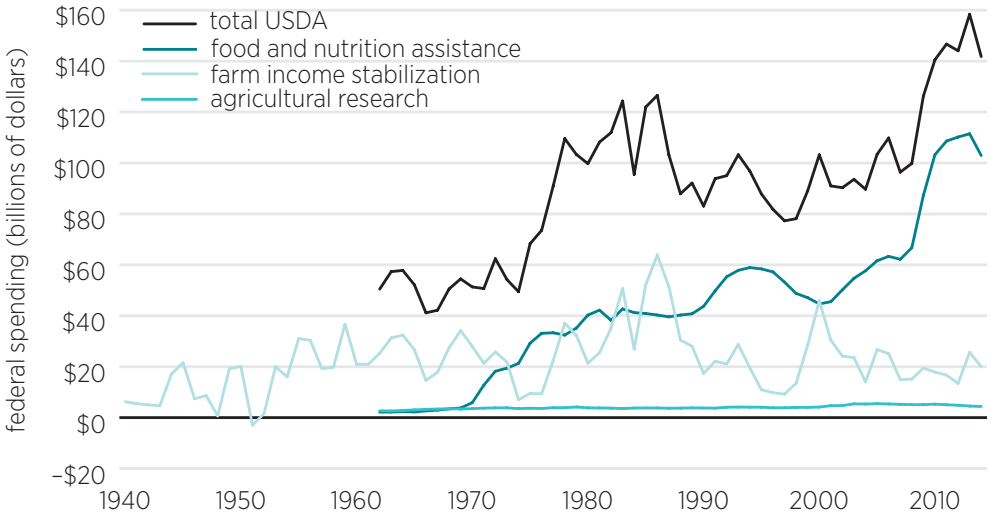
vice; (6) Farm Service Agency; (7) Food and Nutrition Service; (8) Food Safety and Inspection Service; (9) Foreign Agricultural Service; (10) Forest Service; (11) Grain Inspection, Packers and Stockyards Administration; (12) National Agricultural Library; (13) National Agricultural Statistics Service; (14) National Institute of Food and Agriculture; (15) Natural Resources Conservation Service; (16) Risk Management Agency; and (17) Rural Development. A complete description of each agency and descriptions of an additional 18 offices are available online.[27]

Many (but not all) USDA activities are authorized by the farm bill, the most recent of which is the Agricultural Act of 2014.[28] The 2014 Farm Bill has 12 major sections (or titles) related to (1) commodities; (2) conservation; (3) trade; (4) nutrition; (5) credit; (6) rural development; (7) research, extension, and related matters; (8) forestry; (9) energy; (10) horticulture; (11) crop insurance; and (12) miscellaneous. Before its passage, the Congressional Budget Office projected that the total cost of the bill would amount to $956 billion over the 10-year period 2014–2023.[29] Falling commodity prices are likely to boost actual costs of the bill.[30]

Although "farm subsidies" are often mentioned in popular discourse as some monolithic policy, in reality they are a diverse mix of policies that subsidize farmers either directly or indirectly. With regard to the most visible farm subsidies that come through the USDA, the 2014 Farm Bill introduced two new programs, price loss coverage (PLC) and agricultural risk coverage (ARC); eliminated direct payments; and continued the crop insurance program, adding a new feature that subsidizes the deductible in addition to providing the ongoing subsidies for the premium. The 2014 Farm Bill requires producers to make a set of complicated and interrelated decisions related to base acreage, enrollment in ARC (either for county or individual coverage) or PLC, crop insurance coverage, and the availability of supplemental coverage for the deductible if PLC is selected. The Farm Service Agency handles decisions related to base acreage and choice of PLC and ARC, whereas the Risk Management Agency oversees the crop insurance programs. Other key changes in the 2014 Farm Bill include the addition of $200 million to create the Foundation for Food and Agricultural Research, a public-private venture to fund research; a doubling of

27. USDA, USDA Agencies and Offices web page, http://www.usda.gov/wps/portal/usda/usdahome?navid=AGENCIES_OFFICES_C.
28. Agricultural Act of 2014, Pub. L. 113-79, 128 Stat. 649 (2014).
29. Congressional Budget Office, *H.R. 2642, Agricultural Act of 2014*, January 28, 2014.
30 David Rogers, "Payments to Farmers May Exceed Farm Bill's Expectations," *Politico*, January 29, 2015.

FIGURE 8. USDA REAL SPENDING OVER TIME



Source: Author's calculations based on data reported in Office of Management and Budget, "Historical Tables," *Fiscal Year 2015: Budget of the U.S. Government*.

the Small Crops Research Initiative to $80 million; the provision of $72.5 million for the Specialty Crop Block Grant Program; a requirement of particular conservation practices for certain types of land as eligibility for subsidized crop insurance; an authorization of $800 million for energy programs; and $100 million for beginning farmers and ranchers, among other changes.[31]

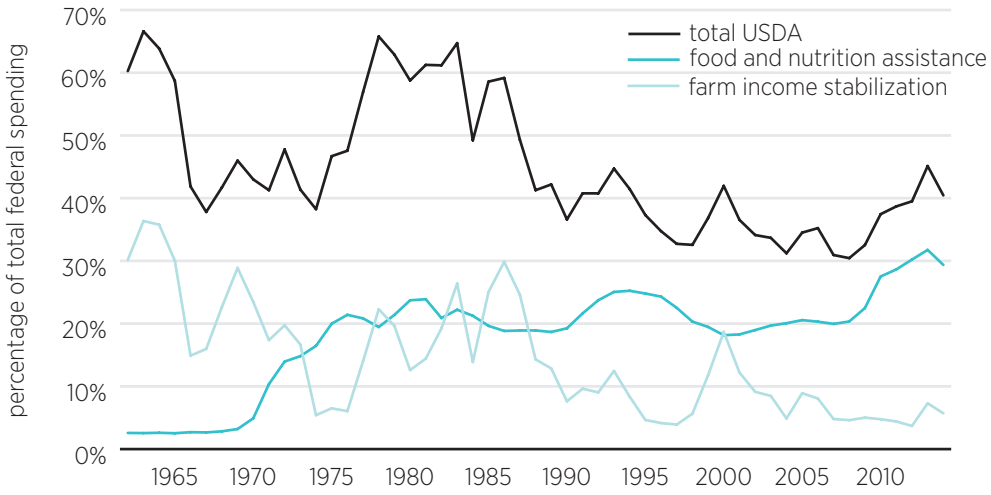
USDA by the Numbers

Figure 8 shows USDA spending in real terms from 1940 to 2014.

As figure 8 indicates, since the 1960s there has been a sharp increase in USDA spending. Most of that increase has been driven by spending on food and nutrition assistance (primarily food stamps). Of total USDA outlays in 2014, over 70 percent went toward food and nutrition assistance. Real spending on agricultural research slowly increased from the 1960s and experienced a sharp jump in the first few years of the 21st century. Since that time, research funding has declined in real terms and fell back in 2014 to the pre-2000 levels. Spending

31. USDA, *2014 Farm Bill Highlights*, March 2014.

FIGURE 9. SPENDING ON USDA AND SUBFUNCTIONS AS A PERCENTAGE OF TOTAL FEDERAL SPENDING



Source: Author's calculations based on data reported in Office of Management and Budget, "Historical Tables," *Fiscal Year 2015: Budget of the U.S. Government*.

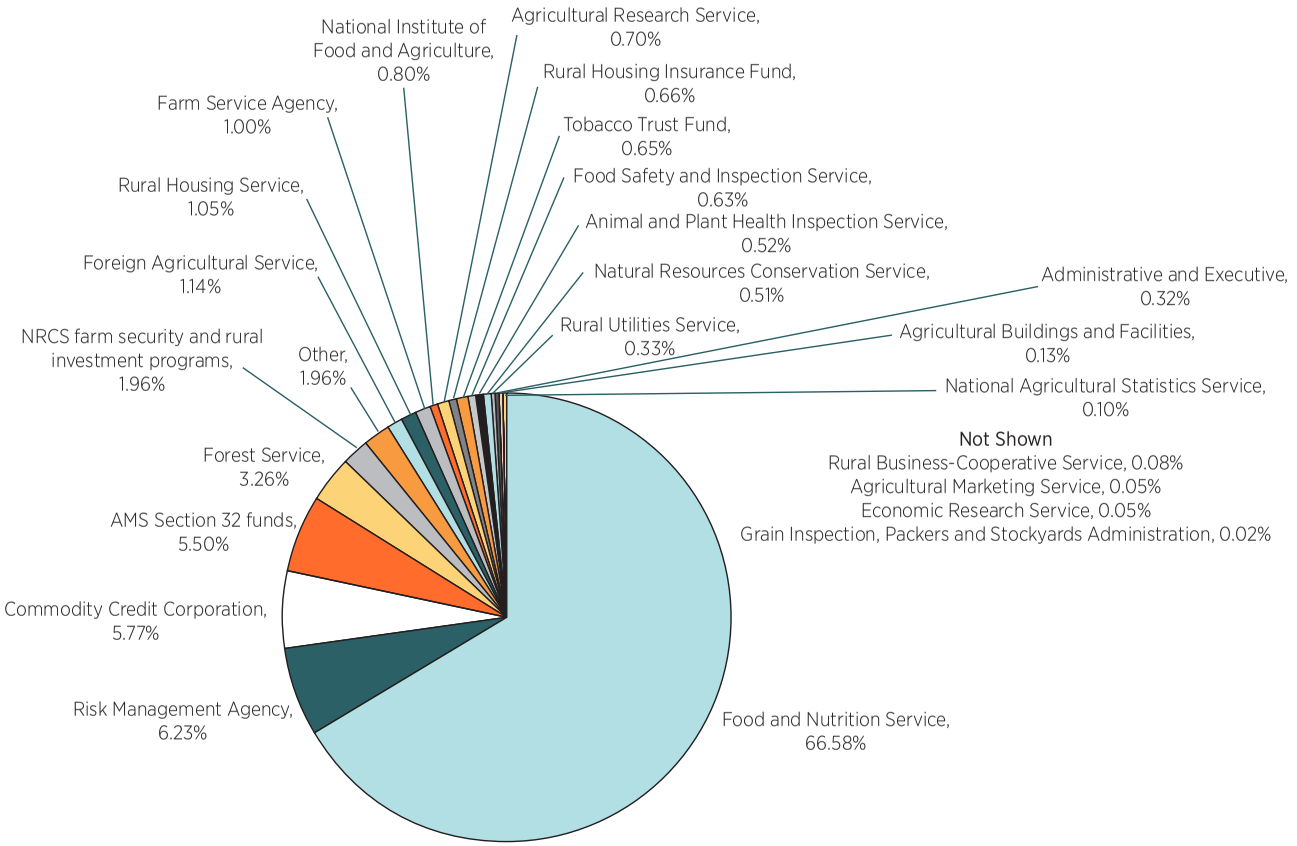
on farm income stabilization varies from year to year, but it has hovered around $20 billion in recent years.

From 1980 until 2009, total federal spending increased at a faster rate than did USDA spending, leading to a fall in the share of spending attributable to the USDA. Since that time, USDA spending has outpaced total federal spending because of increases in food and nutrition assistance. In 2014, the USDA was responsible for about 4 percent of total federal spending (figure 9).

Figure 10 shows a breakdown of the USDA budgetary authority for 2014. The department was authorized to spend $161 billion, with 66.6 percent allocated to the Food and Nutrition Service, which is responsible for administering the Supplemental Nutrition Assistance Program.[32] The next-largest spending categories in 2014 were the Risk Management Agency (i.e., crop insurance) and the Commodity Credit Corporation. The Commodity Credit Corporation is the mechanism through which the USDA pays out farm subsidies associated with price and income support programs, Conservation Reserve Program payments,

32. Of the $107 billion budgeted for the Food and Nutrition Service, 82.8 percent was for SNAP; 10.5 percent was for child nutrition programs; 6.3 percent was for the Women, Infants, and Children program; 0.3 percent was for commodity assistance programs; and 0.1 percent was for administration. On top of that, an additional $8 billion was allocated for child nutrition programs from Section 32 funds.

FIGURE 10. COMPONENTS OF 2014 USDA BUDGET, TOTALING $161 BILLION



Note: AMS = Agricultural Marketing Service; NRCS = Natural Resources Conservation Service.

Source: Author's calculations based on USDA budget authority as reported by USDA.

and payments for export promotion programs. The Agricultural Marketing Service Section 32 funds (representing customs receipts allocated to support the farm sector; in recent years, most of those funds have been transferred to the childhood nutrition account) and the Forest Service account for 5.5 percent and 3.3 percent of the USDA budget, respectively. All other agencies individually account for 2 percent or less of total USDA spending.

As a basis for comparison, and to illustrate how the USDA has changed over time, figure 11 shows a breakdown of the USDA budgetary authority in 2006, when the department was authorized to spend only $100 billion. The Food and Nutrition Service accounted for only 53.7 percent in 2006 compared with 66.6 percent in 2014. The Commodity Credit Corporation played a much larger role in the USDA budget in 2006 than in 2014, with the opposite being true of the Risk Management Agency.

While figure 9 suggests USDA expenditures represent only a small share of overall federal spending, figure 12 shows that the department is among the largest federal employers. In 2010, the USDA had 106,867 employees. If one disregards employment by the Defense Department (and Veterans Affairs) and the US Postal Service, USDA employees account for just under 10 percent of all federal employees.

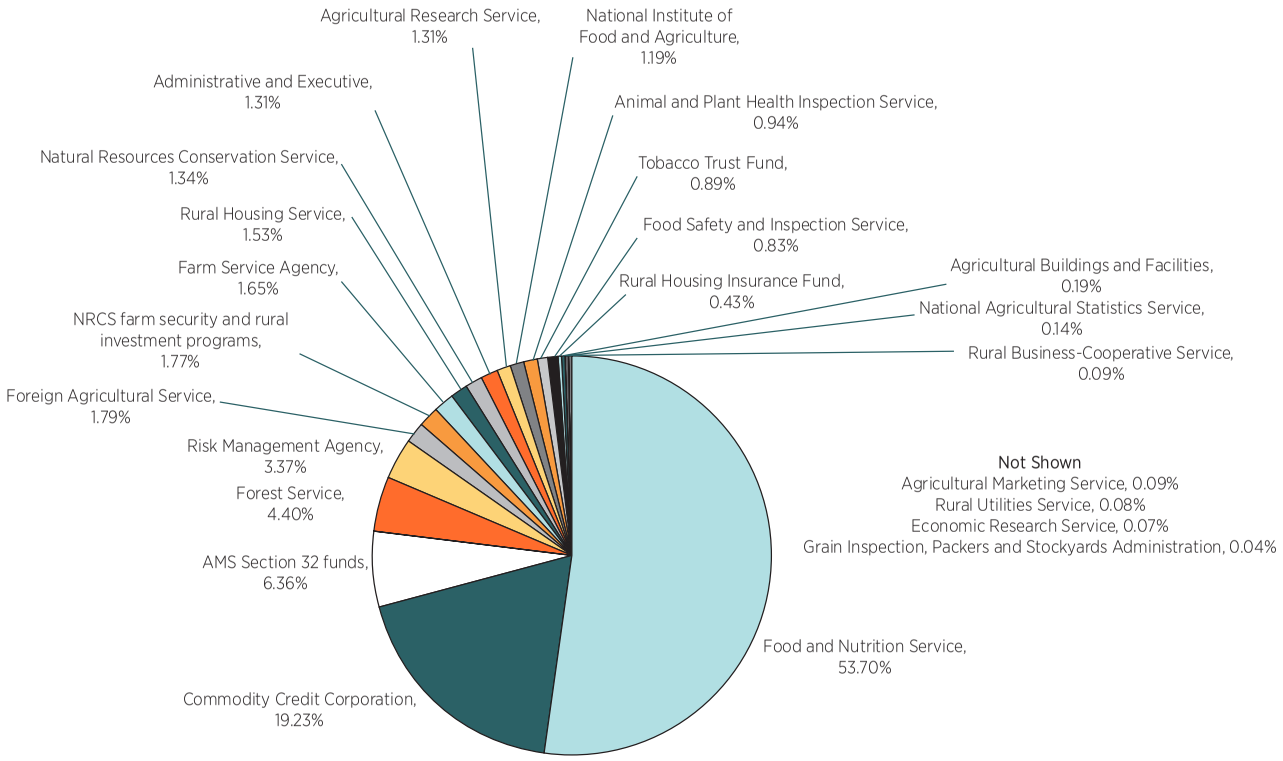
Given the dramatic change in the structure of agriculture (see figure 1), the number of USDA employees would be expected to decrease with the number of farms. Instead, the number has increased, though it should be noted that an increasing number of USDA employees likely focus on nonfarm issues, such as food assistance programs. In 1955, there were about 85,500 USDA employees and 4.78 million farms, implying about 1.8 USDA employees for every 100 farms in the United States. The number of USDA employees per farm grew sharply until the 1980s, when there were 6.4 employees per 100 farms (figure 13). Since that time, the number of USDA employees has fallen slightly, with an uptick in 2010, the last year for which data are available. In 2010, there were 5.0 USDA employees for every 100 farms in the United States.

USDA Program Impacts

USDA activities and spending affect the farm and nonfarm economies in varied ways. A discussion of the effects of SNAP and other farm support programs follows.

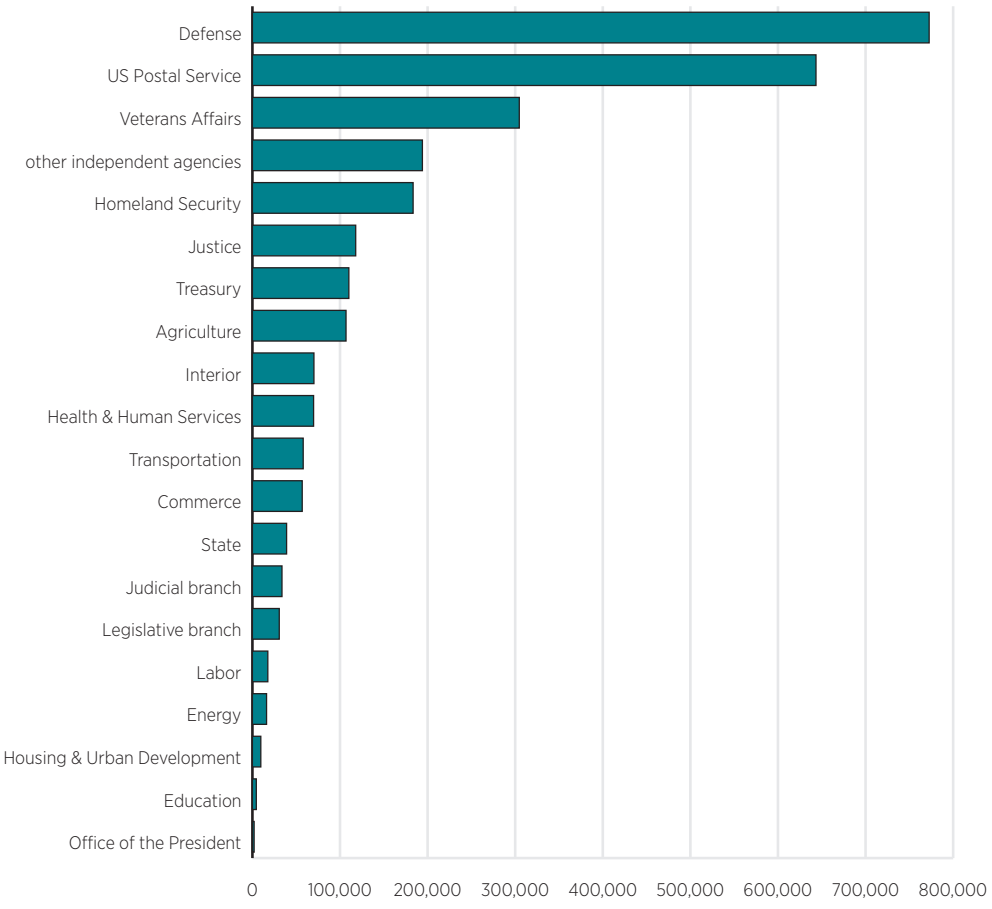
SNAP spending. Given the large share of the USDA budget allocated to SNAP, it is instructive to compare it—on a per-recipient basis—with that of farm

FIGURE 11. COMPONENTS OF 2006 USDA BUDGET, TOTALING $100 BILLION (IN 2014 DOLLARS)



Note: AMS = Agricultural Marketing Service; NRCS = Natural Resources Conservation Service.
Source: Author's calculations based on USDA budget authority as reported by USDA.

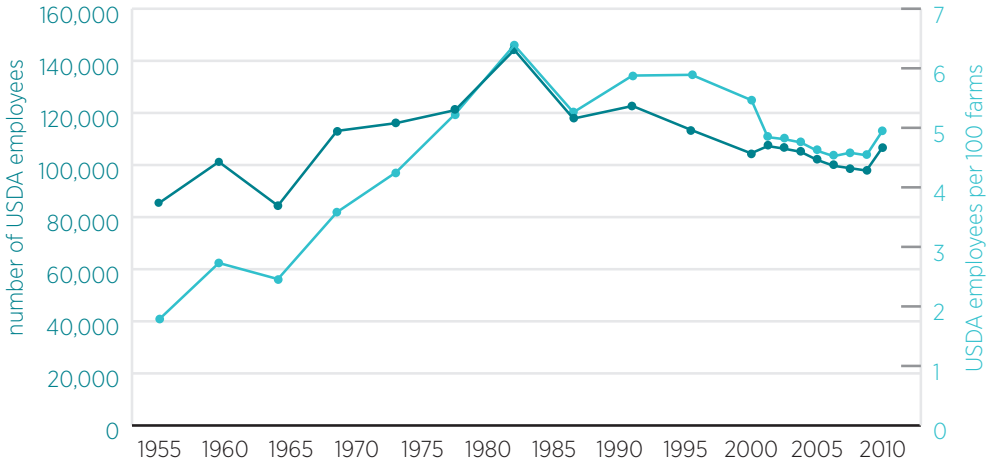
FIGURE 12. NUMBER OF FEDERAL EMPLOYEES BY FEDERAL AGENCY IN 2010



Source: US Census Bureau, *Statistical Abstract of the United States*, 2012.

programs. As will be discussed in more detail, of the farms receiving payments in 2012, the average payment was $9,925. By contrast, USDA data indicate that the average payment per individual receiving SNAP in 2012 was $133 per month, or $1,596 annually. SNAP payments increase at a decreasing rate with the size of the household. For a four-person household receiving SNAP benefits, the average payment was $440 per month, or $5,280 per year, in 2012. Food assistance programs represent a larger share of the USDA budget than do farm support programs because SNAP recipients far outnumber the recipients of farm program payments, not because each SNAP recipient receives a higher payout than does each recipient of farm supports.

FIGURE 13. NUMBER OF FEDERAL USDA EMPLOYEES OVER TIME, 1955–2010



Source: US Census Bureau, *Statistical Abstract of the United States*, multiple years.

Note: Data for 1955–2000 are provided every five years (plus data for 1958). Data for 2003–2010 are provided every year.

SNAP payments differ across the United States, because different states have different rules. In general, SNAP eligibility is determined by gross income (usually a recipient must be at or below 130 percent of the poverty line) after adjustments are made for various deductions and asset holdings.[33] The rapid rise in SNAP participation in recent years is explained in large part by the effects of the Great Recession, but changes in policies (including recent farm bills) have increased payments and loosened application and eligibility requirements.[34] SNAP is a so-called entitlement program in that spending is not capped; all applicants who meet eligibility requirements receive funds regardless of the total costs of the program.

Farm subsidies. In 2012, the average government payment per farm receiving payments was $9,925. However, a large percentage of farms receive no government payments (table 2). In particular, farms that sell less than $50,000 worth of products tend not to receive payments, while the opposite is true for

33. For a recent discussion on eligibility criteria, determination of benefit amounts, and so forth, see Center on Budget and Policy Priorities, "A Quick Guide to SNAP Eligibility and Benefits," November 5, 2015.

34. Margaret Andrews and David Smallwood, "What's Behind the Rise in SNAP Participation?," *Amber Waves*, March 1, 2012.

TABLE 2. GOVERNMENT PAYMENTS BY FARM TYPE IN 2012

Farm type (by total sales)	Percentage of all farms	Percentage of farm type receiving government payments	Payment per farm receiving payments	Payment as percentage of value of production
Less than $1,000	20.3	5.9	$446	9.36
$1,000 to $2,499	11.2	38.8	$1,405	0.92
$2,500 to $4,999	11.0	36.1	$2,607	0.87
$5,000 to $9,999	11.8	36.4	$3,975	0.62
$10,000 to $24,999	12.9	53.9	$5,458	0.23
$25,000 to $49,999	7.7	38.0	$6,416	0.29
$50,000 to $99,999	6.4	63.8	$7,108	0.12
$100,000 to $249,999	6.7	73.1	$9,598	0.06
$250,000 to $499,999	4.5	79.4	$15,060	0.06
$500,000 to $999,999	3.7	79.0	$23,446	0.05
$1 million or more	3.9	71.2	$40,559	0.02

Source: USDA Census of Agriculture.

farms with sales greater than $50,000. For the 3.9 percent of farms with sales of $1 million or more, 71.2 percent receive payments averaging $40,559. Payment amounts increase with the size of the farm. Just over 20 percent of farms have less than $1,000 in agricultural output; of farms that fit this category, only 5.9 percent receive a subsidy, and the average subsidy received is $446.

Payments are often tied to the volume of output. The last column of table 2 calculates the average payment per farm as a percentage of the value of production of farms in each respective sales class. Whereas the smallest farms receive the smallest average payments in total dollars, they receive the largest payments when expressed relative to value of production. Farms with sales of less than $1,000 that receive payments tend to get 9.36 cents for every dollar of output produced, but farms with sales of more than $1 million that receive payments tend to get only about 2 cents for every dollar of output produced.

Although government payments represent a small fraction of the value of output (i.e., gross revenue), they are certain to represent a much higher fraction of farmers' net income. In fact, USDA Census of Agriculture data show that in 2012, the average net cash income for each category of farm with sales of less than $24,999 was *negative*. Those farms operate at a loss; because of this,

whatever government payment they receive is infinitely greater than what they make from farming. The average payment as a percentage of net income (for those receiving payments) is 31 percent, 18 percent, 13 percent, and 7 percent for farms with total sales in the categories $100,000 to $249,999, $250,000 to $499,999, $500,000 to $999,999, and $1 million or more, respectively.

In 2014, the US Government Accountability Office discussed the extent of farm subsidies and revealed the multiplicity of farm programs.[35] It found that the USDA spent $114 billion from fiscal year 2008 to fiscal year 2012 on 60 different programs, an amount that included $28 billion in crop insurance subsidies. It also found that most of the farms in the United States received no government payments during this period. However, it reports,

> About 37 percent (800,000) received a payment from at least one farm program. Farms receiving payments reported receiving $11,293 on average (median payment of $3,719) annually from various programs. Payments were higher if a farm received assistance from multiple farm programs—less than 1 percent of farms received payments of $57,899 on average (median payment of $27,412) annually from multiple programs. Larger farms or farms producing cash grains such as corn were more likely to receive payments from multiple programs than small farms or farms producing other crops. Larger farms also received more crop insurance premium subsidies than other farms.

It is possible with many overlapping programs that activities that appear to reduce risk may, in fact, do the opposite. For example, economists Deith Coble, Richard Heifner, and Manuel Zuniga show that hedging in the futures market—an activity long thought to reduce price risk—may actually increase risk when a farmer is enrolled in other government "safety net" programs.[36]

International comparisons of farm support. It is also instructive to consider changes in farm support payments over time relative to that in other countries. A project by the World Bank led by the economist Kym Anderson and

35. US Government Accountability Office, *USDA Farm Programs: Farmers Have Been Eligible for Multiple Programs and Further Efforts Could Help Prevent Duplicative Payments*, GAO-14-428, July 2014.
36. Keith H. Coble, Richard G. Heifner, and Manuel Zuniga, "Implications of Crop Yield and Revenue Insurance for Producer Hedging," *Journal of Agricultural and Resource Economics* 25, no. 2 (2000): 432–52.

colleagues offers just such information.[37] They provide a variety of statistics related to agricultural support in different countries, and this section focuses on three measures: the nominal rate of assistance (NRA), the gross rate of assistance (GRA), and the welfare reduction index (WRI).

The NRA quantifies the policy-induced price distortions in agriculture, as well as the distortions imposed by governments that create a gap between domestic prices and the prices that would exist under undistorted, free markets. The NRA is defined as the percentage increase or decrease in gross returns to farmers caused by government policies. A positive number means a country's policies are pushing up agricultural prices and returns, and a negative number implies the opposite.

The GRA is the NRA expressed in absolute dollar terms (in the year 2000) instead of in percentage terms. The GRA is the NRA multiplied by the value of agricultural production in a country divided by the number of farmers.

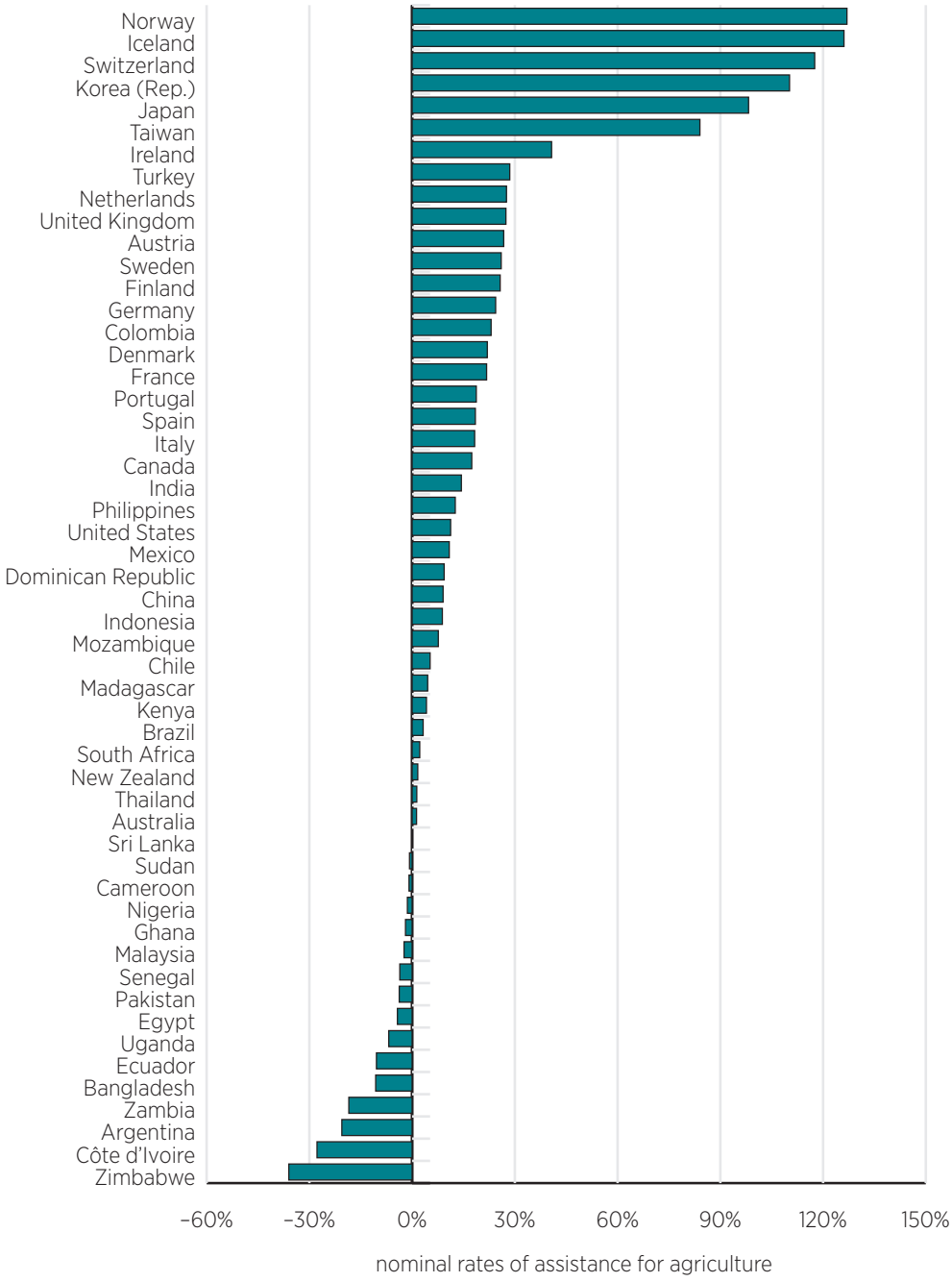
Some policies may produce measures similar to the NRA but have very different effects on the economy. That is, some policies are more distorting than others and cause larger reductions in the size of the economic pie. The WRI, the third measure, accounts not only for transfers but also for trade policies that affect the food and agricultural economy. According to economists Kym Anderson, Gordon Rausser, and Johan Swinnen, the WRI is calculated as "the percentage uniform trade tax which, if applied equally to all agricultural tradables, would generate the same reduction in national economic welfare as the actual intrasectoral structure of distortions to domestic prices of these tradable goods."[38]

Figure 14 shows the average NRA, and figure 15 shows the average GRA of 53 different countries from 2000 to 2010. The figures contain a selection of developed and developing countries to provide insight into the diversity of agricultural policies around the world. The United States had an average NRA of 11.2 percent and a GRA of $3,576 per farmer over this period. That means that the gross returns of US farmers are 11.2 percent (or $3,576 per farmer) higher than would have been the case were it not for various government policies. Some countries, such as Norway, Iceland, Switzerland, and the Republic of Korea, have NRAs higher than 100 percent. Thus, US agricultural policies

37. Kym Anderson and Ernesto Valenzuela, *Estimates of Global Distortions to Agricultural Incentives, 1955 to 2007* (Washington, DC: World Bank, 2008); Kym Anderson and Signe Nelgen, *Updated National and Global Estimates of Distortions to Agricultural Incentives, 1955 to 2011* (Washington, DC: World Bank, 2013).

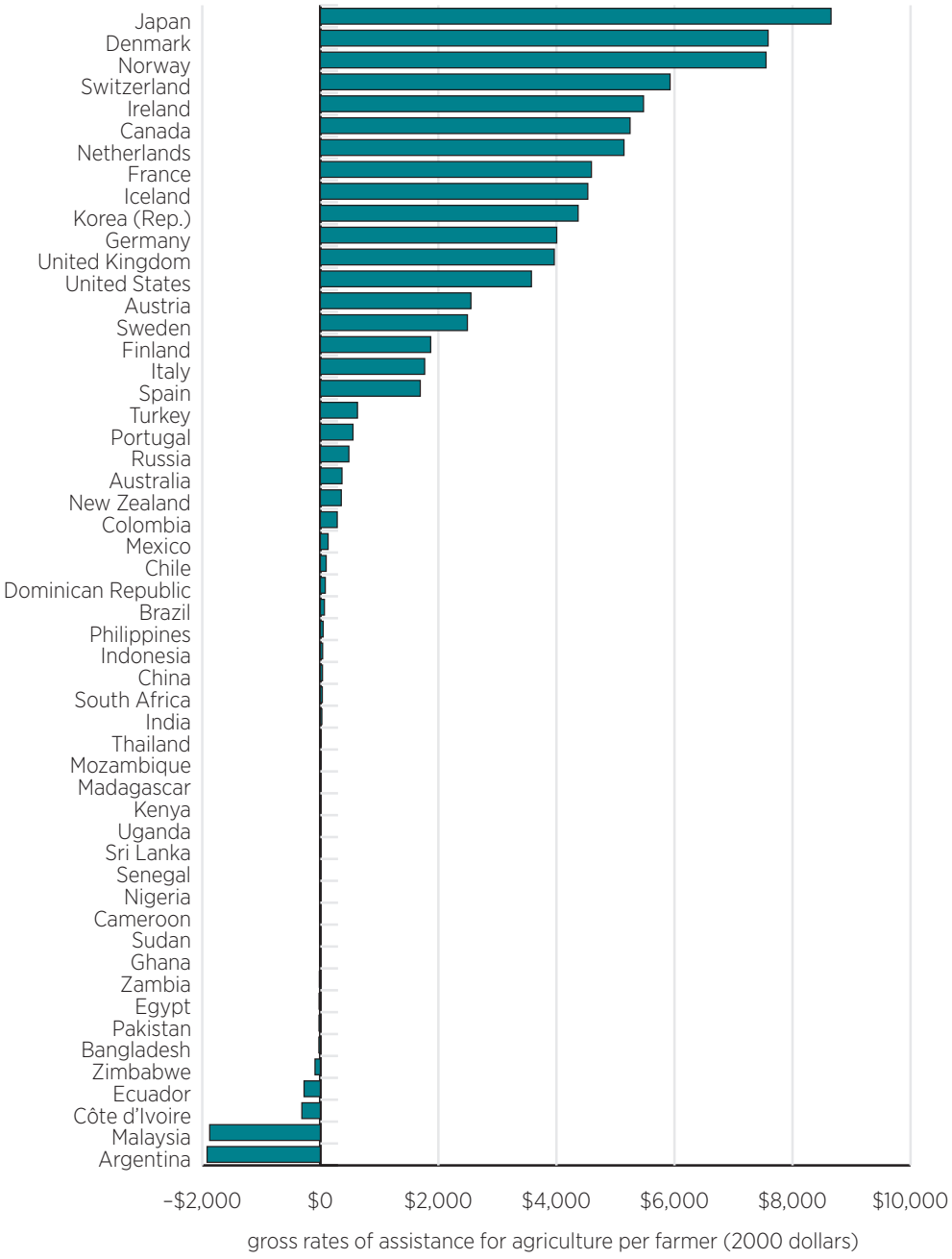
38. Kym Anderson, Gordon Rausser, and Johan Swinnen, "Political Economy of Public Policies: Insights from Distortions to Agricultural and Food Markets," *Journal of Economic Literature* 51, no. 2 (2013): 429.

FIGURE 14. NOMINAL RATES OF ASSISTANCE AROUND THE WORLD, 2000–2010



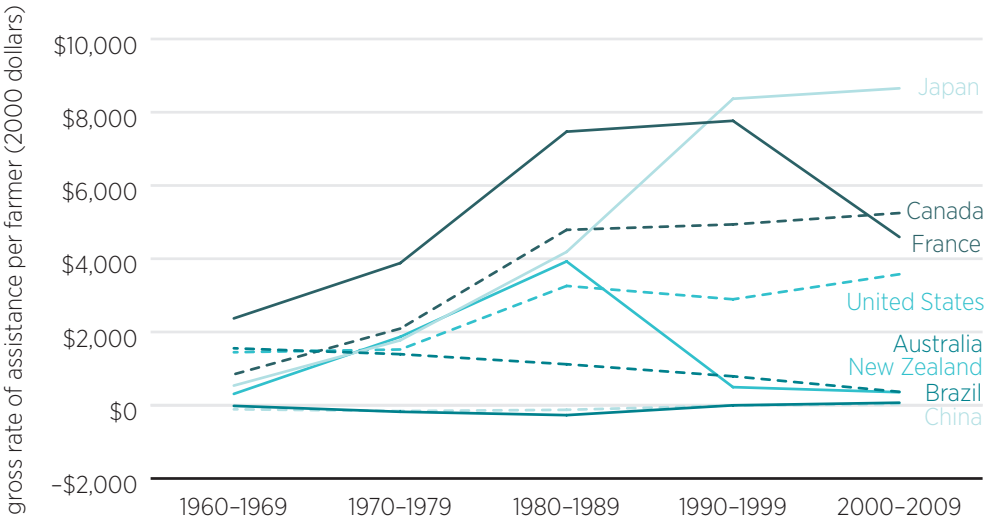
Source: Author's calculations based on data in Kym Anderson and Signe Nelgen, *Updated National and Global Estimates of Distortions to Agricultural Incentives, 1955 to 2011* (Washington, DC: World Bank, 2013).

FIGURE 15. GROSS RATES OF ASSISTANCE AROUND THE WORLD, 2000–2010



Source: Author's calculations based on data in Kym Anderson and Signe Nelgen, *Updated National and Global Estimates of Distortions to Agricultural Incentives, 1955 to 2011* (Washington, DC: World Bank, 2013).

FIGURE 16. GROSS RATE OF ASSISTANCE PER FARMER OVER TIME IN SELECTED LOCATIONS



Source: Author's calculations based on data in Kym Anderson and Signe Nelgen, *Updated National and Global Estimates of Distortions to Agricultural Incentives, 1955 to 2011* (Washington, DC: World Bank, 2013).

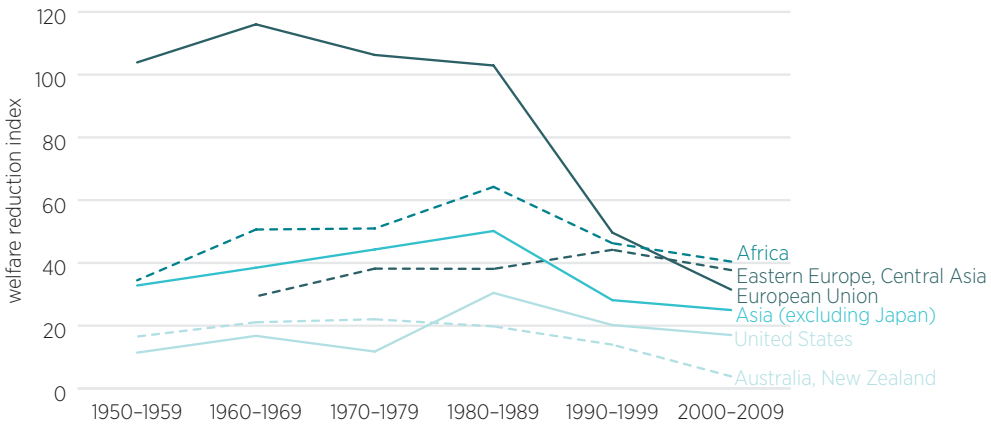
push farmer prices and returns higher than would be the case in the absence of such policies, but by an amount far less than is the case in some other countries and far more than in others.

Figures 14 and 15 also show that a number of other countries, typically developing and African countries, have negative NRA and GRA measures, an indication that government policies in those countries transfer resources from the farm sector to the urban, consumer sectors. Farmers in those countries are worse off as a result of government policies.

Whereas figure 15 shows a snapshot of the GRA at a point in time, figure 16 shows changes in the GRA per farmer over time in eight selected locations (all in 2000 dollars). The GRA per farmer in the United States increased sharply from the 1970s to the 1980s and has subsequently stayed around $3,000 per farmer per year. The GRA per farmer in Japan has risen over the entire period considered from only $536 per farmer per year in the 1960s to $8,653 per farmer per year from 2000 to 2009. New Zealand dramatically lowered the GRA per farmer from the 1980s to the 1990s. Brazil and China have policies that are relatively neutral with regard to farmer gross returns.

Until recently, countries in the European Union had highly distorting policies equivalent to taxes in excess of 100 percent. In most locations (except

FIGURE 17. WELFARE REDUCTION INDEX OVER TIME IN DIFFERENT LOCATIONS



Source: Author's calculations based on data in Kym Anderson and Signe Nelgen, *Updated National and Global Estimates of Distortions to Agricultural Incentives, 1955 to 2011* (Washington, DC: World Bank, 2013).

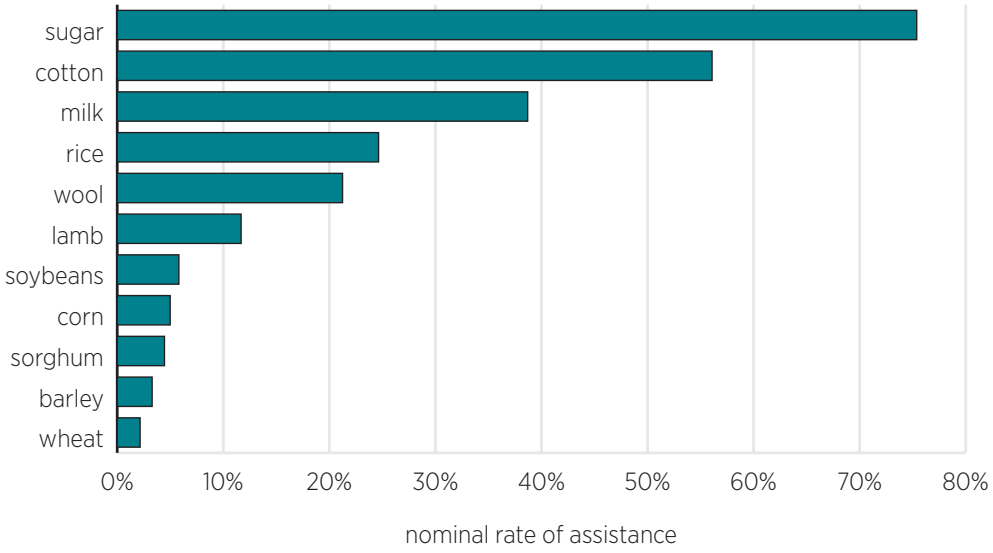
eastern Europe and central Asia), agricultural policies have distorted the overall economy less since the 1980s. From 2000 to 2010, the United States had a WRI of 17; the only locations that had less distorting policies were Australia and New Zealand, which had an average index of only 3.8 over this period (figure 17).

To put the calculations in figure 17 in perspective, it is useful to compare them with other distortions in the economy. In a remarkable statement, Anderson, Rausser, and Swinnen write, "In 2004, existing agricultural and trade policies accounted for an estimated 70 percent of the global welfare cost of all merchandise trade distortions, even though the agricultural sector contributes only 6 percent of global trade and 3 percent of global GDP."[39] In short, despite the small contribution of agriculture to global GDP, agricultural policies are responsible for the lion's share of welfare losses that result from trade-distorting policies.

The previous graphs aggregate the effects of agricultural and trade policies across all commodities. Figure 18 shows the average NRA for 11 different commodities in the United States from 2000 to 2010. During that period,

39. Anderson, Rausser, and Swinnen, "Political Economy of Public Policies," 423.

FIGURE 18. NOMINAL RATES OF ASSISTANCE FOR DIFFERENT COMMODITIES IN THE UNITED STATES, 2000–2010



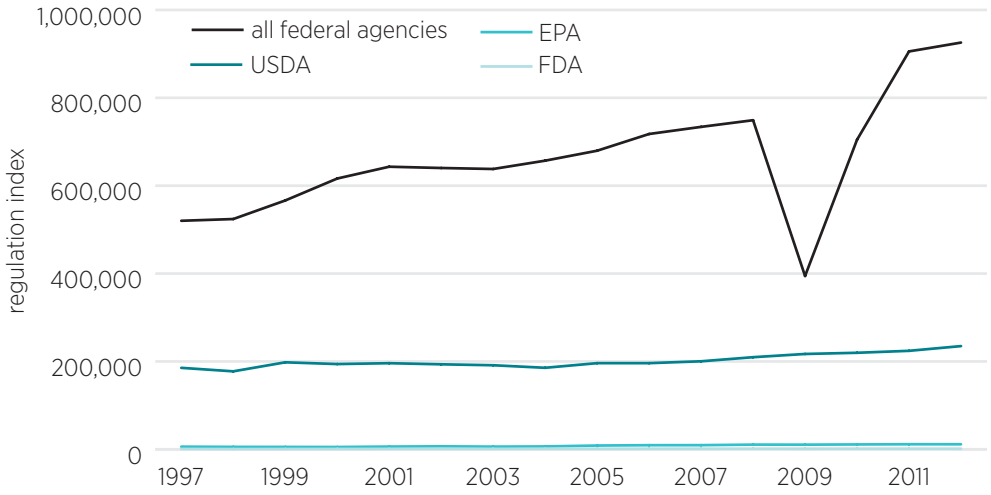
Source: Author's calculations based on data in Kym Anderson and Signe Nelgen, *Updated National and Global Estimates of Distortions to Agricultural Incentives, 1955 to 2011* (Washington, DC: World Bank, 2013).

sugar, cotton, and milk producers benefited most, with NRAs of 75 percent, 56 percent, and 39 percent, respectively. Barley and wheat had relatively low NRAs. Other commodities like beef and pork (not shown in the graph) had NRAs near zero.

Cumulative regulatory impact of the USDA. Given the number of agencies and activities associated with the USDA, some impacts on the economy likely extend beyond those caused by explicit farm-commodity policies. To get a sense of such impacts, this section turns to the RegData database created and maintained by the Mercatus Center at George Mason University.[40] The database attempts to quantify and track changes in the amount of regulation caused by different government agencies that is directed toward different industries. In particular, the *Code of Federal Regulations* is searched each year, and a word

40. Omar Al-Ubaydli and Patrick A. McLaughlin, "RegData: A Numerical Database on Industry-Specific Regulations for All US Industries and Federal Regulations, 1997–2012" (Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, November 2014).

FIGURE 19. REGULATIONS AFFECTING AGRICULTURE AND FORESTRY, 1997–2012



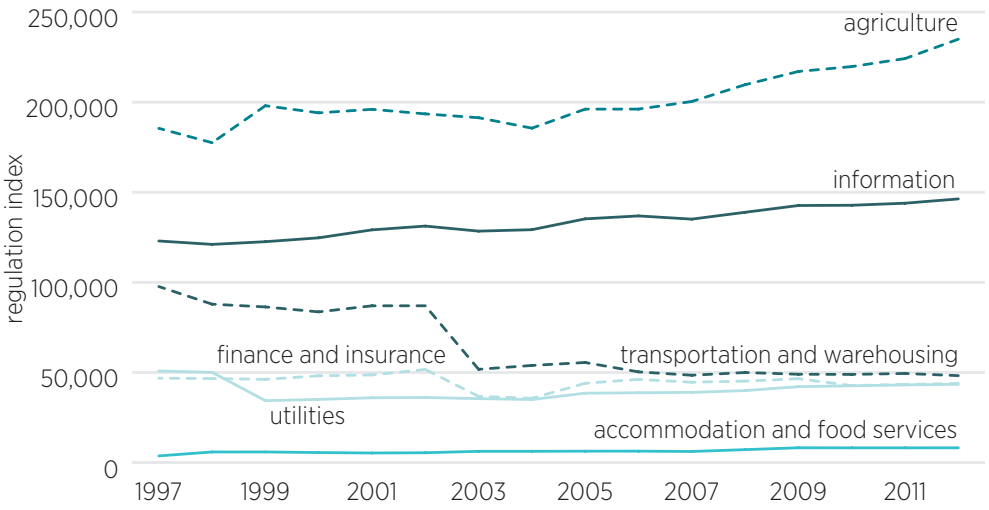
Note: USDA = US Department of Agriculture; EPA = Environmental Protection Agency; FDA = Food and Drug Administration.

Source: RegData, Mercatus Center.

count is conducted for five terms that indicate obligation or restriction: "shall," "must," "may not," "prohibited," and "required." The counts are then allocated to different industries according to the judged relevance of the terms to a given industry. A regulation index is then created on the basis of the relevance-adjusted word counts.

Figure 19 reports the regulation index for the agriculture and forestry industries coming from all federal agencies as well as those specifically from the USDA, the Environmental Protection Agency (EPA), and the Food and Drug Administration (FDA). Although the USDA places far more regulatory restrictions on agriculture than do the EPA or the FDA, the USDA accounted for only 25 percent of the overall regulatory index facing agriculture in 2012. From 1997 to 2012, regulations from all federal agencies increased 78 percent along with a 27 percent increase from the USDA, a 41 percent increase from the FDA, and an 89 percent increase from the EPA. It is unclear what caused the dip in total regulations facing agriculture during 2009 and 2010, but figure 19 shows that it was not a result of reductions in USDA, EPA, or FDA regulations. Economists Levi Russell, John Crespi, and Michael Langemeier link these regulation data to changes in agricultural productivity and find

FIGURE 20. REGULATIONS BY THE USDA AFFECTING DIFFERENT INDUSTRIES, 1997–2012



Source: RegData, Mercatus Center at George Mason University.

evidence that an increasing regulatory index is associated with a reduction in farm productivity.[41]

Although USDA regulations tend to affect agriculture and forestry primarily, industries related to information, utilities, transportation, finance, and food service are affected as well (figure 20). From 1997 to 2012, the regulatory index for the USDA increased 27 percent for the agriculture industries and 121 percent for the accommodation and food service industry and decreased 15 percent for utilities and 51 percent for transportation. Not shown in figure 20 is the additional 148 percent rise in the education services industry.

Academic Research on USDA Programs

A great deal of academic research has been conducted on the effects of USDA programs. It would be impossible to fully summarize that body of research here. However, because popular articles about food and agriculture often include

41. Levi A. Russell, John M. Crespi, and Michael R. Langemeier, "Effects of USDA and EPA Regulation on Farm Profitability and Productivity" (paper presented at the annual meeting of the Public Choice Society, San Antonio, TX, March 15, 2015).

assertions that are at odds with the best available evidence, this section will briefly summarize some of the research related to a few key areas of USDA activity. What follows is a succinct discussion of three program areas: farm subsidies, food assistance programs, and agricultural research.

"Economic theory suggests that farmers are not the ultimate beneficiaries of farm subsidies."

Farm subsidies. Standard economic theory suggests that subsidies, whether subsidies in the form of price supports on crops or subsidies on the premiums for crop insurance, distort production decisions and result in so-called deadweight loss. Subsidies—even supposedly "decoupled" farm payments that aren't tied to production—encourage greater production.[42] Greater production dampens prices, a condition which leads to calls for ever-greater subsidies. Over the years, various fixes have been proposed for this conundrum, such as the government's buying surplus grain, but none can really address the fundamental problem that subsidies lead to an inefficient level of production from a social welfare point of view.

Moreover, economic theory suggests that farmers are not the ultimate beneficiaries of farm subsidies. Given an additional subsidy, farmers will compete with one another and bid up the price of fixed assets, such as land or high-quality seed, implying that the owners of fixed assets, such as landowners or holders of patents on seed technology, capture a portion of the subsidy.

The literature includes substantial debate regarding the share of farm subsidies captured by nonfarmers, but economists almost universally agree that for every $1 in farm subsidies, farmers benefit by less than $1. Economist Barrett Kirwan estimates that for an extra $1 in farm subsidies, 20–25 cents go to landowners (via higher rental rates) and 70–75 cents go to farmers.[43] Economists Michael Roberts,

42. Barry K. Goodwin and Ashok K. Mishra, "Are 'Decoupled' Farm Program Payments Really Decoupled? An Empirical Evaluation," *American Journal of Agricultural Economics* 88, no. 1 (2006): 73–89.
43. Barrett Kirwan, "The Incidence of US Agricultural Subsidies on Farmland Rental Rates," *Journal of Political Economy* 117, no. 1 (2009): 138–64.

Barrett Kirwan, and Jeffery Hopkins estimate that for every $1 in subsidies 34–41 cents go to the landowners.[44] Economists Barry Goodwin, Ashok Mishra, and François Ortalo-Magné estimate much higher rates—in some cases, calculating that landowners benefit by an amount that exceeds the amount of the subsidy.[45]

Economist Julian Alston estimates that "for every dollar of U.S. government spending on farm subsidies, farmers (in their capacity as both landowners and suppliers of other farming inputs such as labor and managerial inputs) receive about 50 cents, landlords who rent land to farmers receive about 25 cents, domestic and foreign consumers receive about 20 cents, and 5 cents are wasted."[46] Although owners of fixed assets benefit from farm subsidies, Jeremy Weber and his colleagues find no evidence to support the idea that farm subsidies affect rural economies positively.[47] Another reason a one-to-one benefit between subsidy payments and farm income is unlikely is that subsidies, on the margin, keep some farmers in business who would otherwise choose another occupation, a phenomenon that likely results in more competition for fixed assets (driving up the cost of inputs) and additional supply (driving down the price of outputs).

Despite popular claims to the contrary, research suggests that farm subsidies have likely had little to no effect on obesity rates.[48] First, although such policies may have had some effect on farm commodity prices, these inputs account for only a small share of the overall retail cost of food. For example, in 2013, only 7 percent of the retail price of bread was a result of the farm-gate price of wheat and other agricultural commodities.[49] Even the enormous price swing that took wheat from around $3 per bushel in 2006 to almost $12 per bushel in

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44. Michael J. Roberts, Barrett Kirwan, and Jeffrey Hopkins, "The Incidence of Government Program Payments on Agricultural Land Rents: The Challenges of Identification," *American Journal of Agricultural Economics* 85, no. 3 (2003): 762–69.
45. Barry K. Goodwin, Ashok K. Mishra, and François Ortalo-Magné, "The Buck Stops Where? The Distribution of Agricultural Subsidies" (NBER Working Paper No. 16693, National Bureau of Economic Research, Cambridge, MA, January 2011).
46. Julian M. Alston, "Efficiency of Income Transfers to Farmers through Public Agricultural Research: Theory and Evidence from the United States," *American Journal of Agricultural Economics* 91, no. 5 (2009): 1281–88.
47. Jeremy G. Weber, Conor Wall, Jason Brown, and Tom Hertz, "Crop Prices, Agricultural Revenues, and the Rural Economy," *Applied Economic Perspectives and Policy* 37, no. 3 (2015): 459–76.
48. Julian M. Alston, Daniel A. Sumner, and Stephen A. Vosti, "Farm Subsidies and Obesity in the United States: National Evidence and International Comparisons," *Food Policy* 33, no. 6 (2008): 470–79; J. Corey Miller and Keith H. Coble, "Cheap Food Policy: Fact or Rhetoric?" *Food Policy* 32, no. 1 (2007): 98–111; Abigail M. Okrent and Julian M. Alston, "The Effects of Farm Commodity and Retail Food Policies on Obesity and Economic Welfare in the United States," *American Journal of Agricultural Economics* 94, no. 3 (2012): 611–46.
49. USDA Economic Research Service, "Price Spreads from Farm to Consumer."

February 2008 (a 300 percent increase) would be expected to increase the price of bread by only about 14 percent.[50] Second, agricultural policies are mixed, and some policies (such as those for sugar, ethanol promotion, and the Conservation Reserve Program, or CRP) push the prices of agricultural commodities up rather than down. Third, despite the widely varying agricultural policies across countries and over time (see figures 14–16), those policies do not correlate well with differences in food prices and obesity rates across countries or with changes in obesity rates over time.

Some forms of farm subsidies are tied to environmental objectives. For example, the CRP came into existence in 1985 and is managed by the Farm Service Agency. The program contracts with farmers who are paid to keep certain types of land out of production. In 2014, 27.5 million acres were enrolled in the program at a cost of about $2 billion.[51]

Research suggests that although the program has achieved some goals related to erosion, wildlife, and soil and water quality, some unintended consequences have occurred.[52] Economists JunJie Wu and Haixia Lin show that CRP participation increased farmland values by 5 percent to 14 percent, 4 percent to 6 percent, and 2 percent to 5 percent, respectively, in the Mountain, Southern Plains, and Northern Plains regions.[53] Taking some cropland out of production can drive up commodity prices, which in turn incentivizes producers to plant more farmland. Wu calls this a "slippage effect," and he calculates that for every 100 acres enrolled in the CRP, 20 acres of new land were brought into production, offsetting some of the environmental benefits of the program.[54] Moreover,

50. A bushel of wheat contains 60 pounds, implying prices of $0.05 per pound and $0.20 per pound for wheat in 2006 and 2008, respectively. Economic Research Service data indicate the price of bread in 2006 was $1.08 per pound, implying nonfarm costs were $1.08 − $0.05 = $1.03 per pound. Holding nonfarm costs constant at $1.03 per pound and increasing the price of wheat to $0.20 per pound implies a retail price of bread of $1.23 per pound. Going from a retail price of $1.08 to $1.23 represents a 14 percent increase.

51. Megan Stubbs, "Conservation Reserve Program (CRP): Status and Issues," Congressional Research Service, August 29, 2014.

52. For example, see Peter Feather, Daniel Hellerstein, and LeRoy Hansen, "Economic Valuation of Environmental Benefits and the Targeting of Conservation Programs: The Case of the CRP" (Agricultural Economic Report No. AER-778, USDA Economic Research Service, May 1999); D. L. Karlen et al., "Conservation Reserve Program Effects on Soil Quality Indicators," *Journal of Soil and Water Conservation* 54, no. 1 (1999): 439–44; and Douglas H. Johnson and Michael D. Schwartz, "The Conservation Reserve Program: Habitat for Grassland Birds," *Great Plains Research* 3, no. 1 (1993): 273–95.

53. JunJie Wu and Haixia Lin, "The Effect of the Conservation Reserve Program on Land Values," *Land Economics* 86, no. 1 (2010): 1–21.

54. JunJie Wu, "Slippage Effects of the Conservation Reserve Program," *American Journal of Agricultural Economics* 82, no. 4 (2000): 979–92.

some researchers argue that the CRP crowds out private provision of conservation services and recreational activities.[55]

Finally, agricultural policies create distributional effects across producers, locations, and commodities. That is, farm subsidies benefit some farmers more than others and actually harm other farmers and consumers. Economist Joe Balagtas and his colleagues, for example, find that planting restrictions on farmers receiving payments for commodity crops reduce fruit and vegetable production by about 7 million acres (or 4.26 acres for every 100 acres of program crops).[56] The reduction in fruit and vegetable production leads to higher consumer prices for these products. In the same way that the CRP removes land and increases farm prices, food consumers are worse off as a result (though consumers who value ecosystem services provided by the CRP may benefit in other ways).

Crop insurance subsidies also have distributional effects. I find that crop insurance subsidies flow unevenly to different types of producers, with the benefits going more to producers of some commodities than to producers of others and more to those who reside in some locations than to those who reside in others.[57] Some locations in the western United States are even projected to benefit from the removal of crop insurance subsidies. In related research, economists Octavio Ramirez, Carlos Carpio, and Alba Collart find that farmers who face higher yield risks receive more generous subsidies than do farmers with more certain yields.[58] Moreover, because the United States exports a large share of domestic agricultural products, US policies have the potential to affect prices paid by consumers and received by farmers who live in other parts of the world. One high-profile example that ultimately wound up in the courts of the World Trade Organization involved the dampening effect of US cotton policies on world prices.[59]

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55. Dominic P. Parker and Walter N. Thurman, "Crowding Out Open Space: The Effects of Federal Land Programs on Private Land Trust Conservation," *Land Economics* 87, no. 2 (2011): 202–22.
56. Joseph V. Balagtas et al., "How Has US Farm Policy Influenced Fruit and Vegetable Production?," *Applied Economic Perspectives and Policy* 36, no. 2 (2014): 265–86.
57. Jayson L. Lusk, "Distributional Effects of Crop Insurance Subsidies," *Applied Economic Perspectives and Policy* (forthcoming).
58. Octavio A. Ramirez, Carlos E. Carpio, and Alba J. Collart, "Are the Federal Crop Insurance Subsidies Equitably Distributed? Evidence from a Monte Carlo Simulation Analysis," *Journal of Agricultural and Resource Economics* 40, no. 3 (2015): 457–75.
59. Mohamadou Fadiga, Don E. Ethridge, Samarendu Mohanty, and Suwen Pan, "The Impacts of US Cotton Programs on the World Market: An Analysis of Brazilian WTO Petition," *Journal of Cotton Science* 10 (2006): 180–92; Daniel A. Sumner, "Reducing Cotton Subsidies: The DDA Cotton Initiative," in *Agricultural Trade Reform and the Doha Development Agenda*, ed. Kym Anderson and Will Martin (New York: Palgrave Macmillan, 2006), 271–92.

Food assistance programs. An early and temporary version of the food stamp program began during the New Deal era. Although addressing hunger was a key goal, architects of the program also envisioned it as a way to alleviate farm surpluses. As Milo Perkins, the first administrator of the food stamp program in the late 1930s, put it: "We got a picture of a gorge, with farm surpluses on one cliff and undernourished city folks with outstretched hands on the other. We set out to find a practical way to build a bridge across that chasm."[60]

However, little evidence verifies that the modern-day incarnation, SNAP, has any substantive effect on farm prices. For example, I calculate that for every $1 taxpayers spend on SNAP, farmers benefit by only a penny.[61] Likewise, economists Steve Martinez and Praveen Dixit calculate that food assistance programs increase farm prices by less than 1 percent.[62] In one review of such programs, economist Chris Barrett argues, "Given the modest estimated producer price effects of [food assistance programs], it seems unlikely that they have appreciably reduced government payments to farmers. Moreover, given the dramatic changes enacted in farm income support policies during the 1990s, these effects are likely rapidly approaching zero."[63] Barrett reaches a similar conclusion with regard to international food aid: "Where once food aid was primarily seen as a lever to be used for diplomatic ends, as a vent for farm surpluses, and as a trade promotion tool, the dominant view of food aid since the early 1990s has been that of a safety net used to guarantee access to food to the poorest populations and countries."[64] Little evidence exists on whether the National School Lunch Program or other child nutrition programs, which also partially aim to boost farm prices, actually do so.

Since at least the work of the economist Herman Southworth in the 1940s, debate has continued about whether food stamps (now SNAP) have effects that differ from unconditional cash transfers (although as previously discussed, the food stamp program hasn't always operated as a lump-sum food transfer).[65]

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60. Ronald J. Daniels and Michael J. Trebilcock, *Rethinking the Welfare State: Government by Voucher* (New York: Routledge, 2005), 45.
61. Jayson L. Lusk, "Distributional Effects of Selected Farm and Food Policies: The Effects of Crop Insurance, SNAP, and Ethanol Promotion" (Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, April 2015).
62. Steve W. Martinez and Praveen M. Dixit, *Domestic Food Assistance Programs: Measuring the Benefits to Producers* (Washington, DC: USDA Economic Research Service, 1992).
63. Christopher B. Barrett, "Food Security and Food Assistance Programs," in *Handbook of Agricultural Economics*, vol. 2, ed. Bruce L. Gardner and Gordon C. Rouser (Amsterdam: North-Holland, 2002), 2127.
64. Ibid., 2151.
65. Herman M. Southworth, "The Economics of Public Measures to Subsidize Food Consumption," *Journal of Farm Economics* 27, no. 1 (1945): 38–66.

Southworth noted that people who spend more on food than they receive in food stamp benefits (the so-called inframarginal consumers, who represent the vast majority of SNAP recipients) should, in theory, treat the benefits the same as an unrestricted cash transfer.

The consumer can get around the restriction that SNAP payments be spent only on food by rearranging which items are purchased with SNAP benefits and which are bought with cash. Despite this theoretical result, some empirical evidence indicates that SNAP benefits tend to increase food purchases by a slightly greater amount than would be expected by an equivalent rise in income, though the evidence is debated.[66] For similar reasons, more recent calls to restrict SNAP purchases to only healthy foods or to outlaw purchases of soda or junk food with SNAP benefits are unlikely to be successful; inframarginal consumers can reallocate which items are paid for by SNAP benefits and achieve the same consumption bundle at the same cost, irrespective of the soda or junk food restrictions.[67]

Reasonably good evidence shows that food assistance programs accomplish their primary objective—reducing hunger among low-income Americans. For example, it has been estimated that SNAP participation reduces food insecurity (i.e., hunger) by about 30 percent.[68] In one review of the topic, economists Craig Gundersen, Brent Kreider, and John Pepper conclude,

"Recent calls to restrict SNAP purchases to only healthy foods or to outlaw purchases of soda or junk food with SNAP benefits are unlikely to be successful; inframarginal consumers can reallocate which items are paid for by SNAP benefits and achieve the same consumption bundle at the same cost."

66. Timothy K. M. Beatty and Charlotte Tuttle, "Expenditure Response to Increases in In-Kind Transfers: Evidence from the Supplemental Nutrition Assistance Program," *American Journal of Agricultural Economics* 97, no. 2 (2015): 390–404; Hilary W. Hoynes and Diane Whitmore Schanzenbach, "Consumption Responses to In-Kind Transfers: Evidence from the Introduction of the Food Stamp Program," *American Economic Journal: Applied Economics* 1, no. 4 (2009): 109–39.

67. Amanda S. Weaver and Jayson L. Lusk, "An Experiment on Cash and In-Kind Transfers with Application to Food Assistance Programs" (Working Paper, Department of Agricultural Economics, Oklahoma State University, Stillwater, 2016).

68. Caroline E. Ratcliffe, Signe-Mary McKernan, and Sisi Zhang, "How Much Does the Supplemental Nutrition Assistance Program Reduce Food Insecurity?," *American Journal of Agricultural* Economics 93, no. 4 (2011): 1082–98.

> There is a small but growing body of evidence that the Supplemental Nutrition Assistance Program reduces the prevalence of food insecurity. This should be kept in mind as reconstructions of SNAP are being proposed. In particular, some have proposed changes to the structure of SNAP with respect to what types of food should be available for purchase. While these proposals have the goal of enhancing nutrition among SNAP participants, the effectiveness of the program on the whole could be compromised if more restricted food options discourage participation and lead to subsequent increases in food insecurity.[69]

In addition, the best academic research does not support the view that SNAP benefits result in higher rates of obesity.[70]

Agricultural research. A large body of research has investigated the returns to agricultural research funding disseminating from USDA programs like National Institute of Food and Agriculture. One review of 35 studies finds that the average estimated rate of return on US public agricultural research is 53 percent, which is quite high compared with other investment alternatives.[71] Economists Yu Jin and Wally Huffman estimate the real social rate of return to public investments in agricultural research at 67 percent and at more than 100 percent for spending on agricultural extension.[72] Julian Alston and his colleagues have criticized the methods used to calculate the high rates of return on agricultural research, but even after adjusting for the way returns are compounded, they show a benefit-cost ratio of 32 to 1.[73] That is, every dollar of public spending on agricultural research yields $32 in benefits for consumers, retailers, processors, farmers, and agribusinesses.

Alston argues that spending on research is more beneficial to farmers than are farm subsidies.[74] He estimates that farmers receive only about 50 cents of

69. Craig Gundersen, Brent Kreider, and John Pepper, "The Economics of Food Insecurity in the United States," *Applied Economic Perspectives and Policy* 33, no. 3 (2011): 295.
70. For a review, see Craig Gundersen, "SNAP and Obesity" (Discussion Paper 2013-02, University of Kentucky Center for Poverty Research, Lexington, 2013).
71. Keith O. Fuglie and Paul W. Heisey, "Economic Returns to Public Agricultural Research," USDA Economic Research Service (Economic Brief No. 10, USDA-ERS, September 2007).
72. Yu Jin and Wallace E. Huffman, "Measuring Public Agricultural Research and Extension and Estimating Their Impacts on Agricultural Productivity: New Insights from U.S. Evidence," *Agricultural Economics* 47, no. 1 (2016): 15–31.
73. Julian M. Alston, Matthew A. Andersen, Jennifer S. James, and Philip G. Pardey, "The Economic Returns to U.S. Public Agricultural Research," *American Journal of Agricultural Economics* 93, no. 5 (2011): 1257–77.
74. Alston, "Efficiency of Income Transfers to Farmers."

every $1 in farm subsidy. By contrast, he estimates that every dollar spent on agricultural research and development would generate a $10 benefit to farmers. Thus, according to Alston's estimates, if the desire is to convey $10 billion in benefits to farmers, the outcome could be achieved either by spending $20 billion on farm support programs or by spending $1 billion on agricultural research.

Despite all that, the rate of growth in public spending on agricultural research has slowed.[75] Alston, Jason Beddow, and Phil Pardey argue that the slowdown in spending has partially caused a slowdown in agricultural productivity growth.[76] In addition to the change in the total volume of spending, the types of research being funded have changed. An increasingly larger proportion of federal research dollars has shifted from productivity-enhancing research toward research on social goals such as childhood obesity, climate change, and the economic viability of organic production and small farmers. Moreover, public funding is being redirected toward production and marketing practices that prohibit the use of technologies, such as biotechnology or synthetic fertilizers and pesticides, known to increase productivity. Despite the slowdown in the growth in public spending on agricultural research, private investments appear to be increasing, mainly in areas related to crop seed and biotechnology.[77]

ECONOMIC JUSTIFICATIONS FOR USDA PROGRAMS

The typical economic approach to evaluating government action is to ask whether the intervention can improve economic efficiency. That is, can a policy increase the size of the economic pie? The fundamental theorems of welfare economics suggest that no allocation of resources can produce a higher level of welfare (i.e., a larger economic pie) than that produced by competitive markets.[78] Thus, a government intervention is justified as increasing economic efficiency only in cases of so-called market failures—when the competitive equilibrium breaks down or when the assumptions of competitive markets fail to hold.

Those insights have led to a search for a variety of market failures that would justify market interventions. However, identifying a textbook market failure on technical grounds doesn't necessarily imply that an intervention will

75. Jin and Huffman, "Measuring Public Agricultural Research and Extension."
76. Julian M. Alston, Jason M. Beddow, and Phillip G. Pardey, "Agricultural Research, Productivity, and Food Prices in the Long Run," *Science* 325, no. 5945 (2009): 1209–10.
77. Keith Fuglie et al., "The Contribution of Private Industry to Agricultural Innovation," *Science* 338, no. 6110 (2012): 1031–32.
78. See, for example, Kenneth J. Arrow and Gerard Debreu, "Existence of a Competitive Equilibrium for a Competitive Economy," *Econometrica* 22, no. 3 (1954): 265–90.

produce a more desirable outcome from the standpoint of economic efficiency. Intervention has its own costs, and sometimes unrecognized institutions develop to solve what appear to be market failures.[79] Nonetheless, a discussion of market failures is a useful starting point from which to judge the merits of intervention. The following subsections consider a variety of commonly presumed market failures and their relationship with various USDA programs; the last subsection discusses the political dynamics that partially explain the persistence of agricultural support programs.

Imperfect Competition

When a single-producer monopoly exists, the firm can produce less output than would be the case under perfect competition. The lower volume of output results in a higher price, which in turn results in higher profits for the firm but at the expense of consumers' well-being. The resulting pie is smaller than it would be if more firms were competing. Monopsony, when a single buyer exists, results in a similar outcome in reverse. Oligopolies represent a middle ground between monopoly or monopsony and competitive markets where there are intermediate reductions in pie size.

Most USDA activities have little to do with dealing with imperfect competition per se. Some price reporting activities of the Agricultural Marketing Service might be argued to promote competition, but the Grain Inspection, Packers and Stockyards Administration (GIPSA)—particularly the Packers and Stockyards Program (P&SP)—is probably the USDA agency most directly tasked with regulating such activities. The stated mission of the P&SP is "to protect fair trade practices, financial integrity, and competitive markets for livestock, meat, and poultry." In the first term of the Obama administration, GIPSA drafted new rules to regulate competition and held hearings related to accusations of imperfect competition in the meat sector, but Congress ultimately stopped the effort. GIPSA has, at times, conducted various studies and investigations, and the agency routinely monitors market outcomes. In 2013, the P&SP charged $106,387 in fines for violations of the Packers and Stockyards Act and won almost $3 million in litigation (up from $1.5 million in 2012 and $0.7 million in 2011), mainly through rulings of a USDA administrative law judge.[80]

79. Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (Cambridge, UK: Cambridge University Press, 1990).
80. USDA Grain Inspection, Packers and Stockyards Administration, *2013 Annual Report: Packers and Stockyards Program*.

Although USDA has a potential role in ensuring "fair" competition in agriculture insofar as the market failure argument is concerned, other remedies for such grievances exist. In particular, victims of uncompetitive practices can sue in court for redress under a variety of federal laws, and indeed many such lawsuits have occurred with varying degrees of success.

Ironically, a number of other USDA activities actually seek to promote market power and imperfect competition in the agricultural sector. Some marketing orders, for example, give commodity organizations the power to control supply, which drives up prices and harms consumers (the aforementioned case against the Raisin Administrative Committee is one such example). Agricultural cooperatives, as another example, are exempt from antitrust laws under the Capper-Volstead Act. One purpose of cooperatives is to coordinate activities in a way that can produce uncompetitive outcomes (or, more charitably, to counteract a preexisting monopoly or monopsony that exists in the market).

A large body of research attempts to estimate the degree of market power in the agricultural sector, and the general findings tend to suggest less power and more benefits from concentration than is often presumed.[81] Recent research by economist Rich Sexton suggests that the high levels of concentration seen in agriculture may not be a result of market power per se but rather represent an attempt by firms to secure a high volume of quality input required to run plants at cost-lowering, full capacity.[82] Much of the discussion of monopolistic power also ignores the dynamics of the marketplace. A monopoly earning excess profits today creates the incentive for new firms to enter and compete away some of the profits. Indeed, although often only a few large firms are involved in meat processing or other sectors, a high level of acquisitions and turnover frequently occurs among the large players. None of this is to say market power may not exist over certain periods, only that legal mechanisms are already in place to address the issue.

Public Goods and Externalities

Economists define a public good as being nonrival (i.e., one person's consumption of the good does not reduce the amount available for another person) and nonexcludable (i.e., people cannot be prevented from the enjoying the good). Classic examples of public goods include clean air and national defense.

81. For one review related to meat industries, see Michael K. Wohlgenant, "Competition in the US Meatpacking Industry," *Annual Review of Resource Economics* 5, no. 1 (2013): 1–12.
82. Richard J. Sexton, "Market Power, Misconceptions, and Modern Agricultural Markets," *American Journal of Agricultural Economics* 95, no. 2 (2013): 209–19.

"From an efficiency standpoint, a producer will produce too much if it fails to fully consider the costs being imposed on others."

Traditional analysis of public goods suggests that the market may underprovide the volume of the public good that is optimally demanded by the public, providing an initial rationale for the government provision of the good.[83] A primary reason for underprovision is the so-called free-rider problem. When a good is nonexcludable, an individual can consume the good without having to pay; consequently, many people won't pay (i.e., they'll free-ride), which results in a lower volume of the good being produced than would be the case if the producer could charge for every unit. A closely related concept is that of externalities, which arise when the costs (or benefits) of producing a good are not fully reflected in the market price. From an efficiency standpoint, a producer will produce too much if it fails to fully consider the costs being imposed on others.

Many possible public goods and externalities are related to agricultural production. Examples include public goods like air and water quality and the benefits of agricultural research, as well as externalities like fertilizer runoff and livestock odor. The USDA agency most related to the public goods associated with agriculture is the Natural Resources Conservation Service, though the Farm Service Agency also has some responsibilities related to CRP and other programs. The National Institute of Food and Agriculture and the Agricultural Research Service fund and conduct research for which a public good rationale can be made (i.e., except in the case of patents, others cannot be kept from enjoying the benefits of research, and one's ability to learn from new research does not preclude others from doing the same).

No doubt, externalities and public goods exist in the agricultural sector. Indeed, there are calls for policies to calculate and enforce the "true cost of food."[84] However, many of the externalities in food and agriculture

83. Paul A. Samuelson, "The Pure Theory of Public Expenditure," *Review of Economics and Statistics* 36, no. 4 (1954): 387–89.
84. Mark Bittman, "The True Cost of a Burger," *New York Times*, January 15, 2015; Mark Bittman et al., "A National Food Policy for the 21st Century," *Medium.com*, October 2015.

are neither the sorts that reduce the size of the pie nor externalities at all.[85] Moreover, costs are internalized in many ways that may not be initially obvious, whether they be through litigation, insurance contracts, reputation, or negotiation. In the case of both public goods and externalities, ill-defined property rights are often the root cause of the problem.

Some USDA programs, such as the marketing orders or legislation that creates checkoff programs, can be viewed through a public-good lens. When an industry uses generic advertising (e.g., the "milk mustache"), all producers benefit regardless of whether they pay for the advertising. The opportunity for free riding has motivated mandatory participation in the programs. However, when multiple competing industries use generic advertising, some of the benefits dissipate, because demand increases for one industry come at the expense of demand reductions in others.[86] Also rarely considered are the potential adverse effects on owners of branded products, who can be harmed from advertising that lowers perceived differentiation among products.[87] Despite the potential problems with free riding, the evidence also suggests that other mechanisms could be used to fund such programs in the absence of an industrywide mandate.[88]

Information

Lack of information, or an inequitable distribution of information, can lead to moral hazard, adverse selection, wasteful signaling, imperfect competition, and other welfare-reducing outcomes. One of the most well-known examples is Nobel Prize–winning economist George Akerlof's market for lemons.[89] In Akerlof's original example, used-car sellers have more information about the quality of their car (whether it has been in an accident, whether the engine runs well, etc.) than does the prospective buyer. The buyer, unsure of whether the car is a lemon, is at an information disadvantage. In the most extreme case, the buyer refuses to purchase a used car for fear that sellers are only getting rid of lemons,

85. Lusk, "Public Opinion about the Food Stamp Program."
86. Julian M. Alston, John W. Freebairn, and Jennifer S. James, "Beggar-Thy-Neighbor Advertising: Theory and Application to Generic Commodity Promotion Programs," *American Journal of Agricultural Economics* 83, no. 4 (2001): 888–902.
87. John M. Crespi and Stéphan Marette, "Generic Advertising and Product Differentiation," *American Journal of Agricultural Economics* 84, no. 3 (2002): 691–701.
88. Kent D. Messer, Harry M. Kaiser, and William D. Schulze, "The Problem of Free Riding in Voluntary Generic Advertising: Parallelism and Possible Solutions from the Lab," *American Journal of Agricultural Economics* 90, no. 2 (2008): 540–52.
89. George A. Akerlof, "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism," *Quarterly Journal of Economics* 84, no. 3 (1970): 488–500.

and there ceases to be a market for used cars at all, despite the fact that there are buyers and sellers willing to engage in mutually beneficial trade. Similar adverse selection problems are thought to exist in markets for health and crop insurance. Only individuals who are sick or likely to experience a crop failure will enroll in insurance, and insurance providers, knowing that fact, fail to insure anyone. Of course, these extreme cases of complete market failure are not always observed in practice (e.g., an active market for used cars existed well before Akerlof's 1970 article), and emerging technologies are helping address some of these information problems.[90] However, it remains true that some advantageous trades will likely fail to take place when information is incomplete.

Many examples of imperfect information relate to the ability of one party to determine the "type" of another (e.g., sick or healthy person; lemon or well-functioning auto). Some USDA programs, such as grades and standards, are designed to partially alleviate some of those asymmetric information problems. Reports on the distribution of quality in the population (e.g., percentage of cattle graded USDA Choice, prices of hogs and cattle by weight and quality) can help prevent some of the problems associated with the information asymmetries by providing buyers and sellers with more accurate information on the "types" to be expected.

Those and other issues are discussed in a report by the Council on Food, Agricultural and Resource Economics in relation to the value of USDA data collection and dissemination efforts that are associated mainly with the National Agricultural Statistics Service, Agricultural Marketing Service, and Economic Research Service.[91] Although some of these information-provision programs have strong justifications, areas for improvements and cost reductions are also possible.

Public Choice

Looking for economic justifications to explain the current actions of the USDA may be unproductive. Although market failures provide a normative framework from which to evaluate government intervention, this approach does not necessarily provide a descriptive account of the policies we now see. Actual farm policy outcomes are likely to be driven by political considerations. A common explanation for agricultural subsidies is a model of concentrated benefits

90. Christopher Koopman, Matthew Mitchell, and Adam Thierer, "The Sharing Economy and Consumer Protection Regulation: The Case for Policy Change," *Journal of Business and Entrepreneurship and the Law* 8, no. 2 (2014): 529–46.
91. Council on Food, Agricultural and Resource Economics, "Value of USDA Data Products," Washington, DC.

and diffuse costs: the costs of agricultural subsidies go relatively unnoticed by the general public because they are spread across all taxpayers, but the payouts are concentrated among a smaller group of farmers who are well organized and who lobby for the redistributive policies.[92] Although this explanation can go part of the way to explaining agricultural subsidies, a rich empirical and theoretical literature adds additional insight.

One of the key puzzles surrounding agricultural policies was summed up nicely by Krueger: "Why is it that rich countries, in which farmers are a small minority, normally subsidize agriculture so much, while in poor countries, where farmers are in a majority, they are usually heavily taxed?"[93] This phenomenon was more recently discussed by Anderson, Rausser, and Swinnen and is illustrated in figures 14 and 15.[94] As it turns out, this "puzzle" can be explained by political economy models. For example, Swinnen created a political economy model of farm support to explain why policies often differ markedly across countries, commodity, and time.[95] His model views politicians as utility-maximizing actors who seek election in return for redistribution policies that increase political support. His model leads to a number of interesting predictions, such as (1) politically optimal farm subsidies will increase as agriculture's share of total economic output falls and (2) transfers to agriculture will increase if agricultural income falls relative to income outside agriculture.[96]

In a seminal work on the topic, Gardner models agricultural support as an attempt at efficient redistribution (i.e., minimizing the deadweight loss of transfers) given a weight assigned to the rents accruing to agricultural producers, which depends on political and economic characteristics of commodity interest groups.[97] Gardner analyzes how agricultural support varies over time and across agricultural commodities and hypothesizes that the weight given to agricultural producers depends on economic factors that convey political power. Groups that have more common economic interests and that are able to reduce the cost of lobbying are likely to garner greater redistribution. Analyzing data on subsidies

92. Mancur Olson, *The Logic of Collective Action: Public Goods and the Theory of Groups* (Cambridge, MA: Harvard University Press, 1965).
93. Anne O. Krueger, "Political Economy of Agricultural Policy," *Public Choice* 87, no. 1–2 (1996): 163.
94. Anderson, Rausser, and Swinnen, "Political Economy of Public Policies."
95. Johan Swinnen, "A Positive Theory of Agricultural Protection," *American Journal of Agricultural Economics* 76, no. 1 (1994): 1–14.
96. This model and others like it are discussed in detail by de Gorter and Swinnen. See Harry de Gorter and Johan Swinnen, "Political Economy of Agricultural Policy," in *Handbook of Agricultural Economics*, vol. 2, ed. Bruce L. Gardner and Gordon C. Rouser (Amsterdam: North-Holland, 2002), 1893–1943.
97. Bruce L. Gardner, "Causes of US Farm Commodity Programs," *Journal of Political Economy* 95, no. 2 (1987): 290–310.

paid to 17 farm commodities from 1909 to 1982, Gardner finds that redistribution to a given commodity fell (1) as the absolute value of the elasticities of supply and demand for the commodity increased, (2) when the number of producers exceeded one million, (3) the more production a commodity shifted geographically over time, (4) for commodities whose production was more geographically diffuse (rather than concentrated in a given region), (5) as farm income increased, and (6) for commodities that were imported less frequently.

Other work has directly analyzed the relationship between political donations, lobbying, and congressional voting. For example, economists Johnathan Brooks, Colin Cameron, and Colin Carter studied contributions and voting related to sugar policies.[98] They found congressional votes in favor of redistribution to sugar farmers prompted more pro-sugar contributions and fewer anti-sugar contributions. They also found that pro-sugar redistribution groups tended to concentrate their donations on fewer legislators than did anti-sugar redistribution groups. Donations by pro-sugar redistribution groups increased in response to donations by anti-sugar redistribution groups, suggesting competition in lobbying. Similarly, economists Garth Holloway, Donal Lacombe, and Timothy Shaughnessy find that legislatures' votes on agricultural policies were affected by donations from agricultural political action committees and by whether the legislator was from an urban or rural district.[99] Economist Thomas Stratmann provides evidence suggesting that these agricultural donations are rational in the sense that they do not go to legislators who would have voted in favor of redistributive policies anyway.[100] Economists Thomas Garrett, Tom Marsh, and Maria Marshall show that agriculture disaster support is higher in states represented by public officials with greater power to affect the allocation of relief funds.[101]

Economist Vernon Ruttan discusses a case that runs counter to that predicted by public choice models.[102] In particular, many public choice models

98. Jonathan C. Brooks, A. Colin Cameron, and Colin A. Carter, "Political Action Committee Legislation and U.S. Congressional Voting on Sugar Legislation," *American Journal of Agricultural Economics* 80 (1998): 441–54.
99. Garth Holloway, Donald J. Lacombe, and Timothy M. Shaughnessy, "How Large Is Congressional Dependence in Agriculture? Bayesian Inference about 'Scale' and 'Scope' in Measuring a Spatial Externality," *Journal of Agricultural Economics* 65, no. 2 (2014): 463–84.
100. Thomas Stratmann, "Are Contributors Rational? Untangling Strategies of Political Action Committees," *Journal of Political Economy* 100, no. 3 (1992): 647–64.
101. Thomas A. Garrett, Thomas L. Marsh, and Maria I. Marshall, "Political Allocation of US Agriculture Disaster Payments in the 1990s," *International Review of Law and Economics* 26, no. 2 (2006): 143–61.
102. Vernon W. Ruttan, "Bureaucratic Productivity: The Case of Agricultural Research," *Public Choice* 35, no. 5 (1980): 529–47.

suggest a tendency for bureaucratic overinvestment; bureaucrats seek to maximize the size of their budgets irrespective of the output actually produced. However, Ruttan notes that the high rates of return for research in agriculture undermine the bureaucratic overinvestment hypothesis in this case. Possible reasons may relate to competition among states and agencies in agricultural research and to spillover effects that arise when innovations developed in one state positively affect agricultural output in other states.

Public choice analyses of farm policy have tended to focus on farmers, lobbyists, and legislatures. Often ignored is the influence of another important group: voters and food consumers. A growing body of empirical literature has revealed that the US public is surprisingly interventionist when it comes to farm and food policy.[103] As described by economist Bryan Caplan, voters are able to hold onto a variety of antimarket biases because they provide psychological benefits but are unlikely to impose significant costs (at the individual level).[104] Thus, one possible explanation for why inefficient agricultural subsidies exist is that voters elect politicians who favor them. That is, agricultural subsidies exist because voters want them. Moreover, in recent years, ballot initiatives have emerged that give voters more direct control over food and agricultural policy.[105]

Summary

Other types of market failures could exist, but the ones discussed in this paper are those that tend to occupy most economists' attention. Noticeably absent from the preceding discussion are the two largest USDA budgetary items: farm subsidies and food assistance programs. It is true that crop insurance could suffer from problems of adverse selection (only those farmers facing large risks will sign up) and moral hazard (insurance will cause farmers to take more risks); however, these are concerns associated with *any* insurance market. Most states require auto insurance (alleviating adverse selection), but they do not subsidize the drivers' premiums. The use of deductibles is a common means of

103. Jayson L. Lusk, "The Political Ideology of Food," *Food Policy* 37, no. 5 (2012): 530–42; Ellison, Lusk, and Briggeman, "Taxpayer Beliefs about Farm Income"; Ellison, Lusk, and Briggeman, "Other-Regarding Behavior."
104. Bryan Caplan, *The Myth of the Rational Voter: Why Democracies Choose Bad Policies* (Princeton, NJ: Princeton University Press, 2011).
105. Brandon R. McFadden and Jayson L. Lusk, "Effects of Cost and Campaign Advertising on Support for California's Proposition 37," *Journal of Agricultural and Resource Economics* 38, no. 2 (2013): 174–86; Katie Smithson et al., "Predicting State-Wide Votes on Ballot Initiatives to Ban Battery Cages and Gestation Crates," *Journal of Agricultural and Applied Economics* 46, no. 1 (2014): 107–24.

mitigating moral hazard, but new elements of the 2014 Farm Bill subsidize this portion of the insurance policy as well, reducing whatever mitigating effects the deductible has on risk taking.

Farm subsidies and food assistance programs could be justified on grounds of equality, "fairness," or inequality aversion. These are questions related to how the slices of the pie are allocated (not to the overall size of the pie). Depending on one's perspective, they can be legitimate motives for government intervention, although they typically fall outside the purview of welfare economics. Food assistance programs are means tested; as such, the benefits flow primarily to lower-income households. Thus, transfers move from relatively well-off taxpayers to relatively less well-off benefit recipients. In the case of crop insurance subsidies and commodity program payments, however, benefits flow from taxpayers to relatively well-off farmers (see the discussion surrounding figure 2). Thus, although concerns about distribution and equity might have had some force in motiving farm subsidies in the past, that is not the case today. That is likely one reason that payment limitations have made their way into recent legislation (e.g., the 2014 Farm Bill caps commodity payments from Title I to $125,000 per year per individual and prohibits payments to individuals earning more than $900,000 in adjusted gross income; crop insurance subsidies are not subject to payment limitations).

In short, although political economy provides compelling reasons for why farm subsidies exist, sound economic justifications for them are lacking.

SUMMARY AND FUTURE DIRECTIONS

Agriculture has changed dramatically over the course of the past century. So too has the USDA. The USDA began in the Civil War era as a seed-disseminating department. In the early 1900s, it took on food safety regulations. In the 1930s, farm support programs were added. To that, antipoverty and nutritional programs were added after the 1960s, along with various environmental policies. Farm policy changes over the past 20 years have led to more planting flexibility for farmers, which allows adjustment to market prices, and the government no longer buys and stores massive amounts of excess commodities.

Despite these positive developments, additional change is likely warranted. The farms today that supply the bulk of the nation's food are larger and more sophisticated than in the past. The farmers have access to crop consultants, and online information is at their fingertips. Today's agricultural producers are wealthier than they were in the past, and they own assets of significant monetary value. Futures markets are available to hedge against price risk, and,

in many cases, producers have access to more vertically integrated markets that offer contracts that reduce price or production risk. Solid economic justifications for farm subsidies, which cost taxpayers $20 billion annually, are virtually nonexistent.

The latest farm bill introduced a complicated set of programs with overlapping objectives that are run through two different USDA agencies. A statement by a farmer during a Kansas State University webinar on the 2014 Farm Bill summed up the situation well: "Just left my local FSA [Farm Service Agency] office and had long discussions on [farm bill] implementation and procedures. They are still quite confused. Regardless of that, they have now confused me more."[106] The complicated nature of the programs was anticipated. The 2014 Farm Bill contained more than $100 million to develop decision tools and education programs to inform farmers about which options would provide the highest payouts. If all this might seem necessary, it is noteworthy that the majority of the large fruit and vegetable growers and livestock producers receive, for all practical purposes, no farm subsidies.

While Congress continues to alter commodity programs with each additional farm bill, mission creep has occurred as the USDA has taken on new and expanding roles. There are programs aimed at helping small farmers, funding research on specialty crops, supporting farmers markets and local foods programs, improving the quantity and quality of foods consumed by lower-income Americans, regulating anticompetitive practices, improving water quality, and mitigating adverse effects of livestock manure, just to name a few. With the expanding mission have come multiple objectives that are often in conflict. Examples are numerous: (1) increase the efficiency of agricultural production to produce more food at a lower cost, while trying to reduce obesity and promote organic

"Solid economic justifications for farm subsidies, which cost taxpayers $20 billion annually, are virtually nonexistent."

106. "Questions and Answers from October 2, 2014 Farm Bill Webinar," http://www.agmanager.info/policy/commodity/2012/WebinarQuestions.pdf.

practices that lower yields and increase costs; (2) help small, minority, and beginning farmers and promote farmers markets, while trying to ensure food security for the nation and promoting exports to consumers elsewhere; (3) pay producers to remove environmentally sensitive lands from production, which increases food prices and thus the amount of assistance needed by low-income households; and (4) create nutritional guidelines that recommend eating fewer animal products, while helping fund promotional campaigns that encourage consumption of those products and conducting research that makes such products less expensive. Each of these examples is not necessarily in conflict: more efficient production can improve the environment through reduced resource use while lowering prices for consumers and giving farmers more to sell. Ultimately, improved efficiency and productivity would be a laudable goal, but it is far from clear that it is the sole, or even most important, objective of the department.

A department that focuses on activities and policies that expand the size of the pie, rather than redistributing the pieces, is one most likely to ensure a prosperous future. What additional activities can the department undertake to move further away from old-style commodity programs and reduce barriers to the development of self-funded farm insurance underwritten by the private sector? Ensuring that accurate data are available on price and delivery of insurance is one role. Others have suggested ideas such as crop insurance savings accounts,[107] as well as other alternatives.

American farmers are more prosperous when they have access to consumers all over the world by having open borders and freer trade. American farmers are among the most competitive in the world, not because they have the lowest labor costs or rental rates but because they have access to the best science and technology. Ensuring a flow of efficiency-enhancing science and technology is a mechanism to improve farmer and consumer well-being. That will require preventing trading partners from enacting nontariff trade barriers based on specious food safety claims. Health and environmental goals are important, and many can be reached through advances in science and technology and in more local ways without infringing on consumers' desires for tasty food and on producers' freedom to operate.

107. Gregory Colson, Octavio A. Ramirez, and Shengfei Fu, "Crop Insurance Savings Accounts: A Viable Alternative to Crop Insurance?," *Applied Economic Perspectives and Policy* 36, no. 3 (2014): 527–45.

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