The Past, Present, and Future of the U.S. Department of Agriculture

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Abstract: Since its inception in 1862, the U.S. 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 agency. This paper first takes a step back and documents the changes that have occurred over time to U.S. agriculture in general and to the USDA in particular before discussing the current make-up and activities of the agency. 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.

1. Introduction

Since its inception in 1862, the U.S. Department of Agriculture (USDA) has experienced dramatic growth and change, as has the industry it was set up to serve. Today the USDA has an annual budget of around $150 billion (USDA, 2015) and it employs more than a hundred thousand people - or about one federal employee for every 20 farms (US Census Bureau, 2012). The agency's original mission has expanded into new areas, and with it has come increased controversy and scrutiny. The USDA has historically focused on farmer support and domestic agriculture, but it has now taken on roles related to the environment, nutrition, rural development, lending, food safety, public health, and food assistance, just to name a few.

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 Farm Bill), which authorizes USDA programs through 2018, was finally signed in to law in February 2015. However, it was two years late, with the previous farm bill having expired in 2012. The delay resulted from the difficulty reaching compromise between the competing factions usually affected by bill. 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 (Orden and Zulauf, 2014). That 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 issues such as obesity, sustainability, international development, organic, 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 bill that President Obama called a "Swiss army knife" that "multitasks" (Jackson, 2014).

Even still, the current make-up of the farm bill and the activities of the USDA continue to be contested. Well known authors and food activists, for example, have recently argued for a policy overhaul focusing more on food than the farm. Writing in the *Washington Post*, Mark Bittman, Michael Pollan, and others (2014) proposed a whole suite of new policies that guarantee, among other things, "access to healthy food", "fair wages" for food workers, lower carbon emissions, high animal welfare, and farm policies that "support our public health and environmental objectives." The irony is that such an all-encompassing food policy is one already confronting the USDA. The authors argue that our present day food woes are "largely a result of government policies", but they expect new policies to better perform.

The same authors (2015) released a longer memo to the next president in October 2015 entitled "A National Food Policy for the 21st Century", in which, among other things, they recommended renaming the USDA the Department of Food, Health, and Well-being. Commenting on the proposal, Eikert (2015) wrote, "I think elimination of the U.S. Department of Agriculture should be the cornerstone demand of the consumer, tax-payer revolt." He instead wants to replace the USDA with a "Department of Domestic Food Security." The demands for change in food and farm policy are also reflected in the focus of the 2015 New York Times "Food for Tomorrow" conference which focused on policy issues.

The calls aren't new. Penning a letter entitled "Farmer in Chief" to newly elected President Obama in 2008, Michael Pollan (2008) called for federal policies to, among other things, support food diversity, promote regional food economies across the world, enact environmental standards, revamp school lunch programs, forgive loans to culinary students, and renew the 1960's era policies requiring government purchases of grain. While such members of the co-called "food movement" have had historically had much less influence on farm and food

policy than, for example, farm commodity organizations, recent events suggest that power dynamic could be changing.

Congress has also sought advice about USDA re-organization. The 2014 Farm Bill included a mandate for the National Academy of Public Administration to make recommendations on a new undersecretary for trade and foreign affairs. The 2015 report from the Academy suggested the first reorganization of USDA in more than a decade. The recommendations were to eliminate three current undersecretaries and replace them with three new undersecretaries focused on trade and market development, health and safety, and farm services and risk management.

Consumers themselves have also expressed strong, if not sometimes conflicting, opinions about agricultural policy. When asked to prioritize spending among six major expenditure categories at the USDA, survey respondents prefer re-allocations away from food assistance programs and farm support toward food safety and research and education activities (Ellison and Lusk, 2011). Nonetheless, other studies have shown relatively high levels of public support for farm subsidies, particularly those targeted small farmers, based on the (probably inaccurate) belief that the subsidies help ensure a secure food supply (Ellison, Lusk, and Briggeman, 2010a,b). One survey during the most recent farm bill debate revealed low levels of support for monetary cuts to food assistance programs like 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 (Lusk, 2013). 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.

Not only are the pressures and demands of food activists and taxpayers affecting USDA activities, so too are the courts. In the summer of 2015, the Supreme Court, by a vote of 8 to 1, struck down a 1940s-era USDA marketing order which forced producers to give up a portion of their raisins to the Raisin Administrative Committee in an effort to artificially raise prices. Justice Kagan said the court's task was to decide whether "this marketing order is a taking or it's just the world's most outdated law" (Liptak 2015). There are marketing orders affecting a number of other commodities, though it unclear the extent to which the latest ruling will affect existing orders on other commodities like milk, walnuts, tomatoes, onions, and oranges.[1] This is certainly not the first or only first USDA program to be challenged in the 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 (Chen, 2008). Legal pressures have come not only from within the U.S. but also from other countries, as are perhaps best exemplified by World Trade Organization rulings against certain features of the U.S. cotton subsidy program and against mandatory origin labeling laws for meat.

The purpose of this paper is to several-fold. First, I take a step back and document the changes that have occurred over time to U.S. agriculture in general and to the USDA in particular before discussing the current activities of the agency. Then, I briefly review some of the academic research on the effects of selected USDA policies on agricultural producers and food consumers. Then, I put forth conventional economic justifications typically given for selected USDA programs, and evaluate them in light of the changes witnessed in agriculture over

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[1] For a full list of commodities covered see the links at http://www.ams.usda.gov/rules-regulations/moa.

the past century. Public choice considerations that help explain the existence and persistence of

farm subsidies are also discussed. Finally, I conclude by highlighting some of the challenges and

conflicts that exist with the current makeup of the USDA and ask what the future might hold for

the agency.

2. U.S. Agriculture Past and Present

The agricultural economy in the US has witnessed dramatic change over the past century. In

1900, just under 40% of the total population was on the farm and 60% lived in rural areas.

Today the respective figures are only about 1% and 20%. Moreover, agriculture is less

important in terms of the overall economy. As a share of GDP, agriculture accounted for 7.7%
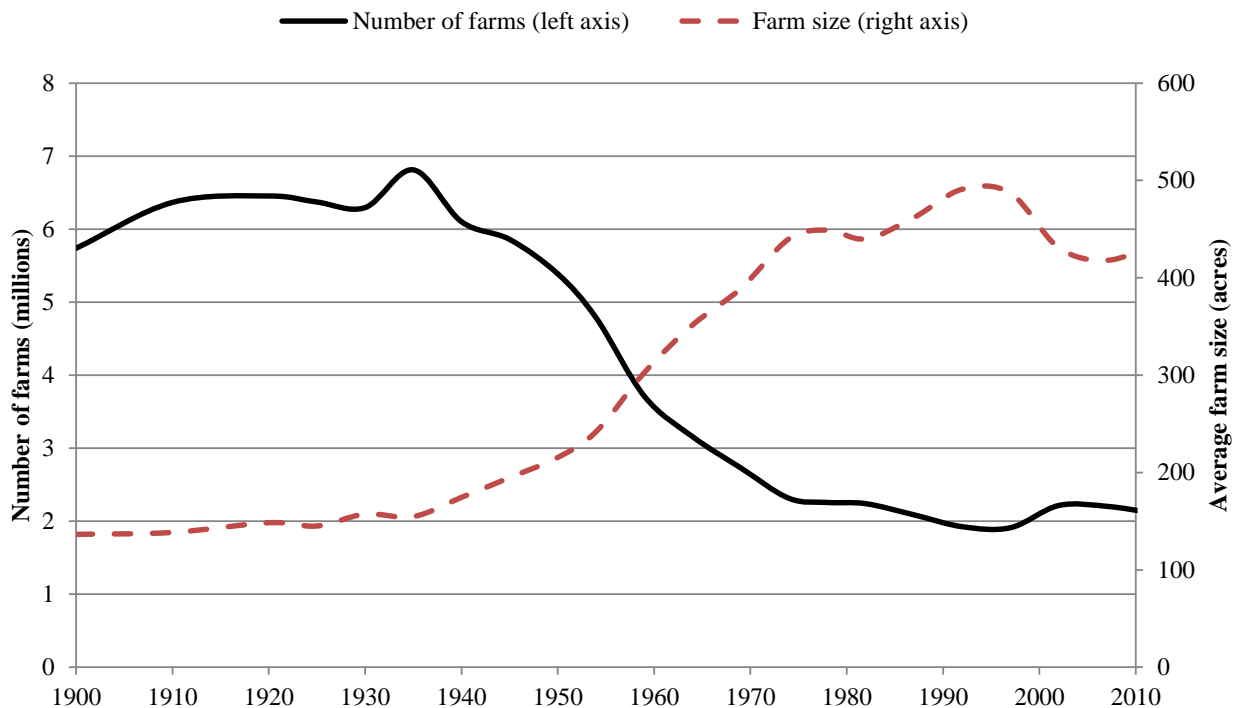
in 1930 but only 0.7% in 2000 (USDA, ERS).

Figure 2.1. Number of farms and farm size over time (source: USDA Census of Agriculture; note: after 1997 the USDA adjusted the figures for coverage)

Figure 2.1 shows the number of farms and the average farm size from 1900 to 2010.

There were between six and seven million farms in from 1910 to 1940. 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, there are today fewer,
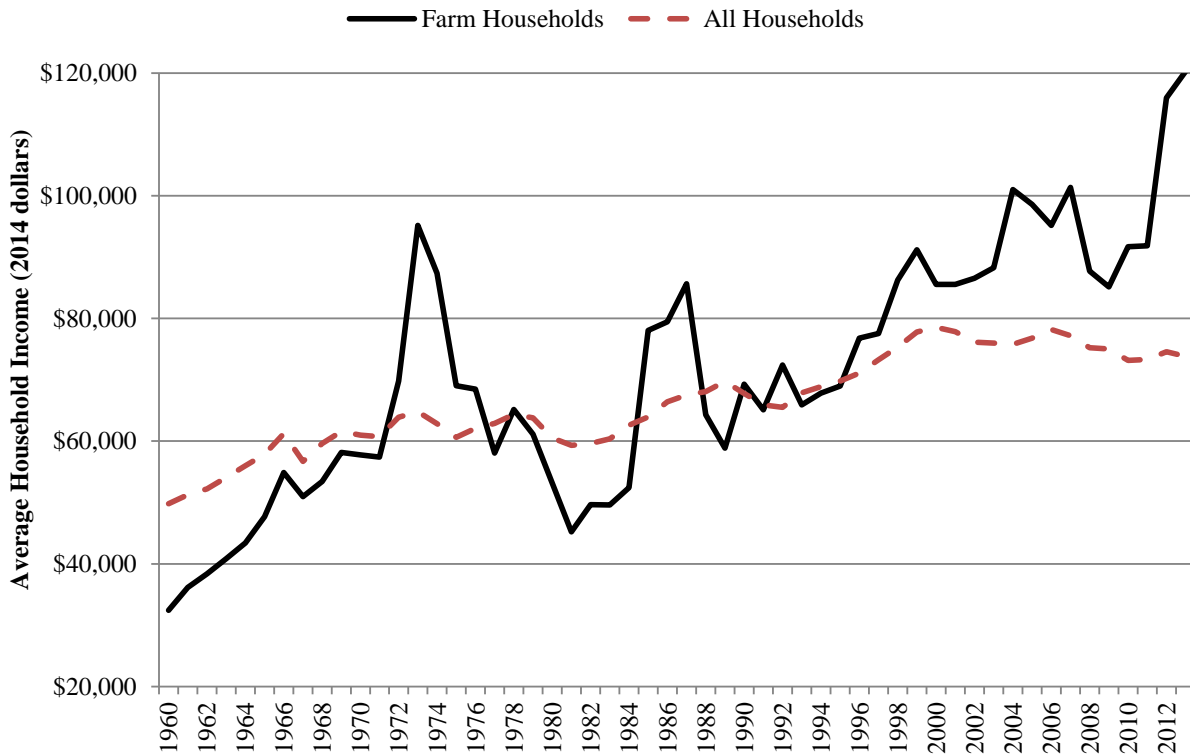
larger farms than there were in the past.

Figure 2.2. Household Income over Time in 2014 Dollars (source: USDA-ERS)

Table 2.2 reports the average household income of farm households compared to all US

households from 1960 to 2014. Whereas farm households earned lower incomes than other

households prior to the 1970s, since the mid-1990s, farm households have consistently earned

more than other US households. In several years after 2000, average annual farm household

income was at 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 nonfarm

households. Census data indicates 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 was $915,210 ($802,000). In 2012, 98% of farm households had net worth that exceeded the net worth of the median US household.[2] For the past 20 years, farm households as a group have been in relatively good financial standing compared to nonfarm households.
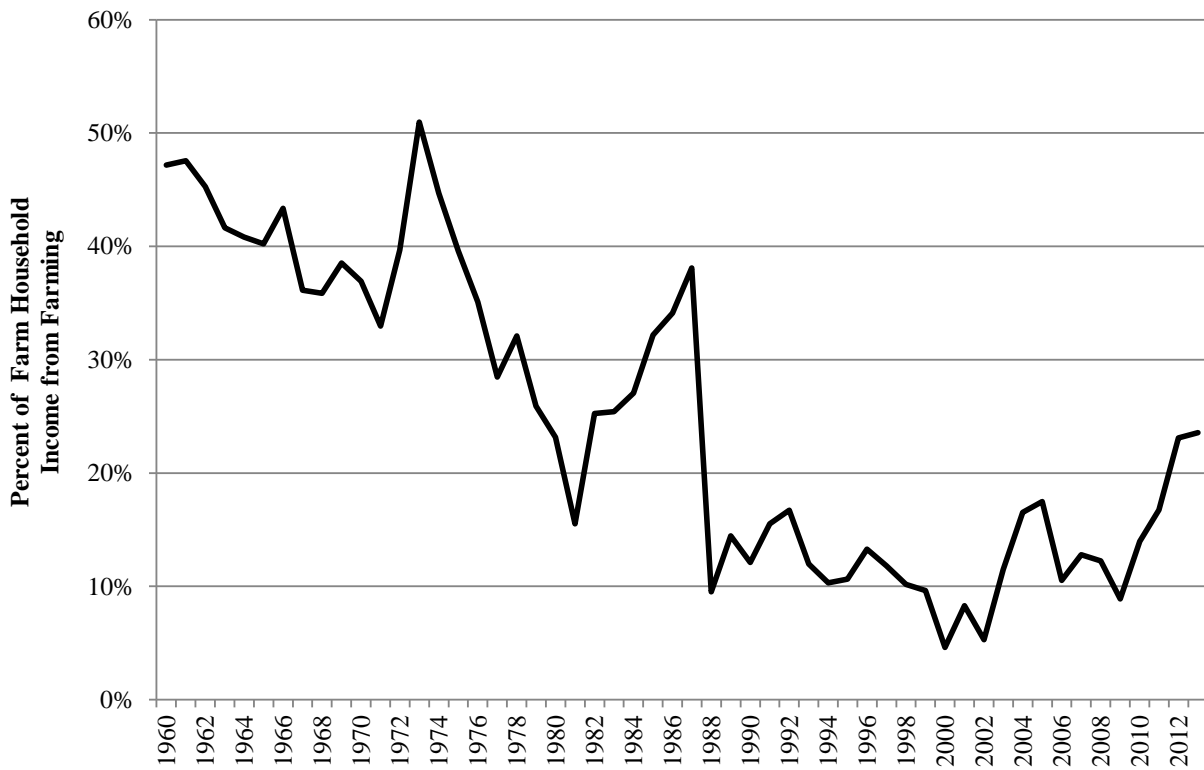

Figure 2.3. Percent of Farm Household Income from Farming over Time (source: USDA-ERS)

Figure 2.3 shows that over time farm household incomes have become more diversified in the sense that the percentage of household income from farming has steadily declined (aside from the increase in 2011-12 due to higher commodity prices). In 1960, almost half the income earned by farm households came from farming. By 2000, it reached a low of about five percent before rebounding to about 20%. So, while at the same time farms have become more

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[2] http://www.census.gov/compendia/statab/2012/tables/12s0830.pdf
http://www.census.gov/people/wealth/
http://www.ers.usda.gov/topics/farm-economy/farm-household-well-being/income-and-wealth-in-context.aspx#wealth

specialized on the farm (growing fewer commodities than they did in the past), 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 2.1 shows the distribution of farms in the US by total sales. Twenty percent

of farms have total sales less than $1,000, and 67% of farms have total sales less than $25,000.

These small farms only account for a small share of the value of agricultural output. In fact,

farms with total sales of less than $25,000 (accounting for more than half of all farms) account

for less than one percent of the value of agricultural output while farming 20.7% of the acres. By

contrast, 7.5% of the larger farms (those with more than $500,000 in sales) account for 80% of

the value of agricultural output while only farming 38.4% of the land. These data suggest that

much of the data the USDA reports on farms fail to correspond with businesses that have any

substantive level of output and are run by households who rely on the vast majority of their

income from non-farm sources.

Table 2.1. Size of farms and value of production in 2012 (source: USDA Census of Agriculture)

Farm Type (by total sales)	% of all farms	% of value of production	% 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%

The change in the number and composition of farms over time are partly attributable to changes in technology and market conditions. Figure 2.4 shows an index of yields for corn, wheat, and cotton. Corn yields in 1900 were only 18% of what they were in 2014. In 1900, wheat yields were only about 30% of what that they were in 2014. With the adoption of tractors, synthetic fertilizers, and improved seeds, yields began climbing after World War II. Yield grown has continued until today, although the rate of growth has slowed somewhat in recent decades.
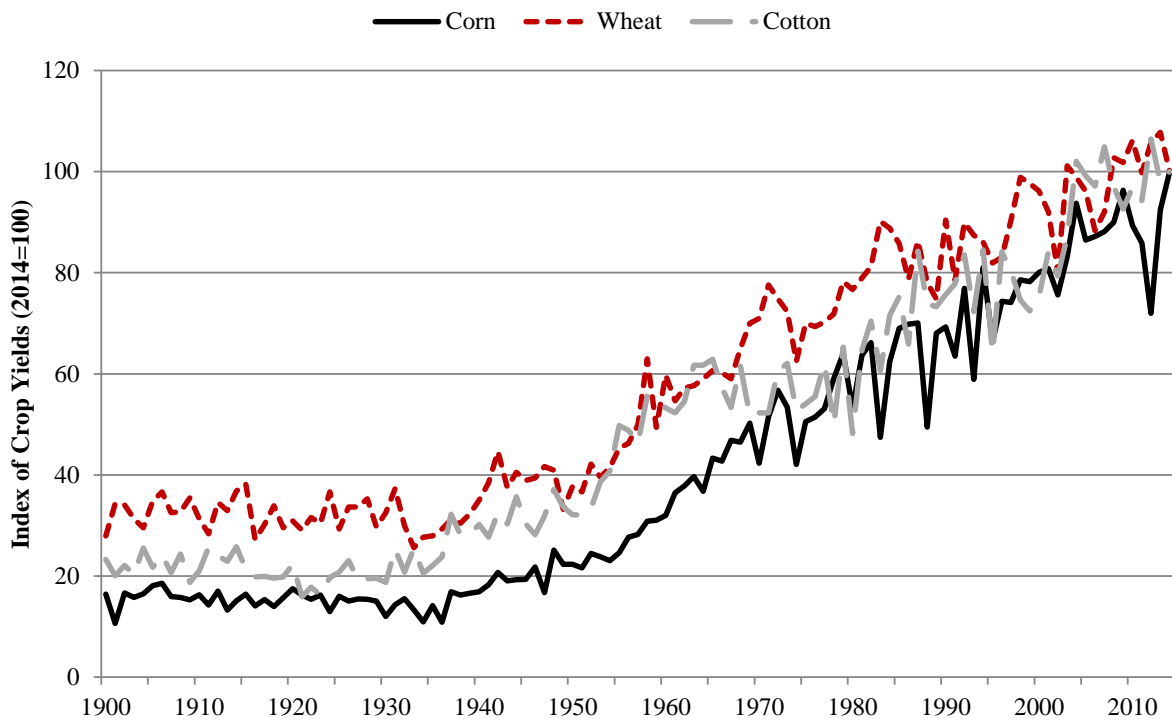

Figure 2.4. Index of Crop Yields (2014=100) (source: USDA National Agricultural Statistics Service)

It is possible to achieve higher output by increasing the volume of inputs used. However, as show in figure 2.5, total agricultural output has more than doubled since 1948 while at the same time key agricultural inputs have fallen. More output with fewer inputs implies increasing productivity. In 1948 there was four times the amount of labor used in agriculture than there is

today. As figure 2.5 shows, the US produces more agricultural output today despite using less land and substantially less labor.
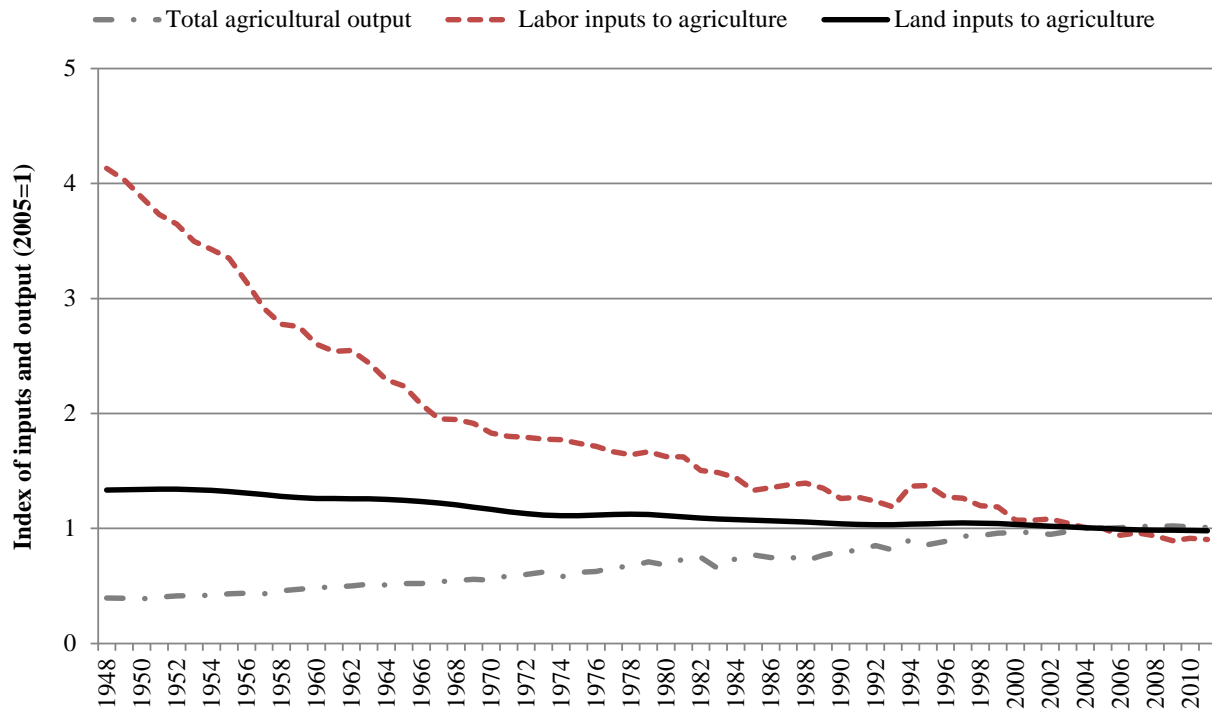

Figure 2.5. Index of Farm Input and Output (Source: USDA-ERS, http://www.ers.usda.gov/data-products/agricultural-productivity-in-the-us.aspx)

Increasing productivity leads in falling prices. Figure 2.6 shows an index of real prices from 1910 to 2014 for corn, wheat, and cotton. Prior to the 1950s, prices for these commodities were routinely three to six times higher than they are today. Around World War I, as production in Europe fell, farm commodity prices reached a high (prices were seven times higher than they were in 2015). When production in Europe resumed after the war, prices dramatically fell. 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 2.6 suggest that the so-called parity price outcomes observed during that period were an aberration rather than 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 the preceding

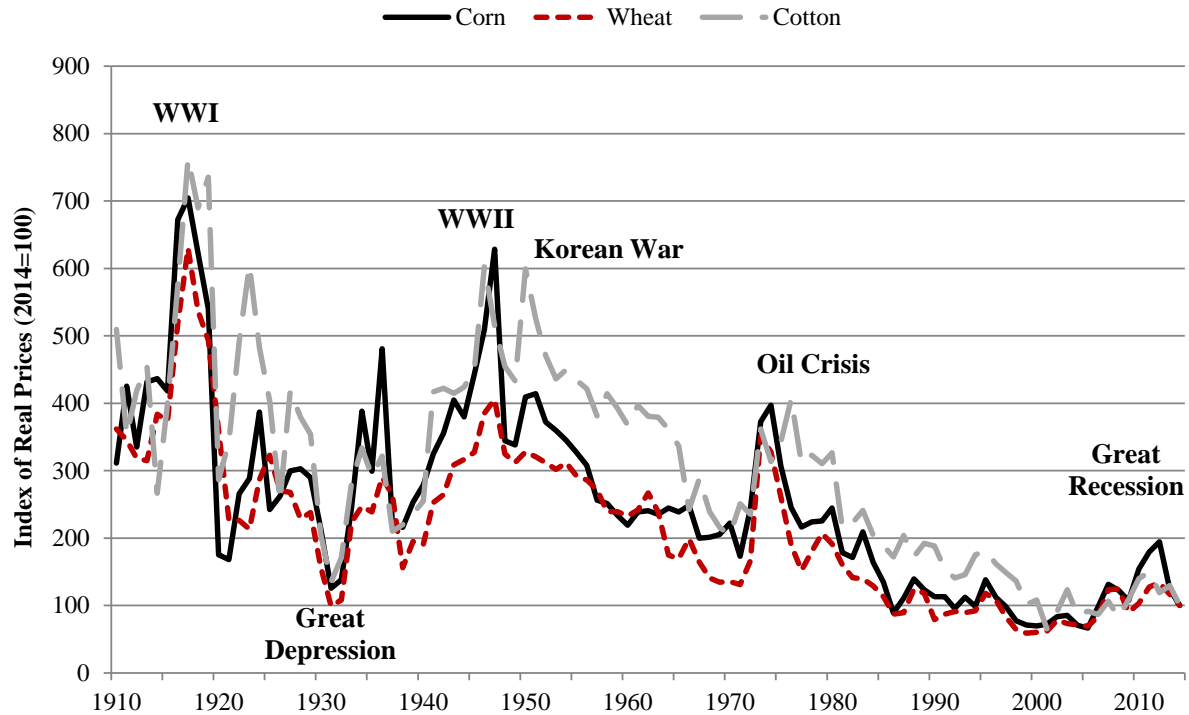figures reveled, they have more output to sell, resulting in higher net incomes.

Figure 2.6. Real Prices Received by Farmers (2014=100) (source: USDA National Agricultural Statistics Service)

3. USDA Past and Present

3.1 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 at present. 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."[3]

The USDA was created as an extension of the U.S. 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 government until the Great Depression. Even during the financial crises of the mid-1890s, the Secretary of Agriculture, J. Sterling Morton did not budge on request for subsidies from beet-sugar farmers. Morton said, "Those who raise corn should not be taxed to encourage those 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" (Olsen, 1942). Congress's first attempt at agricultural support began with the McNary-Haugen Bill introduced during the 1920's to fix the prices of certain crops to the "parity", pre-WWI levels. Congress passed the bill, but President Coolidge vetoed it, echoing the sentiments of Morton by saying, "[The passing of this 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" (Folsom, 1996). 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 passing the Federal Meat Inspection Act as well as the Pure Food and Drug Act. Soon after, the Poultry

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[3] http://www.nal.usda.gov/act-establish-department-agriculture

Products Inspection Act, the Humane Methods of Slaughter Act, and the Egg Products

Inspection Act were all passed, and enforcement fell to the USDA.

The Great Depression led to other major changes in the mission of the USDA. Herbert

Hoover created the Farm Board which created price floors for wheat and cotton. When market

prices fell below $0.80/bushel for wheat and $0.20/lb 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 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.

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 supply. Farmers who

agreed not to plant or to kill off livestock were given subsidies. Prices for crops were pegged to

the "parity" prices of 1910. Of course, the program increased the cost 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."[4] Nonetheless, other

programs were enacted and upheld by the courts. For example, instead of subsidizing farmers

not to plant crops, a similar program subsidized farmers who grew soil enriching crops, like

alfalfa that would not be sold on the market. When these programs were challenged on a

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[4] http://www.ssa.gov/history/court.html

constitutional basis, the Supreme Court ruled in favor of protecting the newly formed agricultural

programs invoking the Commerce Clause.[5] 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. By growing more wheat

than his allotment, the court claimed that he indirectly helped depress prices. His wheat was

destroyed.[6]

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.

While 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.

Important changes have occurred since the 1930s that have expanded the mission of the

USDA. The 1950s introduced flexible (as opposed to fixed) price supports for commodities, and

temporary introduced a 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 this period coincided with the advent of Lyndon B. Johnson's "Great

Society." Johnson's administration charged the USDA to oversee programs meant to promote

the wellbeing of the poorest of Americans through food stamps and commodity distribution

programs. As the next section will reveal, this change would ultimately cause a dramatic

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[5] Chen, Jim. 2009. "The Story of Wickard v. Filburn: Agriculture, Aggregation, and Commerce." *Constitutional Law Stories*.
[6] http://www.law.cornell.edu/supct/html/historics/USSC_CR_0317_0111_ZO.html

increase in the size of the USDA budget. In the 1980s, commodity loan programs were

introduced to offset the effect of government-owned grain storage, and the conservation reserve

program was re-established. The so-called "Freedom to Farm" bill in 1996 brought about more

planting flexibility for farmers, allowing greater responsiveness to market prices, and 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 USDA farm programs.

These and other developments are discussed in more detail by Dimitri, Effland, and Conklin

(2005).

3.2 The USDA Today

Today the USDA engages in numerous activities, and its programmatic activities are illustrated

in its organizational chart (see figure 3.1). The USDA has 17 different agencies and 18 different

offices. The agencies are organized under seven politically appointed undersecretaries 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,

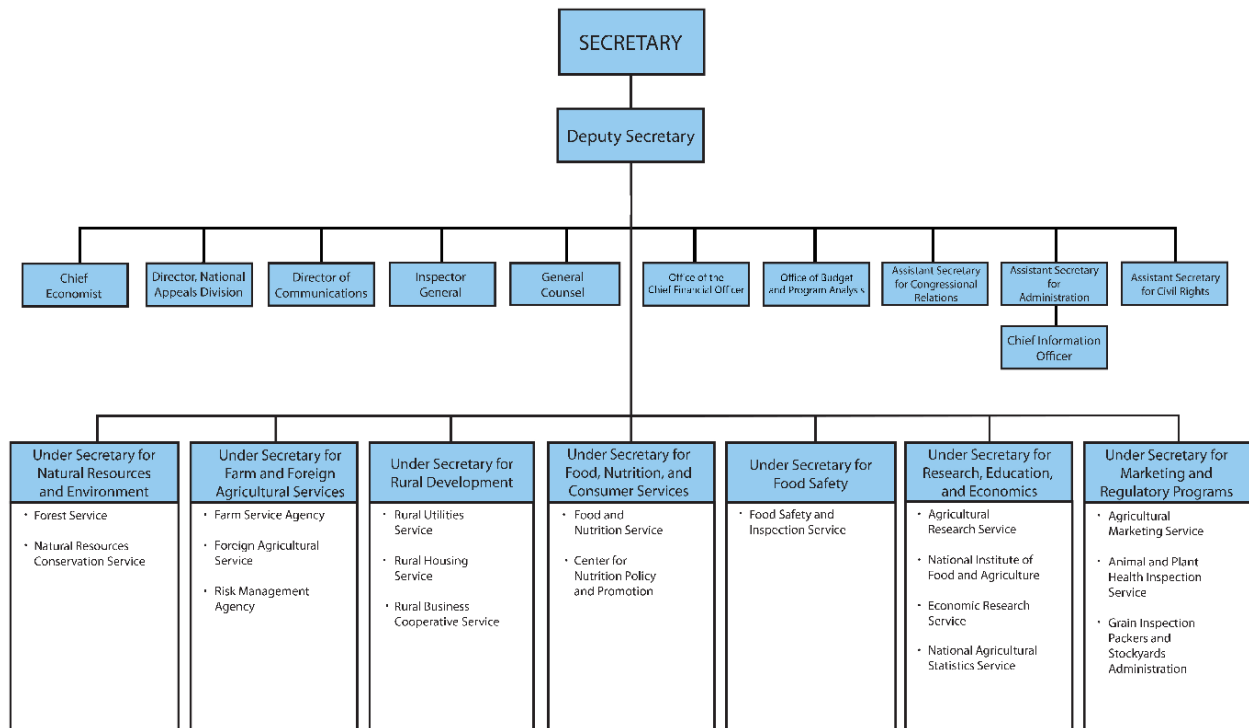and economics, and 7) marketing and regulatory programs.

Figure 3.1. USDA Organizational Chart (source: http://www.usda.gov/documents/AgencyWorkflow.pdf)

USDA agencies include the Agricultural Marketing Service (AMS), Agricultural

Research Service (ARS), Animal and Plant Health Inspection Service (APHIS), Center for

Nutrition Policy and Promotion (CNPP), Economic Research Service (ERS), Farm Service

Agency (FSA), Food and Nutrition Service (FNS), Food Safety and Inspection Service (FSIS),

Foreign Agricultural Service (FAS), Forest Service (FS), Grain Inspection, Packers and

Stockyards Administration (GIPSA), National Agricultural Library (NAL), National Agricultural

Statistics Service (NASS), National Institute of Food and Agriculture (NIFA), Natural Resources

Conservation Service (NRCS), Risk Management Agency (RMA), and Rural Development

(RD). Complete descriptions of each of these agencies, along with a listing and descriptions of

the USDA 18 offices and links to each are available on the agency's website (USDA, 2015).

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Many (but not all) USDA activities are authorized by the Farm Bill, the most recent of which is the Agricultural Act of 2014.[7] The 2014 Act 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. Prior to its passage, the Congressional Budget Office projected that the total costs of the bill would amount to $956 billion over the ten year period from 2014-2013 (CBO, 2014).

In terms of farm subsidies, the 2014 Act 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 the ongoing subsidies for the premium. The Act requires producers to make a set of complicated and inter-related 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 (FSA) handles decisions related to base acreage and choice of PLC and ARC whereas the Risk Management Agency (RMA) 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 private-public venture to fund research, a doubling of funding for the Small Crops Research Initiative (SCRI) to $80 million in addition to the provision of $72.5 million for the Specialty Crop Block Grant Program (SCBG), a requirement of particular conservation practices for certain types of land as eligibility for subsidized crop insurance, an authorization of $800

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[7] The full text of the Act is available at: https://www.congress.gov/113/plaws/publ79/PLAW-113publ79.pdf

million for energy programs, and $100 million for beginning farmers and ranchers, among other changes.[8]

3.3 USDA by the Numbers

Figure 3.2 shows USDA spending in real terms from 1940 to 2014.
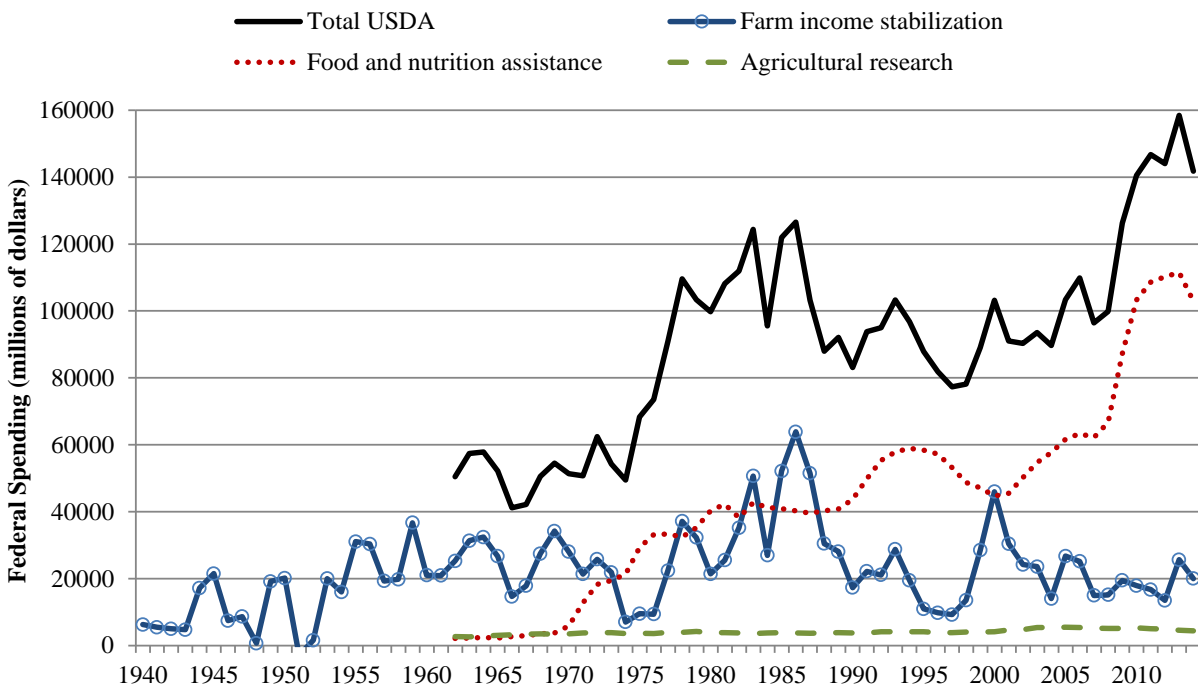

Figure 3.2. Real Federal Spending by USDA over time in 2014 dollars (source: author's calculations based on data reported by Office of Management and Budget, 2015)

Since the 1960s, there has been a sharp increase in USDA spending, most of which has been driven by increases in spending on food and nutrition assistance (primarily food stamps). Of total USDA outlays in 2014, over 70% went toward spending on food and nutrition assistance. Real spending on agricultural research slow increased from the 1960s and experienced a sharp jump in the early 2000s. Since that time, funding has declined in real terms and in 2014 fall back

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[8] http://www.usda.gov/documents/usda-2014-farm-bill-highlights.pdf

to the pre-2000 levels. Spending on farm income stabilization varies from year to year, but has

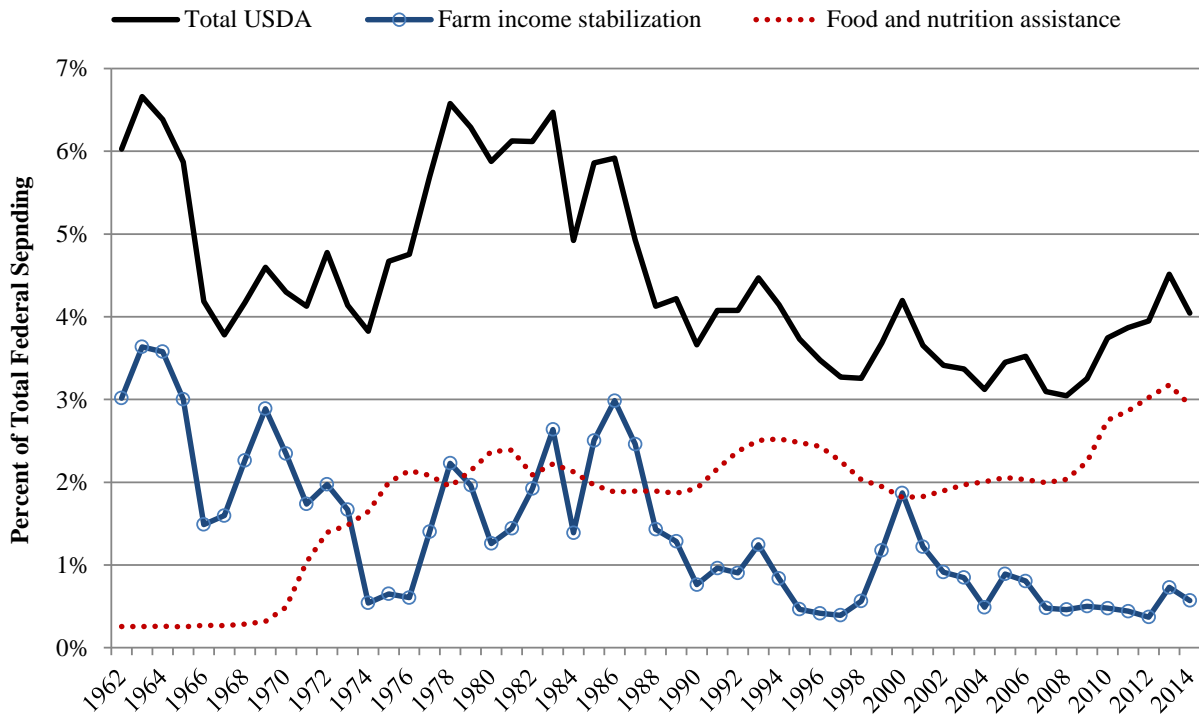hovered around $20 billion in recent years.

Figure 3.3. Spending on USDA and sub-functions as a percent of Total Federal Spending
(source: author's calculations based on data reported by Office of Management and Budget, 2015)

Figure 3.3 reports USDA spending over time as a percentage of total federal spending.

From 1980 until 2009, total federal spending increased at a faster rate than 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 due to increases in food and nutrition assistance. In

2014, the USDA was responsible for about 4% of total federal spending.

Figure 3.4 shows a breakdown of the USDA budgetary authority for 2014. The agency

was authorized to spend $161 billion, with 66.6% allocated to the Food and Nutrition Service,

which is responsible for administering the Supplemental Nutrition Assistance Program (SNAP).

The next largest spending categories in 2014 were the Risk Management Agency (i.e., crop

insurance) and the Commodity Credit Corporation (CCC). The CCC is the mechanism by with

the USDA pays out farm subsidies associated with price and income support programs, conservation reserve program payments, and payments for export promotion programs. The AMS Section 32 funds (representing customs receipts allocated to support the farm sector; in recent years most of these funds have been transferred to the childhood nutrition account) and the Forest service account for 5.5% and 3.3% of the USDA budget. All other agencies individually account for two percent or less of total USDA spending.
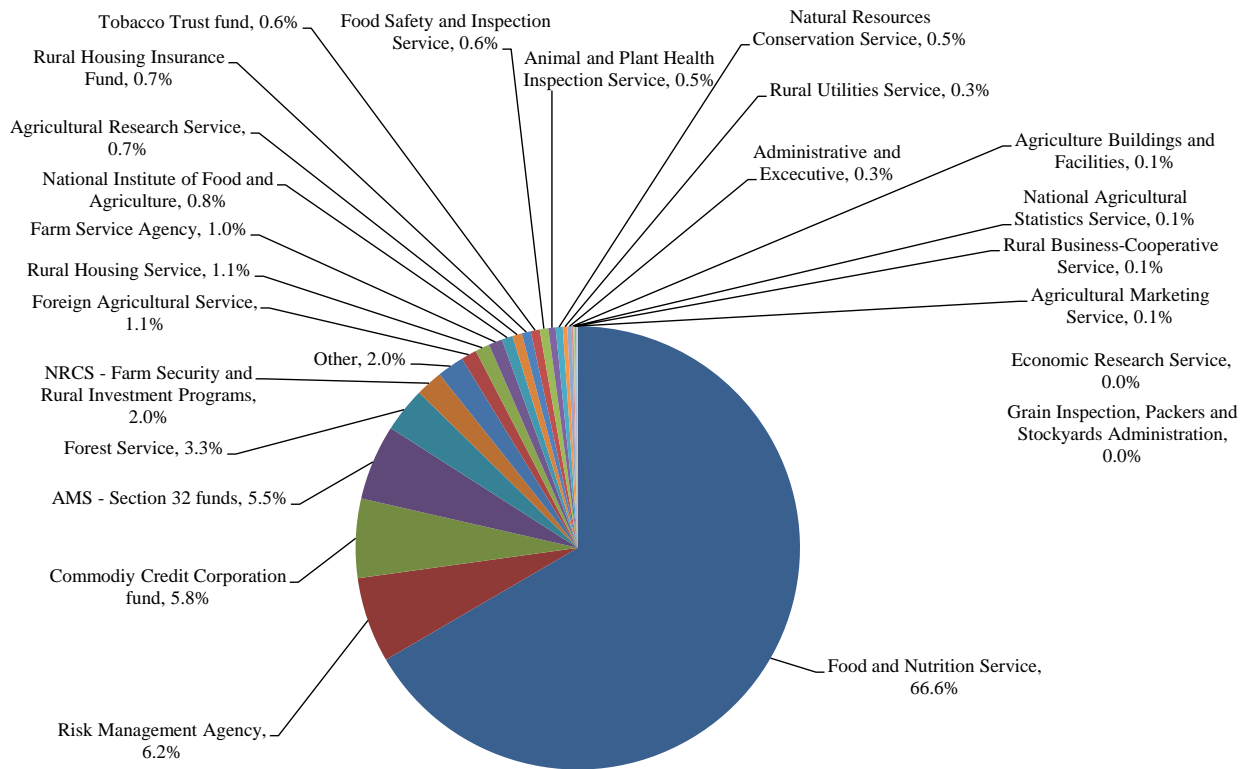

Figure 3.4. Components of 2014 USDA Budget Totaling $161 Billion (Source: author's calculations based on USDA budget authority as reported by USDA)

As a basis of comparison, and to illustrate how the USDA has changed over time, Figure 3.5 shows a breakdown of the USDA budgetary authority in 2006 when the agency was authorized to spend only $100 billion. The Food and Nutrition Services only accounted for 53.7% in 2006 as compared to 66.6% in 2014. The CCC played a much larger role in the USDA budget in 2006 than in 2014 with the opposite being true of the Risk Management Agency.
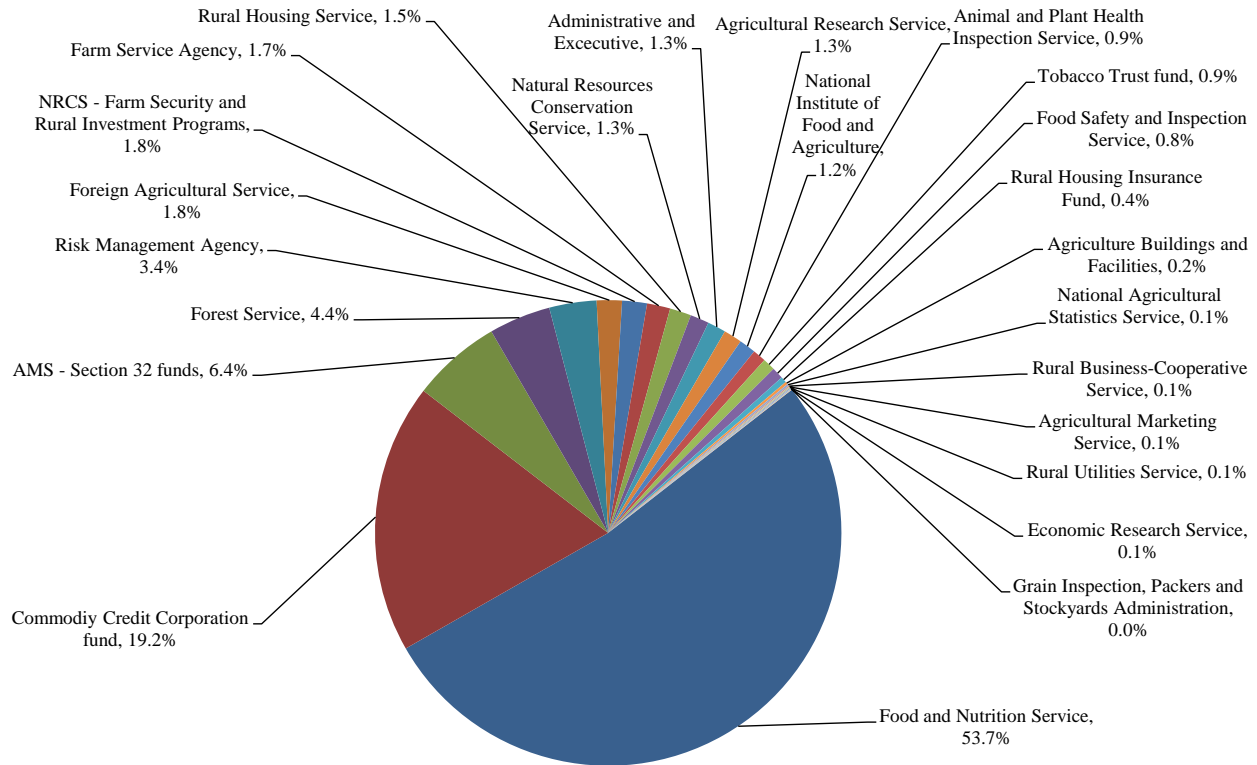
Figure 3.5. Components of 2006 USDA Budget totaling $100 billion in 2014 Dollars (Source: author's calculations based on USDA budget authority as reported by USDA)

While figure 3.3 suggests USDA expenditures represent only a small share of overall federal spending, figure 3.6 shows that the agency is among the largest federal employers. There were 106,867 USDA employees in 2010. If one disregards employment by the Defense Department (and Veterans Affairs) and the Postal Service, USDA employees account for just under 10% of all federal employees.
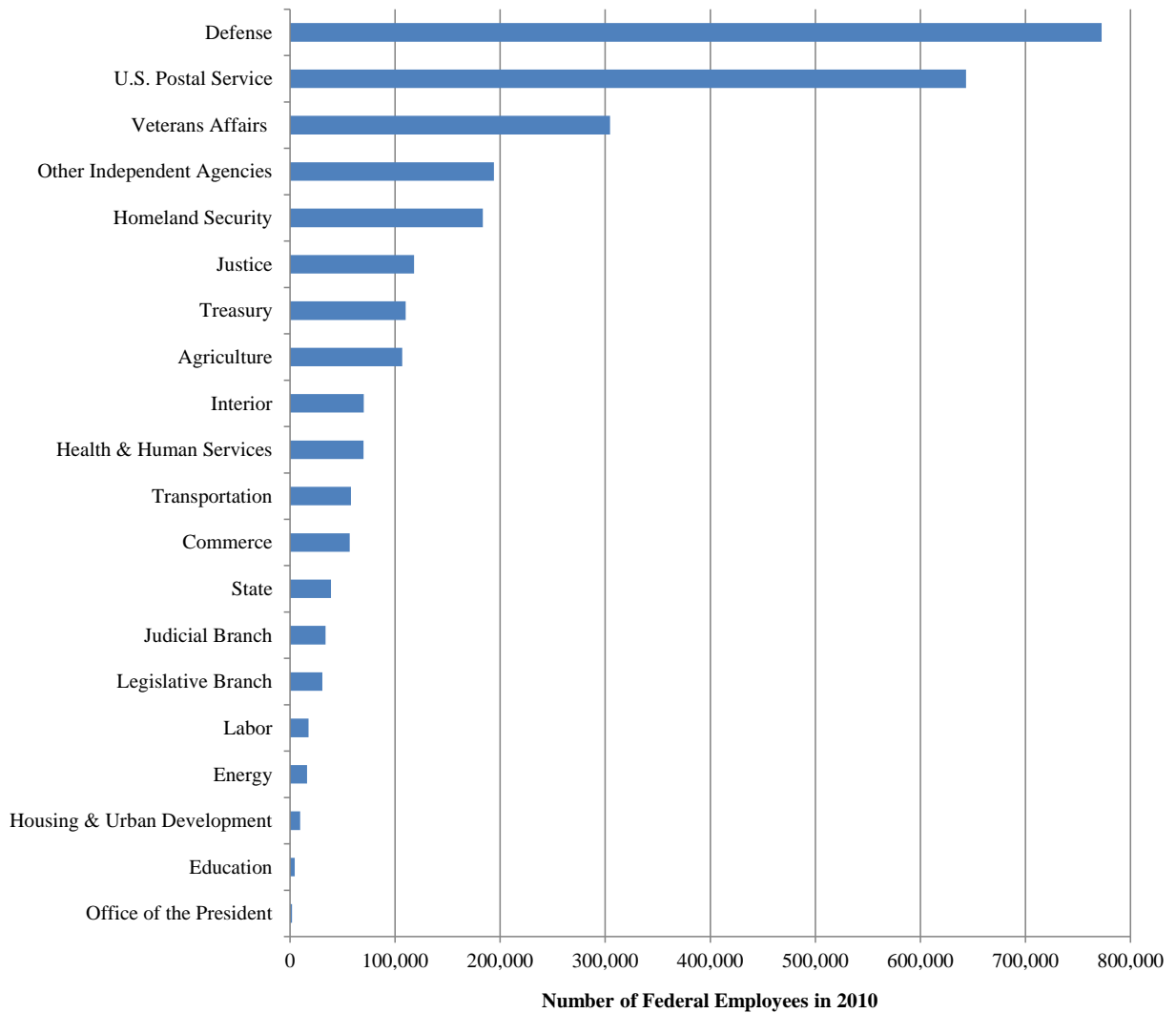
Figure 3.6. Number of Federal Employees by Federal Agency in 2010 (source: US Census Bureau, Statistical Abstract, 2012)

Given the dramatic change in the structure of agriculture (see figure 2.1), it is of interest

to explore how the number of USDA employees has changed with the number of farms. 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 US. As shown in figure 3.7, the number of USDA

employees per farm grew sharply up to the 1980s when there were 6.4 employees per 100 farms.

Since that time, the number of USDA employees has fallen slightly, with an uptick in 2010, the

last date data are available. In 2010 there were five USDA employees for every 100 farms in the US.
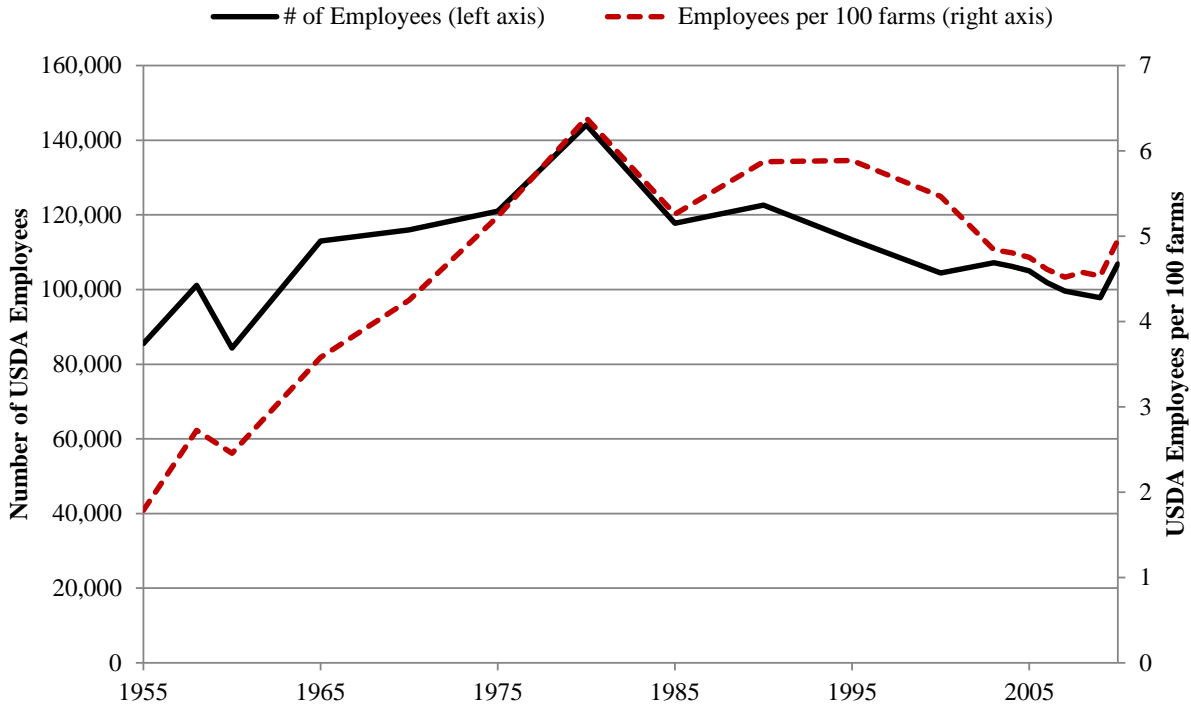

Figure 3.7. Number of Federal USDA Employees over Time (source: US Census Bureau, Statistical Abstract, multiple years)

3.5 Data on Effects and Outcomes of USDA Programs

USDA activities and spending affects the farm and non-farm economy in varied ways. What follows is a discussion of the effects of farm support programs, which is then followed by a brief discussion of the effects of some other USDA programs.

Table 3.1 shows government payments to farms of different sizes (defined as total the total sales) in 2012. In 2012, the average payment per farm receiving payments was $9,925. However, as table 3.1 shows, a large percentage of farms do not receive any government payments. In particular, farms who sell less than $50,000 tend not to receive payments while the opposite is true for farms with sales greater than this amount. For the 3.9% of farms that sell $1

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

Payments are often tied to the volume of output. The last column of table 3.1 calculates the average payment per farm as a percentage of the value of production of farms in each respective class. Whereas the smallest size farms receive the smallest average payments in total dollar terms, they receive the highest payments when expressed relative to value of production. Farms that sell less than $1,000 and who receive payments tend to get 9.36 cents for every dollar of output produced, but farms that sell more than $1 million and who receive payments tend to get only about 2 cents for every dollar of output produced.

While 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 selling less than $24,999 was *negative*. These farms operate at a loss, and as such, whatever government payment these farms receive is infinitely greater than what is made from farming. The average payment as a percentage of net income (for those receiving payments) is 31%, 18%, 13%, and 7% for farms that have total sales in the categories $100,000 to $249,999, $250,000 to $499,999, $500,000 to $999,999, and $1,000,000 or more, respectively.

Table 3.1. Government payments by farm type in 2012 (source: USDA Census of Agriculture)

Farm Type (by total sales)	% of all farms	% of farm type receiving government payments	Payment per farm receiving payments	Payment as % 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%
$1,000,000 or more	3.9%	71.2%	$40,559	0.02%

In 2014, the U.S. Government Accountability Office (GAO, 2014) discussed the extent of farm subsidies and revealed the multiplicity of farm programs. They found that the USDA spent $114 billion from fiscal years 2008-2012 on 60 different programs, an amount which included $28 billion in crop insurance subsidies. Consistent with the data in table 3.1, they also found that most of the farms in the US received no government payments over this time period. However, they report:

> "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 over-lapping programs that activities which appear to reduce risk may, in fact, do the opposite. For example, Coble et al. (2000) 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.

Given the large share of USDA spending allocated toward SNAP, it is instructive to compare it – on a per recipient basis – with that of farm programs. As indicated above, the average payment per farm receiving payments in 2012 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. The reason food assistance programs represent a larger share of the USDA budget than do farm support programs is not because of higher payouts per recipient of the SNAP vs. farm supports but rather because there are many more SNAP recipients than there are recipients of farm program payments.

It is also instructive to consider changes in farm support payments over time and relative to that in other countries. A project by the World Bank led by Anderson and Valenzuela (2008) and Anderson and Nelgen (2012) provide just such information. They provide a variety of statistics relate to agricultural support in different countries, and I focus on three measures. First is the nominal rate of assistance (NRA). The NRA quantifies the policy-induced price distortions in agriculture, and it quantifies the distortions imposed by governments that create a gap between domestic prices and the prices that would exist under undistorted, free markets. NRA is define as the percent 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. In addition to the NRA, I also report the Gross Rate of Assistance (GRA), which is NRA expressed in absolute dollar terms (in the year 2000) instead of

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in percentage terms. GRA is the NRA multiplied by the value of agricultural production in a country divided by the number of farmers. The final measure I consider is the welfare reduction index (WRI). Some policies may produce similar measures of 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 accounts not only for transfers but trade policies that impact the food and agricultural economy. According to Anderson, Rausser, and Swinnen (2013, p. 429), 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."

Figure 3.8 shows the average NRA and figure 3.9 shows the average GRA of 53 different countries from 2000 to 2010. The United States had an average NRA of 11.2% and a GRA of $3,576/farmer over this time period. This means that the gross returns of US farmers are 11.2% (or $3,576/farmer) higher than would have been the case were it not for various government policies. Some countries, like Norway, Iceland, Switzerland, and Korea have NRAs higher than 100%.
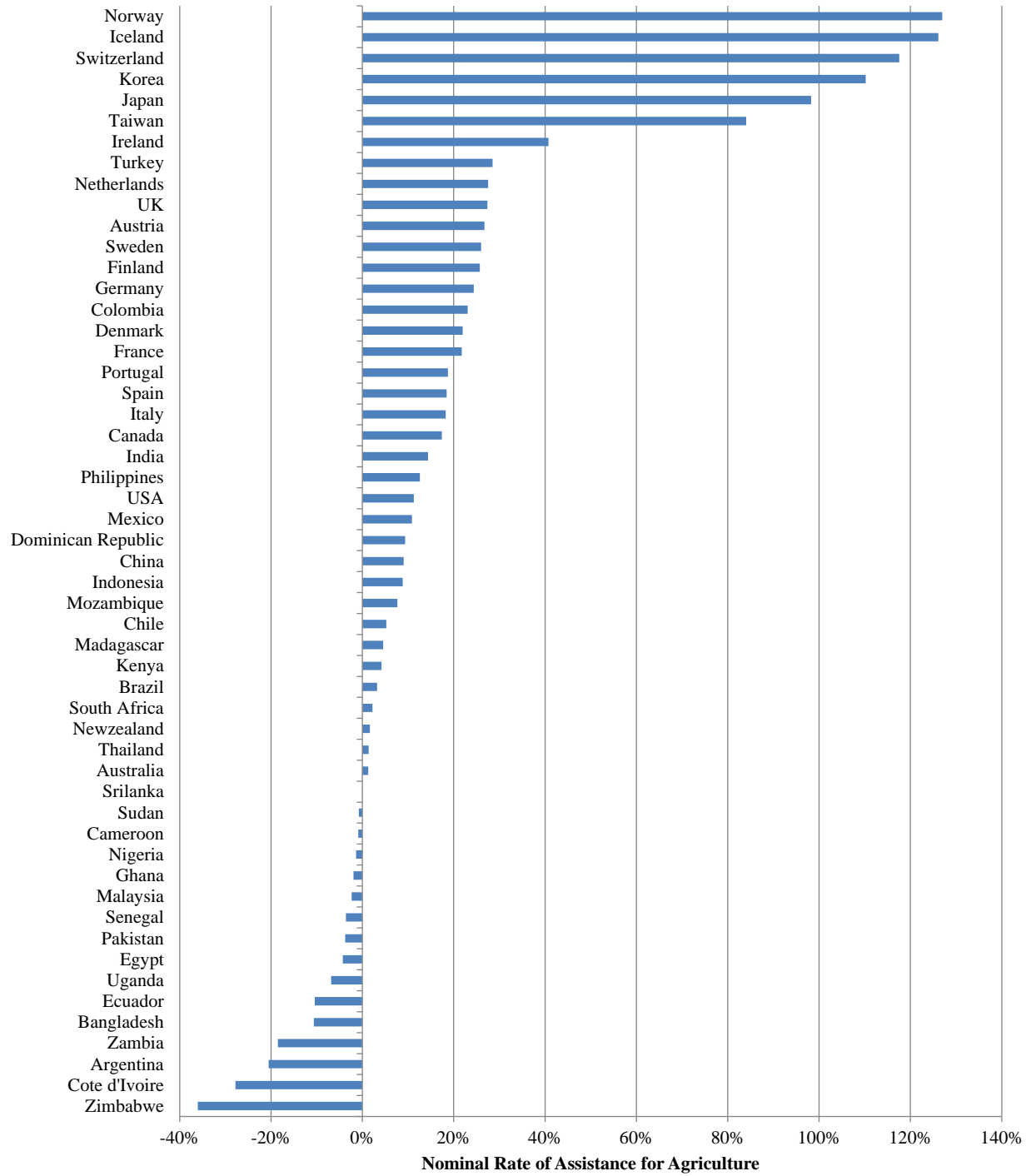
Figure 3.8. Nominal Rates of Assistance across the World, 2000-2010 (source: author calculations based on data by Anderson and Nelgen, 2013)
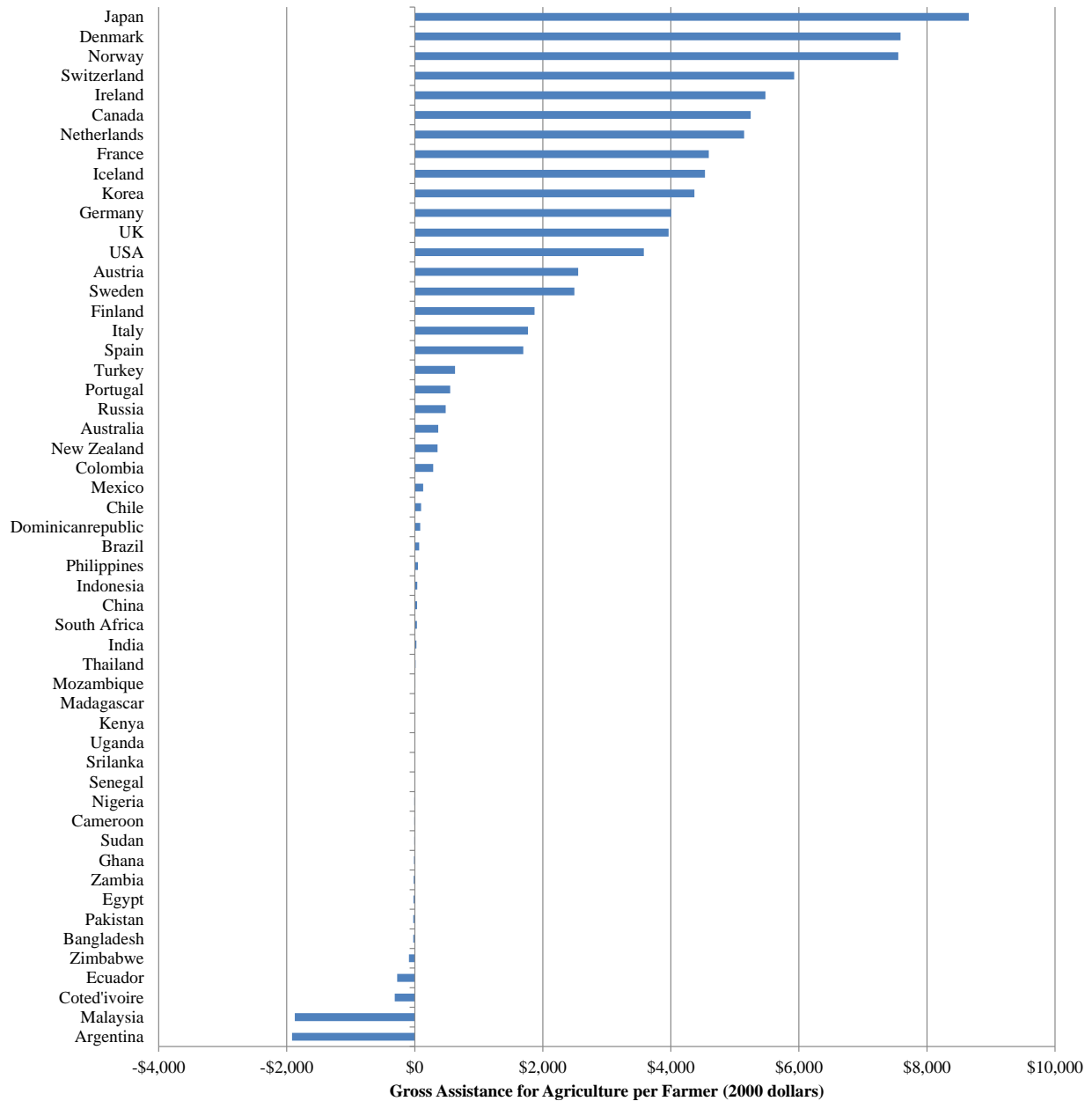
Figure 3.9. Gross Rates of Assistance across the World, 2000-2010 (source: author calculations based on data by Anderson and Nelgen, 2013)

Figures 3.8 and 3.9 also show that a number of other countries, typically developing and African countries, have negative NRA and GRA measures, which means that government policies in those countries transfer resources from the farm sector to the urban, consumer sectors. Farmers in these countries are worse off as a result of government policies.
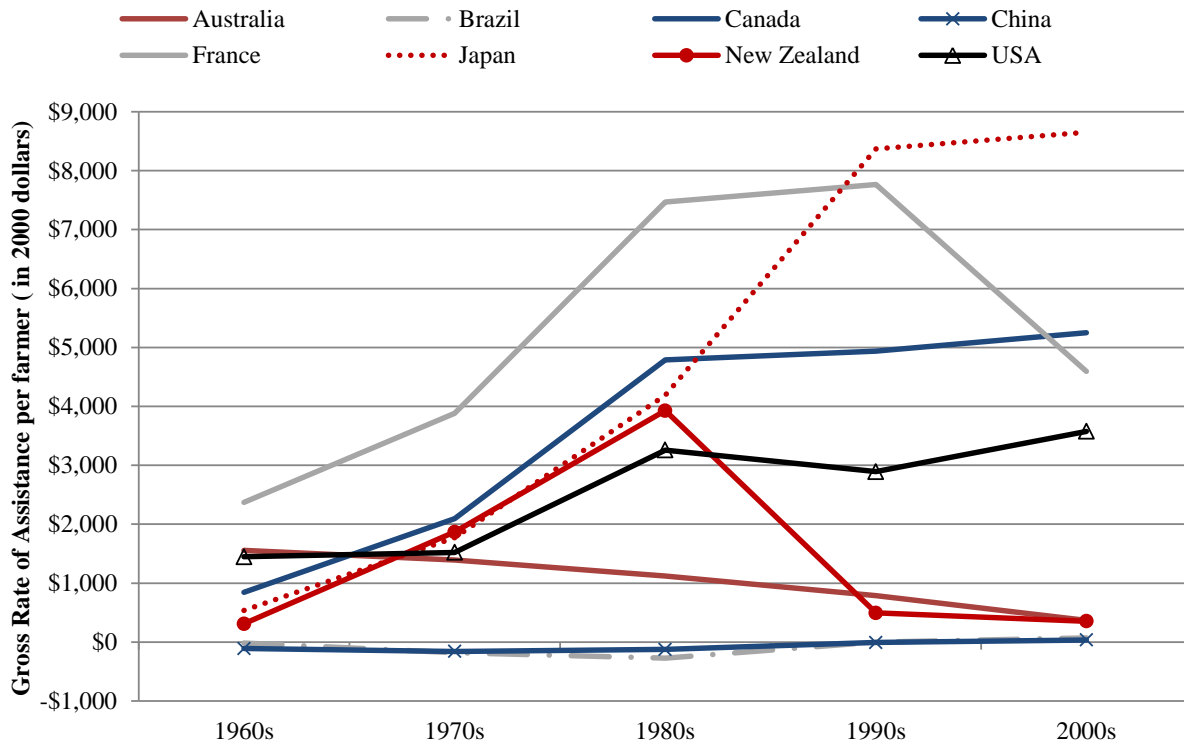
Figure 3.10. Gross Rate of Assistance per Farmer over Time in Selected Locations (source: author calculations based on data by Anderson and Nelgen, 2013)

Whereas figure 3.9 shows a snap shot of GRA at a point in time, figure 3.10 shows changes in the GRA per farmer over time in eight selected locations (all in 2000 dollars). The GRA per farmer in the US increased sharply from the 1970s to the 1980s and has subsequently stayed around $3,000/farmer/year. The GRA per farmer in Japan has risen over the entire period considered from only $536/farmer/year in the 1960s to $8,653/farmer/year in the 2000s. New Zealand dramatically lowered GRA/farmer from the 1980s to the 1990s. Brazil and China have policies that relatively neutral in terms of farmer gross returns.

Figure 3.11 shows the welfare reduction index (WRI) over time in different locations. Until recently, countries in the European Union had highly distorting policies equivalent to taxes in excess of 100%. In most locations (except Eastern Europe and Central Asia), agricultural policies have become less distorting to the overall economy since the 1980s. From 2000 to 2010, the US had a WRI of 17; the only locations that had less distorting policies was Australia and New Zealand, which had an average index of only 3.8 over this time period.
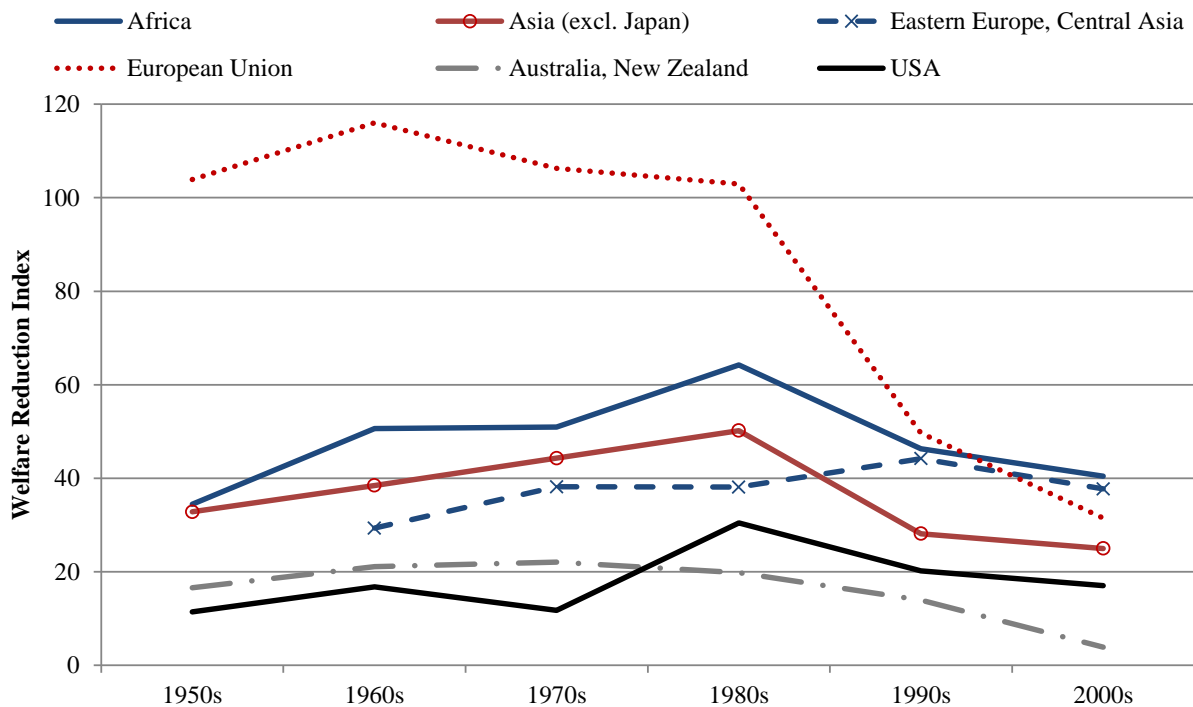
Figure 3.11. Welfare Reduction Index over Time in Different Locations (source: author calculations based on data by Anderson and Nelgen, 2013)

To put the calculations in figure 3.11 in perspective, it is useful to compare them to other distortions in the economy. In a remarkable statement, Anderson, Rausser, and Swinnen (2013, p. 423) 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." 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 3.12 shows the average NRA for eleven different commodities in the United States from 2000 to 2010. During this period, sugar, cotton, and milk producers most benefited with NRAs of 75%, 56%, and 39%, respectively. Barley and wheat had relatively low NRAs. Other commodities like beef and pork (not shown in the graph) had NRAs near zero.
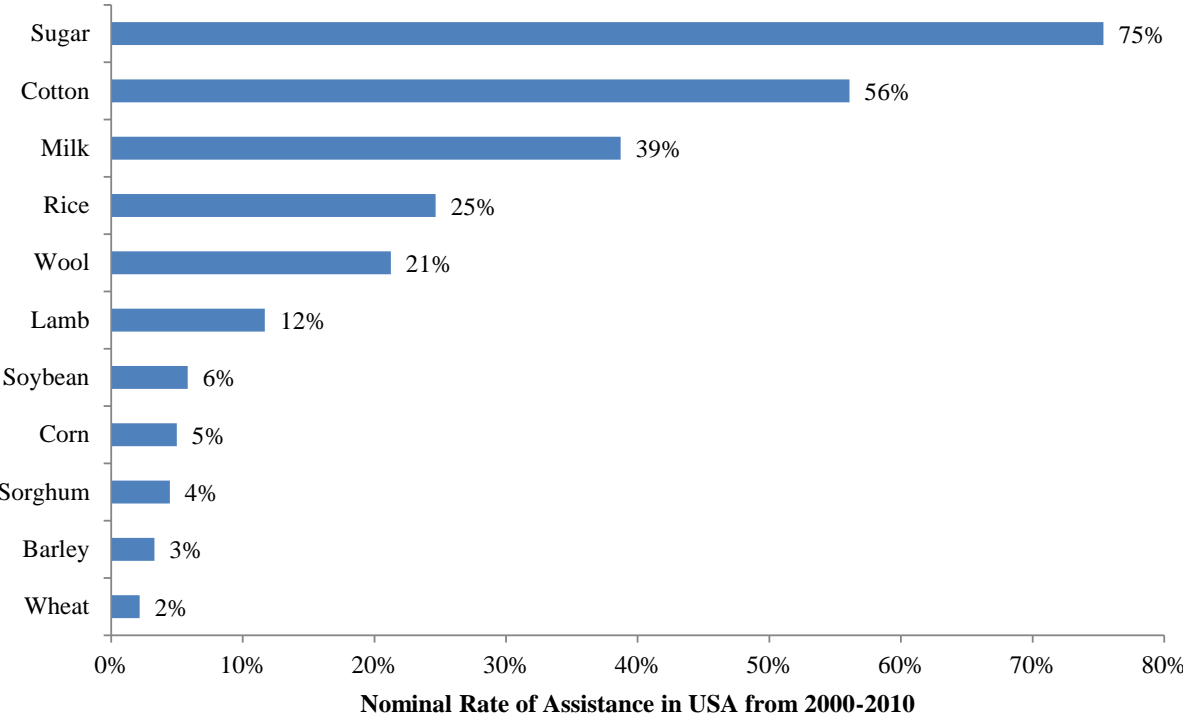
Figure 3.12. Nominal Rates of Assistance for Different Commodities in the US, 2000-2010
(source: author calculations based on data by Anderson and Nelgen, 2013)

Given the number of agencies and activities associated with the USDA, there are likely to be impacts on the economy that extend beyond those caused by explicit farm-commodity policies. To get a sense of the impacts, I turned to the RegData database created and maintained by the Mercatus Center at George Mason University (see Al-Ubaydli and McLaughlin, 2014).

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 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 based on the judged relevance of the terms to a given industry. A regulation index is then created based on the relevance-adjusted word counts.

Figure 3.13 reports the regulation index for regulations affecting the agriculture and forestry industry coming from all federal agencies as well as those specifically from the USDA, EPA, and FDA. While the USDA places far more regulatory restrictions on agriculture than the EPA or FDA, the USDA only accounted for 25% of the overall regulatory index facing agriculture in 2012. From 1997 to 2012, there was a 78% increase in regulations from all federal agencies, a 27% increase from the USDA, a 41% increase from the EPA, and an 89% increases from the EPA. It is unclear what caused the dip total regulations facing agriculture during 2009 and 2010, but the figure shows it is not a result of reductions in USDA, EPA, or FDA regulations. Russell et al. (2015) have linked these regulation data to changes in agricultural productivity and have found evidence that an increasing regulatory index is associated with a reduction in farm productivity.

Figure 3.14 shows regulations by the USDA affecting different industries. While USDA regulations tend to mostly impact agriculture and forestry, the figure shows that other industries related to information, utilities, transportation finance, and food service are affected as well. From 1997 to 2012, the regulatory index for the USDA increased 27% for the agricultural and forestry industry, 212% for food service industry, and 148% for the educational services industry, and was decreased 15% for utilities and 51% for transportation.
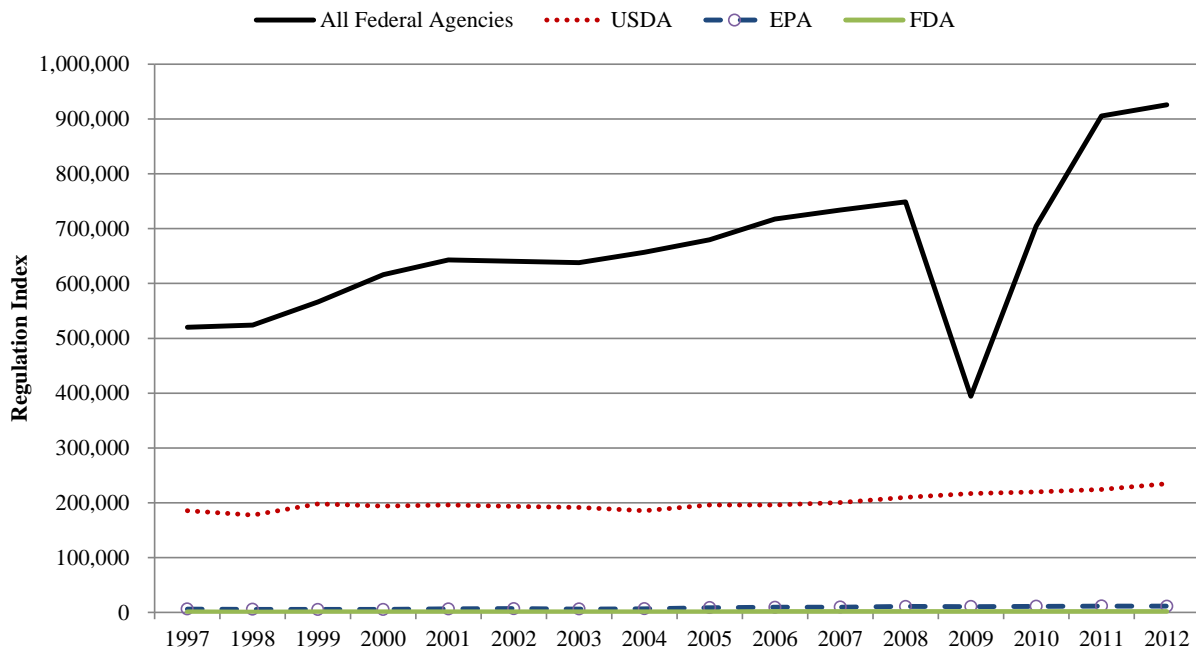
Figure 3.13. Regulations Affecting Agriculture and Forestry (source: RegData, Mercatus Center)
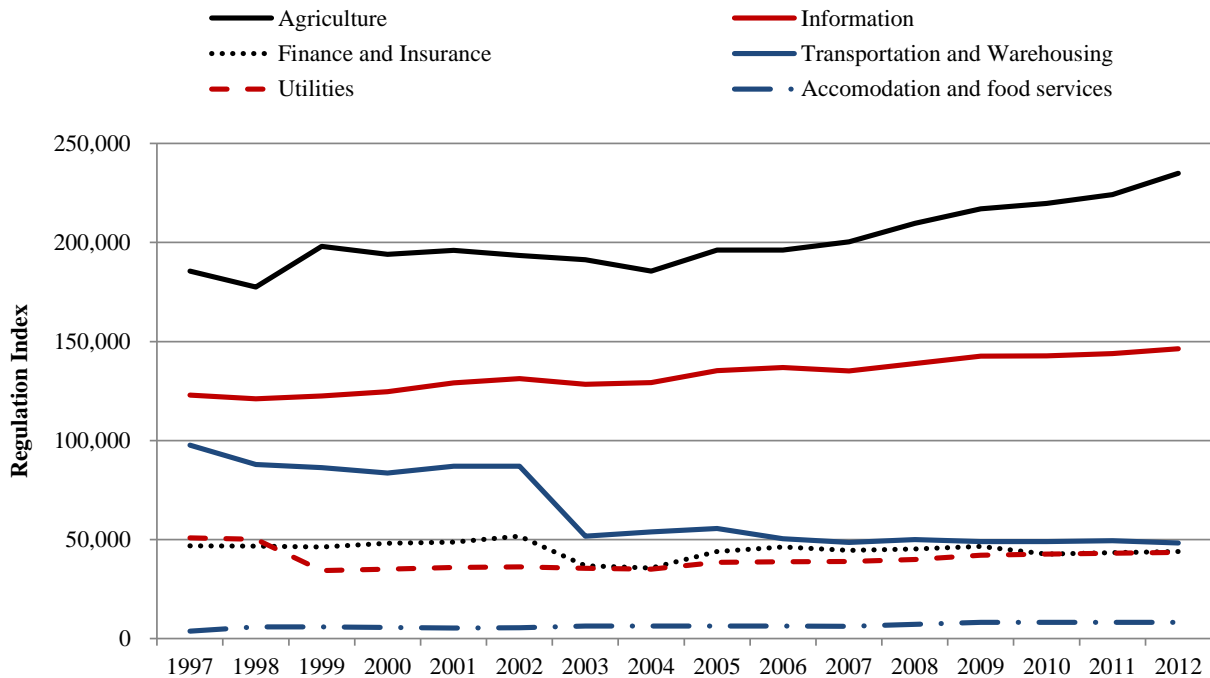

Figure 3.14. Regulations by the USDA affecting different industries (source: RegData, Mercatus Center)

3.6 Research on Effects and Outcomes of 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 writings about food and agriculture often include assertions that are at odds with the best available evidence, it may be worthwhile to briefly summarize some of the research related to a few key areas of USDA activity. What follows is a succinct discussion on five program areas.

3.6.1 Farm Subsidies

Economic theory suggests that farmers are not the ultimate beneficiaries of farm subsidies. Given an addition subsidies, farmers will compete with each other and bid up the price of fixed assets, like land or high quality seed, implying that the owners of fixed assets, like landowners or holders of patents on seed technology, capture a portion of the subsidy. While there is substantial debate in the literature regarding the share of farm subsidies captured by non-farmers, there is near universal agreement among economists that for every $1 in farm subsidies, farmers benefit by less than $1. Kirwan (2009) estimates that for an extra $1 in farm subsidies, $0.20-$0.25 goes to landowner (via higher rental rates) and $0.70-$0.75 goes to farmer. Roberts, Kirwan, and Hopkins (2003) estimate that for every $1 in subsidy $0.34-$0.41 goes to the landowner. Goodwin (2011) estimates much higher rates – in some cases calculating that landowners benefit by an amount that exceeds amount of the subsidy. Alston (2009) estimated 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." While owners of fixed assets

benefit from farm subsidies, Weber et al. (2015) find no evidence to support the idea that farm subsidies positively affect rural economies.

Despite popular claims to the contrary, research evidence suggests that farm subsidies have likely had little to no effect on obesity rates (Alston et al., 2008; Miller and Coble, 2007; Okrent and Alston, 2012). There are multiple reasons. First, while such policies may have had some effect on farm commodity prices, these inputs only account for a small share of the overall cost of retail food. Just to give one example, in 2013 only 7% of the retail price of bread was a result of the farm-gate price of wheat and other agricultural commodities (USDA-ERS, 2015). Even the enormous price swing that took wheat from around $3/bushel in 2006 to almost $12/bushel in February 2008 (a 300% increase) would only be expected to increase the price of bread by about 14%.[9] Second, there is a mix of agricultural policies and some policies (such as sugar policies, ethanol promotion, and the conservation reserve program) push the prices of agricultural commodities up rather than down. Third, despite the widely varying agricultural policies across countries and over time (see figures 3.8-3.10), these 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 Conservation Reserve Program (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, there were 27.5 million acres enrolled in the program at a cost of about $2 billion (Stubbs, 2014). Research suggests that while the program has achieved some

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[9] There are 60 lbs in a bushel of wheat, implying prices of $0.05/lb and $0.20/lb for wheat in 2006 and 2008. USDA-ERS data indicate the price of bread in 2006 was $1.08/lb, implying non-farm costs were $1.08-$0.04=$1.03/lb. Holding non-farm costs constant at $1.03/lb and increasing the price of wheat to $0.20/lb implies a retail price of bread of $1.23/lb. Going from a retail price of $1.08 to $1.23 represents a 14% increase.

goals related to erosion, wildlife, and soil and water quality (e.g., Feather et al., 1999; Karlen et al., 1999; Johnson and Schwartz, 1993), there have been some unintended consequences. Wu and Lin (2010) show that CRP participation increased farmland values by 5% to 14%, 4% to 6%, and 2% to 5%, respectively, in the Mountain, Southern Plains, and Northern Plains regions. Taking some cropland out of production can drive-up commodity prices, which in turn incentivizes producers to plant more farmland. Wu (2000) called this a "slippage effect", and he calculated that for every 100 acres enrolled in CRP, 20 acres of new land were brought into production, offsetting some of the environmental benefits of the program. Moreover, it has been argued that CRP crowds out private provision of conservation services and recreational activities (Parker and Thurman, 2011).

Finally, agricultural policies create distributional effects across producers, locations, and commodities. That is, farm subsidies benefit some farmers more than others, and actually result in harm to other farmers and consumers. Balagtas et al. (2014), for example, found that planting restrictions on farmers receiving payments for commodity crops reduced fruit and vegetable production by about seven million acres (or 4.26 acres for every 100 acres of program crops). The reduction in fruit and vegetable production leads to higher prices for consumers of these products. In the same way that CRP removes land and increases farm prices, food consumers are worse off as a result (though those consumers that value ecosystem services provided by CRP may benefit in other ways). Lusk (2016) and Ramirez et al. (2015) both found that crop insurance subsidies flow unevenly to different types of producers. Ramirez et al. (2015) found that farmers who face higher yield risks receive more generous subsidies than farmers with more certain yields. Lusk (2016) showed that the benefits of crop insurance subsidies flow unevenly to different commodities and to different locations in the United States. Some locations in the

Western US are even projected benefit from the removal of crop insurance subsidies. Moreover, because the U.S. exports a large share of domestic agricultural production, policies in the U.S. have the potential to impact 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 (Fadiga et al., 2006; Sumner, 2006).

3.6.2 Food Assistance Programs

An early and temporary version of the food stamp program began during the New Deal era. While 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 stamps program in the late 1930's put it, "We got a picture of a gorge, with farm surpluses on one cliff and under-nourished city folks with outstretched hands on the other. We set out to find a practical way to build a bridge across that chasm." (Daniels and Trebilcock, 2005, pg. 45). However, there is little evidence that the modern-day incarnation, SNAP, has any substantive effect on farm prices. For example, Lusk (2015) calculates that for every $1 spent by taxpayers on SNAP, farmers benefit by only a penny. Likewise, Martinez and Dixit (1992) calculate that food assistance programs increase farm prices by less than one percent. In one review of such programs, Barrett (2002) argued, "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." With regard to international food aid, Barret reaches a similar conclusion, "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." There is little evidence on whether programs like the Child Nutrition Programs or the National School Lunch Program, which also partially aim to boost farm prices, actually do so.

Since at least the work of Southworth (1945) there has been debate about whether food stamps (now SNAP) will have effects that differ from unconditional cash transfers. Southworth (1945) noted that for 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), that they should treat the benefits the same as an unrestricted cash transfer. The consumer can get around the restriction that SNAP payments only be spent on food by re-arranging which items are purchased with SNAP benefits and which are bought with cash. Despite this theoretical result, there is some empirical evidence 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 (Beatty and Tuttle, 2015; Hoynes and Schanzenbach, 2009). 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 by SNAP benefits and achieve the same consumption bundle at the same cost irrespective of the soda or junk food restrictions (Weaver and Lusk, 2016).

There is reasonably good evidence that food assistance programs accomplish their primary objective – reducing hunger among low income Americans. For example, Ratcliffe et al. (2011) estimates that SNAP participation reduces food insecurity (i.e., hunger) by about 30%.

In one review of the topic, Gundersen et al. (2011, p. 295) concluded, "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." In addition, the best academic research does not support the view that SNAP benefits result in higher rates of obesity (see Gundersen, 2013 for a review).

3.6.3 Agricultural Research

There is a large body of research that has investigated the returns to agricultural research funding disseminating from USDA programs like NIFA. One review of review 35 studies found that the average estimated rate of return on U.S. public agricultural research was 53% (Fulie and Heisey, 2007), which is quite high compared to other investment alternatives. Jin and Huffman (2016) estimate the real social rate of return to public investments in agricultural research of 67% and of more than 100% for spending on agricultural extension. Aston et al. (2011) has 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 cost-benefit ratio of 32:1. That is, every dollar of public spending on agricultural research yields $32 in benefits for consumers, retailers, processors, farmers, and agribusinesses.

Alston (2009) argues that spending on research is more beneficial to farmers than farm subsidies. He estimates that farmers receive about only about $0.50 of every $1 in farm subsidy.

By contrast, he estimated that every dollar spent on agricultural research and development would generate a $10 benefit to farmers. Thus, according to Alston's (2009) 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 this, the rate of growth in public spending on agricultural research has slowed (Jin and Huffman, 2016). Alston et al. (2009) argued that the slowdown in spending has partially caused a slowdown in agricultural productivity growth. In addition to the change in the total volume of spending, the types of research being funded has changed. An increasingly larger proportion of federal research dollars has shifted away from productivity-enhancing research toward research on social goals like 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 seed and biotechnology (Fuglie et al., 2012).

4. Economic Justifications for USDA Programs

4.1 Overview

This section asks what economic basis exists for the various 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 (e.g., Arrow and Debreu, 1954) suggest that there is no allocation of resources that can produce a higher level of welfare (i.e., a larger economic pie) than that produced by competitive markets. As such, a government intervention is justified as

increasing economic efficiency only in cases of so-called market-failures – when the competitive

equilibrium breaks downs or when the assumptions of competitive markets fail to hold.

These insights have led to a search for a variety of market failures that would justify

market interventions. However, just because a textbook market failure can be identified on

technical grounds, it doesn't necessarily imply that an intervention will 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 (Ostrom,

1990). 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 the relation they have with various USDA programs; the last subsection

discusses the public choice dynamics that partially explain the persistence of agricultural support

programs.

4.2 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

turns 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 there were more firms competing. Monopsony, when

a single buyer exists, results in a similar outcome in reverse. Oligopolies/Oligopolies represent a

middle ground between monopoly/monopsony and competitive markets where there are

intermediate reductions in pie-size.

Most USDA activities have little to do with dealing with imperfect completion *per se*.

Some price reporting activities by the AMS might be argued to promote competition, but GIPSA

(and in particular the Packers and Stockyards Program, PS&P) is probably the USDA agency most directly tasked with regulating such activities. The stated mission of the PS&P 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 the effort was ultimately stopped by Congress. There have, at times, been various studies and investigations by GIPSA and the agency routinely monitors market outcomes. In 2013, the PS&P 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 (GIPSA, 2014).

While there is a potential role for the USDA in ensuring "fair" competition in agriculture insofar as the market failure argument is concerned, there exist other remedies for such grievances. In particular, there are a variety of federal laws that exist under which the victims of uncompetitive practices can sue in court for redress, 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 pre-existing monopoly/monopsony that exists in the market).

There is a large body of research attempting 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 (see Wohlgenant, 2013 for one review related to meat industries). Recent research by Sexton (2013) 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. Much of the discussion of monopolistic power also ignores the dynamics of the market place. A monopoly earning excess profits today creates the incentive for new firms to enter and compete away some of the profits. Indeed, while there are often only a few large firms involved in meat processing or other sectors, there is often a high level of acquisitions and turnover among the large players. None of this is to say market power may not exist over certain periods of time, only that there are legal mechanisms already in place to address the issue.

4.3 Public Goods and Externalities

Economists define a public good as being non-rival (i.e., one person's consumption of the good does not reduce the amount available for another person) and non-excludable (i.e., people cannot be prevented from the enjoying the good). Classic examples of public goods include clean air and national defense. Traditional analysis of public goods suggests that the market may under-provide the volume of the public good that is optimally demanded by the public, providing an initial rationale for the government provision of the good (Sameulson, 1954). A primary reason for under-provision is the so-called free-rider problem. When a good is non-excludable, an individual can consume the good without having to pay, and as a result 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 they fail to fully consider the costs being imposed on others.

There are many possible public goods and externalities 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 run-off and livestock odor. The USDA agency most related to the public goods associated with agriculture is the NRCS, though the FSA also has some responsibilities related to CRP and other programs. NIFA and the ARS 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 preclude others from doing the same).

There is no doubt that externalities and public goods exist in the agricultural sector. Indeed there are calls for policies to calculate and enforce the "true cost of food" (Bittman et al., 2015). However, as I discussed in Lusk (2013), many of the externalities in food and agriculture are either not the sort that reduce the size of the pie or are not externalities at all. Moreover, there are many ways that costs are internalized that may not be initially obvious, whether it 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, like the marketing orders or legislation that create checkoff programs, can be viewed through a public good lens. When an industry utilizes 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 utilize generic advertising, some of the benefits dissipate because demand increases for one industry come at the expense of demand reductions in others (Alston et al., 2001). 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 (Crespi and Marette, 2002). Despite the potential problems with free-riding, the evidence also suggests that there are other mechanisms that could be used to fund such programs in absence of an industry-wide mandate (Messer et al., 2008).

4.4 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 Akerlof's (1970) market for lemons. 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 to the seller. In the most extreme case, the buyer refuses to buy a used car for fear that sellers are only getting rid of lemons, 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 those individuals who are sick or likely to experience a crop failure will enroll for insurance, and insurance providers knowing this fact, fail to insure anyone. Of course, these extreme cases of complete market failure are not always observed in practice (e.g., there was an active market for

used cars well before Akerlof's 1970 article); 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 (i.e., sick or healthy person; lemon or well-functioning auto). Some USDA

programs, such as grades and standards are designed to partially alleviate some of these

asymmetric information problems. Reports on the distribution of quality in the population (e.g.,

percent of cattle that grade USDA Choice; prices of hogs and cattle by weight and quality) can

help prevent some of problems associated with the information asymmetries by providing

buyers/sellers with more accurate information on the "types" to be expected.

I discussed these and other issues in a report for the Council on Food, Agricultural &

Resource Economics (C-FARE, 2013) in relation to the value of USDA data collection and

dissemination efforts that are mainly associated with NASS, AMS, and ERS. While there are

strong justifications for some of these information-provision programs, there are also many

possible areas for improvements and cost reductions.

4.5 Public Choice

Looking for economic justifications to explain the current actions of the USDA may be

unproductive. While 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 economic

and public choice considerations. A common explanation for agricultural subsidies is a model of

of concentrated benefits 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 famers who are well organized and lobby for the redistributive policies. While this explanation can go part of the way in explaining agricultural subsidies, there is a rich empirical and theoretical literature that adds additional insight.

One of the key puzzles surrounding agricultural policies was summed up nicely by Krueger (1996, p. 163), "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?" This phenomenon was more recently discussed by Anderson, Rausser, and Swinnen (2013) and is illustrated in figures 3.8 and 3.9. As it turns out, this "puzzle" can be explained by political economy models. For example, Swinnen et al. (1994) created a political economy model of farm support to explain why policies often differ markedly across countries, commodity, and time. His model views politicians as utility maximizing actors who seek election in return for redistribute policies that increase political support. His model leads to a number of interesting predictions such as: i) the politically optimally farm subsidies will increase as agriculture's share of total economic output falls, and ii) transfers to agriculture will increase if agricultural income falls relative to income outside agriculture. This model and others like it are discussed in detail by de Gorter and Swinnen (2003).

In a seminal work on the topic, Gardner (1987) 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. Gardner analyzed how agricultural support varied over time and across agricultural commodities, and hypothesized 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 paid to 17 farm commodities from 1909 to 1982, he found that redistribution to a given commodity fell: i) as the absolute value of the elasticities of supply and demand for the commodity increased, ii) when the number of producers grew past 1 million, iii) the more production a commodity shifted geographically over time, iv) for commodities whose production was more geographically diffuse (rather than concentrated in a given region), v) as farm income increases, and vi) for commodities that were imported less frequently.

Other work has directly analyzed the relationship between political donations, lobbying, and congressional voting. For example, Brooks et al. (1998) studied contributions and voting related to sugar policies. They found congressional votes in favor of redistribution to sugar farmers prompted more pro-sugar contributions and less anti-sugar contributions. They also found that pro-sugar retribution groups tended to concentrate their donations on fewer legislators than anti-sugar redistribution groups. Donations by pro-sugar redistribution groups increased in response to donations by anti-sugar redistribution groups, suggesting competition in lobbing. Similarly, Holloway et al. (2014) found 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. Stratmann (1992) provides evidence suggesting that these agricultural donations are rational in the sense that they do not go to legislatures who would have voted in favor of redistributive policies anyway. Garrett et al. (2006) shows that agriculture disaster support is higher in states represented by public officials with greater power to affect the allocation of relief funds.

Ruttan (1980) discussed a case that runs counter to that predicted by public choice models. In particular, many public choice models suggest a tendency for bureaucratic over-

investment; bureaucrats seek to maximize the size of their budget irrespective of the output

actually produced. However, Ruttan (1980) noted that the high rates of return to research in

agriculture undermine the bureaucratic over-investment hypothesis in this case. Possible reasons

may relate to competition among states and agencies in agricultural research, and to spillover

effects that arise from innovations developed in one state positively affecting 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 (Lusk, 2012; Ellison, Lusk,

and Briggeman, 2010a,b). As described by Caplan (2011), voters are able to hold onto a variety

of anti-market biases because they provide psychological benefits but are unlikely to impose

significant costs (at the individual level). 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 (McFadden and

Lusk, 2013; Smithson et al. 2014).

4.6 Summary

Other types of market failures could exist, but those discussed in sections 4.2 - 4.4 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 act riskier); 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 are a common means of 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 deducible 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, these can be legitimate motives for government intervention, although they typically fall outside the purview of welfare economics. Food assistance programs are means-tested, and as such the benefits primarily flow 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 2.2). Thus, while concerns about distribution and equity might have had some force in motiving farm subsidies in the past, it is not the case today. This 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/year/individual and prohibits payments to those individuals earning more than $900,000 in adjusted gross income; crop insurance subsidies are not subject to payment limitations).

5. Summary and Future Directions

Agriculture has change dramatically over the course of the last century. So too has the USDA. Policy changes over the past twenty years have led to more planting flexibility for famers, 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 farmers today that supply the bulk of the nation's food are larger and more sophisticated than in the past. They have access to crop consultants, and online information is at the fingertip. 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.

The latest Farm Bill introduced a complicated set of programs with overlapping objectives which 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 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."[10] The complicated nature of the programs was anticipated. The 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 bulk of the large fruit and vegetable growers and livestock producers receive, for all practical purposes, no farm subsidies.

While continuing to alter commodity programs with each additional Farm Bill, the USDA has taken on new and expanding roles. There are programs aimed at helping small

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[10] http://www.agmanager.info/policy/commodity/2012/WebinarQuestions.pdf

farmers, funding research on specialty crops, supporting farmers markets and local foods programs, on improving the quantity and quality of foods eating by lower income Americans, regulating anticompetitive practices, programs to improve water quality and mitigate adverse effects of livestock manure, just to name a few. With it have come multiple objectives that are often in conflict. Examples are numerous: increase the efficiency of agricultural production to produce more food at a lower cost while at the same time trying to reduce obesity and promote organic practices that lower yields and increase cost. Help small, minority, and beginning farmers and promote farmers markets while at the same time trying to ensuring food security for the nation while promoting exports to consumers elsewhere. Pay producers to remove environmentally sensitive lands from production, which increases food prices and thus the amount of assistance needed by low income households. Create nutritional guidelines that recommend eating fewer animal products, while helping fund promotional campaigns encouraging consumption of these products and conducting research which makes such products less expensive. Each of these are not necessarily in conflict: more efficient production can improve the environment through reduced resource use, while simultaneously lowering prices for consumers and giving farmers more to sell. But, while improved efficiency would be a laudable goal, it is far from clear that this is the sole, or even most important, objective of the agency.

An agency 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 agency take to move further away from old-style commodity programs, and reduce barriers to the development of self-funded private farm insurance? Ensuring accurate data available to price and deliver insurance is one role. Others have suggested ideas like crop insurance savings accounts (Colson et al., 2014), and there other alternatives as well. 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 rather because of 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. This will require preventing trading partners from enacting non-tariff 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 producers' freedom to operate.

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