Cheap Food Policy: Fact or Rhetoric?

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Abstract

The term "cheap food policy" has frequently been used as a descriptor for U.S. commodity programs by those who contend these payments to farmers ultimately result in lower food costs for consumers. More recently, farm policy has been criticized for contributing to the obesity problem in the U.S. by making large quantities of fattening foods widely available and relatively inexpensive. This paper econometrically evaluates the impact of direct government payments to farmers from 1960-1999 on the proportion of disposable income consumers spend on food. The model finds the payments do not significantly affect the affordability of food.

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Introduction

Americans spent just over ten percent of their disposable income on food in 2003. This amount equals the lowest level recorded since 1929, and is well below the peak level of 25.2 percent experienced in 1933. The percentage of disposable income Americans dedicate to food purchases has consistently fallen since 1947, and has hovered near ten percent since 1997. The downward trend over time can be observed in Figure 1.

This article focuses on a long-asserted source of the declining proportion of consumer income devoted to food, U.S. agricultural commodity policy. For many decades, U.S. farm policy has been described as a "cheap food" policy—in the broadest sense meaning the results of actions taken by the federal government to affect agriculture include lower retail food prices for consumers. In their textbook Agricultural and Food Policy, a cheap food policy is described by Knutson, Penn, and Flinchbaugh (1998) as one that "involves the government overtly pursuing policies that hold down the price of food below the competitive equilibrium price."

Cheap food policy remains in the milieu of the debate about federal farm program payments. For example, a recent farm publication editorial stated, "They [farm payments] really are a food subsidy assistance in disguise . . . and every person in this county [*sic*] who buys food and eats three squares a day are the beneficiaries of it—U.S. citizens pay far less for food than anyone on the planet" (Brandon, 2004).

Cheap food policy has also made its way into the recent debate surrounding the nation's emerging obesity problem. According to the National Center for Health Statistics (2004), the proportion of obese adults in the U.S. increased from 14.6 percent in 1971 to 31.1 percent in 2002. Many articles in the popular press over the last 18-24 months have been highly critical of what their authors contend are the deleterious effects of U.S. agricultural policy concerning

obesity. In 2003 Pollan asserted, "Absurdly, while one hand of the government is campaigning against the epidemic of obesity, the other is subsidizing it, by writing farmers a check for every bushel of corn they can grow." James Tillotson (2003), Professor of Food Policy and International Business at Tufts University, perhaps best encapsulates the arguments for the commodity policy-obesity link:

> Yes, public-supported long-active strongly politically backed agricultural policies have played a pivotal role in shaping our low-cost commodity supply. Combined with our highly efficient food-processing industry, this helps to lower the costs of our consumer food. These conditions have, unintentionally and unexpectedly, created one of the environmental preconditions that have allowed many of us to become fat—cheap food.

The idea of such a relationship is gaining acceptance, as four first-year medical students recently concluded in the Stanford Daily (2004) that, "Specifically, the United States should advocate for a gradual phase-out of the existing farm subsidies and shifting to an open market . . . as a potential solution for the increasing obesity epidemic."

Literature Review

The term "cheap food policy" has been employed by academics, politicians, and a variety of advocates over the years. The concept has taken on numerous meanings over time, although the outcome of low-priced food for a nation's consumers essentially remains the same. In the postwar book The Farmer and the Rest of Us, for example, importing low-priced food products from South America to support an industrial expansion in the U.S. is described as a form of cheap food policy (Moore, 1945). As another example, Peterson (1979) discusses the use of export taxes, overvalued currencies, and state controls by the governments of lesser-developed countries to depress real food prices for their domestic populations as cheap food policy. Yet

both of these depictions differ considerably from our analysis of the impact of commodity programs on the affordability of food for consumers.

In a relatively early reference, Eggert (1947) notes how farmers might oppose receiving direct payments in place of price supports because they could view them as a cheap food policy; at the time receiving such payments was seen as akin to a form of relief.

Paarlberg (1982), describing what he labeled the "scarcity syndrome" that arose out of the events of the mid-1970s, criticizes three forms of government action taken to maintain low food prices: trade embargoes, direct price controls, and management of stocks. Embargoes diminish the nation's credibility, price controls result in marked price increases upon their removal, and liquidating food reserves to depress prices can result in unintended shortages. Paarlberg lists several consequences of this cheap food policy in the context of the scarcity syndrome: 1) low prices and incomes for farmers through disincentives for production, 2) reduced export earnings, 3) loss of export markets, and 4) damage to the U.S. reputation as a global trader.

In his discussion of the justifications for and failures of farm policies, Moore (1987) notes that subsidies are cited as a way to lower food prices for consumers through increases in production. However, he states that "consumers pay the cost of increased production or food reserves through higher taxes." Furthermore, he explicitly states the programs do not reduce food prices for consumers.

Tweeten (1995) dismisses the contribution of commodity programs toward improving economic efficiency in his critique of their most common justifications. He contends the reasons for the decline in the proportion of consumer income spent on food over the last six decades include the increase in real consumer income and the improvements in agricultural

productivity—influenced primarily by "public and private investments in research, education, extension, and infrastructure."

Beach, Boyd, and Uri (1997), in their assessment of land values in the absence of direct payments, develop a computable generalized equilibrium model that finds total output would be reduced by 0.18 percent annually. Output of program crops would be reduced 14 percent, and overall agricultural output would fall 4.39 percent. The reduction in total output reflects a decrease in output in the food and tobacco sector of 0.55 percent because of the higher prices associated with the elimination of direct payments.

Knutson, Penn, and Flinchbaugh (1998) assert the case for a cheap food policy could be made throughout the period USDA maintained its target price-deficiency payment program because the program stimulated production, leading to increases in supply that caused lower commodity prices. However, USDA also established production controls for much of this same period, as on average almost 20 percent of U.S. cropland remained out of production in the five decades following World War II (Orden, Paarlberg, and Roe, 1999). Knutson, Penn, and Flinchbaugh also state any link between farm programs and food prices was essentially broken in 1996 by a farm bill that eliminated deficiency payments and replaced them with a system of decoupled payments. Yet since 1985 USDA has maintained a system of loan deficiency payments which essentially guarantees producers a minimum price for all of their production of program crops.

More recently, Morrison Paul and MacDonald (2003) found that over the period they examined, 1972-1992, agricultural materials declined as a share of food processor costs, as did the sensitivity of food prices to farm prices. Furthermore, they found a total increase in food processing costs of 4.17 percent from 1982-1992 with essentially no contribution from

agricultural materials. This occurred as a result of the decrease in agricultural materials cost as a share of total costs and a negligible increase in inflation. Finally, Babcock has stated his unpublished analysis demonstrates the price of corn and soybeans would increase by no more than five to seven percent without government subsidies (Fields, 2004). Furthermore, Babcock notes, "A five- to seven-percent increase in the price of corn would lead to, at most, a one-percent increase in the price of meat."

Conceptual Framework

The existence of a cheap food policy is most frequently and consistently promoted by proponents of commodity programs as a prime benefit and consequently a justification. Commodity programs keep production resources in agriculture, resulting in surplus production and inefficiency (Shoemaker, Anderson, and Hrubovcak, 1990). Further, not only are these resources impeded from moving to other sectors of the economy, they remain dedicated to the production of crops covered by the commodity programs. In order to clear the market of the surplus production, equilibrium prices for these commodities must fall. An effective cheap food policy would mean lower farm-level prices for these raw commodities would result in less expensive food products at the retail level for sale to consumers.

However, acceding to cheap food policy presents challenges at the farm level in the long run. Shoemaker, Anderson, and Hrubovcak (1990) state that gains to farmers in the short run from payments are lost because the agricultural sector adjusts by capitalizing the expected program benefits into land values. They note that because the value of land is for the most part based on the income it can generate, government payments increasing that income increase the land value and the landowner's wealth. Moore (1987) also states those who actually benefit in

the long run are those who owned farm land before the enactment of a farm program or enhancements to an existing program. Shoemaker, Anderson, and Hrubovcak (1990) estimate land prices would be 15-20 percent lower without government programs. The CGE model developed by Beach, Boyd, and Uri (1997) for 1988 found land prices would fall about 14 percent without direct payments. Under the 1996 farm bill, estimates of inflated land prices were as high as 20 percent (Barnard, 2001). Over time, therefore, as land prices and rents rise the cost of production increases.

Figure 2 depicts the immediate effect at the farm level of a loan program coupled to production. Under the current regime, a loan rate acts as an effective floor on all of a farmer's current production of a particular crop. The first panel of Figure 2 illustrates the farmer's response when the market price is below the loan rate. Production increases in response to the higher effective price created by the loan rate, moving from a_1 to a_2. As each farmer in the industry responds to the loan rate, the quantity supplied increases. Additionally, the potential to earn economic profits attracts new entrants, causing supply of the crop to increase. This change is reflected by the shift in the supply curve for the industry from S_1 to S_2 in the second panel of Figure 2. Total output for the industry increases from Q_1 to Q_2.

Figure 3 illustrates how the initial response to the loan rate becomes tempered in the long run as farmers and landowners recognize the land can produce more income. The figure assumes the value of the payments becomes capitalized and as a result land prices and rental rates increase. Higher land charges increase the farmer's costs of production, as the average cost curve shifts from AC_1 to AC_2. in the first panel of Figure 3. The farmer's marginal cost of production increases and this curve moves from MC_1 to MC_2. The parallel shifts of these curves reflect an assumption that changes to the costs of inputs are scale-neutral. Correspondingly,

output falls from a_1 to a_2, and the farmer earns zero economic profit. As each farmer in the industry reduces output and other farmers exit the industry, the supply curve for the industry shifts from S_1 to S_2 in the second panel of Figure 3. Industry output falls from Q_1 to Q_2, returning to the level that existed prior to the introduction of the loan rate program. Again, this movement follows from the assumption that changes to the costs of inputs in the industry are scale-neutral. Additionally, these figures abstract away from risk aversion and any uncertainty regarding the future of government payments.

In sum, the introduction of a loan rate above the market price causes farmers in the industry to increase their output and new farmers to enter in attempts to capture economic profits in the short run. However, landowners recognize the increase in income their land can generate because of the loan rate program, and they attempt to capture this additional income by raising the price of land and rental rates. Over time, the value of loan payments becomes capitalized in the cost of farm land. Higher land costs result in higher average production costs for farmers, who either reduce their output or exit the industry. The industry output falls and supply reverts from a short-run increase to its original level. The industry again earns zero economic profit over the long-run in the presence of the loan program under the competitive framework.

Data and Methods

We test whether direct payments to producers contribute significantly to the proportion of disposable income devoted to food expenditures. The reason the percentage of disposable income spent on food is the variable of interest in our study is primarily due to its predominance as a measure of food cost. Furthermore, in general, advocates of cheap food policy refer to the commodity title of the farm bill as such. The variable is constructed as the ratio of the dollar

expenditures on food to disposable income, so that the dependent variable is a function of the supply and demand for food and disposable income. Data on the proportion of disposable income spent on food are obtained from the Economic Research Service (ERS) of USDA. Forty observations are utilized in the data set from 1960 through 1999. These data include purchases of food from grocery stores and retail outlets, as well as food produced and consumed on farms, because this value is reflected in personal income. Meals and snacks purchased away from home are also included. USDA's definition of disposable personal income includes the value of food produced and consumed on farms as noted, as well as government transfer payments such as food stamps and supplements to wages and salaries including employers' contributions to Social Security and Medicare.

We employ total factor productivity in agriculture in the model as a measure of changes in technology, another important variable affecting the affordability of food because it lowers production costs and equilibrium prices. As such, we expect advances in technology to have a negative impact on the percentage of disposable income spent on food, as improvements should make food more affordable by shifting the supply curve to the right. Data are also obtained from ERS on this measure of agricultural productivity. Their index of total factor productivity has increased more than two-and-a-half times since 1948. The lack of availability of more recent data prevents the model from incorporating additional years through 2003. Additionally, the remarkable increases in crop yields that have taken place over the same period, as evidenced by the record harvests USDA forecasts for corn, soybeans, and cotton in 2004, reflect the importance of this variable (Abbott, 2004).

The total level of consumer income is included in the model because we expect it to affect the proportion of income spent on food. The variable is constructed as a per capita

disposable income variable, and as income rises over time, the proportion spent on food should decline *ceteris paribus*. Thus, this variable is hypothesized to be negative. USDA data on disposable income are divided into population data from the U.S. Census Bureau to create the variable. These data are adjusted for inflation to 2000 dollars using the Consumer Price Index for all items, which uses a base period of 1982-84.

The model includes an annual calculation of a farm-to-retail price spread from USDA because the food commodities purchased at the retail level by consumers reflect the value added to raw farm commodities. The farm-to-retail spread is expected to be positive because increased food processing raises the proportion of disposable income spent on food (Gardner, 1975). The farm-to-retail spread data acquired from ERS are based on USDA's calculation of its market basket of foods produced on farms, which is weighted according the quantities purchased by consumers during the base period of 1982-84. ERS converts this spread to an index because current price data are multiplied by quantities from the base period instead of current quantities. Thus, as with per capita disposable income, these data are multiplied by the Consumer Price Index using 2000 as a base year.

Finally, direct payments are included as an independent variable in the model to test the hypothesis of cheap food policy. If direct payments to farmers in fact generate cheaper food, then they should have a negative effect on the percentage of disposable income spent on food. Direct payments should stimulate production, shifting the supply curve to the right, ultimately lowering the real cost of food to the consumer. Annual data on direct payments to farmers are also obtained from ERS. These data include payments on program crops as well as conservation payments[1]. As with other monetary data used, these annual payments are also expressed in 2000 dollars by using the Consumer Price Index.

Model and Results

Following our interest in the percentage of disposable income spent on food (*XF*), we use this calculation as the dependent variable in an autoregressive AR(1) model, which employs the Yule-Walker method to correct for the presence of autocorrelation:

$$XF_t = \alpha_{0t} + \alpha_1 TFP_t + \alpha_2 PDI_t + \alpha_3 FRS_t + \alpha_4 DP_t + v_t \qquad (1)$$

The advantage of using the Yule-Walker method is the retention of the first observation from the data. Initially the ordinary least squares method was utilized, but the results of the Durbin-Watson *d* test precipitated the use of an AR(1) model. The five independent variables in Eq. (1) include, in order, total factor productivity, per capita disposable income, farm-to-retail spread, and direct payments to farmers. These variables are all given for year *t*.

All independent variables in the model have the expected sign, reflecting their hypothesized impacts on the percentage of disposable income spent on food. Each independent variable with the exception of direct payments is significant. This implies that while the direct payments variable has the assumed sign, this effect cannot be statistically distinguished from zero[2].

The per capita disposable income variable is the only independent variable significant at the one percent level. This is not unexpected since consumer incomes have steadily increased as standards of living have improved considerably in the years following World War II. The fact the farm-to-retail spread variable is positive and significant is also not surprising given the rising value-added component of retail food. The significance of total factor productivity in agriculture as an independent variable is anticipated because the increases in agricultural efficiency over the last several decades have reduced per unit costs of production.

Table 1 presents the results of the AR(1) model described in the previous section. In understanding these results, an additional reason direct payments do not significantly impact consumers' food expenditures can be observed in the relative size of farm subsidies compared to the dollars U.S. consumers spend on food each year. Figure 4 depicts direct payments to farmers and food expenditures since 1960 in 2000 dollars. Since 1960, this level has averaged 1.1 percent and has not exceeded 2.8 percent. In 2003, direct payments were approximately 1.7 percent of consumer food expenditures, which totaled almost $950 billion in nominal dollars.

Elasticities calculated by the model for each independent variable are also included in Table 1. The largest elasticity is for the disposable income variable with an absolute value of 0.655, indicating not only its influence in the model but how much rising consumer incomes have been responsible for increasing the affordability of food over the last forty years. The next largest elasticity absolute value of 0.297 is for the farm-to-retail spread variable. The increasing value-added component of food products contributes to the sensitivity of the relationship between the farm-to-retail spread and the dependent variable, as the farm value becomes a smaller proportion of the total value of food products. The elasticity value of total factor productivity is the next largest absolute value of 0.097, reflecting the importance of technological change in increasing the supply of food. This variable might be expected to have a larger elasticity value, but the relationship between the production technology and the affordability of food is not as direct as the previously discussed variables. However, technological change remains an important factor because of its impact on the supply of agricultural commodities. Finally, we note the direct payments variable, which is not significant in the AR(1) model, has a very small elasticity with an absolute value of 0.00495.

The fact the model does not find evidence of a cheap food policy at least since 1960 is consistent with the historical development of U.S. farm programs. These programs were initiated during the Great Depression to provide assistance to farmers whose disappearing incomes left them destitute. The number of farmers at that time, and even in 1960, was much greater than today. The programs were designed to increase the incomes of farmers, not to reduce the costs of retail food products to consumers. Indeed, the contribution of direct payments to net farm income is well known throughout agriculture. Since 1960 all direct payments to farmers have on average comprised over 20 percent of net farm income as measured by ERS. In 1983, the year of the highest proportion, they accounted for over 65 percent of net farm income. The percentage has also increased in recent history, as the average from 1960 to 1980 was 15 percent; since 1980 the average has approached 28 percent. Figure 5 depicts net farm income and direct payments to farmers from 1960 to 2003.

Additionally, the existence of supply controls throughout much of the history of U.S. farm policy runs counter to the notion of cheap food policy, as these mechanisms attempted to reduce the differential between market prices for farm commodities and federal price supports. These policy actions to mitigate the distortions created by commodity programs were not consistent with a goal of reducing retail food prices.

The downward trend in the proportion of consumer disposable income spent on food has continued since 1996, when the decoupling of farm programs began. This event alone has made justifying the existence of a cheap food policy more difficult, as noted by Knutson, Penn, and Flinchbaugh (1998), although the retention of a loan deficiency payment program maintains effective price floors for all production of program crops.

Tweeten (1995) notes how half of production agriculture does not receive assistance from commodity programs (livestock, forages, fruits, vegetables), yet remains as abundant and efficient as that of program crops. He states, "Consumers do not anguish over shortages of tomatoes, potatoes, eggs, broilers, and other commodities not under government control." Our results are consistent with this contention.

Implications and Conclusions

The results of this study are perhaps most applicable to the debate over the future of federal commodity policy. As noted in the introduction, the cheap food policy idiom continues to be employed by advocates of existing farm programs, including farmers, interest groups, and farm state members of Congress. However, our findings indicate consumers and taxpayers should be wary of these pronouncements. The results indicate that because the capitalization of direct payments into the cost of land essentially mitigates any significant impact on retail food prices, the true beneficiaries of farm programs tend to be landowners. In addition to our statistical findings, the sheer magnitude of consumer expenditures on food relative to direct payments to farmers indicates how little these payments should be expected to influence the affordability of food. However, direct payments to farmers have become responsible for an increasingly larger proportion of net farm income over time, and perhaps this situation encourages farm interest groups to advocate the continuation and expansion of commodity programs for reasons that include their ostensible impact on retail food prices.

Our results may also clarify the often confusing arguments surrounding the nation's obesity problem. As discussed previously, many social advocates insist on implicating farm commodity programs as at least partially responsible for this predicament by making low-cost,

high-fat food products easily available to consumers. Many of these critics believe eliminating these programs would remedy much of the obesity problem. However, our findings indicate this is a largely unsubstantiated argument. Payments to farmers are not found to significantly influence the affordability of retail food products, particularly not on the scale suggested by some public health advocates. Nonetheless, the mix of crops produced as a result of government support remains a distinctly separate issue from this study. The results are also consistent with recent work on the relationship between technological change and rising obesity rates, both on the supply side and the demand side through the reduction in more labor-intensive employment (Lakdawalla and Philipson, 2002; Philipson and Posner, 1999). Hence, the ability to remove commodity programs from the discussion of the U.S. obesity problem would seem beneficial to all parties.

In the continuing public debate over the design of U.S farm policy, proponents of commodity programs delineate numerous justifications (see Tweeten). Similarly, several sources are cited by critics as contributing to an environment that leads to a significant obese population, commodity programs among them. The lack of evidence found in this study for a significant role for direct payments indicates much of the discussion is misplaced. Direct payments are shown to be a negligible factor in shifting the long-run supply curve for agricultural commodities to the right. Rather, increases in consumer income and advances in technology that improve agricultural productivity are shown to be more significant in their effects on the affordability of retail food products. Debate over public investments to improve such technologies and infrastructure would seem to be more appropriate.

Endnotes

[1] "Direct payments" as used in this article refer to all payments directly received by farmers for which USDA has collected data for many decades. This is not a reference to the specific system of fixed, decoupled payments to farmers established by the 2002 farm bill known as direct or fixed direct payments. These payments could not be included in this analysis since no data after 1999 are incorporated.

[2] The model was also estimated by modifying the direct payments variable to incorporate a three-year moving average. Transforming this variable allowed for an alternative approach to measuring expected direct payments. However, the results of estimating the model with this variable are very similar to those in Table 1. In fact, direct payments become less significant with the inclusion of the three-year moving average.

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Figure 1. Percentage of U.S. disposable income spent on food, 1933-2003. Source: USDA ERS.

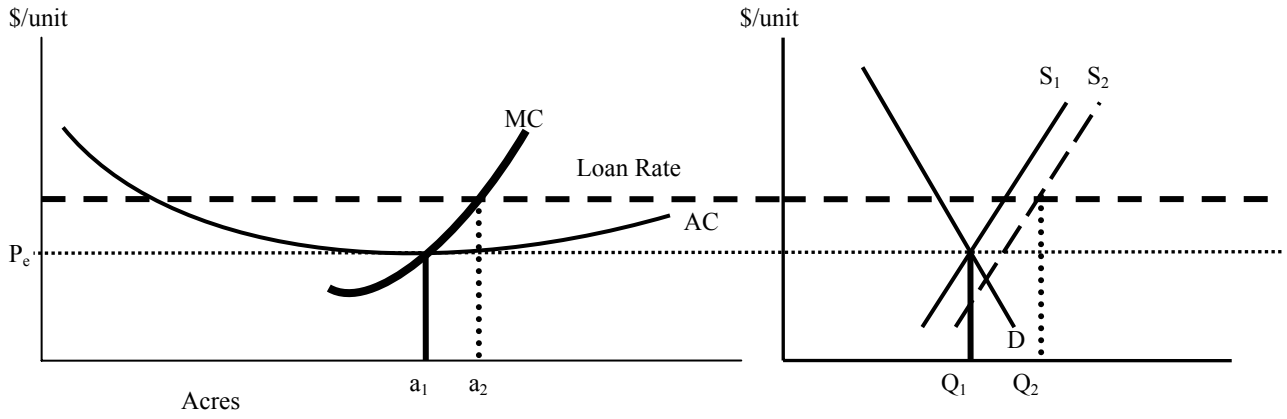

Figure 2. Short-run output effect of a loan program.

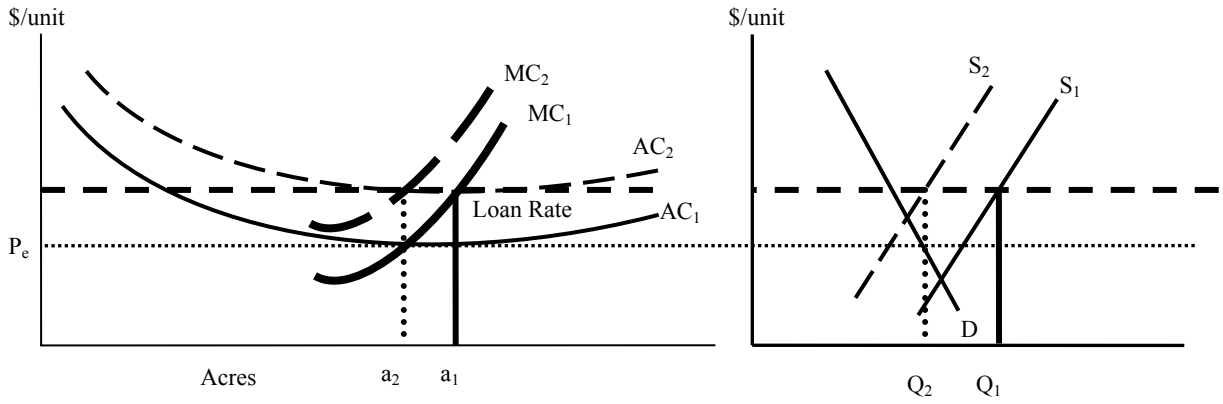

Figure 3. Long-run output effect of a loan program with payments capitalized into land values.

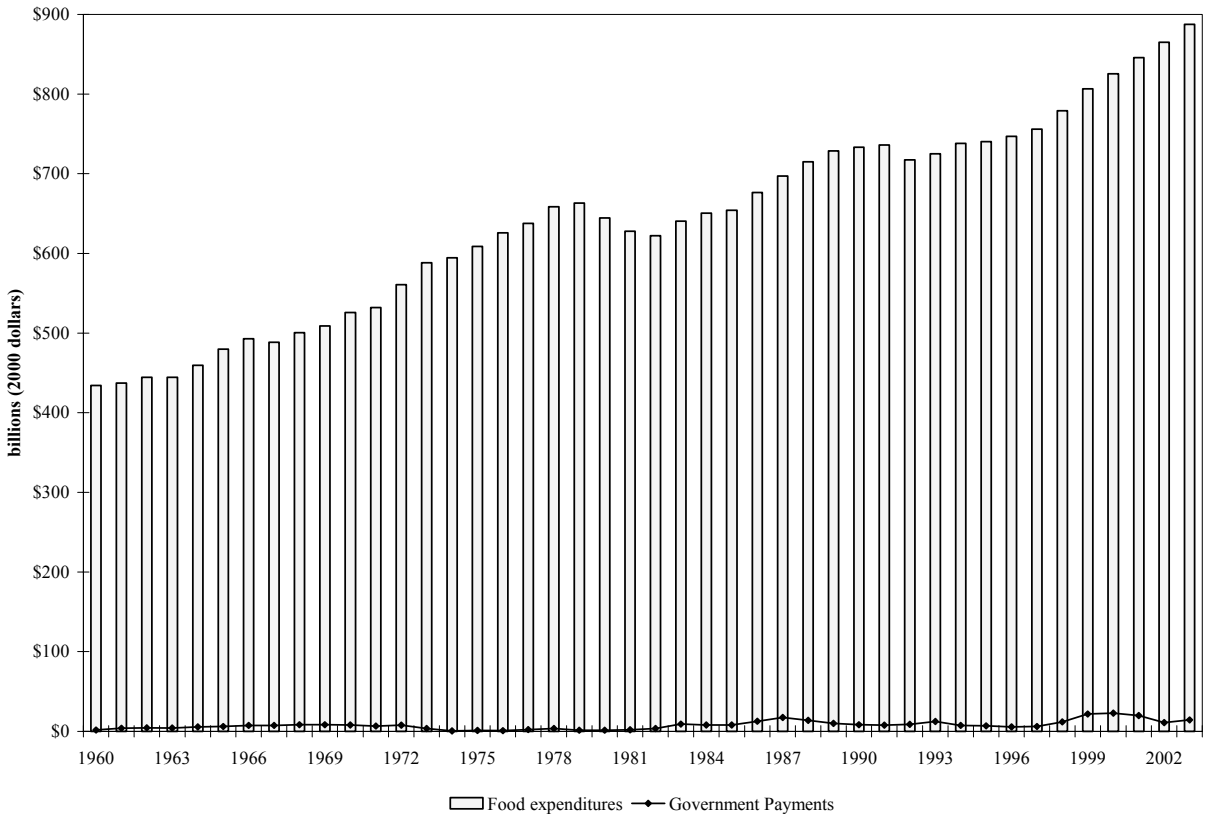

Figure 4. Total U.S. food expenditures and direct government payments to farmers, 1960-2003. Source: USDA-ERS.

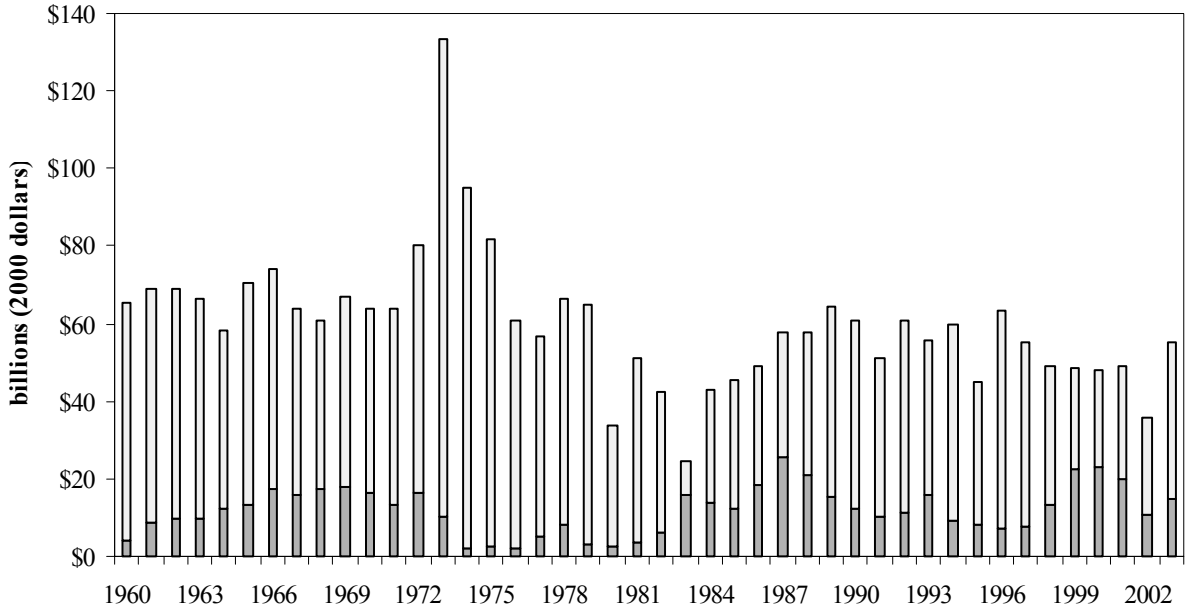

Figure 5. Direct government payments to farmers as a share of net farm income, 1960-2003. Source: USDA-ERS.

Variable	Estimate	Elasticity
Intercept	0.1891*[a] (0.0161)	*n/a*
Total Factor Productivity	-0.018* (0.0103)	-0.09706
Per Capita Disposable Income (thousand $)	-0.00452** (0.00055)	-0.65537
Farm-to-Retail Spread	0.0002* (0.0001)	0.29717
Direct Payments (billion $)	-0.0000932 (0.000145)	-0.00495
R^2	0.987	*n/a*

[a]Numbers in parentheses are standard errors. Statistical significance at the $\alpha = 0.05$ level is indicated by *; significance at the $\alpha = 0.01$ by **.

Table 1. Percentage of disposable income spent on food AR(1) model results.