



United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-265842

September 14, 1995

The Honorable Charles E. Grassley
United States Senate

Dear Senator Grassley:

This report responds to your request for information on the possible effects of eliminating the current tax exemption for ethanol. When blended with gasoline, ethanol (an alcohol that can be made from corn) increases octane levels and provides oxygen to reduce motor vehicle emissions. In 1994, approximately 460 million bushels of corn were used to produce about 1.1 billion gallons of ethanol. Since 1978, the federal government has promoted ethanol use primarily by exempting ethanol-blended gasoline from a portion of the federal excise tax on gasoline.¹ The tax exemption is scheduled to end in 2000. The Joint Committee on Taxation estimates that about \$2.5 billion in tax revenues will be foregone because of the ethanol exemption from 1996 through 2000.²

Specifically, you asked us to estimate the (1) decline in ethanol use if the tax exemption is eliminated and (2) net fiscal effect on the U.S. Treasury as well as the changes in farm income resulting from the decline in ethanol use. To estimate the decline in ethanol use, we relied on the expert opinions of numerous government and industry officials. To measure the effect of changes in demand for

¹The tax exemption pertains to alcohols, including ethanol, produced from renewable resources.

²In lieu of the tax exemption, an income tax credit can be used. According to the Congressional Budget Office, the tax credit is, in almost all cases, less valuable than the exemption and is rarely used. In this report, we refer to both the tax exemption and credit as a tax exemption. In addition, the Energy Policy Act of 1992 extended the tax exemption to ethanol blends of less than 10 percent. The blends receive a pro-rated tax exemption.

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corn from 1996 through 2000 if the ethanol tax exemption is eliminated at the beginning of 1996, we used a well-established econometric model developed by the Food and Agricultural Policy Research Institute (FAPRI). The model assumes that all agricultural policies set forth in the 1990 farm bill are maintained.³ If the farm programs are changed, the model results could be different. To determine the net fiscal effect to the U.S. Treasury, we calculated the difference between increases in gasoline tax revenue and changes in farm program payments that would result from eliminating the tax exemption.⁴ We did not address other federal budget or consumer effects that might result from eliminating the excise tax exemption, such as the income taxes paid by farmers and the ethanol and gasoline industries, because the FAPRI model does not address these effects.

Your office requested that we determine the effect of eliminating the ethanol tax exemption under two different levels of reductions in corn acreage. First, as you requested, we used the Acreage Reduction Program (ARP)⁵ provisions of the 1990 farm bill for corn as modeled in the 1995 FAPRI baseline. This baseline assumes that acreage planted to corn will be reduced by 7.5 percent in the first year and 5 percent thereafter under the ARP. These reductions represent the Institute's baseline estimate for the next 5 years as of January 1995. Second, as you requested, we used a modified version of the FAPRI 1995 baseline--eliminating the ARP for corn--because, as noted in your correspondence to us, many policymakers in the Congress and the administration have argued that this is the direction agricultural policy should take. Therefore, this scenario assumes that the Secretary's discretionary

³The model's baseline was developed in January 1995 and includes assumptions about the general economy, agricultural policies, the weather, and technological change. (See enclosure I.)

⁴Farm program payments are deficiency payments, storage payments, disaster assistance, stock outlays, and other net costs made to farmers by the U.S. Department of Agriculture's (USDA) Commodity Credit Corporation.

⁵Under the ARP, the Secretary of Agriculture has the authority to restrict the number of acres of a crop that farmers can plant and still remain eligible for federal farm program payments.

authority to implement the ARP for corn is eliminated, which would represent a major shift in agricultural policy.

Nevertheless, these two scenarios do not portray the full range of options currently available to the Secretary of Agriculture under the ARP for corn. For example, the 1990 farm bill authorized the Secretary to reduce corn acreage by as much as 12.5 percent if the previous year's stocks-to-use ratio is less than or equal to 25 percent. (During the mid- to late-1980s, when government stocks were at record high levels, the Secretary reduced the acreage for corn by as much as 20 percent; since 1989, reductions in corn acreage under the ARP have not exceeded 10 percent.) According to USDA, the ARP is used to prevent the buildup of surplus stocks, thereby limiting federal budget outlays. A higher level of reductions in corn acreage under the program would mitigate the net fiscal effects of eliminating the ethanol tax exemption.

SUMMARY

We found that it is not possible to calculate with precision the expected decline in ethanol use from eliminating the ethanol tax exemption. Most industry and government officials we interviewed agreed, however, that the decline would be at least 50 percent. On the basis of these discussions, we analyzed two different declines in ethanol use for each ARP scenario--reductions in use of 50 and 90 percent--to represent possible immediate and significant declines.

Under both of the ARP scenarios, eliminating the tax exemption results in a net loss to the U.S. Treasury and lower farm income from corn. Using the ARP levels set forth in the FAPRI baseline, losses to the U.S. Treasury from 1996 through 2000 would be \$2.5 billion if ethanol use dropped by 50 percent and \$5.4 billion if use dropped by 90 percent. With no ARP for corn, the losses to the U.S. Treasury would be \$3.2 billion or \$6.3 billion, with 50-percent and 90-percent declines in use, respectively. In both scenarios, farm income from corn declines. However, if different assumptions about the acreage reduction program were used, the model's results would differ.

BACKGROUND

For a number of years, ethanol has been used as a gasoline extender and octane enhancer--generally in a 10-percent ethanol/90-percent gasoline blend. Since the passage of the 1990 amendments to the Clean Air Act, ethanol has also

been added to gasoline as an oxygenate to reduce motor vehicle emissions. Two provisions in the 1990 amendments affect ethanol use. The first provision, implemented in November 1992, is the oxygenated fuels program, which targets 39 metropolitan areas with high levels of carbon monoxide pollution. The gasoline sold in these areas during the winter must contain a minimum of 2.7 percent oxygen to help motor vehicle fuel burn more completely and reduce carbon monoxide emissions. A 92.3-percent gasoline/7.7-percent ethanol blend meets this requirement. The second provision, implemented in January 1995, is the reformulated gasoline program, which addresses high ozone levels in nine U.S. cities. Reformulated gasoline, which contains a minimum of 2 percent oxygen, is sold year-round in these cities. A 94.3-percent gasoline/5.7-percent ethanol blend meets this requirement. Ethanol is also used to produce ethyl tertiary butyl ether, which can be blended with gasoline to meet oxygen content requirements.

Under the Internal Revenue Code of 1986, as amended, ethanol fuels are exempt from 5.4 cents of the 18.4 cents per gallon tax imposed on gasoline sales (for 90-percent gasoline/10-percent ethanol blends). Using this formula, 1 gallon of ethanol can be blended with 9 gallons of gasoline to make 10 gallons of ethanol-blended gasoline. All 10 gallons are then eligible for the 5.4 cents per gallon exemption, which equates to a total exemption of 54 cents for each gallon of ethanol.

The ethanol industry has strong ties to the nation's agriculture industry. About 95 percent of all ethanol sold for gasoline in the United States is made from corn; the rest is made from wheat, barley, sorghum, and potato waste. Each bushel of corn produces approximately 2.5 gallons of ethanol. The amount of corn available to make ethanol depends in part on the Secretary of Agriculture's actions to restrict corn production under the ARP. Under this program, the Secretary has the authority to restrict the number of acres of a crop that farmers can plant and still remain eligible for payments under the federal farm programs. Since 1989, this program has required farmers receiving federal farm program payments for corn to set aside between 0 and 10 percent of their base acreage for corn.⁶

⁶Base acres are the average of the acreage planted for harvest and considered to be planted for harvest for the previous 5 years.

THE EFFECT OF ELIMINATING THE ETHANOL
TAX EXEMPTION ON ETHANOL USE

According to the ethanol and gasoline industry trade groups, ethanol producers, and government officials we interviewed, eliminating the ethanol tax exemption would produce an immediate and severe decline in the use of ethanol. Consequently, the demand for corn for ethanol production would decline. There was no consensus on the degree of the decline in ethanol use, although most believed it would drop by at least 50 percent. These officials offered several reasons for the decrease in the demand for and supply of ethanol.

First, eliminating the exemption would result in fewer purchases of ethanol by the gasoline refiners and gasoline marketers who blend gasoline with additives for resale and distribution to the retail level. Gasoline marketers need to meet their customers' demand for high-octane gasoline and oxygenated gasoline. Ethanol-blended gasoline can meet these needs but so can other products. For example, motor fuel octane can be raised with hydrocarbon aromatics such as benzene, toluene, and xylene. Oxygenate requirements can be met with methyl tertiary butyl ether and tertiary amyl methyl ether.⁷ The ethanol tax exemption provides a competitive advantage that increases demand for ethanol. Because the tax exemption is equivalent to 54 cents per gallon of ethanol, the effective price is 54 cents less per gallon than the cash price charged by ethanol producers. If the ethanol tax exemption is eliminated, the effective price of ethanol will increase, and gasoline refiners and manufacturers can be expected to purchase alternative products.

Second, as gasoline blenders demand less ethanol, the price at which ethanol is selling will decrease, causing ethanol producers to produce less. If the selling price of ethanol declines below average production costs, some ethanol producers will go out of business. The large-scale ethanol producers having the lowest production costs may stay in business, at least in the short term, but it is generally believed that the amount of ethanol used would fall by at least 50 percent.

⁷Methyl tertiary butyl ether is made by reacting methanol (a product largely made from natural gas) with isobutylene. Tertiary amyl methyl ether is formed by reacting methanol with isoamylene.

On the basis of these discussions, we decided to assume two ethanol-use levels in evaluating the effects of eliminating the exemption. The first assumes a 50-percent decline in use in the first year and no expected future growth. The second assumes an almost total elimination of ethanol use in gasoline--a 90-percent decline in use the first year and no expected future growth.

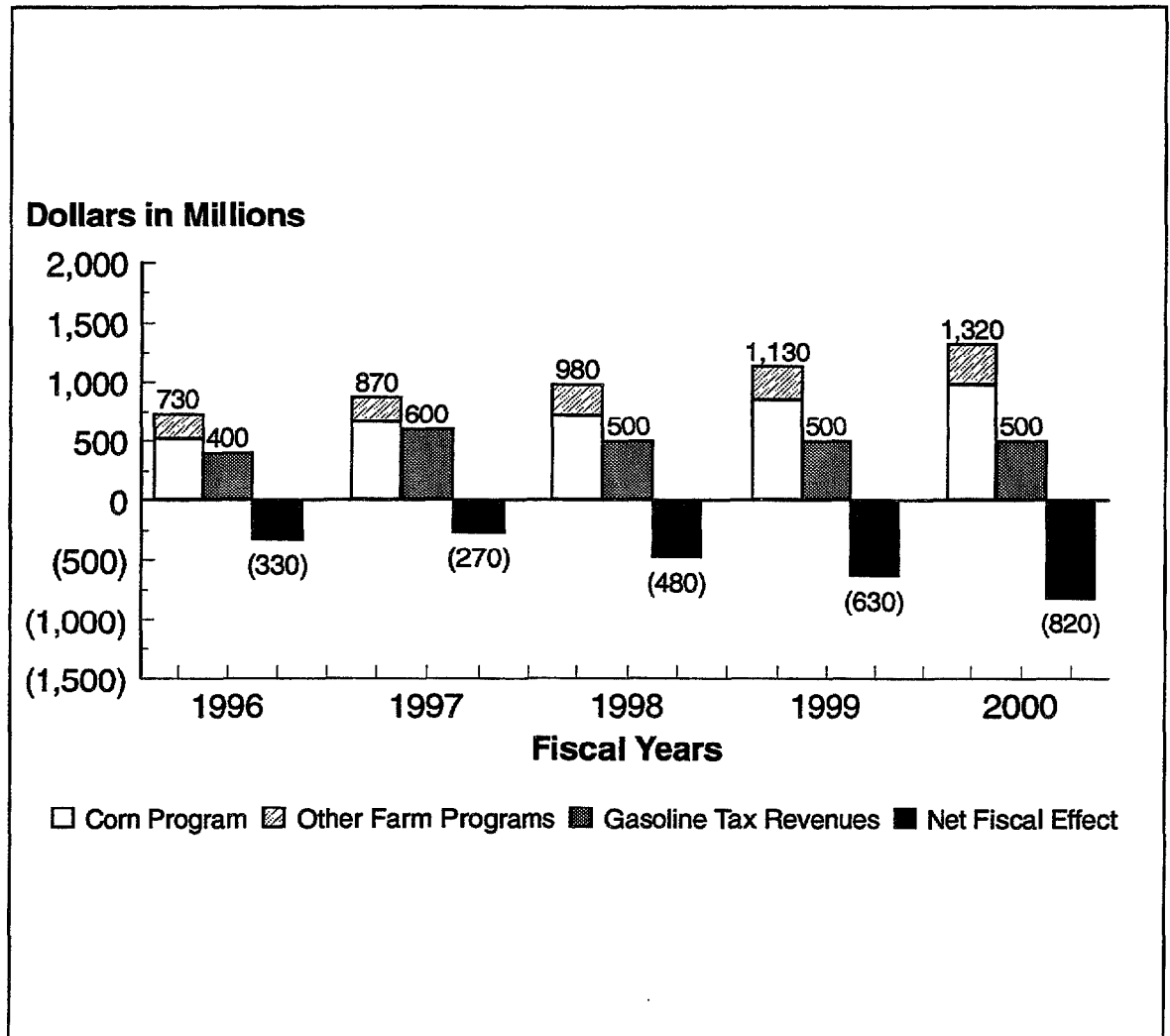
THE EFFECT OF ELIMINATING THE ETHANOL TAX EXEMPTION USING ACREAGE REDUCTION PROGRAM LEVELS FOR CORN SET IN THE FAPRI BASELINE

With the acreage reduction program levels set in the FAPRI baseline,⁸ eliminating the ethanol tax exemption would result in a net loss to the U.S. Treasury from 1996 through 2000. Under this scenario, a 50-percent drop in ethanol use would result in a net loss of about \$2.5 billion, and a 90-percent drop would result in a net loss of about \$5.4 billion. Moreover, in both cases, farm income from corn would decline because corn prices and production would fall.

The U.S. Treasury would incur net losses under both declines in ethanol use over the 5-year period because increases in farm program payments would outweigh the \$2.5 billion increase in gasoline tax revenues. With the acreage reduction program levels set in the FAPRI baseline, if ethanol use drops by 50 percent, federal farm program payments would increase by \$5 billion. Of this increase, corn program payments would account for \$3.7 billion. (See fig. 1.) Under the 90-percent decline in use, federal farm program payments would increase by \$7.9 billion. Corn program payments would account for \$5.6 billion of the increase. (See fig. 2.) In these cases, federal corn program payments increase because the price of corn decreases in response to lower demand for it. As corn prices fall, the difference between the market price and the price the government guarantees farmers (target price) increases, causing government payments to rise. Payments for other commodities with similar price protection (such as wheat, sorghum, and barley) increase because these products are substitutes for corn in the animal feed market. As corn prices fall, so do the prices of these commodities so that they stay competitive in the market.

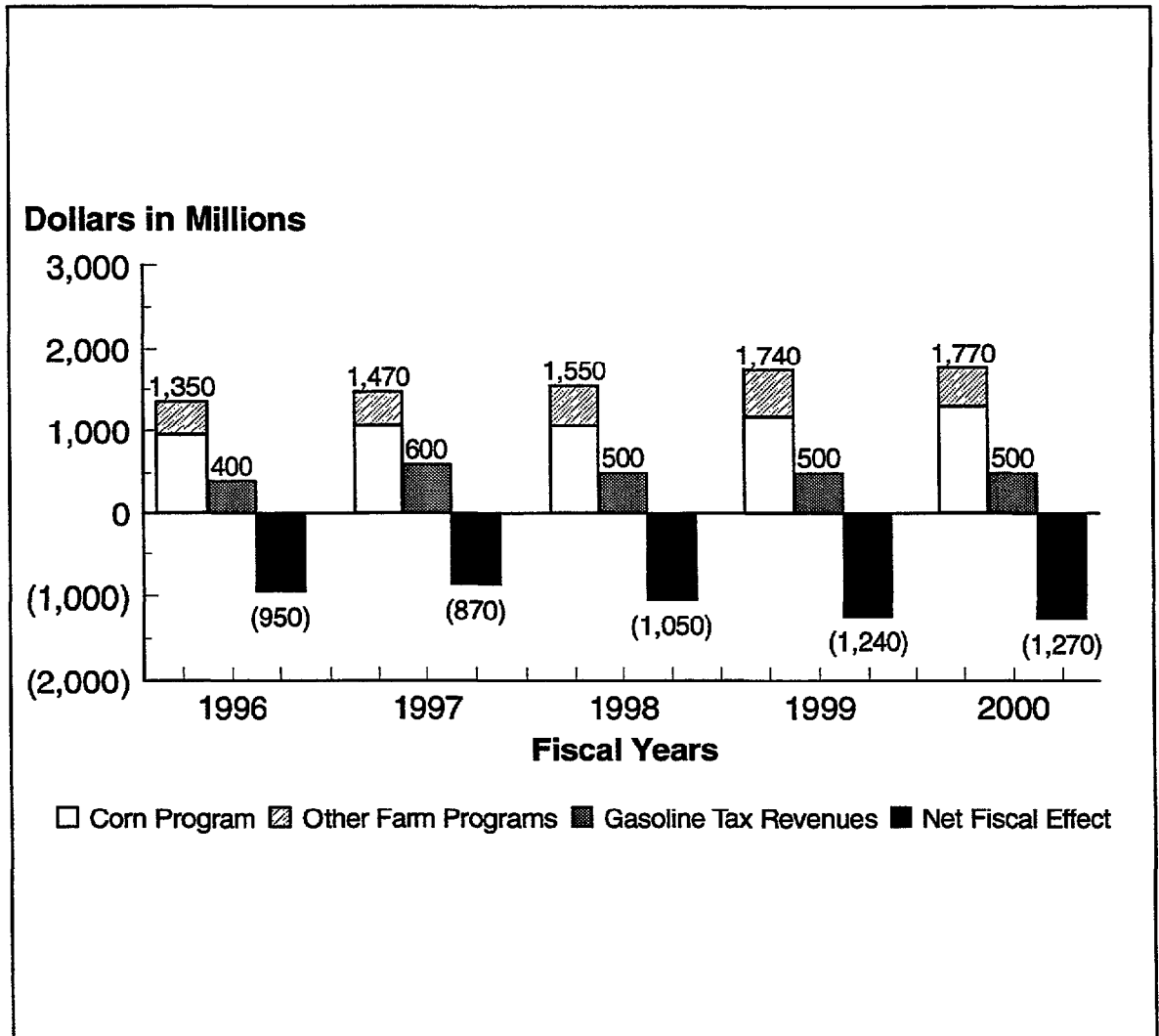
⁸Reductions in acreage are set at 7.5 percent of the base acreage for corn for the first year and 5 percent thereafter.

Figure 1: Changes in Program Payments, Tax Revenues, and Net Fiscal Effects With the FAPRI Baseline's Corn Acreage Reduction Program Levels and a 50-Percent Decline in Ethanol Use



Source: GAO's analysis of data provided by the Joint Committee on Taxation for gasoline tax revenues and the FAPRI model's estimates for corn and other farm program payments.

Figure 2: Changes in Program Payments, Tax Revenues, and Net Fiscal Effects With the FAPRI Baseline's Corn Acreage Reduction Program Levels and a 90-Percent Decline in Ethanol Use



Source: GAO's analysis of the provided by the Joint Committee on Taxation for gasoline tax revenues and the FAPRI model's estimates for corn and other farm program payments.

Eliminating the ethanol tax exemption would affect the farm community beyond the change in payments for the corn program and other farm programs. Under both the 50-percent and 90-percent declines in ethanol use, farmers' net return from corn production would decline between 1996 and 2000. The decline would be \$770 million, on average, each year under the 50-percent decline in use and \$1.2 billion, on average, each year under the 90-percent drop in use. These declines occur because corn prices and production fall while per-acre production costs--such as fuel, fertilizer, and labor--are assumed to remain constant. The federal corn program does not fully protect farmers' income against price drops because (1) not all corn acreage is enrolled in the program and (2) even for the corn acreage that is enrolled, government payments are made on only a portion of production.⁹ Enclosure II contains more information on the other effects of eliminating the ethanol tax exemption.

EFFECTS OF ELIMINATING THE ETHANOL TAX EXEMPTION
IF THERE IS NO ACREAGE REDUCTION PROGRAM FOR CORN

Assuming that the Secretary of Agriculture no longer restricted corn production through the ARP,¹⁰ eliminating the ethanol tax exemption would result in a net loss to the U.S. Treasury of \$3.2 billion if ethanol use drops 50

⁹The corn program does not make payments on full production for all enrolled acres. Under current legislation, 15 percent of the enrolled corn acreage is exempt from payments. In addition, payments are based on established program yields, which are lower than expected yields.

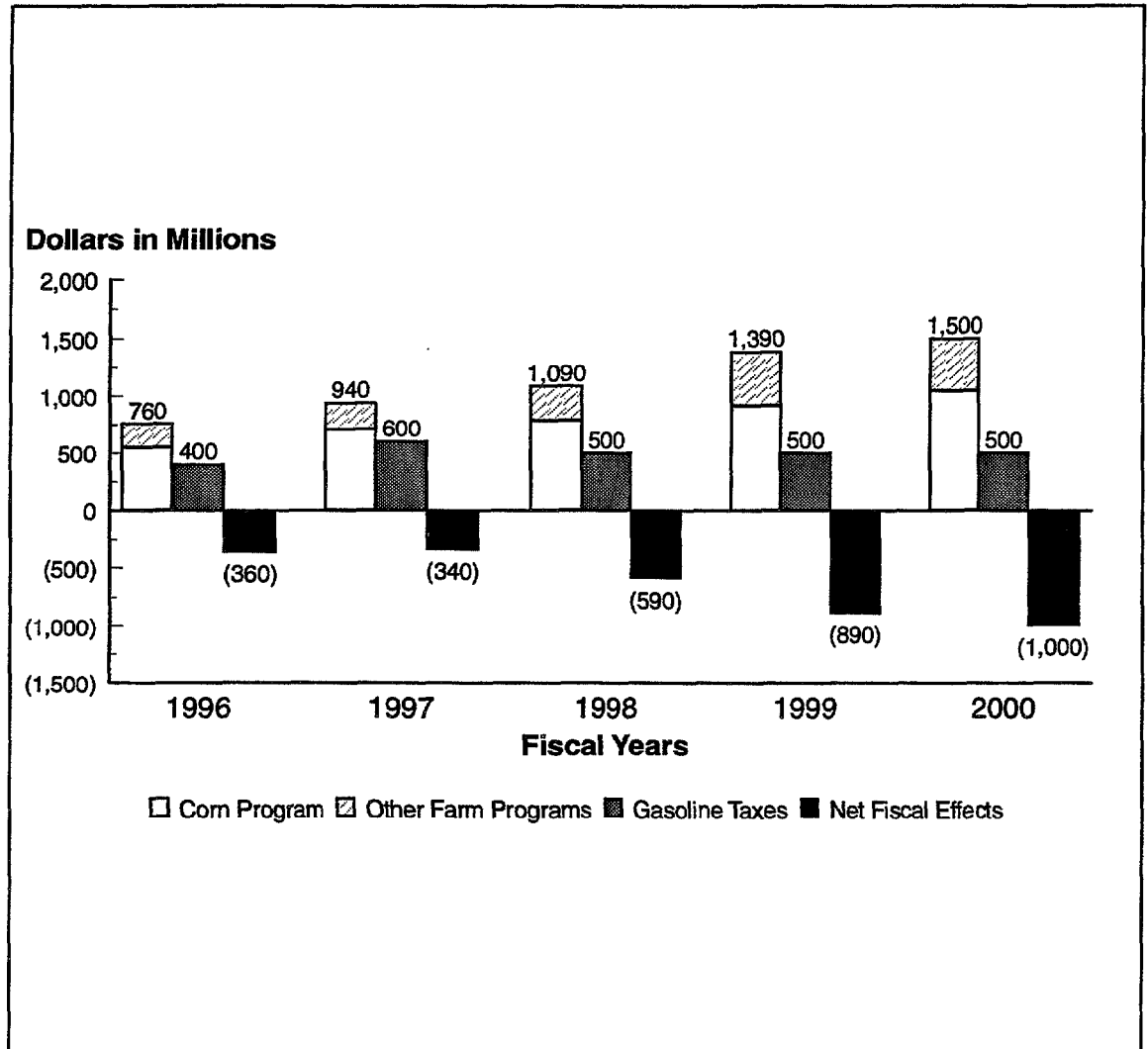
¹⁰This scenario assumes no ARP for corn for crop years 1996-97 through 1999-2000. However, a 7.5-percent ARP for corn for crop year 1995-96 was established in 1994, and farmers made their planting decisions on the basis of this level. Consequently, the 1995-96 corn supply would not change.

percent and a \$6.3 billion net loss if the drop is 90 percent.¹¹ Farm income from corn would also decline.

Under both the 50-percent and 90-percent drops in ethanol use and with no ARP for corn, the increases in farm program payments would outweigh the \$2.5 billion increase in gasoline tax revenues. With the 50-percent decline, farm program payments would be \$5.7 billion higher. Of this increase, corn program payments would account for \$4 billion. (See fig. 3.) Under the 90-percent scenario, farm program payments would be \$8.8 billion higher. Of this increase, corn program payments would account for \$5.8 billion. (See fig. 4.) In these cases, increases in corn program payments would occur because the demand for corn for ethanol decreases more than the supply decreases, causing a significant drop in corn prices. As corn prices fall, the difference between the market price and the price the government guarantees farmers (target price) increases, causing government payments to rise. Payments for other commodities with similar price protection (such as wheat, sorghum, and barley) increase because these products are substitutes for corn in the animal feed market. As corn prices fall, the prices of these commodities fall as well so that they stay competitive in the market.

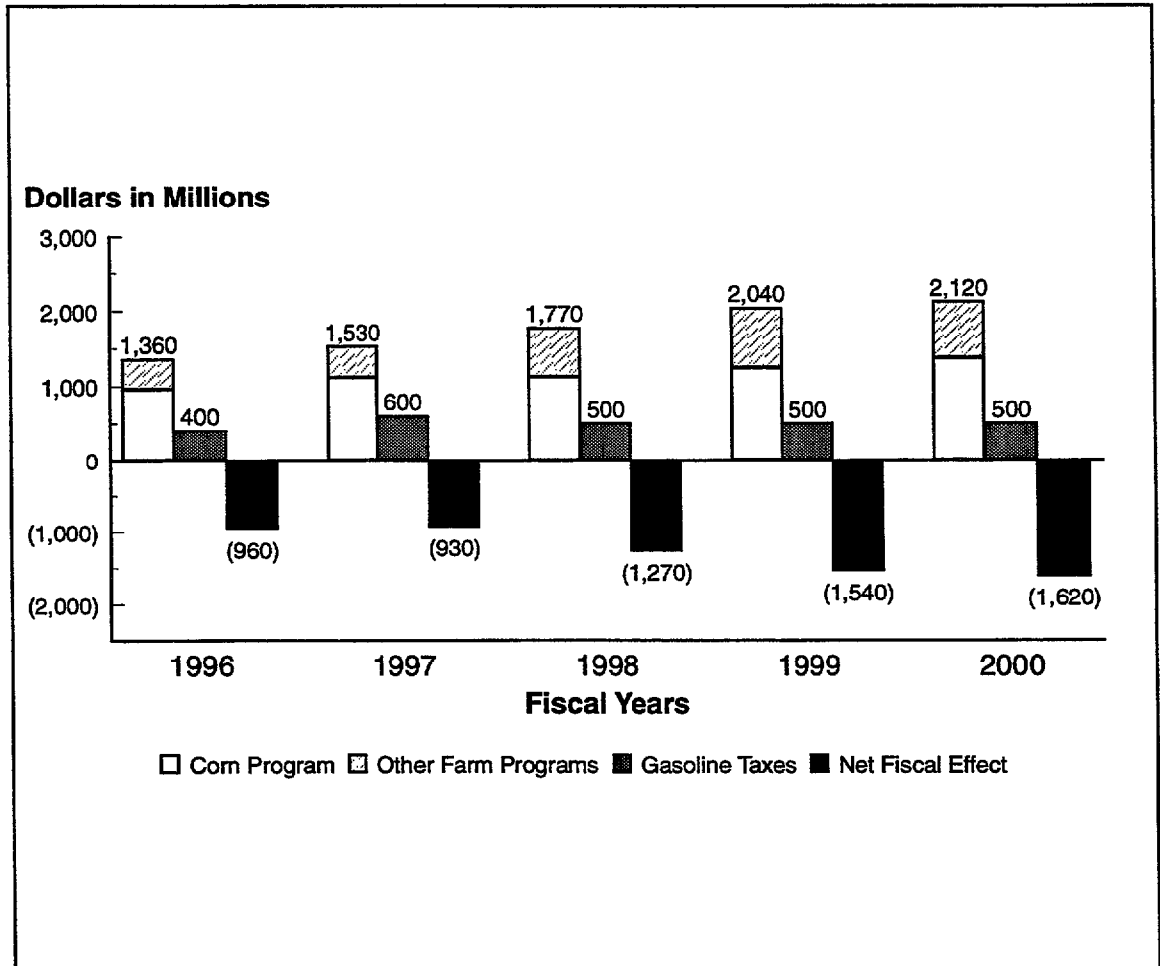
¹¹Changing federal farm program policy so that the Secretary of Agriculture could no longer change ARP levels to restrict corn supply represents a major shift in agricultural policy. Making such a change required FAPRI to construct a new baseline without an ARP for corn. The model shows that eliminating the ARP for corn would increase farm program payments by \$4.2 billion from 1996 through 2000. The effects of eliminating the ethanol tax exemption would be in addition to this increase.

Figure 3: Changes in Program Payments, Tax Revenues, and Net Fiscal Effects With No Acreage Reduction Program for Corn and a 50-Percent Decline in Ethanol Use



Source: GAO's analysis of data provided by the Joint Committee on Taxation for gasoline tax revenues and the FAPRI model's estimates for corn and other farm program payments.

Figure 4: Changes in Program Payments, Tax Revenues, and Net Fiscal Effects With No Acreage Reduction Program for Corn and a 90-Percent Decline in Ethanol Use



Source: GAO's analysis of data provided by the Joint Committee on Taxation for gasoline tax revenues and the FAPRI model's estimates for corn and other farm program payments.

As with the FAPRI baseline's ARP scenario, eliminating the ethanol tax exemption would decrease farmers' net return from corn production between 1996 and 2000. With a 50-percent drop in ethanol use, farmers' net return from corn would decline by \$722 million, on average, each year. With a 90-percent decrease in use, the drop in net return from corn would be \$1.1 billion, on average, each year. In these cases, declines occur because corn prices and corn production fall while production costs per acre are assumed to remain constant. As discussed earlier, the federal corn program does not fully protect farm income from price declines. Enclosure II contains more information on the other effects of eliminating the ethanol tax exemption.

SCOPE AND METHODOLOGY

To obtain information on the ethanol industry and possible changes in ethanol use if the ethanol tax exemption was eliminated, we interviewed officials in USDA's Office of Energy and New Uses and the Department of Energy's Energy Information Administration; representatives of the ethanol and motor fuels industries, including the Renewable Fuels Association, the American Petroleum Institute, the American Methanol Institute, the National Corn Growers Association, and Information Resources, Inc.; industry analysts at several investment brokerage firms; and officials with several ethanol production companies.

After deciding to analyze the effects of 50- and 90-percent declines in ethanol use, we used a FAPRI econometric model to estimate the effects of these declines on the agriculture sector and federal farm program payments. We reviewed the documentation for the model, but we did not independently verify the model. We conducted our review from May through September 1995 in accordance with generally accepted government auditing standards.

AGENCY COMMENTS

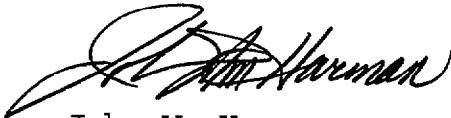
We provided copies of a draft of this report to USDA's Office of Energy and New Uses and Commercial Agriculture Division, in the Economic Research Service; Office of the Chief Economist; and Consolidated Farm Services Agency for review and comment. We met with the Director of the Office of Energy and New Uses, senior analysts from the Commercial Agriculture Division, and a senior economist from the Office of the Chief Economist, who generally agreed with the report's findings. These officials also made suggestions for technical revisions that we incorporated as appropriate.

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We are sending copies of this report to appropriate congressional committees; interested Members of Congress; the Secretary of Agriculture; and other interested parties. We will also make copies available to others upon request.

Please call me at (202) 512-5138 if you or your staff have any questions.

Sincerely yours,



John W. Harman
Director, Food and
Agriculture Issues

Enclosures - 2

DESCRIPTION OF FAPRI'S MODELING SYSTEM AND BASELINES

This enclosure describes the modeling system we used to estimate the effects of eliminating the partial motor fuel excise tax exemption for ethanol and the baselines to which the effects were compared. Given the uncertainty associated with forecasting from modeling systems, the results reflect the direction and a rough estimate of the magnitude of change in selected variables.

Description of Modeling System Used

We used an econometric modeling system developed and maintained by the Food and Agricultural Policy Research Institute (FAPRI). FAPRI has developed and integrated a set of models used to provide quantitative evaluations of national and international policies and other exogenous factors that affect U.S. and world agriculture. The objective of the modeling system is to determine the consequences of policy and program proposals for agricultural commodity markets and the U.S. agricultural sector. The FAPRI modeling system has five components:

- Domestic crop models that estimate U.S. supply, demand, and prices for corn, wheat, soybeans, soybean meal, soybean oil, sorghum, barley, oats, cotton, and rice.
- Livestock models that generate estimates of U.S. supply, demand, and prices for beef, pork, broilers, turkeys, and dairy products.
- World trade models for feed grains, wheat, and soybeans (including soybean meal and oil) that estimate supply, demand, prices, and trade for major trading countries and regions.
- A U.S. government cost model that estimates fiscal year costs of domestic agricultural programs.
- A net farm income model that estimates cash receipts, production costs, and net farm income for U.S. agriculture.

Descriptions of Baselines Used

A baseline provides a set of reference outcomes under specific assumptions against which changes are measured. For our analysis, we used two baselines: the FAPRI baseline as described in FAPRI

1995 U.S. Agricultural Outlook¹ and a modified version of the FAPRI 1995 baseline, which eliminates the Acreage Reduction Program (ARP) for corn. Our estimate of the effects of eliminating the partial excise tax exemption for ethanol reflects differences from these baselines.

The FAPRI baseline reflects a composite of model results and analysts' judgments. These judgments relate to various economic and policy indicators of the domestic and international agriculture markets. Assumptions about the general economy are based on forecasts prepared by the WEFA Group and Project LINK of the United Nations. For domestic policies, the baseline incorporates provisions of the 1990 Food, Agriculture, Conservation, and Trade Act and the Omnibus Budget Reconciliation Acts of 1990 and 1993. Provisions of these acts are assumed to be extended throughout the projection period. This baseline also assumes that random events such as droughts and floods do not occur and that historical rates of technological change prevail.

The modified FAPRI baseline is identical to the FAPRI baseline, except for the absence of the acreage reduction program for corn. Specifically, in the modified FAPRI baseline the ARP levels for corn are changed to zero percent beginning in crop year 1996-97.

¹FAPRI 1995 U.S. Agricultural Outlook, Staff Report #1-95, Food and Agricultural Policy Research Institute, Iowa State University, University of Missouri-Columbia (June 1995).

EFFECTS OF ELIMINATING THE ETHANOL TAX EXEMPTION ON THE
AGRICULTURAL SECTOR

In addition to yielding a negative net fiscal effect for the U.S. Treasury, eliminating the tax exemption has a negative effect on farmers--particularly corn and soybean farmers. Tables II.1 through II.10 provide annual data comparing the expected results if the (1) ethanol tax exemption is maintained (baseline), (2) exemption is eliminated and a 50-percent drop in ethanol use occurs, and (3) exemption is eliminated and a 90-percent drop in ethanol use occurs. The first scenario assumes that the Secretary of Agriculture reduces corn acreage through the ARP by 7.5 percent in crop year 1995-96 and by 5 percent in crop years 1996-97 through 1999-2000. The second scenario assumes that the Secretary of Agriculture reduces corn acreage through the ARP by 7.5 percent in 1995-96 and discontinues the ARP for corn thereafter.

Table II.1: Changes in Corn Prices Under the FAPRI Baseline's Acreage Reduction Program Levels for Corn, by Crop Year

Dollars per bushel

	Changes in corn prices compared with baseline level, by crop year					
Ethanol use level	1995-96	1996-97	1997-98	1998-99	1999-2000	Average
Baseline	\$2.31	\$2.24	\$2.11	\$2.21	\$2.22	\$2.22
50% drop	-0.16	-0.08	-0.12	- 0.14	-0.16	-0.13
90% drop	-0.31	-0.13	-0.18	-0.19	-0.21	-0.20

Table II.2: Changes in Corn Prices Under No Acreage Reduction Program for Corn, by Crop Year

Dollars per bushel

	Changes in corn prices compared with baseline level, by crop year					
Ethanol use level	1995-96	1996-97	1997-98	1998-99	1999-2000	Average
Baseline	\$2.30	\$2.16	\$2.02	\$2.11	\$2.12	\$2.14
50% drop	-0.16	-0.08	-0.12	- 0.14	-0.16	-0.13
90% drop	-0.31	-0.12	-0.17	-0.19	-0.21	-0.20

Under these scenarios, corn prices drop significantly the first year because the elimination of the excise tax exemption would be announced after the 1995-96 corn crop was planted. As a result, corn production would be larger than it would be if the expected decline in corn demand had been incorporated into production plans. In subsequent years, corn farmers can anticipate a continued decline in demand for corn for ethanol use and lower corn prices; these factors will lead to reduced corn production. Corn prices continue to be lower than the baseline level, however, because the drop in corn used for ethanol exceeds the drop in corn production.

Table II.3: Changes in Farmers' Net Returns From Corn Sales Under the FAPRI Baseline's Acreage Reduction Program Levels for Corn, by Crop Year

Dollars in millions

Changes in farmers' net returns from corn sales compared with baseline level, by crop year						
Ethanol use level	1995-96	1996-97	1997-98	1998-99	1999-2000	Average
Baseline	\$12,360	\$12,480	\$12,030	\$12,570	\$12,590	\$12,406
50% drop	-810	-570	-700	-810	-960	-770
90% drop	-1,560	-930	-1,030	-1,160	-1,300	-1,196

Table II.4: Changes in Farmers' Net Returns From Corn Sales Under No Acreage Reduction Program for Corn, by Crop Year

Dollars in millions

Changes in farmers' net returns from corn sales compared with baseline levels, by crop year						
Ethanol use level	1995-96	1996-97	1997-98	1998-99	1999-2000	Average
Baseline	\$12,320	\$12,250	\$11,780	\$12,260	\$12,250	\$12,172
50% drop	-820	-530	-640	-740	-880	-722
90% drop	-1,560	-840	-950	-1,060	-1,200	-1,122

In both scenarios, farmers' net returns from corn sales are reduced in each year, particularly in the first year. Returns drop in the first year because of severe price declines. These declines occur because of excess corn supplies resulting from the unanticipated drop in demand for corn to produce ethanol. In later years, lower prices, lower production, and constant per-acre production costs (e.g., fuel, fertilizer, and labor) contribute to lower returns for corn farmers.

Table II.5: Changes in Soybean Prices Under the FAPRI Baseline's Acreage Reduction Program Levels for Corn, by Crop Year

Dollars per bushel

Changes in soybean prices compared with baseline level, by crop year						
Ethanol use level	1995-96	1996-97	1997-98	1998-99	1999-2000	Average
Baseline	\$5.48	\$5.67	\$5.63	\$5.59	\$5.67	\$5.61
50% drop	0.04	-0.21	-0.22	-0.22	-0.22	-0.17
90% drop	0.07	-0.35	-0.36	-0.35	-0.34	-0.27

Table II.6: Changes in Soybean Prices Under No Acreage Reduction Program for Corn, by Crop Year

Dollars per bushel

Changes in soybean prices compared with baseline level, by crop year						
Ethanol use level	1995-96	1996-97	1997-98	1998-99	1999-2000	Average
Baseline	\$5.48	\$5.65	\$5.52	\$5.44	\$5.49	\$5.52
50% drop	0.04	-0.21	-.20	-0.20	-0.20	-0.15
90% drop	0.07	-0.35	-0.33	-0.32	-0.31	-0.25

Soybean prices increase in the first year under both scenarios and under both ethanol-use levels because with less ethanol production there would be less production of corn gluten feed (corn gluten feed is a by-product of some ethanol production processes). With less corn gluten feed available for export to the European Union, soybean meal for feed would fill in the gap at higher prices. However, in later years, soybean prices decline because the continued lower prices for corn shift some corn acreage into soybean production, increasing soybean supply. Adding further to the decline in soybean prices are the generally lower prices for other animal feeds, including corn, sorghum, and barley.

Table II.7: Changes in Farmers' Net Returns From Soybean Sales Under the FAPRI Baseline's Acreage Reduction Program Levels for Corn, by Crop Year

Dollars in millions

	Changes in net returns from soybeans compared with baseline level, by crop year					
Ethanol use level	1995-96	1996-97	1997-98	1998-99	1999-2000	Average
Baseline	\$6,770	\$7,280	\$7,400	\$7,490	\$7,760	\$7,340
50% drop	80	-320	-400	-430	-430	-300
90% drop	160	-540	-680	-690	-660	-482

Table II.8: Changes in Farmers' Net Returns From Soybean Sales Under No Acreage Reduction Program for Corn, by Crop Year

Dollars in millions

	Changes in net returns from soybeans compared with baseline level, by crop year					
Ethanol use level	1995-96	1996-97	1997-98	1998-99	1999-2000	Average
Baseline	\$6,770	\$7,240	\$7,200	\$7,180	\$7,400	\$7,158
50% drop	80	-320	-380	-390	-400	-282
90% drop	150	-540	-630	-630	-620	-454

In both scenarios, net returns from soybeans are slightly higher in the first year because of (1) higher prices for soybeans in the export market as a result of the reduction in the amount of U.S. corn gluten feed available for export and (2) constant per-acre production costs assumed in the FAPRI estimate. Lower net returns for soybeans in subsequent years reflect prices that fall at a higher rate than soybean production increases.

Table II.9: Changes in Net Farm Income Under the FAPRI Baseline's Acreage Reduction Program Levels for Corn, by Crop Year

Dollars in millions

	Changes in net farm income compared with baseline level, by crop year					
Ethanol use level	1995-96	1996-97	1997-98	1998-99	1999-2000	Average
Baseline	\$40,780	\$41,540	\$42,120	\$44,400	\$48,580	\$43,484
50% drop	-90	-680	-820	-840	-890	-664
90% drop	-180	-1,220	-1,360	-1,250	-1,210	-1,044

Table II.10: Changes in Net Farm Income Under No Acreage Reduction Program for Corn, by Crop Year

Dollars in millions

	Changes in net farm income compared with baseline level, by crop year					
Ethanol use level	1995-96	1996-97	1997-98	1998-99	1999-2000	Average
Baseline	\$40,800	\$41,470	\$41,650	\$43,620	\$47,660	\$43,040
50% drop	-60	-640	-740	-750	-780	-594
90% drop	-120	-1,130	-1,200	-1,050	-1,040	-908

Net farm income decreases over the 5-year period. This decline is due to reductions in receipts from crops and livestock and per-acre production costs (such as fuel, fertilizer, and labor) that do not vary as output changes. Lower receipts reflect lower prices for major commodities such as corn, soybeans, barley, sorghum, and wheat. Federal programs do not fully protect farmers' income against price drops because (1) not all acreage is enrolled in the programs and (2) even for the acreage that is enrolled, government payments are made only on a portion of production.

(150831)

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