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Potential Impacts of E15 Expansion on Fuel and Agricultural Commodity Markets

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Allowing greater use of E15, such as through legislative action to allow for year-round blending of up to 15% blends, would allow for additional flexibility in meeting blending requirements by creating the opportunity of firms and people to choose to use more ethanol. Current use in mid-blend fuels beyond E10 is currently subject to seasonal and locational limits. If E15 were allowed at more times and more locations, then ethanol use might expand. Importantly, in the presence of the Renewable Fuel Standard (RFS) that mandates biofuel use, the expansion of E15 could cause interactions that might not be expected, as we discuss below.

The following results are based on analysis using the FAPRI-MU stochastic model. This is a partial equilibrium model focusing on the markets of US agricultural commodities and their products, including renewable fuels for the analysis of agricultural and biofuel policy. The model is used for a baseline-and-scenario comparison: a baseline path is generated that assumes current conditions and the scenario generates results if we assume a certain change in those conditions. Here, the difficulty of expanding ethanol use beyond E10 is replaced with growing adoption of E15 that causes the inclusion rate of ethanol into gasoline to rise by a quarter of a percent (0.25%) per year.

Key results of E15 expansion without any other policy changes are as follows:

- Greater willingness to use ethanol makes it easier to meet given RFS targets. The biofuel use mandate is easier to meet and the associated compliance costs fall.

- More ethanol use causes less need for biomass-based diesel to meet the mandate.

- Some part of the reduced mandate compliance costs are passed through to consumers, causing a small reduction in overall fuel costs while also increasing the cost of ethanol to buyers.

- Corn price rises as more corn is used to make more ethanol whereas soybean oil and, to a lesser extent, soybean prices are lowered as biomass-based diesel production falls.

- Government farm support expenditures, provided through farm bill provisions, fall modestly as declines in corn support more than offset increases in soybean support.

This work has limitations. We list several key concerns here. Voluntary E15 expansion once permitted is assumed, not explained. We do not associate any new support, requirement, or fuel delivery infrastructure change with this expansion. Choosing a specific reason for the E15 expansion could change many or most of our results. For example, if the RFS requirements are also assumed to rise with E15 use, then the mandates would not be easier to meet. A different pace of E15 expansion could affect results, particularly if the assumed path causes use to exceed the minimum use mandated. We do not model all the details of imported biofuel feedstocks or how they can be treated by different policies, such as tax credits.

Fuel volumes and RFS compliance costs

The ethanol expansion assumed here causes use to rise in each year. Assuming a quarter percent (0.25%) increase in the average ethanol inclusion rate each year causes +264 million gallons in 2026 and +1.368 billion gallons in 2030 relative to the baseline path. These and all other numbers presented here are averages of many model simulations to cover a variety of market conditions, such as with different crop yields and petroleum prices.

The RFS requirements are not assumed to change, so the additional ethanol demand makes it easier to meet the overall mandate and indirectly helps to meet other mandate components, such as for biomass-based diesel. The price of Renewable Identification Numbers (RINs), or RFS compliance certificates, is consequently lower. The price of conventional RINs associated with corn ethanol fall. Moreover, because biomass-based diesel can compete with ethanol to meet the overall mandate under certain conditions, the biomass-based diesel RIN price also falls. The falling use of biomass-based diesel is a result of this competition: more ethanol demand pushes out some biomass-based diesel for meeting the set RFS requirements.

Table 1. Changes in fuel volumes and RIN prices

	2026	2027	2028	2029	2030
Fuel use, million gallons					
Ethanol	264	591	883	1163	1368
Biomass-based diesel	-116	-271	-310	-273	-285
RIN prices, dollars per RIN-gallon					
Conventional	-0.10	-0.23	-0.32	-0.34	-0.40
Biomass-based diesel	-0.10	-0.23	-0.26	-0.22	-0.22

Source: averages of stochastic simulations of FAPRI-MU model.

Fuel prices and costs

The price to ethanol buyers rise in this scenario while biodiesel buyer prices fall. The greater demand for ethanol starts to bid up the price of the fuels among buyers. While final consumers do generally see the price of blended fuels, the value of their components (such as ethanol and gasoline) can be considered separately – and, indeed, fuel blenders who buy input fuels to make the blended fuels for retailing observe these prices directly. Our assumption of rising ethanol demand without considering possible causes for this growth causes rising ethanol fuel price.

We assume that lower RFS compliance costs are passed on to fuel consumers over time. We represent this effect as a cost of being in the business of blending fuels. Consequently, the shift out in ethanol demand that lowers blenders compliance costs can lower average fuel expenditures. This result, like others, might depend on the cause of the E15 expansion. While we do not explore possible reasons for the E15 expansion, any proposed factor might have implications for fuel costs. For example, assuming an accompanying RFS expansion would maintain mandate compliance costs and reduce, eliminate, or reverse the fuel cost impacts estimated here.

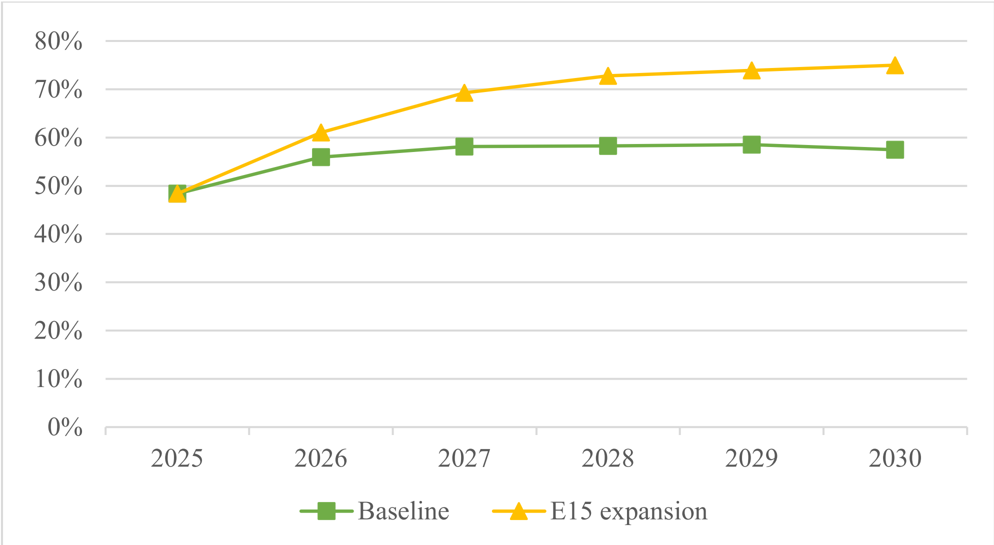
Table 2. Changes in fuel prices and costs

	2026	2027	2028	2029	2030
Implied fuel component prices to buyers, dollars per gallon					
Gasoline-only, retail value	-0.01	-0.02	-0.03	-0.03	-0.04
Ethanol only, retail value	0.16	0.34	0.46	0.51	0.59
Implied fuel expenditure, average, billion dollars	-0.5	-1.6	-1.9	-1.6	-1.7

Source: averages of stochastic simulations of FAPRI-MU model.

These results suggest a potentially important change in the relative costs for buyers who consider purchasing ethanol or gasoline to blend into retail fuels. The ethanol fuel price to buyers rises by $0.16/gallon in the first year and $0.59/gallon in the fifth year. This increase suggests that future buying decisions in this scenario might not take place at prices comparable to what we see in markets today. Whereas ethanol typically sells at a discount relative to gasoline now, encouraging blending, the ratio of the ethanol buyer price to the gasoline buyer price would rise by 5 percentage points in the first year and 18 percentage points in the last year. The ratio of ethanol-to-gasoline buyer prices in the last year rises from under 60% to 75%, on average. This change would reduce the incentive to blend ethanol. This result stresses the importance of considering why E15 expansion takes place.

Figure 1. Ratio of ethanol-to-gasoline buyer prices



The falling RIN price is tied to changes in fuel prices that producers get and buyers pay. As the RIN price falls in this scenario, renewable fuel prices to producers tend to fall. These prices include two components: the fuel value and the value of each gallon towards helping to meet the mandate. The lower RIN price means that these fuels have less value under the mandates. For ethanol, the rising demand for fuel use more than offsets the lower RIN price, but biomass-based diesel producer prices fall with lower RIN prices.

Agricultural sector impacts

Rising ethanol demand leads to more production. The use of corn for ethanol and coproducts rises This link is softened by ethanol exports, which fall as domestic price rises.. Similarly, the reduction in biomass-based diesel use leads to less demand for soybean oil and other feedstocks. Consequently, the price effects are opposite, with corn price rising and soybean oil price falling.

These initial effects on prices cause responses throughout the sector, some immediate and others with some delay. Lower soybean oil price reduces crush margins and pulls down crush use, leading to lower soybean price and higher soybean meal price. Greater corn for ethanol causes more production of its coproducts, dried distillers grain (DDG) and corn oil. Corn, DDG, and soybean meal interact in animal feed markets, with potentially important differences between immediate impacts given animal inventories and after a few years when producers can adjust inventories in response – and some of these price effects are passed on to final consumers.

Government costs associated with agricultural commodity programs fall in these estimates. The effect on corn price per bushel is smaller than the effect on the soybean price per bushel, but the tie to payments also depends on the bushels of production and where prices are relative to policy triggers. In this case, given the baseline, government outlays are more sensitive to corn price than soybean price. A different starting point, such as with lower soybean price or higher corn price, could reverse the taxpayer effects.

Table 3. Changes in agricultural prices, farm income, and program costs

	2026/27	2027/28	2028/29	2029/30	2030/31
Feedstock prices, marketing year					
Corn, dollars/bushel	0.02	0.04	0.04	0.05	0.07
Soybean, dollars/bushel	-0.09	-0.20	-0.22	-0.16	-0.15
Soybean oil, cents/lbs.	-1.66	-4.18	-4.98	-4.33	-4.27
DDG, dollars per ton	1.19	1.10	0.86	0.99	1.24
Soybean meal, dollars per ton	6.21	8.39	8.34	8.52	9.95
Government outlays by	2027	2028	2029	2030	2031
fiscal year, million dollars	-13	-36	-49	-47	-75

Source: averages of stochastic simulations of FAPRI-MU model.