Diesel and the Grocery Bill

A Dollar More for Diesel Means About a Penny More for Bread Under Full Cost Pass-Through

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Higher diesel prices raise the cost of producing and delivering food. But a 60% increase in diesel does not mean a 60% increase in the grocery bill. Fuel is only one part of the cost of getting food from the farm to the consumer, and its importance varies considerably across foods.

Diesel averaged $6.13 a gallon in the week of November 9, 2026, compared with $3.84 a year earlier. That $2.29 increase raises a practical question: how much additional food cost can reasonably be attributed to fuel?

My estimates suggest that every $1 increase in the price of a gallon of diesel would add about **1.1 cents to a pound of white bread, 4.3 cents to a gallon of whole milk, 7.9 cents to a pound of ground beef and 3.2 cents to a Big Mac**, if the modeled fuel costs rose with diesel and were passed fully to consumers. Ground beef uses Kansas farm records for the farm portion of the estimate; the other items use national input-output accounts.

Applied to the past year's $2.29 increase, those estimates imply about 2.4 cents for bread, 9.7 cents for milk, 18 cents for ground beef and 7.3 cents for a Big Mac. These amounts equal roughly 1.3%, 2.4%, 2.7% and 1.2% of their respective retail prices. The comparison uses October prices of $1.86 per pound of bread, $4.10 per gallon of milk and $6.76 per pound of ground beef, and a July Big Mac price of $6.22.

These are estimates of fuel-cost pressure, not measurements of how much diesel has already raised shelf prices. They also cover more than diesel alone. The underlying accounts include other petroleum products, so the calculations are best read as an indication of scale under stated assumptions.

1 Where the numbers come from

The Bureau of Economic Analysis publishes input-output tables that trace consumer spending through the industries supplying a product. This analysis uses the detailed 2017 benchmark tables to account for petroleum purchased by farms, carriers, processors, warehouses, stores and their suppliers.

In those accounts, each dollar spent on bread included 1.29 cents of refinery products across the supply chain. The corresponding amounts were 2.13 cents for fluid milk, 1.75 cents for meat and 1.16 cents for fast-food restaurants. These are purchases of refinery products, not shares of the retail price paid specifically for diesel.

Bread illustrates the calculation. A pound of white bread cost $1.33 in 2017, implying about 1.7 cents of refinery products per pound. Dividing that amount by the year's average Gulf Coast wholesale diesel price of $1.62 a gallon gives about one-hundredth of a gallon in diesel-equivalent terms. A $1 increase applied to that quantity produces the estimated 1.1-cent increase per pound.

This conversion expresses petroleum spending in a common unit; it does not establish how many gallons of diesel were physically used. The calculation holds fuel use per unit of food fixed and assumes the relevant fuel price rises dollar for dollar with the observed diesel price. It also assumes the entire additional cost reaches consumers. Changes in wholesale prices, distribution margins and taxes can make an actual retail diesel increase differ from the increase paid by individual businesses.

The retail prices come from Bureau of Labor Statistics U.S. city averages, except for the Big Mac, which uses The Economist's July 2026 price. For ground beef, Kansas Farm Management Association records replace the farm portion of the national estimate. The remaining supply-chain costs still come from the BEA tables.

2 Milk, bread and the Big Mac

Milk has a relatively direct connection to the farm. USDA estimates that the farm value represented 49.5% of the retail price of whole milk in 2024. In the 2017 accounts, dairy production and its suppliers used 4.8 cents of refinery products per dollar of dairy-farm sales. Fluid milk plants and their suppliers used 2.89 cents per dollar of plant sales.

Those figures describe successive stages and should not be added together: the milk plant's total already includes its farm suppliers. After wholesale and retail activities are included, refinery products account for 2.13 cents of each consumer dollar spent on fluid milk. Applying that share to the 2017 gallon price of $3.23 gives the estimated 4.3-cent response to a $1 increase in diesel.

Bread tells a different story. Grain farms and their suppliers used 6.4 cents of refinery products per dollar of sales, more than dairy farms. Yet wheat represented only 3.6% of the retail price of white bread in 2024. A large fuel expense relative to grain revenue therefore translates into a much smaller expense relative to the price of bread.

In the 2017 accounts, the bakery received about 56 cents of each bread dollar, while the grocery retail margin was about 30 cents. That margin pays the store's operating costs as well as profit; it is not a measure of profit alone. The bakery and its suppliers accounted for 0.85 cents of the total 1.29 cents of refinery products in a bread dollar.

For a Big Mac, much of the consumer's payment supports work done inside the restaurant. USDA's 2024 Food Dollar accounts attribute 62.5 cents of each fast-food dollar to value added by food service, supporting labor, property income and other components. The 2017 BEA estimate puts refinery products at 1.16 cents per restaurant dollar, the lowest share among these four items. The Big Mac calculation represents the broader fast-food industry rather than a recipe-specific estimate for that sandwich.

3 Ground beef and the cattle farm

Ground beef is the most uncertain estimate, and the choice of farm data makes a substantial difference. Using the BEA tables throughout gives about 3.9 cents per pound for every $1 increase in diesel. Replacing the farm component with the Kansas estimate raises the total to 7.9 cents. The farm component alone rises from about 1.4 cents to 5.4 cents.

One reason to examine the Kansas records is that BEA's red meat category combines cattle with hogs and other livestock. The Kansas records provide a closer look at cattle operations, although they do not constitute a nationally representative sample of beef production.

The analysis uses KFMA member records from 2015 through 2025. Fuel spending is divided by an estimated farm diesel price to obtain diesel-equivalent gallons. Estimated fuel for grain

and oilseed acres is then subtracted using crop-specific rates from grain farms in the same region. Fuel associated with hay, silage and pasture remains with the cattle enterprise.

For 331 cow-calf farms, the remaining fuel averaged 3.9 diesel-equivalent gallons per hundred pounds of net cattle production. For 34 finishing farms, it averaged 0.6 gallons. The calculation combines these rates with a backgrounding estimate from 79 farms, assuming a calf weaned at 550 pounds, backgrounded to 800 pounds and finished at 1,400 pounds.

Using about 2.4 pounds of live cattle per retail pound of beef, and adding an allowance for fuel used to grow feed grain elsewhere, gives the 5.4-cent farm component. The cow-calf stage accounts for nearly three-quarters of the modeled on-farm fuel before that additional feed-grain allowance.

There is considerable uncertainty. Repeatedly drawing samples from the cow-calf farms gives a 95% bootstrap interval of about 2.6 to 11.3 diesel-equivalent gallons per hundred pounds. Substituting those endpoints while holding the other assumptions fixed gives total ground beef estimates of **6.6 to 14.8 cents per pound** for every $1 increase in diesel. This is a sensitivity range for the cow-calf component, not a confidence interval covering every source of uncertainty in the final estimate.

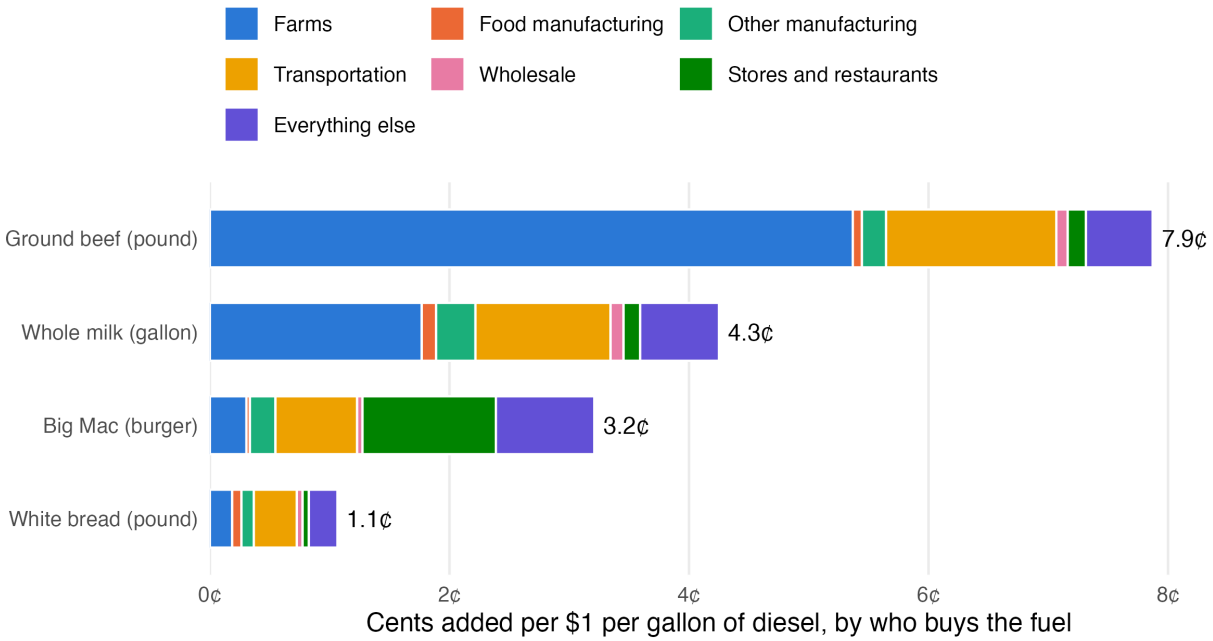
The backgrounding estimate is especially imprecise: its interval extends below zero to 11.7 gallons. A negative estimate does not mean cattle production creates fuel; it reflects the uncertainty of assigning whole-farm fuel expenses between crops and livestock. Setting backgrounding fuel to zero gives a total of 7.1 cents per retail pound. Using the cow-calf rate for backgrounding gives 8.7 cents.

4 Who buys the fuel

Figure 1. Farms and carriers account for most modeled fuel costs in milk and ground beef

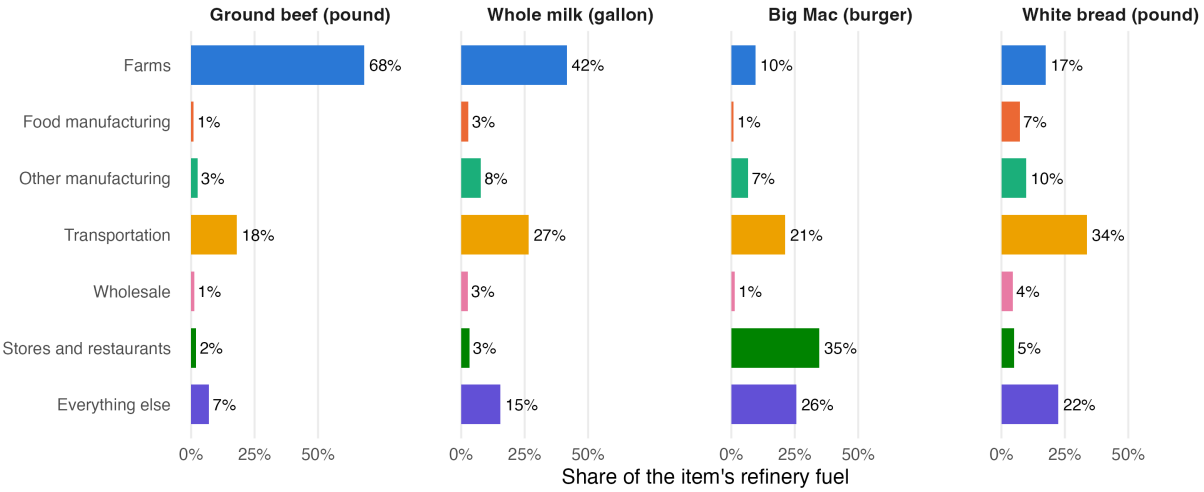
Figure 2. Restaurants account for about a third of the Big Mac's modeled refinery-product use

Figure 1 divides the estimated cost response among the industries buying the fuel. Figure 2 presents the same allocation as percentages. The ground beef farm component includes the Kansas adjustment. These shares describe modeled fuel exposure, not shares of the total food price.



Source: BEA 2017 benchmark input-output tables (total requirements and margins), BLS, FRED, The Economist.
Ground beef farm fuel from Kansas Farm Management Association records, 2015-2025.

Figure 1: Cents added per dollar of diesel by the stage that buys the fuel



Source: BEA 2017 benchmark input-output tables (total requirements and margins), BLS, FRED, The Economist.
Ground beef farm fuel from Kansas Farm Management Association records, 2015-2025.

Figure 2: Share of each item's refinery fuel by stage

For milk, farms account for about 1.8 of the 4.3 cents, or 42%. Carriers account for another 27%, with trucking representing about half of that transportation component. Milk plants, wholesalers and grocery stores each account for about 3%.

For ground beef, cattle operations and feed production account for 5.4 of the 7.9 cents, or 68%. Carriers contribute another 1.4 cents, or 18%. The packing-plant component is about 1%.

Transportation accounts for the largest share of bread's modeled fuel use, at 34%, while all farms account for 17% and food manufacturing for 7%. The separately recorded transportation margin on finished bread is less than 1% of the bread dollar. That small margin should not be confused with all transportation throughout the supply chain, which also includes moving inputs used by farms, mills and bakeries.

For the Big Mac, restaurants account for 35% of modeled refinery-product use, or about 1.1 of the 3.2 cents. Farms account for 10% and carriers for 21%. The accounts do not identify how much of the restaurant component is diesel, gasoline, propane or another refinery product.

The category labeled "Everything else" accounts for 7% to 26% of modeled fuel use. It includes supporting industries such as electric utilities, real estate, building maintenance and refineries. These industries help supply the food system even though they are not usually considered food businesses.

5 Two other measures

Figure 3. The three methods differ by less than a cent for bread and milk

Two additional calculations provide perspective on the main estimates. They measure different things, so agreement is useful context rather than proof that any one estimate is correct. The connecting lines in Figure 3 show the spread across methods, not statistical confidence intervals. The open square identifies the ground beef estimate using Kansas farm fuel.

The first comparison uses USDA's Food Dollar energy-industry shares for 2024: 3.0 cents per bakery-product dollar, 4.4 cents for fresh milk, 2.8 cents for beef and 3.9 cents for fast-food restaurants. Treating those shares as energy exposure and assuming energy prices move proportionately with diesel gives estimated responses of 1.6 cents for bread, 4.7 cents for milk, 4.0 cents for ground beef and 5.9 cents for a Big Mac.

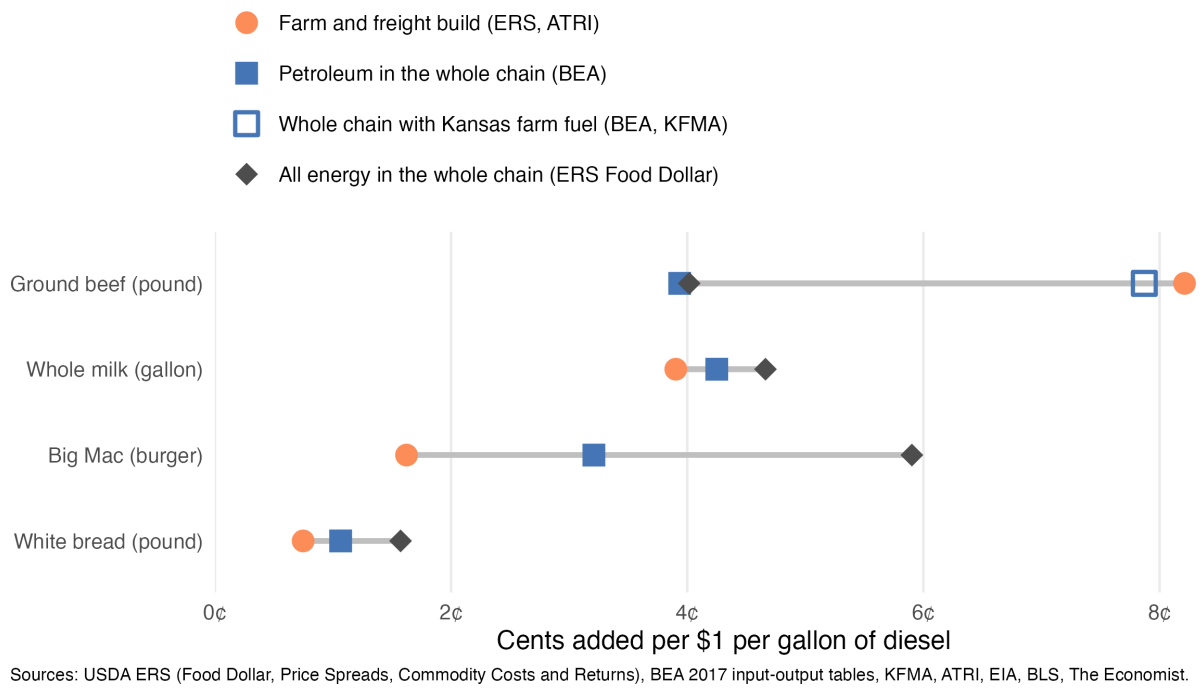


Figure 3: Cents added per dollar of diesel by method

This is a broad energy comparison. It includes electricity and natural gas, whose prices need not move with diesel. Moreover, the industry-group accounts measure contributions to food costs rather than the full purchaser-price energy bill. These figures are neither diesel-only estimates nor reliable upper bounds.

The second comparison adds farm and trucking fuel costs directly from budgets. It gives 0.7 cents for bread, 3.9 cents for milk, 8.2 cents for ground beef and 1.6 cents for a Big Mac. The farm calculations use USDA production-cost data, including the category "Fuel, lube, and electricity." Trucking uses the American Transportation Research Institute's 2024 fuel cost of 48.1 cents within a total operating cost of about $2.26 per mile.

This approach also requires approximations. The Big Mac farm component uses a simple average of wheat, milk and beef fuel rates rather than ingredient weights. The beef calculation applies a cow-calf fuel rate to the full value of finished cattle, including feedlot production. It also uses the $4.13 farm value of a retail pound of Choice beef, about 77% of the 2024 ground beef price. Ground beef can come from lower-valued trimmings and cull cows, so that allocation may overstate its farm component. The budget estimate's proximity to the Kansas estimate should therefore be interpreted cautiously.

6 Limits

The estimates describe a cost scenario with fixed production practices and full cost pass-through. They do not identify diesel's causal contribution to observed food inflation. Businesses may absorb costs temporarily, change sourcing or production practices, or adjust prices on different schedules.

The petroleum accounts include products other than diesel. Treating all of them as diesel exposure can overstate the effect of a diesel-only price change. At the same time, omitted costs and differences in production systems mean the estimates should not be treated as strict upper bounds.

The national tables describe 2017 production relationships and broad industries rather than individual products. Bakery products stand in for white bread, red meat packing for ground beef and fast-food restaurants for the Big Mac. A project comparison using USDA farm-business data suggests that price-adjusted farm fuel use per unit of output was about 11% lower in 2024 than in 2017. That comparison suggests some upward bias in the older farm components, but it does not provide a product-specific correction.

The Kansas beef calculation combines 2015-2025 farm records with 2017 national estimates for the rest of the chain. Its fuel bills include gasoline and propane as well as diesel. Commercial feedyards are absent from the farm sample, and only 34 finishing farms are represented. Purchased feed grain is included through an assumed allowance, while fuel used to produce purchased hay and fuel bought by hired machine operators are omitted. The assumed cattle weights and retail-yield conversion also affect the result. Kansas winter feeding practices may differ from those in regions with longer grazing seasons.

For consumers, the useful finding is the scale: under these assumptions, even a large diesel increase contributes only a few percent of the price of these foods. For farmers and carriers, the same increase can put substantial pressure on costs and margins. A relatively small effect at the checkout does not imply a small effect on the businesses producing and delivering the food.

7 Sources

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- Bureau of Economic Analysis, input-output accounts, 2017 benchmark, commodity-by-commodity total requirements and margins tables, detail level.
- Federal Reserve Bank of St. Louis (FRED), U.S. Gulf Coast ultra-low-sulfur No. 2 diesel spot price, series DDFUELUSGULF.
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- Kansas Farm Management Association, member farm records, 2015 to 2025, summarized by farm type.
- American Transportation Research Institute, An Analysis of the Operational Costs of Trucking.
- The Economist, Big Mac Index data.

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8 Contact

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