

# Bottlenecks and Oil Price Spikes: Impact on U.S. Ethanol and Agriculture

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October 5, 2007

# Outline

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- Based on an update of our earlier study “Emerging Biofuels: Outlook of Effects on U.S. Grain, Oilseed, and Livestock Markets”

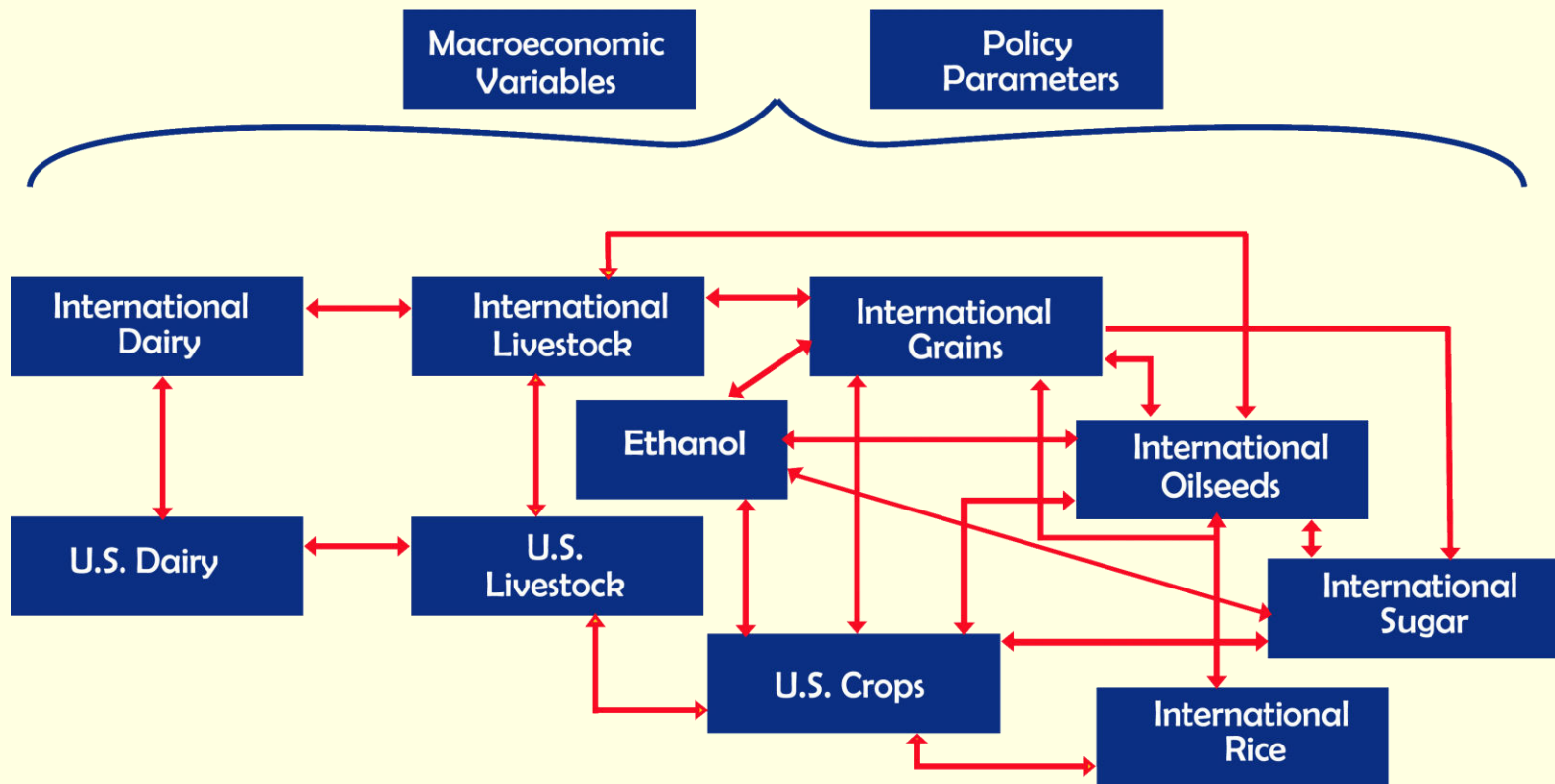
<http://www.card.iastate.edu/publications/synopsis.aspx?id=1050>

- Updated with available 2006 and 2007 data
- The objective is to estimate:
  - how large the biofuels sector in the U.S. could become
  - the impact of the biofuels sector on crops markets, trade, and on livestock markets
  - the response of world agricultural markets

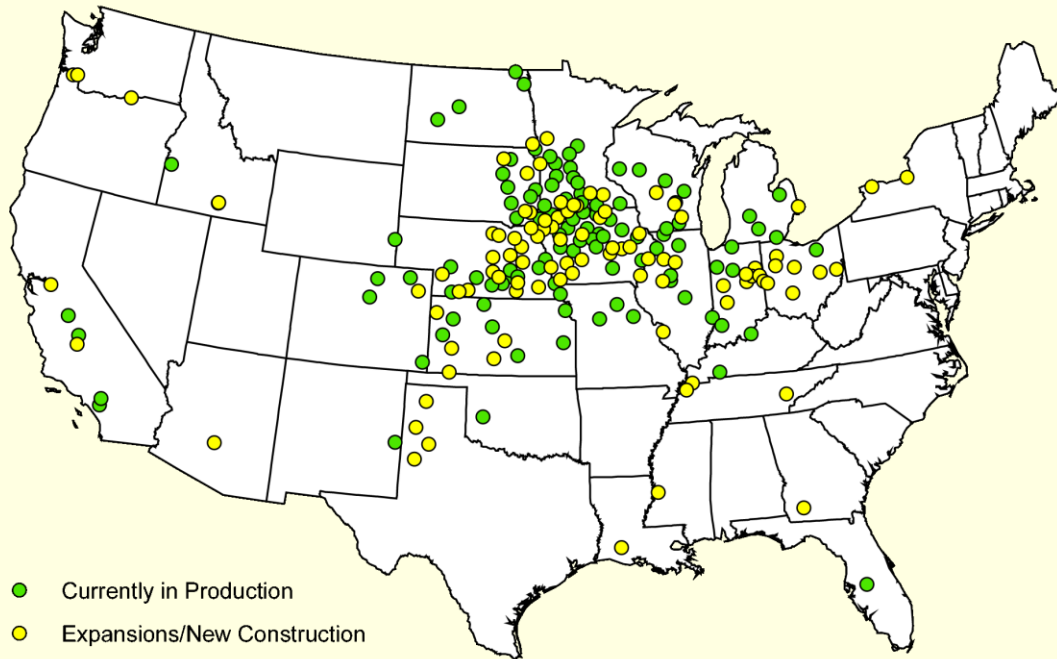
# Model Interactions

## Model Interactions

Trade, Prices, and Physical Flows



# U.S. Ethanol Industry



- Current ethanol capacity: 129 plants, 6.88 billion gallons/year
- Total capacity under construction and expansion: 6.77 billion gallons/year
- 76 new ethanol plants and 10 expansion projects underway
- 2.2 billion bushels of corn were used in producing fuel ethanol in 2006/2007 marketing year.
- 3.2-3.5 billion bushels of corn are expected to be used in producing fuel ethanol for 2007/2008 marketing year.

# Key Determinants of Impacts

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- Crude oil prices
  - Used NYMEX futures prices as a guide
- Policy incentives in the U.S.
  - \$0.51/gallon ethanol blenders credit
  - \$0.54/gallon import duty and 2.5% import tariff
- The “E-85 bottleneck”: the location and quantity of flex-fuel vehicles and E-85 pumps

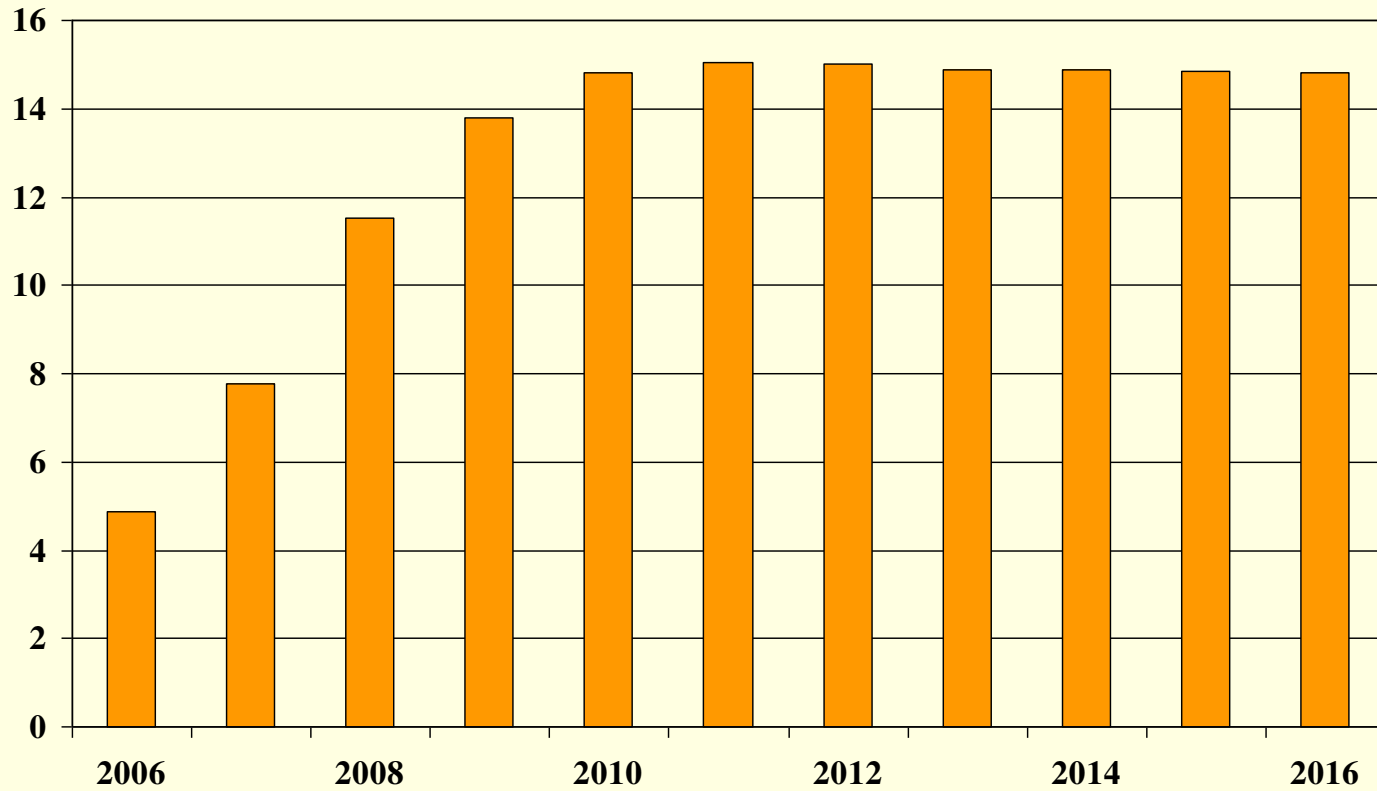
# Three Cases

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- Baseline
  - Current policies, “normal” weather
- Higher oil prices throughout projection period
  - Adding \$10/barrel to the crude oil price
- Drought in the 2012 crop year
  - Placing a 1988-style drought in the middle of the projection period

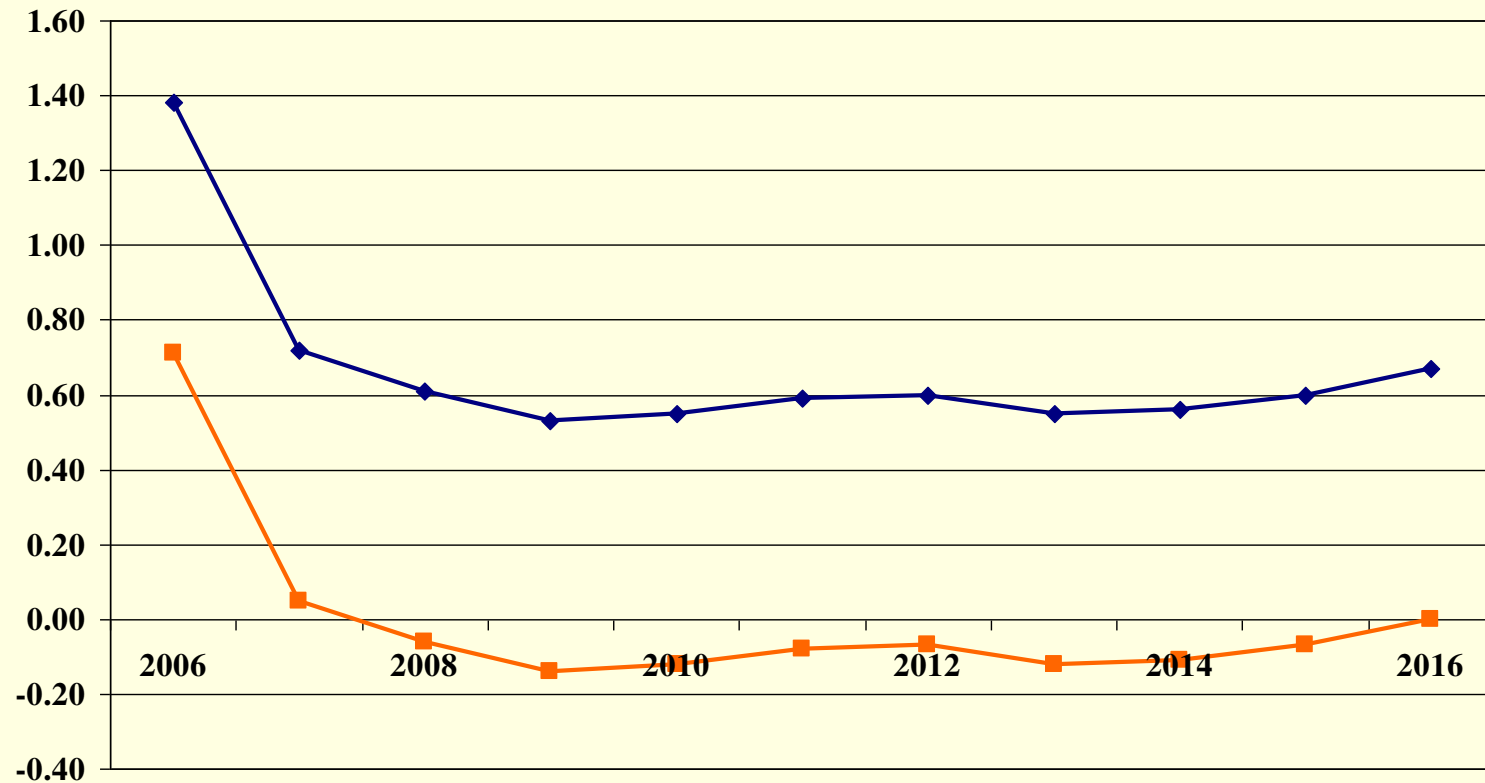
# Projected U.S. Ethanol Production

billion gallons



# Projected U.S. Dry Mill Margins

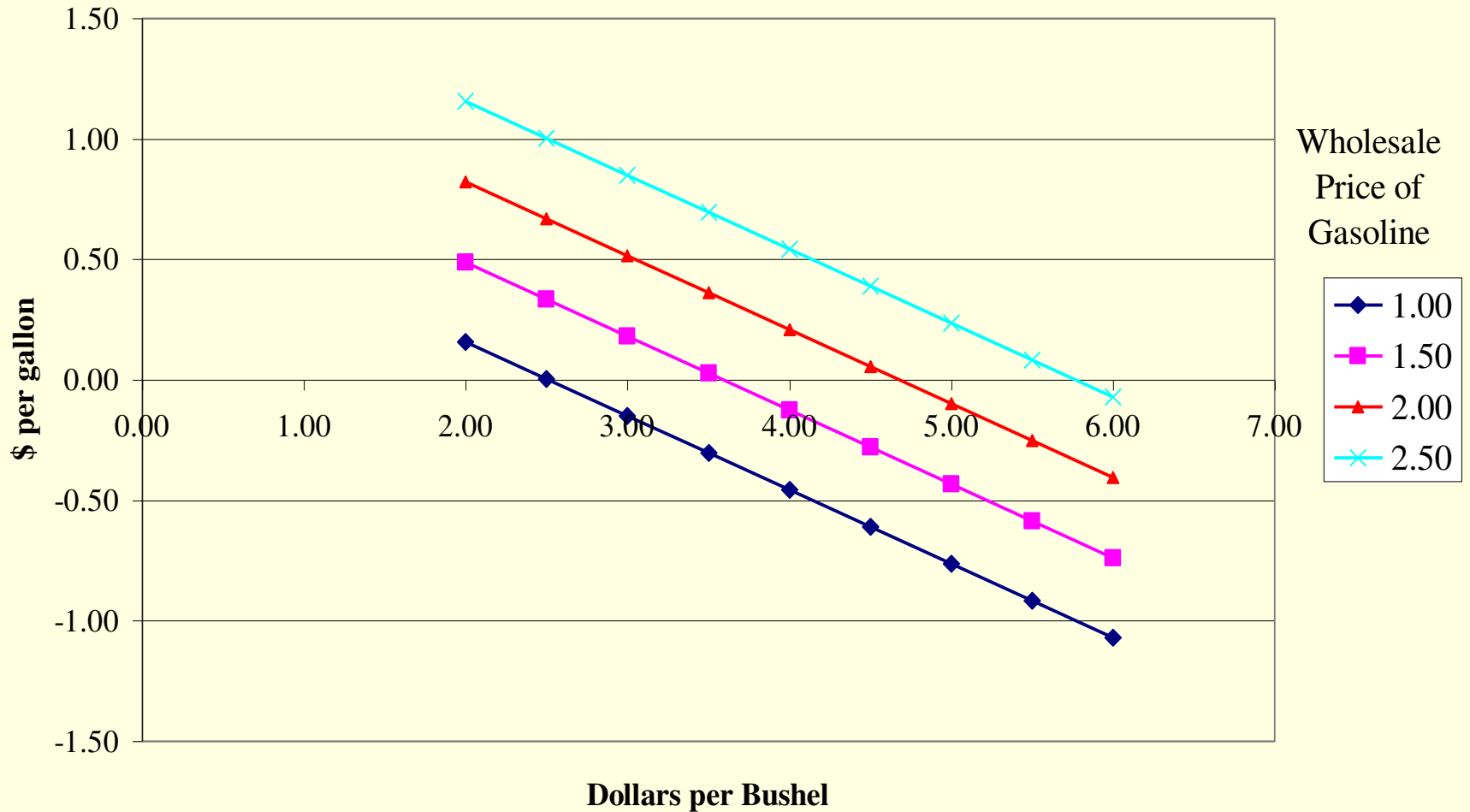
US\$/bushel



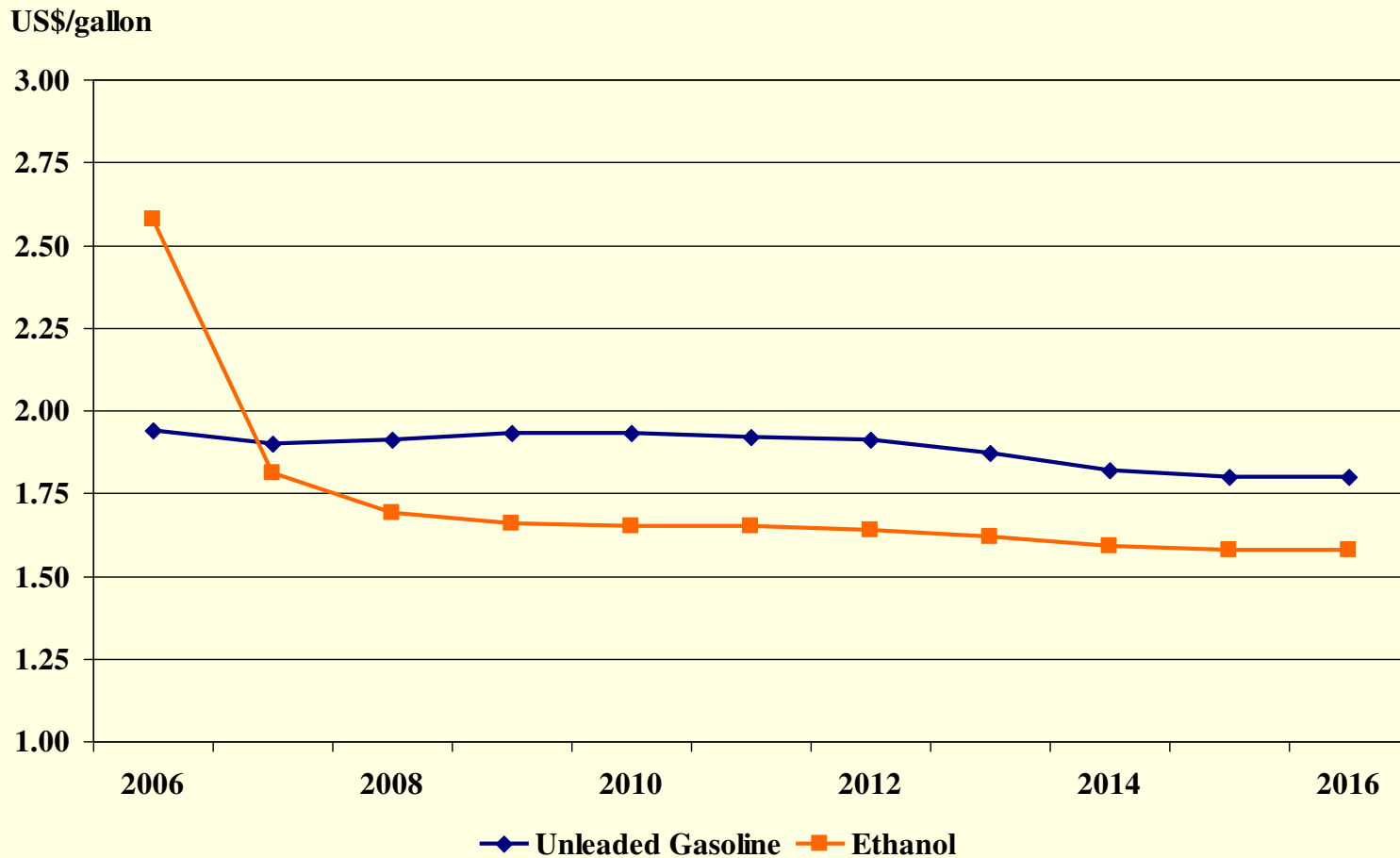
◆ Margin Over Operating Costs ■ Margin Over Total Cost



# Margins at Various Corn and Gasoline Prices

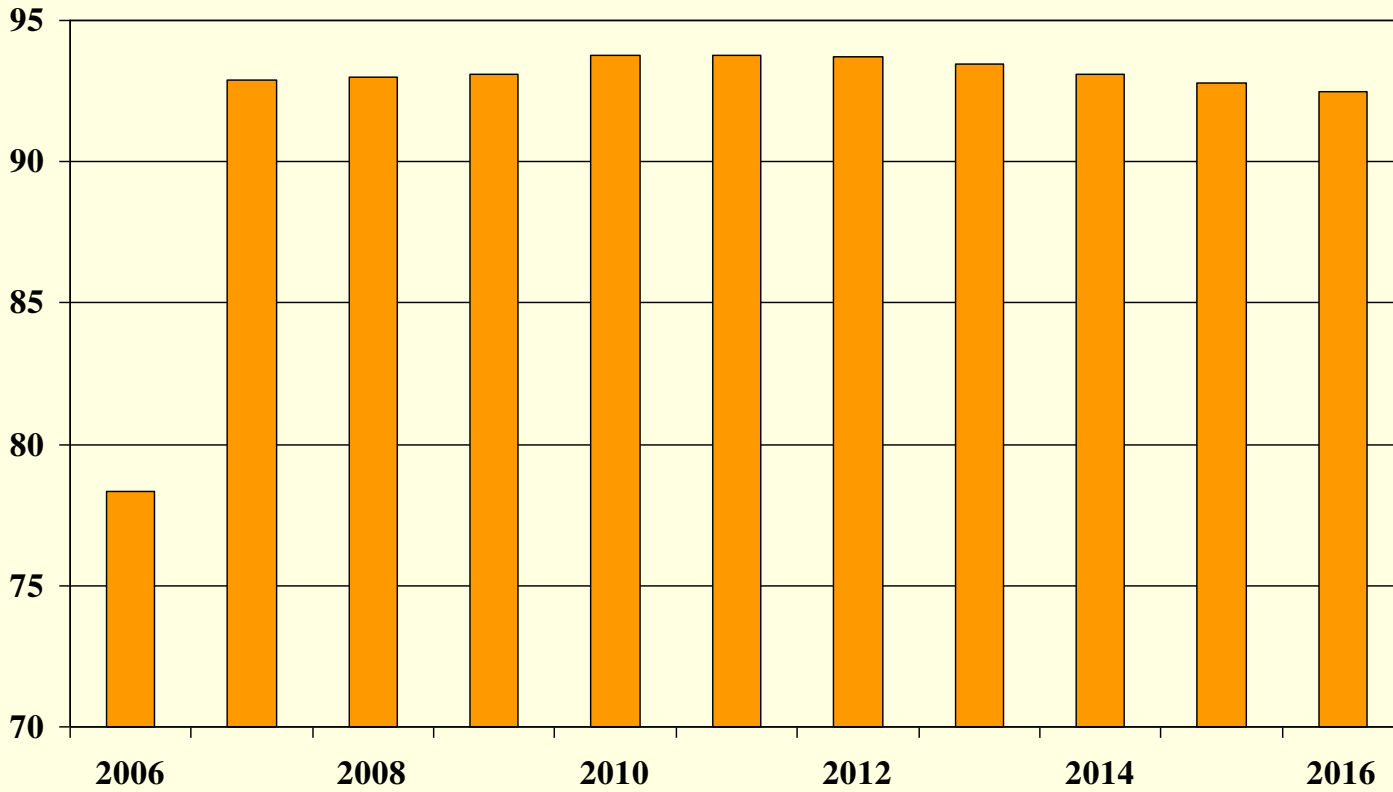


# Wholesale Gasoline and Ethanol Prices



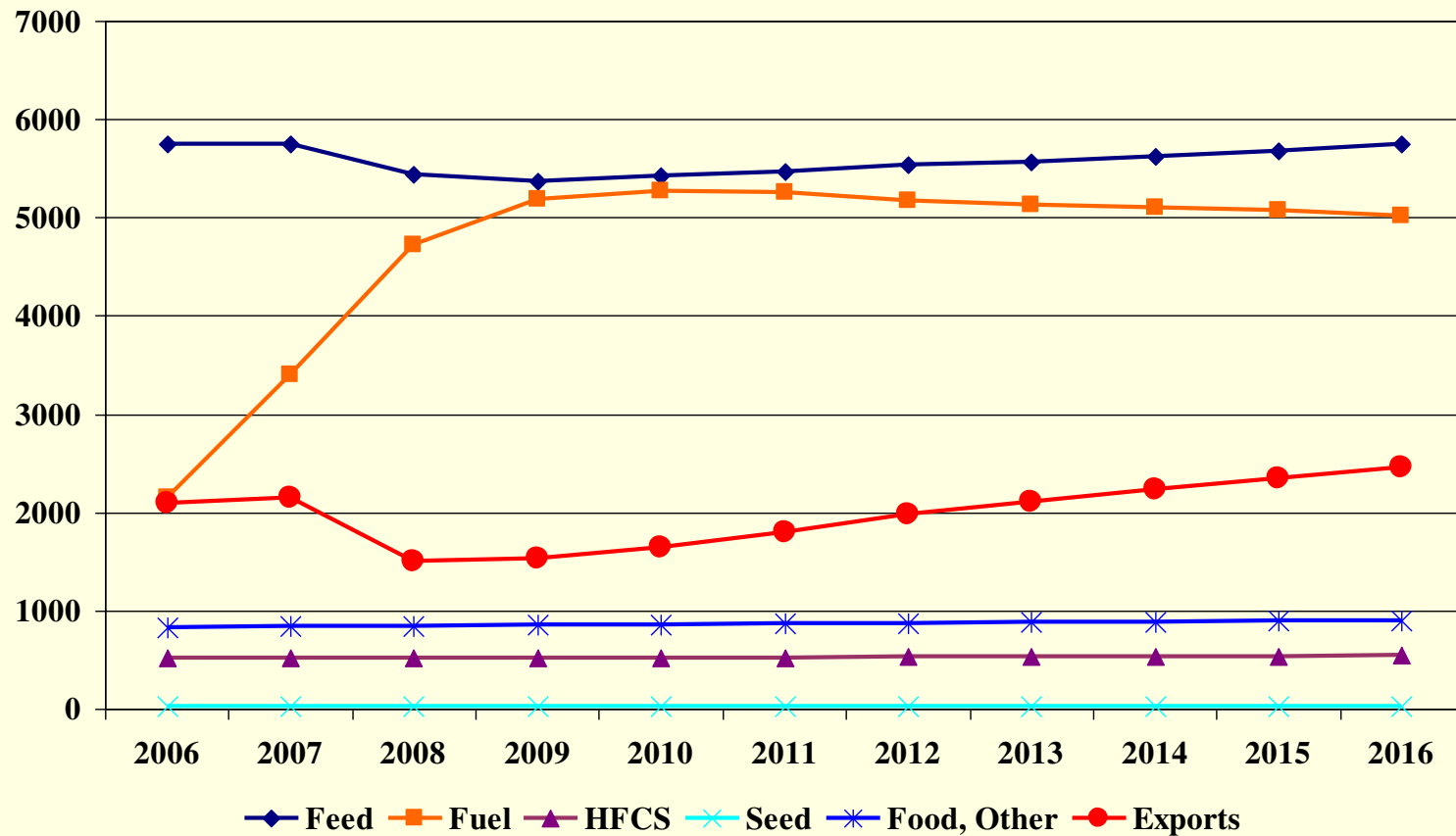
# Projected U.S. Corn Planted Area

million acres

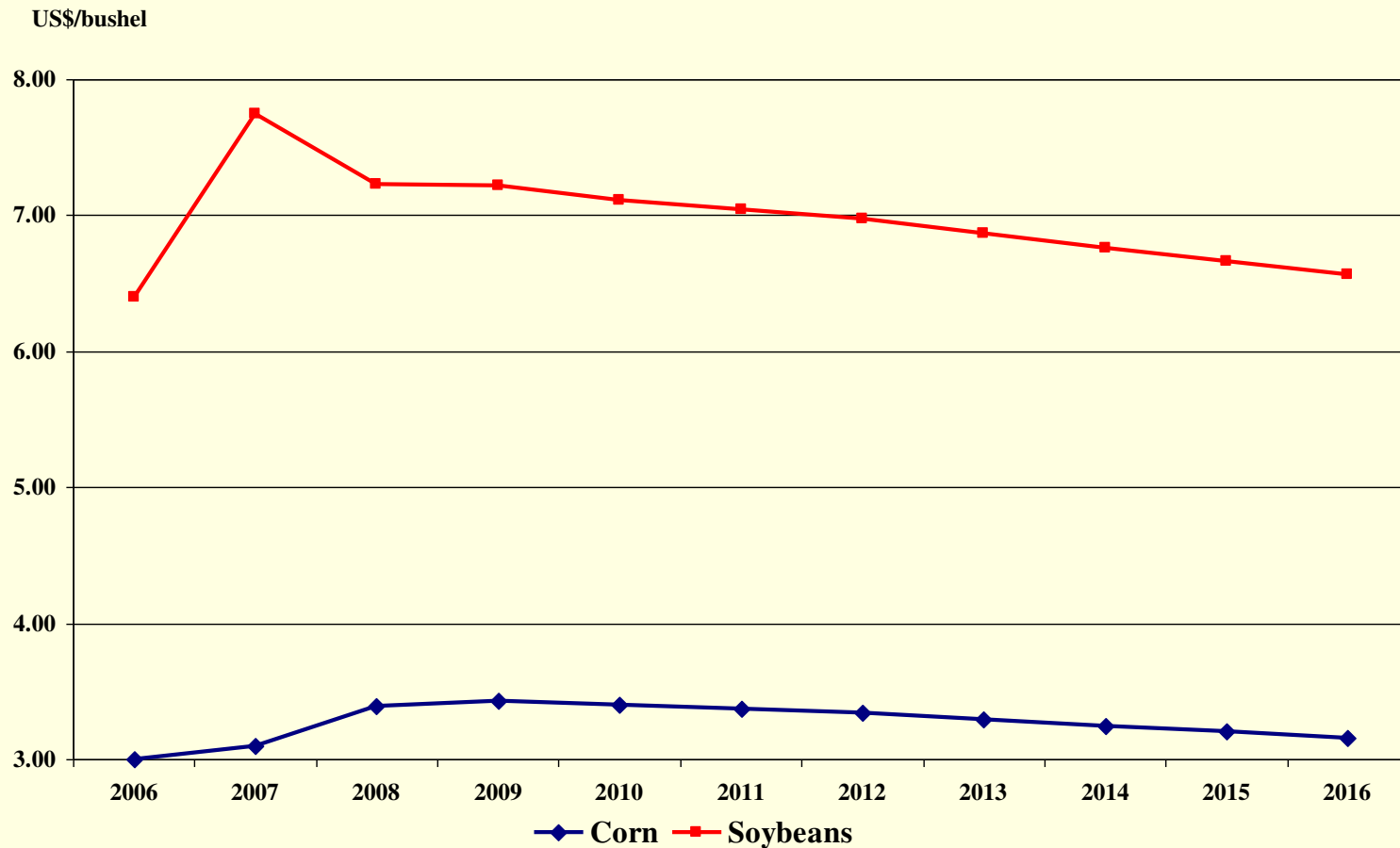


# Projected Utilization of U.S. Corn

million bushels

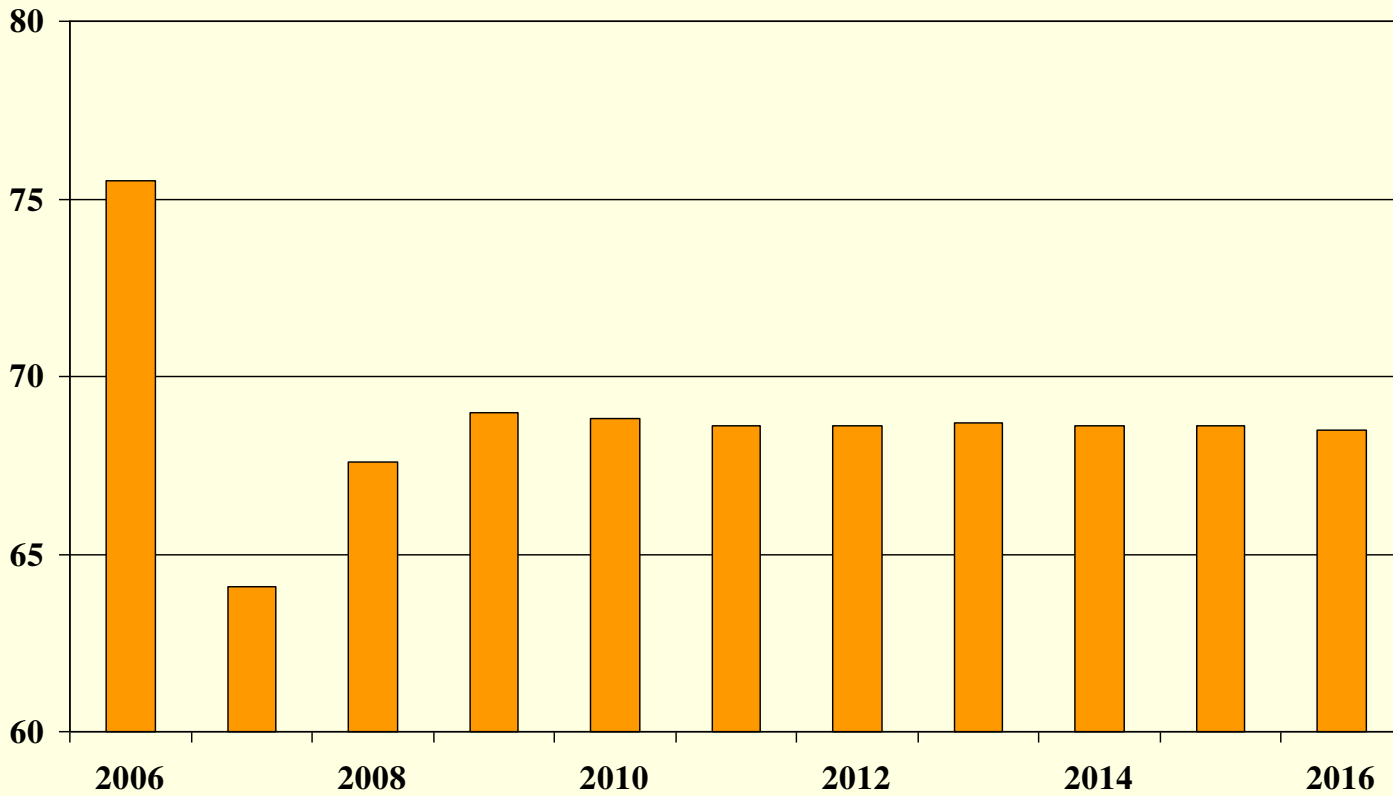


# Projected U.S. Corn and Soybean Prices



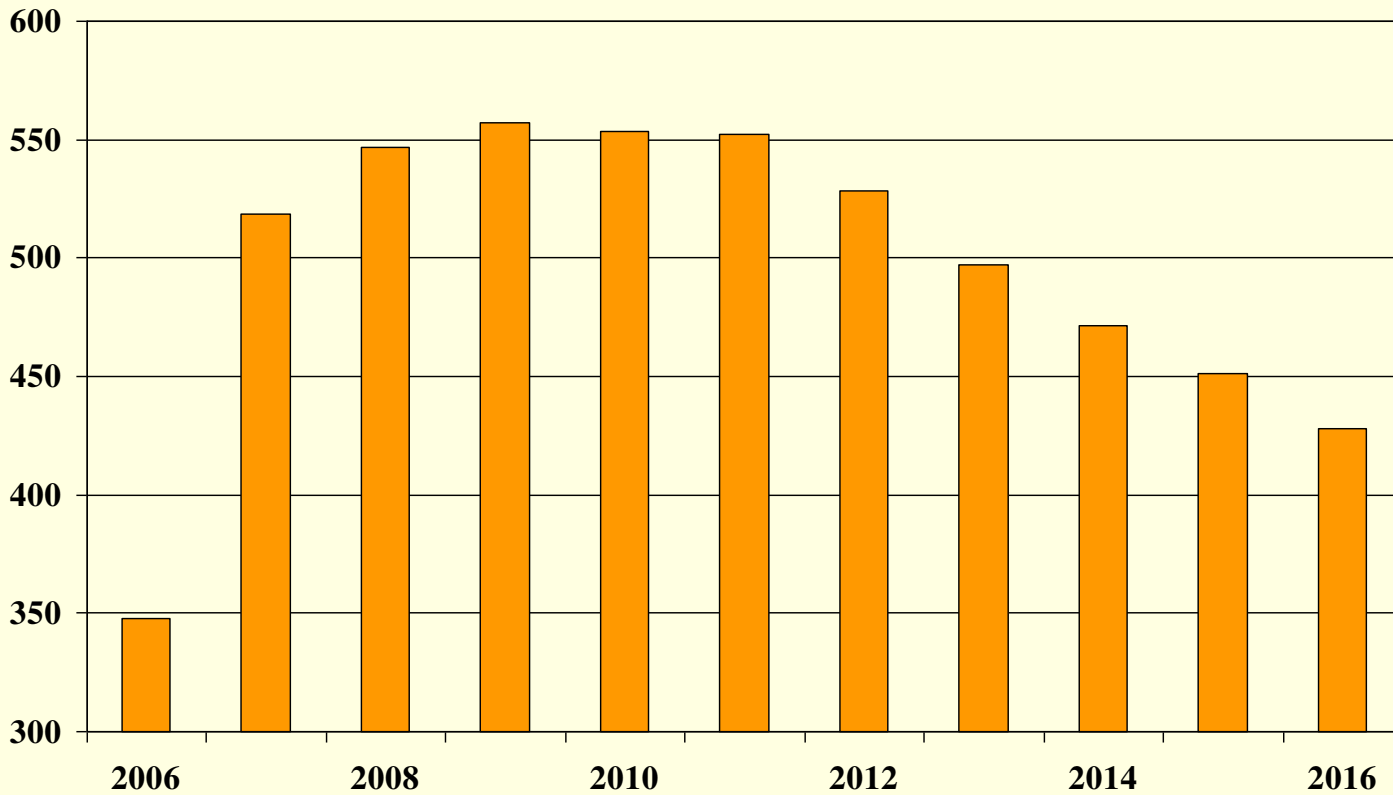
# Projected U.S. Soybean Planted Area

million acres



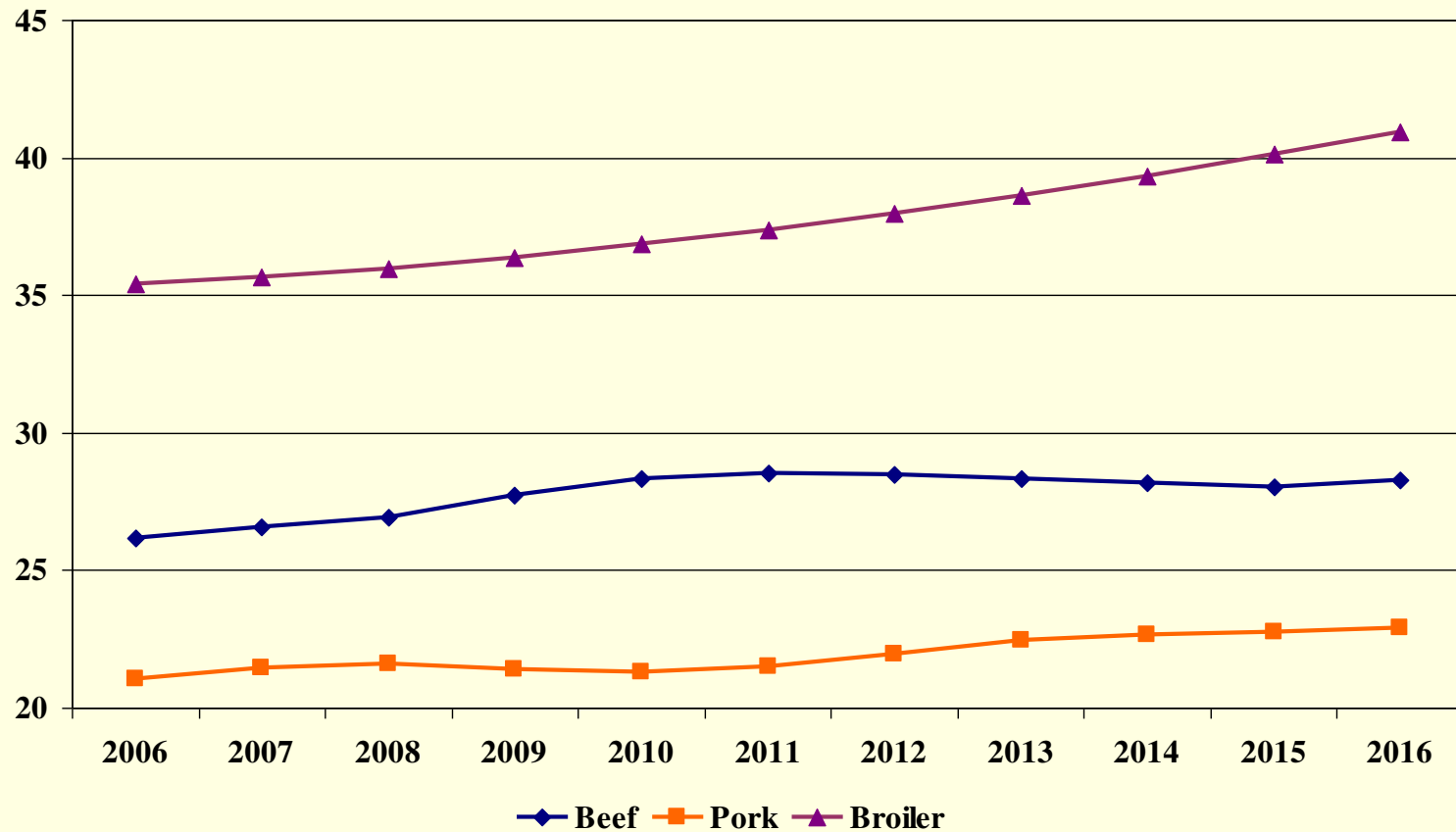
# Projected U.S. Biodiesel Production

million gallons



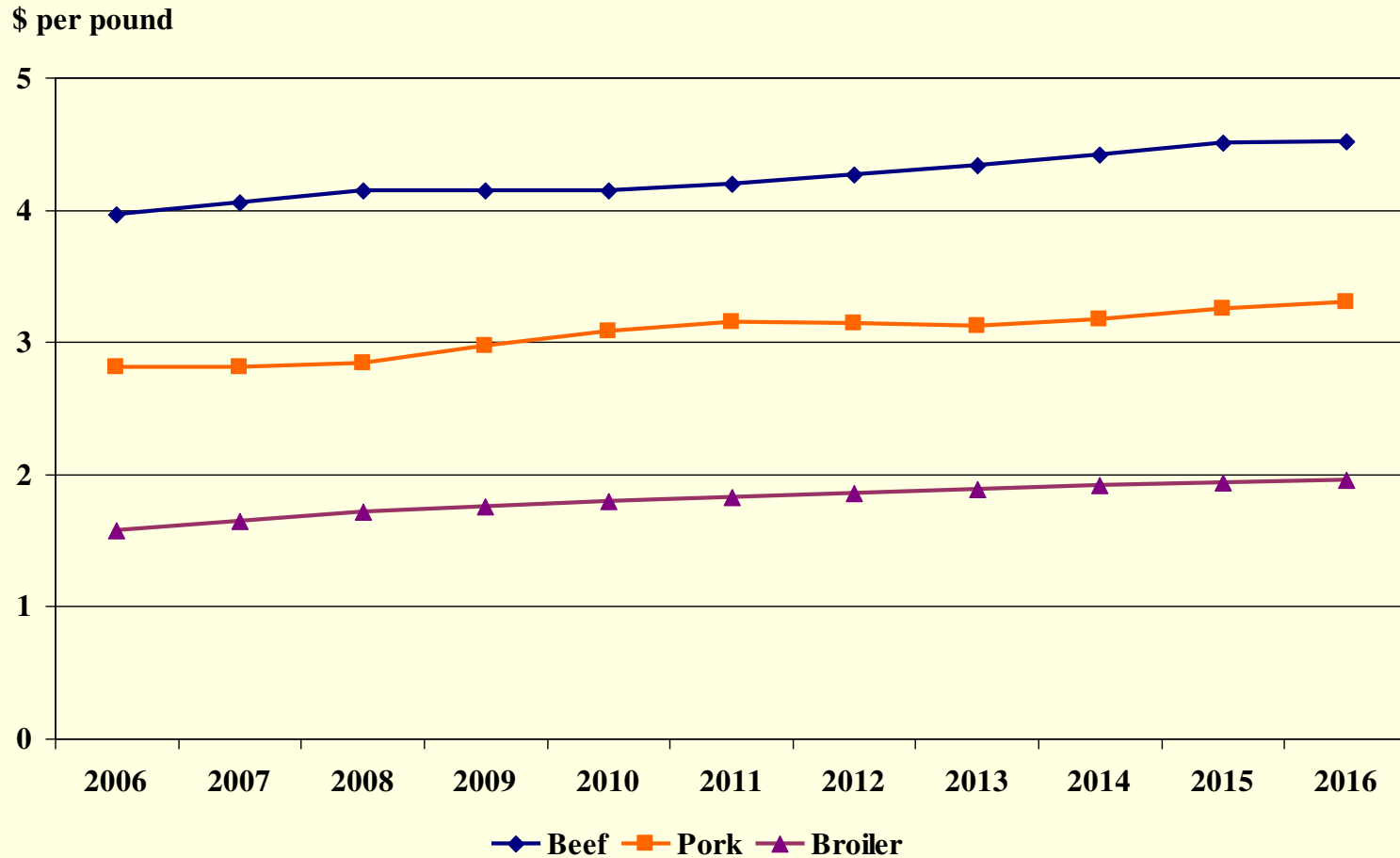
# Projected U.S. Meat Production

billion pounds

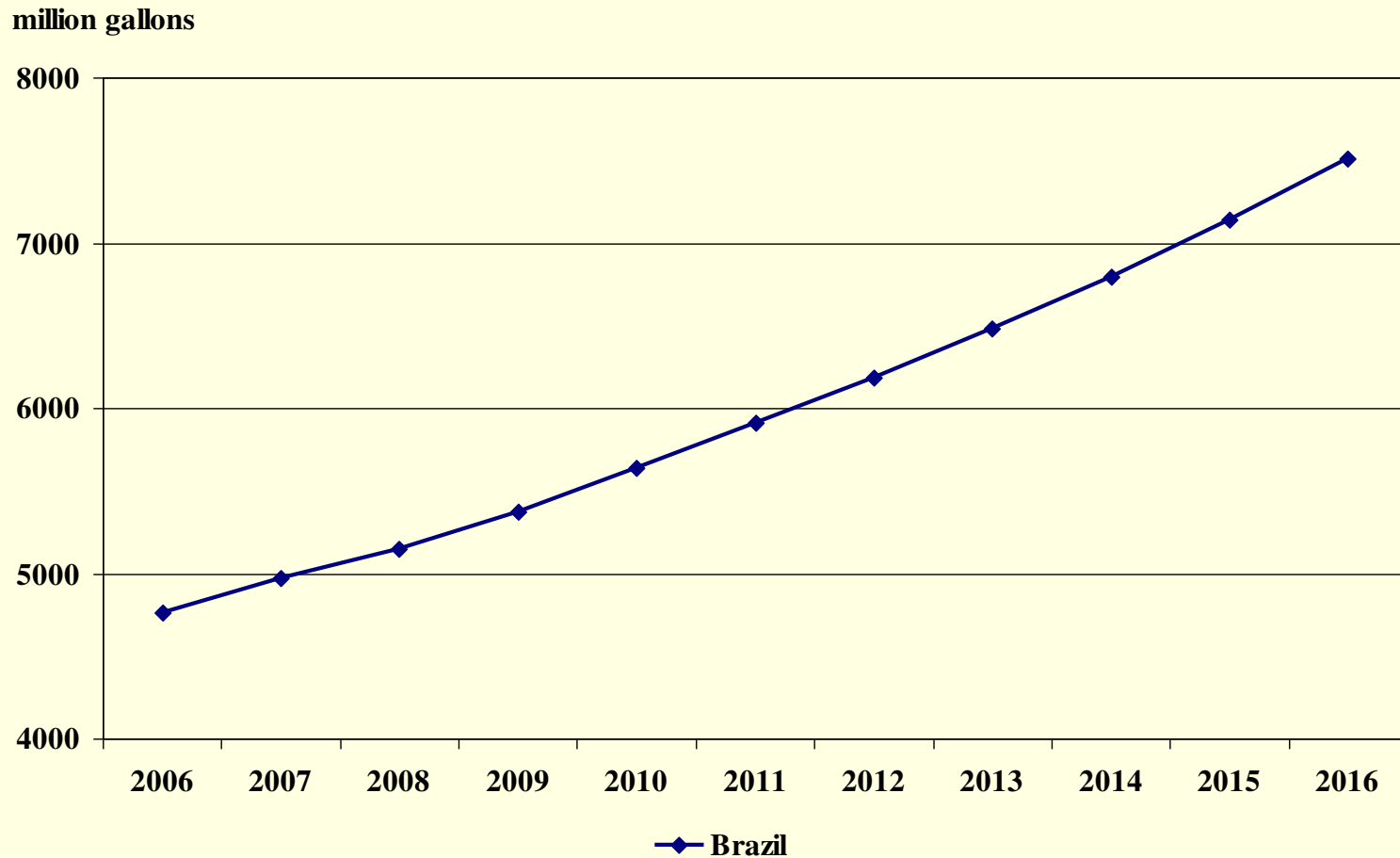




# Projected U.S. Retail Meat Prices

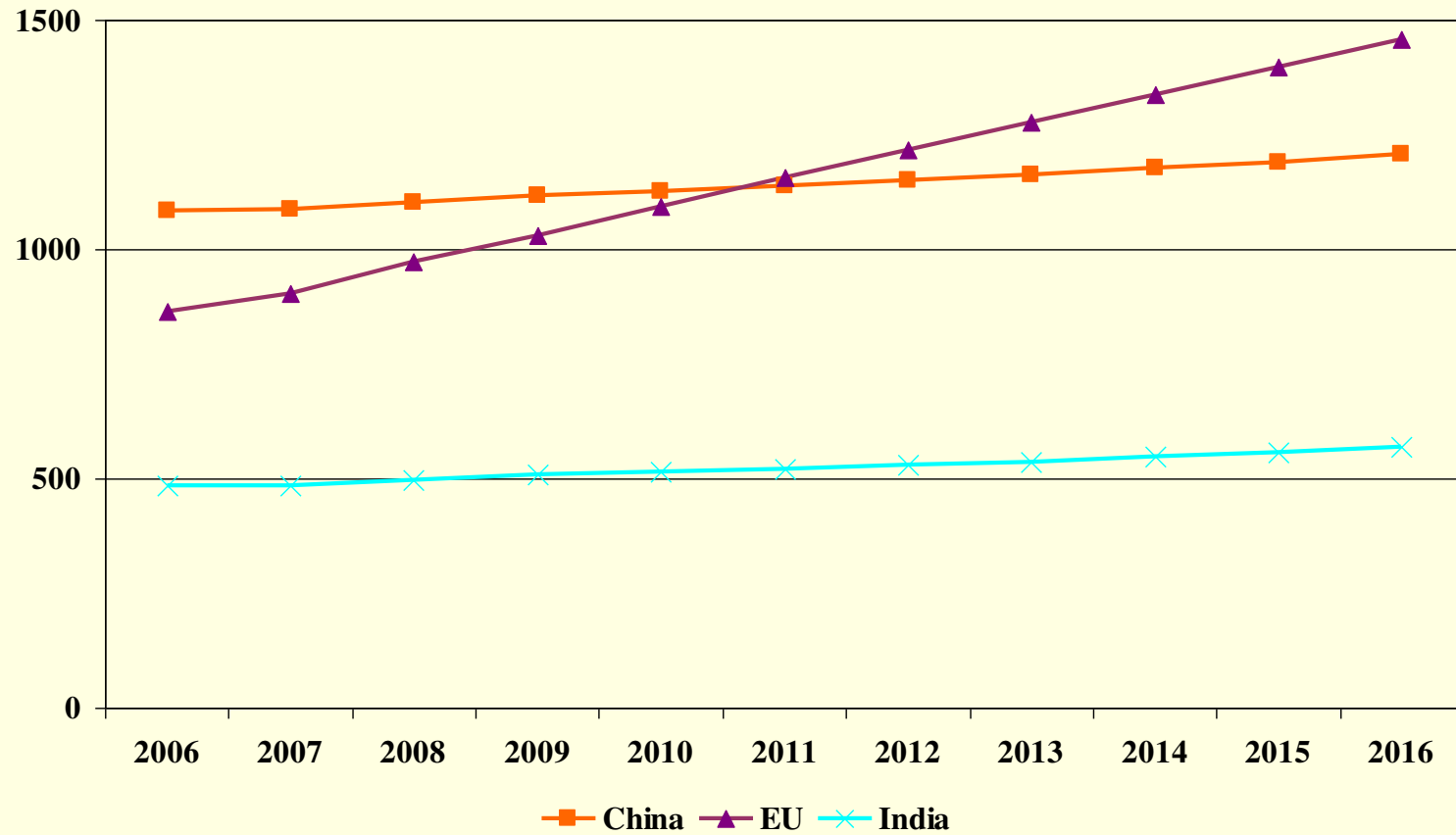


# Projected Brazilian Ethanol Production



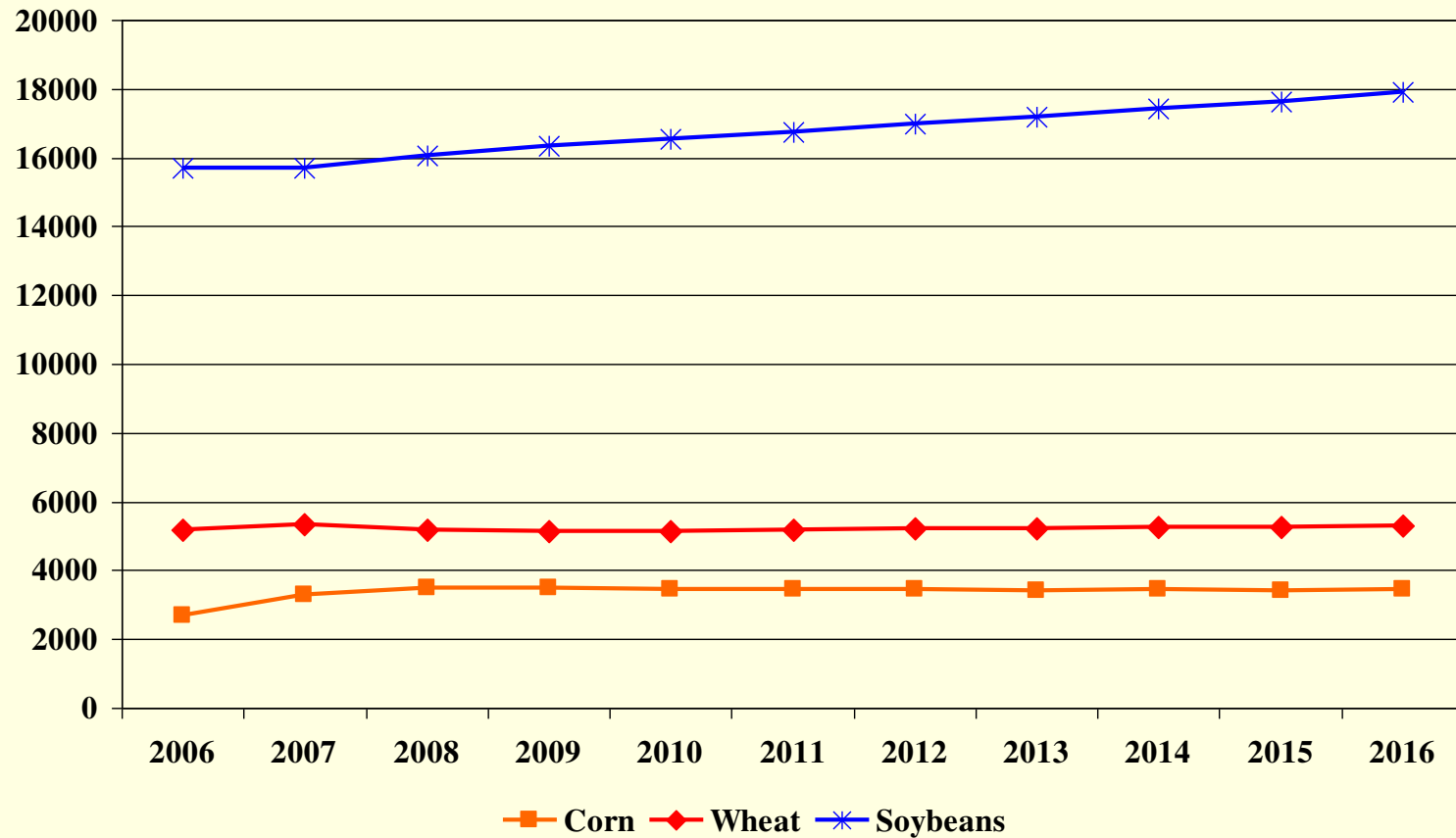
# Projected Ethanol Production

million gallons



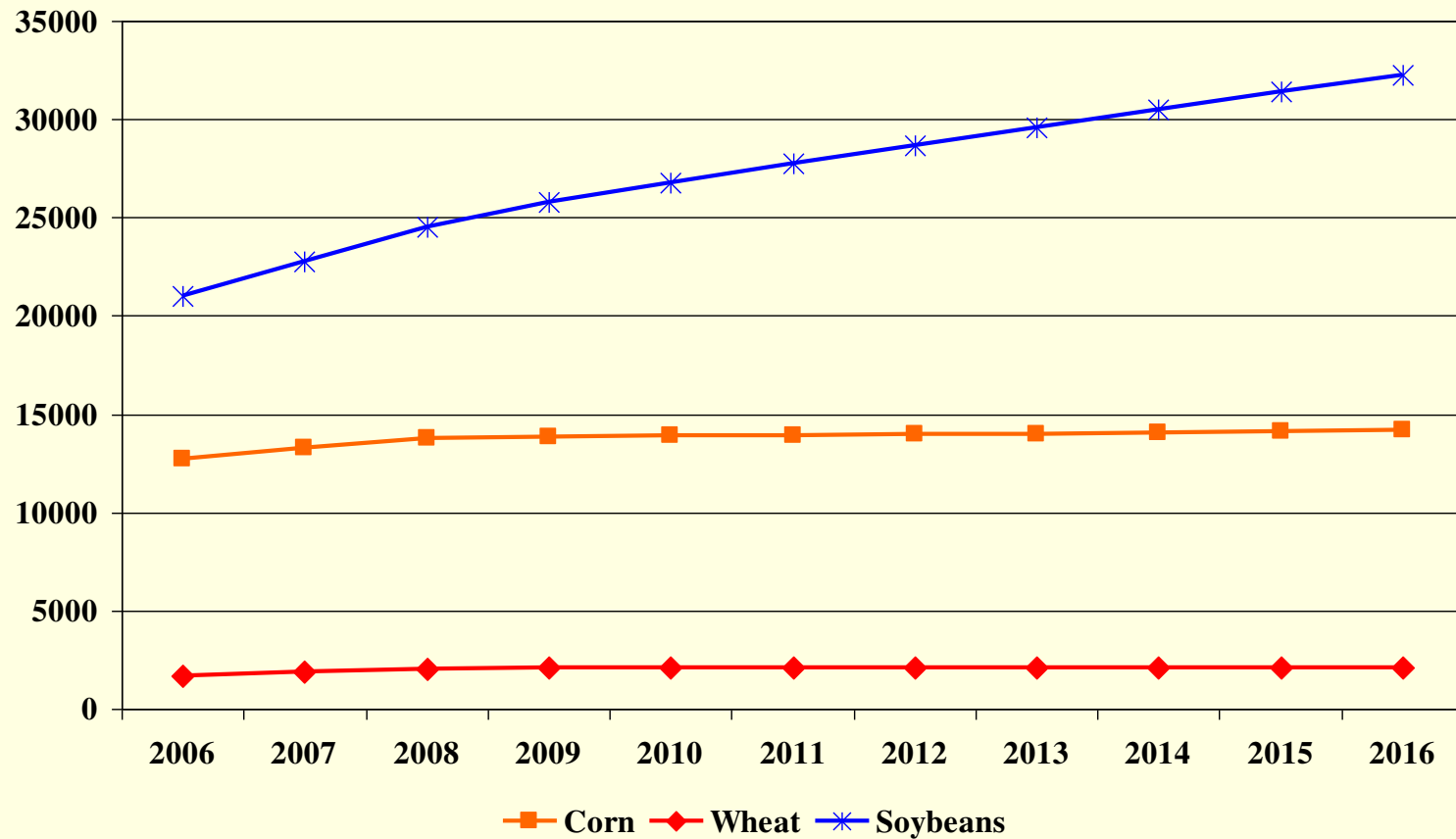
# Projected Argentine Area Harvested

thousand hectares



# Projected Brazilian Area Harvested

thousand hectares



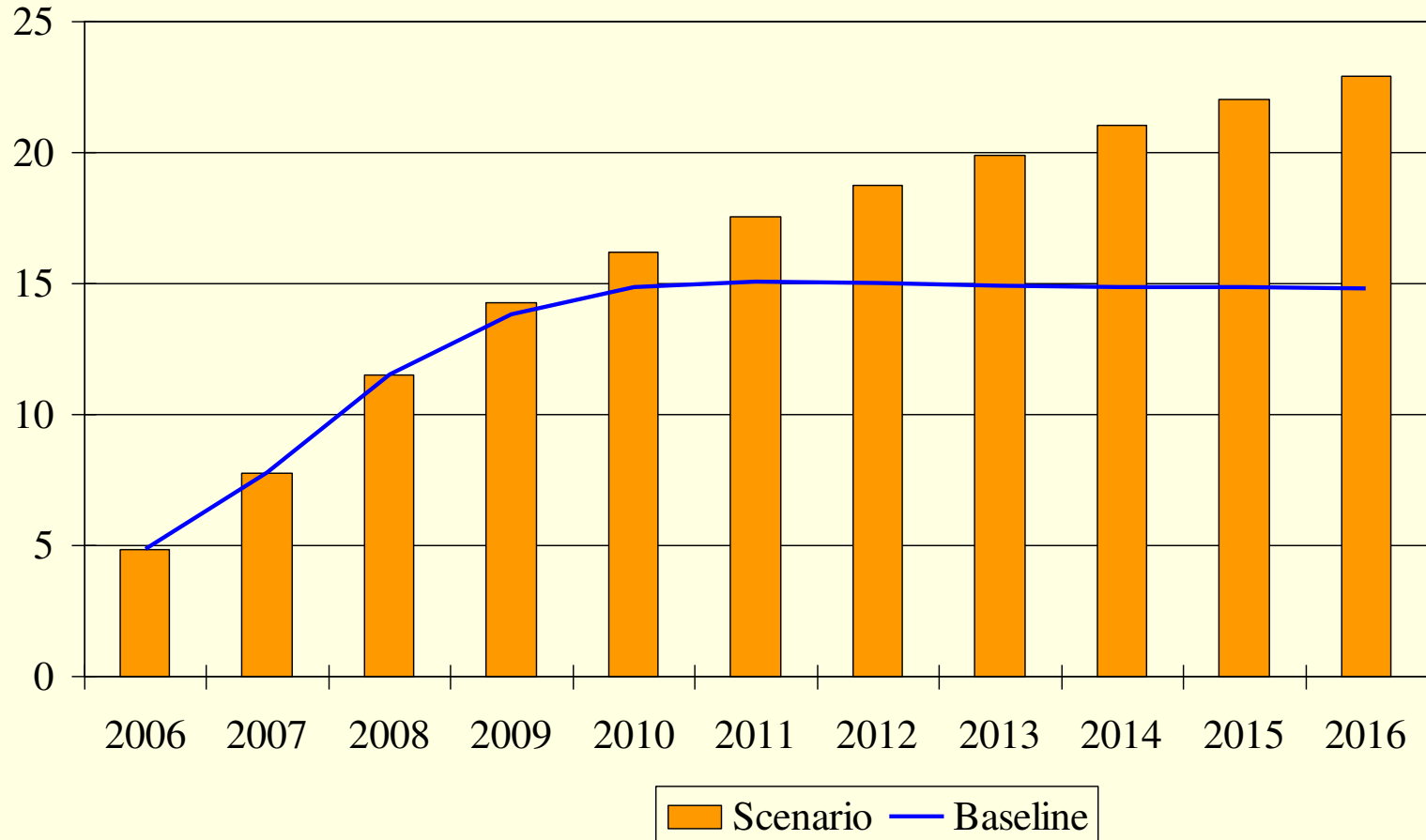
# Impact of Higher Crude Oil Price

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- Increased crude oil price by \$10/barrel over the projection
- Margins on ethanol plants increase
- New incentive to invest in added capacity for ethanol production
- Eventually, a new equilibrium reached where there is no incentive to invest in or exit the ethanol industry
- Will demand for ethanol be enough?
  - E-10 market will saturate around 15 billion gallons
  - Drop in ethanol price will eventually encourage increase in demand for the flex-fuel cars

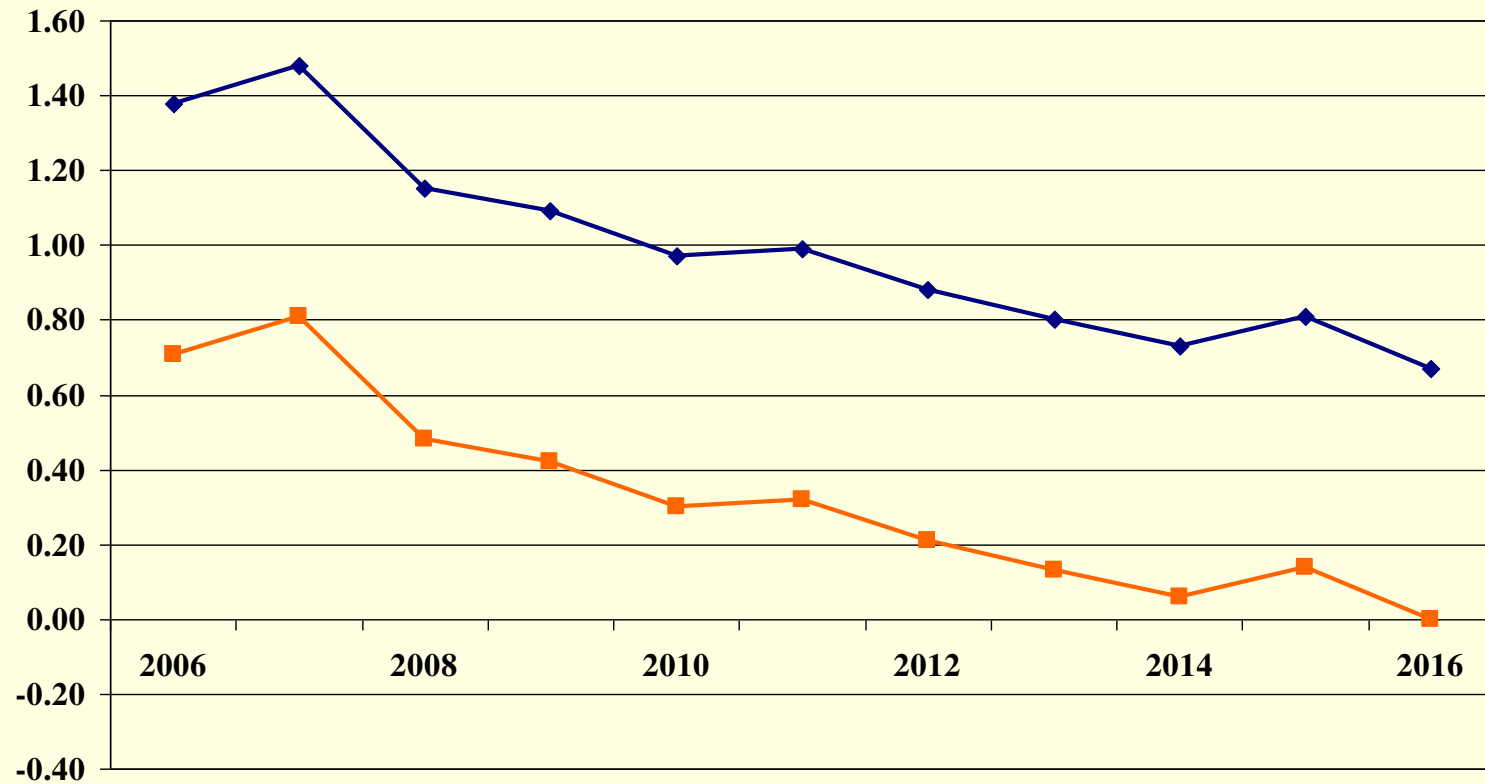
# Projected U.S. Ethanol Production

billion gallons



# Projected U.S. Dry Mill Margins

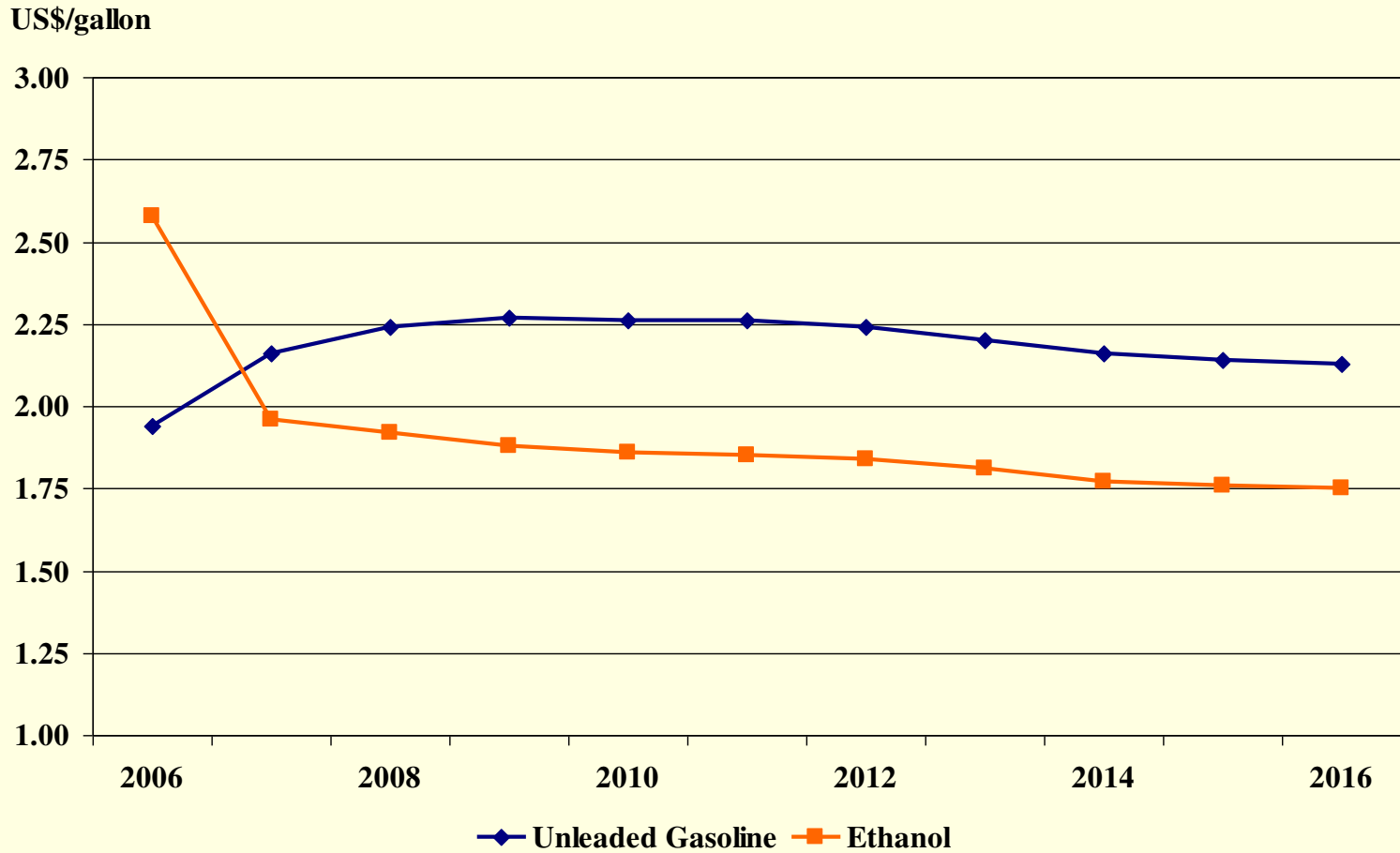
US\$/bushel



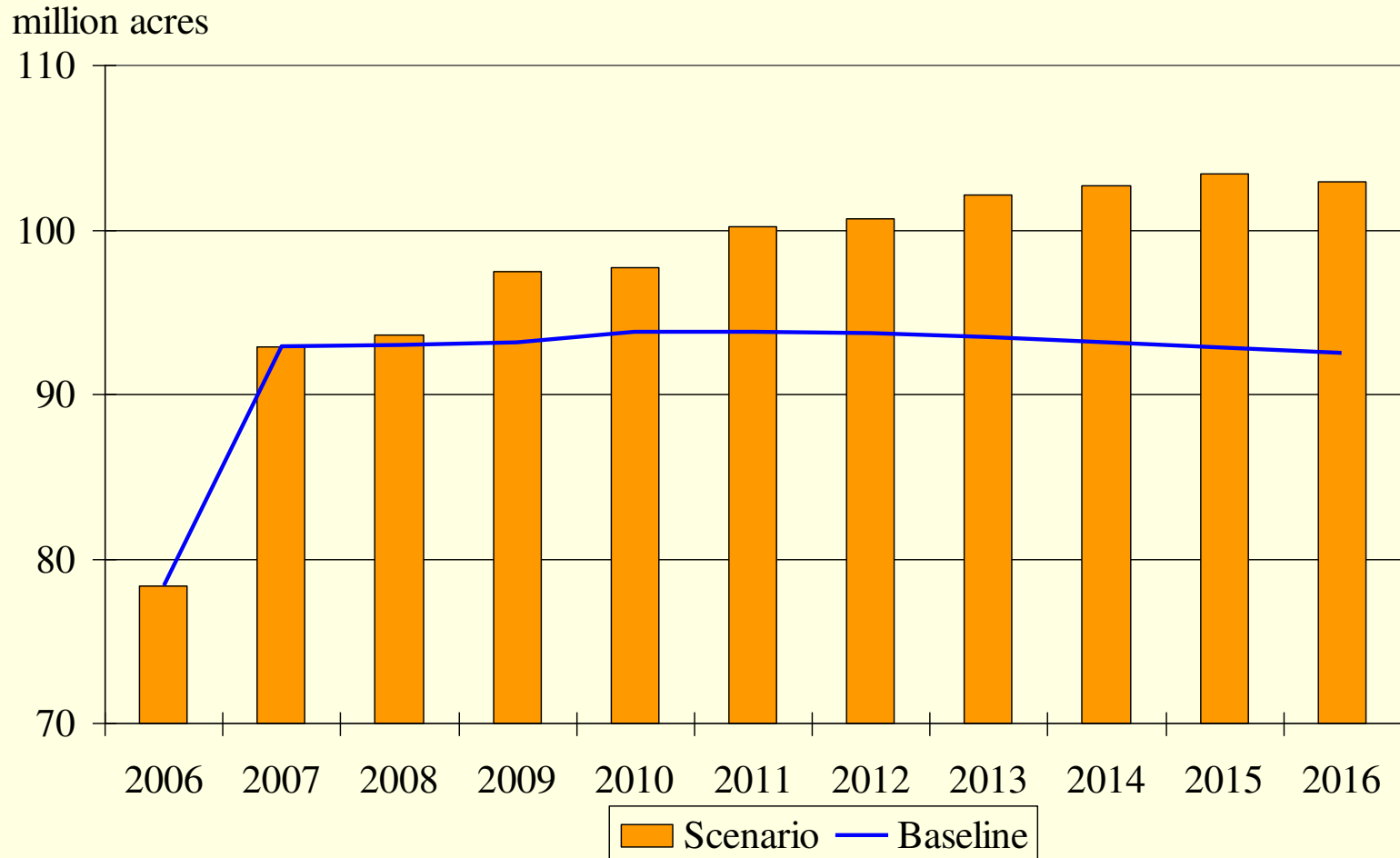
◆ Margin Over Operating Costs ■ Margin Over Total Cost



# Wholesale Gasoline and Ethanol Prices

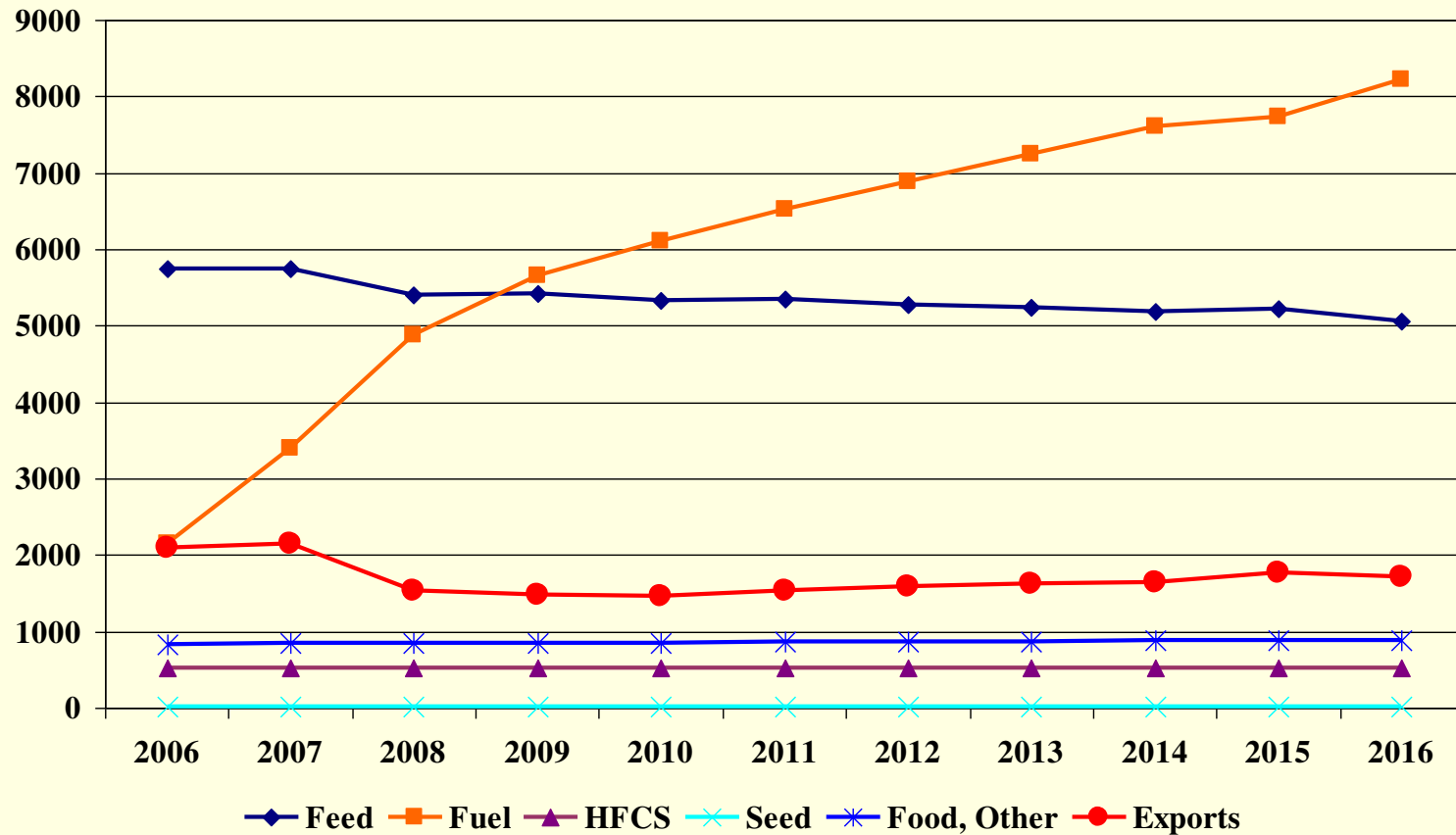


# Projected U.S. Corn Planted Area

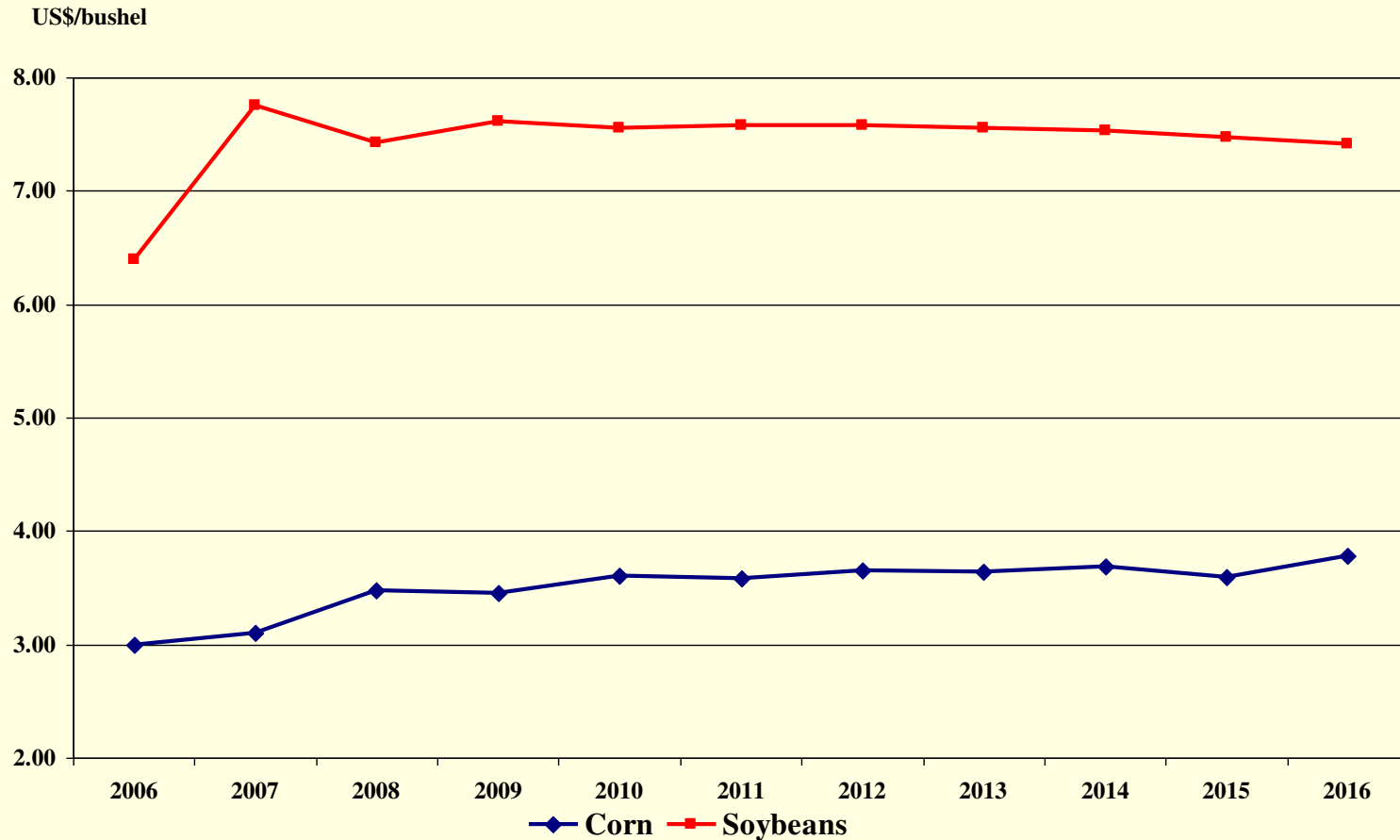


# Projected Utilization of U.S. Corn

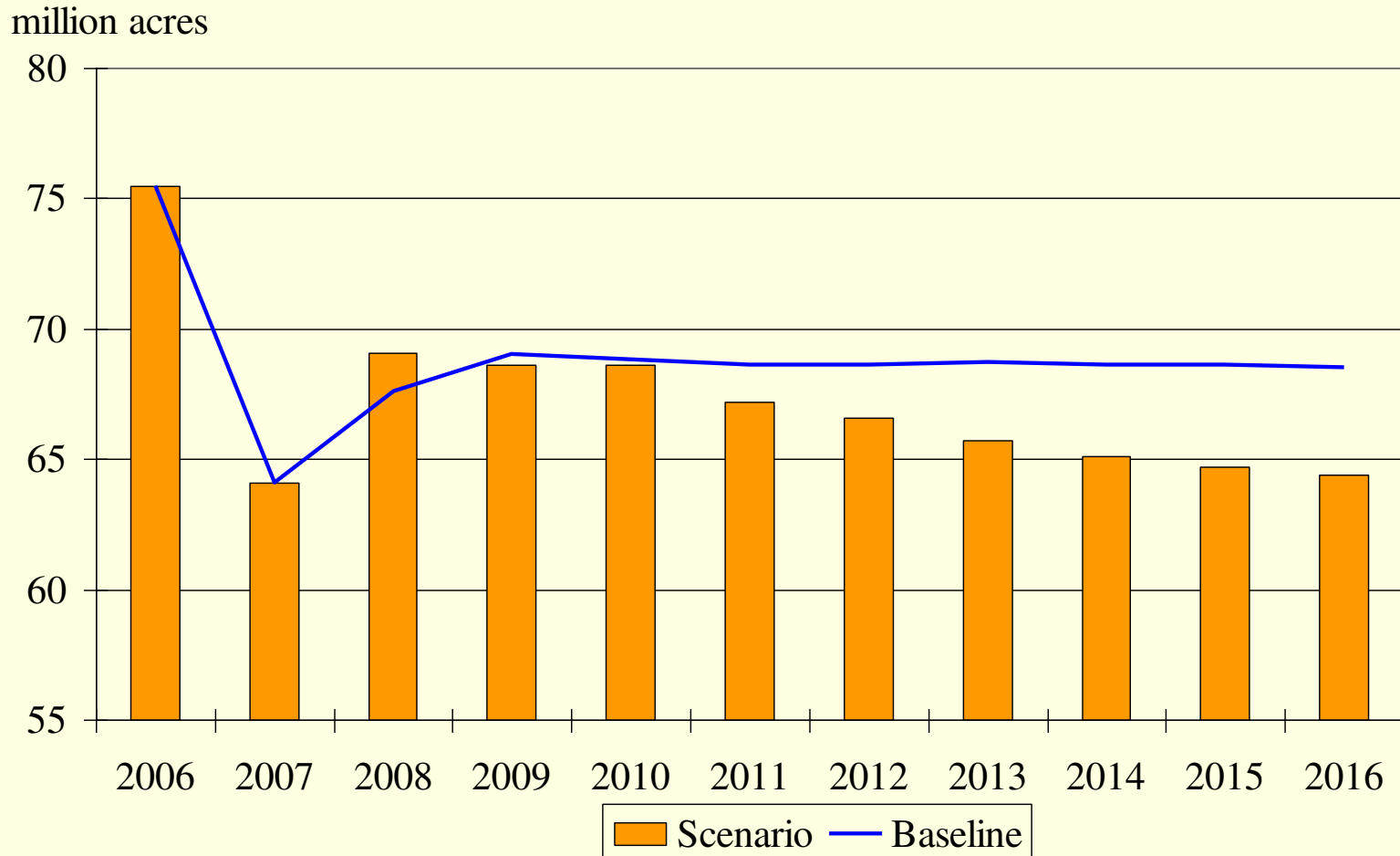
million bushels



# Projected U.S. Corn and Soybean Prices

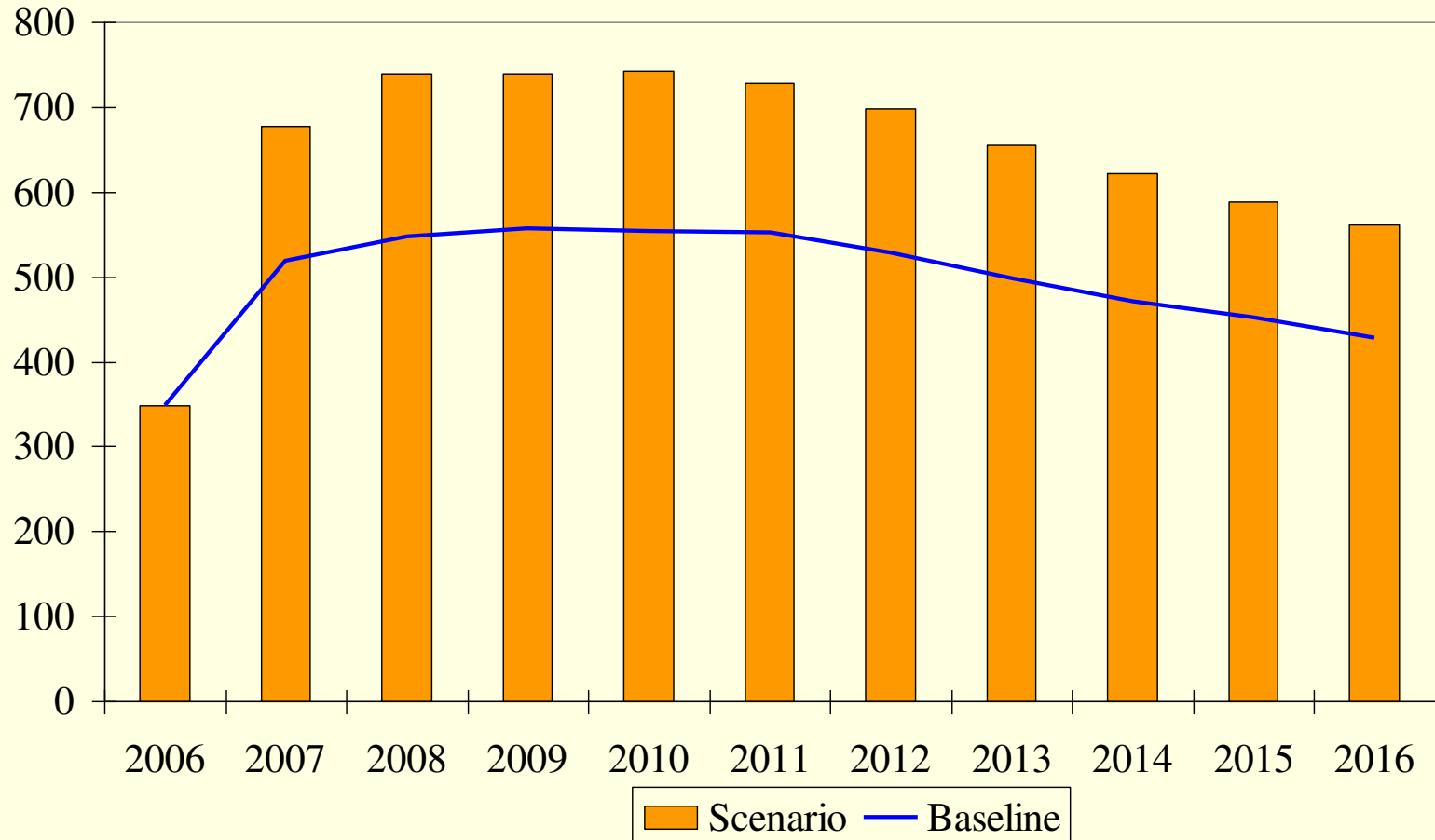


# Projected U.S. Soybean Planted Area



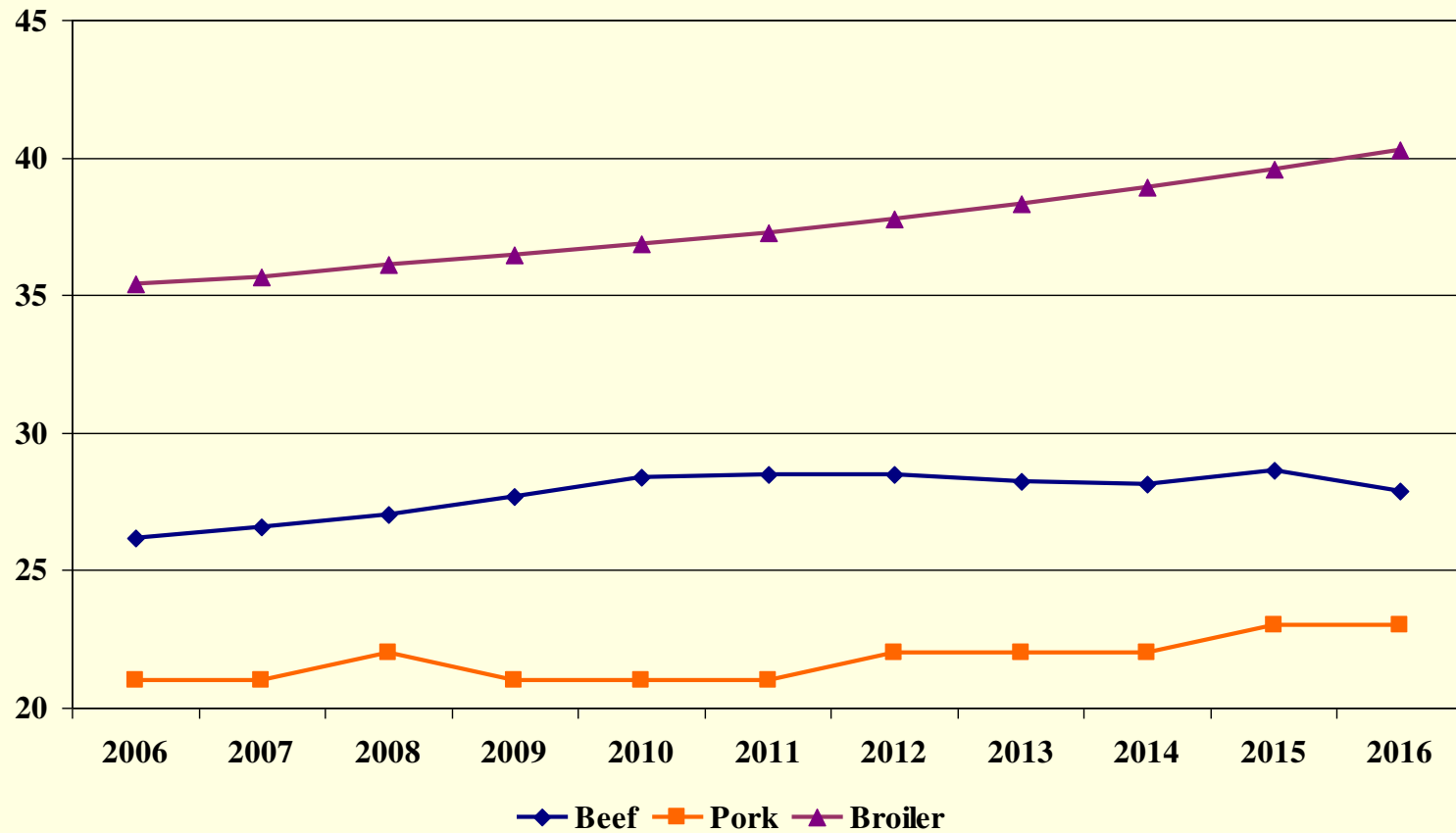
# Projected U.S. Biodiesel Production

million gallons

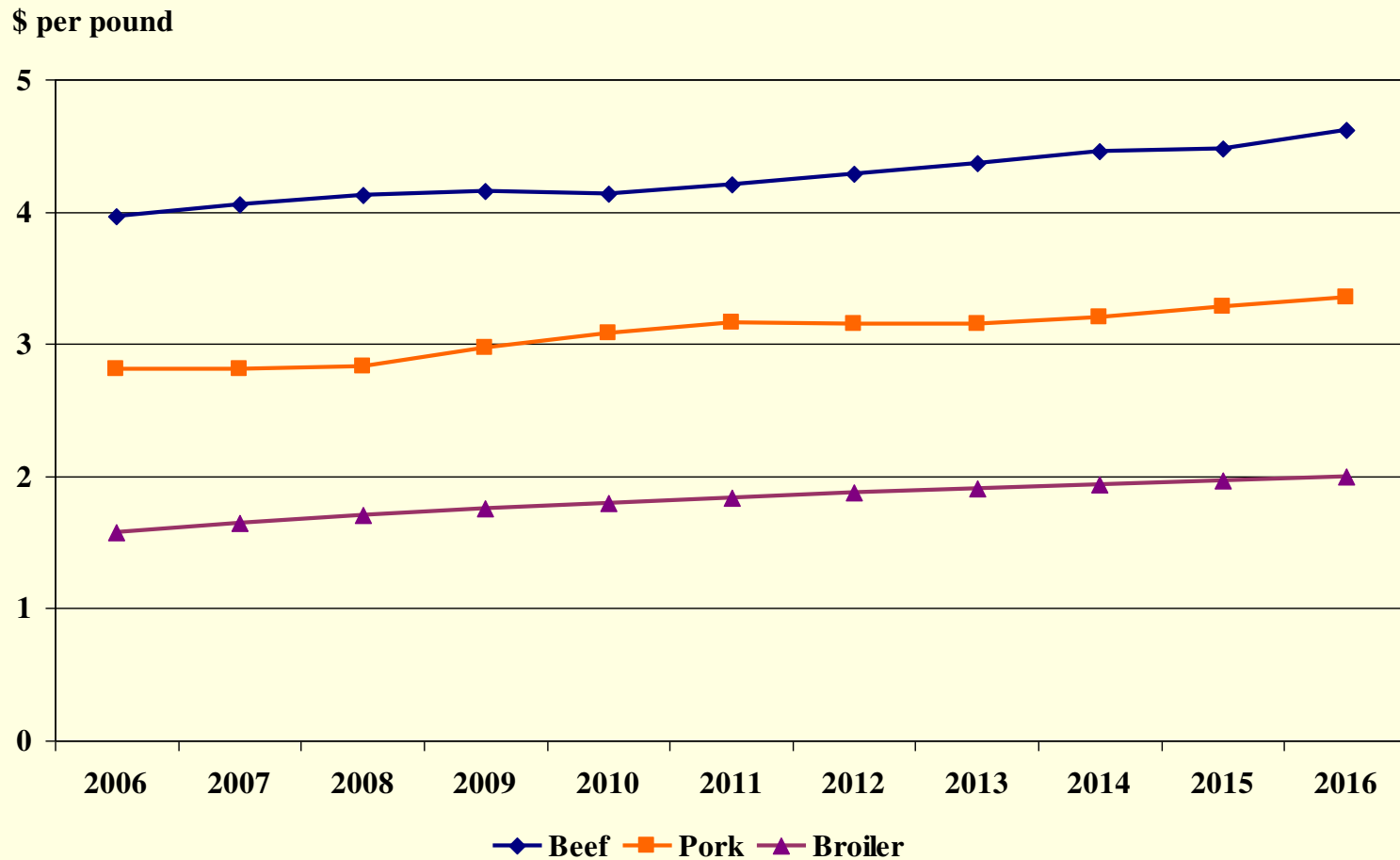


# Projected U.S. Meat Production

billion pounds



# Projected U.S. Retail Meat Prices





# U.S. Meat, Egg, and Dairy Price Changes

	Baseline	Scenario	Percentage Change
Beef Retail Price (\$/pound)	4.52	4.62	2.2%
Pork Retail Price (\$/pound)	3.30	3.35	1.5%
Broiler Retail Price (\$/pound)	1.96	2.00	2.0%
Turkey Retail Price (\$/pound)	1.26	1.30	3.2%
Egg Retail Price (\$/dozen)	1.63	1.68	3.1%

# Farm to Retail Food Price Spread

Food	Farm Value Share of Retail Food Price	Food	Farm Value Share of Retail Food Price
Eggs	53	Canned Corn	22
Beef	49	Sugar	27
Chicken	48	Wheat Flour	19
Milk	34	Bread	5
Pork	31	Corn Flakes	4
Orange Juice	33	Corn Syrup	3

Source: USDA-Economic Research Service, 2001

# Impact on Rest of the World

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- World grain and oilseed prices increase
- Result in higher feed and food prices
- Higher food prices
- Higher livestock production cost
- Countries in South America and Asia fill the gap

# Impact of Short Crop Scenario

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- Drought in 2012 similar to 1988
  - Regional yields of corn, soybeans and wheat changed from trend levels
  - Yields were off by 25% for corn, 18% for soybeans, and 11% for wheat in 1988
- Ethanol mandate for 2012 assumed to be 14.7 billion gallons

# Historical Corn Production Deviations



# Corn, Soybean and Ethanol Markets

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- Corn price increases by 44% above baseline levels
- Soybean price rises by 22%
- Corn exports and stock levels decline by more than 60%
- Corn exports from South America, China, etc. fill part of the gap from decline in U.S. corn exports
- Corn feed use declines by 16% (switch to other feeds)
- Ethanol trade increases moderately

# Livestock Market

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- Higher feed costs affect the livestock sector but to a lesser extent as shock is perceived as temporary
  - Production declines
    - Broiler production declines the most (over 2.5%)
    - Milk production declines the least (0.5%)
  - Retail prices increase
    - Egg prices increase the most (about 5.5%)
    - Prices of other products increase by a range between 2% and 4%



Thank You