

Agricultural Outlook Forum 2000

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## COMMENTS ON THE LONG-TERM PROJECTIONS FOR U.S. AGRICULTURE

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The Food and Agricultural Policy Research Institute (FAPRI), located at the University of Missouri and Iowa State University, develops long-term projections for world agriculture. The 10-year baseline results from a process that lasts several months. Initially, analysts from universities involved in the FAPRI consortium meet to determine the key assumptions that underlie the baseline. Based on these assumptions, preliminary projections are developed and then subjected to outside review. The last step is to incorporate comments from the reviewers, as well as any other changes into the final baseline projections. FAPRI has just recently completed its global baseline for 2000, and these projections will serve as the “yardstick” against which alternative scenarios are analyzed.

This paper will cover three areas. First, a brief overview of the FAPRI baseline for U.S. agriculture will be given. Second, several key indicators from the FAPRI and USDA baselines will be compared and contrasted. Finally, as with any projections, there are always critical uncertainties surrounding the numbers. The paper concludes by examining some of these uncertainties.

### **Summary of the FAPRI Baseline for U.S. Agriculture**

Baseline projections are not forecasts of the most likely outcome, but rather just one plausible scenario highly dependent on the underlying assumptions. FAPRI relies on the WEFA Group, a private forecasting firm, for the macroeconomic variables included in the projections. In general, the macroeconomic projections suggest a reasonably optimistic outlook. By 2001, real GDP growth in developing economies recovers to an annual rate of 5 percent, similar to levels observed in the early 1990's. Developed economies maintain growth between 2 and 3 percent. In the U.S., overall price inflation, as measured by the CPI, is projected at a modest level of 2.5 percent.

As is customary in a FAPRI baseline, current agricultural policies are assumed to hold for the life of the baseline. By assuming constant policies, the baseline provides the “yardstick” against which alternative policies are measured. For the U.S., the FAIR Act is continued with provisions for 2002 extended indefinitely. FAPRI does not assume any new legislation or changes to current legislation beyond what has already been agreed upon. The current baseline does not assume expansion of the European Union or a new WTO agreement, nor does it incorporate China's accession into the WTO.

Assumptions must also be made regarding rates of technological change, both for crop yields and livestock productivity. For the baseline, technological change is generally assumed to continue at rates consistent with recent history, unless there are overriding reasons to assume otherwise. Longer term, these assumptions become critical. For example, yield assumptions have a direct impact on the number of acres that are required for crop production. Likewise, gains in feed efficiency impact the amount of grain necessary to produce a pound of meat.

For the U.S. crops sector, the short-term projections suggest continued pressure on prices, with the long-range outlook characterized by guarded optimism. Since 1996, the crops sector has generally seen favorable yields and higher acreage levels at the same time that demand has been rather sluggish. The result has been that production has exceeded disappearance and stock levels have recovered. Subsequently, prices have fallen, and in some cases, reaching the lowest levels since the mid-1980s. Looking forward, under the assumption of trend yields, prices for wheat and feed grains are expected to show modest recovery in 2000, but still remain below historical averages. Domestic and export demand are both expected to continue to strengthen. For soybeans and cotton, little if any price recovery is expected for 2000. Despite low prices in 1999, acreage devoted to these two crops is expected to increase in 2000. For soybeans, the loan rate is partially responsible for the increased acreage.

Looking toward the end of the baseline, crop prices are projected to recover to levels in line with historical averages. For example, corn prices reach \$2.50 per bushel, and wheat prices top \$3.50 by 2008. Income growth fuels the demand for food on a global basis, allowing U.S. exports to expand. In addition, domestic demand expands as the U.S. livestock sector increases production levels. With demand growth outpacing supply, stock levels of the major grains and oilseeds decline from their recent highs.

The outlook for U.S. livestock shows more favorable times than what has been observed in recent years, particularly with regards to the output price. The beef cycle is in a liquidation phase of the herd, continuing to tighten the supply of feeder calves. The result is projected strengthening in prices through 2003, with feeder steer prices averaging above \$90 per hundredweight. For beef, the long-term outlook depends on relatively stable domestic demand and continued growth in exports.

The U.S. pork sector has just completed two of the worst years, in terms of profitability. The result has been to downsize the breeding herd, leading to projected declines in production for the 2000-02 period. While still below the levels observed in the mid-1990s, pork prices are expected to recover and average above \$40 per hundredweight for much of the projection period. Despite a relatively stable breeding inventory, production approaches 21 billion pounds by 2009 based on gains in productivity.

The projections for broilers and dairy are both characterized by a continuation of recent trends. Broiler production is expected to grow at an annual rate of 3 percent, with the additional production finding a home in both the domestic and export markets. Milk production is also projected to continue its growth, as the increase in productivity more than offsets a declining herd size.

When looking at the sector as a whole, U.S. net farm income in 1998 and 1999 has held up reasonably well despite the low prices. To a large extent, this is due to the increased government payments resulting from the assistance packages. Assuming no additional assistance packages and the declining payments under the FAIR Act, significant pressure on farm income is projected for 2000. In fact, little recovery in aggregate farm income is expected before 2007 as rising output prices are generally offset by increased production expenses.

### **Comparison of FAPRI and USDA's Long-Term Projections**

Before examining the outcomes of the two sets of projections, it is important to first look at the key assumptions. In general, it appears that there are more similarities than differences between the underlying assumptions. Macroeconomic projections in both baselines assume recovery in the Asian economies will continue and income growth in developing economies approach historical levels. The FAPRI baseline does assume slightly stronger growth in the developing economies than USDA. For

2004-2009, FAPRI has annual growth of about 5.5 percent with USDA assuming a slightly lower rate of 5 percent. Policy assumptions are also very similar with both baselines assuming a continuation of current policies. The only differences are areas where the Secretary has discretion to set the exact levels. For example, FAPRI assumes loan rates will be held constant for both 2000 and 2001 and then adjust for the 2000 crop based on the formulas of the FAIR Act. USDA allows the adjustment beginning with the 2001 crop. Perhaps, the most noticeable difference that could impact the resulting price and quantity projections is the Export Enhancement Program (EEP). USDA assumes that EEP expenditures resume in FY 2001 while FAPRI assumes no EEP expenditures throughout the baseline. Regarding technology, crop yield assumptions are also quite similar with only modest differences occurring by 2009.

Turning attention to the projections themselves, do similar assumptions and input data generate similar output data? The answer is a definitive maybe (or maybe not). Baseline projections are the result of combining mathematical models with the judgment of analysts. There are a number of areas where differences and divergence of opinions can arise. The challenge becomes identifying those differences and the reasons for them. Table 1 gives a comparison of some the major indicators from the U.S. baselines generated by FAPRI and USDA. While there are many similarities in the numbers, there are also a few key differences worth exploring.

Looking at price projections for the major crops, FAPRI is noticeably stronger in the near-term with USDA being much more bullish on the long-term price outlook. By 2007-09, USDA corn prices exceed those of FAPRI by about 20%. The short-range differences appear to be associated with export markets. FAPRI has a stronger export demand for U.S. crops in the early years. By the end of the projections, the situation appears to be reversed with USDA's crop exports exceeding those of FAPRI even at a substantially higher price.

On the supply side, there appear to be substantial differences regarding the responsiveness of U.S. acreage as well as constraints on U.S. acres. In the early years, USDA has fewer acres in production of the 8 major crops than FAPRI, even though overall returns are comparable. By the end, acreage levels in USDA's projections are roughly the same as in the FAPRI baseline, but at much higher prices and returns.

With nearly identical supply and demand quantities, yet much higher prices, it appears that USDA's basic supply curve for the crops sector lies to the left of the one assumed by FAPRI. The resulting prices in the USDA baseline increase to levels that are substantially above the per-unit variable costs, suggesting incentives for additional acres both in the U.S. and globally.

When comparing the projections for the U.S. livestock sector, the long-term price differences also become evident. USDA prices exceed FAPRI prices for beef, broilers, and milk. Pork is the one exception. Higher livestock prices are to be expected given the higher feed costs between the two projections. However, it appears that for beef and dairy, output prices are strong enough to support returns and offer incentives to increase production. In the middle of the projection period, FAPRI's beef cow numbers exceed those of USDA's by about 10 percent. As is the case in the crops sector, more pessimism regarding supply potential is evident in the USDA projections.

One final point on the livestock projections regards the price outlook across the various enterprises. By the end of the baseline, beef, broiler, and milk prices recover to levels higher than what was observed in the 1980's and 1990's. However, pork prices remain below historical levels throughout the projection period. Is the new price level reflecting a new cost structure that resulted from the structural changes of

the 1990's? Or is it an indication that the Iowa-Southern Minnesota price may not be accurately reflecting the true output price?

Regarding the sector as a whole, net farm income projections mirror the differences in the price projections. USDA shows substantial weakness in the early years, before recovering longer term. FAPRI's income projections are generally more stable throughout the period.

### **Concerns and Uncertainties**

As with any projections, there are always a number of concerns and uncertainties around the projections. In fact, the only certainty is that just about everything is uncertain. The FAPRI projections are no different. As mentioned earlier, a baseline is just one plausible scenario dependent on the underlying assumptions. Changing any of those assumptions regarding the economy, policy, or technology will alter the results. In addition to these unknowns, projections regarding the agricultural sector must be concerned with a host of other issues.

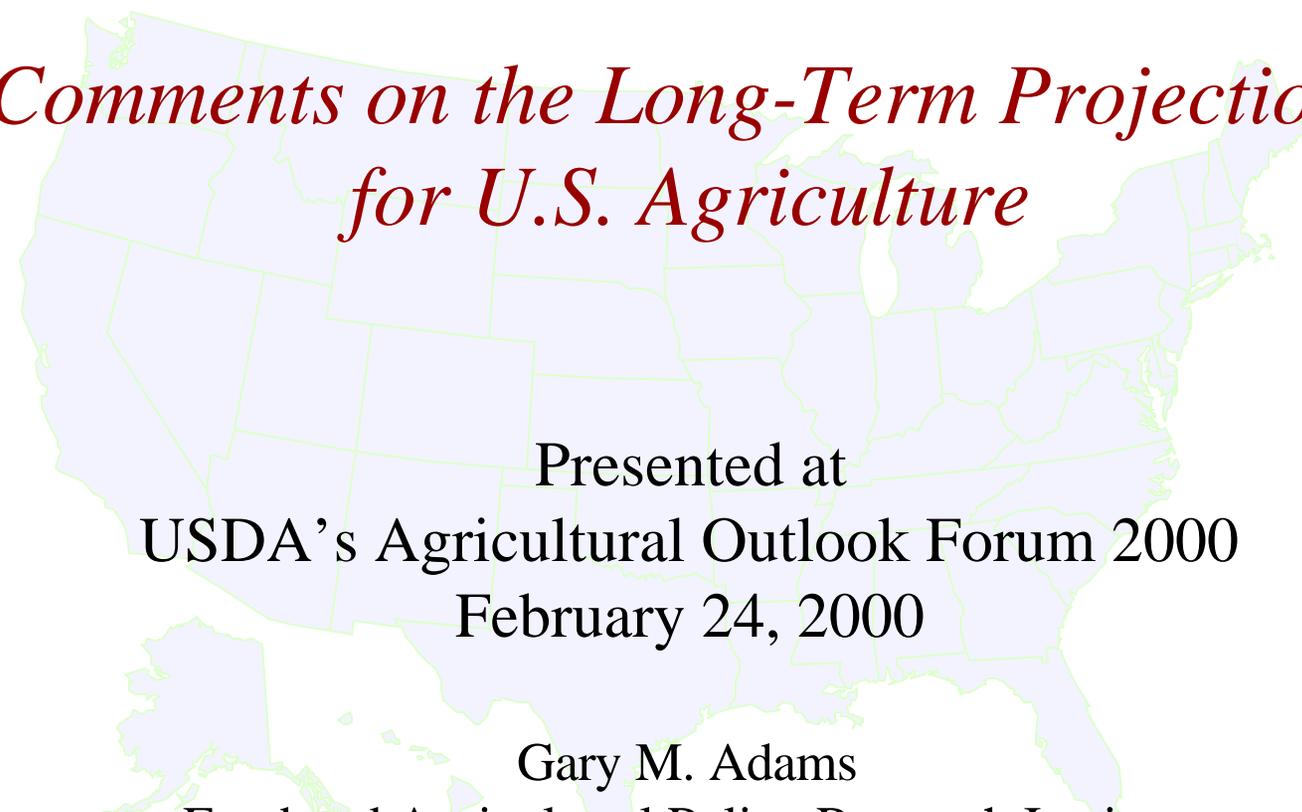
What impacts will recent and future developments in GMO's have on the sector? Are there long-run impacts on the supply and demand for crops? As the production of crops with specialized traits continues to grow, it may no longer be relevant to just look at a corn supply and use table, but instead projections for different types of corn. The degree that this becomes necessary in the next 10 years may ultimately depend on the consumer.

A long-run view of agriculture must also come to grips with the implications of structural change and consolidation. To what extent will these changes impact some of the basic relationships that have held in the past?

Finally, with so much uncertainty and risk surrounding the long-term projections, it is important to provide some indication as to the variability around the deterministic baseline. This is critical in the current environment where so much of the focus is on managing risk. In addition, the pros and cons of many policy options under consideration become evident only in situations where supply, demand and prices are not at average levels but rather near the extremes.

Table 1. Comparison of FAPRI and USDA Baseline Projections

	<i>2000-02 Average</i>			<i>2007-09 Average</i>		
	<i>FAPRI</i>	<i>USDA</i>	<i>Diff.</i>	<i>FAPRI</i>	<i>USDA</i>	<i>Diff.</i>
<b>Planted Area</b>			(Million Acres)			
Wheat	63.5	61.7	-1.8	66.4	67.8	1.4
Corn	78.4	76.5	-1.9	80.6	79.8	-0.8
Soybeans	72.9	73.9	1.0	73.0	71.5	-1.4
Upland Cotton	14.4	13.7	-0.7	13.7	13.4	-0.3
Rice	3.5	3.3	-0.1	3.3	3.2	-0.1
8-Crop	249.6	246.1	-3.5	253.1	253.4	0.3
<b>Crop Exports</b>			(Million Units)			
Wheat, bu	1,150	1,158	8	1,239	1,475	236
Corn, bu	2,083	1,967	-116	2,562	2,408	-154
Soybeans, bu	1,017	1,023	6	1,053	1,012	-41
Up Cotton, bales	7.96	7.07	-0.89	7.59	7.70	0.11
Rice, cwt	94.2	87.2	-7.1	81.6	73.3	-8.3
<b>Crop Prices</b>			(Dollars per Unit)			
Wheat	3.00	2.60	-0.40	3.54	4.18	0.65
Corn	2.13	2.00	-0.13	2.42	2.90	0.48
Soybeans	4.55	4.25	-0.30	5.61	6.43	0.82
Upland Cotton	0.48	NA	NA	0.61	NA	NA
Rice	6.92	5.72	-1.20	8.26	8.20	-0.06
<b>Livestock Prod.</b>			(Billion Pounds)			
Beef	25.1	24.2	-0.9	27.5	24.3	-3.1
Pork	18.5	18.7	0.2	20.4	20.5	0.1
Broilers	31.8	32.1	0.3	38.5	37.6	-0.9
Milk	168.0	168.6	0.6	184.0	182.7	-1.3
<b>Livestock Prices</b>			(Dollars per Cwt)			
Beef	73.11	69.43	-3.69	68.03	80.87	12.84
Pork	41.37	37.71	-3.66	42.89	39.86	-3.03
Broilers	57.17	56.33	-0.84	55.82	64.10	8.28
Milk	12.68	13.42	0.74	13.05	15.80	2.75
<b>Net Farm Income</b>			(Billion Dollars)			
	40.21	36.97	-3.25	43.11	54.63	11.52



*Comments on the Long-Term Projections  
for U.S. Agriculture*

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Food and Agricultural Policy Research Institute

**FAPRI**



## What I'll Cover

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- Comparison of major results from the FAPRI and USDA projections
- Key uncertainties around the projections

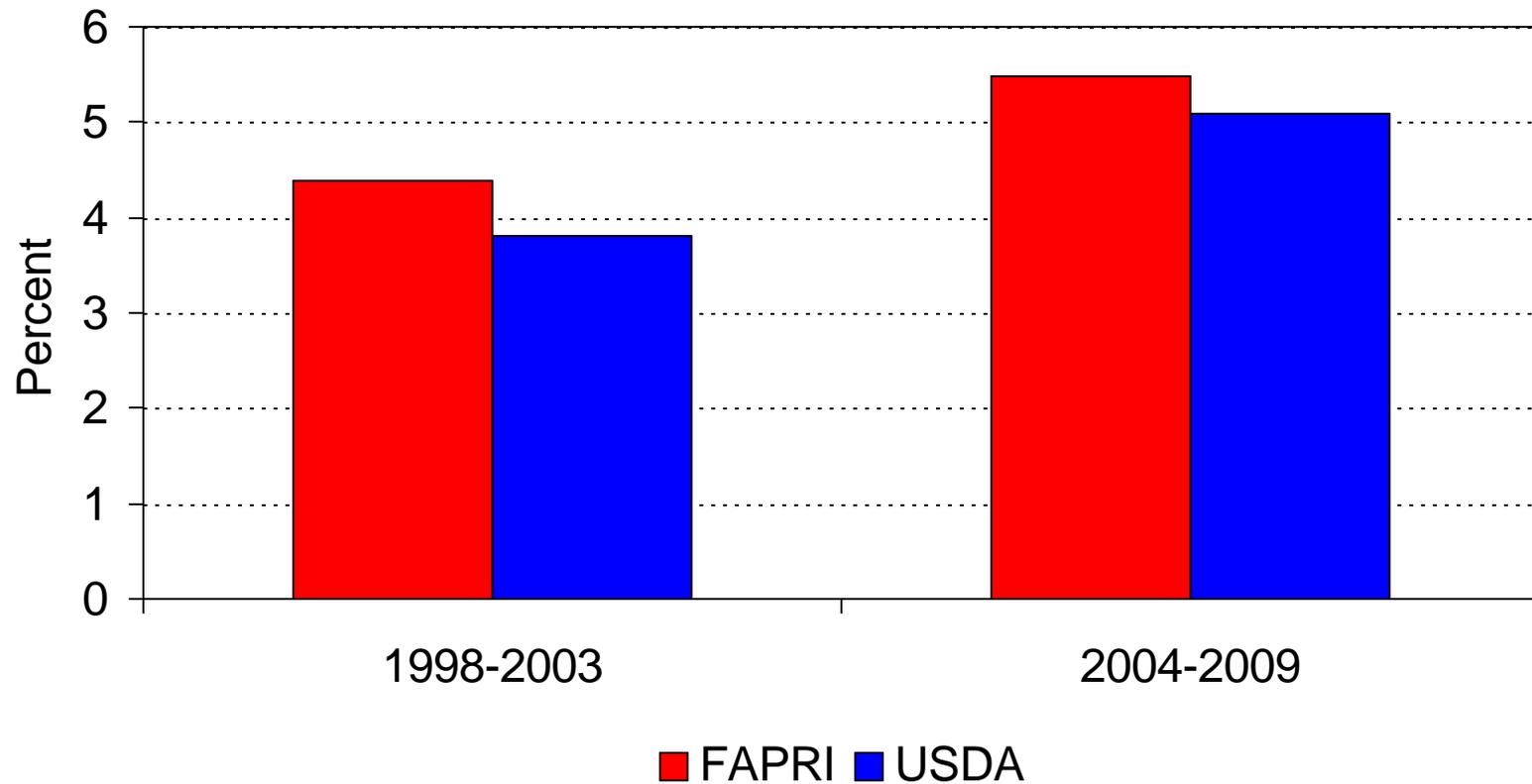
# Comparing Baseline Projections

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- Baseline projections are not forecasts of the most likely outcome, yet one plausible scenario dependent on the underlying assumptions.
- Before examining the outcomes, it is important to first look at the key assumptions.
  - Macroeconomic
  - Policy
  - Technology

# Macroeconomic Assumptions, FAPRI has Stronger Real GDP Growth in Developing Countries

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# Policy Assumptions,

(Similar but there are some differences)

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- Same (or close to it)
  - FAIR Act (flexibility, loan rates)
  - Step 2 for cotton
  - CRP
  - Int'l Policy (EU, WTO)
  - Dairy
- Different
  - Export Enhancement Program

# Technology

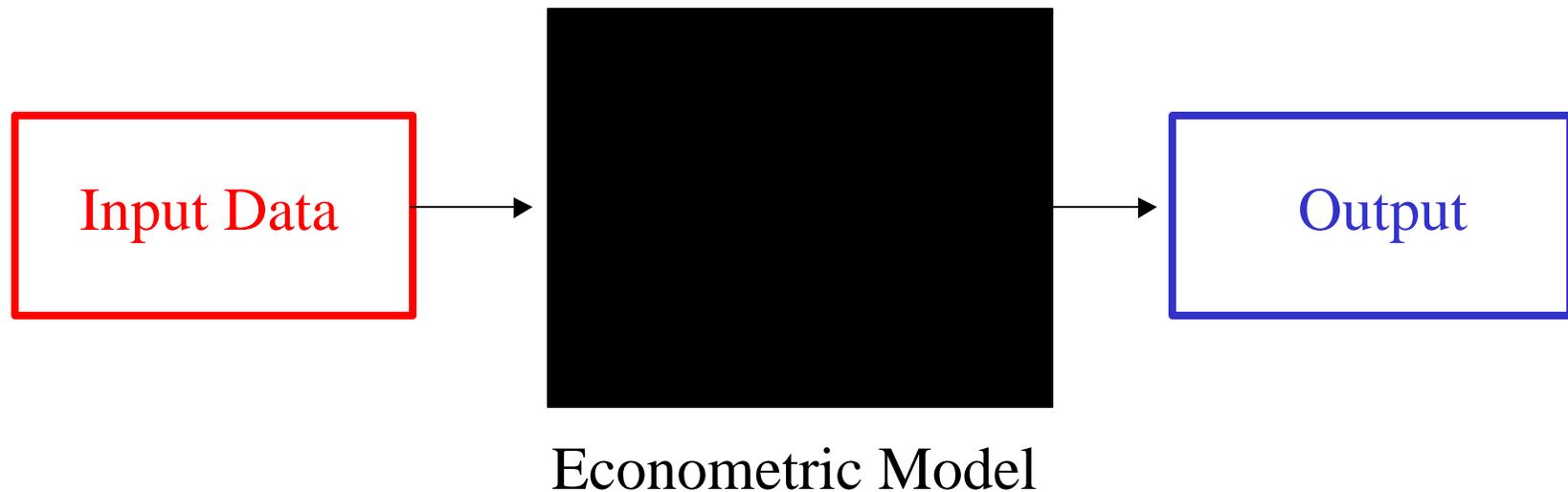
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- Similar Crop Yields
  - By 2009, 1.5 bu difference in corn and 0.5 bu difference in soybeans. In wheat, USDA is 2 bu higher.
- Livestock Productivity
  - USDA - Stronger milk yields consistent with smaller herd.

# What About Baseline Results?

## Does Similar Input Generate Similar Output?

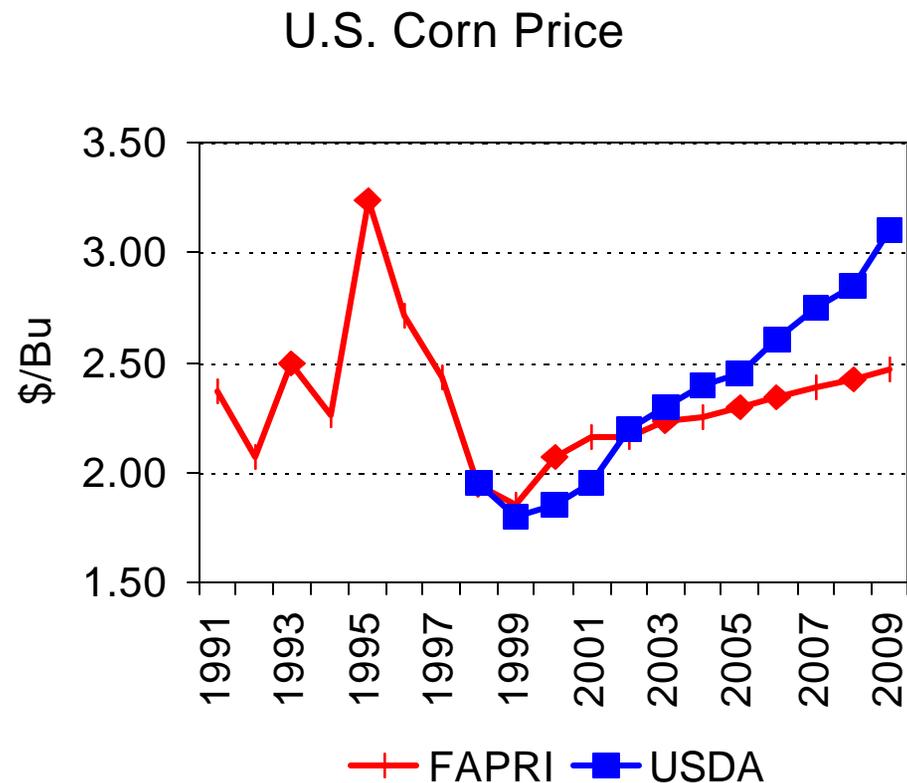
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# Comparing Price Projections

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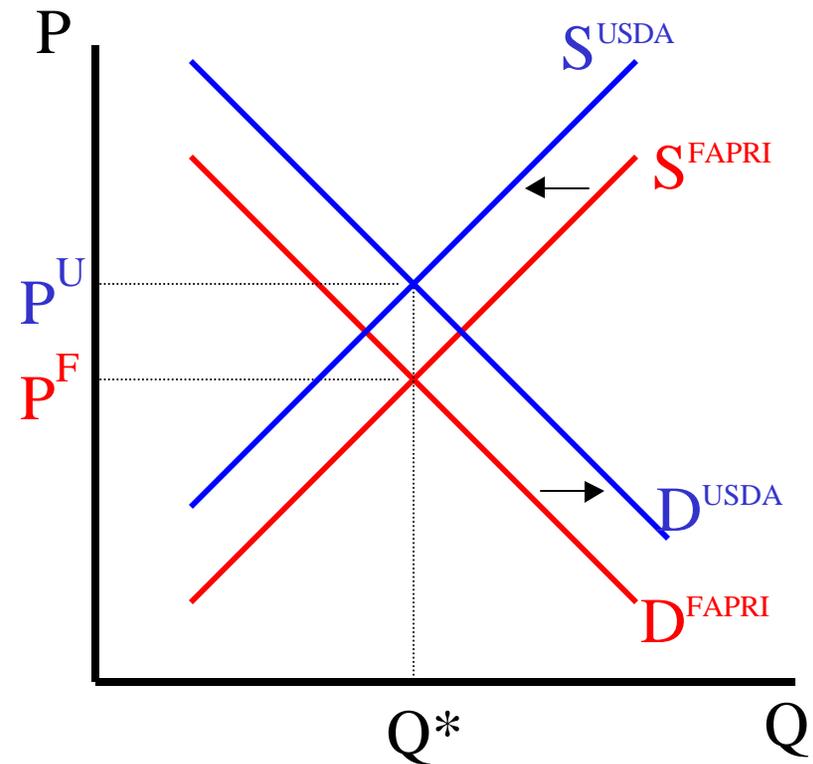
- In most cases, FAPRI prices are stronger in the near term.
- Prices in the USDA baseline are well above FAPRI levels by the end of the projection period.



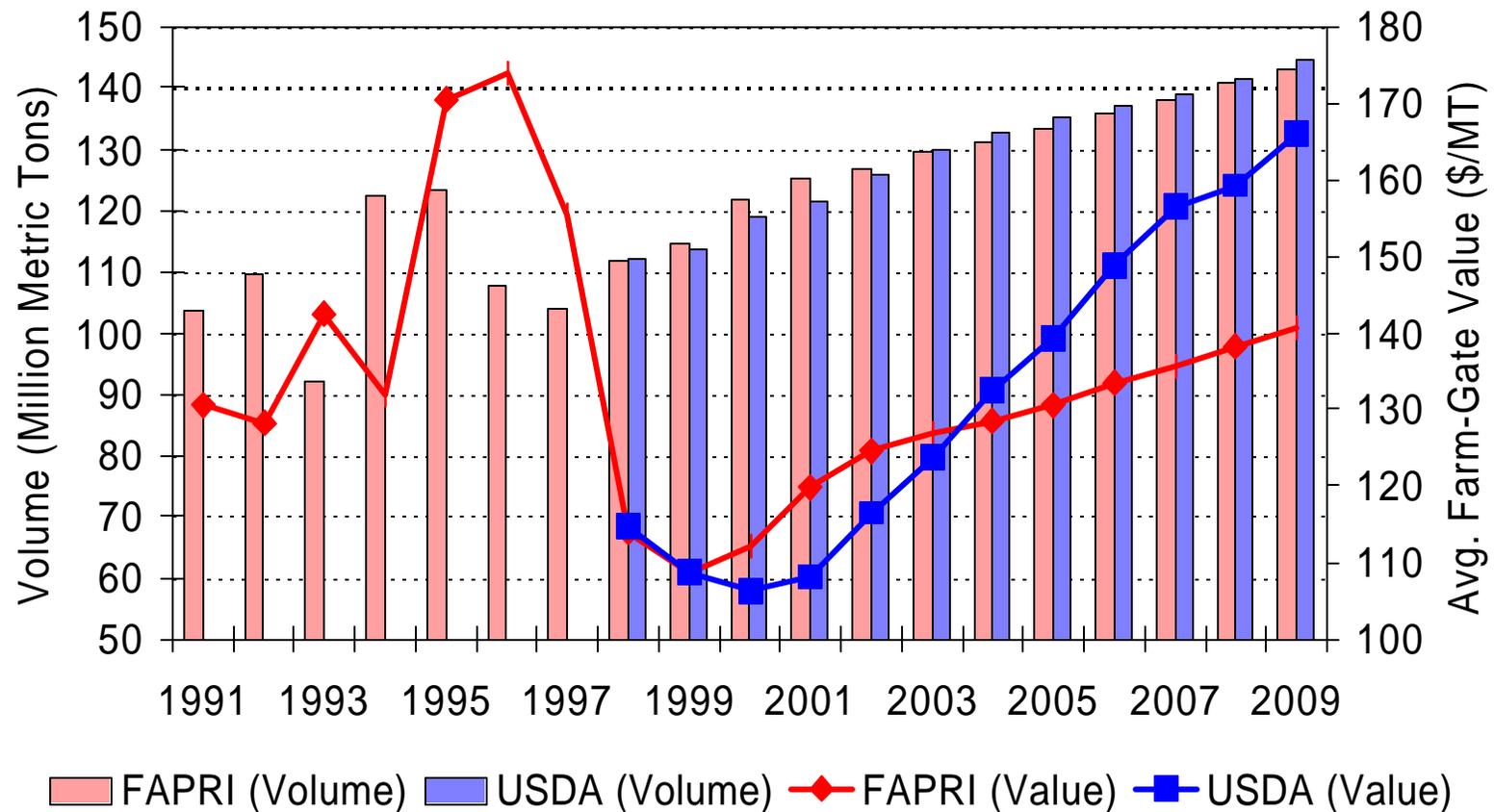
# Supply & Demand for the Crops Sector

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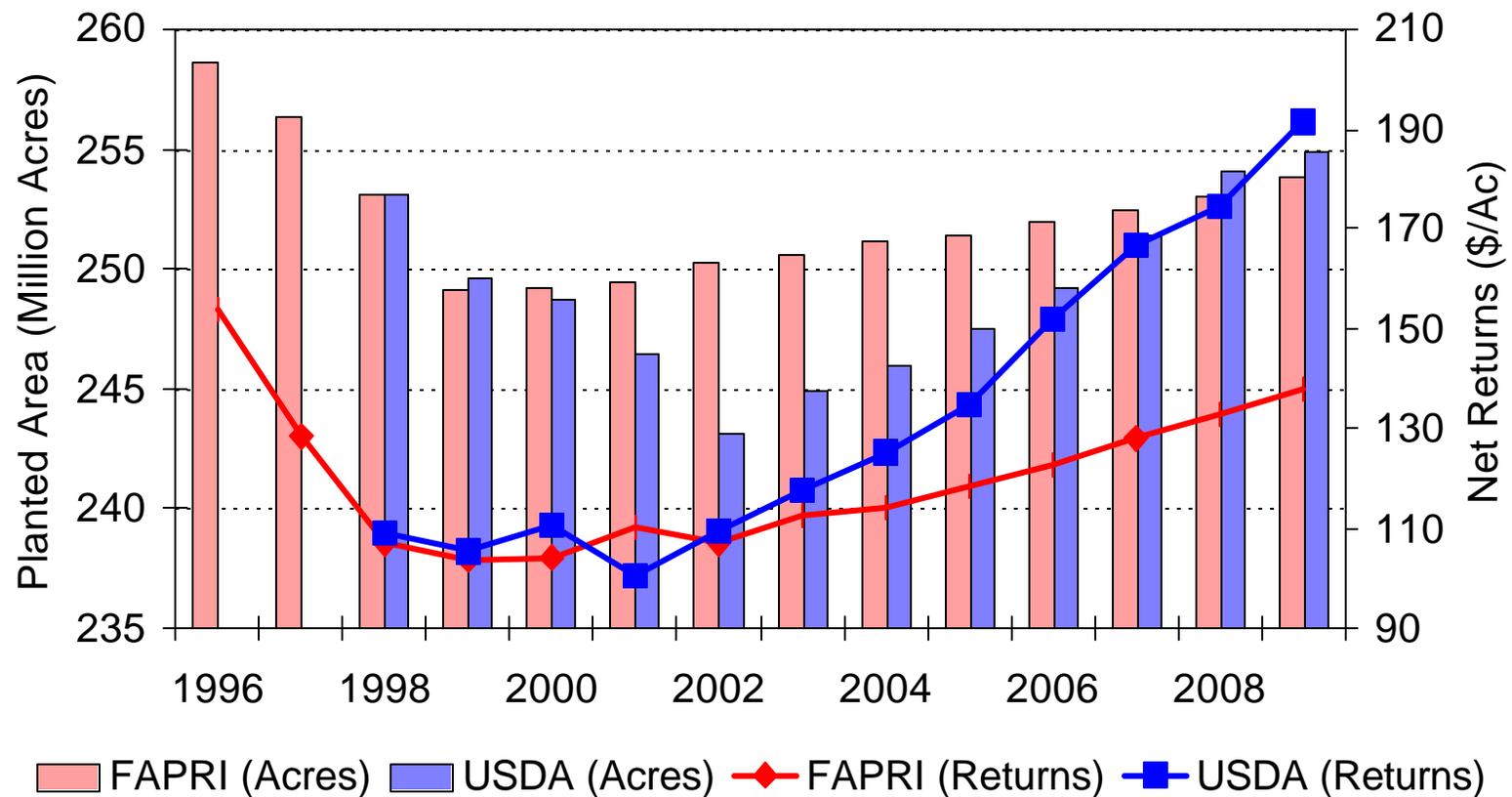
- Longer term, projections from FAPRI and USDA show similar quantities, but at much different price levels.



# U.S. Crop Exports (Corn, Food Grains, Soy Sector)



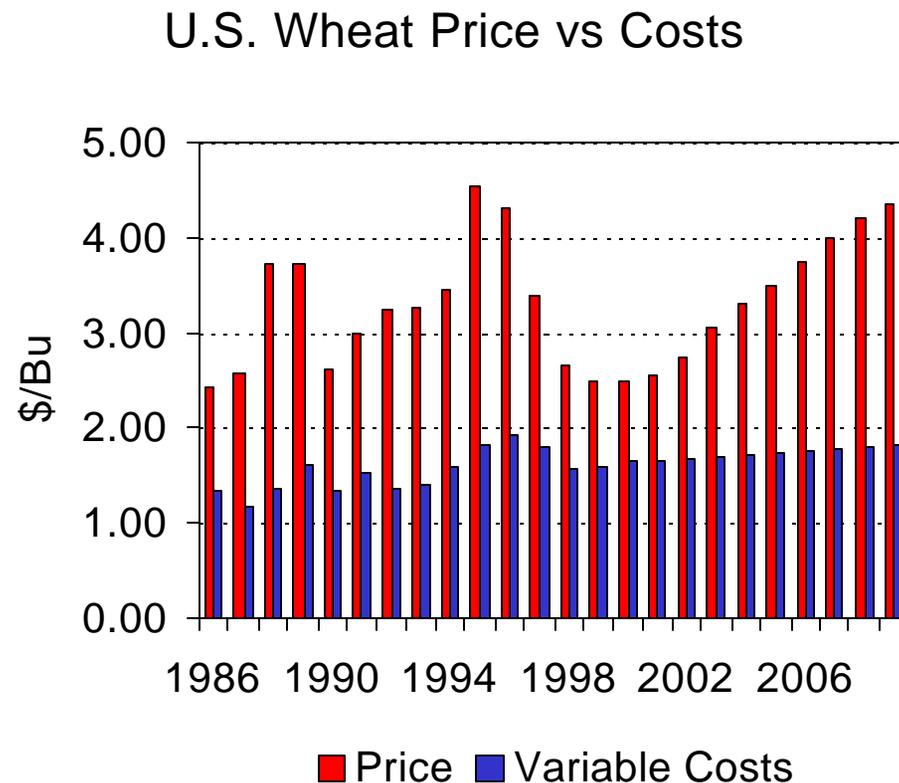
# 8-Crop Planted Area



# Question about Crop Sector Projections

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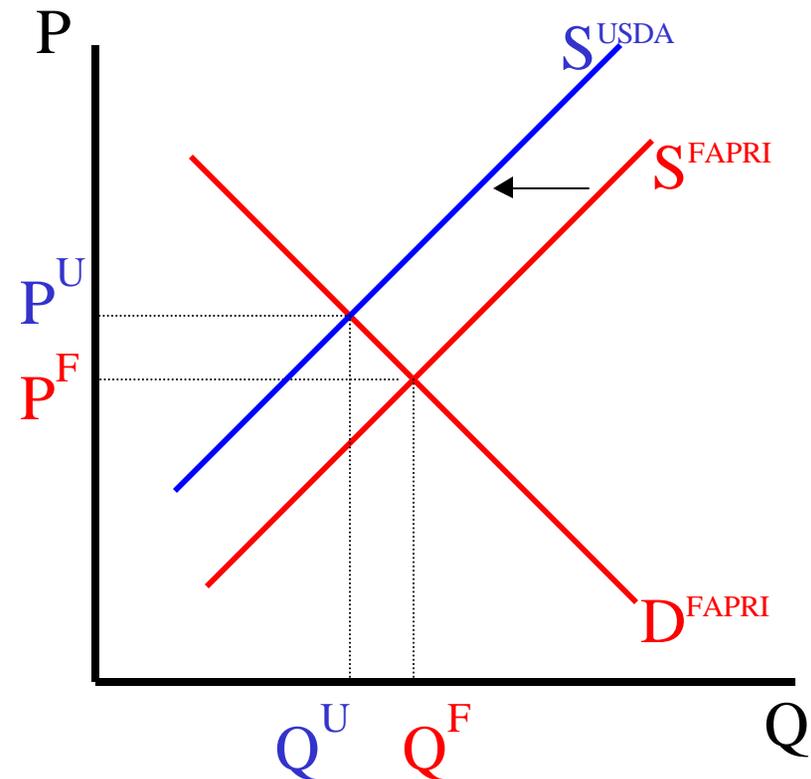
- Given the strong prices longer term, is there enough supply response, either in the U.S. or globally?



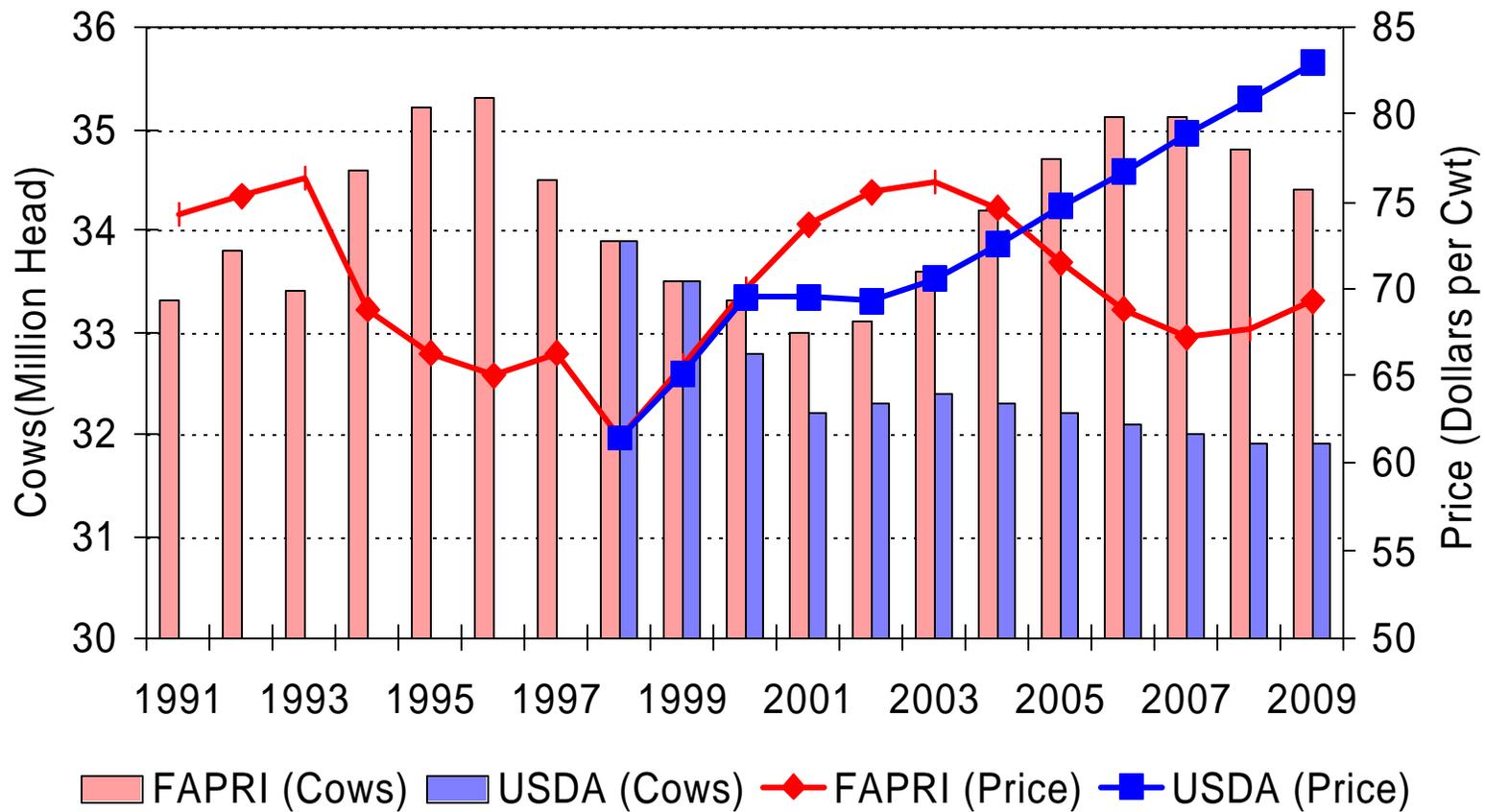
# Supply & Demand for Beef and Dairy

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- USDA projections have lower supplies and higher prices
  - Feed costs play a role in the differences.
  - There still appear to be incentives to increase production.



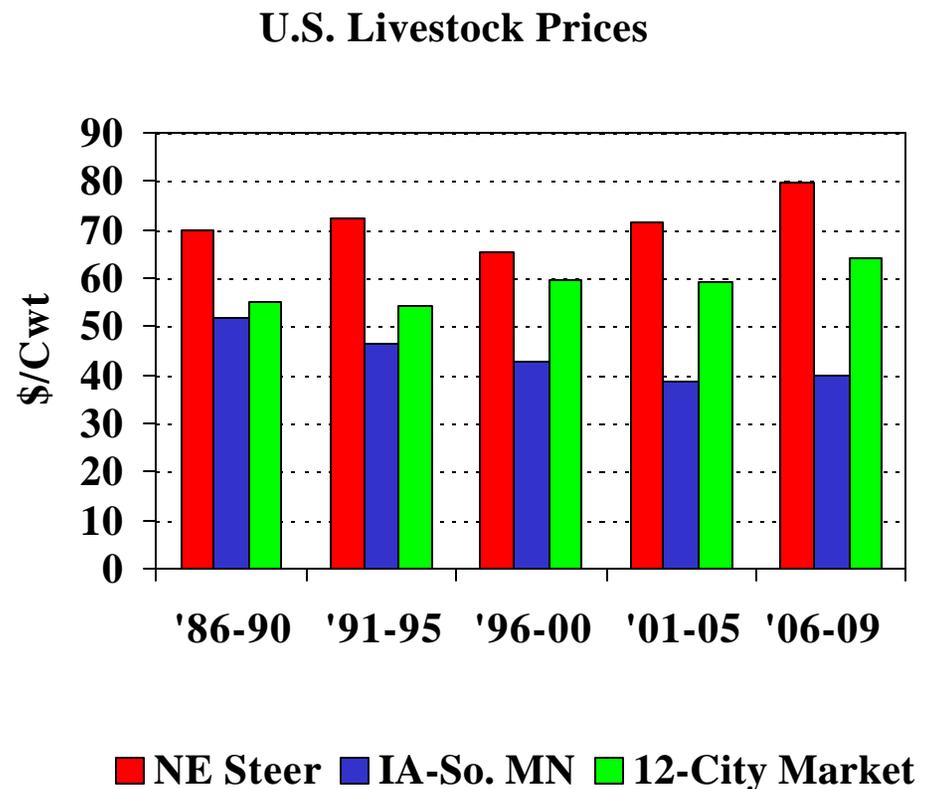
# Beef Cows vs. NE Steer Price



# Question about Livestock Sector Projections

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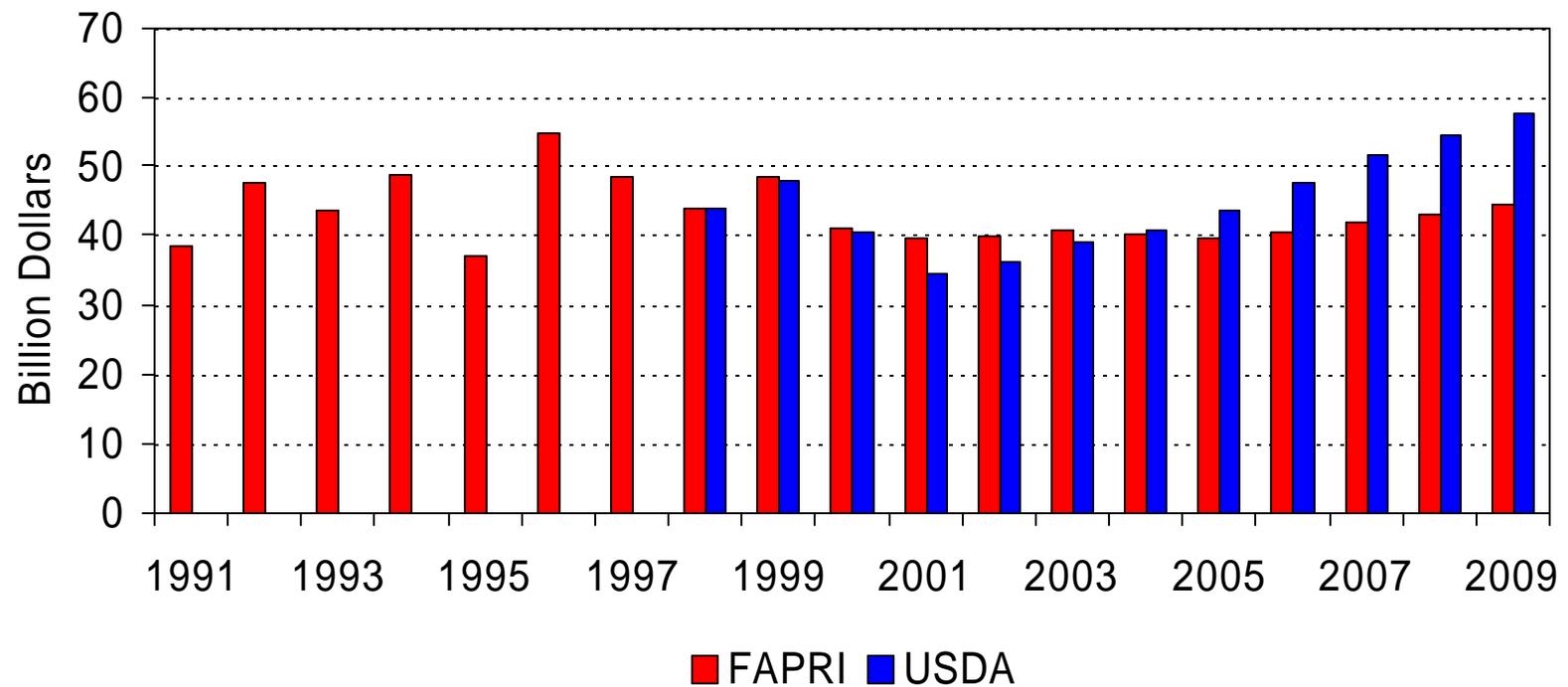
- Relative to historical averages, pork prices are quite a bit lower.
- Other sectors show stronger prices relative to history.



# What About the Sector as a Whole?

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## U.S. Net Farm Income



# In Conclusion, Certainties & Uncertainties?

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- Certainties
  - Just about everything is uncertain.
- Uncertainties
  - Usual concerns about assumptions for macro, policy, and technology
  - In addition, there are others:
    - GMOs (or GEOs)
    - Structural Change
    - Variability and Risk

# Variability Around the Projections

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- Many of the current policy questions can't be analyzed against a deterministic baseline.
- We must look at variability around supply, demand and price.

U.S. Corn Farm Price

