Economic Crisis in the Pork Industry: Situation, Outlook and Response

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Situation

The U.S. pork industry is undergoing the longest and deepest economic losses in the past 20 years. Farm records compiled by the University of Minnesota Center for Farm Financial Management (CFFM) (www.cffm.umn.edu) show losses were $13.40 per head sold in 2007 and $10.27 per head sold in 2008. Estimates from Iowa State University suggest losses have been even greater: $14.55 per head in 2007 and $21.99 per head in 2008. The deeper losses estimated by Iowa State are because they assume that only prices impact profits. However, actual farm records likely demonstrate that producers respond to lower prices by trying to change production practices thereby reducing costs and providing some mitigation.

CFFM data shows losses for the industry, which had a federally inspected market hog harvest of more than 104 million head in 2007 and 111 million head in 2008, total about $1.4 billion in 2007 and more than $1.1 billion in 2008. This total of more than $2.5 billion in losses since 2007 is greater than the estimated $2.4 billion losses in 1998, which according to CFFM records was a one year event followed by positive profits typified by the usual hog cycle.

Based on year to date numbers, 2009 is shaping up to be even worse than 2007 and 2008 making this the longest continuous stretch of losses for the modern pork industry. My projections, based on cost parameters from CFFM and hog, corn and soymeal prices from January 2009 – September 2009, estimate losses of $30.85 per head for 2009. For any individual producer, this number will be higher or lower depending on when and at what price they purchased feed inputs and marketed hogs, and *how* they marketed hogs (for a negotiated price or under some form of contract). The losses are more dependent than normal on these factors because of the extraordinary volatility the pork industry has faced during the past two years. For example, the 27 percent of producers that sell under "other market formula" or "other purchase arrangements" instead of on a "negotiated" basis or a "swine/pork market formula" basis, sold hogs at an average of $6 per hundred pounds of carcass weight higher. If a producer purchased a significant share of corn in fall 2006 for 2007 feeding needs, the producer paid about $2.40 per bushel for corn. If corn was purchased throughout 2007 or 2008 a producer paid an average $3.39 to $4.78 per bushel for corn and if the producer purchased at the high of 2008, as many

ethanol plants did out of concern for even higher projected prices, the producer paid as much as $5.47 per bushel. In short, this hog cycle has much to do with conflicting market signals and some key decisions that may be as much about luck as about management, arguably victimizing otherwise good producers.

It is likely losses will continue well into 2010. Pigs born in October 2009 will be sold in April 2010. With current corn prices at $3.54 per bushel and April 2010 Lean Hog futures prices trading at about $65 per carcass hundred-weight, producers will just break-even on these pigs assuming all feed needs for finishing are purchased now. However, corn prices are once again rising and delay breakevens further into the future. The period between October and April will be worse, with average losses between $10 and $23 per head. At current market hog harvest rates about 2.5% less than 2008, the total expected loss for 2009 will be about $3 billion. This will bring the three year total losses to over $5.5 billion since the beginning of 2007.

How Did the Pork Industry Get Here?

Non-Pork Sector Causes

How did the pork industry get into this situation? There is one very direct reason the pork industry had losses beginning in 2007 – high corn and soybean meal prices that began in August 2006. Figure 1 shows the prices of corn and soybean meal back to 1996. In August 2006 there was a sharp increase in prices of all crops; this dramatic change did not allow pork producers to respond with reduced production.

What was the cause of higher crop prices? Figure 2 shows total corn demand by type of use. There has been an increase in corn use for food, feed and industrial uses which includes ethanol. Part of this increased use was due to renewable fuel standards, but it's unlikely that this was the sole cause of the dramatic price increases. Another factor was the rapid global economic growth and declining dollar which led to increased demand for commodities including oil and grains, and also an increase in meat demand that itself increased demand for feed grains and oilseeds. This rising global growth, coupled with rising demand affecting broader commodities is a key factor in the pork industry's lack of immediate response.

All indications in 2006 and even into 2007 were that global demand for agricultural commodities would continue to rise. Although a forward looking pork producer was concerned about rising grain prices, the reasonable expectation was that hog and pork prices would eventually follow. Essentially, like much of the rest of the world, including Federal Reserve Chairman Bernanke (*WSJ, 7/*16/08), pork producers expected growth to continue and prices to rise – allowing global growth to pull them out of the looming cost price squeeze.

The expected potential for price improvement is shown by the dramatic increase in pork exports in Figure 3. In hindsight, this chart also shows how much exports have declined since the highs, although pork exports remain on long run trend in recognition of the overall strength of demand for U.S. pork.

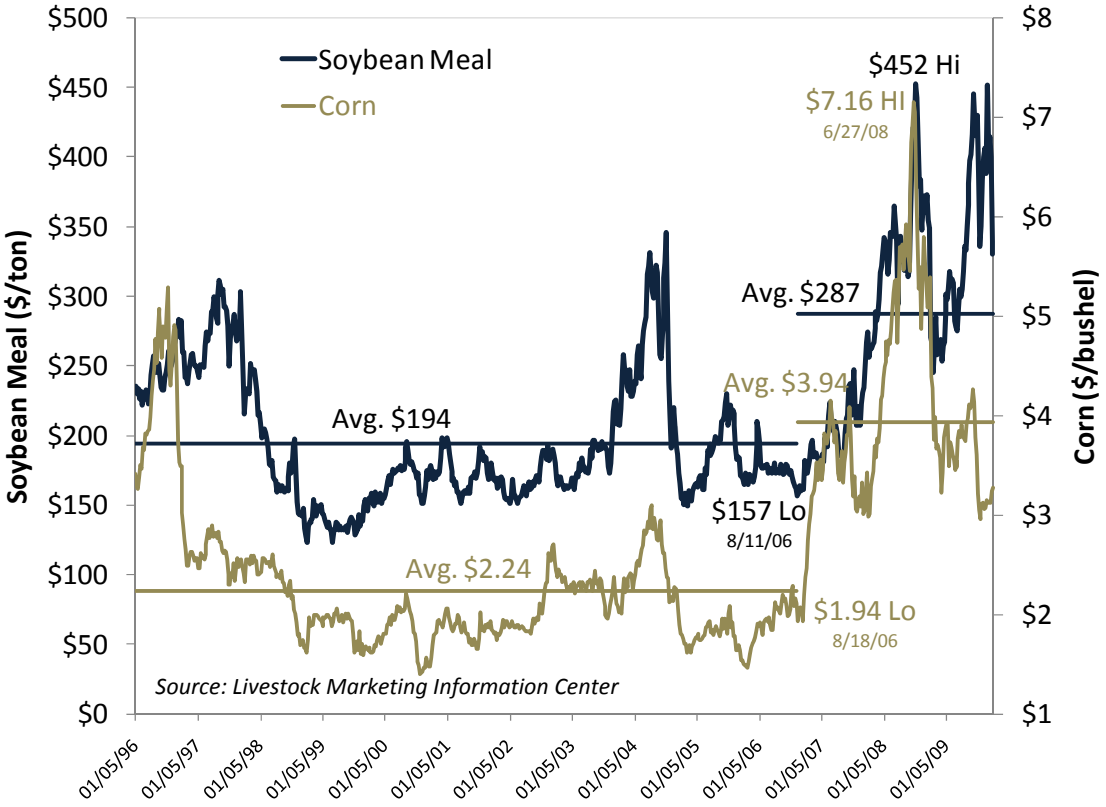

Figure 1. Weekly Omaha no. 2 corn and Decatur 48% protein soybean meal (1996-present).

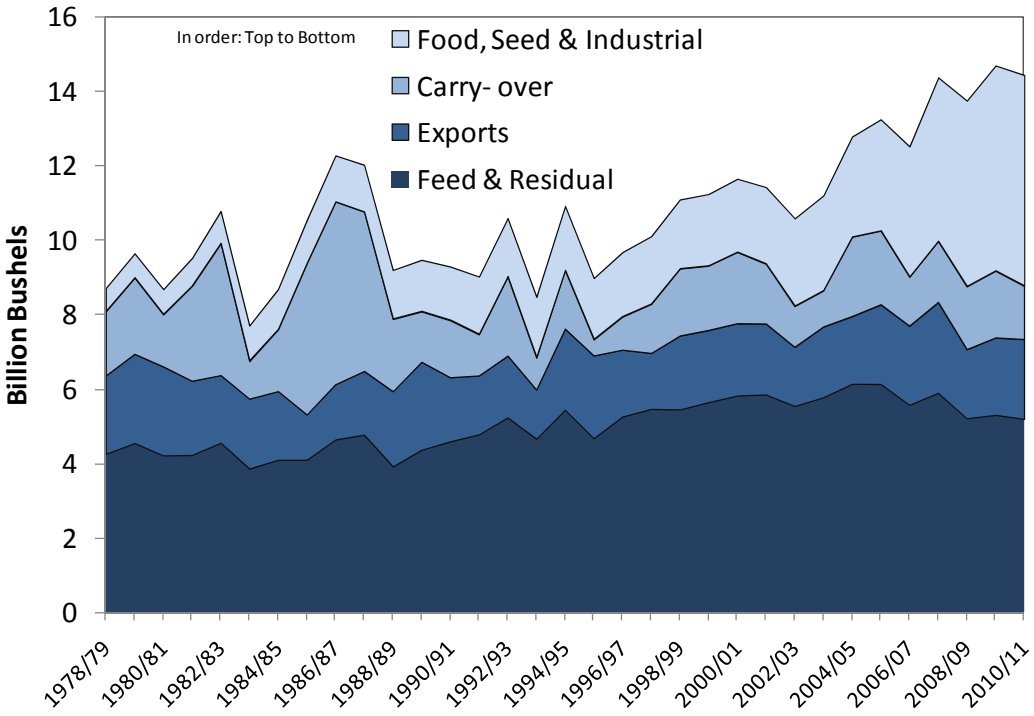

Figure 2. Total corn disappearance by type of use. *Source: USDA, ERS Feedgrains Database.*

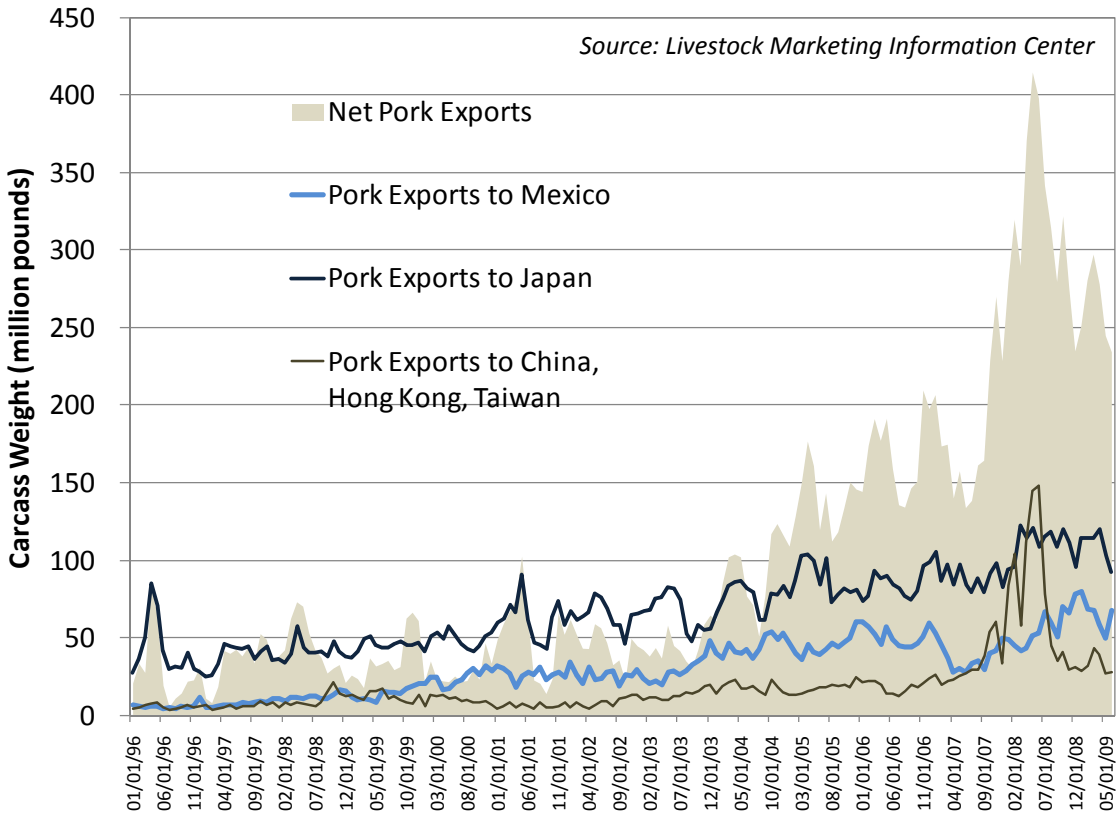

Figure 3. U.S. total net pork exports and pork exports to selected countries.

Part of this brief run-up in exports was due to global economic conditions and illustrated by the dramatic fluctuations associated with the dollar shown in Figure 4. As shown, pork exports increased as the value of the dollar decreased more rapidly beginning in 2002 and 2003. Exports, especially to China, react in tandem with the currency exchange rate primarily because the Chinese yuan does not freely float, so that a declining dollar or increasing dollar almost impacts the cost of pork to China on a one-for-one basis. This has again created global volatility difficult for pork producers to respond to, and which is not driven solely by the supply and demand factors fundamental to the pork sector. This trade relationship is also impacting other protein sectors such as dairy products.

Pork Industry Fundamental Causes

Certainly fundamental aspects of pork markets have played a role in the current crisis. Figure 5 shows annual September hog inventories. The overall trend for breeding herd is declining, primarily due to the increased productivity for each sow in the breeding herd. The productivity contrast is shown by the sharply increasing market hog inventories. This productivity increase has allowed producers to maintain a reasonably valued pork product for consumers, even in light of rising feed costs. The large relative increase in market hog inventories in 2007-2008 is due to a new porcine circovirus vaccine that reduced hog mortalities. This was another factor (economic shock) not anticipated by pork producers when making production decisions.

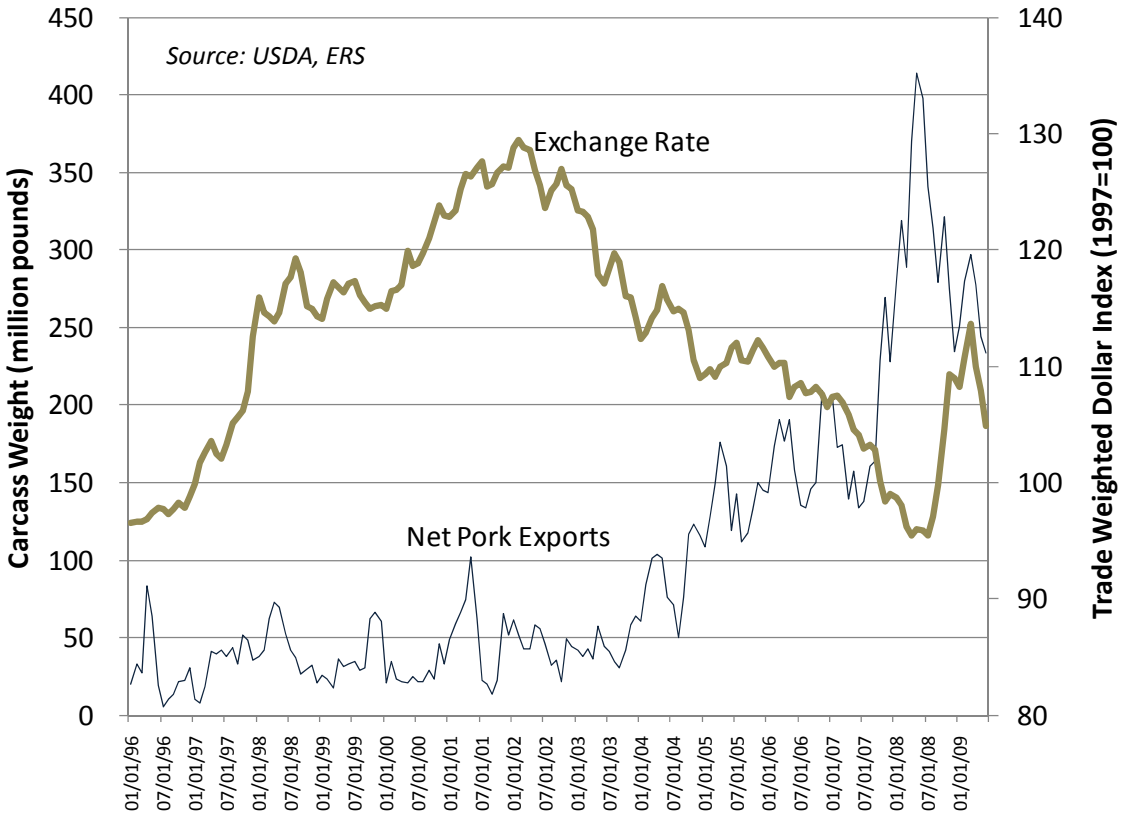

Figure 4. Trade weighted dollar exchange rate index and net pork export relationship.

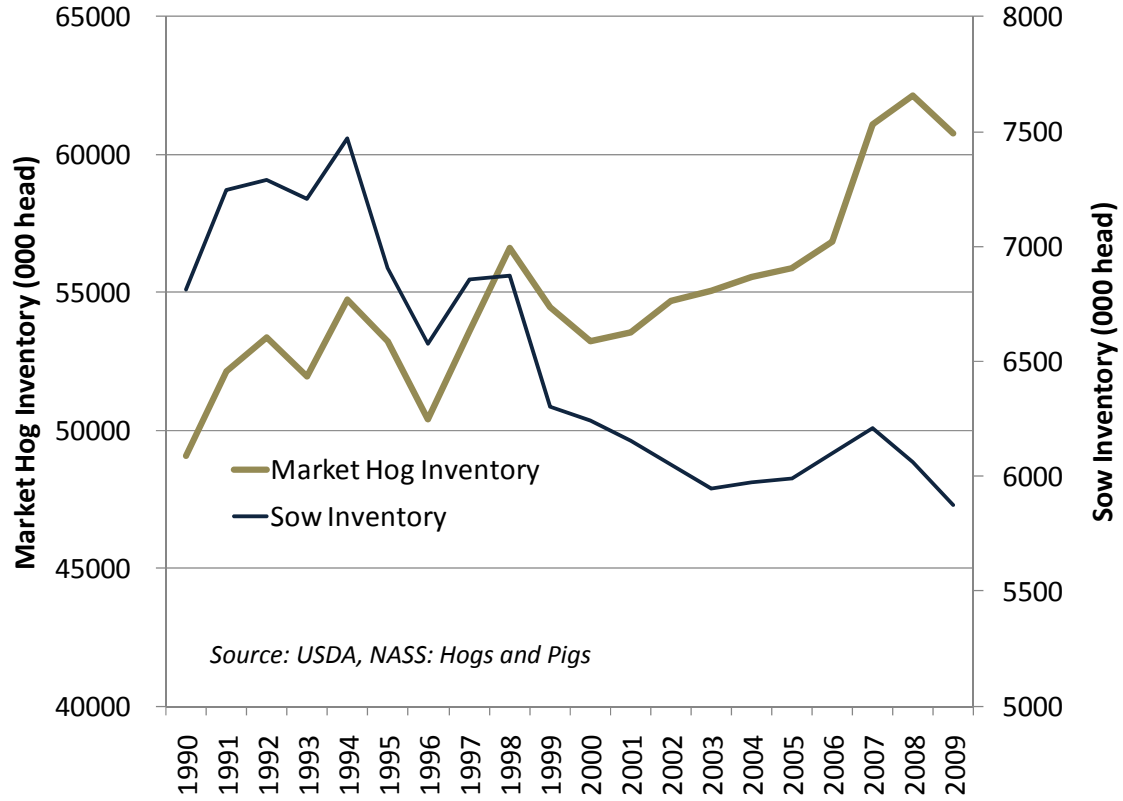

Figure 5. Hog inventory trends and increasing productivity per sow.

Higher inventories resulted in both higher slaughter and production levels during 2007 and 2008 as shown in Figure 6. The rising production levels relative to slaughter (narrowing gap between slaughter and production) are due to higher slaughter weights in hogs. This is again due to production efficiency improvements where hogs can be fed more cost effectively to heavier weights using less feed.

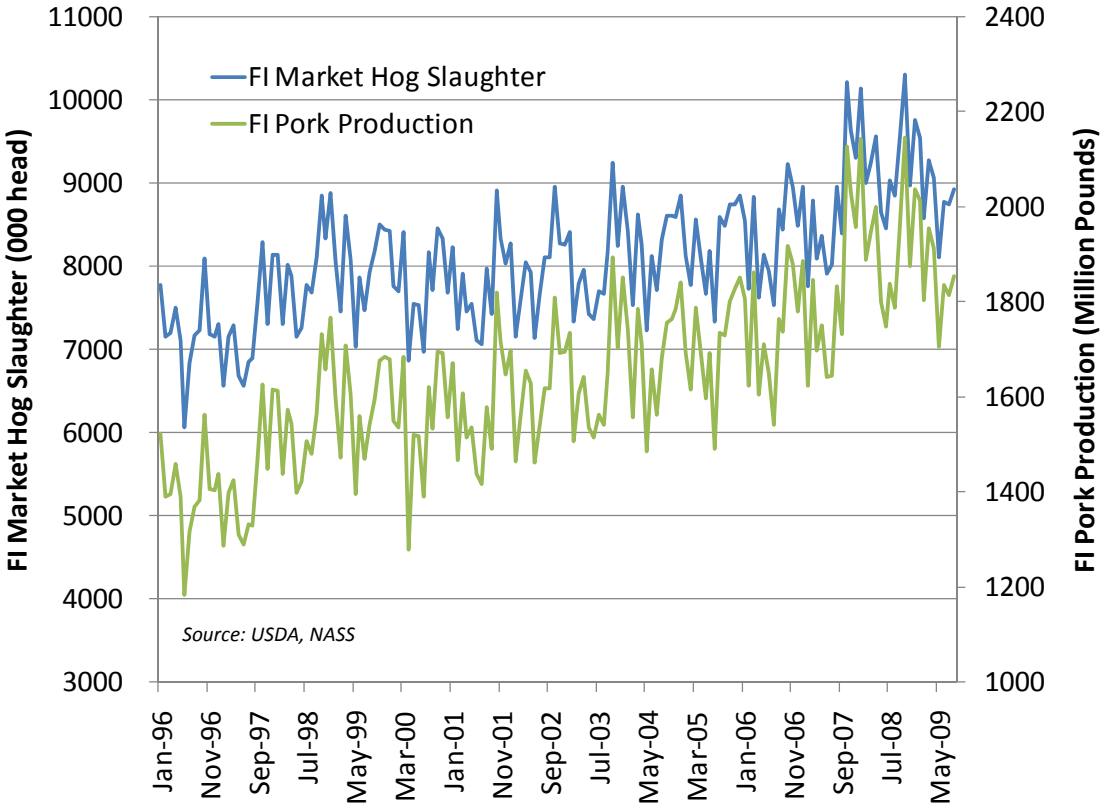

Figure 6. Federally inspected hog slaughter and pork production.

As shown in Figure 5, the pork industry is now responding to the sharply deteriorating market conditions experienced in 2009 by reducing breeding herd and market hog inventories by about 2.5 percent. However, using an equilibrium model of the pork industry that allows for simulation of quantity and price relationships, it is estimated that the total reduction in pork supplies to achieve the 21 percent increase in prices necessary to reach break-even is about 10 percent – or an additional 7.5 percent reduction in hog and pork supplies. This dramatic reduction in pork production will also result in a nearly 30 percent increase in retail pork prices, increasing food prices at a time of rising unemployment and declining personal income.

The demand side of the pork fundamentals is somewhat mixed. Figure 7 shows a scatter plot of pork demand with a linear trend line fit to represent price quantity trade-offs by consumers. Points approaching the origin represent weaker demand and points moving up to the right represent stronger demand – that is, consumers willing to consume more pork at higher prices. Domestic pork demand has been low relative to historical levels ever since 2005. This has been offset by very strong export demand for U.S. pork and these points also belie the fact that total

consumption is at record levels, because it is affected by total population. Still, maintaining pork demand is a key concern as the economy weakens, unemployment rises, and personal incomes decline (Figure 8). Surprisingly, 2009 has been relatively strong (higher quantity consumed at slightly higher prices) compared to 2008 especially in light of concerns regarding the effects of H1N1 on consumer perceptions regarding pork safety. The Food Industry Center in Applied Economics at the University of Minnesota has created a "Consumer Food Safety Tracker" to track consumer knowledge about media information on food safety events. On April 29, 2009 they began tracking consumer response to H1N1. Within 3 weeks 99.3 percent of consumers had heard of H1N1. More importantly, in the first 13 weeks, 3.6 percent of respondents said they would avoid eating pork and 2.5 percent said they would avoid eating pork in the last five weeks (ending late September). It is not clear what impact this has had on actual demand, but it illustrates the importance of communication and effective information on these issues that could adversely affect demand. In summary, two key external factors – weakening consumer purchasing power and H1N1 also are likely to negatively impact pork demand.

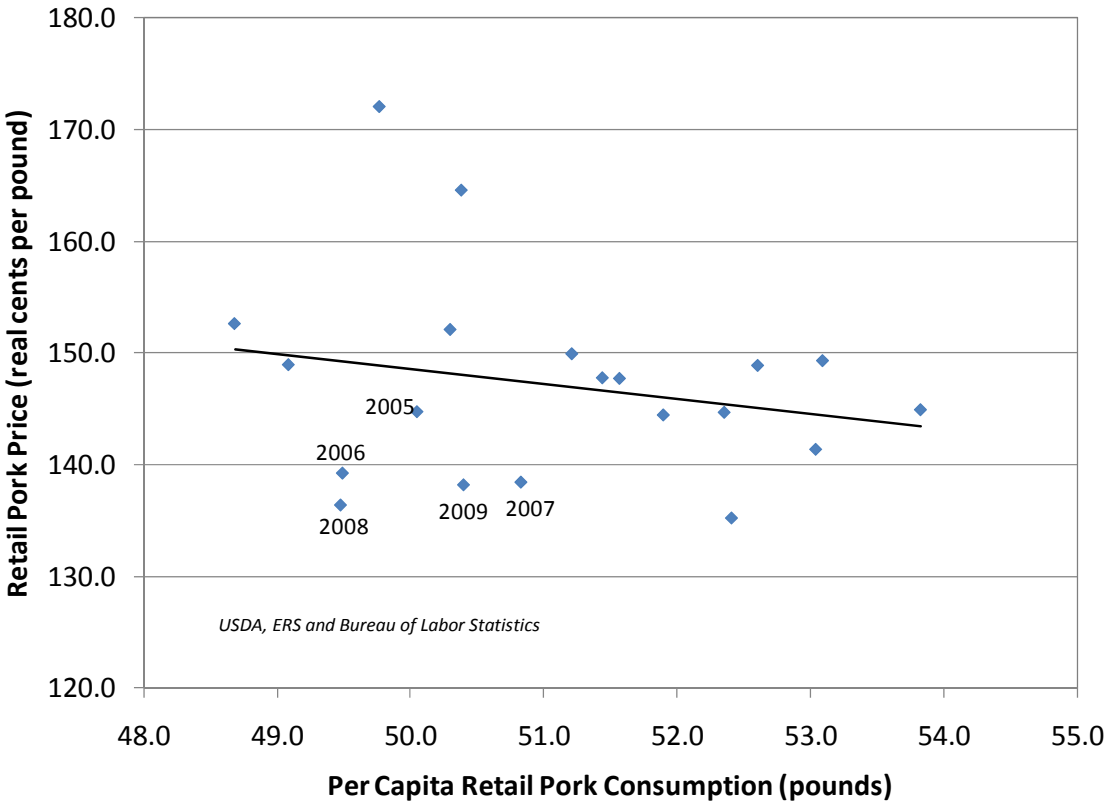

Figure 7. Retail pork demand, 1990-present.

Many unforeseen factors including food and grain price inflation brought on by global economic growth, a declining U.S. dollar and rising oil prices placed cost pressure on pork production. This was followed by the global economic crisis that dramatically increased the value of the dollar and reduced foreign demand for U.S. pork products. Domestically, a new vaccine to reduce circovirus death loses increased supplies while rising unemployment and the emergence of H1N1 influenza softened domestic consumer demand for pork.

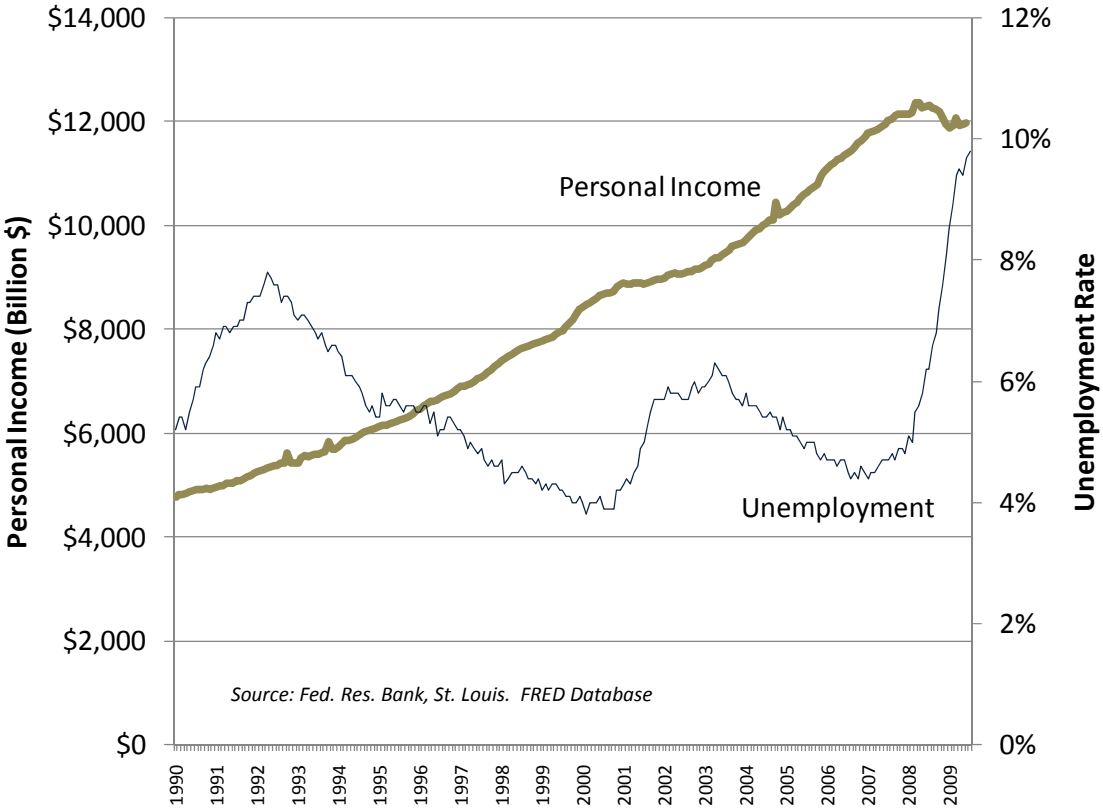

Figure 8. U.S. unemployment rate and personal income levels, 1990 – 2010.

Why Didn't Pork Producers Reduce Production Sooner?

With two years of loses, why didn't pork producers reduce production sooner? Are pork producers responsible for mismanaging their production? The answer is no. Figure 9 shows a continuous series of futures prices for the June Lean Hog futures contract for the period 2006-current. These are the hog prices a pork producer would look at in making production decisions.

For the entire period of 2007 through 2010, the June Lean Hog futures price averaged $76.06/carcass cwt. These prices were easily observed by producers, and accounting for soybean meal prices ($310/ton), weaned pig prices ($35/head) and other costs, result in a break-even corn price of $4.86/bushel. Therefore, producers rightfully formed expectations that hog production would be profitable. Unfortunately, Figure 9 also shows that national cash hog prices (the price actually received at delivery) averaged $62/carcass cwt. for the period, $15/carcass cwt. below the average futures price, and most likely due to the external economic shocks described earlier.

June has on average the highest seasonal price of the year. However, a similar result emerges for December hogs which tend to average about 10% lower than the overall annual average for hogs. Figure 10 shows the average December futures price of $65.64 was closer to the average cash price of $62.53, but most producers would look at this futures price as a seasonal low anticipating that the average for the rest of the year would be higher. Even assuming this price, the breakeven corn price with $310 per ton soybean meal would have been $3.54/bushel, only about $0.40 below the average price of corn the past several years.

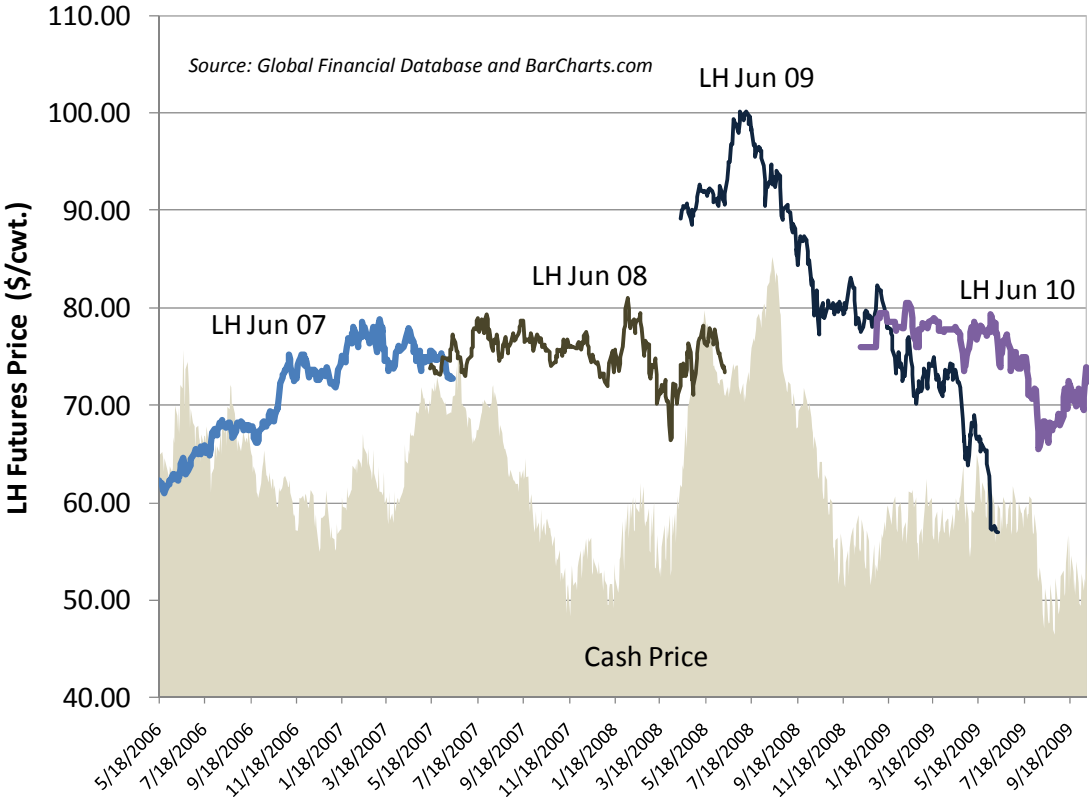

Figure 9. Continuation series of June Lean Hog futures prices 2007-2010.

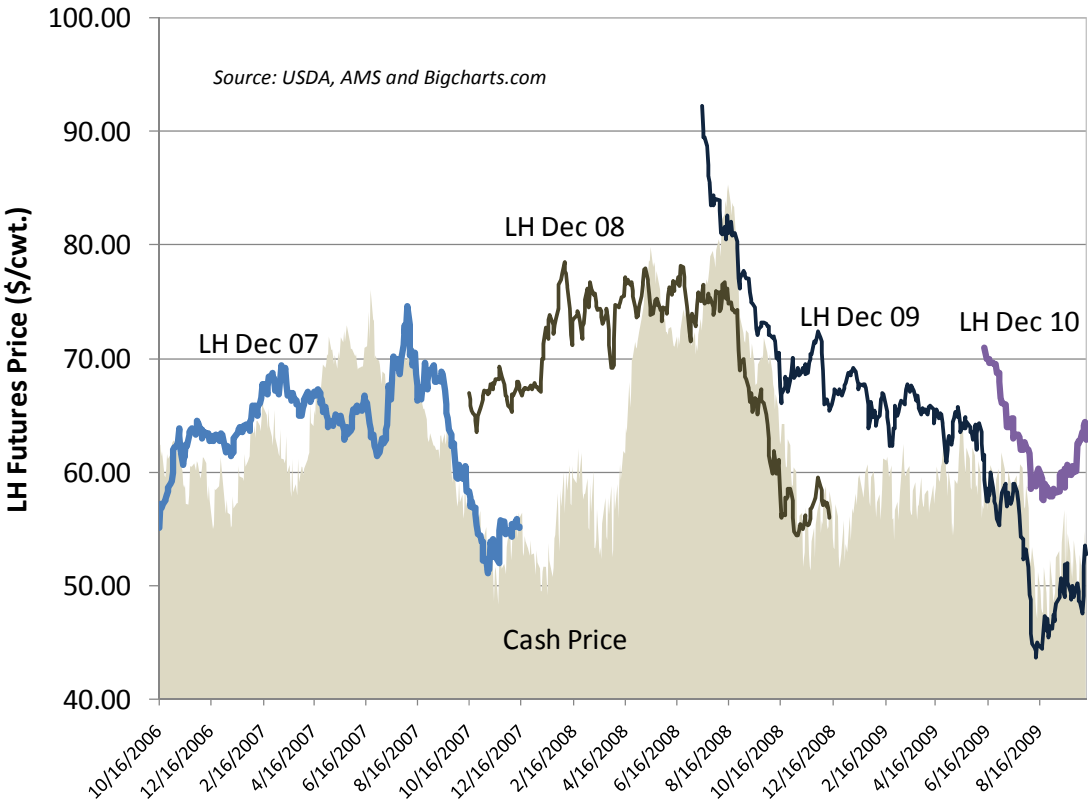

Figure 10. Continuation series of December Lean Hog futures prices 2007-2010.

Obviously, corn prices were rising during this period, so it is possible that producers should have cut back if they expected losses due to rising costs. Figure 11 shows the hog-corn price ratio for June Lean Hog futures and July Corn futures as a proxy for profit margins. The results again show that for all but mid-2008 when corn prices spiked dramatically, pork producers could expect hog production to be profitable. Again, as market conditions eroded for hogs more than corn the actual cash prices received resulted in much lower returns than anticipated and likely forestalled more rapid and decisive reductions in the herd.

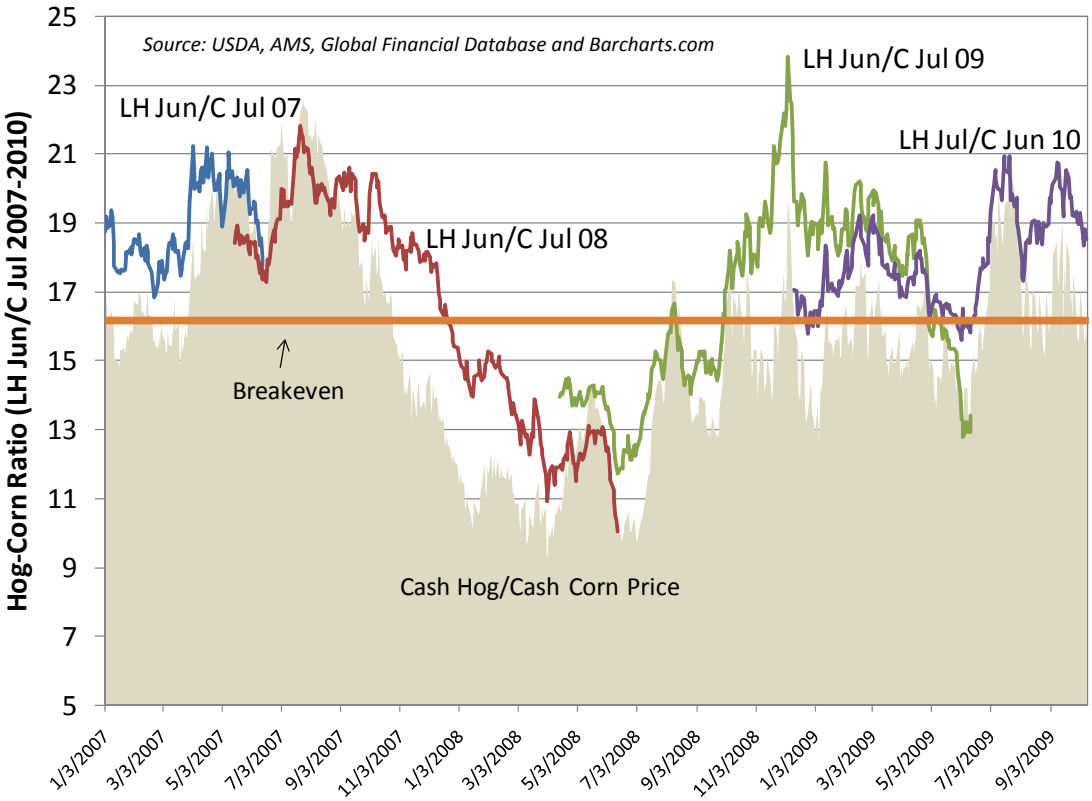

Figure 11. Hog-Corn price ratio comparison of expected profit margins.

This illustrates that while profitability remained negative, producers were reasonable in expectations from a theoretical standpoint that higher feed costs would eventually lead to higher hog prices. The observed futures markets provided real evidence that the theory was supported by traders and one could argue that futures traders also bought into that theory. However, very few anticipated the global financial crisis causing a dramatic run up in the dollar reducing export demand; the public relations disaster of the H1N1 flu virus being misnamed swine flu; the productivity boosting benefits of a new circovirus vaccine; and the prolonged downturn in employment and personal income that will likely reduce demand.

Even with these unanticipated shocks, why didn't pork producers lock in profits when they had the opportunity to do so? The primary reason is the extreme volatility during this period. During periods of rapidly changing markets, locking in prices can be as risky as just staying in the open market expecting that hog prices would follow corn prices as described earlier. The ethanol

industry provided a dramatic illustration of what could happen if proper hedges weren't placed. In addition, the use of hedges or options becomes more costly during these periods as hedge margin requirements increase and option premiums can be very high due to high volatility. Figure 12 shows the implied volatility of corn from 2005 to 2009. Implied volatility is calculated based on option premiums for underlying futures contracts. A higher volatility implies more risk and option premiums are higher to account for this risk. From 1997-2004, the annual average implied volatility was 23.64 percent, since 2004 it has averaged nearly 33 percent and recently it has hovered between 40 and 50 percent, making it difficult to execute risk mitigation strategies.

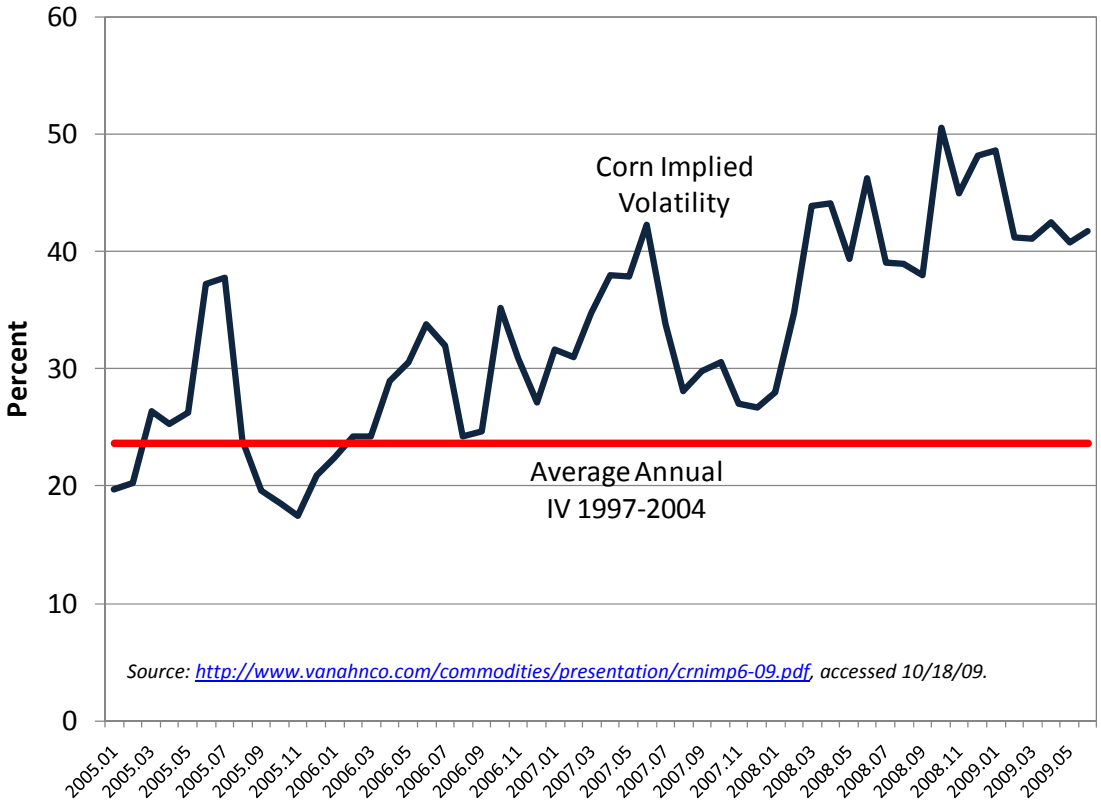

Figure 12. Corn implied volatility.

The concern going forward is that this economic scenario of high volatility and rapid cost increases will repeat itself. Crude oil prices are again rising, moving from $66/barrel in September to nearly $80 per barrel in mid-October for December Crude Oil futures. With the link to ethanol, December 2009 corn futures have also rallied from near $3/bushel in September to near $3.80 in October. Further increases will deepen the pork industry's losses and extend their length.

Producers are beginning to respond with lower production, primarily because they have eroded their equity base in production and can no longer simply hope that markets improve as has been anticipated. As described earlier, by mid-2010 there should be a rise in pork prices and profitability. There is potential, given the deep economic distress, that the liquidation will be

extreme, on the order of 10 percent of total production. A disorderly and extreme liquidation will ultimately harm consumers, also under economic distress, by increasing retail pork prices by as much as 30 percent.

What Are Some Possible Policy Responses?

The pork industry functions as a relatively competitive market with mostly secondary benefits from price and income stabilization programs. However, given the short term nature of this problem it is possible to provide some support to producers that can help mitigate the crisis.

1. *Provide capital or loan guarantees to agricultural lenders to support competitive pork producers.* While many community and local banks have withstood the credit crisis relatively well compared to the global banking community, the ability to continue to carry significant losses on their balance sheet is limited. Providing capital to lenders allows for them to work with producers and counsel them on strategies going forward while helping to provide a more stable transition.

2. *Financial mediation for pork producers.* Anecdotally, farm mediators in Minnesota are being overwhelmed with new cases. Many veteran mediators who may have retired from extension service or other agencies are being called back. There is a real need to train and attract more professionals to serve as farm mediators. The Extension Service is one possible conduit to provide mediation support services to help producers make good decisions under financially stressful circumstances. This should also include family counseling on stress.

3. *Expand educational programs in marketing and business planning.* As the report demonstrates, there were ample opportunities for producers to lock in profits using futures or other risk management strategies. Those who have the necessary marketing skills have done quite well, however, those who do not, have had substantial loses. Increasing support of educational programs on risk management can benefit pork producers. Greater sophistication is needed with greater systemic volatility.

4. *Pork purchasing programs for school lunch and food shelf aid.* According to the Minnesota Department of Human Services, the number of households using food stamps increased 30 percent from 2008-2009 and visits to Minnesota food shelves were greater than 2 million for the first time (*Star Tribune, 9/28/09).* At a time of high demand for food assistance programs, it seem natural to purchase pork to help support unprecedented needs based on nearly 10% unemployment rates and declining personal income.