

A Look at Factors Causing the Fall 1998 Live Hog Price Decline

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The average live hog price for the fourth quarter of 1998 was \$19.48/cwt. (USDA). This price was 48% lower the average price received during the third quarter of 1998 (\$37.53 was the average price reported). Figure 1 is used to graph historical live hog price and head slaughtered. Although fall 1998's large price decline was attributed primarily to a large increase in domestic hog slaughter and pork production (U.S. Department of Agriculture), two factors separated it from previous hog market price declines. First, it was larger than expected based upon historical hog market supply and demand relationships and, second, the price decline was much more severe at the live hog market level than at the wholesale level. The objective of this research was to estimate the impact that changes in different factors (slaughter numbers, average dressed weight, cold storage stocks, and industry processing capacity) had on the live hog price decline.

To accomplish this task data was gathered from sources such as the Livestock Marketing Information Center and USDA. We used monthly data from January 1981 through December 1999 to provide sufficient observations to allow to make specific statements with a high degree of confidence. Multiple regression was used to ascertain the specific impact on live hog price from a specific change in one of the explanatory variables in the model. Multiple regression is used to evaluate the impact of a specific event when there are several variables simultaneously leading to a change in the event being examined. For our study, we were interested in determining to what extent several factors might have in explaining changes in live hog price (specifically, the Iowa-southern Minnesota price) over time - though we were very interested in determining to what extent specific factors had on the fall 1998 live hog price decline. The models estimated generally explained the variation in live hog price pretty well. If so desired, the full manuscript with complete model details can be downloaded at:

<http://agecon.lib.umn.edu/ncr134.html>.

Instead of showing the regression results from the equations estimated, the results were used for simulation of the fall 1998 (figure 2). The simulation was carried out for the change in live hog price between the third quarter and fourth quarter of 1998. This price decline was \$18.05/cwt. The variables found to have the greatest impact on the fall 1998 live hog price decline were an increase in head slaughtered, over utilization of the pork industry's capacity to slaughter hogs available, increased weight of the animals, and increased cold storage stocks. From figure 1 below, average daily head slaughtered during the fourth quarter of 1998 was 10% higher than the during the third quarter. Based on the regression results, this increase caused over 50% of the decline in live hog price. However, increased cold storage and over utilization of hog processing plants each accounted for around 20% of the decline in live hog price. Lastly, increased dressed weight accounted for slightly over 10% of live hog price decline.

The results of this study found that several factors contributed to the fall 1998 live hog price decline. Furthermore, information from this research can be used to assess the impact on price from future changes in one or more of the explanatory variables. One specific area of current discussion and future discussion is whether there is sufficient processing capacity in the hog industry to handle large supplies of hogs. Historical information on the intensity of use of

hog processing facilities is not available. For our study we constructed a variable to approximate the intensity of use of hog processing facilities (called utilization to capacity).

Figure 3 is used to illustrate the change in processor utilization to capacity. Over time, this variable has trended toward one. This indicates processors are running plants at nor near capacity. There has been considerable structural change in pork processing facilities over this time period. During the 1980s packers typically operated an 8 hour single-shift 5 day week, where packers could effectively increase capacity by 50% by moving to a 10 hour day and processing animals on Saturday. Because of economies of size, packers shifted away from the traditional slaughter week. Now, packing facilities typically operate two processing shifts and a third shift used for clean-up. The processing capacity of most packing facilities can only increase by operating during the weekend. There are two costs of expanding operation into the weekend: 1) overtime is paid; 2) loss of worker efficiency from not having days off. Thus, when processing facilities are over used, packers must pay lower prices for animals to offset the costs of operating plants additional hours.

Parcell, J.L, J. Mintert, and R. Plain. “An Empirical Examination of Live Hog Demand”
 Presented paper at NCR-134 Conference on Applied Commodity Price Analysis,
 Forecasting, and Market Risk Management, ed. T.C. Schroeder, Dep. of Agr. Econ.,
 Kansas State University, 2000:22 p. <http://agecon.lib.umn.edu/ncr134.html>.

Figure 1. Monthly Average Nominal Iowa - Southern Minnesota Barrow & Gilt Live Hog Price and Monthly Average Daily Slaughter (February 1981 - December 1999).

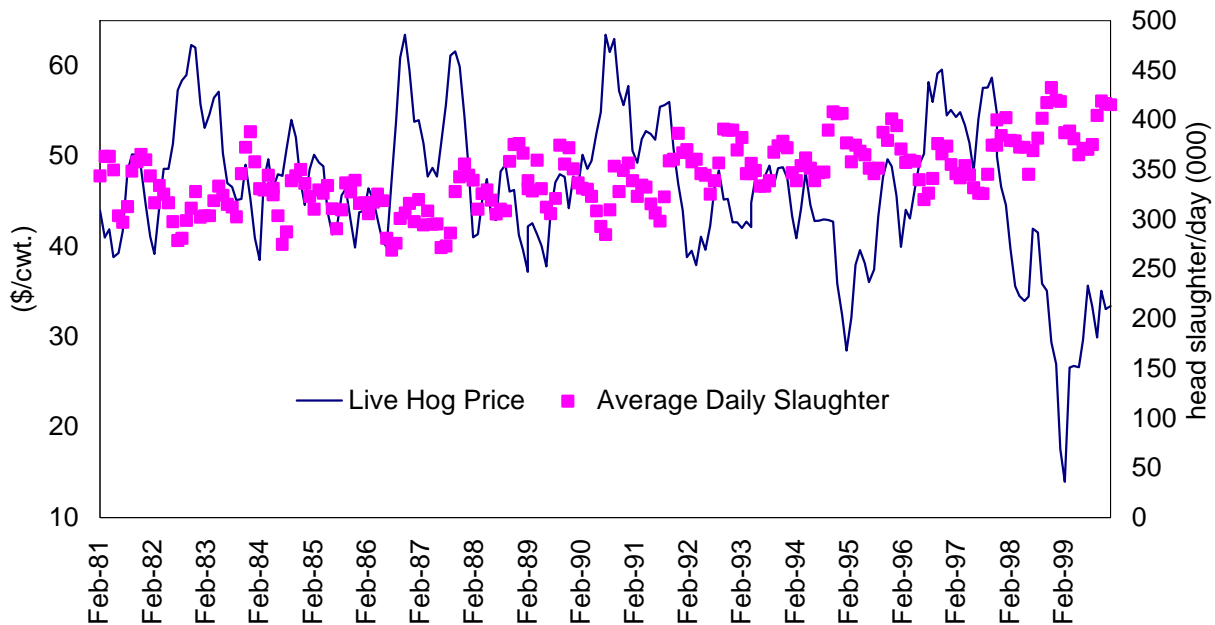
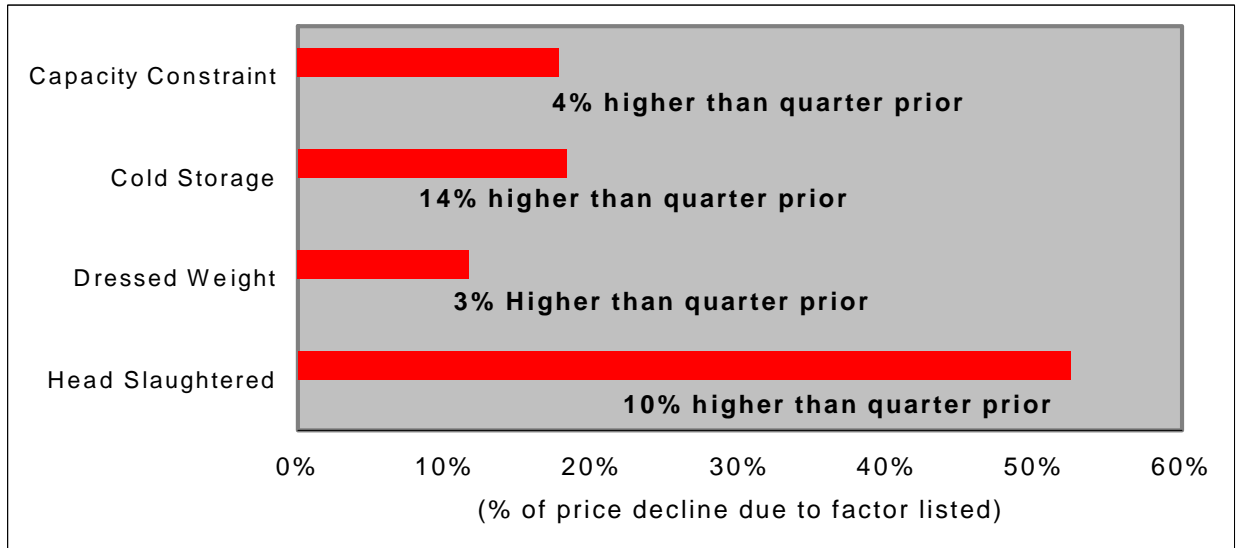


Figure 2. Magnitude of Fall 1998 Live Hog Price Decline due to Increase, relative to 12 month prior, in the Factors Listed Below.



Variable definitions:

- Capacity constraint: Number of hogs processed relative to what the industry is set up to process during a normal work period
- Cold Storage: Pork held in cold storage
- Dressed weight: Carcass weight of a hog
- Head Slaughtered: The number of hogs procured during a day

Figure 3. Processing Utilization to Capacity (February 1981- December 1999).

