



Hog Market Cycles

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The U.S. hog industry has historically been characterized by cyclical variations in hog inventories, pork production, and hog and pork prices. A cycle is defined as a production or price movement that tends to last a certain number of years and repeats that pattern over a long period of years. Inventory cycles typically experience periods of increasing numbers called accumulation

phases and periods of declining numbers called liquidation phases. Price cycles are typified by periods of increasing prices called increasing phases and decreasing prices called decreasing phases. Price cycles tend to be the opposite of production cycles, but turning points may not occur at identical times.

Hog cycles are caused by factors that occur both within and outside the industry. Underlying reasons include the reproductive biology of hogs and time lags in the adjustment of production levels to price changes. Modifying factors include variations in feed grain production, supplies of competitive meats, and economic, social, and political factors that affect the demand for pork.

Hog production in the United States includes a wide range of sizes and kinds of production units. Factors such as age and degree of mechanization of facilities, single or multiple enterprise production units, kinds of feed grown or purchased, and

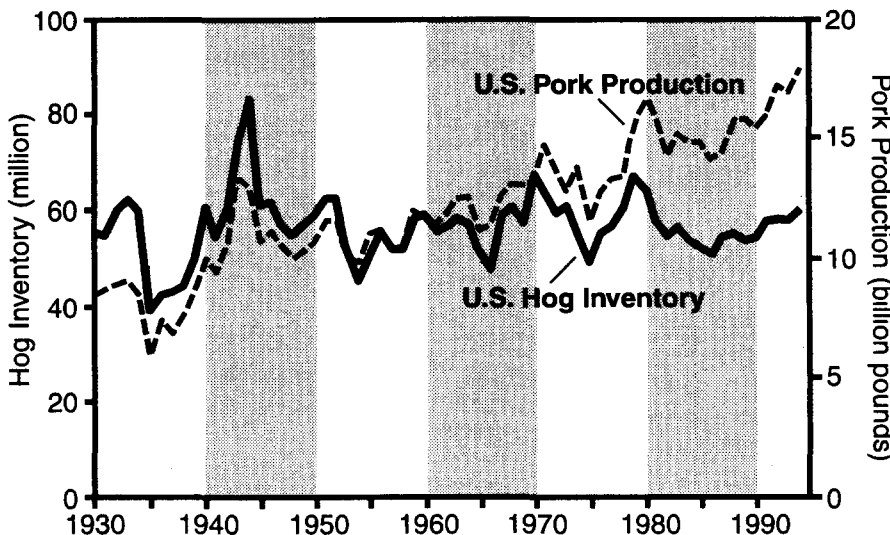


Figure 1. U.S. Hog Inventory and Pork Production, 1930-1994.

Source: *Agricultural Statistics*, various issues.

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JANUARY 1996

geographic location affect cost of production and the willingness of individual producers to vary production. Hog production units range in size from only a few sows to large units selling tens of thousands of head annually. Larger units have high capital/labor ratios, total confinement and highly mechanized facilities, and tend to be less willing to adjust production – especially downward – when prices decline.

Hog inventory numbers (USDA December 1, U.S. hog inventory numbers) increased steadily from the mid-30 million head range when records were first kept in 1867 to the mid-60 millions in the 1920s. Since the 1920s the long-term trend has been level at about 55 million head, but there have been significant cyclical swings above and below the trend. The all-time high in hog numbers occurred during World War II at over 80 million

head (Figure 1). Hog numbers in December 1994 were 59.6 million head.

Per capita consumption of pork has remained stable, because the increasing human population in the United States has absorbed increased production. This production increase is due to improved breeding, feeding, and management factors that have allowed heavily muscled, leaner hogs to be marketed at higher market weights (Figure 1).

Over the years, hog inventories, slaughter and prices have followed definite cyclical patterns. Hog producers make production decisions before fundamental supply and demand factors influencing prices for subsequent periods are known.

The reproductive biology of hogs causes a lag time between

the time when prices are reflected to producers from consumers and when production adjustments can be made. The time period involved between breeding a sow and the slaughter of offspring is about 10 months. Since individual hog producers may not know the decisions being made by other producers, cumulative overreactions to good times and bad have resulted in the cyclical pattern of production and prices.

A theoretical four-year hog inventory, pork production, and hog price cycle with two-year accumulation, liquidation, increasing, and decreasing phases is illustrated in Figure 2. Assume in year one that prices go above costs of production and there is an ample supply of corn, so producers decide to increase inventories. Retaining more gilts for

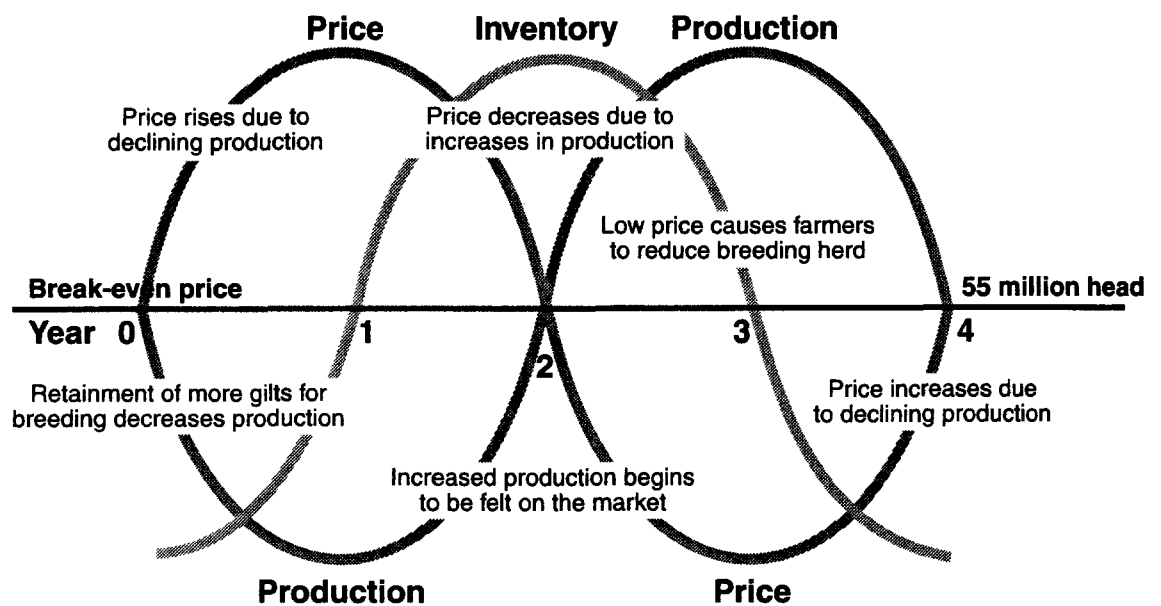


Figure 2. Theoretical Four-Year Hog Price, Inventory and Production Cycles.

breeding purposes causes prices to go even higher due to decreasing pork production. In year two, increasing production from the now larger breeding herd forces prices to decline. By year three, production has increased to the level where prices go below all costs of production and some producers decide to reduce herds. Fewer gilts are retained and more sows are sold, which causes increased pork production and even lower prices. During year four, production declines and prices increase to the break-even point where the cycle began.

Obviously, the actual hog cycle does not behave as consistently as the theoretical one, but similarities certainly exist (Figure 3). During the past 50 years, 12 cycles have occurred averaging 4.08 years in length, with a range of two to six years. It is not uncommon to have phases of one to three years instead of two. The 1989-1992 inventory cycle consisted of one year of liquidation in 1989 (54 million head) and three years of accumulation in 1990, 91, and 92 (54.5 million, 57.7 million, and 58 million). The current cycle began with liquidation in 1993 (57 million). Theoretically, liquidation should have continued into 1994 with accumulation in 1995 and 96. However, expanding hog production in North Carolina, Missouri, Oklahoma, Tennessee, Mississippi, and Colorado caused a higher inventory on December 1, 1994 (Figure 4). Hog inventories

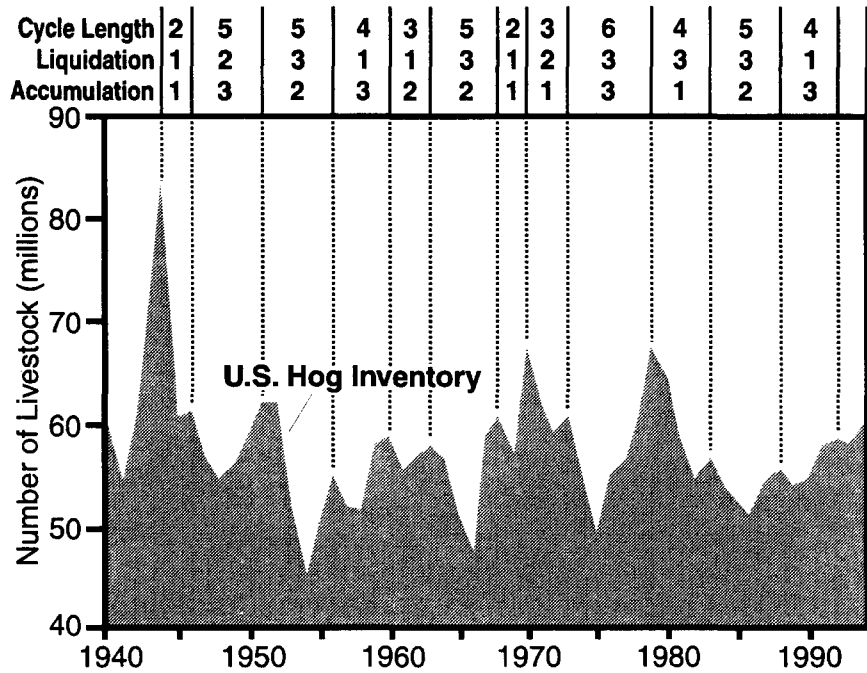


Figure 3. Hog Inventory Cycle, United States, 1940-1994.

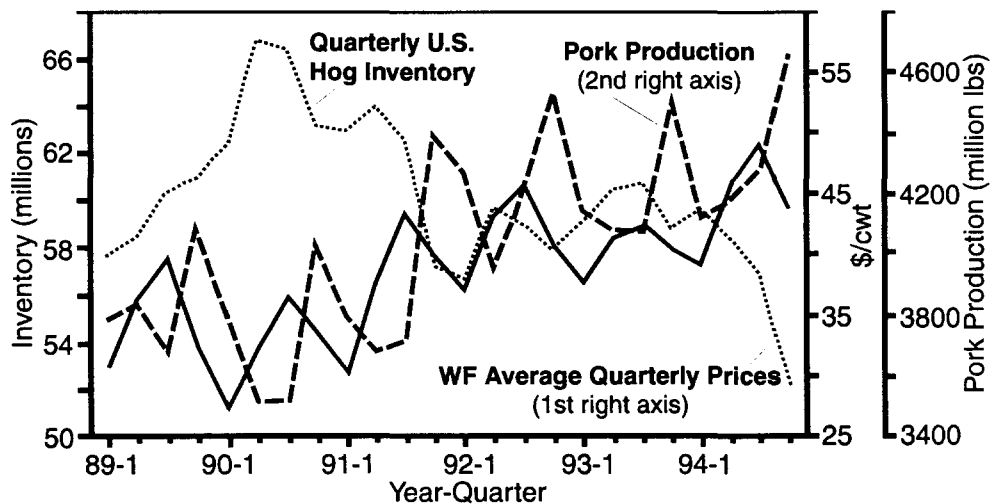


Figure 4. Quarterly U.S. Hog Inventory, Average West Fargo Hog Prices, and U.S. Pork Production, 1989-1994.

did decline, as expected, in the Corn Belt states of Iowa, Illinois, Kansas, and South Dakota.

Average annual hog prices during the 1989-1992 inventory cycle are shown in Table 1. In 1989, the end of the liquidation phase, the average price was \$43.17/cwt. The three-year accumulation phase was triggered by profitable prices beginning in mid 1989, through 1990, and three-quarters of 1991. Prices then declined through 1992, following an average annual high of \$53.56/cwt. in 1990, as inventory increased.

Hog numbers in North Dakota have followed the same general trend as in the United States with high numbers of over one million head during World War II, falling to a relatively stable trend at just over 300 thousand head for the last 40 years (Figure 5). North Dakota ranks 24th in hog production and produced

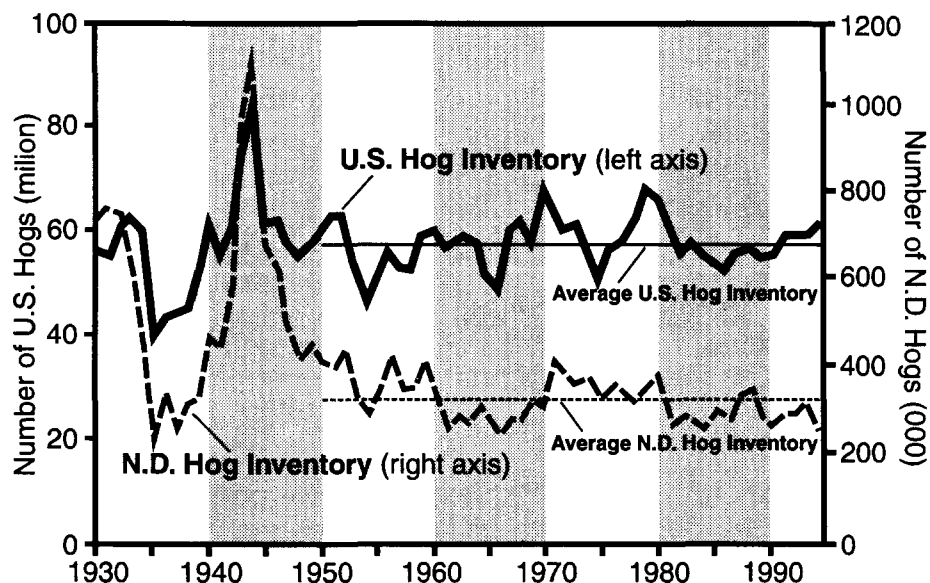


Figure 5. U.S. and N.D. Hog Inventories, December 1, 1930-1994.
Source: *Agricultural Statistics* and *North Dakota Agricultural Statistics*, various issues.

1 percent of U.S. pork in 1993 (ND Agricultural Statistics 1994). Cyclical variations in North Dakota inventories have also followed U.S. cycles, but the phases have not been exactly parallel due to unique conditions such as feed availability in North

Dakota versus the entire United States. The North Dakota hog inventory on December 1, 1993 was 320 thousand head but followed the Corn Belt states and fell to 245 thousand in 1994.

Table 1. Average Monthly Butcher Hog Prices, West Fargo, North Dakota, 1989-1994.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
----- \$/cwt -----													
1989	41.27	39.65	38.79	36.39	42.30	45.68	46.12	46.16	42.76	46.18	45.20	47.58	43.17
1990	47.23	48.50	51.23	52.51	60.86	59.69	61.44	55.97	53.24	55.71	48.98	47.39	53.56
1991	48.95	50.75	50.41	49.75	53.14	53.40	53.53	49.39	45.18	42.36	37.08	37.82	47.65
1992	36.15	39.45	37.94	40.52	44.47	46.06	43.61	42.60	40.76	40.70	39.98	40.57	41.07
1993	40.16	42.72	45.17	44.16	44.84	46.82	44.60	46.60	46.46	45.56	41.52	38.91	44.14
1994	42.38	46.51	42.72	41.00	41.02	41.62	40.81	40.26	33.68	30.43	27.29	30.19	38.15

Source: USDA, AMS, Livestock Market News, West Fargo, N.D.

Future Cycles

Future cycles in hog inventories, pork production, and prices have been predicted based on information published by the Food and Agricultural Policy Research Institute (FAPRI) for 1995-2004. FAPRI provides baseline projections for the U.S. agricultural sector and international commodity markets. These projections serve as a baseline for evaluating and comparing alternative macroeconomic, policy, weather, and technological scenarios for medium- and long-term planning. The projections are grounded on a series of assumptions about the general economy, agricultural policies, the weather, and technological change.

FAPRI projections indicate that pork production, hog inventories and prices will follow a pattern similar to past cycles. The trend in pork production has been increasing due to increased slaughter weights and larger litter size. FAPRI projects a continued increasing trend in pork production from 1995 through 2004, even though hog inventories remain relatively steady (Figure 6). This phenomenon may be attributed to projected increased marketing weights, litter size, and growth rates, although these characteristics may be reaching their limits.

Hog cycles will continue because of reproductive biology and lags in adjusting production

to prices, but that may be affected by structural changes that are currently taking place in the U.S. hog industry. Consolidation of hog production into larger facilities which rely on new state-of-the-art technology and improved productivity is having a pronounced impact on the pork supply. Long-term profitability in hog production has encouraged corporate investment. Very large hog operations have expanded into “non-cornbelt” states such as North Carolina, Oklahoma, Utah, and Colorado, and other states are initiating similar systems.

All of these “non-hog” states have similar forces driving hog industry growth:

- In-state or nearby increases in modern processing capacity.

- Relatively unobtrusive government regulations that encourage corporate and expanded family operations and crop/climate/weather and environmental rules that facilitate disposal and other uses of wastes.
- Contractual relationships and large-scale production as contracting permits producers to expand quite rapidly, whereas building huge farrow-to-finish operations ties up considerable equity and time.
- Favorable costs of production-to-hog price relationships as producers can offset higher costs for grain with lower-per-animal costs for facilities, lower costs for labor and waste disposal, and highly efficient produc-

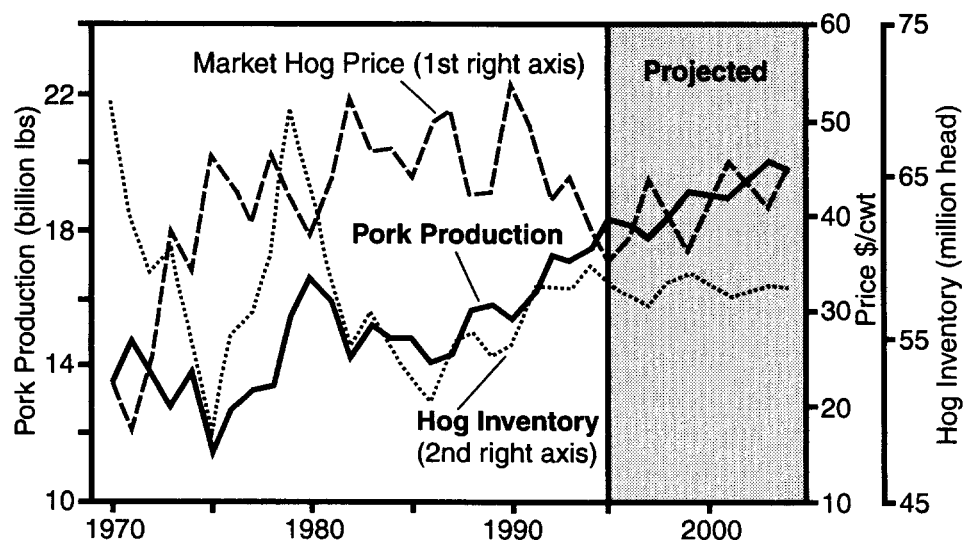


Figure 6. Pork Production, Average annual Market Hog Price, and Hog Inventory, United States, Actual 1970-1994, Predicted 1995-2004.

tion, as well as premiums earned for uniformity and value of finished animals.

Large production units rely on low cost labor, inexpensive energy, and low interest rates. Alliances between packers and large operations are fueling the expansion and could prolong the cyclical supply upswing. Five-, seven-, and even ten-year contracts are common, as well as shorter term farmer-to-farmer contracts. Lenders are becoming more comfortable with contracting and are lending to producers that have contracts with reliable contractors with ample financial reserves.

Large firms will have less flexibility in output, contributing to sticky supply response, while small producers can be more responsive to the hog cycle. However, if the hog industry becomes highly concentrated, the thousands of small hog producers who have long provided downward and upward adjustment of supply may be largely out of the industry.

Large producers' resistance to reducing inventories when pork prices are low will put more economic pressure on the less efficient producers.

To remain competitive with structural changes taking place in the hog industry, producers must maintain or improve management efficiency. Management practices that can improve efficiency include improved gene pool for breeding stock, improved feed formulation, comparison shopping for inputs, networking with other producers for purchasing inputs and marketing hogs, and producing hogs to match packer specifications. Size does not have to be a limiting factor in efficient operations. Smaller hog producers can be efficient. Larger producers may enjoy some efficiencies of size that smaller producers have to compensate for in other ways, but implementing good management practices can keep smaller producers competitive.

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