

# Hog Market Outlook and Pricing Methods

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## 1. Abstract

The outlook for 2018 is for the third consecutive year with record hog slaughter. Hog prices are likely to average slightly below the breakeven level. Rapid growth in U.S. ethanol production led to very high grain prices during 2006 to 2013 which caused a great deal of financial stress for livestock and poultry producers. Slower growth in ethanol production combined with record corn harvests in 2013, 2014 and 2016 have pushed down feed prices and aided livestock profits. The death of nearly 7 million baby pigs from the PED virus reduced hog slaughter and pushed 2014 hog prices to record highs. Since then, hog numbers have increased and prices decreased.

## 2. Hog Inventory

Statistics Canada said the July 1 hog inventory in Canada was up 2.1% with the market hog inventory up 2.2% and the breeding herd up 1.1%. USDA's June hogs and pigs report said the U.S. market hog inventory was up 3.6%, but swine kept for breeding was up only 1.5% compared to June 1, 2016. USDA's estimate of the total number of hogs and pigs on U.S. farms at the start of June was up 3.4% compared to 12 months earlier.

**Table 1. Hog Inventory, 2017 as Percent of 2016, U.S. and Canada**

	U.S. June	Canada July
All hogs and pigs	103.4	102.1
Kept for breeding	101.5	101.1
Market hogs	103.6	102.2
Under 50 pounds	103.2	101.4
50 - 119 pounds	103.5	104.5
120 - 179 pounds	104.3	101.8
180 pounds and over	103.7	102.1
Pig Crop		
March-May	103.8	
January-June		102.9
Pigs per Litter		
March-May	100.7	

Source: USDA/NASS June 2017 Hogs and Pigs Report and Statistics Canada

Statistics Canada said the number of sows farrowed in Canada during the first half of 2017 was up 1.0% with the pig crop up 2.9% compared to a year earlier. USDA said spring farrowings (March-May) were up 3.1% compared with a year ago. USDA said summer (June-August) farrowing intentions were up 0.2% compared to 12 months earlier and fall farrowing intentions are for 0.3% more sows to farrow than in September-November 2016. If pigs per litter is up by 1.0% (my guess), then winter and spring hog slaughter should be 1.3% or so larger than a year earlier.

**Table 2. Sows Farrowed and Farrowing Intentions, U.S.**

	2016 as % of 2015
March-May	104.0
June-August	101.3
September-November	104.0
	2017 as % of 2016
December-February	102.8
March-May	103.1
June-August	100.2
September-November	100.3

Source: USDA/NASS June 2017 Hogs and Pigs Report

The long-term trend is for U.S. hog slaughter to increase about 1% per year. Canadian hog slaughter has increased at a slightly slower pace in the last decade. Combined U.S. and Canadian hog slaughter increased 19% from 2000 to 2016.

**Table 3. Annual Hog Slaughter, Canada and U.S.**

	-----Canada-----		----- U.S. -----		----- Combined -----	
	Million Head	% of Yr Ago	Million Head	% of Year Ago	Million Head	% of Year Ago
2000	19.466	104.0	97.976	96.5	117.442	97.7
2001	20.542	105.5	97.962	100.0	118.504	100.9
2002	21.979	107.0	100.263	102.3	122.242	103.2
2003	22.288	101.4	100.931	100.7	123.219	100.8
2004	22.714	101.9	103.463	102.5	126.177	102.4
2005	22.159	97.6	103.582	100.1	125.741	99.7
2006	21.620	97.6	104.737	101.1	126.356	100.5
2007	21.078	97.5	109.172	104.2	130.250	103.1
2008	21.519	102.1	116.452	106.7	137.971	105.9
2009	21.639	100.6	113.618	97.6	135.257	98.0
2010	21.123	97.6	110.260	97.0	131.383	97.1
2011	21.098	99.9	110.860	100.5	131.958	100.4
2012	21.121	100.1	113.163	102.1	134.284	101.8
2013	20.759	98.3	112.077	99.0	132.836	98.9
2014	20.336	98.0	106.876	95.4	127.212	95.8
2015	21.186	104.2	115.425	108.0	136.612	107.4
2016	21.263	100.4	118.240	102.4	139.503	102.1

Source: USDA and Statistics Canada

U.S. hog slaughter weights have increased at an average rate of 1.3 pounds per year over the last 60 years. Weights were a record high in 2014 and were down in 2015 and 2016. Slaughter weights are likely to hold steady in 2017 and 2018.

### 3. International Trade

Over the last 20 years U.S. pork imports have typically been between 3.5% and 5.5% of U.S. pork production (Table 4). Imports of live hogs peaked at 10 million

head in 2007 and have been around 5 million head the last few years. U.S. pork exports in 2016 were the second highest ever behind the 2012 record. During the last seven years, the U.S. has exported more than 20% of its pork production. The U.S. is the world's second largest pork exporter after the European Union. Canada ranks third in pork exports.

**Table 4. U.S. Imports and Exports of Pork and Hogs**

	-----Imports-----			-----Exports-----		
	-----Pork-----		Hogs	-----Pork-----		Hogs
	Million Pounds	Percent of Production	Head	Million Pounds	Percent of Production	Head
2000	966.592	5.1	4,357,564	1286.664	6.8	69,228
2001	950.745	5.0	5,377,688	1559.458	8.1	64,049
2002	1070.726	5.4	5,740,675	1612.227	8.2	205,121
2003	1185.201	5.9	7,438,254	1716.697	8.6	169,881
2004	1099.465	5.4	8,505,518	2180.534	10.6	174,010
2005	1023.846	4.9	8,190,801	2666.115	12.9	153,650
2006	989.680	4.7	8,763,378	2995.096	14.2	164,621
2007	968.436	4.4	10,004,348	3141.183	14.3	136,816
2008	831.883	3.6	9,347,951	4651.465	19.9	97,340
2009	833.767	3.6	6,364,553	4094.111	17.8	21,245
2010	859.490	3.8	5,749,134	4224.044	18.8	14,958
2011	803.403	3.5	5,794,601	5193.327	22.8	30,459
2012	801.691	3.4	5,656,402	5383.429	23.2	56,428
2013	879.422	3.8	4,947,751	4992.308	21.5	34,004
2014	1007.492	4.4	4,947,243	4855.118	21.3	18,933
2015	1112.199	4.5	5,740,376	4946.571	20.2	40,601
2016	1091.915	4.4	5,668,734	5233.024	21.0	48,018

Source: USDA-ERS

Canadian pork exports set a record in 2016 for tons exported. Canadian pork imports in 2016 were the highest since 2012. Both countries are likely to export more pork in 2018.

**Table 5. Canada Imports and Exports of Pork**

	Imports	Exports
	Tonnes	Tonnes
2000	74,088	636,646
2001	92,598	718,703
2002	96,117	827,378
2003	109,224	924,345
2004	126,508	931,287
2005	137,096	1,030,546
2006	142,250	1,037,968
2007	156,800	997,042
2008	150,298	1,094,500
2009	169,346	1,075,314
2010	182,437	1,098,171
2011	191,524	1,152,718
2012	221,106	1,189,433
2013	201,188	1,184,159
2014	195,016	1,154,974
2015	203,272	1,177,772
2016	207,399	1,249,045

Source: Canada Pork International

#### 4. Slaughter Capacity

U.S. hog markets were at the slaughter capacity limit for much of the fourth quarter of 2016. This produced both outstanding packer margins and extremely low hog prices. Two large new slaughter plants (Coldwater, Michigan and Sioux City, Iowa) opened on September 5, 2017. Operating single shifts, each of these two plants add about 2.5% to U.S hog slaughter capacity. Both plants are likely to add second shifts in the next few years. Another large slaughter plant is likely to open at Eagle Grove, Iowa in 2019. These new plants should eliminate concerns about slaughter capacity for the next several years.

## 5. Hog Pricing Mechanisms

During the last decade of the 20<sup>th</sup> century there was a dramatic shift in how the price of U.S. slaughter hogs was determined. Prior to 1990, most barrows and gilts were sold on the spot market, i.e., which packer would buy the hogs and the price to be paid were determined through negotiations between the producer and hog packers that occurred shortly before slaughter. Since the late 1990s, most barrows and gilts have been marketed under a written contract between the producer and the packer. These contracts specify how the hog price is to be determined.

The Livestock Mandatory Reporting Act of 1999 requires large packers to report to USDA detailed information on the hogs they buy. Data from the Mandatory Price Reporting system (MPR) is published each business day by USDA/AMS. MPR applies to hogs slaughtered by any U.S. packing plant that processes more than 100,000 hogs per year. Typically, about 96% of federally inspected barrow and gilt slaughter is reported under MPR. MPR separates packer purchases of barrows and gilts into several categories:

**Packer sold** – barrows and gilts raised by a packer, but sold for slaughter to a different packer.

**Packer owned** – barrows and gilts owned, raised, and slaughtered by the same packer.

**Negotiated** – barrows and gilts raised by a non-packer and purchased by a packer on a carcass weight basis on the spot market. (i.e. the base price for the

hogs is determined by buyer-seller interaction shortly (not more than 14 days) before slaughter).

**Market formula** – barrows and gilts raised by a non-packer and purchased by a packer on a carcass weight basis with the price paid for the hogs determined by a contract formula based on a contemporaneous publicly reported hog or pork price.

**Other market formula** – barrows and gilts raised by a non-packer and purchased by a packer on a carcass weight basis with the price paid determined by a contract formula based on the Chicago Mercantile Exchange's lean hog futures contract at the time the contract was signed.

**Other purchase agreement** – barrows and gilts raised by a non-packer and purchased by a packer on a carcass weight basis with the price determined by a contract using some method other than the three listed immediately above.

**Live weight priced** – barrows and gilts purchased on the spot or cash market with the price based on the live weight of the animal. This category includes some packer sold hogs.

**Non-MPR hogs** – barrows and gilts not covered by MPR. (i.e. slaughtered in a packing plant that processes fewer than 100,000 hogs annually).

**Table 6A. Market Hog Sales by Pricing Method, 2002-2008**

	2002	2003	2004	2005	2006	2007	2008
	----% of Federal. Inspected Barrow & Gilt Slaughter---						
MPR carcass weight priced							
Negotiated	13.8	12.6	10.4	10.4	9.0	8.2	8.1
Market Formula	40.8	37.1	38.2	38.6	35.4	35.7	35.6
Other Market Formula	8.7	7.2	8.6	8.4	8.1	8.1	9.4
Other Purchase Agreement	12.2	18.0	17.0	15.5	14.8	13.8	12.6
Packer Sold	2.1	2.0	2.0	2.3	5.9	6.1	5.9
Packer Owned	16.4	17.8	18.1	19.4	20.7	22.3	23.1
TOTAL	94.1	94.8	94.2	94.6	93.9	94.2	94.7
MPR live weight priced			1.6	1.5	1.7	1.9	1.5
Non-MPR			4.2	3.9	4.4	3.9	3.9
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: USDA/AMS Market News Reports: summary of LM\_HG201 and LM\_HG200

**Table 6B. Market Hog Sales by Pricing Method, 2009-2016**

	2009	2010	2011	2012	2013	2014	2015	2016
	% of Federally Inspected Barrow & Gilt Slaughter							
MPR carcass weight priced								
Negotiated	6.5	4.9	4.1	3.4	3.1	2.6	2.5	2.3
Market Formula	41.4	36.5	36.8	38.9	38.9	38.9	41.3	36.1
Other Market Formula	6.5	10.1	9.4	7.3	6.9	10.0	7.9	8.8
Other Purch' Agreem't	11.2	12.4	14.6	14.6	14.1	12.5	12.5	16.5
Packer Sold	5.5	5.3	4.5	4.1	3.8	4.0	4.1	4.1
Packer Owned	24.0	25.2	26.5	26.6	27.8	27.2	27.5	26.7
TOTAL	95.2	94.4	95.7	95.0	94.6	95.2	95.7	94.6
MPR live weight priced	0.9	1.3	1.3	1.0	1.0	0.8	0.6	0.5
Non-MPR	3.9	4.3	3.0	4.0	4.4	4.0	3.7	4.9
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

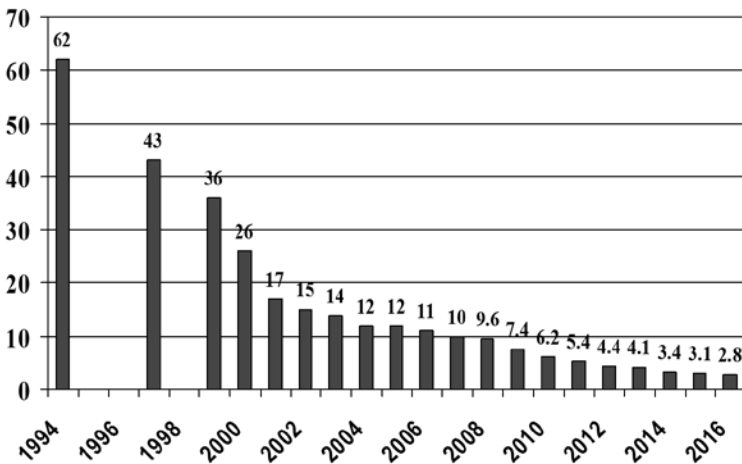
Source: USDA/AMS Market News Reports: summary of LM\_HG201 and LM\_HG200



Tables 6A and 6B show the percent of federally inspected barrow and gilt slaughter that was purchased under these different methods for the years 2002 through 2016. The share of Negotiated sales on a carcass weight basis dropped from 13.8% of federally inspected barrow and gilt slaughter in 2002 to only 2.3% in 2016. The percentage of Packer Owned hogs increased from 16.4% in 2002 to 27.8% in 2013, before decreasing to 26.7% in 2016. The percentage of Packer Sold hogs jumped from 2.3% in 2005 to 5.9% in 2006. This jump occurred because in the spring of 2006 USDA reclassified as Packer Sold the hogs raised and sold to other packers by the multiple owners of two producer-owned packing plants (Triumph Foods and Meadowbrook Farms). The other three categories of hogs purchased on a carcass weight basis under MPR (Market Formula, Other Market Formula, and Other Purchase Agreement) remained fairly consistent in market share over this 15-year period. The final two categories (MPR live weight priced and Non-MPR hogs) remained reasonably steady with a combined share of roughly 5% of federally inspected barrow and gilt slaughter.

The ever declining number of Negotiated hog purchases is worrisome. My former colleague, Glenn Grimes, did his initial survey of packer pricing methods in 1994. That survey found that 62% of the barrows and gilts purchased by large U.S. packers in January 1994 were spot market purchases. In 2016, MPR data indicate only 2.8% of federally inspected barrow and gilt slaughter was spot market purchases (2.3% carcass weight basis and 0.5% live weight basis). See Figure 1 below. The widely reported Negotiated hog price is a key component in

determining the price for four of the other MPR categories. The price paid for the 2.3% of barrows and gilts purchased on a negotiated carcass weight basis in 2016 was crucial to determining the price for roughly three-fourths of the combined 65.5% of hogs purchased on Market Formula, Other Market Formula, Other Purchase Agreement, and Packer Sold. It is not clear there is a sufficient number of Negotiated purchases to effectively represent the true supply and demand balance for hogs and thus be a sound basis for formula pricing other hogs.



Source: Glenn Grimes for years before 2003; USDA/AMS for years after 2002

**Figure 1.** Percent of Barrows & Gilts Sold on the Spot Market, live or carcass weight basis

The Mandatory Price Reporting Act of 2010 requires packers to report the price and volume of wholesale pork cuts that they sell. These reports began in January 2013 and are believed to result in a more accurate calculation of pork cutout value than the old voluntary reporting system which was discontinued in early April 2013. Over time, these mandatory pork cutout reports may become widely

used as a substitute for the MPR Negotiated carcass hog price in producer-packer marketing contracts.

MPR requires covered packers to report percent lean, carcass weight, base price, and net price for most of the marketing categories. This data for 2016 are shown in Table 2. In 2016, Packer Owned hogs had carcasses with the lowest average percent lean (53.63%) while packer sold hogs had carcasses with the highest average percent lean (56.06%).

Negotiated purchases were the lightest hogs with an average carcass weight of 200.52 pounds in 2016. Packer owned hogs were the heaviest at 213.92 pounds on average.

The base hog price is determined before premiums or discounts. The net price includes price adjustments for weight, leanness, delivery time, transportation, etc. For 2016, both the base price and the net price were lowest for Negotiated hogs (\$60.14/cwt and \$61.90/cwt, respectively). In 2016, the base price and the net price were both highest for other purchase agreement hogs (\$67.85/cwt and \$69.20/cwt, respectively).

In 2016, the average price of MPR hogs purchased on a live weight basis on the spot market was \$46.75/cwt. That equaled 77.7% of the average carcass base price and 75.5% of the average carcass net price of Negotiated carcass weight purchases. MPR data indicate the average dressing percent for barrows and gilts in 2014 was approximately 75.5%.

**Table 7. Barrow & Gilt Slaughter Averages by MPR Pricing Method, 2016**

	% lean	Carcass Weight lbs.	Base Carcass Price \$/cwt.	Net Carcass Price \$/cwt.
MPR carcass weight priced				
Negotiated	54.10	200.52	60.14	61.90
Market Formula	55.79	211.33	62.66	65.30
Other Market Formula	55.78	212.19	65.48	68.17
Other Purchase Agreement	55.22	210.03	67.85	69.20
Packer Sold	56.06	205.19	63.09	66.17
Packer Owned	53.67	213.92		

Source: USDA/AMS Market News Reports: LM\_HG201

## 6. Forecast

If USDA's numbers are close to right, 2018 hog slaughter will be above 125 million head, up 3% from 2017, and a new record. For 2018, look for 51-52% lean hogs to average in the upper \$40s/cwt live and Iowa hogs averaging in the mid \$60s/cwt on a carcass basis. On average, hog slaughter drops below the year-earlier level 15 months after losses begin. Financial losses by hog producers were modest in 2016 and 2017. Given corn prices under \$4 per bushel, there is no clear signal that producers should cut back the sow herd.

**Table 8. U.S. Commercial Hog Slaughter and Barrow and Gilt Price by Quarter**

Year & Quarter	---Comm. Hog Slaughter---				Barrows & Gilts, U.S. price/cwt	
	Million Head	Percent change from year ago		51-52% Lean Live	lowa-Minn Base Carcass	
		monthly	daily			
2014	1	27.131	- 2.6%	-2.6%	\$68.69	\$94.98
	2	25.575	- 4.4	-4.4	85.40	115.42
	3	25.558	- 7.6	-7.6	83.31	112.00
	4	28.612	- 4.0	-3.9	66.75	88.90
	Year	106.876	- 4.6	-4.6	76.04	102.82
2015	1	28.724	+ 5.9%	+5.9%	\$48.47	\$64.23
	2	27.850	+ 8.9	+8.9	53.20	73.26
	3	28.477	+11.4	+11.4	54.59	73.59
	4	30.375	+ 6.2	+6.2	44.66	57.93
	Year	115.425	+ 8.0	+8.0	50.23	67.25
2016	1	29.261	+ 1.9%	+0.7%	\$44.63	\$60.52
	2	28.116	+ 1.0	+0.7	53.71	73.08
	3	29.316	+ 2.9	+2.8	49.25	63.68
	4	31.516	+ 3.8	+4.8	36.99	46.83
	Year	118.209	+ 2.4	+2.3	46.15	61.07
2017	1	30.176	+ 3.1%	+3.1%	\$49.73	\$66.45
	2	29.163	+ 3.7%	+4.1	51.70	69.65
	3*	29.861	+ 1.9%	+3.0	53.69	69.04
	4*	32.327	+ 2.6%	+2.8	41.40	54.33
	Year*	121.528	+ 2.8%	+3.3	49.13	64.87
2018	1*	30.707	+ 1.8%	+1.6%	\$44.80	\$59.00
	2*	29.850	+ 2.4%	+2.2	52.48	69.00
	3*	30.821	+ 3.2%	+3.6	53.90	70.67
	4*	34.096	+ 4.5%	+3.9	45.90	60.33
	Year*	125.473	+ 3.0%	+2.8	49.27	64.75

\*forecasted

Source: USDA/NASS (actual values), and Ron Plain (forecast)

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