Hog Market Outlook & Pricing Methods

Ron Plain
Professor Emeritus of Agricultural Economics
University of Missouri-Columbia
http://web.missouri.edu/~plainr/
The way packers acquire hogs has changed
MPR Barrow & Gilt Negotiated Purchases

Source: USDA/AMS Prior Day Slaughter Reports
Barrow & Gilt Negotiated Purchases

Source: USDA/AMS Prior Day Reports
Half of U.S. barrows and gilts are sold on a formula tied to the negotiated price.
Source: USDA/AMS Prior Day Slaughter Reports
MPR Barrow & Gilt Purchases

Source: USDA/AMS Prior Day Slaughter Reports
MPR Barrow & Gilt Purchases

Source: USDA/AMS Prior Day Slaughter Reports
How Packers Acquired Barrows & Gilts in 2017

- 5.1% Non MPR Packers
- 94.9% MPR Packers
  - 0.5% negotiated, live-weight purchase
  - 2.4% negotiated, carcass-weight purchase
  - 32.3% market formula contract
    - Reported hog price
    - Reported pork price
  - 9.9% other market formula (CME futures)
  - 18.3% other purchase agreement
  - 3.0% purchased from another packer
  - 28.1% raised them
**Reported Barrow & Gilt Prices, 2013-17**

<table>
<thead>
<tr>
<th>Base</th>
<th>Net Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>$/cwt</td>
<td>$/cwt</td>
</tr>
<tr>
<td><strong>Negotiated hogs</strong></td>
<td>79.89</td>
</tr>
<tr>
<td><strong>S/P Market formula</strong></td>
<td>81.49</td>
</tr>
<tr>
<td><strong>Other market formula</strong></td>
<td>80.26</td>
</tr>
<tr>
<td><strong>Other purchase agreement</strong></td>
<td>83.03</td>
</tr>
<tr>
<td><strong>Packer sold</strong></td>
<td>81.63</td>
</tr>
</tbody>
</table>

Negotiated live averaged $59.04/cwt ~ $78.72 carcass

Source: USDA/AMS Prior Day Slaughter Reports
Pork Cutout Value, Monthly, 1997-2017

Source: USDA-AMS
51-52% Lean Live Hog Price, Monthly, 1997-2017

Source: USDA-AMS
Ratio: Live Hog Price to Pork Cutout, Monthly, 1997-2017
PDS Base Price as % of Cutout Value

Calculation: Prior Day Purchased Hog Base Price/Pork Cutout Value
Calculation: Byproduct + Cutout – Negotiated net
Weekly Pork Packer Gross Margin, 200 Pound Carcass

Calculation: Byproduct + Cutout – Negotiated net
New Pork Packing Plants

1995 Seaboard opened Guyman plant
2006 Triumph opened St Joseph plant
2016 reopen plants in:
  Windom, MN – Prime Pork - 4,000/day
  Pleasant Hope, MO – Moon Ridge Foods - 2,500/day
New Pork Packing Plants

2017 new large plants in:
   Sioux City, IA – Seaboard/Triumph 8/23
   Coldwater, MI – Clemens Foods

2019 new large plant in:
   Eagle Grove, IA – Prestage Foods
Hog Slaughter Capacity
Annual U.S. Hog Slaughter, 1930-2017

Source: USDA/NASS
HOG SLAUGHTER
Federally Inspected, Weekly

Data Source: USDA-AMS & USDA-NASS
Livestock Marketing Information Center
SATURDAY HOG SLAUGHTER
Weekly

Thou. Head

JAN  APR  JUL  OCT

Avg. 2011-15  ●●●  2016  2017

Data Source: USDA-AMS & USDA-NASS
Livestock Marketing Information Center
Canada Swine Industry
Canadian Hog Inventory, July 1

Million Head

July 2017 up 2.1%

Source: Statistics Canada
Pigs Born, July-December

Source: Statistics Canada
Canadian Pork Imports & Exports

Source: Canada Pork International
### Canadian Pork Imports By Origin 2016

<table>
<thead>
<tr>
<th>Country</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>87.9%</td>
</tr>
<tr>
<td>Spain</td>
<td>2.2%</td>
</tr>
<tr>
<td>Germany</td>
<td>2.2%</td>
</tr>
<tr>
<td>Italy</td>
<td>1.9%</td>
</tr>
<tr>
<td>Poland</td>
<td>1.6%</td>
</tr>
<tr>
<td>Denmark</td>
<td>1.3%</td>
</tr>
<tr>
<td>Others</td>
<td>2.8%</td>
</tr>
</tbody>
</table>

Source: Canada Pork International
Canadian Pork Exports By Destination 2016

Source: Canada Pork International
Typically, the size of the swine herd is driven by last year’s profitability.
Iowa Farrow to Finish Profits, 1965-2017

2017: +$11.95
2018 ~ +$25.00?

Source: Lee Schulz, Iowa State University
U.S. Commercial Hog Slaughter

Source: USDA/NASS

2016: 118.2 million, +2.4%
2017: 121.3 million, +2.6%
2018: 125.8 million, +3.7%
Hog Slaughter & Lagged Profit
1983-2017

Source: Ron Plain
Cost of Production
U.S. Monthly Average Corn Price, 2000-2017

Source: USDA-NASS & CMEGROUP Futures
Meat Supply
U.S. Meat Production

Source: USDA-OCE WASDE, December 2017
## Forecast Change in Meat Production

<table>
<thead>
<tr>
<th>Type</th>
<th>2016-17</th>
<th>2017-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef</td>
<td>+4.3%</td>
<td>+4.9%</td>
</tr>
<tr>
<td>Pork</td>
<td>+2.5%</td>
<td>+5.3%</td>
</tr>
<tr>
<td>Chicken</td>
<td>+2.1%</td>
<td>+1.8%</td>
</tr>
<tr>
<td>Turkey</td>
<td>+0.3%</td>
<td>+0.5%</td>
</tr>
<tr>
<td>All Meats</td>
<td>+2.6%</td>
<td>+3.4%</td>
</tr>
</tbody>
</table>

Source: USDA-OCE WASDE, December 2017
U.S. Per Capita Meat Consumption

Trend: Up 1.2 pounds per year

Source: USDA/OCE  December 2017
Meat Demand
Growth in Real GDP

Source: U.S. Commerce Department
Index of Domestic Pork Demand
Monthly, Base Elasticity = -0.75

Source: Ron Plain, MU, January 2018
International Trade
U.S. Dollar Exchange Rate

Source: St Louis Federal Reserve Bank – FRED 1/3/18
Exchange Rate: C$/US$

Source: St Louis Federal Reserve Bank – FRED 1/3/18
Top Pork Importing Countries, 2012-18

Source: USDA/FAS  October 2017
Source: USDA/FAS October 2017
Jan-Nov 2017: imports up 2.3% exports up 7.9%

Source: USDA-ERS
U.S. Pork Imports & Exports as % of U.S. Pork Production, 2006-2017

Monthly Carcass Weight Equivalent

Source: USDA ERS, December 2017
U.S. Pork Exports, 2011-2017
Monthly Carcass Weight Equivalent

Source: USDA ERS, December 2017
Index of Export Pork Demand

Base Elasticity = -0.5

Source: Ron Plain, MU, December 2017
U.S. Pork Exports by Destination 2016

- Mexico 31.6%
- Japan 23.2%
- ChinaHK 12.3%
- Canada 10.2%
- S Korea 7.8%
- Australia 3.6%
- Others 12.3%

In 2002, 48.1% of U.S. pork exports went to Japan
U.S. Pork Imports By Origin 2016

- Canada: 72.2%
- Poland: 9.2%
- Denmark: 6.1%
- Mexico: 2.8%
- Italy: 2.1%
- Others: 7.6%
U.S. Hog Imports & Exports

Jan-Nov 2017: imports up 1.0

Source: USDA ERS
Source: USDA – ERS data thru December 2017
Cold Storage
Hog Inventory
## 2017 Hog Inventory

<table>
<thead>
<tr>
<th>Type</th>
<th>US Dec</th>
<th>Can July</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Hogs</td>
<td>102.4</td>
<td>102.1</td>
</tr>
<tr>
<td>Breeding</td>
<td>101.1</td>
<td>101.1</td>
</tr>
<tr>
<td>Market</td>
<td>102.5</td>
<td>102.2</td>
</tr>
<tr>
<td>&lt;50 lbs</td>
<td>102.7</td>
<td>101.4</td>
</tr>
<tr>
<td>50-119</td>
<td>102.5</td>
<td>104.5</td>
</tr>
<tr>
<td>120-179</td>
<td>102.3</td>
<td>101.8</td>
</tr>
<tr>
<td>&gt;180</td>
<td>102.3</td>
<td>102.1</td>
</tr>
</tbody>
</table>

Source: USDA & Statistics Canada
# December 2017 Hog Inventory

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Hogs &amp; Pigs</td>
<td>102.4</td>
</tr>
<tr>
<td>Kept for Breeding</td>
<td>101.1</td>
</tr>
<tr>
<td>Kept for Marketing</td>
<td>102.5</td>
</tr>
<tr>
<td>Under 50 lbs</td>
<td>102.7</td>
</tr>
<tr>
<td>50-119 lbs</td>
<td>102.5</td>
</tr>
<tr>
<td>120-179 lbs.</td>
<td>102.3</td>
</tr>
<tr>
<td>180 lbs. and over</td>
<td>102.3</td>
</tr>
<tr>
<td>Pigs/Litter Sep-Nov</td>
<td>101.0</td>
</tr>
<tr>
<td>Pig Crop Sep-Nov</td>
<td>103.2</td>
</tr>
<tr>
<td>Sep-Nov Farrowings</td>
<td>102.1</td>
</tr>
<tr>
<td>Dec-Feb Farrowing Intentions</td>
<td>102.8</td>
</tr>
<tr>
<td>Mar-May Farrowing Intentions</td>
<td>102.3</td>
</tr>
</tbody>
</table>

Source: NASS December 2017
U.S. Hog Inventory by Quarter

Source: USDA – NASS  December 2017
Farrowing Intentions and Actual Farrowings by Quarter, 2014-2017

13 of last 14 quarters actual farrowings have been higher than farrow intentions

Source: USDA/NASS Hogs & Pigs Reports
U.S. Sows Farrowed by Quarter

Source: USDA – NASS  December 2017

% change from yr. ago

MAM +1.6%,  JJA 1.5%,  SON 2.1%,  DJF 2.8%,  MAM 2.3%
U.S. Pigs Per Litter by Month

Source: USDA – NASS    December 2017
Production
PORK PRODUCTION
Federally Inspected, Weekly

Mil. Pounds

JAN  APR  JUL  OCT

Avg. 2011-15  •••• 2016  • 2017

Data Source: USDA-AMS & USDA-NASS
Livestock Marketing Information Center
HOG SLAUGHTER
Federally Inspected, Weekly

Thou. Head

JAN
APR
JUL
OCT

Avg. 2011-15
2016
2017

Data Source: USDA-AMS & USDA-NASS
Livestock Marketing Information Center
SATURDAY HOG SLAUGHTER
Weekly

Thou. Head

Data Source: USDA-AMS & USDA-NASS
Livestock Marketing Information Center
BARROW AND GILT DRESSED WEIGHT
Federally Inspected, Weekly

Data Source: USDA-AMS & USDA-NASS
Livestock Marketing Information Center
Productivity
Litters Per Sow Per Year, 1930-2017
Pigs Per Sow Per Year, 1930-2017
USDA Hogs & Pigs Reports

Source: USDA/NASS
Average U.S. Hog Carcass Weight, 1930-2017

Source: USDA/NASS
Annual U.S. Pork Production, 1930-2017

Billion Pounds

actual 1.5% trend

Source: USDA/NASS
Annual U.S. Hog Slaughter, 1930-2017

Source: USDA/NASS
Annual U.S. Sow Inventory, 1930-2017

Source: USDA/NASS
Prices
Retail Boneless Pork Prices
Monthly, 2001-2017

Source: USDA/ERS  December 2017
HOG BY-PRODUCT VALUE
Live Animal Basis, Weekly

$ Per Cwt.

Jan 5.0
Apr 5.0
Jul Avg. 2011-15
Oct

Data Source: USDA-AMS
Livestock Marketing Information Center
EARLY WEANED PIG PRICES
National, 10-12 Lbs, Delivered, Weekly

$ Per Head

JAN
APR
JUL
OCT

Avg. 2011-15
2016
2017

Data Source: USDA-AMS
Livestock Marketing Information Center
BARROW AND GILT PRICES
Iowa – So. Minnesota, Carcass Base Price, Weekly

$ Per Cwt.

- Avg. 2011-15
- 2016
- 2017

Data Source: USDA-AMS, Compiled by LMIC
Livestock Marketing Information Center
Forecast
# Commercial Pork Production Forecast

**Million Pounds**

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qtr 1</td>
<td>6,230</td>
<td>6,409</td>
<td>6,700*</td>
</tr>
<tr>
<td>Qtr 2</td>
<td>5,963</td>
<td>6,137</td>
<td>6,390*</td>
</tr>
<tr>
<td>Qtr 3</td>
<td>6,100</td>
<td>6,239</td>
<td>6,580*</td>
</tr>
<tr>
<td>Qtr 4</td>
<td>6,648</td>
<td>6,775</td>
<td>7,245*</td>
</tr>
<tr>
<td>Year</td>
<td>24,941</td>
<td>25,560</td>
<td>26,915*</td>
</tr>
</tbody>
</table>

*forecast

<table>
<thead>
<tr>
<th>Year</th>
<th>Change 2016-17</th>
<th>Change 2017-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>+ 2.9%</td>
<td>+ 4.5%</td>
</tr>
<tr>
<td>2017</td>
<td>+ 2.9%</td>
<td>+ 4.1%</td>
</tr>
<tr>
<td>2018</td>
<td>+ 2.3%</td>
<td>+ 5.5%</td>
</tr>
<tr>
<td></td>
<td>+ 1.9%</td>
<td>+ 6.9%</td>
</tr>
<tr>
<td></td>
<td>+ 2.5%</td>
<td>+ 5.3%</td>
</tr>
</tbody>
</table>

Source: USDA – OCE, December 2017
## Iowa-Minn Hog Price Forecast
### Negotiated Base Price Per Carcass Hundredweight

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qtr 1</td>
<td>$ 64.35</td>
<td>$59.67</td>
<td>$66.29</td>
<td>$63-68*</td>
</tr>
<tr>
<td>Qtr 2</td>
<td>$ 71.59</td>
<td>$73.46</td>
<td>$69.86</td>
<td>$70-75*</td>
</tr>
<tr>
<td>Qtr 3</td>
<td>$ 73.43</td>
<td>$62.30</td>
<td>$70.78</td>
<td>$68-73*</td>
</tr>
<tr>
<td>Qtr 4</td>
<td>$ 58.95</td>
<td>$46.26</td>
<td>$58.77</td>
<td>$55-60*</td>
</tr>
<tr>
<td>Year</td>
<td>$ 67.08</td>
<td>$60.42</td>
<td>$66.43</td>
<td>$64-69*</td>
</tr>
</tbody>
</table>

*forecast price – prior day purchased
Net Slaughter Hog Price,
Monthly Average 2002-2017
Iowa Farrow to Finish Profits, 2006-2017

$ Per Head

Iowa State University Calculations

Forecast Source: Ron Plain using futures contract prices
Questions?