How to Tackle the “Hog Price Cycle”

- A Practical Guide to Hedge Market Risks for China Agribusiness

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## What's the Big Deal about Hog and Layer Chicken?

### China
- **Population**: 1.3 billion
- **accounting for**: about 1/6 of the world’s

### Hog Industry
- **Farmers/Ranchers**: 50 million people
- **Hog Output**: 670 million heads
- **Wholesale Value (hog)**: RMB 1.2 trillion, US$ 175 billion
- **Retail Value (meat)**: RMB 2.1 trillion, US$ 300 billion

### Layer Chicken
- **Farmers/Ranchers**: 10 million people
- **Egg Output**: 25 million tones
- **Annual Wholesale Value**: RMB 150 billion, US$ 25 billion
- **Annual Retail Value**: RMB 200 billion, US$ 30 billion
A. The infamous “Hog Price Cycle” in China
The price of hog follows a 3-5 year cycle of “Boom and Bust”, causing great pain to farmers, ranchers, feed processors and pork merchants in China.
Similarly, the price of egg follows a 2-3 year pattern of roller coaster up and down, causing severe problem to egg farmers, feed processors and egg merchants.
B. Market Risks - from Agribusiness Point of View
Investing in a new hog farm requires major capital, and its payback depends on the business profits in the next ten years, driven largely by the uncertain hog price.

A 10,000-head Hog Farm, 2014 Profit/Loss

<table>
<thead>
<tr>
<th>Annual Output</th>
<th>10,000 heads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly Output</td>
<td>833 heads</td>
</tr>
<tr>
<td>Hog-grain Ratio</td>
<td>5.4</td>
</tr>
<tr>
<td>P/L per head</td>
<td>RMB -164.34</td>
</tr>
<tr>
<td>Depreciation</td>
<td>RMB 1 million</td>
</tr>
<tr>
<td>Annual P/L</td>
<td>RMB -2.64 million</td>
</tr>
</tbody>
</table>

Note: ①. The breakeven point of hog feed ratio is measured by china-data
②. The price ratio is given out by the hog price that divided by the grain price
It takes five months to ready a hog to market. Future hog price is the key profit driver after deduction of upfront payment for piglets and the ongoing feed cost.

The down trend of hog price, coupled with the steady rise of feed cost, turned hog farmers into deep losses in 2012.
Meat processor, who pays cash now for hogs and sell meat products to supermarket several days later, will suffer losses if hog price goes down during this period.

**Opinion:**
- The price fluctuates frequently.
- Sometimes there will be violent fluctuations.
- Because of short-term price fluctuations, the timing of selling the hogs should be carefully chosen.
Investing in a new chicken farm requires major capital, and its payback depends on the business profits in the next ten years, driven largely by the uncertain egg price.

Long-term Investment Risks

A 10,000-bird Layer Chicken Farm, 2017 P/L

- Daily Egg Output: 500 KG
- Monthly Egg Output: 15,000 KG
- Egg-grain ratio: 2.77
- P/L per KG: RMB -0.648
- Depreciation: RMB 7,000 per month
- Annual P/L: RMB -208.8K

Note:
① The breakeven point of egg feed ratio is measured by china-data.
② The price ratio is given out by the egg price that divided by the grain price.
The average life span of layer chicken is 500 days. Future egg price is the key profit driver after deduction of upfront payment for chicks and the ongoing feed cost.

The down trend of egg price, coupled with the up trend of feed cost, turned egg farmers into deep losses in 2012.
Egg merchant, who pays cash now for eggs and sell to supermarket several days later, will suffer losses if egg price goes down during this period.

Opinion:
- Short-term prices are prone to violent fluctuations, making the normal profit of the farm can not be guaranteed.
- Farm stock management and short-term risk hedging can ease the farm’s profit fluctuations.
How Are Market Risk Impacting on China Agribusiness?

With Revenue and Profit greatly affected by uncertain future price, China’s banking system and capital market largely stay away from Agriculture …

- It is difficult to obtain long-term capital investment for building new farms.
- Working capital to finance new crops can be costly.
- Short-term loan for purchasing may not be extended if price is trending down.
C. Big Data Solutions and Price Forecasts
Measure Supply and Demand accurately, the first step in tackling the “Hog Price Cycle”

- Proprietary data sources from 24 provinces cover more than 30% of China’s hog and egg trades;
- Scientific sampling represents the current state of hog and egg production, trade and consumption;
- Using a combination of data collection techniques, from on-site inspection, video monitoring, telephone interview, online data mining, to point-of-sales data from our partners and customers;
- Screening, correcting and removing outliers to ensure the accuracy of our data;
- Our industry trade data is constantly being cross-examined using price data, government agency data, third-party data and commodities trading data
Construct Supply and Demand Balance Sheet, our second step in understanding current market conditions and directions.

**China Hog Supply-Demand Balance Sheet**

<table>
<thead>
<tr>
<th>(Million Head)</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Beginning Stocks</strong></td>
<td>473.34</td>
<td>463.41</td>
<td>466.67</td>
<td>430.18</td>
</tr>
<tr>
<td><strong>Sow Beginning Stocks</strong></td>
<td>49.28</td>
<td>50.68</td>
<td>49.38</td>
<td>41.9</td>
</tr>
<tr>
<td><strong>Production</strong></td>
<td>707</td>
<td>725</td>
<td>721</td>
<td>712</td>
</tr>
<tr>
<td><strong>Imports</strong></td>
<td>7</td>
<td>8</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total Supply</strong></td>
<td>1188</td>
<td>1196</td>
<td>1195</td>
<td>1153</td>
</tr>
<tr>
<td><strong>Total Slaughter</strong></td>
<td>698</td>
<td>716</td>
<td>735</td>
<td>708</td>
</tr>
<tr>
<td><strong>Loss</strong></td>
<td>25</td>
<td>9</td>
<td>20</td>
<td>46</td>
</tr>
<tr>
<td><strong>Sow Slaughter</strong></td>
<td>-1</td>
<td>1</td>
<td>6.5</td>
<td>3.9</td>
</tr>
<tr>
<td><strong>Exports</strong></td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Ending Stocks</strong></td>
<td>463</td>
<td>467</td>
<td>430.18</td>
<td>391.64</td>
</tr>
<tr>
<td><strong>Total Distribution</strong></td>
<td>1188</td>
<td>1196</td>
<td>1195</td>
<td>1153</td>
</tr>
</tbody>
</table>
Building our proprietary Price forecasting models, the Holy Grail in penetrating the myth of Hog Price Cycle

• In our second version of the forecast model, we simplify in order to consider only the main factors such as the piglets, the substitute chicken, pork prices, government policy and holiday demand. And policy and holiday demand are set as exogenous variables, with the others being endogenous variables to establish the error correction model:

\[ ECM_{1,t-1} = \eta_{10} + \kappa_{1} PIG_{t-1} - \eta_{11} PORK_{t-1} - \eta_{12} CHICKEN_{t-1} + \pi_{1} \] (1)

\[ ECM_{2,t-1} = \eta_{20} + \kappa_{2} PIG_{t-1} - \eta_{21} PORK_{t-1} - \eta_{22} CHICKEN_{t-1} + \pi_{2} \] (2)

\[ \Delta PIG_{t} = \lambda_{10} + \lambda_{11} ECM_{1,t-1} + \lambda_{12} ECM_{2,t-1} + \sum \alpha_{1i} \Delta PI\dot{G}_{t-i} + \sum \beta_{1i} \Delta PORK_{t-i} + \sum \gamma_{1i} \Delta PIGLET_{t-i} + \sum \delta_{1i} \Delta CHICKEN_{t-i} + \theta_{1} PL_{t-4} + \xi_{1} FD_{t} + \mu_{1t} \] (3)

\[ \Delta PORK_{t} = \lambda_{20} + \lambda_{21} ECM_{1,t-1} + \lambda_{22} ECM_{2,t-1} + \sum \alpha_{2i} \Delta PIG_{t-i} + \sum \beta_{2i} \Delta PORK_{t-i} + \sum \gamma_{2i} \Delta PIGLET_{t-i} + \sum \delta_{2i} \Delta CHICKEN_{t-i} + \theta_{2} PL_{t-4} + \xi_{2} FD_{t} + \mu_{2t} \] (4)

\[ \Delta PIGLET_{t} = \lambda_{30} + \lambda_{31} ECM_{t-1} + \sum \alpha_{3i} \Delta PIG_{t-i} + \sum \beta_{3i} \Delta PORK_{t-i} + \sum \gamma_{3i} \Delta PIGLET_{t-i} + \sum \delta_{3i} \Delta CHICKEN_{t-i} + \theta_{3} PL_{t-4} + \xi_{3} FD_{t} + \mu_{3t} \] (5)

\[ \Delta CHICKEN_{t} = \lambda_{40} + \lambda_{41} ECM_{t-1} + \sum \alpha_{4i} \Delta PIG_{t-i} + \sum \beta_{4i} \Delta PORK_{t-i} + \sum \gamma_{4i} \Delta PIGLET_{t-i} + \sum \delta_{4i} \Delta CHICKEN_{t-i} + \theta_{4} PL_{t-4} + \xi_{4} FD_{t} + \mu_{4t} \] (6)
Hog Price Index and Egg Price Index: Now used by China Agribusiness, insurance carriers and investment companies alike, and quoted by mainstream news media
D. Our Risk Management Solutions
Exchange-traded Derivatives credited to us: DCE Egg Futures, Tianfu Egg Forward Contract, DCE Soybean Meal Options, and DCE Hog Futures (to be launched in 2017)

DCE listed egg futures in 2013

DCE listed Soybean Meal Options in 2017
Two basic principles for Agribusiness to choose risk hedging tools:
- combine the actual situation of the industry and the enterprises when choose financial tools
- Make sure that the risk is basically covered and the market capacity is sufficient to meet the needs of enterprises

Structured Insurance
- Make risk matches income through using the form of classification to share the risks

Egg options
- Using the spot price as a basis for settlement, and meeting the needs of enterprises through financial innovation

Insurance, OTC Options and Structured Finance products credited to us: Hog Price Insurance, and Huatai Egg Options (Calls and Puts)
Backed by accurate forecast of Price Trends, we combine Exchange-traded Futures and Options contracts, OTC Derivatives, Insurance contracts and Structured Finance products, for the purpose of helping our clients --

- Lower the cost of purchase and inventory
- Increase sales revenue and profit margin
- Improve capital efficiency of running the business
We look for long-term partnership with domestic and international companies, to build win-win business cooperation.
Thank You!

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