Increasing Overall Throughput via Optimum Market Weights

Saskatchewan Pork Industry Symposium

15 November 2018
Speaker Background

Brandon Fields – Manager, Applied Meat Science
- Technical Service for in-plant operations and factors influencing meat quality
- Trial planning, data collection, and analysis
- Optimum Market Weight and Carcass Value Calculators

Joined PIC in March 1997

BS Animal Science from Purdue University
- Focus on meat science
- 3 years as Research Assistant in meat lab

Part-time Saskatchewan Resident…
Start with the right plan!
Bigger is usually better!

Although they restricted themselves to one drink at lunch time, Howard and Tom still found they were not at their most productive in the afternoons.
Do you want high highest premium ($/kg), or the most money (total $)?

They are NOT the same thing

Targeting higher premiums may leave money on the table

Goal is to maximize PROFIT
Cost of Production

![Graph showing cost of production vs. live weight in pounds. The graph displays two lines: one for total COP (Cost of Production) and another for COP/lb. As live weight increases, total COP decreases, while COP/lb increases.]
Optimum Market Weight is the Key

PIC Optimum Marketing Calculator

Packer = A  Payment method = Calculation Date = 08/NOV/18
Size = PIC 200  Dietary Energy = Medium  Day Fixed Cost = $0.14
Sex = Barrow  Food Cost = $0.58/kg  Placement Diff. = 7 Days
Base = $1.73/kg  Feeder Pig Cost = $52.0  Paylean Level = None

<table>
<thead>
<tr>
<th>Mkt Week</th>
<th># Head</th>
<th>Margin/Head</th>
<th>Avg Weight</th>
<th>Week WF</th>
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<td>$29.56</td>
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<td>4</td>
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<td>720</td>
<td>$11.26</td>
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<tr>
<td>6</td>
<td>350</td>
<td>$-8.85</td>
<td>121 kg</td>
<td>24</td>
</tr>
</tbody>
</table>

Barn ADG = 0.81 kg/d  Barn FCR = 2.79
Avg Live Weight = 126 kg  Avg Carcass Weight = 96 kg
# of deads = 61  Cost of deads per pig mktcd = $21.6 / pig
Overall Barn Margin = $42033  Margin per pig placed = $17.51

Net Margin Summary (By Final weight)

Week 1 0.91W = 132 kg at max 50% above feed and housing costs = $24.47/pig
Week 2 0.91W = 136 kg at max 50% above feed and housing costs = $20.37/pig
Week 3 0.91W = 131 kg at max 50% above feed and housing costs = $20.59/pig
Week 4 0.91W = 129 kg at max 50% above feed and housing costs = $23.79/pig
Week 5 0.91W = 127 kg at max 50% above feed and housing costs = $4.85/pig
Optimum Market Weight is Different for Each Packer

### PIC Optimum Marketing Calculator

**Packer:** A  
**Sire:** PIC260  
**Sex:** Barrow  
**Base:** $1.73 / kg  
**Feeder Pig Cost:** $82.6  
**Dietary Energy:** Medium  
**Day/Fixed Cost:** $0.14  
**Placement Diff.:** 7 Days  
**Paylean Level:** None  
**Calculation Date:** 09/NOV/16

<table>
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<td>$22.59</td>
<td>131 kg</td>
<td>22</td>
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<td>720</td>
<td>$11.29</td>
<td>128 kg</td>
<td>23</td>
</tr>
<tr>
<td>5</td>
<td>350</td>
<td>$8.85</td>
<td>121 kg</td>
<td>24</td>
</tr>
</tbody>
</table>

**Barn ADG:** 0.81 kg / d  
**Avg Live Weight:** 126 kg  
**# of deads:** 61  
**Overall Barn Margin:** $4,2033

**Barn FCR:** 2.79

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**Packer:** B  
**Sire:** PIC260  
**Sex:** Barrow  
**Base:** $1.73 / kg  
**Feeder Pig Cost:** $82.6  
**Dietary Energy:** Medium  
**Day/Fixed Cost:** $0.14  
**Placement Diff.:** 7 Days  
**Paylean Level:** None  
**Calculation Date:** 09/NOV/16

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<td>3</td>
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<td>4</td>
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<td>$13.41</td>
<td>123 kg</td>
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<td>6</td>
<td>170</td>
<td>$-15.43</td>
<td>117 kg</td>
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</table>

**Barn ADG:** 0.77 kg / d  
**Avg Live Weight:** 124 kg  
**# of deads:** 61  
**Overall Barn Margin:** $4,2471

**Barn FCR:** 2.76

**Avg Carcass Weight:** 96 kg  
**Cost of deads per pig killed:** $2.6 / pig  
**Margin per pig placed:** $17.7
Optimum Market Weight is Different for Each Packer

**Net Margin Summary (By Wean-Finish Week)**

- **Week 1** OWF = 125 kg at Max Margin above feed and housing costs = $89.07/sg
- **Week 2** OWF = 135 kg at Max Margin above feed and housing costs = $33.17/sg
- **Week 3** OWF = 140 kg at Max Margin above feed and housing costs = $29.59/sg
- **Week 4** OWF = 135 kg at Max Margin above feed and housing costs = $42.64/sg
- **Week 5** OWF = 125 kg at Max Margin above feed and housing costs = $24.29/sg
- **Week 6** OWF = 115 kg at Max Margin above feed and housing costs = $4.85/sg

**Net Margin Summary (By Wean-Finish Week)**

- **Week 1** OWF = 125 kg at Max Margin above feed and housing costs = $81.35/sg
- **Week 2** OWF = 120 kg at Max Margin above feed and housing costs = $32.56/sg
- **Week 3** OWF = 125 kg at Max Margin above feed and housing costs = $23.45/sg
- **Week 4** OWF = 130 kg at Max Margin above feed and housing costs = $23.45/sg
- **Week 5** OWF = 125 kg at Max Margin above feed and housing costs = $15.65/sg
- **Week 6** OWF = 115 kg at Max Margin above feed and housing costs = $15.65/sg
Optimum Market Weight is Different for Each Sex

PIC Optimum Marketing Calculator

- **Fadke:= A**
- **Sex:=Barrow**
- **Base:= 31.73 / kg**
- **Dietary Energy = Medium**
- **Feed Cost = $0.35/kg**
- **Feeder Pig Cost = $82.6**
- **Paydown Level = None**
- **Day/Fixed Cost = $0.14**
- **Placement Diff. = 7 Days**
- **Calculation Date = 05/NOV/16**

<table>
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<td>129 kg</td>
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<td>6</td>
<td>350</td>
<td>$8.85</td>
<td>121 kg</td>
<td>24</td>
</tr>
</tbody>
</table>

- Barn ADG = 0.81 kg / d
- Avg Live Weight = 126 kg
- Cost of deaths per pig marketed = $2.6 / pig
- Overall Barn Margin = $4,203.3
- Avg Carcass Weight = 96 kg
- Margin per pig placed = $17.51

PIC Optimum Marketing Calculator

- **Fadke:= A**
- **Sex:=Dile**
- **Base:= 31.73 / kg**
- **Dietary Energy = Medium**
- **Feed Cost = $0.35/kg**
- **Feeder Pig Cost = $82.6**
- **Paydown Level = None**
- **Day/Fixed Cost = $0.14**
- **Placement Diff. = 7 Days**
- **Calculation Date = 05/NOV/16**

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<td>5</td>
<td>899</td>
<td>$5.19</td>
<td>120 kg</td>
<td>24</td>
</tr>
</tbody>
</table>

- Barn ADG = 0.79 kg / d
- Avg Live Weight = 125 kg
- Cost of deaths per pig marketed = $2.5 / pig
- Overall Barn Margin = $5,103.1
- Avg Carcass Weight = 97 kg
- Margin per pig placed = $21.26
Optimum Market Weight is Different for Each Sex

Net Margin Summary (By Wean-Finish Week)

Week 1: OEW = 112 kg at Max Margin above feed and housing costs = $44.47/pc
Week 2: OEW = 135 kg at Max Margin above feed and housing costs = $31.27/pc
Week 3: OEW = 135 kg at Max Margin above feed and housing costs = $29.59/pc
Week 4: OEW = 135 kg at Max Margin above feed and housing costs = $28.48/pc
Week 5: OEW = 135 kg at Max Margin above feed and housing costs = $27.71/pc
Week 6: OEW = 135 kg at Max Margin above feed and housing costs = $26.85/pc

- **M**
- **F**

Net Margin Summary (By Wean-Finish Week)

Week 1: OEW = 112 kg at Max Margin above feed and housing costs = $40.50/pc
Week 2: OEW = 135 kg at Max Margin above feed and housing costs = $36.42/pc
Week 3: OEW = 135 kg at Max Margin above feed and housing costs = $32.56/pc
Week 4: OEW = 135 kg at Max Margin above feed and housing costs = $30.70/pc
Week 5: OEW = 135 kg at Max Margin above feed and housing costs = $30.38/pc
Week 6: OEW = 135 kg at Max Margin above feed and housing costs = $29.88/pc
Effect of Market Weight Variation on OMW

Increasing market weight variation (standard deviation) has a minimal effect on optimum market weight.
Effect of Market Weight Variation on Net Margins

Increasing market weight variation (standard deviation) has a large effect on net margins ($0.40-$0.60 per lb).
Take Home Message

Packer matrix, weight variation, marketing strategy, feed costs, and feed efficiency are critical elements of maximizing net margins and determination of OMW.

Reducing variation can make significant economic impact

Get the right pigs out the barn door at the right time!!!
Know the little things...

All the preparation in the world is useless if the implementation is poor.
Preventing defects
Carcass Losses

<table>
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<th>Problem</th>
<th>Loss</th>
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<tr>
<td>Skin Problem</td>
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<tr>
<td>Abscess</td>
<td>14%</td>
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<tr>
<td>Bruising</td>
<td>12%</td>
</tr>
<tr>
<td>Injection Sites</td>
<td>3%</td>
</tr>
<tr>
<td>Arthritis</td>
<td>11%</td>
</tr>
<tr>
<td>Diseased</td>
<td>44%</td>
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The diagram illustrates the percentage of carcass losses due to various skin problems and injection sites.
Estimate of Economic Loss from Nonconformities in Carcass Quality

<table>
<thead>
<tr>
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<td>Condemnation</td>
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<tr>
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<tr>
<td>Skin</td>
<td>.01</td>
<td>.02</td>
</tr>
<tr>
<td>Bruises</td>
<td>.08</td>
<td>.08</td>
</tr>
<tr>
<td>Abscesses/Injection Sites</td>
<td>.47</td>
<td>.57</td>
</tr>
<tr>
<td>Arthritis</td>
<td>.08</td>
<td>.12</td>
</tr>
<tr>
<td>Broken Bones</td>
<td>.59</td>
<td>.30</td>
</tr>
<tr>
<td>Subtotal</td>
<td>2.23</td>
<td>2.29</td>
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</table>
## Estimated Cost of Poor Handling*

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<th>Cost / Pig</th>
<th>Total Cost</th>
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<td>$31,694,000</td>
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<tr>
<td>Dead in Plant (DIP)</td>
<td>$23,770,500</td>
<td>$23,770,500</td>
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<tr>
<td>Color</td>
<td>$0.43</td>
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<tr>
<td>Bruising</td>
<td>$0.08</td>
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<tr>
<td>PSE</td>
<td>$0.90</td>
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“Total lost opportunity for the U.S. swine industry of $2.44 per finisher head per year, or $254,104,500.00”

*“Handling and Loadout of the Finisher Pig”
Jeff Hill, Premium Standard Farms Nick Berry, Iowa State University
Anna K. Johnson, Iowa State University, December 2015
Typical Causes of Trim Loss and Condemnations

Cryptorchids and Rigs
Ruptures, belly busts, etc.
Black hair roots and/or “hard hair”

**Bug bites**
Disease / Sub-optimal health
  • Skin lesions
  • Lung adhesions
  • Condemned offal

**Injuries**
  • Cuts, bruises, abscesses, etc.
    • Often caused by sharp objects in pens (bolts, gate latches, water nipples, etc.)
  • Broken bones
  • Tail bites
  • Fight marks

**Feed Withdrawal**
  • Reduced gut spill
Skin damages

Fight marks

Hematoma (bruise)

Strick print

Hematoma (loin)
“But I didn’t shock the pig...”

From: Kellye Pfalzgraf / Tyson Foods - 2011
Cause and Effect
Slippery Floor = Injured Pig
Feed Withdrawal

A total time off-feed of around 18 hours is considered ideal for meat quality and food safety
  • Minimal effects are seen on carcass weight up to 24 hours off-feed (but with access to water)
  • It is recommended that pigs be off feed 4-6 hours at the farm, prior to loading
  • 5 hours off feed at farm + 12 hours transport + 3 hours rest at plant = 20 hours total off feed
    • Still well within the limits
Selecting the Right Pigs
How do you select pigs?

SWAG?
  • Scientific Wild Guess

PIDOOMA?
  • Pulled It Directly Out Of My

Well educated and practiced methodology?
Which pig weighs more?
Which is heavier?
Which has the greater volume?
**Basic math/physics**

Volume = length * width * height  
Mass = Density * volume

To normal folks:
- Weight = density * size  
- So....assuming same material is same density, bigger size = more weight.  
- Right?

**Lets practice...**
- Which weights more? A ton of cotton or a ton of bricks?
Which has the greater volume?
Which pig weighs more?
Out of the barn, onto the truck
Relating to pig behavior

It’s like relating to the behavior of a 4 year old….

• They aren’t rational
• They are easily distracted
• They make you lose your cool
Transport

Loading
- Time to load is not a good metric
- Avoid electric prods
  - Influences stress
- Load size and space allowance
- Load crew size

Duration
- Influences glycogen at slaughter (pHu)

Truck driver

Weather conditions
Is this what your load out feels like?
Load Crew

Size depends....
- 3-4 people recommended
- Should all be experienced and level headed

No. of loads / day depends....
- 2-3 loads normally
- Full barn dumps are different

Recommended to “specialize”
- Each job is unique, best to specialize
- ie. 2 empty pens, 1 takes pigs up ramp, etc.

Realize that different barn designs call for different strategies
Who is faster?

Michael Phelps

This guy...
Who are you more likely to “force” on a truck?

BJ Raji
6’2” – 337 lbs

This kid...
Which group moves better?
Which group can you load on a truck faster?
Which group can you load on a truck faster?
Where is the problem?
What can you do about it?

NOT a proper handling tool....
Pig Handling Tools

Acceptable

Minimize use, but best to completely eliminate use

Never use
How about now?
Take Home Message

Have a company plan that focuses on the OMW for your system
Take care to load the right pigs at the right time
Take care to avoid trim loss and injuries to the pig.
  • Facility maintenance
  • Proper handling and welfare
Understand the basics of proper pig handling to improve pig movements
Thank you for your time! And....