Factors affecting pork gross margins

December 2019, Primefact 1698, First edition
Jayce Morgan, Development Officer Pigs, Tamworth NSW

What is the gross margin?
A gross margin can be defined as the gross income from an enterprise less the variable costs incurred in achieving it. Variable costs are those costs directly attributable to an enterprise and will vary in proportion to the size of an enterprise.

The gross margin is sometimes referred to as an operating margin as it does not include ‘fixed’ or overhead costs such as depreciation, interest payments and rates. It is not the business profit margin but a healthy gross margin is a good indicator of a healthy business.

Every farm business is different and is a reflection of the people in management and the specifics of the business size, location and goals. Gross margin analysis allows you to track business performance and benchmark against selected goals or industry averages.

Income sources in pork production
The major source of income is the sale of pigs for pork. However there can be different market outlets requiring different carcass sizes:

- Weaner pigs for niche markets – whole pig 15-25 kg carcass
- Grower pigs to specific retail butchers or food service – retail cuts from “porker” carcass with weight range 45-70kg
- Finisher pigs to retail – usually 70-85 kg “baconer” carcass
- Backfatter pigs (cull sows) for secondary processing (salami pigs) >150 kg pigs

The smaller carcass weight ranges (weaner or porker pig carcass) tend to be preferred by small scale or outdoor producers. Bacon weight pigs tend to be the preferred carcass weight for larger indoor producers. Although any producer can choose to provide any size pig if they have a market for that pig and if their cost structure means that is a viable market for them.

Small (weaner or porker) carcasses need to return more money per kilogram than large carcasses to cover costs of the breeding herd. Small pigs may be less labour intensive and less total feed is used but it depends on the costs of production whether they are a good option with a good margin on farm. Backfatter pigs usually return less than half the price per
Factors affecting pork gross margins

kilogram of a bacon pig. Like any commodity, price is dependent upon supply and demand in the marketplace.

In Australia the main retail fresh meat market demands the carcass weight range of 70-85 kg carcass. Comparisons with other pork production countries (Denmark, USA, and Canada) reveal that they have preference for a heavier carcass 90-100 kg which results in a greater yield of pork per sow (and better margins if all other parameters are equal). European countries also tend to wean greater numbers of pigs per sow – a function of genetics and management. Table 1 provides country comparisons for key performance indicators from March 2018 as a guide. High production costs, lower average carcass weight and fewer pigs weaned per sow per year reduce Australia’s competitiveness in world markets.

Other income sources

Other sources of income in a pork production business may include sales of:

- Gilts as replacement breeding stock for other pork producers
- Weaners to other farmers to grow to market weight
- Manure or compost to grain farmers nearby
- Boars to other pork producers
- Semen to other pork producers although this tends to be highly specialised and a business in its own right.

Payment grids

Pigs produced to specifications under contract are paid for on a grid system. Specifications for the carcass will include acceptable carcass weight and fat ranges. Price penalties or deductions apply to carcasses falling outside the specifications. The size of the penalties will depend on supply and demand, and the target market. Penalties will apply to carcasses that are too fat, too thin, too light or too heavy. Over fat carcasses usually receive the greatest price penalties. Not all processing chains can handle heavy pigs.

Figure 1 is a guide to how a grid system works and how to maximise your income by targeting the maximum carcass weight and fat. Prices are paid on a dollars per kilogram basis so it makes sense to have heavy carcasses to maximise the return.
Table 1: A comparison of the cost of production (COP) and the key performance indicators (KPI) between Australia and selected pork producing countries (Source: Dr Roger Campbell in Australian Pork Newspaper March 2018)

<table>
<thead>
<tr>
<th>KPI/Country</th>
<th>Australia</th>
<th>United States</th>
<th>Canada</th>
<th>Denmark</th>
<th>Netherlands</th>
<th>Great Britain</th>
</tr>
</thead>
<tbody>
<tr>
<td>COP</td>
<td>2.70</td>
<td>1.56</td>
<td>1.81</td>
<td>2.10</td>
<td>2.34</td>
<td>2.29</td>
</tr>
<tr>
<td>Feed $/T</td>
<td>365</td>
<td>256</td>
<td>314</td>
<td>328</td>
<td>370</td>
<td>340</td>
</tr>
<tr>
<td>Feed $/kg CWT</td>
<td>1.38</td>
<td>1.02</td>
<td>1.22</td>
<td>1.22</td>
<td>1.27</td>
<td>1.25</td>
</tr>
<tr>
<td>Non Feed $/kg CWT</td>
<td>1.32</td>
<td>0.54</td>
<td>0.59</td>
<td>0.88</td>
<td>1.07</td>
<td>1.04</td>
</tr>
<tr>
<td>HFC (Herd Feed Conversion)</td>
<td>3.73</td>
<td>3.97</td>
<td>3.87</td>
<td>3.70</td>
<td>3.43</td>
<td>3.67</td>
</tr>
<tr>
<td>Pigs weaned/sow/y</td>
<td>23.9</td>
<td>25.7</td>
<td>23.2</td>
<td>32.1</td>
<td>29.8</td>
<td>24.8</td>
</tr>
<tr>
<td>Pigs sold/sow/y</td>
<td>22.8</td>
<td>23.4</td>
<td>21.9</td>
<td>30.8</td>
<td>28.4</td>
<td>23.2</td>
</tr>
<tr>
<td>Carcass weight CWT kg</td>
<td>76.5</td>
<td>94.0</td>
<td>99.3</td>
<td>84.2</td>
<td>93.0</td>
<td>82.0</td>
</tr>
<tr>
<td>CWT/sow/y (kg)</td>
<td>1687</td>
<td>2202</td>
<td>2178</td>
<td>2531</td>
<td>2640</td>
<td>1901</td>
</tr>
<tr>
<td>Wean to finish mortality %</td>
<td>4.4</td>
<td>9.02</td>
<td>5.5</td>
<td>6.4</td>
<td>4.8</td>
<td>5.04</td>
</tr>
</tbody>
</table>

Factors affecting pork production

Pig flow

The pork market operates on a continuity of supply scenario sometimes referred to as ‘pig flow’ on farm. Pigs are mostly non-seasonal breeders so producers can mate sows in batches all year and have some sows farrowing each week (or fortnight or month) depending on the size of the herd, farm facilities and markets.

If there is any disruption in the supply chain affecting the delivery of pigs to the processor (eg flood, disease outbreak) this will affect pig flow on-farm. If there was a stock standstill due to an emergency animal disease outbreak (EAD) pigs will back-up on farm and a whole different set of issues will arise for farmers. Shed capacity, feed, water and effluent control can be impacted as well as market access due to ‘out of specification’ pigs (pigs keep growing and more pigs enter the system due to pig flow).
Abattoirs have a certain capacity for lairage (holding yards), on their processing chain and in their chillers. If they have been operating to capacity, they cannot suddenly absorb extra pigs into the system. Contingency plans for emergency situations are essential for planning and maintaining a productive herd and business.

**Figure 1**: An example of a price grid and out-of-specification penalty scenarios. Aim for the maximum allowed carcase weight and fat measurement for maximum income. (Source: The Managers Toolbox, Pig Research and Development Corporation)

**Sow productivity**

Herd management, nutrition and health have the greatest impact on pork production. A sow is capable of 2.4 production cycles per year. One cycle is approximately 150 days – gestation 115 day average, lactation 28 day average, plus mating 7 days. Attention to detail in management of the sow herd determines the sow productivity.

However, even on a very well managed farm, the average farrowing rate may only be between 85-95% of the total sow number that was mated.

Sows can only be mated if they display oestrus – some sows for a variety of reasons will exhibit anoestrus and will not be mated. Some sows will be mated but will not become pregnant; while others may become pregnant but the pregnancy will not hold and the sow will return to oestrus at a later date.

Contingency practice to cover for these ‘empty’ (not pregnant) sows is to mate at least 20-30% gilts with every group of sows mated. These mated gilts become herd replacements ensuring ongoing herd productivity and pig flow on farm. The ‘empty’ sows may be culled depending on their health and breeding history.
**Litter size**

Genetics, sow nutrition and health have the greatest impact on litter size. The more piglets weaned and grown to market weight the better the gross margin for the enterprise. Pigs are capable of litter sizes up to 20+ piglets. As litter size increases, individual piglet body weight decreases making them more vulnerable to cold and illness. Overlay of piglets by the sow is the major cause of piglet death in the first 3 days of life. Adequate colostrum in the first 24 hours and warm creep area temperatures help piglets become fit and agile.

**Costs of pork production**

**Feed**

The cost of production is split into feed and non-feed costs. This is because the cost of feed can be between 50-70% of the total cost of pork production. A lot of effort therefore should go into the efficient use of feed, minimising waste and matching the right feed formulas to the needs of the pig.

The cost of pig feed is a direct reflection of the grain price since grain is 70% to 80% of the ration. Other components a ration includes:

- Protein meals such as soybean or canola meal
- Synthetic amino acids
- Vitamins and minerals

The additive costs can add an extra $50 to $100 per tonne to the base grain price, especially if transport costs are included for purchased complete rations. It is a sound investment to procure the services of a nutrition consultant for ration formulations that factor in the available ingredients with the needs of the pig.

Grain prices can vary across the country due to drought. Otherwise identical businesses can have different cost structures simply due to feed cost variations across different regions and states.

Different categories of pig have different nutrient requirements. Lactating sows need a more nutrient dense ration than dry sows; and weaner pigs have higher nutrient needs than finisher pigs. This will mean a different cost structure for different rations and sections of the herd. The breeding herd will utilise approximately 25% of all feed in a farrow-to-finish farm.

The cost of feed wastage increases as grain price increases. In practical terms, a bacon pig only has to spill 80 gram of feed per day over its lifetime to cost $6 per pig if feed was $500 per tonne. It is impossible to eliminate all feed waste on farm but it is an area for improvement on most farms. Pig feeder space and jostling at the trough, feeder adjustment, over filling of feeders, are all important. Less tangible evidence of feed waste include inefficiencies in feed utilisation due to things like particle size of the feed, temperature effects on appetite, stocking density, herd health and pig performance per unit of feed consumed.
There are two measures of feed use efficiency – whole herd and grower herd. Whole herd feed conversion efficiency ratio (HFC) includes all feed used by the entire herd. It represents the kilograms of feed used to produce a kilogram of carcass. The range is usually between 3.4:1 and 4.0:1 and the lower the value the better the performance.

Assessments of feed use in the growing herd are usually conducted over a set period of time where the pigs are monitored for body weight and all feed used is recorded. An industry goal has been to achieve feed use in kilograms relative to carcass weight gain in kilograms with a ratio 2:1 respectively. Currently this ratio ranges between 2.3:1 to 3.0:1 depending on genetics, management, and feed waste.

The ratio of pork price relative to feed price can be a useful indicator of the financial health of the industry at a certain point of time. The ratio measures the kilograms of feed that can be purchased by the sale price of one kilogram of pork. If pig feed is $500 /T (0.50c/kg) and pork price is 350c/kg then the ratio would be 7:1. (350÷0.5)

If the price of feed dropped to $350 /T and the price of pork remained at 350c/kg the ratio increases to 10:1 (350÷0.35). A larger ratio indicates more profitable prospects for pork production.

Some farms incorporate waste streams from the human food processing industry into their pig diets. These products will include past use-by date products such as bread and dairy, grain by-products, or end of run leftovers such as biscuit mix, or breakfast cereals etc. The use of by-products from the human food chain is strictly governed by swill feeding regulations. The use of products that contain or that have been in contact with material of mammalian origins (meat) is prohibited. Swill feeding is illegal in all states and territories of Australia.

The feeding of by-products can provide some relief from high feed costs but is not widely practiced on large farms due to the variation of the type and consistency of products available – wet and liquid or dusty and dry. Specialist liquid feeding equipment can be needed along with more careful attention to diet formulations. Herd performance may not be as expected.

The mixing costs of energy, labour and transport are included in the price of proprietary feed mixes and these costs need to be accounted for when feed is mixed on farm. The labour and energy used for mixing and milling can be included in the non-feed costs for ease of calculation.

**Non-feed costs**

Non-feed costs will include:

- Labour – in pig sheds and feed mixing
- Energy – fuel and electricity
- Marketing – transport costs, slaughter levy, agent and abattoir feed
Factors affecting pork gross margins

- Health costs – veterinary consultant, feed additives of veterinary nature, vaccinations and other veterinary chemicals
- Breeding – semen and AI consumables
- General consumables

**Labour**

After feed cost, labour is the second highest cost for pork production. Competition from other industries such as mining has seen the employment of overseas workers under a Temporary Skill Shortage (TSS) visa (subclass 482). High staff turnover has been a feature of the industry and the loss of trained personnel and the induction and training of new staff adds to costs.

Labour can also have a major impact on herd performance. Positive behaviours such as pats, rubs and strokes on the back of the pig (as opposed to negative behaviours such as hits, slaps and loud noises) can result in improved growth rates in young pigs and improved pregnancy rates among sows. (ProHand)

Greater use of technology such as electronic sow feeders can reduce the labour units needed on farm. However the more complex the technology the more technically capable the labour unit needs to be. Additional labour units at farrowing can result in improved piglet survival to weaning but, this use needs to be balanced with labour needs in other sections and any internal biosecurity practices.

**Energy**

Energy costs on farm can be very variable. Larger farms tend to install biogas systems to harvest methane from the piggery effluent for use in electricity generation and provision of heat to the farrowing sheds. Some farms rely on mains electricity with diesel powered generators as backup in times of emergency. A benchmarking group in Queensland experienced an almost doubling of power costs between 2009 and 2016. Farms with biogas systems may have power to export back to the grid and earn income on their power supply.

**Transport**

Transport costs for pigs to slaughter will depend on numbers of pigs transported and the distance travelled to the processor. Smaller producers tend to cart their own pigs or work in collaboration with other small producers to share a truck. Own cartage may add to the labour units needed and subsequent costs. Shared transport for pigs adds to the biosecurity risk.

**Levies and processing**

A pig slaughter levy of $3.425 per carcass at slaughter is charged on all pigs killed. The National Residue Survey (NRS) receives $0.175 for residue testing. Australian Pork Limited (APL) receives the other $3.25 of which $2.25 is used for marketing and $1.00 goes into research.
Factors affecting pork gross margins

There are processing or kill fees which vary between processors but can be up around $45.00 per head. NSW is a large state and transport costs for pigs to processing can be large if there is no abattoir nearby. Many pigs in southern NSW go into Victoria or South Australia for processing.

Other considerations around processing include marketing. If you do some or all of your own marketing you need to consider the time and transport costs of the pork carcass to butchers, restaurants or other retail outlets.

Health and breeding

Piggery health expenses are dependent on the health status of the herd and the farms commitment to biosecurity practices. Attention to biosecurity helps keep the pigs on farm free from introduced diseases. Farmers are being encouraged to practice good antibiotic stewardship and reduce the use of antimicrobials. A more committed vaccination program can however negate any reduction in health costs from reduced use of antimicrobials. The best way to reduce health costs is to improve biosecurity and pay attention to nutrition and housing.

Most large piggeries employ a veterinary consultant to get a veterinary perspective on herd health and biosecurity practices. Building a working relationship with a veterinarian is recommended for all piggeries. The cost will vary depending on services rendered but an outside viewpoint on your business from a trustworthy source is invaluable. Currently African swine fever (ASF) is causing concern worldwide. Strict biosecurity on-farm and staff training for recognition and reporting of emergency animal diseases (EAD) are recommended.

Breeding costs are tied to semen supplies and consumables. Most farms have some boars which are mainly used for sow stimulation and oestrus detection and some mating. There is a need to purchase new boars at least annually. Use of artificial insemination (AI) is both cheaper and safer for sows and staff. Mature boars can be over 300kg and are usually retired after a couple of years before they become too big for the sows. Most semen comes from specialist facilities and is delivered as ordered.

Summary

Historically pork prices peak around Christmas when demand is highest while pork prices are lowest around July when demand is weakest. There is a cycle of approximately 5 to 7 years due to pork supply issues which also affect returns. The industry is just coming out of an over-supply period compounded by drought during 2017-18. This resulted in pork being produced below the cost of production. Margins have returned to positive territory but remain slim due to the ongoing high grain prices. Calculation of your business gross margin is a good strategy for business analysis and detecting areas for improvement.

The cost structure for small scale free range producers will be different to that of the indoor producer. Free range producers often participate in their own marketing arrangements. Price received per kilogram of pork produced can be higher than mainstream markets. However
outdoor herds can use more feed due to exercise, weather and waste; have more varied herd performance due to the vagaries of climate; and spend more time off farm doing transport and marketing.

**Further reading**

- Australian Pork Limited Market Reporting
- Australian Pork Newspaper
- NSW DPI Weekly Commodity Reports
- Pork Biosecurity Manual 2019
- ABARES Impact of African swine fever on Global Markets
- Emergency Animal Disease Watch hotline 1800 675 888
- Swill Feeding

Reference number PUB 19/667

© State of New South Wales through Department of Planning, Industry & Environment 2020. The information contained in this publication is based on knowledge and understanding at the time of writing (December 2019). However, because of advances in knowledge, users are reminded of the need to ensure that the information upon which they rely is up to date and to check the currency of the information with the appropriate officer of the Department of Planning, Industry & Environment or the user’s independent adviser.