

# Managerial Accounting and Return on Equity Analysis

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## ■ Introduction

For decades, most agricultural business owners and managers have been severely handicapped by their financial information systems. They have been unable to practice managerial accounting. Managerial accounting is employed widely across all other areas of business in the United States, except until now, in production agriculture. Historically, the main stimuli for farmers to maintain their financial accounting systems have been external reporting requirements to the Internal Revenue System and to lenders. Consequently, farm accounting practices and computer software systems have evolved to respond to the external reporting requirements with little, if any, regard for the internal functions of planning, monitoring and control of the farm business.

The use of managerial accounting is one of the core concepts of the National Pork Producer' Council's (NPPC) Production & Financial Standards initiative. From its inception as a project to develop production and financial guidelines for pork producers, the NPPC's Production and Financial Standards guidelines have provided the template for all agricultural commodity groups to follow as they begin to implement managerial accounting throughout U.S. production agriculture.

## ■ What is Managerial Accounting?

Managerial Accounting involves first identifying manageable segments of the business, then accumulating and analyzing financial transaction data within and among those manageable segments. Manageable segments are comprised of Cost Centers and Profit Centers.

## **Cost Centers & Profit Centers**

In order to justify the existence of each cost and profit center within the financial accounting system, two criteria must be satisfied. First, an individual within the business organization must be identified as the manager responsible. Second, there must be a sufficient flow of dollars through and/or a significant value of assets allocated to the center to warrant its separate management.

Management of cost and profit centers requires contrasting managerial attitudes. For example, the breeding herd is typically a cost center in a commercial farrow-to-finish pork production system. In such a situation where there is typically little or no sales revenue, the objective of the cost center manager is to control costs and to produce weaned pigs as cheaply and efficiently as possible.

In contrast, if the breeding herd is a business that primarily sells weaned pigs, it should be set up as profit center. In such cases, the focus of the profit center manager is to aggressively seek ways to enhance sales revenue such as identifying new customers and perhaps customizing the products to suit the requirements of various markets. Profit center managers should be willing to “spend money to make money.”

### **■ Managerial Intent**

Before designing and implementing a managerial accounting system, it is essential that all personnel involved in the business understand “what business we’re in.” The business’s mission statement should already adequately express this information. If a written mission statement does not exist, then one should be drafted and agreed upon before going further. Knowing “what business we’re in” will help define the cost and profit centers. Further, it is crucial that the manager assigned to each activity fully understands whether he or she will be responsible for management of a cost center or a profit center, and is comfortable with that role.

Successful cost center managers tend to be conservative in nature, while profit center managers need to be aggressive in their approach to generating revenue. While it is by no means impossible, some individuals may find it difficult to successfully manage a combination of cost and profit centers within the same business. If so, then it may be wise to assign certain individuals managerial responsibilities exclusively to either cost or profit centers such that the business benefits from their consistent behaviour.

## ■ Separating Production Costs, from Financing and General Overhead Costs

One important feature that distinguishes managerial accounting from enterprise accounting, which has been traditionally used in agriculture, is that managerial accounting clearly separates production and financing activities within the business. Specifically, two special cost centers, Financing and Sales, General & Administrative (S, G & A) are required to be maintained. While this approach does not prohibit allocation of such costs to various activities within the farm business, it facilitates calculation and reporting of production costs and break-even costs at three distinct levels. Consider the costs of producing a weaned pig:

Production Cost	\$ 22.46
+ Allocated Sales, General & Administrative Costs:	<u>\$ 1.74</u>
= Operating Cost	\$ 24.20
+ Allocated Financing Costs	<u>\$ 0.82</u>
= Total Cost	\$ 25.02

Knowledge of this cost structure enables us to determine how well the manager is controlling production costs, and to what extent the total cost is influenced by debt service and allocation of overhead costs. As production managers typically exert little or no control over S, G & A or Financing costs allocated to their centers, it is appropriate to benchmark their performance against other farms at the production cost level. Adoption of managerial accounting systems is allowing this to be done across pork and other commodity groups.

## ■ Work in Process (WIP) Accounting

The biggest pitfall to avoid is having the manager of a cost center behaving as if he/she were managing a profit center. One of the core concepts of managerial accounting is that inventories are valued at accumulated cost, and not at estimated market value – the approach traditionally favoured by agricultural lenders.

For example, if the farm has a corn growing activity with the managerial intent of feeding the corn grain produced to livestock on the farm, then that activity should be captured in a cost center. The justification for this approach is that the responsibility of the corn cost center manager is to supply corn as cheaply as possible to the livestock center managers. The livestock center managers always have the option of buying their feed corn from an outside supplier. If the

corn cost center manager were to behave instead as a profit center manager, he or she may spend more on inputs to improve yield and quality. As corn is taken out of inventory and fed to pigs, the extra production costs would be passed on to the managers of the livestock centers, increasing their production costs. Regardless of whether the livestock managers are responsible for cost or profit centers, they may decide that it is in their interest to acquire their feed corn from outside the farm business if they can purchase it at a lower price than the home-grown corn. If the corn activity manager persists in behaving as a profit center manager, then the logical outcome is that home-grown corn will be sold, while corn for livestock feed will be purchased. Deciding on the appropriate center designation for each activity can be a contentious issue, particularly where multiple family members are involved in management of the farm business.

Because managerial accounting uses the work in process (WIP) approach to valuing inventories of growing crops and livestock, managers have access to detailed information on the cost of producing a bushel of corn, a ton of prepared feed, or a replacement gilt. Armed with such knowledge, keen managers are constantly able to address the question of whether to continue raising and/or milling their own feed, or to instead purchase more inputs allowing them to focus more on the central pork-production (profit center) activities of the business.

In addition, managerial accounting provides managers the ability to “drill-down” and examine the detailed cost structure underlying of the production of a kilogram of pork. Understanding the cost structure is the first step in identifying the competitive advantages of the business.

## ■ Exploiting Competitive Advantages

Competitive advantages take a number of forms. Many small family farms have remained in business because of the availability of unpaid family labour or the willingness of the owners to draw a wage less than could be earned through off-farm employment. Many successful livestock farms enjoy a competitive advantage due to their geographical proximity to a brewery, distillery, or bakery that allows them access to cheap by-products, which provide excellent feed. Some innovative producers are tapping methane or wind energy to generate electricity to reduce their energy costs.

It is difficult to properly evaluate the value of a competitive advantage in isolation. Therefore, knowledge of the cost structure of producing pork from a database of comparable farms is required. In the past this has been impossible because of the lack of standardized accounting practices across farm businesses. While attempts by farm management associations to derive

databases of “standardized” cost of production figures have attempted to address this problem, the results have not been as useful as they might be because they have usually adjusted feed, labour, and other key costs. Thus, the process of standardization is prohibitive to identifying competitive advantages.

In order to address this problem in the pork industry, the NPPC task force first developed a standard chart of financial accounts for the pork industry, then worked with other key commodity groups and the Farm Financial Standards Council to expand the concept to develop a Agricultural Chart of Accounts for use across all important agricultural commodities produced in the U.S. The leading publishers of farm accounting software have embraced the managerial accounting approach by incorporating the chart of financial accounts for agriculture.

## ■ Return on Equity Analysis

If my feed conversion in the finisher improved from 3.1 to 2.9, what would be the effect on my net profit margin? How much more per ton of feed could I afford to pay for such improvement? This is an example of a “what if” question that a participant in the NPPC Production and Financial Standards education program has asked during the past two years of training.

Other popular questions include:

- My breeding herd is currently producing 2.05 litters/breeding female/year. If I can raise the farrowing rate to 2.20 litters/breeding female/year, what effect will that have on asset turnover, net profit margin, return on assets, and return on equity?
- Stillbirths and preweaning mortalities combined cause me to lose 25% of the piglets born in my herd. If I invested in extra labour to attend all farrowings with the goal of reducing total piglet mortality to 15%, how many extra labour hours could I afford?
- If my cost of corn increased or decreased by a \$0.05 per bushel, how would that affect my net income?
- I see several opportunities for improving the production efficiency of my farrow-to-finish operation. Which improvement should I implement first, based on expected change in return on equity?
- Compared with similar farms, my profit margin is satisfactory, but my asset turnover is low. Why is my asset turnover so low, and how should I go about improving it?

Using the NPPC Return on Equity (ROE) Model has suggested answers to these and many more “what if” questions. The ROE model is based on the DuPont equation:

$$\text{Return on Equity} = (\text{Asset Turnover} \times \text{Net Profit Margin} \times \text{Leverage})$$

Asset turnover is a function of revenues and throughput. Understanding these measures and their relationships to costs, prices, and physical productivity is the key to using the ROE model diagnostically to identify opportunities for improving net income and growing the business. Net profit margin may be improved by the prices received from pig sales and/or reducing production costs. When, but not before, net profit margin and asset turnover are at acceptable levels, business growth may be accelerated by increasing leverage through borrowing more money. In other words, “get better before you get bigger.”

By filling out a blank workbook with farm-specific data for a “typical” production year, a working economic educational model of any pork production system can quickly be assembled. The ROE Model is not an accounting system. It is not designed nor intended to match the output of your accounting software for any particular period. Rather, it provides an integrated, comprehensive model of your pork production system, including physical productivity, animal flows, feed budgets, input costs and prices, revenues, and, assets and liabilities assigned to pork production. By adjusting the values of various factors and recording the relative change in key output measures, users can quickly generate the data to help or suggest answers to important management questions such as those posed above. Managerial accounting and the ROE model work hand-in-hand. Both separate the pork-production activities from the rest of the business and focus attention on cost structure, asset management, and revenue-generating activities. Managerial accounting provides an enriched supply of financial data. The ROE model is one of a set of “power tools” that we use to extract and analyze the informational content of the data.

### ■ **Farrow-to-Finish Example**

Consider an example of reducing the preweaning mortality rate from 9.40 to 8.46% in a 320-sow farrow-to-finish herd. The ROE model shows that the physical change in this herd amounts to an increase of 157 weaned pigs/year, or 3 extra pigs weaned/week, and calculates that net profit margin would increase by 1.05% from 14.97% to 15.38%. The feed budget in the model automatically purchases more feed for the extra pigs, but does not change the non-feed costs.

When modeling small changes, this approach may be appropriate. For greater changes in pig flow, however, it may be appropriate to increase selected non-feed costs such as animal health and labor to account for the additional costs of processing the extra pigs. If nursery and finisher capacity is already tight, then additional capital investment in facilities may also need to be considered. In our example, asset turnover increased from 95.2% to 96.01%, due to the fact that more pigs would be marketed with no change in the asset base of the production system.

The leverage measure shows no change. In fact, it will have changed very slightly. As growing pigs are valued on an accumulated cost basis, more pigs in the system will increase the value of current assets, thus changing the ratio of assets to liabilities. The changes in net profit margin, asset turnover and leverage compound to improve return on equity by almost 1% from 16.88% to 15.9%. The potential improvement in net income from pork operations is almost \$4,000/year.

Armed with this information, the model user can then proceed to evaluate and compare competing opportunities for improvement and rank them in order of financial attractiveness. Reduction in preweaning mortality influences both of the main factors that feed into return on equity. Profit margin is increased as most of the non-feed costs (e.g. rent, utilities, taxes, and depreciation) for their littermates were already covering the extra (marginal) pigs. Asset turnover increases because more pigs are being marketed from the same asset base.

Other opportunities may have different effects. For example, modeling an increase in feed efficiency or a decrease in production costs shows that there is no effect on asset turnover. Therefore, in circumstances where profit margin is already high but asset turnover is low, the model can help identify opportunities to increase throughput and revenue needed to boost asset turnover.

The ROE model is an especially powerful tool when used in conjunction with complementary information sources. The National Pork Production & Financial Database facilitates comparisons amongst pork production systems. Knowledge of your farm's performance compared to the performance of similar farms identifies opportunities for improvement, backed by hard numbers that also define the scope for improvement.

Diagnostic use of your on-farm production and financial records systems completes the trio of power tools. For example:

*"Where are my opportunities for possible improvements? What is the scope for each opportunity?"* **Answer:** National Pork Database

*“How do those opportunities rank financially? Which physical performance measures, costs, and revenues need to change in order for me to take advantage of those opportunities?”* **Answer:** ROE model

*“What management changes must I make in my daily routine in order to improve productivity, control costs, and enhance revenue?”* **Answer:** Production and Financial Records.

## ■ Conclusion

These questions, tools and resources are fundamental to increasing your knowledge base and understanding of the economics of your pork production system. The answers to be found there can improve your profitability and help your business to grow.