Price Discovery Mechanisms and Alternatives for Canadian Agriculture
Part I: A Review of Pricing Mechanisms in Agriculture

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FOREWORD

The stimulus for this project developed from a number of years of observing changes in the Canadian agri-food sector. We have seen new food products emerge and be successful, and with them create markets for differentiated farm products that hadn't previously existed. In almost every case, these products had to be developed out of the tradition of commodity markets. For all the benefits of established grades and standards for farm products, we're left wondering if our adherence to them limited our ability to create food products that are differentiated based on the nature of the farm product. Put differently, could we have had a greater expansion in new and innovative food products if there were innovative price mechanisms available to price specialty farm products as distinct from commodities? Since the evolution from commodities toward differentiation continues, perhaps a better question is, "can innovative pricing mechanisms be developed as a competitive tool in the new market place?". Little question exists in our minds.

This is probably not the first study of its kind. For example, William Tomek of Cornell University reviewed pricing mechanisms in agriculture almost twenty years ago. However, his work focused on commodity products and on the relative costs of using alternative pricing mechanisms. Twenty years ago, agricultural pricing research was more focussed on price discovery and transmission in commodity markets than it was on conveying incentives and aligning supply chains in specialty products. We live in a different world today.

The first parts of this study were initiated by Dr. Zana Kruja in 1999. With support from the Canadian Banker's Association, and the Ontario Ag Odyssey group through the Agricultural Adaptation Council, we were able to complete this broader-based study in 2002. The project was conceived in the following way. The first phase was to survey existing pricing mechanisms in agriculture, the second phase was to survey pricing mechanisms in specific sectors outside of agriculture, the third phase was to survey relevant parts of the academic literature, and a fourth phase was to apply the findings of the first three phases to specific case-studies. As is often the case in research, things do not go entirely as planned. Our attempts to find concrete examples of pricing mechanisms outside of agriculture (in forest products, automotive components, textiles, and financial services) were largely frustrated. About the only examples we could find were derived from pricing network products and products subject to congestion (telephones, highways, internet services), and these seemed to have little relevance to the current topic. However, Phases 1 and 3 yielded an excellent set of examples and insights that exceeded our expectations. The findings were applied to examples in Phase 4, most of which were outside of Canada so as to avoid confusion with the details of specific cases in Canada.

The project is organized as follows. This report provides a review of existing pricing mechanisms in agriculture and food. Part II in the series *A Review of Pricing Mechanisms from the Economic Literature* provides a review and interpretation of price mechanisms found in the academic literature. Part III provides an application of the findings of Parts I and II to hog and horticultural crop marketing.

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EXECUTIVE SUMMARY

The purpose of this section is to review pricing mechanisms in agriculture and food. We started by constructing a taxonomy and system of classification for pricing mechanisms that is rooted in economic theory. This framework was applied to 26 pricing mechanisms observed from the following product categories:

- Beef
- Hogs
- Grains and oilseeds
- Dairy
- Poultry and eggs
- Processed food and horticulture

The following types of pricing mechanisms were observed:

- Market price plus premium contracts
  - Basis contracts
  - Spot price premium contracts
- Cost-plus pricing
  - With and without sharing of productivity gains
  - With and without price smoothing provisions
- Formula prices
  - With and without smoothing provisions
- Tournament pricing
- Direct negotiation
  - With full information sharing
  - Without full sharing of information
- Spot market pricing plus premium dependent on retail value
- Product pricing classified by end use
- Pricing dependent upon specific quality attributes

The price mechanism taxonomy was applied to all of the pricing mechanisms surveyed. This revealed the following:

- Most of the pricing mechanisms had a base price to which premiums or discounts were applied

- Volume was a fundamental part of hog and grain pricing mechanisms but was specified to varying degrees in other products
- Most of the mechanisms had some mention of the length of time in which the pricing arrangement was in place (particularly in hogs) or the timing of delivery
- Most of the mechanisms specify a location basis for the price
- Pricing mechanisms varied widely in their specification of quality
- Very few of the pricing mechanisms referenced the prices of substitute products
- Approximately half of the pricing mechanisms observed information from multiple market levels
- Most of the pricing mechanisms transferred some information beyond price and quantity
- In several of the cases observed, the information passed in the exchange was observed by a third party
- Price risk was a major component of some of the pricing mechanisms. In particular, it was a major focus of pricing mechanisms in hogs
- Most of the mechanisms contained provisions for quality and/or volume risk on behalf of either the producer or the processor
- Relatively few of the mechanisms examined dealt explicitly with risks in the relationship between producer and purchaser
- In most of the cases, market access risk was eliminated because the mechanism was part of a contract that implied a commitment to buy

The purpose of the study was not to evaluate or rank pricing mechanisms. However, after reviewing all 26 examples, the following observations were made:

- The further away the exchange from the retail stage, the simpler the pricing mechanism
- The more specialized and aligned the supply chain, the more creative and open the pricing mechanism
- There is a distinct difference between pricing mechanisms in North America and Europe. There is a greater degree of retail value and information sharing along the supply chain occurring in the European cases than there is in the North American cases

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1.0 Introduction

A broad variety of institutions have developed to market agricultural products in Canada. These include auctions, decentralized negotiations, centralized selling, end-use pricing, and transfer pricing. However, as the agri-food industry changes in favour of more niche products marketed through supply chain relationships, these institutions are coming under strain. For example, the March 12, 2001 edition of *Feedstuffs* reported that due to declining volumes, the cash market for hogs in the US will be non-existent within 5 years. If this occurs, what mechanisms will be used to establish (discover) the price of hogs? There are many other contexts in which a shift toward specialty products from commodities is not readily reflected in exchange mechanisms designed for commodity products in which there are many more sellers than buyers. Thus, pricing mechanisms must evolve as the nature of markets for agricultural and food products evolve. In other words, problems in agricultural markets may not be simply of the nature that farm prices are too low (or high) or too volatile; rather, it can be a symptom that the price discovery and value transfer process is not functioning effectively.

The essential problem in designing a pricing mechanism is to devise a system in which buyers and sellers signal to one another their true willingness to pay or accept payment for the good in question. Thus, the pricing mechanism discovers and implements prices that reflect the value of buyers and sellers. In addition, the pricing mechanism must be robust to misrepresentation of preferences, small or unequal numbers of buyers and sellers, and coalitions of buyers and sellers. The design of pricing mechanisms is thus a precise and detailed undertaking.

In this review, we undertake to review pricing mechanisms currently in place in agriculture. The objectives are:

- To develop criteria with which to compare alternative pricing mechanisms
- To document and explain the types of pricing mechanisms currently in use in agriculture
- To discuss the advantages and disadvantages of these pricing mechanisms

1.1 Pricing Mechanisms

[1] The authors wish to thank Brad Tkatchuk and Stephen Holub who were instrumental in assembling background information for this review

In conducting this analysis, it is important to define what is meant by a *pricing mechanism* and to differentiate it from other related topics in the study of agricultural markets. The notion of a mechanism for prices is an analogy to a mechanical device; when force is applied to the device in a particular direction, a predictable outcome results due to the physical relationships embodied in its design. In this vein, the similarities between a price mechanism and the physical mechanism in mechanical device are more obvious; just as downward force on a lever will place upward force on a load, an increase in the volume of product offered for sale will decrease the price under a given demand. In both cases, the system is designed to obtain predictable outcomes given specific external stimuli.

Thus, the study of pricing mechanisms relates to the data and causative relationships that result in a price being observed. This review of pricing mechanisms is concerned with:

- The process of price discovery
- The transfer of value between adjacent stages of agri-food value chains
- The conditions underlying the observation of price
- The specific manner in which information sent from buyers and sellers are used in determining a price

1.2 Classifying and Comparing Pricing Mechanisms

Pricing mechanisms take on a variety of structures and forms which are the natural basis for a taxonomy. These relate to:

- The explicit mention of
    - Base price
    - Volume
    - Frequency and timing of exchanges
    - Location of exchanges
    - Measurement and compensation for product quality,
    - Prices of substitutes
- The levels of the market considered
- The information conveyed
    - Nature of information
    - Market levels to which information is transferred
- Management of risk
    - Price risk
    - Supply/quality risk
    - Relationship risk
    - Market access risk

Many of these items are obvious. Price mechanisms commonly use a reference price from a central trading location; for example, commodity corn in North America typically uses the nearby futures price, deliverable in the Chicago area, as a reference price. In other cases, a substitute product with a more liquid market is used, with adjustments made to standardize the substitute's price to the product. A base price is frequently stated in mechanisms that have reward/penalty incentives built into them. Finally, price mechanisms have specific implications

for risk on behalf of buyer and seller. This most obviously relates to price; however there are also risks associated with the volume (supply), the quality of products, and obtaining access to marketing channels. Particularly in specialty products, there is also the risk that relationships among supply chain participants will break down.

The notion that the structure of a pricing mechanism is related to the nature of exchanges (in terms of volume, quality and frequency) was first emphasized by Williamson (1985) in his discussion of governance structures and contractual relations. He suggested that highly standardized transactions do not require as specialized of governance structures, and that only recurrent transactions can support highly specialized governance structures (page 72). Since a pricing mechanism is a form of governance structure, the same logic applies, and the nature of the transaction becomes part of the taxonomy.

Classification of pricing mechanisms based on the treatment of product characteristics has a basis in the principal-agent literature. The notion is that since the innate ability and effort of suppliers of a product are unobservable, pricing mechanisms are structured to convey incentives through proxy measures that result in more skilled suppliers and greater effort. These proxy measures are typically quality, relative quality, yield, or relative yield of a product. Laffont and Tirole (1993) describe the quality-incentive relationship in the following way, "…if the firm [supplier] cannot quite translate quality improvements into higher prices, it will have lower incentives to provide quality" (page 141). Thus, the incentives awarded to encourage effort through quality and associated measures are an important basis upon to differentiate pricing mechanisms.

The relationship between prices in vertical related markets, and their connection through formula pricing mechanisms is discussed at length by Mises. He argued that, since the pricing of consumer goods is based on the subjective valuations of consumers, the pricing of factors used in the production of consumer goods are ultimately determined by subjective valuations. However, since the value of the consumption good cannot be less than the total value of the factors of production used to produce it, we are faced with a connection between the prices of the inputs at the various market levels, not a connection of valuations (page 333). This provides the rationale for mechanisms that use prices at the adjacent market level in a formula.

Finally, the analysis of information transferred in exchange is a component of the analysis of "signalling games". This is clear in the analysis of the market for "good" and "bad" used cars conducted by Akerlof (1970), in which plausible situations are presented where mutually beneficial exchanges fail to occur if the only information present in exchanges is the price. This is different than the issue of quality measurement discussed above; in this case, it is not clear which attributes of the exchange to measure. Instead, it is necessary for buyers and sellers to determine what non-price information is relevant and to "signal" it through the price system.

Within the above context, we review pricing mechanisms in a variety of farm and food products. These mechanisms are taken from both commodity and specialty products from around the world. The discussion are organized around farm product types, starting with livestock, then grains and oilseeds, milk and dairy products, poultry, and fruits and vegetables.

1.3 Searching for Pricing Mechanism Examples

To gather information on pricing mechanisms that are currently in use, we used the following approaches:

- Search for case studies in the agricultural literature. We searched agricultural economics and related journals for material published in the last 10 years that contained concrete examples and case studies of pricing mechanisms
- Interviews with agribusiness people. We contacted individuals within supply chains or firms that we knew or had heard of that were familiar with specific pricing mechanisms. Based on these interviews, we developed an understanding of the operation and characteristics of the pricing mechanisms
- Search for information on pricing mechanisms through electronic media. We conducted extensive internet searches for pricing mechanisms in agriculture. This search was designed to pick up websites that contained examples of contractual pricing mechanisms, case studies, and other examples contained in university working papers and other sources.

We cannot claim that this search process was exhaustive. Instead, it is structured to provide a broad survey across farm and food products in multiple jurisdictions for comparative purposes.

2.0 Pricing Mechanisms in Beef

In beef pricing throughout North America, pricing systems with premiums and discounts for weight, quality (eg. Choice, Select, AAA, AA, etc), and yield. In commodity products, a base price is typically quoted with deductions for lower grades. Both premiums and discounts are applied in branded beef programs such as Certified Angus Beef, and Cargill's Sterling Silver Beef program.

2.1 North American Bison Cooperative

The North American Bison Cooperative (NABC) is a processing and marketing co-operative for bison meat and by-products. It does not handle any other type of meat. NABC was formed in 1993 and began operating 1994. The co-op currently has over 400 members in 17 states, 4 provinces and one European country. Production capacity is now 12,500 bison per year, and the facility is both USDA and EU approved.

NABC uses the following pricing mechanism:

- The price for bison is set each year in the fall by the Board of Directors. It is for hot carcass weight, based on the price the coop expects to receive for the finished bison products.
- A pricing grid is used that takes into account weight, fat cover, bone ossification and colour of fat and lean muscle.
- The co-operative also pays members 8.5% annual interest on the net carcass value starting on the 16th day after slaughter, as members don't receive payment for an animal until the product is marketed.
- Patronage dividends are distributed proportional to production. Patronage funding is determined from co-operative earnings less retained capital.

2.2 SOVIBA Cooperative

SOVIBA is a French beef cooperative with a traceability system that relates to the national identity program which exists throughout Europe now for all large animals. All animals born in the EU countries must be given a 10-digit unique numerical identity within a certain number of weeks after birth and they are registered. Without the numerical identity, the animals are not allowed to be sold inside the EU. Attached to the numerical identity is the breed of the sire and dam, the date the animal was born, the number of the farm–each one has an identifier number with the farmer's name, how big the farm is, and other information. The animal arrives at the loading dock and has been pre-certified for between 0 and 5 quality programs. The quality program may be organic production or a pure-bred quality program; more than 90 percent of the animals that are sold in France are sold pure-bred rather than crosses, because consumers believe that is a quality characteristic

When a steer arrives at the abattoir with ear tags, the first thing that happens in the processing plant is the head is removed, but the ears remain with the carcass. The head is removed because

of BSE regulations and is taken to the incinerator. Part of the hide is removed from one flank and the abattoir puts its own identification number on the flank of the animal. The person who does that records the number in their information system, along with the ear tag numbers which are still hanging on the carcass. The ears are removed when the hide is removed, but the 10-digit live-animal identifier number is encoded with the 5-digit number which is used inside the plant. Both sides of the animal are tattooed with the identifier number on the carcass. The identifier number of the plant automatically goes on at the veterinary inspection, which is about the second or third stop on the line. Next, the animal is split in half for removal of the spine and the other soft tissues around the nervous system. The person who does this taps into the computer, automatically generates two bar codes, one for each half-carcass. The bar code information is linked to the carcass number and by extension, to the live animal ID number. The barcodes are pinned on the animal and it goes down the line. Every time an operation happens to that side, for example when a butcher removed the loin/rib section from the side, the operation is entered into the computer and the computer spits out another bar code which goes on to the piece.

For example, a whole loin section is cut and it goes into an area where it is de-boned and broken out by sub-primal. One butcher does all the operations on that piece and enters the bar code number of the whole loin. The computer spits back what cuts are supposed to be created. The butcher follows that specification, presses the button and the right number of new bar codes comes out and they are tacked to each of the sub-primals. The pieces travel to the next spot on the line and they are flash frozen at that point. The bar codes go inside the cryovac so they are visible. The person at that processing station then scans each of the cryovac pieces and another bar code is put out for the group of cuts. That goes into a plastic bin. Plastic bins go down the line and at the next stop the cuts are going to be boxed. In some cases, the boxes themselves have bar codes. Thus, if the grocery store wants three loins, five tenderloins and whatever other cuts they want in the order, they are removed from the plastic box, scanned in the box and then the information system creates a bar code for the box. Thus, at any one point in time, given the bar code associated with a carcass the meat can be followed through the supply chain as it is disassembled into individual pieces. So, at any point in time, the information system can track backwards to the barn and forward to any package or container.

The pricing mechanism operates in the following way. SOVIBA, the abattoir company, negotiates prices with the retailers. The price by cut is transferred back to the value of the animal that is marketed. Farmers are not paid on delivery. They are paid based on the sales value. So, an electronic funds transfer comes back from the retail to SOVIBA. It is generally in the range of a 10 centime per kilogram premium which automatically pays for breed-based sales. For example, an animal that qualifies under Charolais, Normand or Limousin receives ten centimes above the price which is generic beef. Retailers pay it because the grocery stores can extract premiums for the product from the consumer. Thus, the value that results from negotiation between processor and retailer is returned to the producer based on the value of the retail cuts.

2.3 Van Drie

The VanDrie group is a veal processing company which independently implements traceability

throughout their veal supply chain. It consists of four segments – husbandry (calf rearing), calf milk replacer production (feed), slaughterhouses and a hide processor. There are five husbandry firms (four in Holland, one in France), two calf milk replacer firms (Holland), five slaughterhouses (four in Holland, one in France), and one hide plant. All calves are obtained from controlled dairy farms which must meet pre-defined health criteria. These dairy farms are not directly part of the VanDrie Group. Other than this, the entire production process from feed to farm to slaughter and case ready veal product is within the integrated VanDrie Group system.

As many as 18-20 independent auditing groups visit the company (at all stages of production) on a regular basis within a year. Some agencies are veterinary services some are food safety inspectors, others are governmental agencies others are private auditors. Each calf which enters the grower site has an Identification and Registration number (I&R). This is the base number upon which traceability through final retail portion cut is maintained. Each calf receives this number at birth with a "NBC (new-born-calf) registration" form completed stating its birthdate, where it was born (including farm and barn number), sex, and weight. This number and certificate is issued by one of the auditing agencies to ensure integrity. The animal must have an eartag with its I&R number on it or it is removed from the food supply chain. As well, the feed consumption and quality of the animal's intake are monitored, with one veterinary service technician assigned to twenty-five farms. Their role is to monitor health status, and record any treatments or medicines administered to the calf. This information is cross-tabbed with the I&R number. In addition, the calf's production performance is monitored since its intake weight is known, its slaughter weight is known (from the plant) and the total quantity of feed shipped is known. Independent control auditors also audit farms three to four times per year.

Van Drie uses a system of fixed price contracts throughout its system. This is possible because it controls the entire supply chain. Producers are paid a fixed price per finished calf, feed suppliers are paid a fixed rate per tonne, and processors are paid on a toll basis. The excess of revenue over transfer payments to producers, feed suppliers, and processors provide the return to Van Drie for its integration of the system.

2.4 Summary- Price Mechanisms in Beef

Table 2.1 below applies the price mechanism taxonomy discussed above to the beef examples. The table shows that many of the items in the taxonomy are not explicitly mentioned in the mechanism. In fact, the only significant differences between the 3 examples considered relate to the transmission of price information between market levels and the exchange of non-price information. The two European examples had a greater degree of information transferred to multiple levels than did the Bison co-operative.

Table 2.1 Beef Pricing Mechanisms

	NA Bison	SOVIBA	Van Drie
Base Price	Estimate by NA Bison	No	Yes- per head payment
Volume	No	No	No
Frequency & Timing	No	No	No
Location	Delivered to NA Bison	At plant	At plant
Quality	Pricing Grid	Value priced to individual carcass	Value priced to individual carcass
Price of Substitutes	No	No	No
Multiple levels-pricing	No	Yes- Retail pass-through pricing	Yes- network of contracts
Non-price information	No	Yes- Breed, farm, date of birth	Yes- cuts identified back through carcass and farm
Market levels receiving information	Producer, NA Bison	Retailer, Processor, Producer	Van Drie, Wholesaler/retailer
Price Risk	No	No	No
Volume/Quality Risk	No	No	No
Relationship risk	Co-operative	Co-operative	No
Market Access Risk	Commitment to buy	No	Commitment to buy

3.0 Pricing Mechanisms in Hogs

Hog pricing in North America has evolved rapidly from a system based almost exclusively on cash markets in the late 1980's to one in which a majority of pricing is through contracts. This section reviews some of the mechanisms in place in hog contracts.

3.1 Hog Pricing Overview

Kunkel and Buhr (1999) discussed the types of formula pricing mechanisms used in the Midwest US hog sector. They described the following types of pricing arrangements:

- Fixed price contract. These arrangements set a firm price at which hogs will be transferred in the future. It is analogous to forward pricing contracts in grain.
- Fixed basis. In these arrangements, the price is not fixed, but the local basis is. Thus, the only source of fluctuation is the futures price.
- Formula price. In this approach, a price from another jurisdiction is used to establish value, and a mathematical formula adjusts the value to make it useable in the local area. (The formulae prices used by Quebec or Ontario marketing boards that are conversions of the US National Base Lean price are examples).
- Cost Plus. Under this arrangement, prices are set based on the current period feed cost plus some factor that accounts for fixed costs. The feed price is adjusted regularly to reflect profitability conditions.
- Price Window. With a price window, minimum and maximum price for hogs are set. If the market price fluctuates between minimum and maximum, the market price is used for the exchange. If the price rises above the maximum (top of the window), the actual exchange price is the midpoint between the market price and the top of the window. Similarly, if the market price falls below the bottom of the window, the actual exchange price is the midpoint between the bottom of the window and the market price
- Price Floor. The price floor arrangement sets a minimum price for hogs. In return for this protection, the producer sets aside a portion of revenues above a specified price into a fund. This fund is drawn out in low price periods to finance the price floor.

Kunkel and Buhr also offer the following cautions related to contracts and formula prices:

- Contracts and formula pricing schemes remove volume from spot markets. The result is a *thin* or more volatile spot market
- Contracts and formula pricing schemes can be used to secure/reward better quality hogs. As a result, the spot market is effectively "sorted", leaving lower quality hogs in the spot market.
- Contracts and formula pricing schemes that use spot prices can themselves become more volatile because of their negative effect on spot market volumes and liquidity

Johnston and Foster (1994) found that two types of price mechanisms in hog finishing were prevalent in the US hog industry. As a general rule the arrangement is that:

- The contractor provides feeder pigs, feed, veterinary care, managerial assistance, and marketing functions.
- The producer provides buildings, equipment, utilities and labour.

Pricing is determined based on the level of production efficiency achieved and sometimes on product quality. Production efficiency is determined based on observable proxies such as feed

conversion, death loss and days to market. Product quality is determined based on the level of contractor's profitability. Based on the growers' compensation method used, there are two main arrangements used in the US hog industry:
1. The producer is paid a base payment per pig marketed, plus bonus payments for high feed efficiency and a low death loss
2. The producer is paid a base payment per pig marketed. In addition the grower shares the contractor's profit or loss.

Koehler *et al* (1996) reported that at least 30 production networks, involving at least 450 producers, were operating in the Minnesota Swine Industry in 1995. The types of arrangements varied from informal farmer-to-farmer formula pricing arrangements to large scale jointly owned weaner units. Koehler *et al*. studied the fundamental pricing relationships in these production networks. The basic questions they ask are:
1. What pricing mechanisms will ensure a fair share of return for all parties involved?
2. What pricing mechanisms will ensure a fair share of return as market prices change over time?

The pricing formulas reported by Koehler *et al*. are typically based on an estimate of production costs for various stages of production. These formulas may also consider potential profits based on expected prices, average prices, or future prices. In custom networking (or contract) arrangements usually one member (the contractor) supplies the animals, feed and medications, and the other members supply the facilities, labour and management. The custom rates used in Minnesota are as follows:

Feeder Pig Production:
The average price for feeder pigs is $14-16 per pig. In some cases this price is reported relative to litter value, namely 25-30% of litter or equivalent value. Based on the assumed budget, Koehler *et al*. suggest $18.11 / pig ($12.16 per pig average plus $5.95 nursery) to cover facilities, labour, utilities and miscellaneous expenses including manure disposal. For nursery costs, three different approaches were reported:
Per pig/day range of $0.07 - 0.10
Per pig $5.50 appears typical
Per pig space (3 ft 2)/year range of $30 - 32
They suggest $5.95 / pig or $35.70/pig space (if 6 turns /year are assumed) to cover facilities, labour, utilities and miscellaneous expenses including manure disposal.

For finishing, two different approaches are reported:
Per pig/day range of $0.07 - 0.10
Per pig space range of $35 – 36 (or lower per pig guarantee with bonus payments based on feed efficiency and death loss)
Koehler *et al*. suggest $12.18 / pig to cover facilities, labour utilities and miscellaneous expenses including manure disposal (or $0.11/pig/day, or $36.54/pig space if 3 turns/year) and that weaner pig prices should provide equal Internal Rates of Return on investment for the farrower and the combined nursery-finishing stages. Based on the budget information of the farrower and nursery-finishing stages, they determined the price formula that yields equal return on investment for both stages. This formula

expresses the relationship over a range of quarterly corn, soybean meal and 170 day hog futures prices that occurred in the three year period 1993-95:
Pp = - 0.699 - 1.750 * Cp - 0.0239* SBMp + 0.862 * MHp
Where: Pp = Weaner pig price/hd,
Cp = corn Price per bushel,
SBMp = soybean meal price per ton, and
MHp = 170 day hog futures price.
In practice, the pricing formulas appear to be simpler. The following are pricing approaches used in Minnesota that deal with changing prices

For early weaned pigs the following was found:
1- Fixed price in the range of $27 -33 per pig.
2- Price per pig equal to a percentage times the hog futures price per cwt, such as 60-70%. With this approach, the farrower faces all the price risk, for the part of price related to farrowing stage of production.
3- Price per pig equals the hog futures price per cwt minus a constant number in the range of $12 - 15. Some include a minimum and maximum window such as $27-37. This approach risk shares the price risk between the two parties involved.
The pricing formula derived by Koehler *et al*. is:
Weaner pig price = - 0.729 - 1.376 * corn price / bu. - 0.0215 * Soybean Meal price / ton + 0.859 * market hog 170 day futures price / cwt.
For feeder pigs:
1- Price per pig equals a percentage of futures
2- Two part payment:
The first payment is fixed price per 40 pound pig with adjustment for weight variation (for example: $40 / 40 lb. pig plus/minus $0.30 / lb). The second payment is a profit split at close out.

Lawrence and Schmidt (1994) suggest several feeder-pig and weaner-pig pricing formulas. These formulas are based on regression equations. The equations were estimated using weekly data from January 1975 through December 1985. This time frame covers two complete hog price cycles. The formulas are expected to provide a more satisfactory sharing of profits and losses over time as opposed to fixed prices.
The data used by Lawrence and Schmidt include:
- Feeder pig prices: US 40-50 pound feeder pigs at Iowa auctions.
- Hog futures prices: the Chicago Mercantile Exchange live hog futures prices for the contract four months out.
- Corn prices: North Central Iowa corn.

Feeder pig price per cwt:
$P = - 6.16 + 2.10 *$ live hog futures $R^2 = 0.44$
$P = 32.85 + 2.73 *$ live hog futures $- 27.90 *$ cash corn price $R^2 = 0.70$
The above formulas refer to live hog future prices. When carcass hog futures are used, these price formulas can be transformed into the following (assuming a standard carcass yield of 74%).
P = -6.16 + 1.55 * carcass hog futures
P = 32.85 + 2.02 * carcass hog futures - 27.90 * cash corn price.

Martin (1997) analyzed hog pricing arrangements in North Carolina that award compensation on the basis of absolute performance and those that award compensation to producers on the basis of performance relative to peers. The primary purpose of the study was to consider the risk impact of contract design; however, as part of the study, the pricing mechanism is clearly illustrated. The structure of the absolute performance mechanism is given by

$$Y_{it}^{AP} = XG_{it} + b(\tilde{F}\tilde{C} - FC_{it})HD_{it}$$

Where: Y_{it}^{AP} = absolute performance contract payment
X = fixed price per unit gain
G_{it} = weight gain
b = incentive coefficient
$\tilde{F}\tilde{C}$ = standard feed conversion ratio
FC_{it} = actual feed conversion ratio
HD_{it} = head shipped to market
i = producer
t = period

The relative performance mechanism is of the form

$$Y_{itr}^{RP} = XG_{itr} + b(\tilde{F}\tilde{C}_r - FC_{itr})HD_{itr}$$

Where: Y_{itr}^{RP} = absolute performance contract payment
G_{itr} = weight gain
$\tilde{F}\tilde{C}_r$ = standard feed conversion ratio
FC_{itr} = actual feed conversion ratio
HD_{itr} = head shipped to market
r = peer group

The major difference between absolute and relative performance mechanisms is in the structure of the benchmark feed conversion measure. Under the absolute performance mechanism, the benchmark feed conversion ratio is fixed; under the relative performance mechanism, the benchmark is the group average. Thus, the relative performance mechanism depends on the number of producers participating and actual feed conversion ratios, and the ultimate hog price is the result of the producer's relative efficiency in production, rather than quality, etc. Martin's results showed that income variability was reduced to a greater extent under the relative performance mechanism than under the absolute mechanism. In addition, as the incentive parameter b is increased the income variance increases.

3.2 Hormel Long-term Hog Purchase Agreements

Hormel Foods operates a market hog pricing mechanism in the Midwest that provides producers with a minimum price plus an agreed upon premium. The term of the arrangement is 7 years for an agreed upon weekly volume estimate. Producers agree to maintain Hormel-approved nutrition programs, be supervised by an approved veterinarian, maintain a health status

equivalent to Pork Quality Assurance Program Level 3, and provide Hormel access to farm financial records. The producer must sell all hogs to Hormel; Hormel schedules delivery. Hormel agrees to provide the producer with a minimum price arrangement:

- The guaranteed minimum price is equal to feed costs (determined according to a matrix of corn and soymeal prices) plus $5/cwt live. Feed costs are computed based on the 8 week moving average Omaha corn price and 8 week moving average Decatur soymeal price. The feed cost matrix is subject to change to incorporate the impact of growth promotants and technological improvements
- Contract base price is the previous week's cash price paid at Hormel plants.
- If the contract base price is less than the guaranteed minimum, the guaranteed minimum price is paid
- If the contract base price is above the guaranteed minimum, the price paid is the midpoint of the guaranteed minimum and the contract base price
- The actual settlement price is adjusted based on the Hormel quality and yield grid
- If Hormel has paid the producer more than the total value of the hogs (based on the contract base price) at the end of the term, Hormel has the option of extending the agreement until this producer balance is eliminated, for up to an additional 5 years. Alternatively, the producer can "buy out" the extension by paying the accumulated difference between the price paid and the contract price.
- If Hormel has paid the producer less than the total value of the hogs (based on the contract base price), the producer can extend the contract until the Hormel balance is eliminated, for up to an additional 5 years.
- Beyond the original 7 year term, Hormel retains the right to terminate the agreement at any time.

A variant on this mechanism is used in a second form of Hormel hog procurement contract. Under this design, the obligations of producers and Hormel are similar. However, the minimum price arrangement is slightly different:

- The guaranteed minimum price is equal to feed costs (determined according to a matrix of corn and soymeal prices) plus $5/cwt live. Feed costs are computed based on the 6 week moving average Omaha corn price and 6 week moving average Decatur soymeal price. The feed cost matrix is subject to change to incorporate the impact of growth promotants and technological improvements.
- The guaranteed minimum price and contract base price are defined as above. Hormel agrees to pay to the producer the higher of the guaranteed minimum price and the base price, provided that the accumulated difference between the guaranteed minimum price and the contract base price has not placed Hormel in a deficit position.
- If Hormel is in a deficit position and the contract base price rises over the guaranteed minimum, Hormel retains the difference between the two prices until the deficit balance is neutralized.
- At the end of the 7 year term, Hormel has the option to extend the agreement until its deficit balance is neutralized, up to 5 years.

3.3 IBP Hog Purchase Agreements

IBP's hog purchase agreements are an innovative version of "ledger" pricing mechanisms. The period of the agreement is 6 years. Producers agree to consult with IBP on hog genetics and nutrition, to provide IBP with farm visitation privileges, to consult with a veterinarian, to supply IBP with financial information, and to give IBP with the right of first refusal on all sows, boars, and off quality hogs. The producer must maintain a herd health status of Level 3 in the Pork Quality Assurance Program. Volumes supplied are stipulated in the contract, and the producer must estimate volumes that will be shipped on a monthly or quarterly basis. IBP schedules specific delivery dates. The specific pricing mechanism:

- Provides a floor price which is driven off feed costs based on the 6 month moving average Omaha corn price.
- A base meat price is computed as the 3-day moving average of the Western Cornbelt Lean value, specified at 170-191 lbs and 1-1.19 inches of backfat.
- The total market price is the base meat price, adjusted for the IBP schedule of premiums and discounts.
- Whenever the total market price exceeds $46/cwt (live), the producer makes deposits into a reserve account according to a prescribed schedule. The reserve account earns interest and has a maximum balance of $500,000. At the end of the term, any remaining balance is repaid to the producer
- Whenever the total market price falls below the floor price, the producer receives the floor price. The difference between the total market price is financed from withdrawals from the reserve account. If the reserve account is empty, the difference is financed from an IBP deficiency account.
- If the IBP deficiency account exceeds $500,000, the producer pays interest on the balance. At deficiency account balances greater than $500,000, IBP pays the total market price even if it is less than the floor.
- The deficiency account balance is reduced by crediting the deficiency account for the difference between the total market price and the floor price when the total market price exceeds the floor price
- At the end of the term, the producer is obligated to repay any balance in the deficiency account. In lieu of cash repayment, the producer has the option to extend the agreement and repay the deficiency account as outlined above.

3.4 Murphy Farms Contract Hog-finishing Agreements

Murphy Farms offers contracts to custom hog finishers under a tournament payment scheme. Under this arrangement, Murphy Farms agrees to supply all feeds, feeder pigs, medications, transportation services and management consulting. Murphy schedules the delivery and finishing date of pigs. The producer supplies labour, management, and facilities. The producer must maintain Pork Quality Assurance certification, report all mortality and appropriately dispose of carcasses, and supply proof of insurance and financial soundness. In addition, the producer must maintain an environmental file that documents environmental permits, soil tests, nutrient loads and water use. The producer must maintain at least 101 acres per 1100 head finishing building adjacent to the building site for the purposes of manure disposal; if the land is not owned it must be leased. Compensation is based on the following mechanism:

- A fixed payment of $ 34,500 per 1100 head finishing facility per year

- A bonus incentive payment based on the following:
- Murphy Farms designates a group of consecutive growers as an "accounting control group"; for example, 10 barns (producers)
- Murphy constructs an index of individual performance based on feed conversion and death loss percentage
- For each head marketed in the accounting control group, Murphy allocates $1.50 into a bonus pool
- Producers receive a bonus payment on the basis of their individual performance index relative to the accounting group average index.; the producer with the lowest index in the accounting control group receives no bonus, others receive a bonus payment proportional to their relative index

3.5 Cargill Pig.Net Agreement

Cargill operates a unique transfer pricing scheme for weanling pig producers and hog finishers. The Pig.Net alliance is a network of member weanling suppliers and purchasers. Through this network, Cargill places farrowers in contact with finishers for the purpose of feeder pig exchange for a fixed period of 3 years and 9 weeks, extendable for up to 2 years. Network participants have the choice participating in a Price Risk Program or independent arrangements in which they negotiate weanling pig prices and market hog prices (with freedom to choose among processors). In either case, farrowers schedule delivery of weanlings with member finishers and finishers are invoiced for weanling pigs with specified adjustments for blemished pigs; the two parties know each other's identity and deal directly with one another. Under the Price Risk Program:

- Weanlings are priced on a base matrix formula that relates the projected initial size of pigs, projected number of days on feed, projected feed prices and amounts, projected cull rate, interest costs, and hog futures price. The formula uses a 26 week moving average price of corn and soymeal at selected Iowa points with $10/ton added to the soymeal cost
- The matrix formula is customized to an individual facility if Cargill determines that, based on production records, the base matrix formula is inappropriate.
- There is a weanling price floor of $25/head and a weanling price ceiling of $40/head which supercede the base matrix formula; if an individual facility matrix formula is used, the floor and ceiling are adjusted to their equivalents under the base matrix formula.
- Upon delivery of feeder pigs, the finisher must forward contract the hogs. The forward contract price is the current futures price for the contract closest to the delivery month, adjusted by the predicted basis quoted by Excel (Cargill processor). Until the finisher fails to forward contract the market hogs, there is no obligation on behalf of the farrower to supply weanlings.
- Both the farrower and the finisher pay a subscription fee of $3.50 per hog to Cargill. The fee is waived if Cargill feeds are used.

3.6 Hog Pricing in Quebec

Quebec has a central desk selling system operated by the Federation des producteurs porcin du Quebec (FPPQ) in which prices are pooled and all producers receive the same price regardless of

size or farm location. All hogs raised in Quebec must be sold through the FPPQ in order to be eligible for ASRA deficiency payments. Quebec processors have agreed to obtain their hog requirements from the FPPQ and not buy any hogs directly from producers. In return processors receive a pre-allocation of hogs based on their historical market share. Hog volumes are distributed through three avenues: pre-allocation - 55%; monthly block contracts - 20%; and daily auction - 25%. The shares of each of these volumes have changed over time. The pricing mechanism works in the following way:

- Quebec processors are invoiced the average weighted price of the day while producers are paid the weekly pool price. It is the responsibility of the producer to pay for transportation to the nearest packing plant. However, if the animals are transported to another plant, the FPPQ pays the transportation and then invoices the plant for 50% of the trucking cost. At the provincial level, because of the distribution of hog farms versus packing plants, it is estimated that processors pay for 50% of the provincial hog transportation costs.
- Pre-Allocated Hogs - 55% of the Quebec hog volumes are allocated to plants based on their historical slaughter market share. This pre-allocation amount is adjusted yearly and changes up or down depending on aggressiveness on the daily auction. The price for these animals is the U.S. National Lean Base Cost adjusted for exchange rate, dressing percentage, index and with $3/ckg is subtracted. To get the base 100 price, the 13 week rolling average Quebec hog index is used
- Block Contracts - 20% of the previous quarters' marketings are sold on block contracts. The monthly block auction contracts state the number of hogs per week and at the price for 1 month. The hogs are distributed through out the week as follows: 25% Monday; 20% Tuesday; 20% Wednesday; 20% Thursday; and 15% on Friday. The price is set at the US National Lean Base Cost plus/minus a premium that results from competitive bidding on a telephone auction. Through the auction, demand is set to equal supply plus/minus 1,500 hogs. If demand is greater or less than supply by 1,500 hogs, the auction is started again. If demand equals supply plus/minus 1,500 hogs the daily auction ends. In the end, the final price is pooled so that every bidder pays the same price for all block contract hogs purchased.
- Auction - 25% of the daily hog volume is sold using an English auction system. There are 7 main Quebec buyers and the initial price is the US National Lean Base Cost which is then adjusted in 20 cent increments up or down every 3 seconds. In order to buy from the auction a processor needs a computer connection and must commit to no direct contracts with producers. Hogs are typically sold in 250 head lots. If a packer also owns production, these animals must be sold through the FPPQ, but it is possible to buy them back. These packer owned hogs are the first animals scheduled for slaughter in the plant. Auction prices are prone to seasonal fluctuations in demand and suffer from price abnormalities caused by statutory holidays.

3.7 Interpreting the Hog Pricing Examples

The pricing mechanisms described above are compared and contrasted in Table 3.1 below. All of the hog pricing mechanisms employ a base or reference price. With the exception of the Murphy Farms contract finishing agreement and the Quebec pricing mechanism, duration and frequency are specified or explicitly negotiated in all of the mechanisms. Most of the

mechanisms contain provisions that reduce risk in prices volumes, and relationships. The only mechanisms that moderate market access risk are the market hog purchase agreements from Hormel and IBP and (implicitly) the Quebec market mechanism. All of the mechanisms transfer non-price information, with the hog procurement agreements generally transferring the most. None of the mechanisms use the price of a substitute to establish price.

Table 3.1 Comparison of Hog Price Mechanisms

	Hormel	IBP	Murphy Farms	Cargill Pig.Net	Quebec- FPPQ
Base Price	Cash price at Hormel plants	Cash Western Cornbelt price	Base price per building per year	Base cost matrix	U.S. National Lean Base Cost, adjusted
Volume	Specified weekly volume	Volume specified quarterly	Given by Murphy Farms	Negotiated	Volume allocated by pricing method
Frequency & Timing	7 years, extendable for up to additional 5 years to balance accounts	6 years with option to extend to balance accounts	Scheduled by Murphy Farms	3 years, 9 week duration, negotiated frequency	Weekly pooled prices
Location	Hormel plants	Specified IBP plants	Not specified	At farm, negotiated	At Quebec plants
Quality	Grid settlement pricing	Grid settlement pricing	Tournament incentive payment	No	Pricing grid
Price of Substitutes	No	No	No	No	No
Multiple levels-pricing	Yes- Feed and hog prices	Yes- Feed and hog prices	No	Yes- production costs and hog prices	No
Non-price information	Animal health, financial, nutrition	Animal health, nutrition, genetics, financial, option on culls	Financial, environmental file	Weanling production costs	Historic share of purchases
Market levels receiving information	Producer and processor	Producer and processor	Finisher and Murphy Farms	Farrower, finisher, and Cargill (processor)	Producers, processors, FPPQ; public pool price
Price Risk	Cost-plus or Base Price, whichever is higher	Cost-plus or Base Price, whichever is higher, subject to ceiling	Fixed base price plus incentive payment	Cost-plus, with price floor and ceiling	No
Volume/Quality Risk	Carcass grid, default provisions	Carcass grid	Factor in tournament scheme	Default provisions	Carcass grid
Relationship risk	Default, Force majeur components in contract	Default, Force majeur components in contract	Default, Force majeur components in contract	Cargill bears relationship default risk	FPPQ negotiation
Market Access Risk	Commitment to buy	Commitment to buy	No	No	Implicit commitment to buy

4.0 Pricing Mechanisms in Grains and Oilseeds

Specialty grains and oilseeds in the US are not generally priced according to value in end-use[2]. Instead, a premium is attached to a base commodity price (e.g. number 2 yellow corn) that is sufficient to compensate the producer to substitute the specialty crop (e.g. high-oil corn) for the commodity. The per-bushel premium generally compensates for yield drag, special handling and storage requirements (ambient air drying for food-grade white corn, on-farm storage for high oil corn, direct delivery to barge port for organic soybeans), and for buyer's call for delivery post-harvest.

Elevators tend to receive a similar fixed price premium from processors and exporters for assembly and transshipment of specialty grains. Premia are often insufficient to compensate all transactions costs, especially when a risk premium is considered. The dominant transaction costs at the elevator are in identity preservation. Empirical analyses of transactions costs and price premia year-to-year in specialty grains and oilseeds show that these are
a) volatile across years,
b) idiosyncratic to specific crops, and
c) differentially distributed by type of first handler/elevator.
This implies that care should be taken in talking "globally" about costs of identity preservation, trends in contract production, and the efficacy of premia in coordinating the market.

4.1 Identity Preserved Canola

There are several companies in western Canada that contract for identity preserved (IP) production of certain canola varieties. One example is Natreon canola oils, which have a unique and specific oil profile. Dow AgroSciences Canada develops the varieties that contain this oil profile, markets the seed and markets the oil. However, producers sign Natreon IP production contracts with grain marketing companies James Richardson International (JRI) and Agricore United. The reason production contracts are with these companies and not Dow AgroSciences itself is because JRI and Agricore United's grain handling facilities are needed to take delivery of the harvested canola and then preserve the identity through the storage and transportation system. Contracts are generally limited to geographic areas where soil type and climate favour canola production.

Contracts are written for a specific number of acres, rather than tonnes. The price producers receive for IP Natreon varieties is the canola commodity price, plus a premium. The premium is established by Dow AgroSciences and the grain companies and is intended to compensate (to a certain degree) for the extra effort involved in producing and handling an IP crop and potentially poorer than average agronomics of the varieties (i.e. yield, disease resistance, lodging, etc.). The major limiting factor in setting the premium is the price that Dow AgroSciences will receive for the oil. The premium value therefore varies from year to year as the selling price of the oil and agronomics of the varieties change.

[2] For a complete exposition, see Bender, Karen, Lowell Hill, Benjamin Wenzel, and Robert Hornbaker. *Alternative Market Channels Specialty Corn and Soybeans*, *AE-4726*. Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign. February, 1999.

Producers' obligations under Natreon IP production contracts include:

- Following proper agronomic crop rotations
- Ensuring required isolation distances from other crops
- Using only the specified seed variety and quality
- Cleaning seeding, harvesting and grain handling/transportation equipment thoroughly before it comes into contact with the IP crop
- Managing weeds and disease
- Storing the harvested seed properly and in marked bins
- Harvested canola must meet quality specifications for oil profile, and the usual Canadian Grain Commission specs for No. 1 Canola
- Delivery of the canola when called for by the grain company, i.e. not when the producer wants to deliver

The grain companies' primary obligations are to take delivery of the Natreon canola and pay producers the premium established in the contract. Producers are not required to provide documentation of any kind (eg. herbicide use) to the grain companies or Dow AgroSciences. However, representatives from the grain companies and/or Dow AgroSciences do personally monitor producers throughout the growing season and assist them in making production decisions such as pesticide use and timing, and swathing and combining timing.

4.2 Canola Certified Seed Production Contracts

The production of certified seed is often done through a contract between producers and seed companies. The following information is one example of a contract offered by a seed company in western Canada for the production of certified canola seed.

The price offered for open-pollinated canola seed is based on the commodity value of canola, as this is the price that producers would receive if they sold the canola to the commodity market. Since there is additional management required to produce certified seed (isolation distances, cleaning equipment, etc.) a premium is offered. The price offered for production of hybrid canola seed is based on the net return/acre of competitive crops. Hybrid seed production requires significant additional effort and management, and only half of the acres planted are harvested.

Terms of the contract include:

- The number of acres of seed to be grown. The seed company uses average yields and a risk factor to convert the number of tonnes it requires into the number of acres that will be contracted.
- The number of tonnes per acre to be purchased by the seed company from each producer, which may or may not be equal to the total production per acre[3].
- Where the harvested seed is to be delivered to.
- The date by which the seed must be delivered to this location.

[3] Canola is a high-value/low-volume crop. For other crops such as barley that are relatively low value and high volume, there may be no commitment to purchase a specified volume per acre.

- Who is responsible for the freight to the delivery location (seed company or producer). This depends on the distance from the producer's farm to the delivery point.
- Adhering to applicable isolation requirements of the contracted fields/acres, and other seed production management requirements
- Good overall agronomic management

Most seed growers are members of the Canadian Seed Growers Association, a membership organization that establishes rules and guidelines for seed production. However, the seed company discussed here also has their own set of procedures to select growers and monitor their performance, in order to help ensure the final product meets their quality requirements.

4.3 Organic Grain Production

Organic grain production contracts are offered to producers prior to seeding by brokers. The process starts when a broker receives an offer from a buyer(s) for a specific volume of grain at a certain price. The price and quantity in this offer then becomes the basis for the price and volume in a production contract that is offered to producers. Producers may sign up for the entire volume of the offer, or only a portion of it – it is their decision.

General terms of the production contract are:
- An 'Act of God' clause that lets producers out of the contract if they cannot deliver the contracted volume
- A 30 day window in which the grain is to be delivered. The grain may not necessarily be delivered all at once, but it will be delivered within the 30 day window specified in the contract
- The producer must be certified as an organic grower by a body that is also recognized by the buyer of the grain. A transaction certification that verifies the grower's organic status must be presented with the grain upon delivery.

4.4 Warburton's Wheat Pricing

Warburton's Ltd. is Britain's largest independent bakery, producing more than 3 million loaves a week. Warburton's bread is known to be high quality, and as such the price is often twice that of regular bread. The company has always used Canadian Western Red Spring (CWRS) wheat in its flour, but in the late 1980's they began to notice a decline in the quality of wheat they were receiving from Canada. To preserve the quality of their bread and their position as a premium baker, Warburton's conducted research into which CWRS wheat varieties would give them the quality they were looking for. Once these varieties had been identified, the company embarked on an identity-preserved production program with western Canadian wheat producers.

The IP production contracts are administered by Agricore (now Agricore United) and Paterson Elevator Co. Warburton's tells these grain companies the volume of each variety that it requires, and the companies are then responsible for signing up producers to fulfill these requirements. Producers sign a contract for a certain number of train carloads of a specific variety of CWRS

wheat. Contracts are for carloads rather than tonnes or acres because the grain is shipped and blended by carload. The capacity of rail cars is not always the same, so contracting on a carload basis also means less administration on the part of the grain companies than if they contracted on a tonnage basis. This way they are not left with an obligation to buy small amounts of grain that are left over once a rail car is loaded.

The price producers receive is the Canadian Wheat Board (CWB) regular pooled price for the applicable grade (#1 or #2 CWRS) and protein level, plus a $20/tonne premium. Producers are paid the CWB initial payment at the elevator upon delivery, as usual, and receive the premium once the grain has met Warburton's additional quality specs and been shipped. The premium is essentially a management premium, and is set at a level that will attract good quality producers to the program. Price of the end product has very little relationship to the premium[4].

Further terms of the contract are:

- Minimum volume is 1 carload. (This may be raised in the near future in order to facilitate varietal and regional blending.)
- Growers are required to use certified seed. They must provide a copy of their seed invoice, and copies of the blue certified seed tags to Warburton's by June 30.
- Growers must follow good agronomic practices, and specifically must not grow wheat on wheat. The grain must also be stored properly.
- A growing season report must be filled out that records all input use (fertilizer and pesticides).
- The growing season report, along with yields of the fields under contract and a sample of the harvested grain must be submitted to Warburton's by October 31.
- Delivery is buyer's call, to a specific elevator.
- Cost of getting the grain to the elevator is the producer's.
- Grain will be delivered piecemeal to facilitate regional and varietal blending.
- Delivery end date is August 31
- Warburton's accepts all contracted grain that meets the agreed-upon quality specs

4.5 Dakota Growers Pasta Company

Dakota Growers Pasta Company (DGPC) is a new-generation co-operative based in Carrington, ND and is the second largest pasta processor in the United States[5]. The company purchases durum wheat from farmers and manufactures pasta products. Annual pasta production capacity is 440 million pounds. DGPC has approximately 1100 producer members from North Dakota, western Minnesota and eastern Montana. At the end of its second year of operation, the coop had a profit of $.46/share, with $.31/share paid directly to members. Producer members earned a 20% ROI.

The co-operative uses the following pricing mechanism:

[4] Warburton's also pays a management fee to the elevator companies for administering the contracts and handling an IP product, and a fee to the Canadian Wheat Board.

[5] Just before this report was released, Dakota Growers restructured to become a publicly traded, investor-owned firm

- The price of durum is the daily posted market price plus a quality premium. Quality premiums are stable but can change with market conditions in the end (pasta) market.
- Patronage dividends are decided on by the Board of Directors. A certain amount is retained for capital needs and rest is paid to members based on how many equity shares they own. Equity shares in a new generation co-operative are proportional to production (1 bushel durum delivered = 1 equity share).

4.6 Scoular Yellow Food Grade Soybeans

Scoular purchases food grade soybeans from farmers using a basis contract arrangement. The contract specifies the acreage from which all soybeans will be purchased, with an estimate of the yield, and the time period over which delivery can be made. The producer agrees to sell the entire yield from the stated acreage, provide proof of seed variety, maintain equipment and storage facilities free of other crops and foreign matter, grow the soybeans in a segregated area to prevent varietal mixture, and deliver the product on the date specified by Scoular. Scoular agrees to purchase all the soybeans from the stated acreage that satisfy the quality standards and test the product for transgenics. Quality is measured using the following parameters:

- Moisture- maximum 14%, discounts applied if above 13%
- Test weight
- Damage
- Heat damage
- Foreign matter- deductions for more than 1%
- Splits- deductions for greater than 5%
- Soybeans of other colour
- Variety mixture- maximum 1% other varieties, maximum 1% transgenics
- Prohibition on any dirty seed coats, mold, or corn

The pricing mechanism is based on the CBOT soybean futures price and a fixed premium:

- At the time of signing, the relevant futures price for the delivery period is the November futures price.
- A fixed premium (basis) of $.85/bushel over the nearby futures price at the time of delivery.
- At any time after September 1, the producer can lock in the futures price through Scoular. The buyer is liable to Scoular for any futures margin requirements that occur in the period between the pricing of the product and physical delivery.
- If delivery of the product has not occurred by the first notice day of the futures contract, the futures position is automatically rolled into the next futures contract.
- If the quantity of soybeans delivered is less than the total volume that has been forward priced through futures, the seller is liable for the difference between the volume delivered at the established futures price and the volume contracted at that futures price.

4.7 Pioneer Low Linoleic-Identity Preserved Soybean Contracts

Pioneer uses a spot market premium contract to conduct purchases of low linoleic-identity

preserved soybeans. Through the agreement, the producer agrees to supply all soybeans from a stated acreage, provide the shipping and storage, and preserve the identity of the product from seed through to the elevator stage. The producer must use specified varieties of Pioneer seed and estimate the yield from the specified acreage. Delivery is coordinated between the producer and a specified receiving elevator. Soybean pricing is based on the following:

- A $.40/bushel premium over the spot price is paid by the elevator upon delivery.
- If the producer uses DuPont crop protection products, an additional premium of $.06-$.36/bushel is paid
- The producer can elect to defer pricing of delivered soybeans, but must have a "price-later" contract with the receiving elevator at the time of delivery.

4.8 Soybean Seed Production Agreement- Crestland Cooperative

Crestland Cooperative in Iowa purchases soybeans for seed using a cash-premium contract arrangement. Under the contract, the producer accepts seed from the cooperative and plants a stated acreage and agrees to follow production practices for certified seed and for specified quality attributes. The producer harvests and stores the soybeans until requested by Crestland; Crestland pays the transportation costs. If the quality specifications are met and the beans are used as seed, the producer is paid a premium of 45 cents/ 50 lb of cleaned seed over the cash price (basis Creston, Iowa). If the soybeans are not used as seed, but satisfy the quality specifications, a premium of 30 cents per bushel over the local cash price is paid. The local cash price can be established (i.e. forward priced on spot market) at any time up to June 28.

4.9 Grains and Oilseeds Pricing Summary

Table 4.1 below interprets the above pricing mechanisms in the context of the price mechanism taxonomy. The table shows a remarkable consistency in the mechanisms used across products and regions. For example, the base price, volume, and location basis are identified in every case. In fact, the pricing mechanisms for grains and oilseeds are relatively simple. They are largely variations on basis contracts, in which there is a fixed base price component, with a premium that compensates the producer for the additional costs involved in producing the specialty crop.

Table 4.1 Pricing Mechanisms in Grains and Oilseeds

	DAS IP Canola	Certified Canola Seed	Warburton's	Scoular	Pioneer	Crestland
Base Price	Local spot price	Local spot price (OP); Net return/acre of competitive crops (hybrid)	Local spot price	CBOT Futures price	Local spot price	Local spot price
Volume	Estimated from given acreage	Acres and tonnes/acre specified	Rail car loads	All yield from contracted acres	Estimated from given acreage	Estimated from given acreage
Frequency & Timing	Delivery is elevator call	Specified end date; frequency up to producer	Delivery is elevator call	Delivery is elevator call, basis timing specified	Arranged between producer and elevator	Elevator call
Location	Specific elevator	Specific elevator	Specific elevator	Specific Elevator	Specific Elevator	Specific Elevator
Quality	Base standard, no premium or deduct schedule	Base standard, no premium or deduct schedule	Base standard, no premium or deduct schedule	Base standard, plus premium/deduct schedule	Base standard, variety specified	Premium based on specification and whether used as seed
Price of Substitutes	No	Yes (hybrid seed only)	No	No	No	Yes
Multiple levels-pricing	Yes	Yes	No	No	Yes	No
Non-price information	Acreage, yield, agronomic practices	Acreage, yield, agronomic practices	Acreage, variety, input use, yield, location of fields	Variety, acreage, input use, yield	Variety, acreage, yield, agronomic practices	Variety, acreage, yield, agronomic practices
Market levels receiving information	Producer, grain company, DAS	Producer, seed company	Producer, grain company, Warburton's	Producer, Scoular	Producer, Pioneer	Producer, Crestland
Price Risk	None	None	None	Choice of basis	None	None
Volume/Quality Risk	Contract by acres/pay by tonne, minimum quality specs, specific geographic areas selected	Contract by acres, minimum quality specs, grower selection	Specified variety, contract by rail car, geographic area of contracts	Contract by acres, variety specified, futures contract commitments	Contract by acres, variety specified	Contract by acres, variety specified
Relationship risk	Not explicit	Not explicit	Not explicit	Not Explicit	Not Explicit	Not Explicit
Market Access Risk	Commitment to buy, if base quality specs met	Commitment to buy, if base quality specs met	Commitment to buy, if base quality specs met	Commitment to buy	Commitment to buy	Commitment to buy

5.0 Pricing Mechanisms For Dairy Products

Milk in most jurisdictions is priced according to its end use. Milk price classes are established to relate the price of manufactured dairy products to the price paid to producers for the milk from which the products were made. In addition, milk prices are fragmented on the basis of component yields relevant in processing. Thus, the pricing system reflects the value of the raw product across end uses and within a given end use. The specific mechanism that facilitates this varies across jurisdictions.

5.1 Milk Pricing in Canada

In Canada, milk pricing is based on the cost of production. A production cost formula is used to calculate production costs, with the data updated periodically to reflect actual market conditions. The cost of production price effectively sets the blend price (weighted average price across all milk classes). Canada maintains several major end-use pricing classes (presented in the table below). These class prices overlay support prices for butter and skim milk powder.

Class	Description
1 (a)	Fluid Milk
1 (b)	Fluid Creams
1 (c)	Milk Beverages
2	Yogurt and Ice Cream
3 (a)	Specialty Cheeses
3 (b)	Cheddar Cheese
4 (a)	Butter and Skim Milk Powder
4 (b)	Condensed milk
4 (c)	New Products
4 (d)	Animal Feeds
5 (a)	Cheese for Further Processing
5 (b)	Other Further Processed Product
5 (c)	Confectionery

The effective base class price is Class 4 (a), which is derived from the support prices for butter and skim milk powder and the concentration of butterfat and non-fat solids in each hectolitre of milk. Other classes are priced on a differential from Class 4 (a) that periodically negotiated between producers and processors.

Underlying the classified price is a multiple component pricing system for butterfat, protein, and other solids. Butterfat prices are common across classes. Protein and other solids values are adjusted in relation to changes in the support prices of butter and skim milk powder. Discounts are applied for bacteria and somatic cell counts above a specified benchmark.

5.2 Milk Pricing Under the US Federal Order System

Minimum milk prices that processors must pay farmers are set by the US Federal Order System. These prices are mandated minimums that non-cooperative milk purchasers must pay farmers. In many areas, competitive pressures push milk prices above the levels required under the federal orders. Minimum prices are established for each end use class based on the prices of dairy products at plants throughout the country as surveyed by the National Agricultural Statistics Service (NASS). The base milk classes are Class 3 (milk used to produce cheese products) and Class 4 (milk used to produce butter and skim milk powder).

The Class 3 milk components are priced as follows:
Butterfat price = ((NASS AA Butter survey price - 0.114)/0.82)
Protein price = ((NASS cheese survey price - 0.1702) x 1.405) + ((((NASS cheese survey price - 0.1702) x 1.582) – butterfat price) x 1.28)
Other solids price = ((NASS dry whey survey price -.137)/0.968).

The Class 4 milk components are priced in the following way:
Butterfat price = ((NASS AA Butter survey price - 0.114)/0.82)
Protein price = Class 3 protein price
Nonfat solids price = ((NASS nonfat dry milk survey price - 0.137)/1.02).

Class 2 milk is used in the manufacture of soft products. Class 2 milk components are priced in the following way:
Butterfat price = ((NASS AA Butter survey price - 0.114)/0.82) +.007
Protein price = Class 3 protein price
Nonfat solids price = ((NASS nonfat dry milk survey price - 0.137)/1.02) + .70.

Class 1 milk is fluid milk used in bottling. Class 1 components are priced as follows:
Butterfat price = ((NASS AA Butter survey price - 0.114)/0.82) +.007
Protein price = Class 3 protein price
Nonfat solids price = The higher of the Class 3 or Class 4 Nonfat solids price + regional differential

These prices are quoted at stated somatic cell and bacteria benchmarks. Pricing adjustments to these levels are made according to standards established by individual milk buyers.

5.3 Milk Pricing in California

California uses a milk pricing mechanism which is a blend between that used in the Canadian and US Federal Order pricing systems. The US Federal Order pricing mechanism is not used in California; California has its own state order. Like the Canadian system, quotas are part of the California pricing mechanism. California milk prices are linked to dairy product prices and product yields in a fashion similar to that under the US Federal Order system. Classified milk prices are also fragmented into components.

There are 5 major milk price classes:

- Class 1: Fluid milk
- Class 2: Milk used in fluid creams, sour cream, and cottage cheese
- Class 3: Milk used in ice cream and frozen products
- Class 4a: Milk used in butter and skim milk powder production
- Class 4b: Milk used in cheese production

The Class 4a minimum price for butterfat is based upon the higher of the USDA butter support price and the AA bulk butter price at the Chicago Mercantile Exchange. A make allowance ($US 0.097 per pound) is subtracted from these prices and the result multiplied by a yield factor (4.2 lbs. butter per cwt. of milk). In the case of the Chicago Mercantile Exchange butter price, a freight allowance of $US .05/lb. is also subtracted from the price along with the make allowance. The Class 4a minimum price for solids-not-fat (SNF) is calculated from the higher of the USDA support price for extra grade nonfat dry milk powder or the price of all extra grade nonfat dry milk for human consumption sold f.o.b. California manufacturing plants. Both prices are adjusted by a make allowance ($US 0.16 per pound) and the result multiplied by a yield factor (8.613 lbs. of nonfat dry milk per cwt. of milk)

The Class 4b price is generated by a complex formula related to cheese and whey butter prices and yields:

Class 4b price = (support price for 40-pound block cheddar X 1.0377-$.195) X 9.8* ratio of NCE block price to support price + (Grade B butter price on the Chicago Mercantile Exchange-$.097) X 0.27

Where: 1.0377 is a moisture adjustment factor
$.195 is the cheese manufacturing cost allowance,
9.8 a hundredweight is the cheddar cheese yield
$.097 is the butter manufacturing cost allowance
0.27 represents the yield of whey butter

To convert this price to a component basis, the Class 4a butterfat price is multiplied by 3.6. This butterfat value is subtracted from Class 4a price, with the residual divided by 8.7 to give the SNF value. These component values are then multiplied by 3.5 and 8.7 to quote the Class 4b price at a standardized test.

Milk in Classes 2 and 3 is priced using Class 4a butterfat and SNF values with fixed differentials added. The Class 1 price is established from a formula that relates the value of milk in butter or cheese to an administratively set base price. To calculate the Class 1 price, the base price is subtracted from the greater of the wholesale value of milk in cheese or in butter/skim milk powder in

the previous 2 months. The residual is allocated 40% to butterfat, 40% to SNF, and 20% to fluid carrier, and converted to a component value assuming a 3.5% butterfat test and SNF test of 8.7%.

Classified prices are pooled each month. Pool revenue is distributed on the basis of a transferable quota and historic production base. From total pool revenue, 1.7 times the total revenue accounted for by the quota volume is allocated to quota holders. Thus, within-quota milk is paid a price equal to 1.7 times the total revenue accounted for by the quota volume, divided by the quota volume. The remaining pool revenue is divided by non-quota volume, with $US 1.70/cwt added to compute the non quota price. Thus, the quota simply allocates pool revenue.

These prices are quoted at stated somatic cell and bacteria benchmarks. Pricing adjustments to these levels are made according to standards established by individual milk buyers.

5.4 Milk Pricing Summary

Table 5.1 applies the pricing taxonomy to the dairy pricing mechanisms. The pricing mechanisms are remarkably similar in terms of the information shared, the accounting for quality (through components) and end use classification. However, relative to pricing mechanisms for beef, hogs, and grains/oilseeds, milk pricing mechanisms consider both value at retail (through end-use classification) and quality (through components) more thoroughly.

Table 5.1 Dairy Price Mechanisms

	Canada	US Federal Order	California Pricing System
Base Price	Class 4a price	Survey of dairy product prices at processing plants	Higher of USDA butter support price or Chicago futures price
Volume	Specified by quota	No	Price paid to producer dependent on quota, production base
Frequency & Timing	Yes- monthly	Yes- monthly	Yes- monthly, 2 month moving averages
Location	Implicitly at plant, hauling cost pooled	Survey prices at plant, hauling costs charged by processors	Implicitly at plant, hauling cost charged by processor
Quality	Component pricing, adjustments for somatic call levels and bacteria	Component pricing, adjustments for somatic call levels and bacteria	Component pricing, adjustments for somatic call levels and bacteria
Price of Substitutes	No	No	No
Multiple levels-pricing	Yes- Milk, butter and skim milk powder	Yes-Milk, butter, skim milk powder, cheese	Yes- Milk, butter, skim milk powder, cheese, whey butter
Non-price information	Quality, volume	Quality, volume	Quality, volume
Market levels receiving information	Producer, processor, retailers	Producer, processor, retailers	Producer, processor, retailers
Price Risk	Indexed to cost of production	Government mandated minimum prices, price pooling	Government mandated minimum prices, price pooling
Volume/Quality Risk	Quota	No	No
Relationship risk	Protected by quota	No	No
Market Access Risk	Commitment to buy secured by quota	No	No

6.0 Poultry and Poultry Products

6.1 Chicken Pricing in Ontario

Chicken pricing in Canada (and in Ontario) occurs under a supply managed system. Under supply management, a system of tariffs and tariff rate quotas controls imports, and gives marketing boards pricing authority. A new chicken pricing mechanism was recently established for chicken in Ontario. Under this new mechanism, a fixed margin is paid to producers by processors, with fixed adjustments for feed and chick costs. The specific pricing formula that will be implemented is:

Price = $ .3641 + Chick Price + Feed Price

The chick price is the quarterly price quoted by the Ontario Broiler Hatching Egg and Chick Commission, and the feed price is the quarterly weighted average of all broiler feeds, obtained from 3 independent feed mills. Underlying this base price formula is a grid pricing system that relates the base price to marketing weight ranges.

6.2 KAT/Wisengold

"Verein fur Kontrollierte Alternative Tierhaltungsformen" (KAT) is a program originated by the European Poultry Egg and Game Association which is similar to some trade associations such as the National Pork Board in the U.S. KAT is organized completely by the trade members of the group and has no direct government involvement, so it can be international in scope and is not constrained by particular national policy issues. KAT is an open system in which anyone meeting the standards can participate – it is not necessarily an integrated part of the production flow. KAT currently has an egg traceability system that was implemented December 1, 1995, and implemented on an electronic basis in December 2001. Originally, KAT had two primary goals: 1) to improve food safety by reducing the incidence of Salmonella, and 2) to improve the marketing integrity of specialty eggs (cheating was a problem). As of 2001, KAT reported that 95% of alternative eggs marketed in Germany came through the KAT system, and accounted for over 20 billion eggs sold in 2001. Of the alternative eggs marketed in Germany under KAT, 50% of those came from other European countries, illustrating that the program has been successfully implemented on a multinational basis.

The administrative and governance structure of KAT is such that the primary controller is the general assembly of members with a one-member/one-vote system. This includes breeders, layers, feed suppliers, and packer/handlers[6]. From the general members a managing board and board of advisors is selected. The operational responsibility falls to KAT itself, which is part of the European Egg, Poultry and Game Association located in Bonn, Germany. It is responsible for organization, planning and overall coordination of KAT and implements the database supporting KAT documentation and traceability. KAT is also the entity through which new production methods or standard operating procedures (SOPs) are submitted and approved. KAT

[6] Many of these groups have their own organizations external to the KAT system.

also owns the trademark KAT logo. The "UV –Controls" group oversees management of the production protocols and SOPs and works as the connection to the autonomous accredited control institutes. This group functions separately from the rest of KAT so as to preclude conflict of interest issues. The autonomous accrediting agencies must meet the European Standard EN45011 to be eligible; this standard provides requirements for certifying agencies to obtain and maintain their accreditation and is established by the British Standards Institute (BSI). The accrediting agencies have also established an autonomous arbitration court for dispute resolution.

KAT recognizes five general egg rearing systems: 1) organic, 2) free-range, 3) intensive free-range, 4) on the ground (no cages, but not free-range), and 5) cage systems. A farm must follow SOPs regarding feed ingredients, lighting, outdoor exposure, square meters of space available to layers and other procedures depending on the protocols[7]. The control institute annually certifies feed mills and farms with respect to conformity to defined rearing systems. However, feed data, egg sales data, mortality and morbidity and entry or removal of laying hens is recorded on site and sent to the packing station which works with the grower to maintain an ongoing database documenting production standards. Packing stations are audited four times per year, since this is the stage where salmonella and other bacterial information are collected. Once accredited, the farms receive a KAT control number specific to their farm. This five-digit number is unique to the farm and an additional 2-digit number identifies the "barn" on the farm site if there are multiple barns. This means that individual eggs are not traceable, but hens are treated as lots based on barn number, and represents the most refined level of traceability in the KAT system.

Wiesengold is a production system with KAT certification. It is a farm cooperative of producers that consists of feed mills, 48 laying farms, and an egg packaging plant, and is a major supplier of organic eggs. Each farm in Wisengold must first register with KAT by supplying a map of the farmstead and also providing detailed documentation of the production protocols that are monitored by KAT. These protocols must be "at least as restrictive" as the KAT base protocols by type of rearing. Farmers may go beyond this, although they must also be certified to that higher level. Because producers can brand beyond the KAT seal, this allows some flexibility.

One-day-old chicks are placed on farms for laying in an all-in-all-out production flow. In 16-17 weeks the hens begin to lay and they will lay for approximately 50 weeks. Sales records of incoming chicks for laying are kept with the farm until the spent hens are sold for organic baby food production. Two other documents must be kept on the farm. One document is the laying record (number of hens and number of eggs laid) and the other is the shipping record (number of eggs shipped to the plant). By combining these three pieces of information with feed supply forms provided when feed is delivered, a continuous monitoring system is in place which can verify quantities. Each laying farm must obtain feed from a KAT certified feed mill (in the case of Wiesengold, this is an "integrated" function). A feed supply form must be given to the farm for each feed delivery and this information is also delivered to KAT for database entry. This is a check mechanism to determine how many layers are in a barn and crosschecked with eggs sold to help maintain system consistency.

Each farm must also pay KAT and the independent certifying agency administrative fees. The

[7] Sample SOP's are available, but far too extensive to include here.

farmer must pay KAT four pfenig per hen (~ $US .02 per hen). However, the certification fee is generally on a per hour basis and will cost ~$US 68 per hour; an inspection takes about one hour once per year. If a farm fails the audit, it can no longer be a member of KAT and all stores and wholesalers are notified. This robust enforcement helps maintain the integrity of the system.

Pricing is negotiated on a quarterly basis between KAT, producers, feed mills, and packers. Price negotiations depend on revenue transferred back from retail and the reported production costs at each stage. The resulting set of transfer prices distribute value from retail back to production and processing levels in a mutually agreeable manner.

6.3 Golden Oval

Golden Oval is a new generation co-op whose 411 members are corn growers. The corn is used to make feed for approximately 2 million laying hens and the final product is liquid eggs. Thus, Golden Oval is a means to add value to members' corn.

One of the members of Golden Oval is Co-op Country, a 'traditional' co-op. Co-op Country is essentially the founder of Golden Oval and owns a portion of its equity. Through its block of shares in Golden Oval, Co-op Country successfully put in place a stream of income to augment its profit, to provide funds for its future development, and to fulfill its responsibility of equity payments to retired members and to the estates of deceased members.

Part of the Golden Oval project is a feed mill facility that was constructed as a joint venture by Golden Oval, Co-op Country, and ValAdCo[8]. The feed mill is used as a cost centre by all three co-ops, rather than a profit centre. The two new generation co-ops use the feed for the laying and hog operations, and Co-op Country sells it to their customers for a profit. The mill currently processes 4 million bu of corn a year.

The pricing mechanism used by Golden Oval is typical of new generation co-ops. Members receive market price for their corn, and a patronage payment. The patronage payment is based on the co-operative's earnings less retained capital costs. Thus, the effective price members receive for liquid eggs is the local corn price plus the value of corn as liquid eggs, less production costs and retained capital.

6.4 Groupe Challans/Label Rouge

Label Rouge is a government owned brand which represents a broader concept and coordination of activities involving French Government agencies, farmers, feed mills, slaughterers, processors, and retailers. The major focus of Label Rouge is chicken, although the brand is used in other meats. For Label Rouge, the French government provides the overarching definition of required attributes and minimal standards of verification for the supply chain, and several ministries and departments have various controls over the system. Other labels include:

[8] ValAdCo is a new generation co-operative of corn producers who operate a hog production facilities as a means to add value to their corn.

Appellation d' Origine Controlee (origin labeling), Agriculture Biologique (organic labeling), and A'tout Qualite Certifie (general quality certification according to defined standards).

The Ministry of Agriculture has the greatest role in development of production supply chains under these brands. Their role is to approve or reject proposed production standards. For example, if a producer group establishes a production system for free-range production, the producer group must first submit its production protocols for meeting their certifying criteria. The Ministry of Agriculture approves the proposed production protocols, but one of the interesting Label Rouge criteria they apply is that the resulting products must have a verifiably differentiable taste attribute. This was done because of the belief that different production protocols alone were not sufficient to create a successful new product. The Ministry of Agriculture also approves third party certifying agencies. Certifying agencies are private organizations responsible for monitoring ongoing production practices to assure the approved production plans (i.e. SOP's) are followed.

The Direction des Politiques Economique et Internationale is the government agency responsible for the creation and certification of labels, including Label Rouge. The third major government agency involvement is the Ministry of Finance, which provides a government check on auditing on the use of labels. The three agencies' involvement provides a system of checks and balances to assure system integrity, with no one agency having complete control over the implementation of production practices.

Producers themselves are organized under "syndicates". For example, Challans is a chicken production operation named for the region of France in which it is located. Challans produces branded chickens under the syndicate "Synalaf". Synalaf's role is as a coordinator of production activities under Label Rouge Poultry Production. Synalaf represents all members of the chain, including hatcheries, feed mills, farmers, processors and retailers. Their role is to establish the linkage of production protocols under the system. While Synalaf provides overall coordination, "Group Qualitate" actually defines the SOPs for the particular production standards. Synalaf therefore acts as a go-between for the actual production chain, the Group Qualitate which defines the SOP's, the certifying organizations and the government agencies.

Day to day functioning of traceability falls under the domain of "Qualitate Groupes" or Syndicates. Groupe Challans provides the coordinated management activities of entities marketing under the Challans label, which is co-branded with Label Rouge. Their control group is called SYLAC – it functions much as a cooperative with a board of directors and executive management group. SYLAC membership is comprised of hatcheries (6), growers (162), feed suppliers (4), and abattoirs (12). Selected members of each of the producer sectors serve on the SYLAC board of directors. SYLAC provides three services: 1) maintains records, provides information and coordinates production planning to participants in Groupe Challans; 2) develops particular production protocols for members of Groupe Challan and works to get these approved by the Ministry of Agriculture and Labeling; and 3) works as liaison to the control (auditing groups) and related governmental agencies in providing appropriate documentation and records.

The production protocols for the Challans group are as follows: 1) required genetics which meet growth criteria and taste preferences; 2) free range rearing and no cages; 3) no artificial lighting;

4) all natural feeds (no sub-therapeutic antibiotics or other growth promotants); 5) space requirements for transport; and 6) specific humane slaughter requirements and sanitation conditions.

Each member in the supply chain has a unique site identification number. If there are multiple facilities per site (e.g., multiple grower barns), these will have unique identification numbers as well. Overall, the production system is managed with a batch-processing concept. Each grower barn is designed to hold 4,300 birds (each bird is required to have a minimum of 11 square meters of space, but this includes outside pasture area). Chicks are delivered in batches of 4,300 to the grower farms. At delivery to the grower facility, a document records the date the chicks were born, the date they were delivered, the number of chicks delivered, and a certificate of origin which provides the hatchery detailed information. This documentation stays with the grower and is also sent to SYLAC. SYLAC is responsible for recording this information and making it available to the controlling or auditing agencies and the Ministries of Agriculture and Finance.

In the growing stage, the system requires three visits by SYLAC technicians to monitor production systems (e.g., mortality, feed consumption, barn condition, etc.). Once a year, a veterinarian must visit to establish that overall production protocols are being followed. All records of any treatments must be kept and signed by both the farmer and the technician or veterinarian. During technician visits feed and manure samples are collected to test for any biological or chemical contamination (e.g., salmonella).

In addition to the on-site technicians and delivery records, feed suppliers provide an important production link. Feed suppliers are independent from the chicken producers, but they are members of the SYLAC syndicate. Participating feed suppliers must meet criteria for feed ingredients and quality control as specified by SYLAC and approved by the various controlling agencies. In the case of Challans, there are 4 different rations used during the growth phase of production. The feed mill formulates these rations according to stage of growth and feed is delivered based on production timing. The farmer receives a feed form which the feed supplier also keeps and forwards to SYLAC. The feed form contains the farm identification number, the dates of delivery, quantities of feed delivered and the diet formulation of the feed. The timing of feed delivery and quantities delivered provide another control point for the auditing agency to make sure that the feed use is within a normal operating range. The feed mill is required to keep records on all feed deliveries (e.g., feed tests, quantities, grower ID, etc.) for ten years and must keep actual feed samples with record of delivery for six months (long enough for birds fed products to be consumed). The feed mill is audited by the controlling organizations once a year in a scheduled visit, and is also audited once a year in a surprise visit.

The abattoir is the final stage in the traceability system. In Groupe Challans, there are twelve approved abattoirs. This is the end of the traceability chain because all poultry is sold in case ready packages, with all labeling and pricing done at the plant. The prices are transmitted from the retailer directly to the packaging line where price labels are printed and the product is shipped.

Producers' price is determined in quarterly negotiations between packers and producers. The

process is similar to that described for KAT in eggs; given revenue from retail sales, mutually agreeable transfer prices are negotiated. There is no guarantee on the price to be received, except for the fact that Label Rouge products represent superior quality and the demand for these products is increasing continuously.

6.5 Mountaire Farms

Mountaire Farms of Delmarva, Inc. purchases broilers using a tournament formula-pricing arrangement.

- The broiler base price is calculated from the three week average of Monday U.S.D.A. New York Grade "A" weighted average quote prices (including branded products) for the week of sale, the previous week, and the week following the sale.
- The simple average of the 3 week's prices is multiplied by 56% to determine the farm selling price (live) for the settlement week. The base payment is adjusted by the relationship between the farm selling-price and the average farm retail costs.
- The farm retail cost is calculated by dividing the total retail cost by the total weight of poultry moved from the farm the final week of the farm's movement for settlement.
- A feed conversion rating bonus is awarded based on a grower's relationship to the average weight and feed conversion of the weekly standard. The weight to feed conversion ratio for payment calculations is set at 6:1. After the feed conversion rating is determined, the bonus or penalty rating is multiplied by .0750 to determine the grower's feed conversion rating bonus.

Producers' compensation is also related to their relative performance:

- A weekly average standard cost is established by all final flocks moved in a given week, with no week shall containing less than 10 flocks for the purposes of establishing grower s feed conversion and fuel cost positions. Flocks with a standard cost of plus (+) or minus (-) one cent per pound above or below the weekly average standard cost for the week are not included when computing the week's average.
- In addition to the payment above, a bonus is paid to the top 3 growers with the lowest adjusted cost rating. The bonus will be paid on the farm weight as follows:
  1st - .50 cents (This bonus will be added to the established weekly base payment)
  2nd - .25 cents
  3rd - .10 cents
- There is a discount for underweight birds Base Payment - Small Bird: 3.25 cents per pound.

Production risks:

- In the event of 100% loss of a flock due to Act of God, Mountaire pays the grower $10.00 per 1,000 per week based on the number started. In the case of a partial disaster as a result of the above, Mountaire pays $10.00 per 1,000 per week on chickens lost, with the surviving poultry settled on the weekly average minimum, whichever is greater.
- In the event of losses occurring due to suffocation or heat exhaustion when the outside temperature is below 95 degrees Fahrenheit, the minimum guarantees or disaster clauses do

not apply. Payment will be based the weight of live poultry moved from the farm after the disaster and the farm's relationship to the weekly average.

- If the first two weeks' mortality exceeds 4% of the chickens billed, and the loss is not the fault of the grower, an adjustment is made using the following:

(Number of chickens) x (Average weight of the birds removed) is credited to the grower's flock settlement, with 75% of the feed for the excess number of birds lost charged back against the flock.

6.6 Summary- Poultry Pricing Mechanisms

There is a great deal of diversity within the poultry pricing mechanisms surveyed. They range from spot market formulas to systems in which retail value is transferred back to the farm level through an open negotiation process. Most of the mechanisms use prices from multiple levels of the market, with multiple parties observing the non-price information. Only one of the mechanisms contained no provisions for risk management; it essentially priced eggs as a function of the corn price, with no limits on corn price movement.

Table 6.1 Poultry and Poultry Products Price Mechanisms

	Ontario	KAT/Wisengold	Golden Oval	Groupe Challans	Mountaire Farms
Base Price	Production cost formula	No	Local spot price	No	New York price, converted to live basis
Volume	Determined by quota	No	Specified by membership shares owned	Specified barn size	Specified in contract
Frequency & Timing	Quarterly	Quarterly	No	Quarterly	Weekly
Location	No	At Farm (Implicitly)	Golden Oval feed mill	Certified abattoir	At Farm
Quality	Index based on weight	Must meet applicable KAT SOPs	Base standard	Must meet applicable Label Rouge SOPs	Discounts for small birds
Price of Substitutes	No	No	No	No	No
Multiple levels-pricing	Yes	Yes	No	Yes	Yes
Non-price information	Weight	Method of production SOPs	Volume	Method of production SOPs	Cost of production
Market levels receiving information	Producer, processor, marketing board	Producer, processor, KAT, certifying agencies, retailer, consumer	Producer, Golden Oval	Producer, abattoir, processor, certifying agencies, retailer, consumer	Producer, Mountaire
Price Risk	Indexed to cost of production formula	Price based on retail revenue and cost of production	No	Price based on retail revenue and cost of production	Moving average formula
Volume/Quality Risk	Quota, grid pricing by weights	KAT certification and verification (quality)	Commitment assoc. with shares (volume)	Label Rouge certification and verification (quality)	Contingency payment specified
Relationship risk	Protected by quota	No	Member-owned	No	No
Market Access Risk	Commitment to buy, protected by quota	No	No	No	Commitment to buy

7.0 Pricing Mechanisms for Processed Food and Horticultural Products

7.1 Pricing in the Ontario Processing Vegetable Industry

Pricing vegetables (tomatoes, peas, cucumbers, beans sweet corn, cauliflower, etc) for processing in Ontario is a relatively sophisticated process. Ontario competes with a number of areas (California, Michigan, Wisconsin, Ohio, Italy) in the production of these products. At least in North America, the system has evolved to one in which growers are contracted by processors to produce the raw products.

In Ontario, contracts for each product are negotiated between the marketing board (OVGMB) and Ontario Food Processors Association (OFPA). General process is as follows:

- Commodity committee of OVGMB negotiates in February with one from OFPA (or, increasingly, one lead company negotiates their contract first, and then the others negotiate theirs after the precedent is set). Both parties bring their analysis of the current and expected market situation to the table.
- For each commodity and contract, prices and payment terms are established in the negotiations for the following year's crop.
- Processors provide seed to growers. So, the price of seed is also included in the negotiation.
- Part of the function of the negotiation is to develop grade differentials and delivery terms for quality factors.
- Negotiation process includes mediation and final offer arbitration when negotiations do not result in agreement.

Once a price has been established and quantities are contracted, the two remaining sources of risk are exchange rate and production (weather) risk. These are shared mutually by the parties to the negotiation.

The negotiation process has been used to bring about considerable change in the industry when factors are under the control of either growers or processors.

- Example: some cucumber processors tend to specialize in different sizes of pickle. Size is determined by picking frequency. Hand picking is very expensive, and yields and profits for farmers are very sensitive to picking size. The negotiation process allows for differences among contracts in prices for various sizes to accommodate processor needs and to balance profitability among farmers – so farmers growing for different processors grow different mixes and receive somewhat different prices for cucumbers of the same size.

- Example: When the Canada/US Trade Agreement was completed in 1989, this industry faced the loss of very considerable import protection on finished goods. Especially for tomatoes, Ontario's farm level efficiency was quite low – eg yields were 19 tons/acre vs 35 tons in California. The industry faced the potential loss of processing plants, and therefore the need for farm production, if companies could source tomatoes cheaper in California, process there and move finished goods into Canada with no tariffs.

To enhance Ontario's efficiency, a productivity pricing concept was negotiated. Since seed genetics play a major role in yield, the concept was to give processors the incentive to increase the quality of seed and, therefore, yield potential. From the producer's perspective, higher yields because of seed means lower cost per ton, especially with mechanical harvesting, because their costs are relatively fixed. The solution was to negotiate a sliding scale of price that gave processors lower prices when growers contracted to them had higher yields than in previous years. The higher the yield, the lower the price. The result is yields the past few years that are comparable to California's. Similar adjustments have been made for mechanical harvesting. Overall, the changes have created a much more efficient supply chain in the Ontario industry.

7.2 US Sugar Beet Pricing

Sugar Beets are grown and processed in 2 major regions of the US- the Upper Midwest (North Dakota, Minnesota, and Michigan) and the West (Montana, Idaho, Colorado, Oregon). The pricing mechanism applied in sugar beets is a contract which compensates the producer on the basis of volume and sugar content of beets. However, the specific structure of the contracts varies between the Upper Midwest and West. In the Upper Midwest, sugar beet contracts specify payment according to volume, sugar content and extractible sugar. In the West, sugar beet contracts are specified only on volume and sugar content. In both cases, beet deliveries are weighed and tested for sugar yield. However, Western sugar beet processors do not specify extractible sugar as a pricing component when they could.

This difference between the two price mechanisms relates to production conditions. The yield of sugar beets increases with the application of nitrogen fertilizer; however the recoverable sugar content of beets decreases with nitrogen. Farmers must thus manage the trade-off between beet yield per acre and the sugar content that can be recovered in processing. However, in the West, sugar beet production occurs in an irrigated system; in the Upper Midwest, sugar beets typically are not irrigated. Since irrigation positively influences the agronomic effectiveness of nitrogen fertilizers, the management of the yield-sugar quality relationship is different. Thus, it is not necessary for western US processors to price beets on the basis of extractible sugar as well as total sugar to obtain the desired quality. In the Upper Midwest, obtaining quality by managing the yield-quality trade-off is more costly, so processors motivate producers by providing additional compensation on the basis of extractible sugar.

7.3 Pricing in a Food Co-Packing Relationship

A Canadian food manufacturer prices product in a co-packing relationship with another manufacturer using a modified "cost plus" structure. The elements of cost included are ingredients, packaging, direct labour (production), logistics costs, indirect overhead overhead costs, and profit.

- Ingredients

The formula is put into a manufacturing bill of materials that shows the amount of each ingredient used per unit plus a yield, or "line loss," factor times the price per ingredient unit. The total ingredients are calculated in this way and summed to get a total ingredient cost.

- Packaging

  Packaging is handled in the same way as ingredients, with the number of trays, sealing film, folding cartons, shipping cases, etc. used per unit factored up by a line loss factor times the cost per unit of packaging, summed to get a total packaging cost.

- Direct Labour

  The amount of direct labour used on the production line per shift is divided by the number of units budgeted per shift. This is more complex because of paid breaks and lunches, line speed variability and downtime need to be factored in. For example, if it takes 10 people at $14.00 per hour to staff a line for an eight-hour shift and there are two 15-minute breaks and a 30-minute lunch, then the total labour cost is 10 x $14.00 x 8 hrs. or $1120. If the line speed is 160 retail units per minute and a shift runs 420 minutes (8 hrs. minus 60 minutes for breaks and lunches), then this gives 67,200 retail units per shift divided by 24 per case or 2800 cases per shift. However, line stops cause the line, on average to run at 85% efficiency, so the 2800 cases must be factored down to 2380 (2800 x .85). So the cost per case is $1120 / 2380, or $.47 per case. This is the Direct Labour cost.

- Logistics

  This is any cost associated with storing and shipping the product. This includes the cost of pallet rental for the number of days you have to store the product, movement of the product to an outside cold storage location, cold storage expenses, and any delivery costs. If the product is exported, the additional costs associated with export documentation preparation costs, export inspection and stamping fees are included. All these costs are summed and broken down to a cost per unit basis.

- Indirect Overhead Costs and Profit

  This includes indirect production costs (uniforms, safety supplies, etc.) plant utility costs, plant sanitation costs, plant maintenance costs, and administrative overhead. Plants can typically report this is on a cost per case of total plant throughput per year. This is factored into a "tolling fee" along with profit margin (a percentage of the selling price).

These cost components are added together to obtain the price of the co-packed product. It is an "open book" system, in the sense that the customer can observe everything except the details of the tolling fee. Costs are reviewed at a set period – every 6 months, or once per year, and cost increases or decreases are passed through.

Another part of the pricing mechanism is continuous improvement. Each party understands that programs are to be implemented that will reduce production costs on a regular basis. This is implemented through a gain sharing system. Under this system, the gains resulting from cost

savings are split evenly by each party. For example, if the manufacturer finds a way to save $100,000 per year (by using a different supplier, improving production methods, etc.) the savings are split between manufacturer and customer.

7.4 Pricing in a Food Manufacturing Strategic Alliance

Several years ago, several small Canadian frozen food companies formed a strategic alliance to export products to the U.S. retail market. The motivation for the arrangement was that they all felt they were too small and their individual offerings too limited to be able to effectively sell to major US chains such as Kroger and Wal-Mart. The basis for the venture was that by working together they could obtain a good mass of similar but not directly competing products.

The alliance is structured as a Canadian limited liability partnership (LLP) with each partner owning a 25% interest in the LLP. One partner acts as General Partner (i.e., General Manager); this partner is paid on a fee for service basis to handle sales, distribution, order processing and accounting. Each partner invested 25% of the operating capital required to cover finished goods inventory, receivables, and any borrowing expense required to finance the operation. The partners plus the Canadian LLP formed a U.S. limited partnership domiciled in the U.S. with each owning 20% of the U.S. LLP. The Canadian LLP is the General Partner of the U.S. LLP, so the partner operating the Canadian LLP is the effective operator of the U.S. LLP as well. The partners share any profits or losses incurred by the U.S. LLP equally.

Each partner makes specific product items and sells the product to the U.S. LLP. The details of the costing of the products remain the confidential information of the producing partner, but in pricing the product to the US LLP each partner is effectively "bidding" on the product, since if his price is too high, the retailer will not list the product, so there is incentive for the producing partner to be efficient. The Canadian general partner invoices the customer and handles the accounting. Each partner company does whatever product development work that is required to get a product to market. Each partner firm handles its own quality assurance and production issues.

Thus, each of the partner firms sell to the US LLP at a transfer price that is profitable to them, with an additional return from the sale realized in the form of the partner firm's share of the earnings of the US LLP. The partnership also serves to share earnings among partners, thereby stabilizing returns from sales for each partner.

7.5 Pricing in the Pro-Fac and Curtice Burns Vegetable Marketing Alliance

Pro-Fac is a US producer-owned fruit and vegetable marketing cooperative. It maintains a strategic alliance with Curtice Burns, a publicly traded fruit and vegetable processing firm. Under the alliance, Pro-Fac sells all its members' product to Curtice Burns. The pricing of the product supplied by Pro-Fac is as follows:

- Curtice Burns pays Pro-Fac a price equal to 70% of the earnings resulting from product supplied by members

- Regardless of the earnings level, the minimum price paid by Curtice Burns to Pro-Fac is the Commercial Market Value (CMV) of the crops. The CMV is determined by a committee established jointly by the boards of directors of Pro-Fac and Curtice Burns. The committee considers pre-season contracts and open market purchases of product in making decisions on the level of the CMV.
- Pro-Fac pays members a price equal to the CMV, plus the Pro-Fac share of the Curtice Burns earnings adjusted for earnings retained by Pro-Fac
- Pro-Fac gives members an initial payment equal to the estimated CMV on receipt of their product. This is followed by an additional payment at the end of the season when the actual CMV is observed. Finally, producers receive a payment based on returns from Curtice Burns earnings, adjusted for retained earnings.

7.6 Summary- Pricing Processed Food and Horticultural Products

There is a great deal of variation among pricing mechanisms for processed food and horticultural products. We observe a range from pricing formulas to open negotiation (with and without limits on price movement). In particular, there is diversity in levels of the market considered in pricing and the amount of information that is observed in exchange. Location basis was about the only standard provision across the mechanisms.

Table 7.1 Vegetable and Processed Food Price Mechanisms

	Ontario Processing Vegetables	US Sugar Beets	Food Co-packing	Food Strategic Alliance	Pro-Fac/Curtice-Burns
Base Price	Yes, Negotiated Pre-season	No	Production cost	No	CMV or 70% of earnings
Volume	Specified in aggregate	Acreage contract, purchase tones	Specified	No	No
Frequency & Timing	Specified	Specified- at harvest	Specified	No	At harvest
Location	Specified	Specified	Specified	US distribution points	C-B locations
Quality	Grade differentials	Sugar and extractible sugar	Specified	Product specific	No
Price of Substitutes	No	No	No	No	No
Multiple levels-pricing	No	No	No	Yes- Manufacturer, Wholesaler (LLP), Retailer	Yes- Farm, Wholesaler, Manufacturer
Non-price information	Tomatoes- yield	Quality	Production cost, output	No	No
Market levels receiving information	Farm, OPVGMB, Processors	Processor, farm	Manufacturer, customer	Manufacturer, Wholesaler (LLP), Retailer	Farm, Pro-Fac, Curtice-Burns
Price Risk	Exchange rate risk shared	No	Cost plus; cost savings shared	Shared earnings in LLP	Guaranteed CMV
Volume/Quality Risk	Volume risk shared	No	No	No	No
Relationship risk	No	No	No	Partnership	Strategic Alliance
Market Access Risk	Commitment to buy	Commitment to buy	Commitment to buy	No	Commitment to buy

8.0 Pricing Mechanisms Summary

The purpose of this review was to examine a diverse set of pricing mechanisms in use in agriculture and food and provide an understanding of their operation. In all, 26 pricing mechanisms were discussed, and a great diversity was observed. The following general types of arrangements were observed:

- Market price plus premium contracts
    - Basis contracts
    - Spot price premium contracts
- Cost-plus pricing
    - With and without sharing of productivity gains
    - With and without price smoothing provisions
- Formula prices
    - With and without smoothing provisions
- Tournament pricing
- Direct negotiation
    - With full information sharing
    - Without full sharing of information
- Spot market pricing plus premium dependent on retail value
- Product pricing classified by end use
- Pricing dependent upon specific quality attributes

Some of these types of arrangement were nested; for example, we observed cost-plus pricing in a tournament structure, and classified pricing in milk in combination with specific component values.

With respect to the classification of pricing mechanisms, we observed the following:

- Base price

  Most of the mechanisms had a base price to which premiums or discounts were applied. This base price is typically referenced to a central spot price, a futures price, or a production cost formula. Surprisingly, the mechanisms that did not mention a base price were largely those for more specialized or value-added products such as European beef and poultry, or manufactured food products.

- Volume
  Volume is a fundamental part of hog and grain pricing mechanisms. In particular, grain and oilseed mechanisms commonly specified both acreage and volume. This forces the yield risk onto the processor, but prevents producers from "sorting" the acreage (supplying only the worst quality portion of the acreage to fulfill the contract). It also allows the processor to adjust the proportion of contracted acreage it purchases as it observes yield in relation to processing/storage capacity. Volume is specified to varying degrees in other products. In beef, for example, none of the mechanisms specified volume.

- Frequency and Timing

Most of the mechanisms had some mention of the length of time in which the pricing arrangement is in place (particularly hogs) or the timing of delivery (particularly grains/oilseeds and vegetables).

- Location Base Point

  Most of the mechanisms specify a location basis for the price. In several cases, the basis for the price is implicitly at plant because transportation charges are subtracted from the price paid to the producer.

- Quality

  Pricing mechanisms varied widely in their specification of quality. In some cases, the product supplied had to satisfy a base standard; if it failed to meet the standard it was not purchased, and if it exceeded the standard no premium was awarded. Specialty grains were typical of this approach. Hog and dairy price mechanisms typically applied a quality index in which premiums or discounts were paid around specific quality measures. Other products varied in their use of quality-based standards.

- Price of Substitutes

  Surprisingly few of the pricing mechanisms referenced substitute products. The only incidence of substitutes being used as part of the price system was in seed production, in which the alternate used of seed-grade product in generic use is reflected in the mechanism.

- Multiple Levels in Pricing Mechanism

  Approximately half of the pricing mechanisms observed information from multiple market levels. In most of these cases, production cost and central market information were included in the mechanism. For example, California milk pricing had components of production costs and commodity dairy product prices. In other cases, particularly those from Europe, information from retail, wholesale (trucking, processing, etc.) and farm production costs were included.

- Non-price Information

  Most of the pricing mechanisms transferred some information beyond price and quantity. In some cases, only quality information was transferred. In other cases it was much more. For example, some of the European livestock supply chains transferred information on breed, farm, production practices used, etc.

- Market Levels Receiving Non-price Information

  In several of the cases observed, the information passed in the exchange was observed by a third party. This was particularly the case for the European value-added supply chains and specialty grains and oilseeds.

- Price Risk
  Price risk was a major component of some of the pricing mechanisms. In particular, it was a major focus of pricing mechanisms in hogs. A number of the mechanisms in poultry also had explicit risk smoothing components. Pricing for grains and oilseeds had more passive risk reduction properties, such as basis risk removal.

- Quality and Volume Risk

  Most of the mechanisms contained provisions for quality and/or volume risk on behalf of either the producer or the processor. This was particularly the case in hogs and poultry. Value-added supply chains tended to have fewer smoothing mechanisms for volume and quality risk.

- Relationship Risk

  Relatively few of the mechanisms examined dealt explicitly with risks in the relationship between producer and purchaser. Some of the hog contracts dealt with default and *Force Majeur* (Acts of God). In other cases, the price mechanism was operated by a co-operative so relationship risk was handled within the governance of the co-operative.

- Market Access Risk

  In most of the cases, market access risk was eliminated because the mechanism was part of a contract that implied a commitment to buy.

9.0 Conclusions

The purpose of this review was not to evaluate or rank pricing mechanisms. However, a number of observations and generalizations can be made:

- The further away from the retail stage, the simpler the pricing mechanism

The most obvious cases that illustrate this are the grain and oilseed pricing mechanisms. Even for those that appear to deviate sharply from commodity product (e.g. specialty wheat for baking, soybeans and canola purchased for specific compounds) pricing mechanisms consisted of futures or spot market basis contracts. Mechanisms for livestock (the next stage closer to retail) tended to have greater creativity associated with them. In particular, some of the livestock pricing mechanisms had either tacit or explicit links to retail or processed wholesale value. None of the grain and oilseed mechanisms had this link; the structure of premiums was associated with additional production costs.

- The more specialized and aligned the supply chain, the more creative and open the pricing mechanism.

In more specialized products, pricing appears to be more open. For example, the specialty aligned systems from Europe typically used periodic negotiation between participants in which each revealed its actual costs, and the total retail value was made known. Aspects of this process were also evident in processed food and vegetable pricing in Canada. It was only in the more specialized and aligned systems that realized retail value of the food product flows back to form a part of the price paid to the producer.

- There is a distinct difference between pricing mechanisms in North America and Europe.

Comparing the pricing mechanisms between Europe and North America, there is a greater degree of retail value and information sharing along the supply chain occurring in the European cases than there is in the North American cases. Even among the higher value-added cases in North America surveyed, there were very few that involved direct revelation of retail value as part of a pricing formula or negotiation. This may be due in part to the fact that more specialized agri-food supply chains exist in Europe than in North America. However, the comparison between selected European and North American pricing mechanisms leaves the impression that the European mechanisms studied are more about transferring value in the supply chain, and North American mechanisms are more about compensating for the additional production costs of the specialty product relative to the commodity.

This last observation makes clear a larger issue related to pricing mechanisms. Many of the mechanisms observed, particularly those in North America, use a premium schedule that is explicitly or implicitly related to the additional cost of producing the specialty product. Others (largely the European examples) pass the retail value of the specialty food back to the farm product; production cost relative to commodity product is not an issue. The first approach endeavours to compensate the producer for additional costs relative to the commodity market. However, the logical extension of this is that since the premium derives from actual costs, the producer is left just indifferent between supplying the specialty farm product and supplying the commodity version. This structure implicitly derives from relative bargaining power; if many farmers are capable of producing the specialty version of the commodity product, all that a purchaser must do to obtain it is offer a price that leaves producers just indifferent at the margin. The ultimate focus of the mechanism for the specialty product is on the related commodity market as a source of suppliers.

The alternative is to back off the equivalent retail value to the specialty farm product. However, in so doing, the producer may receive a price which, relative to the commodity version of the product, is greater than or less than the additional production cost. Thus, there is risk to the producer in terms of the premium received relative to the increased cost. However, if the ultimate food product earns a significant retail premium, there may be little risk of this. This is underscores the value of a stringent product registration system. In the Label Rouge case, for example, new products must have a taste attribute recognizable as distinct by ordinary consumers before the product protocol is approved. This paradox in premium pricing remains between compensation for costs (little risk, little realization of additional value) and direct return of retail returns (higher risk, higher realization of retail value. This review does not resolve the paradox.

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