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# Current

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## Price and Product Pooling: Impact on Development and Operation of Differentiated Value Chains

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### The Issue

Price pooling has long been used as a means to deal with risk in the marketing of agricultural commodities. For commodities, product pooling may also generate potential benefits through economies of scale or the provision of market power. Yet there has also been a growing interest in product differentiation and the development of value chains as a means to increase returns to farmers. This article explores the question of whether price or product pooling is compatible with a strategy of pro-active product differentiation through value chains.

### Implications and Conclusions

An important distinction should be made between price pooling as a risk reduction strategy and product pooling as a means to generate countervailing market power. This article suggests that price pooling may indeed have a role to play within a value chain

pursuing product differentiation. The attractiveness of voluntary product and price pooling for producers participating in value chains depends on a number of factors, including the relative degree of producers' risk aversion and the ability of differentiation strategies to reduce price variability for producers in the absence of pooling.

## Introduction

There has been a strong move over the last 20 years toward an emphasis on product differentiation as a means of increasing returns in agricultural supply chains – creating “value chains” – and, in particular, increasing the returns that farmers receive from the market (Hobbs, Cooney and Fulton, 2000). Implicit in this change in emphasis is an attempt to leave the “commodity” era of agricultural products behind (Gordon, Hannesson and Kerr, 1999). In the common perception, the production of a commodity has meant that one farmer's output competed directly with the output of every other farmer who produced the same crop; any attempt by an individual farmer to increase the price received for his/her output would be immediately undercut by other farmers. Of course, this perception is too simple in that, unlike industrial production, which can achieve narrow product-quality bands, biological-based agricultural production systems always exhibit considerable quality variation. As a result, even for products that are considered commodities, marketing mechanisms have evolved to allow different prices that reflect the differences in quality, e.g., through the creation of grades that allow products to be sorted and auctions that produce lot-by-lot prices. Thus, there would seem to be no inherent conflict between differentiating products and the production of what are commonly thought of as commodities.

In the traditional view of commodities, however, market mechanisms make no distinction between quality differences that arise largely as a result of good fortune (e.g., having a perfect weather season in crop production) and those that arise from superior management. In terms of modern value chains, the focus is on the latter. Resources are expended specifically to provide a product of superior quality. This management approach has two aspects: (1) to produce a superior mix of existing attributes and (2) to add characteristics that a basic commodity does not possess. The aim is to obtain a premium from the marketplace that more than offsets the additional resources required to produce the superior quality. This rewarding of effort is, in turn, often seen as antipathetic to the practice of price pooling that is observed in commodity markets. Pooling certainly alters the incentives pertaining to product marketing. This article explores the question of whether price or product pooling is incompatible with a strategy of pro-active product differentiation.

Product pooling,<sup>1</sup> where the crops or livestock of a large number of farmers are bundled together into large lots, does not seem compatible with a strategy of rewarding successful effort toward improving product quality. As there is no penalty for adding a lower quality to the lot, we have a producer system that parallels Akerlof's consumer-

driven “lemons” problem, and quality will decline. Product pooling must be pursued for other reasons, such as the achievement of economies of scale or acquisition of market power that can offset the negative effects of the decline in quality. Price pooling, however, requires closer examination.

## Price Pooling and Marketing of Agricultural Products

Price pooling is a mechanism to deal with risk. A price pooling strategy will be chosen voluntarily by individuals who exhibit two characteristics: (1) they are risk averse, and (2) they do not believe that any individual effort or strategy on their part can result in a price that is sufficiently above the average (or pooled) price to give a positive reward to their effort. An individual has a choice between accepting the market price at the time of sale or joining the pool and receiving the pooled price.<sup>2</sup> If the expected pooled price and the expected price from marketing individually are equal, a risk averse individual will choose the marketing method with the lower expected price variance. Conversely, a “risk lover” will choose the marketing method with the higher expected price variance. Assuming that a price pool reduces the variance of realized prices, for the risk lover the opportunities forgone from the possibility of receiving a price higher than the pooled price will be valued more highly than the penalty arising when a price lower than the pooled price must be accepted. A risk lover will choose not to join the price pooling scheme unless, paradoxically, he believes he is better than the pool at reducing the variance of realized prices.<sup>3</sup> The opposite will be true for individuals who are risk averse. They will be willing to forgo the positive rewards from receiving a higher price to avoid the loss of income associated with having to accept a price lower than the pooled price.

Risk averse individuals who can, or believe they can, engage in activities that will ensure a price consistently sufficiently above the pooled price to more than offset the costs of engaging in those activities will not be interested in joining a pool. On the other hand, if the individuals do not believe that they have sufficient information or skill to affect the marketing outcome through their own actions, then the pool is not inferior and risk averseness will dominate.

Given that producers are not homogeneous in their risk preferences or in their abilities (or perceptions of their abilities) to anticipate “better than pooled price” marketing opportunities, it is not surprising that mandatory price pooling schemes always have dissenters – those who feel they are being disadvantaged because of forgone opportunities or because they are not allowed to act on their ability to correctly anticipate the market. While most producers are likely risk averse and, in many cases, the belief in superior forecasting ability may be illusionary, individuals with these characteristics will exist and it will not be possible to have all producers voluntarily join a pooling scheme.

What kinds of markets have characteristics that are amenable to pooling activity? The first characteristic is volatility, both through time and in the size of the deviations from the pooled price. Farmers must pick a point in time to market their crops or livestock. Markets

whose volatility through time does not exhibit clear patterns or regularity cannot be anticipated. Many agricultural product markets are cyclical in nature. Cycles are sufficiently regular to be anticipated, meaning that larger numbers of producers may well feel confident they can correctly anticipate market prices and will not have an interest in joining a pool. Markets whose prices are affected by many exogenous factors are less likely to exhibit discernible patterns. Further, it may be difficult or costly to acquire information in a timely manner on factors that affect distant markets. This was particularly the case in the past. Further, from a producer's perspective, buyers had an advantage in acquiring market intelligence, leading to transactions under asymmetric information, with the advantage reaped by the buyer. In recent years, better communication, and particularly the Internet, has made it easier for individual producers to gather market intelligence.<sup>4</sup> As a result, pooling may attract fewer producers than in the past.

Abstracting from the costs associated with administering a price pool, the pooled price can be seen as the average price over some period of time. If the deviations from the average are small, then risk aversion is likely to be relatively less important in the decision to join a pool. In other words, the risk of losses associated with receiving a price lower than the pooled price may be acceptable to more producers. However, as the size of the downside deviations increases, more and more producers will be unwilling to risk low returns, and will voluntarily join the pool. Clearly, the configuration of deviations from the average of any movement of prices will affect the proportion of producers who will be willing to join a pool. For example, without having any discernible pattern through time, price deviations above the mean could tend to be smaller but more frequent. These positive deviations could be offset by fewer but large deviations below the mean. This would lead to a very different distribution of firms wishing to join a pool than would be the case if both the positive and negative deviations were frequent and large.

Pools must be closed over the period that the average prices are calculated, to prevent those who fared badly in the market from latterly joining the pool to gain the higher pooled price. In a similar fashion, opportunists must be prevented from leaving the pool when they can see a near-term price advantage. In either of these cases of opportunism toward the pool, the pooled price would be lowered, increasing the incentive for individual producers to leave the pool.

If the objective is simply to offset the type of risk described above, there seems to be no impediment to voluntary pools, with some individuals accepting the market price when they sell and others being willing to pool their prices. If the pool is passive – simply accepting market prices for all sales and then averaging the prices and giving each member of the pool the same price – then it does not matter if risk lovers or those who believe they can correctly anticipate the market price to their advantage are active in the market.

The question then arises as to why compulsory pricing pools are put in place. In fact, what are called mandatory pricing pools may actually be product pools that are attempts to gain countervailing power in the market. It has long been a perception of farmers (and often the perceptions were correct) that as a result of the asymmetric information discussed above, and due to the geographic dispersion of individual farms relative to buyers (e.g., a number of farmers served by only one local grain buyer), buyers have more market power than producers. With mandatory product pooling, a degree of countervailing market power may be gained. This may be particularly the case if a professional marketing organisation is put in place to administer the pool. Even if the administrators of the pool do not have the power to restrict the quantity of output globally, they may well be able to act strategically in the short run to obtain better prices. Further, a professional marketing arm of the pool's administration may be able to reduce or eliminate asymmetric information.

To have any degree of market power, however, the marketing arm must be able to control the timing of sales. It may also be advantageous to be able to assemble lots of various sizes. Thus, it may be administratively difficult to know what price was actually received for an individual producer's output. Given that quantities are used strategically by the pooling agency, even if the price of each individual producer's output could be discerned, higher or lower prices are not based on the producer's ability to anticipate prices but rather on the ability of the pool's marketing division to anticipate markets and to manipulate them successfully. Not all trades will be successful; others may provide a considerable premium. Any individual producer's quantity contribution is subsumed in the larger strategy. As a result, pooling the prices received from these trades does not disadvantage any producer whose output may in fact have been sold to the lower-priced market. Thus, the pooled price is a convenient way to deal with equity among producers when strategic behaviour is being engaged in by the pooling agency. It may also satisfy the desire of risk averse producers to escape the downside risks associated with volatile prices, but this is a secondary benefit – the higher prices arising from the exercise of market power are the primary benefit. In this case, however, there must be compulsory membership. If risk lovers and those who believe in their superior ability to predict market prices are not forced to be part of the pooling system, they become direct competitors with the pool's marketing arm, reducing or eliminating its ability to exercise market power.

It is important to understand this distinction and to be able to separate the risk management aspect of price pooling from the market power side effect that yields a pooled price. As currently constituted, institutions that mandate product (and, hence, indirectly price) pooling often justify it in the name of the secondary benefit of price risk management.

None of these price pooling activities excludes quality premiums or discounts relative to the pooled price. Producers making the effort to provide high-quality products can receive a price premium. All that is required is recognised standards. The premium

received however, may not offset the extra resources required to produce the higher quality. This is true whether the pooling arises for reasons of risk management or to gain and exercise market power.

## Producer Price Pooling in Modern Value Chains

In a sector where primary production is dominated by commodities, price and product pooling are logical responses for risk averse and competitive<sup>5</sup> producers who face volatile markets and (at least locally) monopsonistic buyers. Price pooling is a simple risk sharing mechanism, while product pooling is a means to collectively garner a degree of countervailing power in the market. This is a reasonable institutional response to being in a commodity industry. It is not the only possible response. One alternative is to alter the market structure so that producers are no longer producing a commodity. This product differentiation strategy has received considerable attention from producers and governments over the last two decades. While it has always been possible for individual producers to attempt to set their products apart from those of others through improving quality (and/or its consistency) or adding value, except for a few exceptional cases these remain cottage industries. Often these cottage industries have vertically integrated supply chains that market directly to the final consumer. This strategy provides a means for the individual farmer to capture the value that exists between the farm gate and the consumer. These cottage industries often lack the ability to attain economies of scale in processing and marketing and, hence, to contribute in a significant way to raising farm incomes or rural revitalization. Since these cases are centred in individual farms, the question of pooling has not arisen.

Latterly, there has been interest in expanding the product differentiation strategy. To achieve economies of scale in processing and marketing, as well as to tap into major retail chains that demand both large quantities and consistency of supply throughout the year, collective marketing efforts, such as new generation co-operatives, are emerging. There has been interest in producer participation in other aspects of the "value" chain to garner a greater portion of the consumer premium. Whether farmers participating in new generation co-operative value chain initiatives would be interested in product and price pooling becomes a relevant question.

As long as individual producers receive price premiums for products exhibiting superior quality, then product pooling can be the means to achieve economies of scale in processing. It can also satisfy the requirements of major retailers for large volumes and consistency in supply through time. There is no advantage to keeping the products of individual producers separate through the supply chain, as the advantages arise from economies of scale and the provision of large volumes on a consistent basis. All products differentiated by quality through the new generation co-operative receive the premium and there is no advantage to further differentiating the products of individual farms.

Whether price pooling will appeal to producers participating in a product differentiating value chain is a more complicated question. As the ability to increase revenue arises from differentiating the product by quality rather than garnering market power, a pooled price is not necessary to increase price. Hence, we are left with the price volatility issue. Based on the analysis in the previous section, a number of propositions can be put forward that form the basis of testable hypotheses for future research.

*Proposition 1:* Participation in a closed value chain that co-ordinates the supply chain to extract the maximum value from quality-based product differentiation will reduce the price volatility faced by producers, hence lessening the incentive for producers to initiate a price pooling scheme.

Retail prices tend to be much less volatile than commodity prices. Retail prices tend to exhibit stickiness due to the pricing strategies employed by retailers. In particular, if consumers are resistant to radical price changes, they could choose to shop at a rival retail store in future. Retailers may adjust their margins more easily than their prices. Thus, having producers participating in tightly co-ordinated value chains means that some of the retail price stability should be passed back down the chain. If this is the case, risk averse producers will perceive less benefit from price pooling. This proposition could be examined empirically (depending on data availability) by comparing the relative volatility of producer prices in a related commodity to those received by producers who are participants in supply chains that pursue product differentiation strategies.

*Proposition 2:* The closer a differentiated value chain product is as a retail market substitute for another product that uses a commodity substitute as an input, the more interest there will be in producer price pooling.

While retail prices may be sticky, price competition is unlikely to be ignored. Assume there is a commodity substitute for the higher-quality output from the producer group supplying inputs for the value chain. If the price of the commodity substitute declines, the substitute retail product gains a price advantage in the retail market. To maintain market share the value chain will have to cut its retail price, and part of this price decline will be passed back to its producers. This effect will be stronger the closer is the substitution relationship between the retail products.

On the other hand, if the price of the commodity input rises, the price of its associated retail product will also have to rise, creating an opportunity to increase the price of the value chain's differentiated product. Some of this price increase may be passed back to producers (depending on the competitive structure of the downstream food processing and retailing sector). In addition, as the price of the commodity substitute rises, producers of the value chain's input will find the commodity market an increasingly attractive alternative. This will threaten the security of the value chain's specialized input supply and the cohesiveness of the value chain's producer group. To reduce the incentive to

supply the commodity market, the value chain will have to increase the price received by its producers.

Hence, close substitutability leads to price volatility and an increased interest in price pooling by risk averse producers supplying the value chain. A low degree of substitutability will increase the isolation of the value chain's producers from the commodity market. Price integration between differentiated products and their commodity-based substitutes could be tested at the retail level. The producer price variability in value chains that have closely integrated retail prices among substitutes could be compared with price variability for those commodities whose retail products are not integrated. The expectation would be that volatility would be greater for products whose retail product prices are integrated (i.e., they are close substitutes).

*Proposition 3:* The larger the proportion of the retail price made up by the output of primary producers, the greater the likelihood of an interest in price pooling by producers supplying inputs to the value chain.

If a superior-quality input supplied to the value chain by producers has a commodity substitute with a volatile price, it will be more difficult to isolate the retail price from changes in the commodity price. On the other hand, if the input price is only a small proportion of the retail price, even a large degree of volatility in the overall commodity price will not be passed through to the retail price. Therefore, the value chain's input prices will not exhibit the same degree of volatility as the commodity market. In this case, the value chain's agricultural input suppliers will have less interest in price pooling. As an empirical test, the correlation between the volatility of value chain input prices and the proportion of the retail price made up by the input price could be tested.

*Proposition 4:* If product differentiation is perceived as a "risky" strategy for producers then it will attract risk lovers and there will be little interest in price pooling.

What type of producers are attracted to new generation co-operatives and to participation in value chains that, at the very least, limit their freedom of action because they often entail working hand-in-hand with other players in the supply chain? Producers choosing to join a value chain may have to make asset-specific investments that leave them open to opportunism by others in the supply chain. The success of the venture may well hinge on the performance of other suppliers over whom little control can be exercised. Investments may be necessary in processing facilities to produce a differentiated product whose market potential is only poorly understood, particularly as the product moves from a test market phase to an attempt to create a sustainable market niche. This business environment may be viewed as very risky and only attractive to risk lovers.

If the majority of those producers joining value chains to exploit the premiums available from product differentiation are risk lovers, then they are also likely to be attracted to price variability. They will not be interested in price pooling.

The risk attitudes of producers participating in new generation co-operatives and value chains need to be better understood. Surveys of participants and potential participants in these institutions could be conducted to determine their attitudes toward risk in general and price pooling in particular.

*Proposition 5:* If participating producers view product differentiation as part of their ability to make strategic marketing decisions, then there will be little interest in price pooling.

If those who choose to participate in a product differentiation strategy had previously been chafing under a compulsory price pooling system, then they are not likely to want a price pooling scheme for producers supplying inputs to the value chain. On the other hand, if producers join the new generation co-operative because they do not believe individual producers can employ a strategy to improve their returns, then they are more likely to be interested in price pooling, just as they would in a compulsory pooling system.

Producers that are participating (or are interested in participating) in a new generation co-operative and/or value chain could be surveyed regarding price pooling and their ability to choose a strategy that will increase net returns. Until producers who are interested in product differentiation strategies are better understood, the attractiveness of voluntary price pooling among value chain producers cannot be discerned.

## Conclusions

Little is known about the role of product and price pooling within agricultural supply chains that are pursuing a strategy of product differentiation. While it may run counter to the conventional wisdom that product differentiation and price pooling are antipathetic, this article suggests that there is nothing inherent in price pooling that would exclude it from having a place within a value chain pursuing a product differentiation strategy. Of fundamental importance is understanding that price pooling is a risk sharing strategy and not a leveller of product quality. Price premiums for quality, and associated institutions such as grading standards, can be accommodated in price pooling schemes. Pooling relates to the movement of price over time and place, and quality premiums can be calculated relative to the pooled price.

The attractiveness of voluntary product and price pooling mechanisms for those producers participating in value chains appears to depend on a number of factors. The central issue for price pooling is price volatility. Risk lovers will see no value in price pooling. For those who are risk averse, the greater the volatility, the more attractive price pooling becomes. If price differentiation strategies reduce price variability for producers, then pooling will become less attractive. A number of propositions pertaining to the ability of value chains to reduce price variability are developed to set the stage for future research.

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## Endnotes

<sup>1</sup> It is assumed that the pooled products are not sorted by quality. Even if sorting takes place, if the quality bands are wide, there will be a decline in quality toward the floor of the band.

<sup>2</sup> The choice is actually more complicated because the cost of administering the pool must be subtracted from the total revenue received by the pool. As a result, the pooled price will be less than the average price. For simplicity we assume that the cost of administering the pool is sufficiently small to be safely ignored.

<sup>3</sup> We are indebted to an anonymous reviewer for this insight.

<sup>4</sup> It still might be argued that buyers, being larger, can afford to hire professionals to analyze the information available and, hence, retain a skills-related information advantage.

<sup>5</sup> In a perfectly competitive market, producers are assumed to be price takers and to strive to maximize returns given the price they face. In other words they do not engage in marketing strategies. This is similar to the case described above where agricultural producers do not believe that any action taken by them will increase their net returns.