
# Effects of Supermarket Monopsony Pricing on Agriculture

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# Effects of Supermarket Monopsony Pricing on Agriculture

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Abstract

Potential effects of alleged monopsony pricing of farm food products by supermarkets on farm product prices, quantities, incomes and land values are assessed relative to competitive behaviour. A comparative static equilibrium model is used. For export products and the few import competing products, the effective food input supply curve facing the supermarkets is close to perfectly elastic and this limits monopsony behaviour. For the non-traded food products, the ease of reallocating the fixed supply of aggregate agricultural land between traded and non-traded food products means a highly elastic food supply function for non-traded food products, and very limited monopsony effects.

## 1. Introduction

Often raised concerns about the use of market power by supermarkets in Australia to reduce prices paid for their inputs and in turn squeeze the returns to farmers are evaluated. As a point of reference, the market outcomes for the extreme case of the supermarkets acting as a monopsony buyer of farm products are compared with the outcomes from a perfectly competitive market structure. The effects of monopsony behaviour on supermarket input costs and farm prices, quantities purchased by supermarkets and farm production, supermarket profits, and farm product returns and land asset prices are assessed. In reality, the extent of supermarket buying power and the effects on farm prices, lies somewhere between the extremes of perfect competition and monopsony.

The paper considers three agricultural product contexts where Australia is a large exporter, for example for dairy, beef, sugar and cereals, a significant net importer, for example for pig meats and some processed horticulture products, and largely a non-traded product, for example most fresh fruit and vegetables and eggs. For the traded products, the effective highly elastic supply function for farm product facing the supermarkets means the scope for monopsony pricing is very limited. For non-traded products, a combination of the lower bound of the export parity price and the ability to reallocate agricultural land in receipt of economic rent from production

[1] I am grateful to Rhonda Smith for discussions while taking responsibility for the views presented.

of the non-traded to the traded farm products results in a highly elastic supply curve for the farm input facing the supermarket, which limits the magnitude of effects of supermarket monopsony pricing.

The paper is organised as follows. Section 2 provides a simplified outline of the food supply chain and a discussion of the industry structure at the different steps of the chain. The textbook comparison of monopsony pricing and perfectly competitive pricing is presented in Section 3. Section 4 discusses the implications of, and especially the limitations imposed by, the importance of international trade of Australian farm products on monopsony pricing. Some model generalisations are considered in Section 5. A final section concludes.

## 2. Food Supply Chain

A simplified picture of the food supply chain in Figure 1 provides a background context for assessing the effects of monopsony pricing by supermarkets on the farm sector. The chain from production to consumption includes farm inputs, farm production, intermediary value added through the transport, processing and storage of farm products, and then wholesale and retail distribution before purchase by consumers.[2] In practice, some firms are involved in several stages of the supply chain, while many others are independent operators. International trade is important at various stages. Exports dominate sales for ultimate domestic consumption at the farm and intermediate post-farm levels for many products, including grains, beef, sheep meats, dairy and sugar. Imports of machinery, chemicals and other farm inputs are important at the farm level. Food imports by wholesalers and retailers are important for beverages, pig meats and some horticulture products. Only a few products fall into the non-traded category, including eggs and in-season fresh horticulture products. Although market structure varies across the different stages of the food supply chain, at each link of the supply chain market forces determine quantities produced and consumed, prices received and paid, and incomes.

[2] More details for specific products are provided in studies by ABARES, including beef (Goesch et al., 2015), and ABARES studies (ABARES, various) for other products. While these studies provide invaluable data and descriptions of industry structure, they provide no formal non-competitive models to explain market conduct and behaviour. Smith (2006) discusses the range of decision options and strategies available to firms along the supply chain, and in particular notes both the limitations on the use of market power and the dearth of empirical evidence on the abuse of market power.

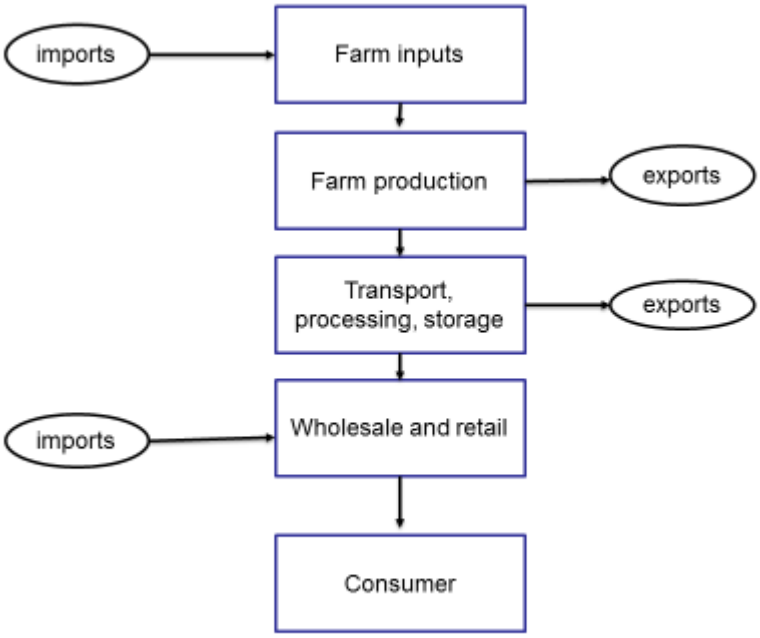


Figure 1 Food Supply Chain

There is a high level of market concentration at the retail stage of the food supply chain. About 70 per cent of domestic retail food sales are made by the two large supermarket chains, Woolworths and Coles (ACCC, 2016). On the other hand, barriers to entry, with the exception of access to desirable shop sites in many areas and the importance of economies of scale, are relatively low as indicated by the growth of market share by Aldi in recent years. Also, purchases of food at supermarkets account for just over 60 per cent of domestic food consumption with the rest purchased at smaller independent retailers, restaurants, takeaways and others (Australian Government, 2012). Retailers provide a bundle of services in addition to food, such as convenience, quality assurance, information and promotion, and access to financial and other services. At best, the food retail sector is an oligopoly, both on the retail demand side and on the food input purchase side, rather than a monopoly/monopsony.[3]

The assumption of monopsony conduct by the supermarkets in Section 3 below provides an extreme position, rather than a realistic assumption. To the extent that most oligopoly models generate price and quantity decisions between a perfect competitive and a monopoly/monopsony outcomes, the objective of this paper in taking a monopsony assumption is to assess the extreme outcome as a benchmark.

For the link in the food supply chain of Figure 1 involved in the processing, storage and transport of farm products for delivery to the wholesale and retail chain, or for export markets, oligopoly

[3] The area of monopoly pricing in setting retail prices is not considered in this paper.

or monopolistic competition best fits the market structure. Economies of scale, and often also economies of scope, favour larger business firms, including private companies, grower owned cooperatives and for some transport government owned businesses. Other than the importance of economies of scale, other market and regulatory barriers to entry are low in most cases. For simplicity, the paper treats this sector of the food chain as setting output prices as a constant mark-up on variable input costs, and variable costs dominate total costs. Input costs include purchases of farm products. These firms are treated as price takers in large national markets for non-farm inputs including labour, capital and other materials. Then, for the purposes of this paper, changes in supermarket food input purchase prices are passed back to the farm link of the supply chain in Figure 1 as an approximate dollar for dollar change in the domestic farm product demand function, or a constant percentage change.

The farm production link in the food supply chain of Figure 1 is the classic perfect competition sector. There are many producers of homogenous products, and free entry and exit. Individual farms are price takers for both inputs and outputs. The supply function for different products is given by the marginal cost function. Geographical differences in soils, climate, access to transport and so forth result in a rising product supply function. Arguably, differences in managerial skills, which again have a low supply elasticity, contribute to a rising supply curve and earn some of the measured economic rent.

At the farm level, economic rents, or producer surplus, is a residual return for the favoured fixed in supply natural resources. In turn, land asset prices approximate the expected value of the sum of the discounted stream of future rents. Formally, the land asset price, A, is given by

$$A = \sum(1+d)^t R_t = R/d \qquad (1)$$

where, d is the discount rate and R is rent income or producer surplus. The right hand simplification assumes a constant expected d and R into the future. That is, lower farm prices resulting from monopsony pricing by supermarkets become smaller economic rents and lower land prices.

However, while land for aggregate food and fibre production is close to fixed in supply,[4] most agricultural land can be reallocated from one agricultural product to another. Then, in the context of choice options for the allocation of land between different farm products and different market circumstances facing different products, land for a particular product can be

[4] In some areas at the margin agricultural land competes with alternative uses for urban use and for the environment.

considered a variable in supply input with an opportunity cost of rent return if used in producing another product.

### 3. Text Book Monopsony Versus Perfect Competition

This section provides the text book comparison of the long run equilibrium effects of a supermarket monopsony compared with a perfect competition model outcomes for farm price, quantity and income, and land value. Importantly, this model implicitly assumes no international trade. This assumption is relaxed in Section 4.

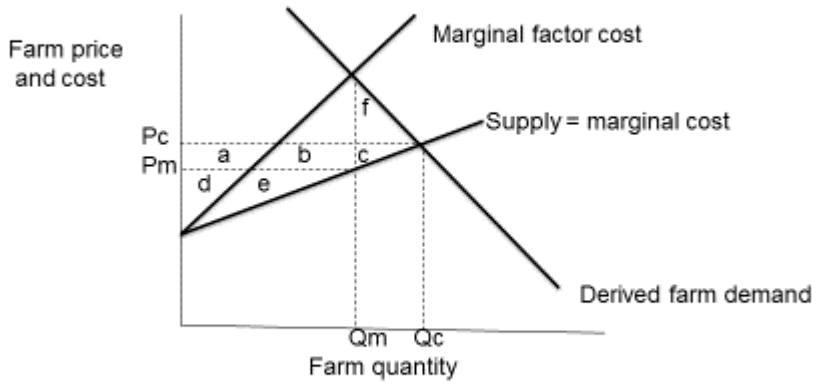


Figure 2 Farm Market Outcomes

Figure 2 captures the competitive market outcomes drawing on the background of Section 2 above. The derived demand for the farm product represents the final consumer demand less the marketing margins to provide the intermediary services of processing, transport, storage and distribution, including by the supermarkets. The supply curve is represented by the farm production marginal cost curve with a positive slope to reflect different endowment characteristics of the fixed supply of land, and perhaps also managerial expertise. Market equilibrium is given by farm price Pc and quantity Qc. The gross farm receipts PcQc cover the opportunity cost of the variable in supply inputs given by the area under the marginal cost or supply curve, and a producer surplus or economic rent of the area above the supply curve and

below the price line, area a+b+c+d+e. In turn, the economic rent, or R, is capitalised into the price of the land asset, A, using (1). Note that the more favourably endowed the land, the larger the rent and land asset price, with marginal land generating a zero rent.

If the supermarkets adopt a monopsony strategy they recognise the rising farm product supply curve and that purchasing more farm product raises the food input cost, or the average price paid, on all farm food input purchased, both infra-marginal and marginal. To maximise profits they calculate the marginal factor cost, MFC, of farm input purchases given by

$$MFC = d(MC\ Q) / d\ Q = MC(1 + 1/Es) \quad (2)$$

where, (MC Q) is input expenditure, MC is marginal cost or average price given by the competitive supply curve, and Es is the elasticity of the supply curve for the farm product input. For the non-farm inputs of labour, machinery and other materials the supermarket is a price-taker. Supermarket profit is maximised by equating MFC of (2) with the price from the derived demand curve. In Figure 2, the monopsony supermarket chooses quantity Qm < Qc and pays farmers a lower price Pm < Pc.

Note that even with supermarket monopsony pricing the farm sector receives enough receipts to cover the outlays on variable inputs, and so is willing to supply the quantity sought by the monopsony supermarket. But, producer surplus or economic rent received for the fixed in supply land and other fixed inputs is reduced. But, because land is fixed in supply with no alternative use, as long as rent and the asset value exceeds zero, it will continue in food production. The lower rent income in turn drives a one-off windfall loss in the land asset price via (1).

The smaller quantity means a higher consumer product price. From a society efficiency perspective, the monopsony decision involves an efficiency loss of area f+c.[5]

The reductions of farm price and quantity are larger the less elastic the farm supply curve. Also, the less elastic the supply curve, the larger the reduction of producer surplus and fall in the land asset value with monopsony pricing. Importantly, using (2), as the supply curve approaches an infinite supply elasticity, Es, reflecting constant returns to scale technology and no fixed in supply farm inputs, the monopsony decision and market outcomes approach the competitive market outcomes. The less elastic is the derived demand for the farm product, the smaller are

[5] The efficiency loss involves distortions to the mix of the farm input and other inputs in producing the consumer products along the food supply chain, and distortions to the mix of food and other products purchased by consumers.

the reductions of supermarket monopsony pricing on farm price, quantity and loss of producer surplus.

## 4. International Trade

International trade is an important component of the market for most Australian farm produced products as shown in Section 2. For the products where exports dominate, supermarkets have to compete against overseas buyers for the Australian product, or, farmers have the option of an export sale rather than a domestic sale. While export demand for some Australian farm products may not be perfectly elastic, computer general equilibrium models drawing on a range of econometric studies assume highly elastic export demand elasticities of between -5 and -10.[6] For the few products where Australia is a net importer, supermarkets are close to price takers in a much larger global product market. For the few cases of non-traded products, Australian farm product prices are bounded between an export parity price and an import parity price, with the difference reflecting costs of transport, storage and inventory management. International trade for farm production restricts the capacity for supermarkets in their purchases of food products for domestic consumption to exercise monopsony pricing. Formally, in terms of the marginal factor cost function of (2), international trade results in a large elasticity of supply, Es, facing a supermarket monopsony.

Figure 3 illustrates the role of international trade for the special case where Australia is a price-taker in world markets. Consider first an export product, such as grains, beef, sugar and dairy. The export demand reflects the export parity price Pe out to quantity Qe with point a on the Australian supply or marginal cost curve, S. With the farm level domestic derived demand curve, DD(e), OQd(e) goes to domestic consumption and Q(e) – Qd(e) to export. The farm food input supply curve facing the supermarket monopsony effectively is infinitely elastic. Should supermarkets set price below export, Pe, competitive farm product marketers arbitrage and reallocate production to the export market until the domestic price rises to match the export parity price.

[6] See, for example, Dixon and Rimmer (2002) for the MONASH model and Hertel (1997) for the GTAP model.

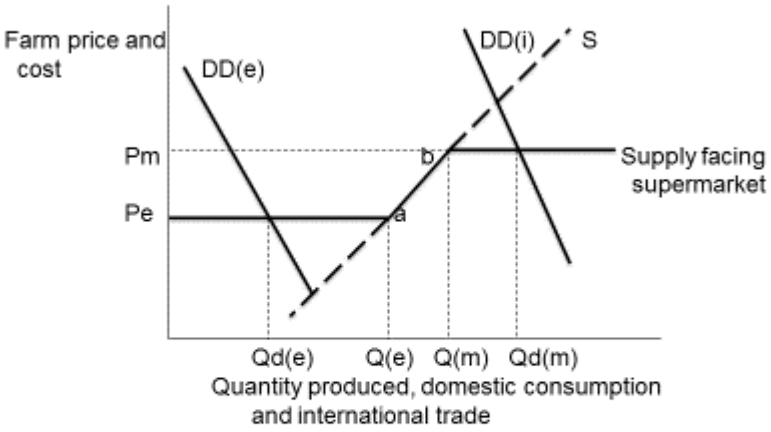


Figure 3 Farm Outcomes with International Trade

Consider an import competing product, for example pigmeat and some processed horticulture products. Here, domestic demand DD(i) exceeds domestic supply at the import parity price, Pm. At the import parity price, domestic supply is Q(m), demand is Qd(m), and Qd(m) – Q(m) is imported. The effective supply curve for food input facing the monopsony supermarket is infinitely elastic at the import parity price. There is no opportunity for monopsony pricing by the supermarket it has no market power in the international market. Importers facing close to zero market entry costs will purchase domestic product for sale to the supermarket if price offered by the supermarkets falls below import parity.

A non-traded agricultural product, such as most fresh horticulture and eggs, would have a domestic demand curve crossing the farm supply curve at a price above export parity and below import parity, namely along ab of the supply curve in Figure 3. In principle, for non-traded products where the food input supply curve facing the supermarket is less than perfectly elastic, a supermarket monopsony has an opportunity to increase its profit by setting a price below the competitive price as told in Figure 2. However, there are two important restrictions on how low that price could be set. First, the export parity price, Pe, sets a lower bound. Second, even though the aggregate quantity of agricultural land for the production of all agricultural products is close to fixed in supply, the allocation of that aggregate quantity between the production of the export and import competing food products on the one hand and the non-traded agricultural products as an alternative is not restricted. Arguably, the land input allocated to the

non-traded products is a variable input rather than a fixed in supply input, which increases the elasticity of supply of the non-traded product. Also, the minimum rent return on marginal land allocated to the non-traded products has a lower bound set by the rent that could be earned if reallocated to the traded products, and these products dominate the allocation of agricultural land in Australia.

In summary, making the plausible assumption of highly elastic demands for Australian agricultural exports, highly elastic supply for imported products, and ease of reallocation of aggregate fixed in supply agricultural land between different traded and non-traded agricultural products, the opportunity for supermarkets to exercise monopsony pricing over farm inputs is very limited. If export demand is less than infinitely elastic, but highly elastic, the farm price markdown from competition to monopsony using (2) is limited. In addition, the ease of reallocating land for production of a product subject to monopsony pricing to other agricultural products not so affected further reduces potential effects of monopsony pricing.

## 5. Some Qualifications and Twists

The foregoing sections employed comparative static equilibrium models. In reality, the adjustment period may be an extended one, and the transition paths could include market outcomes which under- and over-shoot the new equilibrium. That is, in the short term supermarkets could impose conditions on farmers which squeeze their returns below the long run equilibrium. In defence of the long run equilibrium analysis, supermarkets, farmers, and others in the food supply chain are in business for the long run, and both face a multitude of short term positive and negative shocks, including climate and the exchange rate. In the long run, if supermarkets set farm prices below the opportunity costs of variable inputs required for farm production, farmers will withdraw production and the supermarkets will lose a vital input.

Reality is that the food market supply chain is a dynamic and evolving market with other competitive dimensions besides price. Changes in incomes, tastes, international markets, exchange rates, climate and technology are just some of the factors which shift demand functions and cost functions, and in turn call for decision changes leading to changes in market prices, quantities and incomes along the supply chain. Competition often involves many other dimensions as well as price setting, including developments in product characteristics, other dimensions of the supermarket purchasing experience, and the development and application of technology and better management practices. These non-price dimensions and other exogenous shocks add to the challenge for quantitative studies to estimate the magnitudes of effects of market behaviour, including supermarket monopsony.

Another simplifying assumption of the conceptual model was that the monopsony supermarkets set a single price and then allowed farmers to choose the quantity offered. More sophisticated and larger economic rent transfer options for the supermarkets include: effective price discrimination across farmers at different points on the farm product supply curve; and, a "take-it or leave-it" price and quantity package. In theory, these purchase strategies can result in market outcomes with the competitive market quantity and price, a complete transfer of producer surplus or economic rent from the farm sector to the supermarkets leading to a reduction of land asset values to zero, but enough funds for farmers to cover variable input costs and a normal return on their own labour and expertise. The net farm price of the models used in Sections 3 and 4 above readily can be generalised to include specific charges on farmers for labelling, promotion and so forth. These more detailed price strategies do not alter the general finding of Section 4 that the importance of international trade to Australian agriculture works to greatly reduce, if not eliminate, the opportunity for monopsony price behaviour by supermarkets.

## 6. Conclusions

The paper has used conceptual models to assess the effects of the exercise of monopsony pricing by Australian supermarkets on prices, quantities, incomes and land asset values of Australian farmers.

Even if monopsony pricing was invoked, it is not in the long term interest of the supermarkets to set a farm price below the opportunity cost of variable in supply farm production inputs consistent with a competitive market. At most, monopsony pricing can transfer some of the economic rent, or producer surplus, earned on favourably endowed fixed in supply agricultural land from farmers to the supermarkets, and then a one-off fall in land asset values.

The importance of international trade for Australian farm products, both exports and imports, means the supermarkets face a highly elastic supply function for the domestic food input they require. As a result, the opportunity for monopsony pricing is minimal. Further, this result holds as we move from the extreme market power position of monopsony to the reality market power situation of oligopsony.

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