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# National Competition Policy and its effects on rural Australia: A comparative analysis of three industries<sup>\*†</sup>

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## Abstract

In this paper we review some recent studies of the impact of National Competition Policy on rural Australia. National Competition Policy has tended to assume that both domestic and international deregulation of industry leads to a shift from a noncompetitive to a competitive industry structure. Due to the well known efficiency properties of competitive industry structures deregulation is justified as a means to generating greater efficiency in resource allocation. Whilst little can be said about the long-run evolution of market structures, in the short and medium term a competitive industry structure may not develop due to spatial, institutional and intertemporal imperfections. If these imperfections are ignored the costs of reform may be higher than necessary and the reform may not lead to the desired efficiency gains. We compare a series of studies of the Australian wheat, pig and sugar industries that have used a variety of methodologies to analyse the impact of deregulation on rural Australia. These studies are all consistent in that they suggest that the costs of deregulation could be reduced if increased emphasis were placed on understanding industry structure and a staged approach to reform were followed.

**Keywords:** National Competition Policy, Institutional Structure, Pareto Efficiency, Imperfect Competition, Regulation and Deregulation.

**JEL Classification:** D41, D43, F12, L13, Q17

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## 1. Introduction

A number of studies have attempted to analyse the impact of microeconomic reform and national competition policy on rural Australia. The pro- and contra arguments for reform have been discussed from two perspectives, on the one hand the reform debate has involved issues of trade policy, on the other hand the debate has centered on a number of issues in industrial organisation and their implications for competition policy. We use the term competition policy in its neutral sense meaning policy which relates to industrial organisation and reserve the term national competition policy for microeconomic reform in Australia. Thus the ACCC has been associated with competition policy and the NCC with national competition policy. It has been the role of the Productivity Commission, and its forerunner the Industry Commission, to concentrate on the efficiency aspects of industrial organisation in Australia<sup>1</sup>.

Often a partial rather than a general equilibrium perspective has been taken when discussing domestic market relations. Thus the approach to trade policy may not be consistent with the approach taken to analysing the competitiveness of the domestic industry. This dichotomy between the way international and domestic aspects of trade policy are treated leads to the formulation of inconsistent and suboptimal policies [7], [2]. For policy to be consistent it must be formulated based on a consistent set of assumptions, in the case of competition policy this does not appear to be occurring. In the following we will provide evidence for this claim with respect to three industries, pigs, wheat, and sugar. In this paper we will concentrate on the implications of three studies looking at these industries and will attempt to interpret the results of these studies in the light of international trade theory and the theory of industrial organisation. All the industries under examination have been characterised by some sort of non-tariff import restrictions, in particular an import embargo, and in the case of wheat and sugar countervailing monopoly/monopsony power has been invested in statutory marketing authorities

In the first industry, the wheat industry, the implementation of the Hilmer Competition Policy recommendations has led to a growing debate about what is the best institutional structure for the wheat industry. The Grains Council of Australia through its Grains 2000 project canvassed opinion from all sectors of the industry in an attempt formulate an institutional policy and framework that would benefit all in the industry. Despite extensive consultation and the commissioning of independent reports exploring the options for deregulation, the industry has yet to fully explore the industry-wide implications for deregulation from a theoretical perspective. The removal of the Statutory Authority status of the Australian Wheat Board (AWB) and its investiture as a public company with growers as the majority shareholders brings into question the role of a private monopoly in exerting market power to the benefit of its shareholders.

In the second industry under investigation, the pig industry, the relaxation of import protocols in 1990 led to the gradual increase in imports of pigmeat from Canada. In response to mounting producer pressure for the imposition of trade barriers the government set up two investigations; in 1995 the Industry Commission released a research report into the effect of imports on the Australian pig industry [11], which found no link between imports and domestic prices, and in 1998 the Productivity Commission Inquiry [20] made a determination under WTO Safeguard rules that

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<sup>1</sup>See Quiggin [24] for a discussion of the efficiency aspects of micro reform in the Australian context.

imports were seriously injuring the domestic industry and a temporary tariff might be justified, although structural adjustment and industry reform were more likely to be of assistance. In both cases the Commission was presented with economic and econometric evidence [1], [9], [10], [12], [23], [22] to support the claims of either an effect or no effect of imports on the domestic industry. In both cases the econometric evidence was conflicting and the Commission had to rely on a more qualitative partial equilibrium economic analysis to reach its decisions.

The removal of trade barriers on a product which is essentially an input into the manufacturing process allows processors and retailers to bargain down the price of the domestically supplied product to the world price without facing competition themselves on the processor and retail markets, thus enabling oligopolistic rents to be earned.

For the sugar industry the single desk seller status of the Sugar Corporation, the land assignment restrictions, import barriers and the cane pricing formula have all been under scrutiny in recent years. Proponents of reform have suggested that the elimination of government regulation will enable a more flexible marketing structure to evolve.

The paper is organised as follows; In Section 2 a review of trade theory and policy under perfect and imperfect competition is undertaken. In Section 3 the policy implications of trade reform are discussed for the wheat, pigs and sugar industries. In Section 4 conclusions are drawn.

## 2. Trade theory and policy

The majority of inquiries into competition policy towards Australian rural industries have used a Heckscher-Ohlin-Samuelson model (HOS) as a benchmark for trade policy, occasionally with the addition of arguments that are not consistent with the underlying theoretical position chosen<sup>2</sup>. The HOS model of international trade has five main assumptions

1. Constant returns to scale production functions.
2. Fixed total supplies of the two factors, labour and capital which are homogenous and perfectly mobile between industries but are perfectly immobile between countries.
3. There are no market distortions that influence consumption or production decisions, such as imperfect competition or taxes.
4. Consumer preferences are identical and homogenous within and between countries.
5. Countries differ in their relative factor endowments.

The main results of the HOS model are summarised in the form of four theorems; the Heckscher-Ohlin, Factor Price Equalisation, Stolper-Samuelson and Rybczynski theorems<sup>3</sup>. The relaxation of the assumptions of the HOS model gives rise to models incorporating variable returns to scale, imperfect competition, factor market distortions and factor specificity. For example, the Specific Factors model relaxes the

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<sup>2</sup>For example it is not necessarily assumed that domestic market structures are competitive.

<sup>3</sup>These four theorems are

assumption that factors of production are perfectly mobile between industries. The main difference between the HOS model and the Specific Factors model can be viewed as a difference between the long and short run. The results of the Specific Factors model are in sharp contrast to those in the HOS model<sup>4</sup> (See [15, pp. 127-141]).

The specific factors model also predicts that there are welfare gains to trade, but suggests that if the once protected industry contracts, the value of the specific factor used in that industry and the discounted cash flow of that industry will have to be compensated by the gains to trade in order for liberalisation to be justified. As with the HOS model the benefit of trade liberalisation in the specific factors model is that the mobile resources that were used in the protected industry can now be employed more efficiently elsewhere.

The factor intensity of an industry is important in the specific factors model. If the industry uses the mobile factor intensively then trade liberalisation will be of benefit since this factor can move to a higher valued use in another industry. If the industry uses the specific factor intensively then trade liberalisation may or may not be of benefit. If the specific factor cannot move to a higher valued use in another

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**Theorem 2.1 (The Heckscher-Ohlin theorem).** *Given the assumptions of the model, a country will export the commodity that intensively uses its relatively abundant factor.*

**Theorem 2.2 (The factor price equalisation theorem).** *Under identical constant returns to scale production technologies, free trade in commodities will equalise relative factor prices through the equalisation of relative commodity prices, so long as both countries produce both goods.*

**Theorem 2.3 (The Stolper-Samuelson theorem).** *If there are constant returns to scale and if both goods continue to be produced, a relative increase in the price of a commodity will increase the real return to the factor used intensively in that industry and reduce the real return to the other factor.*

**Theorem 2.4 (The Rybczynski theorem).** *If relative commodity prices are constant and if both commodities continue to be produced, an increase in the supply of a factor will lead to an increase in the output of the commodity using that factor intensively and a decrease in the output of the other commodity.*

<sup>4</sup>The propositions of the Specific-Factors model are

**Proposition 2.5 (Commodity prices and factor prices).** *A relative price increase of a good benefits the specific factor used in that industry, reduces the real income of the other specific factor, and has an ambiguous effect on the mobile factor.*

**Proposition 2.6 (Factor endowments and factor prices).** *At constant commodity prices, any increase in the endowment of a specific factor will increase the real returns to the mobile factor and lower the real returns to both specific factors. An increase in the endowment of the mobile factor will reduce its own real income and increase the real income of both specific factors.*

**Proposition 2.7 (Trade and factor prices).** *In the specific-factors model, the equalisation of commodity prices by international trade does not equalize factor prices.*

**Proposition 2.8 (Factor endowments and outputs).** *An increase in one specific factor increases the output of the commodity that uses that factor and reduces the output of the other industry. Increases in the supply of the mobile factor will expand both outputs.*

**Proposition 2.9 (The pattern of trade).** *In the specific-factors model, each country will export the good with the absolutely abundant stock of specific capital, assuming identical endowments of labour, the mobile factor. With differences in labour endowments, trade patterns will depend on the nature of the production functions and on the allocation of capital (that is, on the stocks of specific factors).*

industry, then the value of that factor needs to be written off. Gains to trade will result if the industry is small relative to the rest of the economy, as the gains to trade will more than compensate for the loss of the industry. If the industry is large relative to the rest of the economy, then the gains to trade will not compensate for the loss of the industry. This, of course, is an empirical issue.

In the standard model the expected consequences of opening up a market to import competition depend on the relative elasticities of the demand and supply curve. Using a relatively inelastic supply curve limits the expected producer deadweight losses to be the same as the expected consumer deadweight gains. If an elastic supply curve is used the expected producer deadweight losses appear to be larger than the consumer deadweight gains. Of course the relative sizes of these are an empirical issue.

This is illustrated in Figure 2.1. Under the case of autarchy (no trade) the domestic production ( $SS'$ ) is in equilibrium with domestic demand ( $DD'$ ) at point  $f$  with price at  $P_e$  and quantity produced and consumed at  $B$ . Under trade liberalisation the price drops to  $P_w$ , the world price, with  $P_wP_w'$  being the world supply. This is depicted as being perfectly elastic (horizontal) because of the small country assumption. Domestic consumption now expands to  $C$ , as the new equilibrium is at point  $g$ . Domestic production reduces to  $A$ , with imports taking up excess demand of  $AC$ <sup>5</sup>. Consumer's deadweight welfare gain is the triangle  $hfg$  while producer's deadweight loss is the triangle  $efh$ . The relative sizes of these is an empirical question and will depend on the respective elasticities of demand and supply.

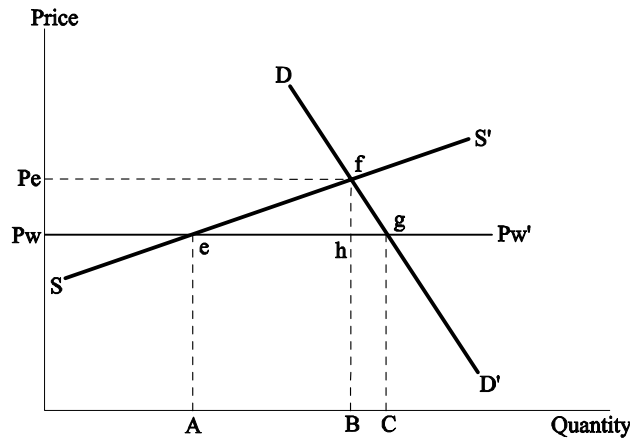


Figure 2.1: Effect of trade liberalisation on a domestic market

Even though trade may result in a contraction in the industry that was previously protected, under a general equilibrium analysis, where reallocation of resources between sectors occurs, the efficiency gains from a reduction in market distortions (barriers to trade) generally outweigh the industry-specific losses.

There are cases where this welfare gain does not happen, particularly when the assumptions underlying the analysis are violated. Two of the main assumptions underlying standard general and partial equilibrium analysis are that firstly, resources are transferred costlessly and fully between sectors based on relative wage rates and,

<sup>5</sup>This is the long-run equilibrium outcome, and the adjustment effects are not modelled here.

secondly, trade liberalisation moves from an imperfectly competitive to a perfectly competitive outcome. The violation of these can be thought of as market failures.

The theory of the second best, where government intervention which distorts incentives in a particular market may increase social welfare if it offsets the consequences of market failures elsewhere, has been used to argue the case for government intervention for example, in the form of tariffs or subsidies or structural adjustment. Under trade liberalisation it is assumed that resources allocated to the once protected industry can be reallocated to other industries when production falls due to a reduction in equilibrium price. In industries characterised by factor specificity, labour and capital (in the form of equipment and buildings) are unlikely to be allocated to other productive uses in the short to medium term. Under this type of market failure the gains to trade can be offset by the costs to the particular industry, flow-on effects to other industries and to treasury.

Under market failure the theory of the second best indicates that government intervention may increase social benefits. This raises the question as to what is the most appropriate form of that government intervention. Krugman and Obstfeld [13, pp. 227-236] argue that when dealing with market failures it is preferable to target the failure directly, rather than use indirect policy instruments. If a market failure is isolated on the domestic production side, then the appropriate instrument to use is one that targets domestic production, for example subsidies or structural adjustment. If a market failure is caused by international trade distortions, then government policy could be targeted toward those distortions by using, for example, duties (tariffs) or quotas.

It is well accepted that trade increases total welfare under most situations and that trade is a “positive sum” game in that countries gain mutually from trade. Trade is seen as being pareto-efficient compared with autarchy. Notwithstanding the gains from trade accruing to any particular country, there is also the potential for an uneven distribution of gains across individuals [25]. This distributional effect of trade gives rise to the argument for compensation of the losers in order to achieve a pareto-optimal outcome.

While there are gains from trade in most situations it is important to also realise that there are situations under which gains from trade are uncertain or in fact turn out to be losses. There are two sufficient conditions for the gains from trade theorem<sup>6</sup> to hold, the tangency and the convexity conditions<sup>7</sup>.

1. The validity of the gains from trade theorem depends on the free trade price forming a separating hyperplane to the production set and the upper contour set of the utility function (See Figure 2.2). If the price plane cuts the production frontier and any portion lies interior to the production set then there exists a feasible production bundle whose value at the free trade price exceeds the free trade production bundle value and thus the theorem does not hold. The situations where the tangency condition does not hold can generally be attributed to

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<sup>6</sup>The Gains from Trade Theorem is

**Theorem 2.10 (The Gains-From-Trade theorem).** *Suppose that the value of production is maximised at free trade prices. Then the value of free trade consumption at free trade prices exceeds the value of autarky consumption at free trade prices. The free trade consumption bundle must thus be preferred to the autarky bundle, because if it were not, consumers would pick the cheaper autarky bundle.*[15, p. 65]

<sup>7</sup>(See Markusen and Melvin [16])

where marginal-cost pricing is not a characteristic of the good being produced; prices will exceed marginal costs for homogenous or differentiated goods produced with external or internal economies of scale. Further, in any case where either producer prices or consumer prices differ from the free trade price (due to domestic distortions or marketing margins) the gains from trade theorem cannot be proven.

2. With increasing returns to scale technology the production set may be non-convex and in the presence of variable returns to scale the gains from trade may be quite large, or may in fact be negative, depending on what the conditions are at the point of interest.

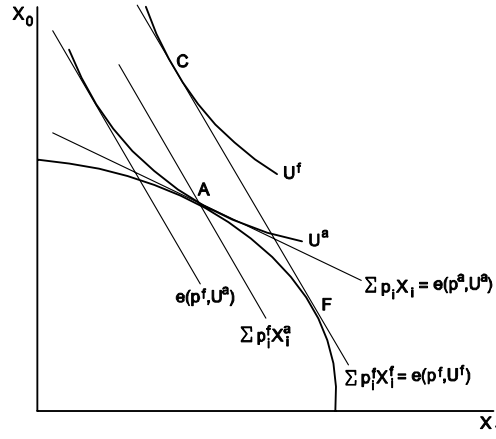


Figure 2.2: Separating hyperplane in the Gains From Trade Theorem (Source: [16, p. 12])

The argument that trade may actually decrease welfare in the presence of domestic distortions<sup>8</sup>, such as imperfect competition, is succinctly put by Markusen, et al [15, pp. 156-157].

1. If an economy with an existing distortion is opened to trade, the resulting trade might not improve welfare. The possibility of welfare-reducing trade occurs when the distortion is made “worse” by the introduction of trade. For example, if the economy initially has a production tax on Y, then the economy is under-producing Y in autarchy. If trade leads to a further reduction in the production of Y, then trade may reduce welfare. A sufficient but not necessary conditions for gains from trade is that trade lead to an increase in the production (consumption) of a good that is initially being underproduced (underconsumed).
2. The preceding point is an example of the theory of the second best. If one distortion (barriers to trade) is removed when other distortions exist (domestic

<sup>8</sup>See [18] and [8] for a discussion on The Theory of Domestic Distortions.



taxes and subsidies), then welfare may fall. Note that this is not an argument against free trade; it is better interpreted as an argument against domestic distortions.

Of course, the above arguments refer to the case of a consumption or production tax. We can generalise this argument to any domestic market distortion that lowers production below the production possibility frontier or limits the consumption bundle. The key is in the non-equivalence of consumption and production prices. If trade reduces the price of the good produced without a concomitant reduction in the price of the good consumed, then production of the good may fall and this leads to a decline in domestic welfare - as measured by consumer surplus. The reason for this is that the gains from trade are captured by both the importers and by the interest group benefiting from the domestic market distortion. In a general equilibrium setting there will be multiplier effects to the rest of the economy flowing from the domestic gainers from trade but this will be less than that obtainable from an economy without those domestic market distortions.

The government maintains that economy-wide trade liberalisation will bring long-term benefits to the economy which will more than offset the declining fortunes of the agricultural sector. Simulations with ORANI, MONASH, and GTAP - static and dynamic economy-wide, and global economy models respectively - certainly support this viewpoint. However, it should be pointed out that these models assume a perfectly competitive microeconomic structure. It follows that in any simulations moving from a regulated to a totally deregulated economy the perfectly competitive structure will always be preferable to the regulated case. It is a well known result<sup>9</sup> that under situations of imperfect competition there are gains to be made through strategic trade. Under any situation where the economy is moving from one market structure to another, which may not necessarily be more competitive, welfare as a whole might not increase, at least in the short-run.

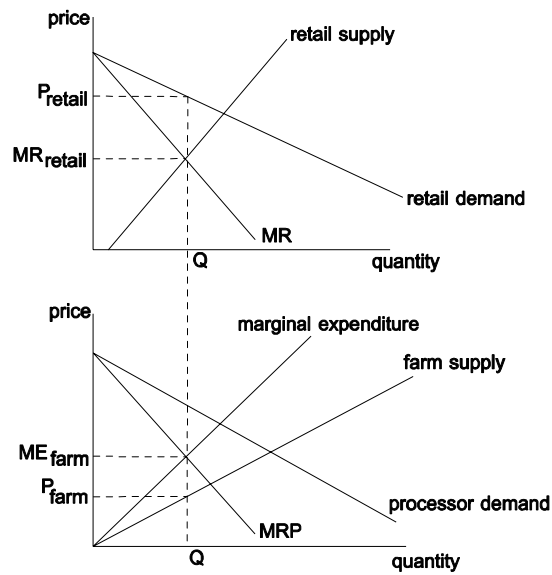
Norman and Goddard [19] provide an extensive literature review of studies examining the welfare implications of supply management. Most conventional studies assess the benefit/cost of trade restrictions compared with the alternative scenario of perfect competition. In situations where there exists imperfectly competitive institutional structures in an industry, for example middlemen with monopoly/monopsony or oligopoly/oligopsony powers, it is shown that countervailing powers actually increase both producer and consumer welfare.

In the situation where producers are assumed to be perfectly competitive but there exists market power by processors a monopoly/monopsony situation occurs (Figure 2.3(a))[19, p. 18]. Since processors are monopolistic they sell where marginal revenue (MR) equates with retail supply. Consumers are faced with a retail price ( $P_{retail}$ ) which is above the perfectly competitive retail price. Processors demand quantity  $Q$  which transforms the farm level demand into a marginal revenue product ( $MRP$ ) curve. Farm level equilibrium is where marginal revenue product equates with marginal expenditure.

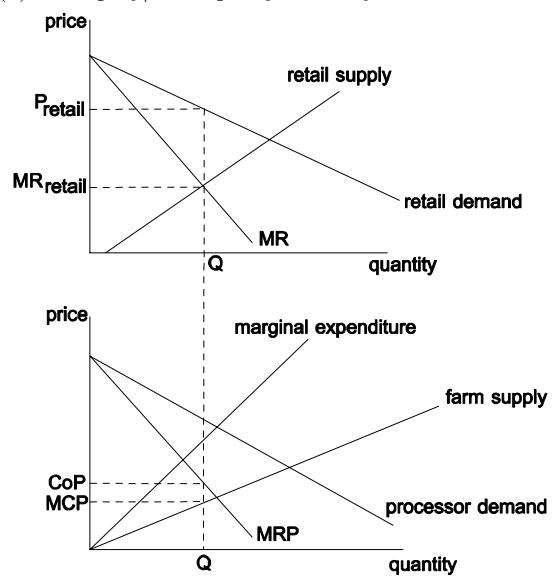
This can be compared with the situation where producers can undertake supply management (Figure 2.3(b))[19, p. 19]. Under regulation, where the price paid by processors is exogenously set at  $CoP$  (Cost of Production), the quantity produced is  $Q$ , where the price paid by processors crosses the effective demand curve ( $MRP$ ).

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<sup>9</sup>See [13] or [3] for textbook examples.



(a) Monopoly/Monopsony industry



(b) Industry with supply management

Figure 2.3: Supply/Demand graph of a Monopoly/Monopsony industry

The quantity produced is still below the competitive equilibrium but the producer price is higher and the consumer price is lower than under deregulation.

The results suggest that if deregulation and trade liberalisation do not remove market power held by middlemen then the presumed beneficiaries of reform, consumers, will lose to the benefit of middlemen.

### 3. Policy implications of industry reform

For any particular institutional structure there exists a pareto-optimal outcome in which global welfare is maximised. Bruno [6] shows that when an industry undergoes reform, moving from one market equilibrium to another, there exists a pareto-optimal outcome for each market equilibrium which can be pareto-ranked. Since the goal of policy formulation is to maximise global welfare there exists a reform outcome which is preferred to all other reform possibilities.

In the presence of domestic distortions such as imperfect competition, variable returns to scale and factor market distortions there is a set of reform outcomes which, by eliminating those domestic distortions, are preferred to reforms which only address external distortions.

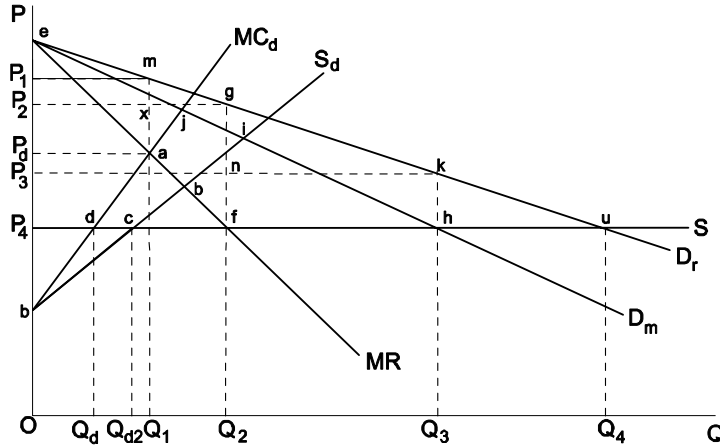


Figure 3.1: Policy reform in the presence of domestic distortions

We can view welfare changes in a partial equilibrium framework, shown in Figure 3.1, moving from autarchy to free trade under various assumptions about domestic distortions. Assuming the initial market equilibrium is at point  $a$ , where the domestic middlemen exert monopolistic and monopolistic market power, the initial welfare allocations are as follows; consumer rent is the area  $P_1em$  producer rent is the area  $bP_da$  and middlemen rent is the area  $P_dP_1xa$ . With free trade, the market equilibrium moves to point  $f$ , the intersection of marginal revenue and the world supply curve. Consumer rent is now the area  $P_2eg$ , a deadweight gain of the area  $xmg$ . Producer rent falls to the area  $bP_4d$ , a loss of  $P_4P_dad$  which is transferred to middlemen. Middlemen rent increases to  $P_2gfp_4$  with the transfer in rent  $P_2P_1mx$  from producers to consumers more than offset by the transfer in rent from producers to middlemen. By expanding imports to  $Q_2 - Q_d$ , with the corresponding reduction in domestic

supply of  $Q_1 - Q_d$ , middlemen gain the area  $daxgf$ . There is a net gain from trade accruing to both consumers and middlemen, at the expense of domestic producers, with most of the gain from trade accruing to middlemen.

The removal of the middlemen's monopoly power on the domestic retail market moves the market equilibrium to point  $h$ . Consumers' rent increases to the area  $P_3ek$  which includes a deadweight gain of the area  $ngk$ . Domestic producers' welfare does not change as the monopsony power of the middlemen is not affected. The removal of middlemen's monopsony power under free trade will change the domestic market equilibrium for producers from point  $d$  to point  $c$ , resulting in an increase in producer rent by the area  $bdc$ , at the expense of imports which are crowded out by the quantity  $Q_{d2} - Q_{d1}$ . The removal of monopsony power does not change the welfare outcomes for middlemen or consumers.

In moving from autarchy to trade liberalisation there is a question as to what the appropriate sequence of reform steps should be. These transitions can be represented in the form of directed graphs (digraphs) where each vertex of the graph represents a different market equilibrium (Figure 3.2).

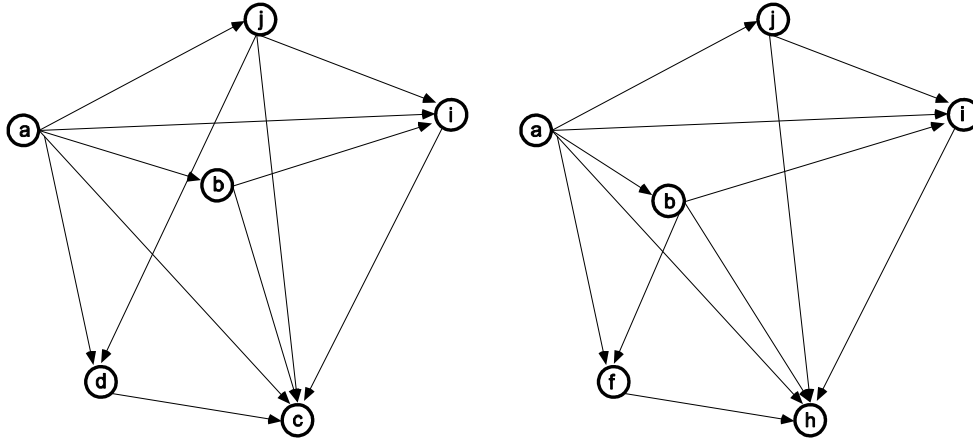


Figure 3.2: Policy reform options

The sequencing of reform steps to the final outcome of trade reform will provide benefits to either producers, consumers, or middlemen depending on the path taken through the graph. The exact amounts of the gains or losses to each of these is an empirical question and the desirability of a particular outcome will depend on the initial endowment of each interest group prior to reform and the change in rent associated with each "edge" of the graph<sup>10</sup>. These reform steps can be analysed for the three cases of the wheat industry, the pig industry, and the sugar industry.

### 3.1. Reform in the wheat industry

In 1993 the Hilmer National Competition Policy report was handed down which recommended that anti-competitive behaviour be limited and public monopolies be re-

<sup>10</sup>The use of digraphs opens up interesting extensions to the analysis, allowing the modelling of the impact of a staged reform process and the derivation of an optimal sequence of reform using weighted digraphs in a mathematical programming setting.

formed. In terms of the wheat industry, this meant that the single desk seller status of the board and its trading on the domestic retail market were going to be under review. In response to pressure from the government and growers the Grains Council of Australia and the AWB embarked on a process of consultation and review of efficiency and competition in the industry. In 1995 the industry commissioned a report into the board's single desk seller status and the viability of growers and traders in the industry. The main conclusions of the Booz, Allen and Hamilton consultant's report were that although the single desk seller status should be retained in the short to medium term as benefits to growers were in the order of \$3/mt, with continued liberalisation of international agricultural trade, elimination of single desk seller status appears to be inevitable. The high administration costs of the board relative to similar sized international grain traders meant that in a fully deregulated market, with the board competing directly against traders, the board would not survive unless it owns or has a stake in handling and storage facilities. The report recommended that, in order to meet the challenges of the future, the AWB needed to corporatise with growers being principle shareholders. In conjunction with corporatisation the board needed capital assets and it was fundamental that Wheat Industry Fund (WIF) be continued to be collected to build up capital base [27].

The Grains 2000 Strategic Planning process in 1995 identified several options for continued reform of the wheat industry [28]:

- Option 1 **Reregulation:** A return to compulsory acquisition of the harvest by the board.
- Option 2 **Deregulation:** Full deregulation with the elimination of the board's single desk seller status.
- Option 3 **Do nothing:** Keep the current, transition period, institutional structure of the industry where the board's single desk seller status was under constant review with government control of decision making.
- Option 4 **Single desk corporatisation:** Retention of the single desk seller status in a government owned, grower represented, commercially orientated corporation.
- Option 5 **Single desk privatisation:** Retention of the single desk seller status in a private company with growers as majority shareholders with the Wheat Industry Fund equity used as its capital base.

In order to analyse the policy implications of deregulation of the wheat industry Purcell and Beard [21] developed a theoretical general equilibrium model of the partial deregulation of the Australian wheat industry. They considered the situation in which the Australian wheat industry were to deregulate but the board was still active as a single desk seller in the international market (Option 4). In their modelling framework the board faced competition from middlemen who were assumed to play a Bertrand game against the board on the domestic market (See Figure 3.3).

The model utilized Bertrand competition to model imperfect competition and product differentiation in an explicit manner. In addition, it incorporated the role of international grain traders and transactions costs in the domestic market after the Hilmer competition reforms. The results suggested that the domestic institutional structure of the model, where middlemen do not have the necessary information to make correct decisions, leads to a situation where the middlemen can be forced from the domestic market. In a general equilibrium although grain traders theoretically

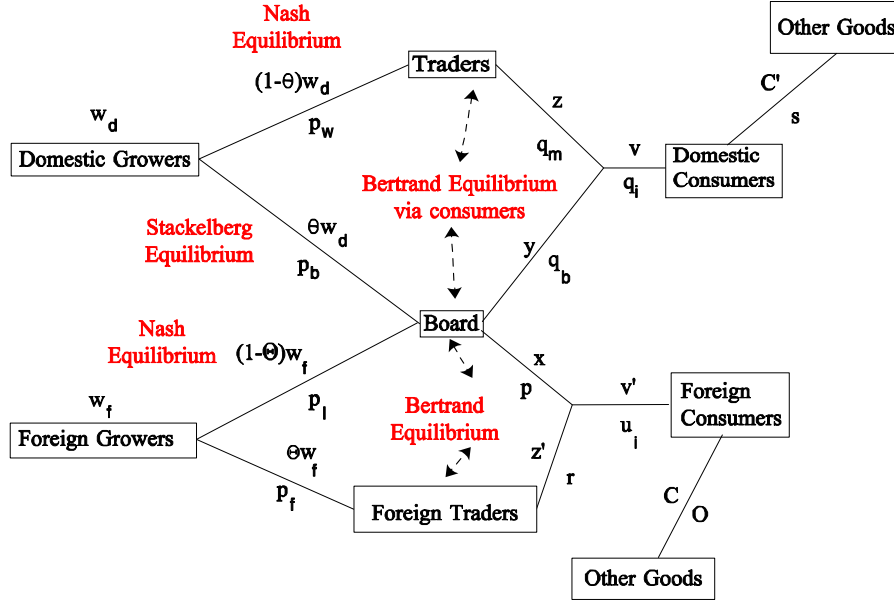


Figure 3.3: Institutional structure of the Australian wheat industry under deregulation

exist on the domestic market they make a loss. This may mean that they are forced from the domestic market or are subsidised by operations on the international market. The institutional structure was modelled in this way as middlemen are seen as new entrants to the market competing against an existing firm, the board. It was assumed that the board possessed detailed market knowledge and was thus in a better position to exercise market power. Interestingly, commentaries on the Booz Allen and Hamilton Consultant's report indicate that

"... traders have moved out of milling wheat in response to what they see as unfair trading and market manipulation.

[The report] reveals trader concerns that the AWB shares information between its trading division and its pool operations - something the AWB vigorously denies.

Also of concern was a perception that commercially sensitive information was shared between the AWB and the bulk handling authorities and that the trade had unequal access to stock swaps.

As a result of traders' reluctance to participate fully in the market, growers had not yet reaped the full benefits of domestic deregulation".[27]

The model shows that it's not necessary for the board to actively use its market power in order to induce middlemen to leave the market, as the institutional structure of the market itself leads to this position naturally. In order to remain as a player in the domestic market the middlemen have to take grower responses to a change in price into their objective function.

The simulations showed that institutional change alone does not lead to a new equilibrium and that structural change is also needed. After deregulation private grain traders capture factor market share in the domestic market and the middlemen's domestic factor price in equilibrium is below the board's pool price. Growers are worse off as the share of their production obtaining the higher pool price declines and more of their revenue is obtained at the lower middlemen's domestic factor price. As the economy progresses through time, at any particular market share, growers are better off under deregulation than under regulation as the pool price is higher. This, of course, is contingent on the particular benchmark year chosen and the relative domestic and international retail prices. If the domestic price is higher than the international price then deregulation will cause a drop in the pool price and a resulting decline in board-derived revenue for the grower. The reverse is true if the domestic price is lower than the international price.

### 3.2. Reform in the pig industry

One of the problems with the standard Heckscher-Ohlin-Samuelson (HOS) model of international trade is that it assumes factor mobility across sectors and a perfectly competitive outcome under trade liberalisation. However, the pig industry is not only characterised by capital specificity (e.g. buildings and plant designed solely for pig production) but also has a unique situation where labour is less mobile, since labour also owns the capital. Under the assumption of perfect competition, the HOS model lends itself naturally to the conclusion that liberalisation is preferable to any type of imperfect competition. If, however, the institutional framework of the industry is such that there is a marketing chain, which is imperfectly competitive at each stage, then reform of one particular point on the marketing chain without reference to the others will result in a situation where the reform may actually increase imperfect competition of the industry as a whole rather than reduce it. In such a situation it is conceivable that any welfare gains due to trade predicted by the HOS model will in fact be welfare losses due to trade. Even if reform was carried out on the whole marketing chain it does not necessarily follow that the industry will move from a situation from imperfect competition to perfect competition (with resultant welfare gains as predicted by the HOS model). Perfect competition is an economic concept rather than a reality and industry reform will, at best, reduce the level of market power of the players but not eliminate it. In such a situation it is desirable that analysis be carried out to determine the actual welfare gains (losses) captured by the economy. If reform of an industry leads to an oligopolistic outcome due to economies of scale and scope, for instance, the question needs to be asked whether government intervention is needed to counteract the market imperfections.

In terms of the pig industry, consumers do not seem to be benefitting from trade reform while producers are seeing both prices and production (and therefore revenue) decline. As shown in Figure 3.4 the benefits of trade reform seem to be captured by the increased marketing margin.

This is not to say that middlemen do not perform a necessary processing and distribution function in the marketplace, nor that the width of the marketing margin is not justified. The question is rather one of whether the exertion of monopoly/monopsony power<sup>11</sup> leads to a situation where the gains from trade are captured by one inter-

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<sup>11</sup>In this scenario it is assumed that the oligopolistic/oligopsonistic middlemen actually play a collusive metagame, which restricts the equilibrium outcome to that of a single monopolist/monopsonist.

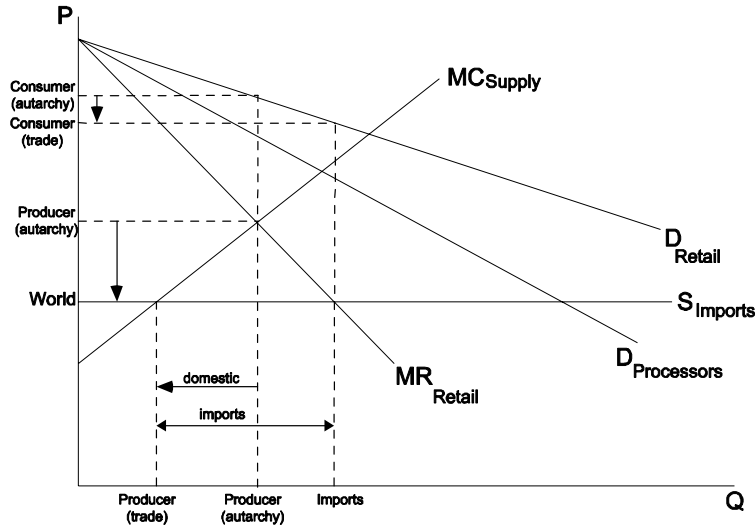


Figure 3.4: Trade liberalisation under monopoly and monopsony power

est group rather than spread throughout the economy. Under trade liberalisation the equilibrium for producers moves from the intersection of marginal revenue and marginal cost to where the marginal cost and world supply line intersect as producer prices drop to the world price. There is a corresponding reduction in domestic production with imports taking up the gap between domestic production and the new quantity demanded by the middlemen, where their marginal revenue curve cuts the world supply line. While there is a consumer deadweight gain most of the producer rent lost is absorbed by middlemen's profit.

Irrespective of the exertion of market power by middlemen on the producer and retail side of the markets the entry of imports into the domestic market has the effect of lowering producer prices as middlemen now have a greater choice in purchasing. The equilibrium outcome of a simple Bertrand game with capacity constraints played between importers and producers at the industry level suggests that importing middlemen would be able to bargain down domestic prices to the same price as the imported product. Under Bertrand competition [17, pp. 387-389], since the processor is indifferent between supplier for a particular quality of pigmeat at a particular price, if the price offered by the domestic producer is lower than that of the foreign producer the domestic producer will capture all of the market and the foreign producer will sell no pigmeat. If the prices are equivalent to each other, then the foreign producer and the domestic producer will each supply half of the pigmeat to the market<sup>12</sup>.

This simple game predicts that prices will fall to an equilibrium position equal to

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The stylised facts of the industry suggest that resale price maintenance is an indication of such a collusive metagame being played. Note also that we view collusion in its economic sense, not legal sense.

<sup>12</sup>This can be readily extended to the case where suppliers are under a capacity constraint. In the case where the lower cost supplier is under a capacity constraint that supplier will sell all of their product and leave the residual market to the higher cost supplier. In the case where the lower cost supplier is not under a capacity constraint there is the potential for that supplier to capture all of the market.



that of the lowest price offered. In a competitive market this means that prices will be set to equal cost of production. In a situation of cross subsidisation due to the jointness of production of higher price pork bellies and lower priced hinds, prices may, in fact, fall to the marginal cost minimum of the imported product.

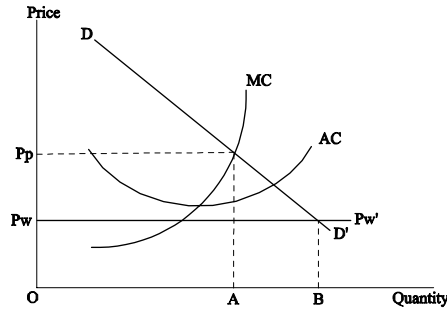


Figure 3.5: Long-run marginal and average cost curves

A partial equilibrium analysis (Figure 3.5) shows that if a domestic firm is supplying where the marginal cost curve ( $MC$ ) cuts the demand curve ( $DD$ ) at price  $P_p$  and quantity  $A$  and the firm is exposed to the world price,  $P_w$ , then quantity demanded of that firm's product will increase to quantity  $B$ . However, since the world price is below the domestic firms' breakeven point, the intersection of the marginal cost and average cost curve ( $AC$ ), the domestic producer will find it unprofitable to remain in the industry and all of the firm's share of consumption will be supplied by the imported commodity.

The Productivity Commission, while agreeing that prices will equate at world price levels, rejected the argument that middlemen will retain monopsonistic market power under free trade and that monopoly power was a relevant factor to take into consideration:

It has been suggested that the availability of imports has given manufacturers and retailers market power because they can force domestic producers to reduce their price to the import price. As noted, this would happen anyway (and, moreover, immediately) in a perfectly competitive market. Indeed, if downstream manufacturers had exerted monopsony power over pig producers before import restrictions were lifted, the availability of imports at a given price, would effectively remove this monopsony power. If processors cannot affect the world price of pigmeat it makes no sense for them to attempt to reduce that price by restricting their purchases.

In addition, whatever power retailers might have in consumer markets, this is irrelevant to the quantity of local legs purchased. This amount will be determined by the competitiveness of local legs *vis-à-vis* imports.[20, p. 53]

The Commission appeared to take the line that the domestic product market equilibrium would be the free trade price at point  $c$  (rather than point  $d$ ) and that it

was irrelevant whether the total supply equilibrium was at point  $f$  or  $h$  (Figure 3.6). While it is true that it is irrelevant to the domestic producer whether total supply is at point  $f$  or  $h$ , it is not true that this issue can be ignored, as the implications for consumer welfare and pareto-efficiency are substantial.

The Commission's argument that trade liberalisation would immediately change the middlemen's game strategy from a monopsonist to a price taker appears to be under the assumption of an immediate alignment of domestic producer and world prices, even as the Commission acknowledges that it takes time for markets to develop [20, p. 52]. The switch in game strategy from monopsonist to price taker will only occur when domestic producer prices and world prices are equalised, and only under the assumption that middlemen are indifferent to source of supplier and thus have no incentive to exert market power. Since the initial market structure is monopsonistic there has to be an incentive for middlemen to switch behaviour in order to give up their monopsonistic market power. It follows that since in equilibrium they are indifferent to supplier there is no incentive to switch.

The Commission's view of middlemen indifference to source of supply under trade reform appears to be under the assumption that the smoothness requirement for cost and production function is relaxed. Under this situation there is a discontinuity when the market equilibrium moves from the marginal cost curve to the supply curve. Production and cost functions characterised by such discontinuities are not neo-classical.

If the Bertrand game under capacity constraints is viewed as a repeated game with a time path tracing out the movement in the equilibria, then at each and every domestic producer price level above world prices middlemen must exert market power in order to induce producers to lower their price. It follows that price equalisation is a boundary condition and at every point on either side of the boundary condition middlemen must exert market power. It is therefore unlikely that given the transaction costs involved in switching agent type (from monopsonist to price taker) there is any incentive for middlemen to become price takers for a boundary condition.

We therefore contend that under standard assumptions middlemen monopsony and monopoly power is unchanged with trade liberalisation occurring at the producer level of the industry.

The ability of middlemen to exert market power and thereby distort the market equilibrium away from the pareto-ranked optimal outcome <sup>13</sup> brings into question whether government intervention to correct the market distortion is justified, and what policy reform instrument should be used. The implications for market participants' (producer, processor/retailer, consumer, importer) welfare under the various reform scenarios can be analysed in a partial equilibrium framework. In Figure 3.6 supply, demand, marginal revenue and marginal cost curves are plotted.

Under autarchy it is assumed that middlemen exert both monopsonistic and monopolistic market power, resulting in the market equilibrium occurring where marginal revenue  $MR$  and marginal cost  $MC_d$  intersect at point  $a$ . Prior to the removal of trade barriers there are several policy options that are available to remove middlemen market power. The removal of monopsonistic market power results in the market equilibrium lying on the domestic supply curve,  $S_d$ , at either points  $i$  or  $b$ . If monopolistic power is retained then the market equilibrium lies on the middlemen's marginal revenue curve, resulting in the equilibrium occurring at point  $b$ . If, however, the middlemen's monopolistic power is removed then middlemen must price along their middlemen demand curve, and thus the equilibrium is at point  $i$ . If monopoly

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<sup>13</sup>See [6] for a discussion on pareto ranking of reform equilibria.

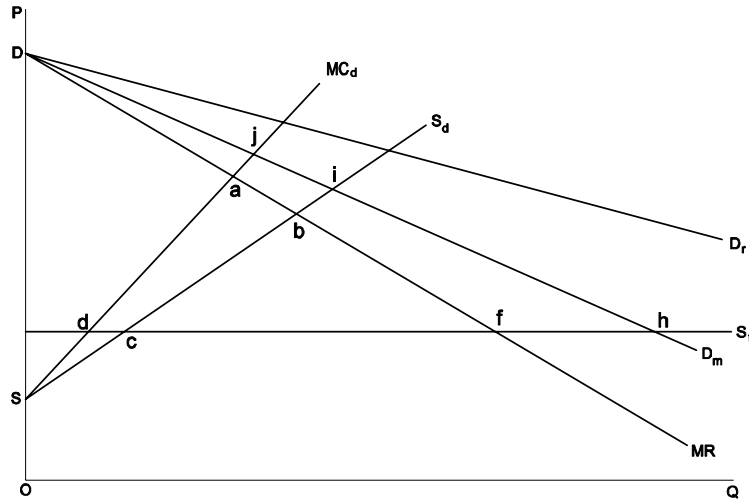


Figure 3.6: Market reform equilibria for the Australian pig industry

power is removed without the concomitant removal of monopsony power the resultant equilibrium will be at point  $j$ .

With the removal of barriers to trade the producer price falls to the world price as producers and importers play a Bertrand game. The exertion of monopoly power by middlemen under trade has no effect on producer outcomes, as monopoly power determines what the total quantity purchased is, rather than the allocation of purchases between imports and domestic production. That is, under monopoly power total purchases will occur at equilibrium point  $f$  whereas if middlemen do not exert market power total purchases will be at point  $h$ . Monopoly power has implications for consumer deadweight losses but not for producer welfare.

The removal of trade barriers has implications for producers, not only in the equalisation of producer and world prices. Under monopsony power producer welfare is actually lower, with the equilibrium occurring at point  $d$ . If monopsony power was removed the equilibrium would occur at point  $c$ , a domestic pareto improvement from point  $d$ .

Each of these policy options may be represented as a vertex in a directed graph (Figure 3.7) with the edge of each graph representing a different policy reform. It is assumed that once a particular policy measure has been implemented that no retrograde steps are undertaken, that is, policy is consistent. This assumption is however not essential.

The pig industry has moved from a situation of autarchy, equilibrium point  $a$ , to one of free trade. Since the relaxation of the import protocols has not impacted on the processor/retailer level of the marketing chain it is assumed that the middlemen retain the market power that they had prior to free trade. Domestic producer equilibrium is at point  $d$ , which represents what might be termed a policy equilibria or trap as it is clearly associated with a lower total economic rent than equilibrium point  $c$ . The policy options for consumers under free trade are restricted to a move from point  $a$  to point  $f$ . Again this can be termed as a policy equilibria for the domestic consumer and is clearly associated with a lower total economic rent than equilibrium point  $h$ .

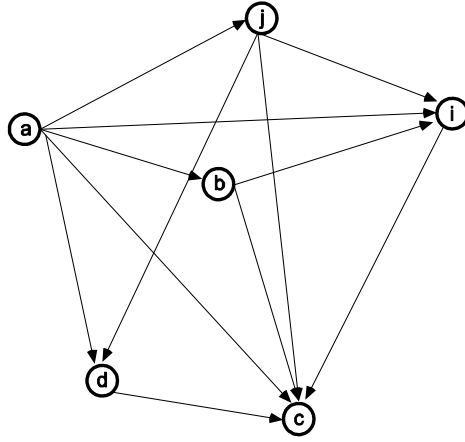


Figure 3.7: Policy options in reforming the Australian pig industry

### 3.3. Reform in the sugar industry

In 1996, there was an extensive enquiry into the Queensland sugar industry. An issues paper prepared for the Sugar Industry Review Working Party[26] by the Boston Consulting Group [5] raised some concern within the industry because it proposed deregulation. The assignment system, single desk selling and the pricing formula for payments to growers were to be reviewed.

In the regulated sugar industry millers must process all cane that growers produce from assigned land and pay for it at the price determined by the formula. In a fully deregulated sugar industry, growers would receive the market price.

One of the major constraints faced by the sugar industry has been the assignment system through which growers are licensed to grow cane on “assigned” land [14]. Originally only 75% of the total assigned area was permitted to be harvested each year. Thus faced with a limited crop cycle of plant and two ratoon crops, 25% of canegrowing land was forced into fallow each year. This unutilised resource led to reduced farm profits. Over the years the limit on harvesting more than 75% of the assigned area has been relaxed, first to 85%, and then removed entirely. More recently up to 100% of the assigned area could theoretically be harvested in any year. Even with no limit, growers still harvest less than 100% of their total area because of the need to fallow some land each year prior to replanting. Growers with sufficient land may fallow while still harvesting 100% of their assignment each year. Growers who have restricted land resources are usually forced to plough out and replant in order to maintain their harvest area as a high proportion of the assigned area.

This is only likely in a few areas in the Queensland sugar industry. The most frequent situation in the event of industry deregulation is likely to be monopsony, and, under these circumstances, millers will gain and growers will lose a share of industry profits. Growers therefore have some justification in being concerned about the possible effects of deregulation on their welfare.

In a recent paper by Beard and Wegener [4] a computational model is applied to a comparative analysis of pricing and profitability across likely alternative industry

structures that may arise in the wake of reform in the sugar industry and implementation of proposals suggested by the sugar industry review working party and in some of the submissions to it. The model presented was a simple static optimization model of the trade in sugarcane in a local mill area. Numerical results were presented to compare prices and profitability for both a representative mill and growers in a monopsony situation, a contestable market, and under the current institutional arrangement.

The results of the model suggested that the main effects of the dismantling of the land assignment system that has occurred progressively in the sugar industry over the past 15-20 years have been beneficial to both growers and the mill.

The results indicated that although deregulation has the potential to lead to improved welfare for both growers and the mills, this will only be the case if mills price competitively, i.e. in the contestable market case where the threat of competition from neighbouring and competing mills is sufficient to force the incumbent mill to pay for cane at a competitive price to prevent the entry of potential competitors.

The implications for market participants' (producer, miller, consumer, importer) welfare under the various reform scenarios can be analysed in a partial equilibrium framework. In Figure 3.8 supply, demand, marginal revenue and marginal cost curves are plotted.  $Q$  refers to the quantity of CCS (not of sugarcane), thus growers face a downward sloping mill demand curve  $D_m$  and the mills face a downward sloping retail demand curve  $D_r$ . The cane pricing formula eliminates the ability of the mills to exert market power in the market for cane, resulting in the mills facing the grower supply curve,  $S_d$ , rather than the marginal cost curve,  $MC_d$ . The mills cannot determine the sugar content of cane and the extent to which it is controllable at all is determined by growers. Market relations may be summarised by the idea that mills buy cane but growers sell sugar. The presence of a pool pricing formula on the retail market eliminates the ability of the mills to exert market power in the market for sugar and thus market equilibrium lies on the mill demand curve rather than their marginal cost curve,  $MR$ . Thus the initial position of the industry in which the cane pricing formula is used, a pool price is used in the market for processed sugar and land assignment restrictions are in place is to be found at the intersection of  $S_d$  and  $D_m$ , that is, point  $i$ .

Several scenarios for reform can be postulated; different combinations of removing the cane pricing formula, the pool pricing formula, the land assignment restrictions, and the import tariff will all lead to different market equilibria and consequent changes in market participants' welfare.

In the absence of market contestability the removal of the cane pricing formula would allow the mills to exert monopsonistic power and move the equilibrium to point  $j$ . This position is protected by the spatial dispersal of cane growing areas and the relatively small number of mills. Conversely, freeing up land assignment but retaining the cane pricing formula would place the industry at point  $\Omega$ . If this was then followed by the removal of the cane pricing formula, allowing mills to exert monopsony power, the new equilibrium would be  $\omega$ .

The removal of the pool price for sugar would enable the mills to exert monopoly power and move the industry onto the marginal revenue curve. Depending on the combinations of other reforms the resulting equilibria will have different welfare effects. From the initial equilibrium at point  $i$  the removal of the pool price for sugar but the retention of the cane pricing formula will result in the new market equilibrium being at point  $b$ . A simultaneous elimination of both the cane pricing formula and the pool

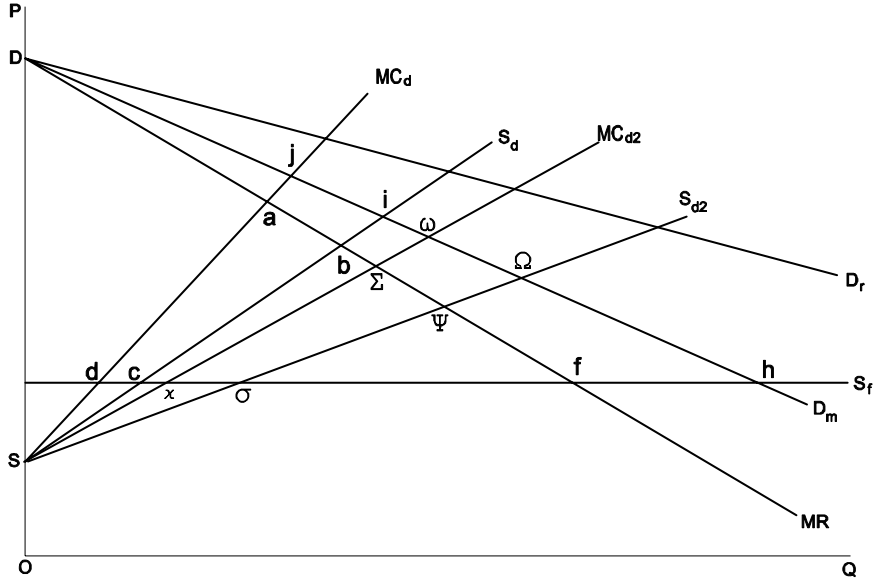


Figure 3.8: Market reform equilibria in the Australian sugar industry

price for sugar will allow mills to exert pure monopoly power, both monopsony and monopoly power, and result in the market equilibrium moving from point  $i$  to point  $a$ . Other scenarios include the removal of the pool price and the freeing up of land assignment (resulting in equilibrium point  $\Psi$ ) and the removal of the cane pricing formula and the freeing up of land assignment (resulting in equilibrium  $\Sigma$ ).

The points  $d$ ,  $c$ ,  $x$  and  $\sigma$  are the domestic supply equilibria that would occur under free trade, that is, dismantling the sugar tariff. The policy options under this scenario include the simultaneous or sequential dismantling of the tariff and the cane pricing formula, resulting in equilibrium point  $d$ , dismantling the tariff alone, resulting in equilibrium point  $c$ , dismantling the tariff and freeing up land assignment, resulting in equilibrium point  $\sigma$  and finally a policy combination of no tariff, no land assignment and no cane pricing formula, resulting in equilibrium point  $x$ . The points  $f$  and  $h$  are equilibria corresponding to total quantities demanded under free-trade and reform of the pool pricing system, with  $f$  representing the removal of the pool price and a move to a less competitive sugar market.

Each of these policy options may be represented as a vertex in a directed graph (Figure 3.9) with the edge of each graph representing a different policy reform. It is assumed that once a particular policy measure has been implemented that no retrograde steps are undertaken, that is, policy is consistent. This assumption is, however, not essential. The industry has in recent times moved from  $i$  to  $\sigma$  by way of  $\Omega$  (or directly depending on ones' interpretation of time lags). From the equilibrium point  $\sigma$  the only other policy option is to move to  $x$ , which would involve scrapping the cane pricing formula. If the market were contestable the industry might stay at, or close to  $\sigma$  but the geography of the industry would appear to make this unlikely. The equilibrium point  $x$  represents what might be termed a policy equilibria or trap as it is clearly associated with a lower total economic rent than  $\sigma$ .

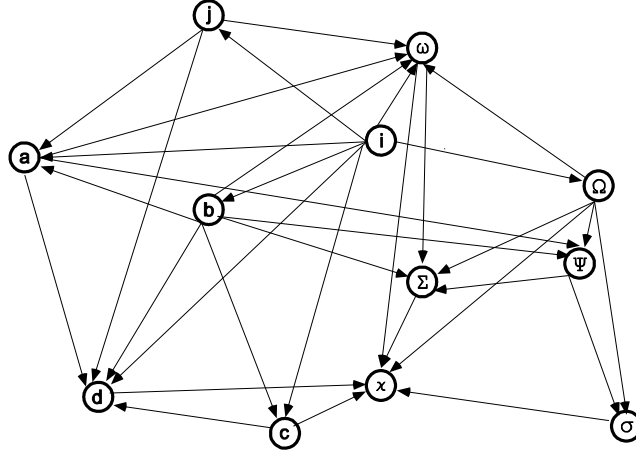


Figure 3.9: Policy options in reforming the Australian sugar industry

#### 4. Conclusions

In summary, ignoring industry structure in formulating trade and competition policy often necessitates modifying standard models in ways not consistent with the underlying assumptions, if one continues to adhere to beliefs about welfare properties that have their genesis in idealised textbook models. If models do not correctly predict equilibria then they should, regardless of their welfare properties, be rejected in favour of models that do correctly predict equilibria.

It appears that trade and competition policy has too often been formulated on the basis of professional beliefs rather than professional analysis. The industry studies that we have summarised in this paper all incorporate institutional features into their analysis and make use of analytical tools drawn from industrial organisation theory. All these studies have otherwise drawn on a variety of methodological approaches, econometric, general and partial equilibrium computational models and geometric analysis. Despite the diversity of analytical techniques, the conclusions drawn appear to be driven by the institutional structures of the markets analysed rather than a result of the modelling framework used. Further, these conclusions appear to be remarkably consistent, suggesting that it is important to analyse the path of reforms as opposed to formulating policy to achieve an end policy result. We have presented a simple graphical method of analysis that facilitates this, in the form of directed graphs. As a tool for simple policy analysis in conjunction with standard supply and demand diagrams we hope that this may assist those interested in carrying out a more detailed and differentiated analysis of reform paths. Finally, it should be mentioned that in order to incorporate institutional factors into policy analysis it is not necessary that one becomes an institutional economist. A neoclassical framework is generally flexible enough to incorporate most of the important institutional details that one might feel the need to include. the important thing is to logically argue from a consistent set of assumptions.

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