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THE SOCIAL COST ON PRODUCTION CONTROL IN THE AUSTRALIAN EGG INDUSTRY*

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Partial equilibrium analysis is used to estimate the social costs of production control in the Australian egg industry. These costs are compared with the estimates of the social cost of the home consumption price scheme which has operated in the past. The comparison is made for various supply and demand conditions and for alternative pricing and quota policies. The method used is to model historical supply and demand relationships for the years 1965–6 to 1972–3. Actual price and quantity data for these years is then used to estimate the social cost of home consumption pricing as it operated in that period. Simulated production controls are imposed on the model and the resulting social costs and benefits are estimated.

1 INTRODUCTION

1.1 GENERAL

The egg industry in Australia has long been subject to the control of Marketing Boards with extensive marketing powers in both the domestic and export markets. In the past the strategy of these Boards has been to operate a home consumption price scheme facilitated by an embargo on egg imports. Pricing in the domestic market has been based in part on costs of production, seasonal factors, and the quantity of eggs exported. An equalized return based on a weighted average of domestic and export returns was paid to the producer.[1] A trend of increasing exportable surplus and declining export prices has occurred since the mid-1960's and this has significantly reduced equalized returns. Between 1965–6 and 1971–2 the percentage of recorded Australian production disposed of overseas increased from 12·9 per cent to 27 per cent.

A major contributing factor leading to the problem of overproduction is associated with the equalized price paid to producers. The marginal return to the producer (the equalized return) is greater than the true marginal value of production (the export return). Thus if producers produce where their marginal cost equals their marginal return there will be overproduction in the industry.

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[1] For further details of the structure of the industry and the home consumption price scheme *see* [5, 6, 7, and 8].

1.2 PRODUCTION CONTROL

Faced with shrinking export returns and continued increases in production, the industry as a whole finally accepted the need for production control. Transferable marketing quotas, coupled with a two-price scheme for domestic and overseas sales would have been the most efficient method of controlling production, however such a scheme is impractical for the Australian egg industry. The potential for selling overquota eggs on a black market or interstate would have undermined such a scheme. Instead, a quota on hen numbers was accepted as being more practical. At a meeting of the Australian Agricultural Council in August, 1972, all States agreed to the implementation of production controls. This decision was taken on the understanding that the Australian Government would consider assistance to reduce the surplus of eggs so that the industry could operate more profitably in relation to available market outlets. To this end the Australian Government allocated $750,000 as a once-and-for-all grant for the 1972–3 financial year.

At a further meeting of the Australian Agricultural Council in October, 1972, agreement was reached on the level of national and State hen quotas. The quotas provided for a maximum limit on the number of hens held in each State and the Australian Capital Territory.[2] Once implemented the quotas are reviewed annually.

Prior to this general agreement, Western Australia and New South Wales had already proceeded with legislation designed to control production. The Western Australian Government implemented production controls with hen quotas from 1st July, 1971. New South Wales controls came into effect on 1st August, 1974. Although other States are currently less advanced with the implementation of quotas, national controls should be in effect by 1976. Basically, proposed schemes for each State are similar and involve the licensing of producers to keep a specified number of hens, with prosecution for non-compliance. Licences or quotas are generally transferable subject to certain conditions.[3] The exceptions are Queensland and the A.C.T. where licences are not readily transferable.

2 METHODOLOGY

The aim of this study is to estimate the social costs and benefits associated with the operation of both the home consumption price scheme and national hen quotas using traditional Marshallian partial equilibrium analysis.

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[2] The national quota was determined at 12 935 000 hens and was allocated as follows:

New South Wales	5 470 000	Western Australia	930 000
Victoria	3 170 000	Tasmania	200 000
Queensland	1 900 000	A.C.T.	85 000
South Australia	1 180 000		

[3] For example, in N.S.W. no producer can acquire licences which would result in his total hen quota exceeding 250 000 hens.

The study is restricted to a single commodity which is considered on a national rather than global basis. To account for other goods would require a more general and complex framework. Despite its limitations, the use of Marshallian partial equilibrium framework is justified as it is one of the few empirical tools for welfare analysis.

2.1 PARTIAL EQUILIBRIUM GAINS AND LOSSES

In Marshallian welfare analysis, social cost is defined as the net loss in consumers' and producers' surplus caused by departures from the competitive equilibrium. It is assumed that the area under the demand curve is a measure of the total value placed on a commodity by consumers, and that the area under the supply curve represents the opportunity cost of the resources used to produce that commodity. Consumers' surplus is the area under the demand curve above the equilibrium price, while the producers' surplus is the area above the supply curve below the equilibrium price.[4]

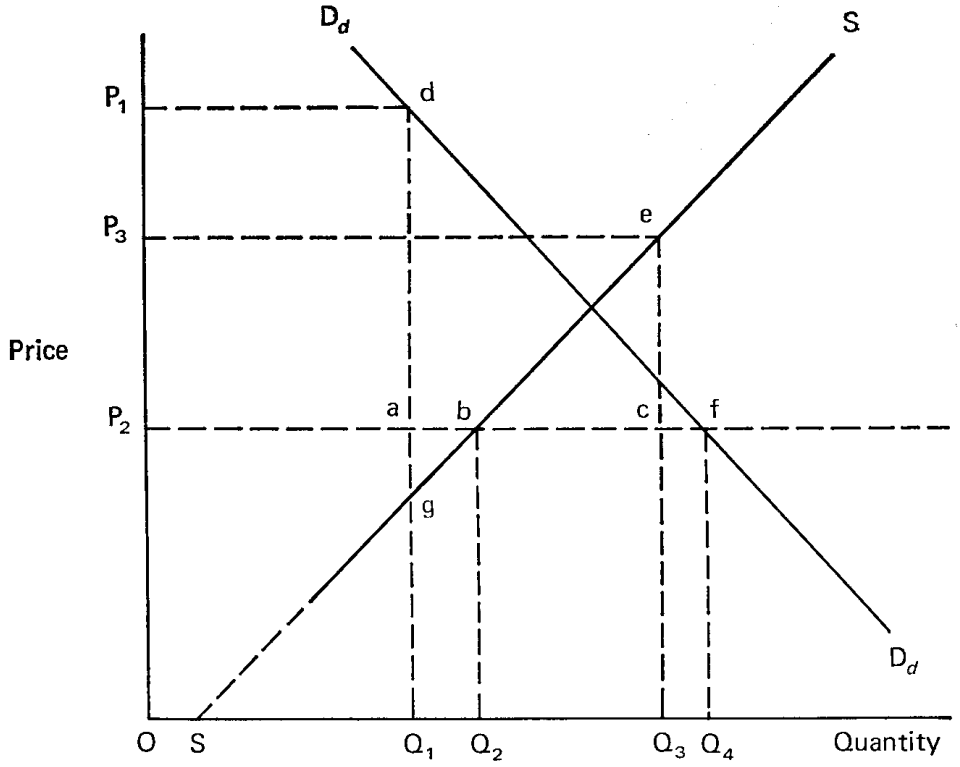

FIGURE 1: *Social costs associated with a home consumption price scheme*

[4] This assumes that there are no external economies or diseconomies of production or consumption and that resources from the egg industry could be efficiently employed elsewhere.

A simplified representation of the social costs associated with a home consumption price scheme is shown in figure 1. This figure is drawn on the assumption that if protection was removed net importation would result, i.e. the import parity price is below the domestic equilibrium price. Also, retailing, exporting and importing costs are ignored.

In this figure D_dD_d represents the domestic demand schedule and SS represents the domestic supply schedule. Overseas supply and demand is assumed to be infinitely elastic at price OP_2.

The Egg Boards set the home consumption price at OP_1 which leads to domestic consumption of OQ_1. All production in excess of OQ_1 is exported at the export price of OP_2. Producers receive an equalized return of OP_3 which generates a domestic supply of OQ_3. This equalized return is the weighted average of the domestic and export prices.

In the absence of domestic price maintenance and the embargo on imports, all eggs would sell at the export/import price OP_2, i.e. at the free trade price. Total supply in such a situation would be OQ_4 and would comprise OQ_2 domestic production and $OQ_4 - OQ_2$ imports. Social cost as defined for this analysis would be zero under these circumstances.

However, under a home consumption price scheme social costs stem from two sources. The first is the loss of consumer surplus caused by increasing domestic prices and reducing supply to the domestic market. The social cost of this loss is the value placed on foregone consumption by domestic consumers (represented by area Q_1dfQ_4 in fig. 1), less the cost of supplying this quantity from imports of $Q_4 - Q_2$ and domestic production of $Q_2 - Q_1$ (Q_1gbfQ_4). In figure 1 the net social cost due to consumption foregone is represented by the area $dfbg$.

The second source of social cost is waste due to excess production. At the equalized price OP_3 the quantity exported is $Q_3 - Q_1$. The opportunity cost of producing this quantity (Q_1geQ_3) less the export revenue earned from it (Q_1afQ_4) represents the social cost of overproduction. This cost is represented by the area $bec - abg$ in figure 1.

Thus an estimate of the total social cost of price discrimination is represented in figure 1 by the two areas $dfbg$ and $bec - abg$ with the common area counted twice.

2.2 APPROACH TO ESTIMATION

The technique used in this study is to estimate historical supply and demand relationships for the years 1965–6 to 1972–3. These relationships correspond to the SS and D_dD_d curves in figure 1. Price and quantity data relating to these years is used to estimate the social costs of protection as it operated in those years, i.e. home consumption pricing.

Simulated production controls are imposed on the model and the resulting social costs and benefits are estimated. From these results some conclusions can be made regarding the potential social benefits and costs of the national quota scheme. The effects of alternative pricing and quota policies are also investigated.

2.3 MARKET STRUCTURE ESTIMATES

Estimates of social costs by the above technique depend critically on the estimates of market structure used. In this study market structure estimates are established by applying a range of assumed supply and demand price elasticities to actual price and quantity data. The advantage of this method is that it uses *actual* values where possible and allows some flexibility in the partial equilibrium approach.

The alternative, using price quantity and elasticity *estimates* based on supply and demand models, was not used due to the sensitivity of social cost estimates to small errors in these values.[5]

2.4 SUPPLY AND DEMAND PRICE ELASTICITIES

The range of elasticities tested in this study are selected on the basis of supply and demand studies undertaken in Australia in recent years.

Demand for eggs in Australia is generally accepted as being relatively price inelastic. Banks and Mauldon [2] estimated price elasticity of demand for eggs in Western Australia at $-0{\cdot}32$, while Gruen *et al.* [12] estimated a demand elasticity of $-0{\cdot}23$ for Australia as a whole.

Gruen *et al.* [12] calculated an average supply elasticity for the period 1952–3 to 1964–5 at 0·668 ($\pm 0{\cdot}204$). Supply elasticity for the period 1965–6 to 1971–2 was estimated by the author [4] at 0·66 ($\pm 0{\cdot}19$).

To encompass the range of possible elasticities suggested by these studies, values in the range $-0{\cdot}1$ to $-0{\cdot}5$ are considered for demand, and 0·4 to 0·9 for supply.

3 SOCIAL COSTS

3.1 MARKET PARAMETERS

Simple supply and demand schedules are derived for each year from 1965–6 to 1972–3 in the following form:

Supply: $Q = a + bP$

Demand: $Q = c - dP$

—where Q is the total recorded commercial production and commercial egg disposals for domestic consumption respectively. P is the net

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[5] This is illustrated by the fact that in 1965–6 a 1 per cent overestimation of production would result in a 7·5 per cent overestimation of the quantity overproduced. This is assuming that consumption is accurately estimated. If this is not the case the potential for error is compounded.

payment to the producer or the average retail prices paid by consumers.[6] The respective slopes of the schedules, b and d are determined by applying the appropriate price and quantity data to the assumed elasticities.[7] The constants a and c can then be readily calculated.

Social costs due to consumption foregone and overproduction, can now be calculated using formulae in terms of the parameters of the supply and demand functions.[8] In the calculation of social costs below, appropriate adjustment is made for retailing and other costs not considered in section 2.1.

3.2 SOCIAL COST OF CONSUMPTION FOREGONE THROUGH HOME CONSUMPTION PRICING

A formula in terms of the parameters of the demand function is used to calculate the social cost resulting from consumption foregone, corresponding to area *dfbg* in figure 1.

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[6] Most of the data used in this study is readily available [1, 5, 7]. Two exceptions, however, are "average retail prices of eggs (all grades)" and the true net return on eggs exported.

A series of average retail prices is available for "large eggs" only. To derive an "all grades" price this series was adjusted by a factor related to the relative prices and quantities sold of other grades.

Average f.o.b. export prices are available but these significantly overstate the net return on exports. These prices take no account of the significant costs involved in the processing and storage of eggs for export. In the absence of data directly relating to these costs, net export returns were estimated indirectly using a transformation of a formula given in [6, p. 16]. Although the net export return series calculated by this method leaves some accuracy to be desired it is probably the best available.

[7] The formulae for b and d are as follows:

$$b = \frac{Q_p \times \epsilon_s}{P_{eq}}$$

where Q_p is recorded commercial production;

ϵ_s is assumed price elasticity of supply;

P_{eq} is equalized price.

$$-d = \frac{Q_c \times \epsilon_d}{P_r}$$

where Q_c is commercial egg disposals for domestic consumption;

ϵ_d is assumed price elasticity of demand;

P_r is average domestic retail price.

[8] For the derivation of these formulae (1 and 2) used in this study *see* [2].

The formula is as follows:

$$\text{Social cost} = \frac{Q_c \times \epsilon_d}{P_r}(P_r - P_i)\{\tfrac{1}{2}(P_r + P_i) - P_e\} \quad (1)$$

where P_r is average domestic retail price.

P_e is net export return

P_i is import price (export price plus average domestic retail margin)

ϵ_d is domestic demand elasticity

Q_c is commercial egg disposals for domestic consumption.

Estimated social costs estimated using this formula are shown in table 1. (All social costs are estimated with prices that were current in the respective years).

TABLE 1

Estimated Social Cost due to Consumption Foregone for a Range of Demand Elasticities 1965–6 *to* 1972–3

Year	Demand Elasticities				
	−0·1	−0·2	−0·3	−0·4	−0·5
	$'000	$'000	$'000	$'000	$'000
1965–6 ..	2,682	5,365	8,047	10,730	13,412
1966–7 ..	2,496	4,992	7,488	9,984	12,480
1967–8 ..	2,035	4,070	6,104	8,140	10,175
1968–9 ..	2,591	5,183	7,773	10,365	12,956
1969–70 ..	2,460	4,920	7,380	9,840	12,300
1970–1 ..	2,328	4,655	6,983	9,311	11,639
1971–2 ..	2,304	4,608	6,913	9,216	11,521
1972–3 ..	3,610	7,220	10,830	14,400	18,050

3.3 SOCIAL COST DUE TO OVERPRODUCTION

Costs resulting from overproduction correspond to area *bec* − *abg* in figure 1. These costs are estimated using the following formula in terms of price and supply parameters:

$$\text{Social Cost} = \frac{Q_p \times \epsilon_s}{2P_{eq}} \{(P_{eq} - P_e)^2 - (P_o - P_e)^2\} \quad (2)$$

where P_{eq} is equalized price (average net return to the producer)

P_e is net export return

P_o is the price at which domestic supply equals domestic demand

ϵ_s is domestic supply elasticity

Q_p is recorded commercial production.

Estimates of losses resulting from overproduction are shown in table 2.

TABLE 2

Estimated Social Cost due to Overproduction for a range of Supply Elasticities: 1965–6 *to* 1972–3

Year	Supply Elasticities					
	0·4	0·5	0·6	0·7	0·8	0·9
	$'000	$'000	$'000	$'000	$'000	$'000
1965–6 ..	4,262	4,470	4,609	4,708	4,782	4,840
1966–7 ..	3,931	4,189	4,360	4,483	4,575	4,647
1967–8 ..	2,869	3,381	3,722	3,966	4,149	4,291
1968–9 ..	4,688	5,231	5,592	5,851	6,045	6,196
1969–70 ..	4,103	4,878	5,394	5,763	6,040	6,255
1970–1 ..	3,052	4,010	4,649	5,105	5,448	5,714
1971–2 ..	2,566	3,634	4,347	4,856	5,237	5,534
1972–3 ..	8,044	8,845	9,378	9,760	10,046	10,268

3.4 SENSITIVITY OF SOCIAL COST ESTIMATES TO ELASTICITIES

As is indicated by the social cost formulae for both consumption foregone and overproduction, the estimated costs vary directly with elasticity. This further supports the case for testing a range of elasticities, thus facilitating some subjective evaluation of costs by the reader as well as the author. The author suggests the "most likely" social cost estimates are those based on a demand elasticity of $-0{\cdot}3$ and a supply elasticity of 0·7. This subjective assessment is based on the estimates of supply and demand elasticities outlined in section 2.4.

To summarize the total estimated social costs which occurred under home consumption pricing, table 3 shows the sum of estimated social costs due to both consumption foregone and overproduction. These costs are determined for three combinations of supply and demand elasticities to give a range of possible values. This range is represented by:

(i) a minimum estimate based on an assumed demand elasticity of $-0{\cdot}1$ and supply elasticity of 0·4;

(ii) the suggested "most likely" estimate based on assumed demand and supply elasticities of $-0{\cdot}3$ and 0·7 respectively;

(iii) a maximum based on demand and supply elasticities of $-0{\cdot}5$ and 0·9 respectively.

These estimates are presented in table 3 together with the total value of domestic retail sales.

TABLE 3

Summary of Social Costs due to Home Consumption Price Scheme

Year	Total retail value of domestic sales	Min. social cost $\epsilon_d = -0{\cdot}1$ $\epsilon_s = 0{\cdot}4$	Most likely social cost $\epsilon_d = -0{\cdot}34$ $\epsilon_s = 0{\cdot}7$	Max. social cost $\epsilon_d = -0{\cdot}5$ $\epsilon_s = 0{\cdot}9$
	$'000	$'000	$'000	$'000
1965–6	69,248	6,944	12,755	18,252
1966–7	76,680	6,427	11,971	17,127
1967–8	74,851	5,904	10,070	14,466
1968–9	81,836	7,279	13,624	19,152
1969–70	86,681	6,563	13,143	18,555
1970–1	84,637	5,380	12,088	17,353
1971–2	84,693	4,870	11,769	16,055
1972–3	90,830	11,654	20,590	28,318

The particularly high costs encountered in 1972–3 are a result of special measures taken by the Australian Egg Board and several State Egg Boards to reduce stocks. In this year egg pulp exports were boosted by some bulk sales by the Australian Egg Board at unusually low prices in order to save further cold storage costs [5, p. F. 4].

4 PRODUCTION CONTROL

In sections 2 and 3 above, a model of the egg industry was derived and the social costs resulting from home consumption pricing were estimated as summarized in table 3. The next step in this analysis is to impose simulated production controls on the model and estimate the resulting costs and benefits.

4.1 POTENTIAL BENEFITS

In theory, production control has the potential to eliminate all social costs associated with overproduction. Thus potential benefits correspond to the social costs due to overproduction given in table 2. However, the conditions required to maximize potential benefits from production control are impossible to achieve. They include: (i) the capacity to control production with absolute certainty; (ii) perfect knowledge of domestic and export market structures; and (iii) the optimum allocation of marketing quotas such that the marginal costs for all producers are equal; and (iv) the automatic transfer of quotas at no cost according to changes in producer costs. These conditions are akin to the conditions for perfect competition and have limited relevance in real world production control. In practice, the efficiency of production controls is inevitably reduced by factors associated with uncertainty and misallocation of resources.

4.2 REDUCED EFFICIENCY DUE TO UNCERTAINTY

Production control in the egg industry involves uncertainty primarily associated with production and domestic demand.

(i) *Uncertainty associated with production*

Quota fixing authorities are faced with uncertainty when they attempt to fix a hen quota to achieve a desired level of egg production because other inputs can be substituted for hens to achieve a range of production possibilities. An example of this effect, which is likely to occur in practice, involves stocking density. It is expected that the number of cages "applied" to a given number of hens will increase when quotas take effect, i.e. stocking density will fall. As quotas reduce flock sizes, the remaining birds will tend to be spread over the same number of cages (at least in the short term). This will increase hen productivity and thus increase total output for a given number of hens. A similar situation may occur with other inputs.

The extent of this substitution will depend on the available capital, the cost structure, and the nature of the factor-factor relationship for each producer. As a result, the aggregate substitution effect is difficult to predict and is thus a major source of uncertainty. Experience in Western Australia, where hen quotas were introduced in 1971, indicates that the substitution effect may be quite significant. Initial Western Australian quotas for 1971–2 were calculated using an expected annual production per hen of 16·8 dozen based on recent historical data. Actual production per hen for that year however, jumped to 18·4 dozen, an increase of 9·5 per cent. In the early years of the scheme in other States, production uncertainty will inevitably lead to problems of setting the appropriate hen quota to achieve a desired level of production.

(ii) *Uncertain domestic demand*

Expected domestic demand for eggs must be estimated in advance so that appropriate quotas can be set. The difficulties associated with this process are obvious and the problem is further compounded in the egg industry by the existence of substantial unrecorded production,[9] which affects demand for controlled production. It is difficult to predict the effect production control will have on unrecorded production. However, if the quota scheme is effective in reducing export surpluses, egg board levies should be reduced and therefore the incentive to market eggs outside the Board will be diminished.

In practice, to allow for uncertain domestic demand, hen quotas are set to cover projected domestic consumption plus a safety margin. This safety margin reduces the chances of an egg shortage with its inevitable consumer reaction.[10]

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[9] This includes production from backyard flocks of less than twenty hens, and eggs from levied flocks sold outside Board control either illegally within State boundaries or legally interstate.

[10] The stated safety margin for hen quotas in New South Wales, which came into effect on 1st August, 1974, is 15 per cent.

4.3 THE COST OF UNCERTAINTY

The likely increase in hen productivity and the safety margin included in hen quotas make it likely that the costs of uncertainty will take the form of continued export losses from continued overproduction.

Estimates of such losses can be obtained using formula (2). The volume of eggs corresponding to a given level of overproduction is substituted for recorded commercial production in the formula. In a simulation of the period 1965–6 to 1972–3, estimated costs due to failure to control production fully are given in table 4. Estimated social costs due to actual overproduction (from table 2) are included for purposes of comparison.[11]

TABLE 4

Estimated Social Costs for Various Levels of Overproduction

Year	Levels of Overproduction					
	Actual	5 per cent	10 per cent	15 per cent	20 per cent	25 per cent
	$'000	$'000	$'000	$'000	$'000	$'000
1965–6 ..	4,708	1,461	3,058	4,791	6,660	8,666
1966–7 ..	4,483	1,190	2,521	3,992	5,604	7,357
1967–8 ..	3,966	556	1,229	2,018	2,923	3,944
1968–9 ..	5,851	967	2,070	3,310	4,684	6,195
1969–70 ..	5,763	687	1,509	2,466	3,558	4,785
1970–1 ..	5,105	403	922	1,559	2,313	3,184
1971–2 ..	4,856	299	710	1,232	1,865	2,609
1972–3 ..	9,760	1,404	2,954	4,648	6,488	8,473
Total 1965–6 to 1972–3 ..	44,492	6,967	14,973	24,016	34,095	45,213
Total Savings..	..	37,525	29,519	20,476	10,397	−721

The level of continuing overproduction is likely to vary as the scheme progresses. In the early years of production control when adjustment is most rapid and knowledge of the effect of quotas is limited, overproduction is likely to remain significant. As the scheme progresses quotas will be set with more accuracy and consequently the social cost savings will increase as a result of reduced unprofitable exporting.

[11] These are suggested "most likely" estimates based on an assumed supply elasticity of 0·7.

The bottom line of table 4 shows that if production in the period 1965–6 to 1972–3 had been limited to cover domestic consumption plus a safety margin of say, 15 per cent, significant social cost savings could have been made as a result of reduced exports (approximately $20 million).

4.4 REDUCED EFFICIENCY OF PRODUCTION CONTROL DUE TO MISALLOCATION OF RESOURCES

Before concluding that there is a net social benefit from effective egg production control, certain other social costs must be considered. Inevitably there must be some social cost resulting from the misallocation of resources caused by restricting one input, viz. hens.

The extent of this misallocation will depend on whether or not hen quotas are readily transferable.

(i) Non-transferable quotas—in Queensland and the A.C.T. quotas are tied to properties and are not freely transferable as they are in other States. The situation under these conditions is illustrated in figure 2, which shows the factor-factor relationship faced by a particular producer.

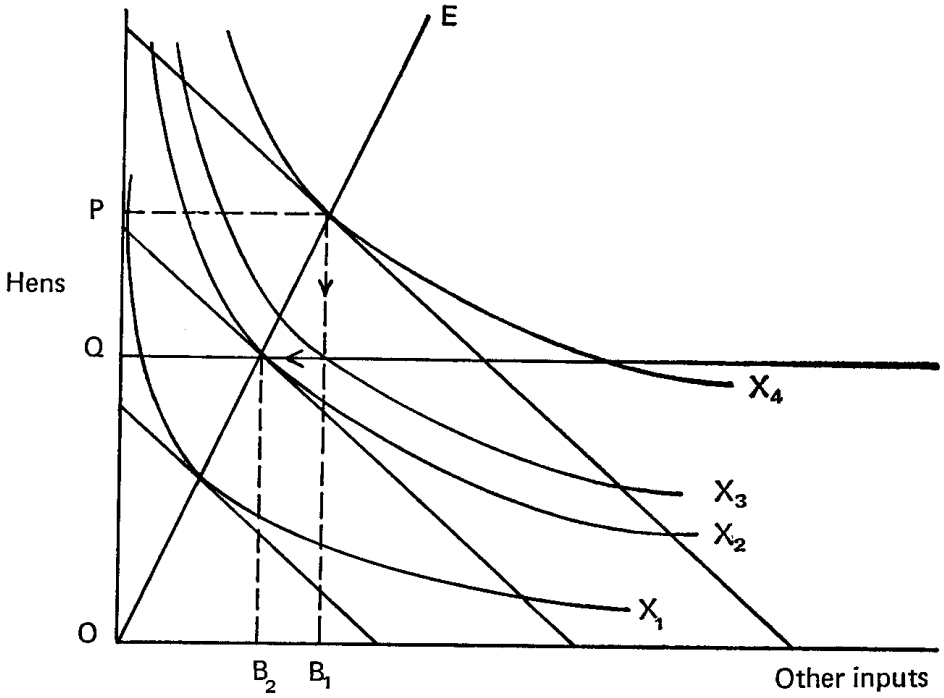

FIGURE 2: *Adjustment related to non-transferable quotas*

Assume a producer, originally producing X_4 eggs with OP hens and OB_1 other inputs, receives a quota of OQ hens. Assuming other inputs are constant in the short run, production will drop to X_3, utilizing OQ hens and OB_1 other inputs. This position represents inefficient allocation as

the price ration differs from the input ratio. In the longer run the producer can increase his efficiency by moving toward the output and resource utilization representation by the intersection of the expansion line E with the quota level Q. The immobility of some factors in egg production will tend to limit the rate of this shift. Even if maximum efficiency of resource allocation is achieved by all individual producers, misallocation within the industry can still occur. Non-transferable quotas limit the extent to which resources can be allocated to favour low-cost producers, and thus the potential for economies of scale is reduced.

(ii) Transferable quotas—transferability of quotas is generally accepted to have two main advantages. Firstly, in the short-run the transfer of quotas will tend to adjust the somewhat arbitrary allocation of quotas[12] in favour of low-cost producers. Secondly, in the long run, it facilitates more efficient allocation of resources within the industry.

Despite these advantages some misallocation of resources will still occur. Input quotas can be regarded as increasing the cost of one input by limiting its supply and this is a source of misallocation. The increase in costs will be equivalent to the annual rental value of the quota held. Figure 3 shows the effect of transferable hen quotas on a particular producer when looked at in terms of an increase in the price of hens.

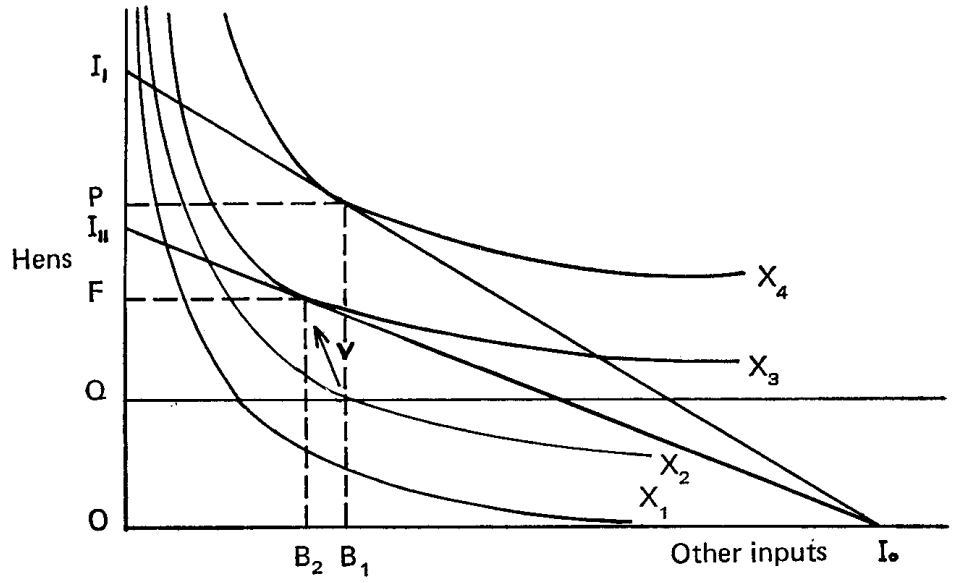

FIGURE 3: *Adjustment related to transferable hen quota imposition*

Before the introduction of hen quotas he produced X_4 eggs utilizing OP hens and OB_1 other inputs. He is given a quota OQ. Assuming other inputs are constant, in the short run production will drop to X_2. In

[12] Hen quotas are usually allocated to producers on the basis of hen numbers held in some historical base period.

the long run, however, the production level will depend on the new relative costs of hens and other inputs as determined by the value of hen quotas on the open market. The iso-cost line will change from $I_0\ I_1$ to, say, $I_0\ I_{11}$ for a given budget restraint. In the long run, production will tend to move to the point where the new iso-cost line is tangential to an iso-product line, i.e. to a production level of X_3 utilizing OF hens and OB_2 other inputs. In this case the buying or leasing of a quota equivalent of QF hens would increase efficiency.[13] Never-the-less misallocation still occurs to some extent because of the artificial change in the input price ratio due to restricting the supply of hens.

4.5 COST OF MISALLOCATION OF RESOURCES

Inefficiencies resulting from restricting one input will cause marginal costs to increase and thus cause the supply function to shift up. Thus, costs due to misallocation of resources will take the form of reduced producer's surplus. It is impossible to estimate these costs without knowing the elasticities of technical substitution of other inputs for hens. However, it is important that the existence of these costs be recognized by both producers and authorities administering production control.

4.6 THE CAPITALIZATION OF INCREASED RETURNS INTO QUOTAS VALUES

The market value of a negotiable quota will be related to quota supply and demand conditions in the industry. These conditions will be based on the different values of the quota to potential purchasers and suppliers. The value of a hen quota to a producer will be equal to the marginal profit that would be gained or lost if hen numbers could be increased or decreased. This profit is the difference between marginal revenue and marginal cost for an individual producer. Differences in marginal value of quotas will arise primarily through differences in marginal cost since marginal revenue equals the price of the controlled product and is the same for all producers.

Any saving of export losses made by restricting production, and which is passed on to the producer in the form of increased marginal revenue, will thus have a direct effect on the value of quotas. In other words, any long-term benefits to producers from production control will tend to be capitalized into quota values.

This fact should be recognized by egg producers and marketing authorities. The tendency for producer benefits to be capitalized into quota values does not mean however, that the producer and the egg industry will not benefit in some way from production control. It provides a way out of the impasse of increasing overproduction and falling export returns which has existed in the past. Significant benefit in the form of windfall capital

[13] If this producer was given an original quota of greater than OF hens, efficiency would be increased by selling his quota for hens in excess of OF and substituting other inputs.

gains also accrue to those holding quota entitlements when the quota scheme is introduced, but this is of short-term significance only.[14]

4.7 DISTRIBUTION OF SOCIAL COST SAVINGS

The distribution of savings from production control between producers and consumers depends on the pricing policies of egg industry authorities. Basically it is a question of surplus transfer. The benefits from production control will take the form of increased net returns for producers or reduced retail prices for consumers (or a combination of both). The potential benefit for producer or consumer (in cents per dozen) is shown in table 5 for a range of overproduction levels.[15] These figures are derived from table 4 by dividing potential savings by domestic consumption.

TABLE 5

Potential Benefit from Production Control for Producers or Consumers

Year	Levels of Overproduction					
	0 per cent	5 per cent	10 per cent	15 per cent	20 per cent	25 per cent
	c/doz	c/doz	c/doz	c/doz	c/doz	c/doz
1965–6 ..	4.06	2.80	1.42	−0.07	−1.69	−3.42
1966–7 ..	3.57	2.63	1.57	0.40	−0.89	−2.28
1967–8 ..	3.06	2.64	2.12	1.51	0.81	0.03
1968–9 ..	4.38	3.66	2.84	1.91	0.88	−0.25
1969–70 ..	4.05	3.57	3.00	2.32	1.56	0.70
1970–1 ..	3.38	3.12	2.77	2.35	1.85	1.28
1971–2 ..	3.18	2.99	2.72	2.38	1.96	1.38
1972–3 ..	6.29	5.39	4.39	3.30	2.12	0.84

5 SUMMARY AND CONCLUSIONS

The home consumption price scheme which has operated in the past involved considerable social costs from two sources. The first source was the loss in consumer surplus resulting from increased domestic price and reduced supply to the domestic market. The value of this loss is the value placed on foregone consumption by domestic consumers (*see* table 1). This loss is the price Australian consumers pay to protect the Australian egg industry and is not necessarily reduced by production control.

[14] With a current quota resale value of approximately $4 per hen in N.S.W. this gain can be significant.

[15] These are suggested "most likely" benefits based on an assumed supply elasticity of 0.7.

The second source of social cost, which stemmed from the home consumption price scheme, was the waste due to overproduction (*see* table 2). There is no doubt that some action was required to limit overproduction, and that this action had to take account of the peculiarities of the Australian egg industry. The national hen quota scheme represents such action and in theory it has the potential to reduce the significant social costs associated with overproduction (*see* table 5).

However, there are inevitable costs associated with the practical operation of such a production control scheme. Initially, there will be considerable uncertainty associated with the setting of hen quotas to achieve the desired level of egg production. This uncertainty stems from the potential for substitution of other inputs for hens to achieve a range production possibilities. This uncertainty, coupled with the need to avoid egg shortages, is likely to result in continued overproduction, thus reducing the potential benefits from production control (*see* table 4). The level of continued overproduction should decrease as the scheme progresses and quotas are set more accurately.

Another factor reducing the potential benefits of production control is the misallocation of resources. Misallocation is inevitable when one input (in this case hen numbers) is restricted and its price artificially increased, to control production. *Non-transferable* hen quotas, where operative, tend to perpetuate this misallocation by reducing the mobility of resources. The loss due to misallocation will take the form of increased marginal costs for the producer.

Finally, any savings of export losses made by controlling production, and passed on to the producer in the form of increased net returns, will tend to be capitalized into quota values.

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