Consequences of Deregulation in the Victorian Egg Industry

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There has been much discussion in recent times of alternative proposals for reform of egg industry regulations. This paper aims to describe, analyse and measure the effects of possible changes to egg industry regulations in Victoria. The conclusion is that there are significant potential net benefits to Victorians from eliminating hen quotas and arrangements for fixing egg prices. The significant losses to each of a small number of producers would be more than offset by the small benefits to each of a large number of consumers. The majority of these net benefits could be obtained, alternatively, by allowing free transferability of quota rather than eliminating quota; but then the benefits would all accrue to quota owners.

Introduction

Egg production, marketing and prices in Australia are controlled by a battery of regulations, applied mainly at the State level by State egg marketing authorities. The regulations have changed from time to time, and the details differ among States, but at present every State employs hen quotas, wholesale price fixing, revenue pooling and producer price equalisation. At the Commonwealth level, hens are subject to a poll tax and imports are prohibited.

Much has been written about the effects of these regulations on prices, costs, and incomes, especially in recent times. The nature and likely direction of the effects on the major variables seems clear and there is little disagreement, but there remain important differences of opinion about the magnitudes of the effects. In particular, the comprehensive study of egg marketing arrangements in Australia by the Bureau of Agricultural Economics (BAE 1983) contains much greater estimates of "consumer transfers" per dozen eggs to Australian producers than those suggested for Victoria alone by Ryan (1980), McArther et. al. (1980) and Cozens (1981). The BAE is an authoritative source and it would seem that the BAE

estimates have been widely accepted. They have been used as a basis for policy discussions (Fisher 1985), including discussions in Victoria.

The purpose of this paper is to revise and update previous measures of the likely effects of changes to egg marketing arrangements in Victoria. Part of this work identifies a methodological error underlying the BAE's estimates.

A Simplified Model of the Victorian Egg Market

In this section a model of the Victorian egg market is developed and applied to indicate the effects of eliminating quotas and wholesale price fixing in the Victorian egg market. The analysis treats Victoria in isolation, assuming that Victoria would continue to be, as at present, approximately self-sufficient in eggs. This would follow if current barriers to interstate trade and the embargo on foreign imports would remain and if these barriers would prevent Victorian producers from selling eggs interstate in response to policy changes that might result in Victorian egg prices falling substantially below prices in neighbouring States.[1]

The Victorian market for eggs at the farm gate level is represented geometrically in Figure 1.[2] In Figure 1, D_f represents the farm level demand for Victorian eggs for fresh use, net of levies for promotion, grading and handling,

[1] Even if, as seems likely, interstate trade could not be prevented following deregulation of the Victorain egg market the price adjustments that would be expected to follow in other States might well leave Victoria approximately self-sufficient in eggs.

[2] In reality there is a multitude of markets for different qualities and end uses of eggs at different times of the year. Commonly a simple two market

administration, and other charges collected by the Victorian Egg Marketing Board (VEMB). It is assumed that these charges would continue in an unregulated market, that is, with unrestricted production and free trade in Victorian eggs within Victoria. Then, D_f is the demand that would be faced by Victorian egg producers in an unregulated market. The supply function that would prevail in the absence of regulations (S_I), is assumed to intersect demand above the export price for egg products (P_x), so that the free trade price and quantity would be P_f and Q_f.

The egg marketing regulations have three main components: wholesale price fixing, hen quotas, and producer price equalisation. The wholesale price of eggs to be consumed fresh in Victoria is fixed above the free trade price. Consequently the net producer's price for fresh eggs is above the free trade price at P_d, resulting in fresh egg consumption of Q_d. To restrict output, hen quotas are applied. These quotas are transferable among producers, but only to a limited extent. Thus the regulated supply function for eggs (S_2) is above and to the left of the free trade supply function.

The supply shift from S_I to S_2 involves two parts, as described in some detail by Alston (1981). First, due to limits on quota transfers, output is not shared among existing and would-be producers to achieve minimum cost, and technical advance is retarded. Second, by restricting the use of one input, quotas on hen numbers result in inefficient input combinations. A special case of this shift occurs when hens are used in fixed proportions with other inputs in egg production and the quotas are freely transferable. In this case there would be no input distortions and the egg supply curve would become vertical at the point where hens were limiting (point c for output of Q_q). Hen (input) quotas would be equivalent to egg (output) quotas (as was assumed by Ryan (1980) for Victoria; by the BAE (1983 e.g. pp. 36–38) for Australia.; and by Veeman (1982) for Canada), and the regulated supply function would be dcS_3.

It is difficult to determine the effects of quotas on hen productivity and thus the extent of the error in assuming fixed proportions. In the ten years since quotas were introduced in Victoria in 1974/75, output per quota unit increased by over 20 per cent (based on Egg Farmers of Victoria 1985). However, industry experts in the Department of Agriculture and Rural Affairs have advised that egg production per hen has increased only modestly as a result of hen quotas *per se* (say five per cent), with little distortion in factor proportions.[3] Nevertheless, there may be some slope to supply because there is a black market in "illegally" produced eggs and some unrecorded sales of "legal" production from small flocks. Together these sources are believed to account for at least ten per cent of egg production in Victoria, and possibly as much as thirty per cent of Victorian production in spring and summer. Thus even if the technical relationships prohibit significant "legal" supply response to price in the presence of hen quotas, there is likely to be some slope to supply arising from "illegal" supply response.

The hen levy, collected by the Commonwealth, might be treated as a further source of a supply shift because it increases costs of egg production. The Commonwealth hen levy is collected as a tax on inputs (hens)

(export and domestic) model is used. In Victoria, exports have been negligible in recent years. Nevertheless, a significant fraction of production is used to produce egg products and some of these are sold at very low, unprofitable, prices. With free trade some eggs would still be sold for processing into egg products. In this paper a simple two market structure is used, but the distinction is between fresh egg equivalents and low priced products. The bulk of eggs are sold for domestic use as either fresh eggs or products at the shell egg price. The remaining fraction is subsidized on to unprofitable domestic or export produce markets, realizing the equivalent of export returns. Thus the diagram is conventional but the interpretation is a little unconventional.

[3] These subjective impressions are based in part on the results from the Department of Agriculture and Rural Affairs random sample laying test, an egg production trial conducted by the Department. Only slight increases in production per hen may be achieved by changing feeding strategies, and feed is the main component of egg production costs. However, replacement hens less than 26 weeks old produce some eggs, and these hens are not counted against quota. Culling at younger ages allows producers to increase production per hen quota unit by both increasing average productivity of the mature birds in the flock and maintaining a larger proportion of immature, overquota hens. Further, there is some incentive to maintain a stock of replacements surplus to expected requirements as insurance against falling short of quota. Through modifications of flock structure, significant increases in egg production per hen quota unit (if not per hen) are possible. In the longer term there are incentives and opportunities to select for hens that produce more eggs and, perhaps more importantly, that produce higher quality (larger) eggs. These adjustments may be quite costly, even if their effects on yields are not dramatic.

Figure 1: Effects of Deregulating the Victorian Egg Market
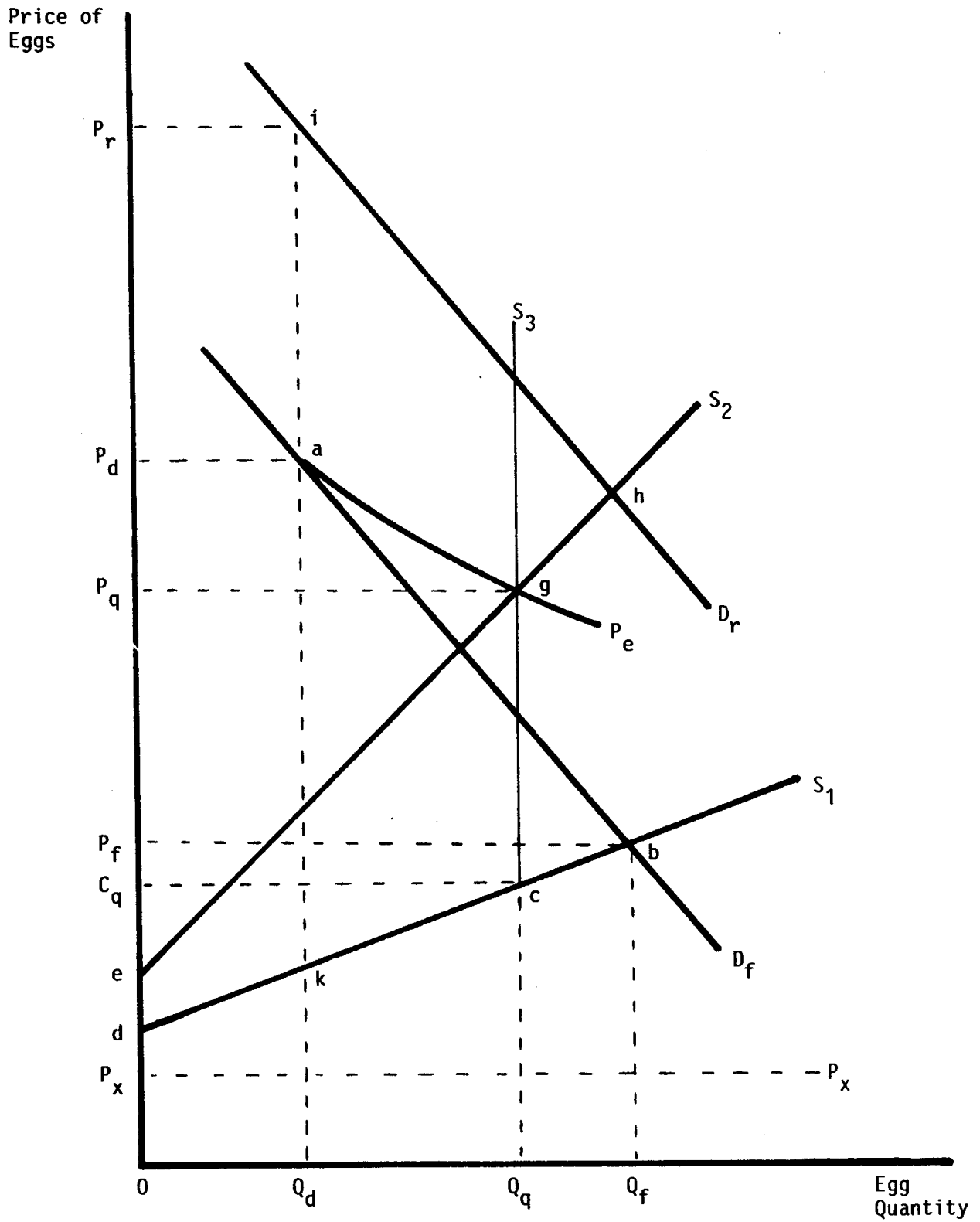
and returned to producers as a subsidy on output (eggs). If there were no input substitution, and no leakages for administration, the hen levy could safely be ignored in the analysis, except for making sure that the producers' prices are net of hen levies. That is, under these conditions, the input tax would be exactly offset by the output subsidy. If there were any leakages or input substitution, the input tax and output subsidy would not be exactly offsetting. If supply were adjusted for the input tax, demand would have to be modified to incorporate the output subsidy. For simplicity, it is assumed that the levy is approximately returned to the producers from whom it is collected without any distorting effects on input combinations. Then, the analysis can be conducted as if there were no hen levy. Therefore the supply function under quotas (S_2) is interpreted hereafter as reflecting marginal cost excluding hen levies. This allows us to continue to interpret the demand function (D_f) as excluding the output subsidy financed by the hen levy. Then, for empirical work, the relevant producers' price (P_q) is to be computed by deducting the per dozen equivalent of the hen levy from the net price returned to producers by the VEMB.

The final main component of the regulations is producers price equalisation. Any excess of production over domestic shell egg requirements is processed and sold either domestically or overseas at the export price for egg products and producers receive a weighted average (equalised or pool) price. Administratively this is effected by the collection of the Commonwealth hen levy which is currently returned to the States from which it is collected to add to the total revenue pool for each State. Analytically it is convenient to ignore these details and, without much loss of realism, to treat the problem as a simple transfer of revenue between the fresh and processing markets. Thus producers face the equalised price line (P_e) and the market clearing producers' price and quantity are P_q and Q_q with exports of $Q_x = Q_q-Q_d$.

If the quota and price fixing arrangements (and Commonwealth hen levy) were to cease the industry would adjust to the free trade equilibrium (P_f, Q_f), yielding a gain in consumers' surplus equal to area $CS = P_d abP_f$, a loss of producers' surplus (including quota rent) equal to $PS = P_q ge-P_f bd$, and net social benefits equal to $NB = CS-PS$.

Approaches to Measure the Effects of Deregulation

To measure these effects on prices, quantities, economic surplus and its distribution requires values for a few key parameters. Basically the idea is to find a point on the demand curve and a point on the free trade supply curve. Then, using information about the functional form and slopes (elasticities) of the curves the free trade point (b in Figure 1) can be identified. Point a on the demand curve is directly observable: current Victorian consumption and net farm gate equivalent price for shell eggs. Similarly point g on the current (regulated) supply curve (S_2) is observable: current production and producers' (equalised) price net of the Commonwealth hen levy. The difficult part is to find a point on the free trade supply curve. For instance, to estimate point c on the free trade supply curve (S_1), a measure of the increase in marginal costs of current output, due to the regulations $(P_q-C_q = g-c)$, would be required.

Faced with a similar problem, the BAE (1983, p. 67) assumed a linear domestic demand and supply and expressed the equilibrium price and quantity as functions of the parameters (slopes and intercepts) of supply and demand. The parameters of the supply function were estimated using the current output and equalized producer price and an assumed supply elasticity. The parameters of the demand function were estimated using the retail quantity and price, and an assumed retail demand elasticity. There are two conceptual errors here. First, the current output and producer price define point g on the regulated supply curve (S_2) rather than point c on the free trade supply curve (S_1). Second, the current retail price and quantity define point i on the retail demand (D_r) rather than point a on the farm gate demand (D_f). By equating retail demand (D_r) and farm level supply (S_2), with an assumed elasticity of *this* supply curve of 0.7) the BAE found point h rather than point b. The resulting "most likely" estimate of the "consumer transfer" to producers was 41.5 cents per dozen.[4]

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[4] The details are as follows. The average retail price in 1981–82 was 54 cents per dozen above the average net equalized producer price (93.3 cents per dozen) with about 8.5 per cent of total production of 189.2 million dozen eggs being exported (BAE 1983). Equating farmers' supply (elasticity of 0.7) and consumers' demand (elasticity of −0.2) would yield a price of 91.3 cents per dozen, a retail price fall of 56.1 cents per dozen. The marketing chain's share of

To measure the effects of interest requires more information than was used by the BAE (1983). In Figure 1, the current average total cost (including quota rents and quasi-rents to non-quota inputs) and current marginal cost are assumed to be equal to the current producer price P_q. On the same quantity the unregulated marginal cost (and average total cost) would be equal to C_q. To define point c on the unregulated supply function we need to measure the reduction in average total costs or, equivalently, the reduction in marginal costs that would follow deregulation $(P_q - C_q)$.

Veeman (1982) suggested two approaches for estimating these effects in the Canadian egg market: using quota values and making comparisons with United States prices. A third alternative approach would be to use cost data for individual firms or some type of synthetic data as used by Wilcox (1985) for analysing Victorian pig industry regulation. A fourth would be to assume an explicit form for the production function as by Johnson (1965) to analyse effects of acreage (input) quotas for U.S. tobacco. All of these approaches are likely to have problems. In the present case the synthetic approach seems too difficult and Johnson's (1965) method requires assumptions that are inappropriate for the egg industry. A modified version of Veeman's (1982) approach will be used instead.

Recalling that we have defined the producer's price and marginal cost (P_q) as net of hen levy, the fall in average total (marginal) costs on current output (O_q) that would follow deregulation $(P_q - C_q)$ may be divided into three remaining components: (a) quota rent per dozen eggs, (b) the increase in average total cost due to limits on transferability, and (c) the increase in average total cost due to input distortions arising from quotas on hens rather than eggs. The last of these components is the most difficult to measure.

Prior to the introduction of quotas, egg prices (and presumably costs) were very similar between New South Wales and Victoria (for example, see McArthur et al. 1980, p. 38). There is no obvious significant comparative advantage to egg production in New South Wales, so it is reasonable to suppose costs in Victoria in an unregulated market would correspond closely to those in New South Wales. In New South Wales hen quotas are freely transferable by either lease or sale up to a limit of 100 000 hens per producer (BAE

1983, p. 29). This maximum size constraint is not likely to have had an important effect on costs. Thus, in New South Wales, the producers' price minus the hen levy and quota rent (expressed per dozen eggs) is a measure of the unregulated unit cost of current output plus any increase in average costs due to input distortions in New South Wales.

In 1984–85, New South Wales quota sold for about $18.00 per hen and corresponding annual quota lease rates were at about $2.80 per hen.[5] The implied real rental rate for quota is 15.6 per cent per year. At first blush, as a real rate of return to owning quota, this seems high. However, a similar ratio of rent to value was used by Veeman (1982) for Canadian quotas on hens producing eggs or poultry meat, and comparably high rates were observed by Sumner and Alston (1984) for U.S. tobacco. The observed rate for New South Wales hen quota may be reasonable, perhaps reflecting uncertainty about (and heavy discounting of) the future returns from owning quota or a view that returns from quota will decline significantly in the near future. Such a perception may be well founded given the large surpluses in New South Wales, recent reductions in producer prices, and the possible implications of the planned phasing out of the Commonwealth hen levy.

During 1984–85, New South Wales producer net equalized prices for eggs averaged 92 cents per dozen (New South Wales Egg Corporation 1985, p. 6). Using 21 dozen eggs per hen per year, quota rents in New South Wales are estimated as 13 cents per dozen eggs. Then average costs of production in New South Wales net of quota rents (13 cents per dozen) are estimated as about 79 cents per dozen eggs.

The average equalised price received by Victoria's producers in 1984–85, net of hen levies, was about 110.5 cents per dozen (Egg Farmers of Victoria 1985, p. 16). This is used

the retail price was 26 per cent. Thus the "consumer transfer" to farmers was calculated as 74 per cent of 56.1 cents per dozen, or 41.5 cents per dozen. This measure explicitly excludes any effects of "hindrance on supply shift" arising from production inefficiencies caused by the quota system (see BAE 1983, pp. 66–68).

[5] David Briggs of the New South Wales Department of Agriculture has studied the egg market intensively (e.g. see Davis and Briggs 1983). He provided the estimates of quota price ($18.00) and rent ($2.80) used here. His estimates are believed to be more accurate than the slightly lower figures published by the New South Wales Egg Corporation (1985).

as an estimate of P_q in Figure 1, *i.e.* the current costs of current Victorian output. New South Wales costs are estimated as 79 cents per dozen eggs, and this value is used as an estimate of unregulated costs of current Victorian output (C_q in Figure 1). The difference between these two estimates (regulated and unregulated costs on current output), 31.5 cents per dozen eggs, is a measure of Victorian quota rent plus increased costs due to limits on quota transfers.

Quotas are not freely transferable at present in Victoria and the observed average price of $15.00 per hen in 1984–85 is therefore likely to understate the average value of quota in Victoria.[6] The ratio of rent to value for quota in New South Wales (15.6 per cent) may be larger or smaller than that in Victoria due to differences in expectations about future policy and the future time path of rents, for instance. Applying the New South Wales ratio of rent to value to the 1984–85 price of quota in Victoria suggests a quota rent of about $2.33 per hen per year. Using a yield of 20.8 dozen eggs per hen in 1984–85 (Egg Farmers of Victoria 1985) this is equivalent to 11 cents per dozen eggs. Subtracting this lower bound estimate of quota rents from the total of 31.5 cents per dozen implies an upper bound to the costs due to limits on transferability in Victoria of 20.5 cents per dozen eggs. An upper bound estimate of quota rent, 31.5 cents per dozen, is obtained by assuming there are no costs due to limits on transferability of quota in Victoria. A more likely combination would be, say, quota rent of 15 cents per dozen and efficiency costs of 16.5 cents per dozen to make up the total of 31.5 cents per dozen. A range of values for these variables will be used in the empirical work that follows.

Estimates of Price, Quantity and Economic Surplus Effects

Official quantities handled by the VEMB will be used to estimate the price, quantity, and economic surplus effects. In 1984–85, Victorian official egg production was about 49.4 million dozen eggs but actual production, including the black market, may have been closer to 60 million. Thus, the quantity and economic surplus estimates will be conservative, scaled down approximately by the proportion of official to actual egg production. Some of the official egg production is sold at unprofitable prices to be processed into egg products. It has been suggested that about 4 per cent (two million dozen) of official sales return as low as 20 cents per dozen to the farm gate level. These

very unprofitable sales would cease if the industry were deregulated. The remaining 96 per cent (47.4 million dozen in 1984–85) are sold as shell eggs, mainly for fresh consumption but with a small fraction going to processing markets that would be profitable in an unregulated situation. The net producer's price (net of hen levy) corresponding to P_q in Figure 1 is 110.5 cents per dozen. This is a weighted average of the egg products price corresponding to P_x (about 20 cents per dozen) and the shell egg price corresponding to P_d (the implied value is about 114.3 cents per dozen). The remaining requirements, to estimate the effects of deregulation, are estimates of the slopes (elasticities) of the linear supply (S_l) and demand (D_f) curves.

Collard, Ryan and Alston (1982) estimated the retail demand elasticity for Victorian eggs as about -0.3. This is consistent with other estimates both for Victoria (Hickman 1979) and for other places (Banks and Mauldon (1966) for Western Australia; George and King (1971) for the United States; Hickman (1979) for Queensland). Assuming a constant absolute mark-up from the farm gate to retail, the elasticity of demand at the farm gate equals the elasticity at retail multiplied by the farmers' share of the consumers' egg dollar. With average retail prices of eggs in Victoria about $1.80 per dozen, the farmer's share of the consumer dollar (P_q/P_r) is nearly two thirds and the implied elasticity of demand facing farmers (D_f) is about -0.2.

The BAE (1983) suggested a "preferred" supply elasticity of 0.7, based on work by Beck (1974) and by Banks and Mauldon (1966). Ryan (1980) used the same supply elasticity. This seems small as an estimate of a long run unregulated supply elasticity in an industry that is likely to be characterised by constant returns to scale (in aggregate if not at the level of the firm) and likely to face highly elastic factor supply functions. For instance, in the Victorian pig industry, which has much in common with the egg industry, Richardson and O'Connor's (1978) econometric estimates suggest the long run supply elasticity is 3.7 and Wilcox's (1985) linear programming estimates suggest the intermediate run supply elasticity is 5.0. Because there is doubt about the appropriate

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[6] The tender prices for quota in Victoria in 1984–85, were $14.11 in September 1984, and $15.88 in April 1985. The average price for the year is $15.00 per hen quota unit. These prices are published by the Poultry Farmer Licensing Committee.

size of the supply elasticity, the effects of deregulating the Victorian egg industry will be estimated using two alternative supply elasticities: 0.7 and 5.0. The lower elasticity provides both a comparison with the previous estimates by Ryan (1980) and the BAE (1983) and a shorter run estimate given a belief that the long run elasticity is likely to be quite large.

Assuming linear supply and demand, these elasticities can be combined with the current price (P_d = 114.3 cents per dozen), current consumption (Q_d = 47.4 million dozen), current output (Q_q = 49.4 million dozen) and marginal cost of current output under free trade (C_q = 79 cents per dozen) to derive the parameters of supply and demand as follows:

(1) Supply: $Q = a + bP$

(2) Demand: $Q = c - dP$

(3) $a = Q_d(1-e)$; $b = eQ_q/C_q$

(4) $c = Q_d(1-n)$; $d = -nQ_d/P_d$

where e = the elasticity of supply and n = the elasticity of demand, a negative number. Then, having obtained the parameters, the free trade quantity and price can be measured by:

(5) $Q_f = (ad - bc)/(d + b)$; and

(6) $P_f = (c - a)/(d + b)$

The "consumer transfer" is $P_d - P_f$ per dozen but only a fraction of this goes as a net benefit to producers in the form of quota rent. The increase in annual consumers' surplus (surplus accruing to the marketing chain as well as final consumers) following deregulation would be:

(9) $CS = 0.5 (P_d - P_f)(Q_d + Q_f)$

Assuming that quasi-rents to non-quota inputs used to produce current output would be unaffected by deregulation, the reduction in annual producers' surplus (including the loss of quota rents) would be:

(10) $PS = RQ_q - 0.5 (P_f - C_q)(Q_q + Q_f)$

The first term in this equation measures the loss in quota rents (R per dozen); the second measures the increase in quasi-rents accruing to non-quota inputs as a result of increased output. Subtracting the net loss to producers from the net gain to consumers yields a measure of the net social benefit:

(11) $NB = CS - PS$

Table 1 contains estimates of the price, quantity, and economic surplus effects arising from deregulation using the alternative supply elasticities, a cost of current output (C_q) of 79 cents per dozen and quota rent (R) of 15 cents per dozen. The estimates of the effects are quite insensitive to changing the supply elasticity from 0.7 to 5.0. As a result of the low magnitude of the demand elasticity relative to the supply elasticity most of the total cost saving due to eliminating quotas and equalisation (31.5 cents per dozen) is reflected in the price fall due to deregulation.

The welfare effects are dominated by the size of the total cost saving due to eliminating quotas (31.5 cents per dozen) and its allocation between quota rents (15 cents per dozen) and deadweight losses due to limits on transferability (16.5 cents per dozen). On 49.4 million dozen eggs per year a cost saving of 16.5 cents per dozen is worth $8.2 million per year net social benefit. This cost saving on current production accounts for all but $1.6 million per year of the net social benefit ($9.8 million per year), and accrues to consumers. The producers' loss is equal to the loss of quota rents ($7.4 million per year) less additional producers' quasi-rents due to a small expansion of output. The total consumers' surplus gain is approximately equal to the cost saving on current output plus the producers' loss plus about $1.8 million per year due to ceasing to subsidise low priced product sales of two million dozen at a subsidy rate of about 90 cents per dozen. Note that these estimates do not include the effects of input distortions due to hen quotas.

Sensitivity of Results to Assumptions

To indicate the sensitivity of the results to assumptions, the estimates in Table 1 were recomputed using a range of values for (a) the demand elasticity, (b) the supply elasticity, (c) the marginal cost of current (regulated) output, and (d) quota rents. The results were quite insensitive to varying the supply elasticity or the demand elasticity. The estimates reported in Table 2 were computed using a supply elasticity of 0.7 and a demand elasticity of −0.2, with a range of values for marginal costs on current output (C_q = 75, 79 or 83 cents per dozen) and quota rent per dozen (R = 11, 15 or 19 cents per dozen).

The estimated free trade price is about one or two cents per dozen greater than the assumed value for marginal costs. Thus the

Table 1: Most Likely Price, Quantity, and Economic Surplus Effects of Deregulation in the Victorian Egg Market[a]

Variable	1984–85 Value	Value after Deregulation	
		Short–Run (e = 0.7)	Longer–Run (e = 5)
Shell Egg Price: P_d (cents/dozen)	114.3	80.8	79.3
Producer Price: P_q (cents/dozen)	110.5	80.8	79.3
Output: Q_q (Million dozen/year)	49.4	50.2	50.3
Consumption: Q_d (Million dozen/year)	47.4	50.2	50.3
		Effects of Deregulation on Surpluses[b] ($ Million per year)	
(a) Quota Rent	—	-7.4	-7.4
(b) Quasi-Rents	—	0.9	0.1
(c) Net Producers' Surplus $(a + b)$	—	-6.5	-7.3
(d) Consumers' Surplus	—	16.4	17.1
(e) Net Social Surplus $(c + d)$	—	9.8	9.8

[a] These estimates are based on quota rent of 15 cents per dozen, an unregulated marginal cost of 79 cents per dozen on current output, and a demand elasticity of -0.2. The implied cost saving net of quota rents on curent output is 31.5 − 15 = 16.5 cents per dozen or $8.2 million in 1984/85.

[b] Figures may not add exactly due to rounding.

Table 2: Sensitivity of Results to Assumptions[a]

Assumed Values		Implied Free Trade Price: P_f (cents/dozen)	Welfare Effects From Deregulation ($ Million/year)			
Quota Rent: R (cents/dozen)	Marginal Cost: C_q (cents/dozen)		Consumer Surplus (CS)	Producer Surplus[b] (PS)	Net Social Surplus (NB)	Cost Saving[c] (W)
11	75	77.3	18.1	-4.3	13.8	12.1
	79	80.8	16.4	-4.6	11.8	10.1
	83	84.2	14.7	-4.8	9.8	8.1
15	75	77.3	18.1	-6.3	11.8	10.1
	79	80.8	16.4	-6.5	9.8	8.2
	83	84.2	14.7	-6.8	7.8	6.2
19	75	77.3	18.1	-8.2	9.9	8.2
	79	80.8	16.4	-8.5	7.9	6.2
	83	84.2	14.7	-8.8	5.9	4.2

[a] Estimates based on a supply elasticity of 0.7 and a demand elasticity of -0.2.

[b] The loss of producer surplus is dominated by the loss of quota rents (11, 15 or 19 cents per dozen). On 1984–85 output (49.4 million dozen) this amounts to $5.4 million, $7.4 million or $9.4 million. The difference between the loss of quota rents and the loss of producer surplus is quasi-rents from a small expansion of output.

[c] This cost saving refers to the reduction in costs of current output, other than quota rent, due to deregulation. The cost saving per dozen equals the regulated producer price (P_q) minus marginal cost on current output (C_q) and minus quota rent (R). The total cost saving is the cost of saving per dozen multiplied by the regulated output (Q_q): $W = (P_q - C_q - R) Q_q$.

value for mariginal costs is the key determinant of the estimate of consumer surplus effects. On the other hand, the estimate of the loss of producer surplus from deregulation is dominated by the assumed rental price for quota.

The net social surplus effect of deregulation is dominated by the cost saving, other than quota rent, on current output which is directly determined by the cost of current output and quota rent. Fairly small changes in both cost of current output and quota rent imply comparatively large changes in net social surplus effects. However, the range of price effects follows directly from the range of costs of current output and is small and plausible. The estimates of the free trade price range from 77.3 to 84.2 cents per dozen, lower than the regulated price by between 26 and 33 cents per dozen.[7] This price difference is only partly attributable as a consumer transfer to producers in the form of quota rents. The lower bound estimate of quota rents is 11 cents per dozen. Quota rents of 15 cents per dozen are more plausible but this remains a matter for conjecture.

Concluding Comments

To estimate the effects of egg marketing arrangements requires more information than was used by the BAE (1983), on variables that are much harder to measure. The most important variables are quota rents and the increases in production costs due to the quota system. Measures of these variables are suggested for Victoria in this paper.

The conclusion is that in Victoria the "consumer transfer" *to egg producers* was likely to be between 11 and 19 cents per dozen eggs in 1984–85. With deregulation there would be a corresponding 20.5 to 12.5 cents per dozen additional reduction in costs on current output so that, with deregulation, the farm price of eggs might fall by between 26.5 and 33 cents per dozen. The wholesale and retail prices of eggs would probably fall by a similar amount.

An estimated net social welfare gain in Victoria of between $4.2 and $12.1 million per year would follow deregulation in the industry. This figure includes about $1.8 million per year that could be saved by ceasing to subsidize very unprofitable sales of egg products. Most of the net gain is a result of the 12.5 to 20.5 cents per dozen cost saving and could be achieved simply

by making quota freely transferrable in Victoria; but then it would be a benefit to producers, rather than consumers, and be reflected in quota rents and quota prices, rather than in egg prices . There would be no obvious direct losers from making quota freely transferable. It would seem that there are some potential indirect losers, otherwise one would expect free transferability to be more common[8].

On the other hand, eliminating the current system would involve substantial losses to each of a small number of producers in order to generate small benefits to each of a large number of consumers. If quotas were abolished in Victoria the current owners of 2.4 million hen quota units, valued conservatively at $15 per hen, would lose a total asset value of $36 million. More than half of this loss would be borne by the 68 Victorian farmers (BAE 1983) who own more than 10,000 leviable hens. A farmer owning 10,000 hens would lose $150,000; the 30 farmers who have more than 20,000 hens would lose more than $300,000 each. Thus to achieve further efficiency gains, beyond those obtainable by making quota freely transferable and ceasing to subsidize egg products, would involve a substantial redistribution of the current wealth of poultry farmers.

These remaining potential efficiency gains may be larger than the estimates in the paper suggest. There may be significant costs of distortions in input use because quotas are applied to a single input, hens, rather than output and because the hen levy system uses an input tax to finance an output subsidy. The rationale for hen quotas rather than egg quotas

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[7] In 1984, U.S. producers supplying an unregulated market received on average 72.3 (U.S.) cents per dozen eggs (USDA 1985). Using an average exchange rate of 86 U.S. cents per Australian dollar, in Australian currency the U.S. egg price is equivalent to 84.1 cents per dozen eggs. This is very similar to the estimate of the Victorian egg price that would have prevailed in an unregulated market in 1984–85.

[8] In Victoria both producers and governments have opposed free transferability. Governments are embarrassed by the high quota prices revealed by a free quota market. The implication is that free transfer of high priced quota is likely to be a short lived phenomenon, to be replaced either with (a) less freedom of transfer and/or concealment of the price, (b) policies to reduce quota rents and prices of quota, or (c) elimination of the quota. The Victorian Government went close to choosing the last option but has recently opted for a combination of options (a) and (b). Sieper (1982) discussed this type of problem.

is ease of enforcement. Even so it is believed at least 10 per cent and perhaps as much as 30 per cent of eggs are produced and sold outside the control of the Board. Thus it is not at all clear that the ease of enforcement of hen quotas, relative to egg quotas, justifies the costs of any input distortions that they cause. It might be possible to make some further net gains by replacing transferable hen quotas with transferable egg quotas, even allowing for enforcement costs. If quotas were eliminated, enforcement costs would be saved as well.

Three other features of the egg marketing arrangements warrant at least a mention. First, the VEMB sets egg prices regardless of seasonal shifts in supply and demand. In an attempt to offset this, quotas are routinely cut by ten per cent in spring and summer when productivity is highest. There will be some distortions in resource use and some hidden gains and losses as a result of stabilising the price in this manner. Second, the VEMB administers monopoly privileges to handle and distribute eggs. It is conjectured that a totally free market in eggs might lead to a ten to twenty cents per dozen reduction in handling and distribution charges[9]. Third, the analysis has treated hens and eggs as homogenous. In fact the VEMB applies price premiums for larger eggs and discounts for smaller sizes. These premiums and discounts are likely to be different from those which would result with free trade. At the same time the quota system modifies the relative costs of different grades. Thus, the regulations lead to a distortion in the relative prices and costs of different grades and the product mix.

The egg marketing arrangements in Victoria lead to a loss of consumer income, some of which is "transferred" to producers and the rest of which is dissipated as a deadweight loss to society. The BAE (1983) estimate of the "consumer transfer" to producers is too large for Victoria. On the other hand, the egg industry regulations are probably less benign than the BAE (1983) study would suggest. A most likely net annual social cost of the regulations of $9.8 million per year is suggested here for Victoria alone, compared to the BAE's (1983) estimate of $13 million for Australia as a whole. Further, the egg marketing arrangements have resulted in black markets, distortions in input use, inefficiencies in handling and distribution, and inefficiencies in seasonal pricing. These effects have social costs in addition to those due to having quotas with

limited transferability. Finally, there will be further gains to be made by freeing interstate trade.

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[9] During 1984, the farm-to-retailer marketing margin in Victoria averaged 39 cents per dozen (VEMB). In the unregulated U.S. market the comparable figure (using an exchange rate of 86 U.S. cents per Australian dollar) was 21 cents per dozen (USDA 1985).

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