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THE ECONOMICS OF RESTRICTING EXPORTS OF WOOL

by

Geoff Edwards*

Abstract

It is accepted in the economics literature that a country may be able to gain by restricting exports of commodities which face less than perfectly elastic foreign demand. The empirical evidence suggests that the elasticity of demand for Australia's exports of wool is low, but little interest has been shown in restricting wool exports. In the present paper, some of the major economic and other issues involved in thinking about restricting exports of Australia's wool are examined.

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THE ECONOMICS OF RESTRICTING EXPORTS OF WOOL

Geoff Edwards

It is well established that a country which can influence the terms on which it conducts its international trade may be able to gain by restricting the volume of its imports and exports (Corden 1974). The terms of trade case is the one economic argument conventionally accepted by economists for restricting a country's international trade.

In this paper consideration is given to the economics of restricting Australia's exports of wool. Australia is considered to have more influence on the world price of wool than of any other tradeable item. The economic case for departing from a policy of unrestricted trade therefore seems to be strongest for wool. It should be emphasised that the case for restricting exports of wool exists independently of Australia's current wool stockpile and stockpile-related debt. However, the presence of the stockpile and the wool debt gives rise to a particular opportunity for restricting exports which is outlined.

The paper has four sections. First, a brief account is given of some policy debates that represent a useful background for thinking about restricting exports of wool. Second, the economic case for restricting wool exports is outlined. Third, ways of restricting exports of wool are discussed, with attention being given to differences in the efficiency and distributional consequences of taxes and quotas. Fourth, some further issues that are relevant in considering the restriction of wool exports are noted.

Background

In this section a brief account is given of the role assigned to terms of trade considerations in certain policy discussions in Australia. Consideration is given first to debate at the macro/structural level, and then to discussion of policy for the wool industry.

The Bridgen Report of 1929 saw the tariff having the favourable effect of allowing a larger population to be supported in Australia at a given per capita income. This assessment

rested partly on the reasoning that, in the absence of the tariff, production of rural export items would have been higher, resulting in lower export prices.¹

The *Report of the Committee of Economic Enquiry* (1965) made little of terms of trade effects (see Vol.1, p.361). The Committee suggested that the wool industry bore proportionately more of the cost increases caused by tariffs than other industries (Vol.1, p.356). But it did not consider the extent to which it was *desirable* that wool be taxed more heavily than other industries by the tariff because of differences in elasticities of demand.

Turning to writing that focuses on *wool* policy, the restriction of exports as a long-term policy measure has received negligible attention in industry circles and from researchers. In fact, it is hard to find authors other than Edwards (1971, 1990, 1993) who have shown any interest in thinking about restricting wool exports on a long-term basis. Gruen (1972) suggested that the economic case for "countervailing protection" for primary industries did not apply to the wool industry. This qualification on terms of trade grounds to the argument for compensating assistance for export industries — an argument for taxing wool relative to other export commodities — was conceded at the in-principle level in the Rural Green Paper (Harris *et.al.* 1974), of which Gruen was a co-author (p.44). However, the practical significance of the qualification was not spelled out. Davidson and Stewardson (1979), in their case study of the wool industry, did not address the economic case for restricting exports of wool, even though they reported an estimate by Emmerly (1967) of -1.5 for the price elasticity of demand for Australian wool in the United Kingdom.

Gruen had earlier suggested (Gruen 1960, 1962) that "... the expansion of wool production resulting from pasture improvement may not be of direct benefit either to woolgrowers as a whole or to the Australian economy. The reason for this is that the increase in Australian wool output resulting from pasture improvement will have some effect on the average price obtained for the total Australian clip" (Gruen 1962, p.357). In effect, Gruen was suggesting that the return from pasture improvement was reduced because of the absence of a policy to restrict wool exports to their optimal level.

In a submission to the Wool Industry Review Committee (Garnaut Inquiry) (1993), Chisholm, Haszler, Edwards and Hone (1993) suggested that "There is *prima facie* a sound

economic argument for restricting Australia's exports of wool on a long-term basis" (p.29). The Garnaut Inquiry did not accept this suggestion. The Committee doubted that the demand for wool was so price inelastic that restrictions on supply would increase woolgrowers' incomes over the medium and long-term. These doubts existed despite the Committee's presentation of an estimate by Connolly (1992) of -1.01 for the long-run price elasticity of demand for Australia's exports of wool (WIRC, P.100). The Committee gave reasons, which are noted later, for taking the view that the price elasticity of demand relevant to the future was much higher than Connolly's estimate. The Committee went a step beyond its dismissal of the case for restricting wool exports: "The Committee is also of the view that there would be powerful arguments against controls on production or exports even if the 'optimal restriction' argument had merit" (p.56). Some of these arguments are considered later.

The neglect of long-term restriction of exports is especially surprising in view of the attention devoted to buffer stock schemes with reserve prices for wool (see A. Lloyd 1965, and references cited there). A buffer stock scheme for Australian wool raises prices by restricting exports when the buffer stock authority is buying. But it depresses prices when the authority is selling from its stocks, increasing exports. In standard analysis of buffer stock schemes, a necessary condition for them to benefit the wool industry is that the price elasticity of demand for wool is higher when the authority is selling wool than when it is buying it (eg. Powell and Campbell 1962).²

Given that there is no firm basis for thinking that a buffer stock cum reserve price scheme would raise the average price for wool over a period in which sales of stocks were equal to purchases, it might be thought that a continuing policy of restricting exports would have attracted more attention. The in-principle case for restricting exports when the foreign elasticity of demand is less than infinite is much more respectable than the economic case for a buffer stock cum reserve price scheme. In fact, a policy of restricting exports on a continuing basis has parallels with a one-sided — buying only — buffer stock scheme: the policy is always acting to pull prices up. But unlike buying activities by a buffer stock authority, the restriction of exports in other ways does not result in the accumulation of stocks that depress prices when they are sold — or by their mere existence.

The Economic Case for Restricting Exports

The conventional way of making the economic case for restricting trade when a country has influence over world prices relies on the fact that unrestricted trade will not under these conditions allow achievement of the conditions for Pareto efficiency, $DRS = DRT = FRT$, where DRS is the marginal rate of substitution between goods in domestic consumption, DRT is the marginal rate of transformation in domestic production and FRT is the marginal rate of transformation through foreign trade (Bhagwati and Ramaswami 1963, Corden 1974). Under competitive conditions, and in the absence of any other causes of inefficiency, the relationship achieved will be $DRS = DRT \neq FRT$. This is because decisions on trade will be made on the basis of relative prices, rather than relative marginal export revenues/marginal import costs, as is required for efficiency. In the two commodity case, where foreign exchange earned from the export commodity equals foreign exchange outlays for the import commodity, the conditions for efficiency can be achieved by restricting exports *or* imports (Corden 1974, p.160).

In the presence of many tradeable commodities, the existence of a potential welfare gain to a country from restricting trade in one commodity — wool — can be demonstrated more conveniently with a simple partial equilibrium approach. Three assumptions of the approach should be highlighted. First, it is assumed that all wool produced is exported — an assumption that is close to reality for Australia. Second, it is assumed that the inefficiency arising from the unexercised ability to restrict exports of wool to its advantage is the only source of inefficiency in the Australian economy. This assumption means either that there are no other factors causing inefficiency, or that other inefficiencies have been removed using first-best policies. Third, it is assumed that adoption of a policy of restricting exports has no repercussions on Australia through policies implemented in other countries.

The inefficiency in the wool export industry is shown in Figure 1. With the assumptions made, Australia's supply curve for wool is also a social marginal cost curve. The ROW excess demand curve for Australia's wool — or average revenue curve — is also shown, along with the corresponding marginal revenue curve. The equilibrium quantity of exports is Q and the equilibrium price P . However, exports in excess of Q' are made at a loss to Australia

— marginal national revenue is less than marginal costs. The welfare loss from producing and exporting quantity Q rather than Q' is given by area ABC .

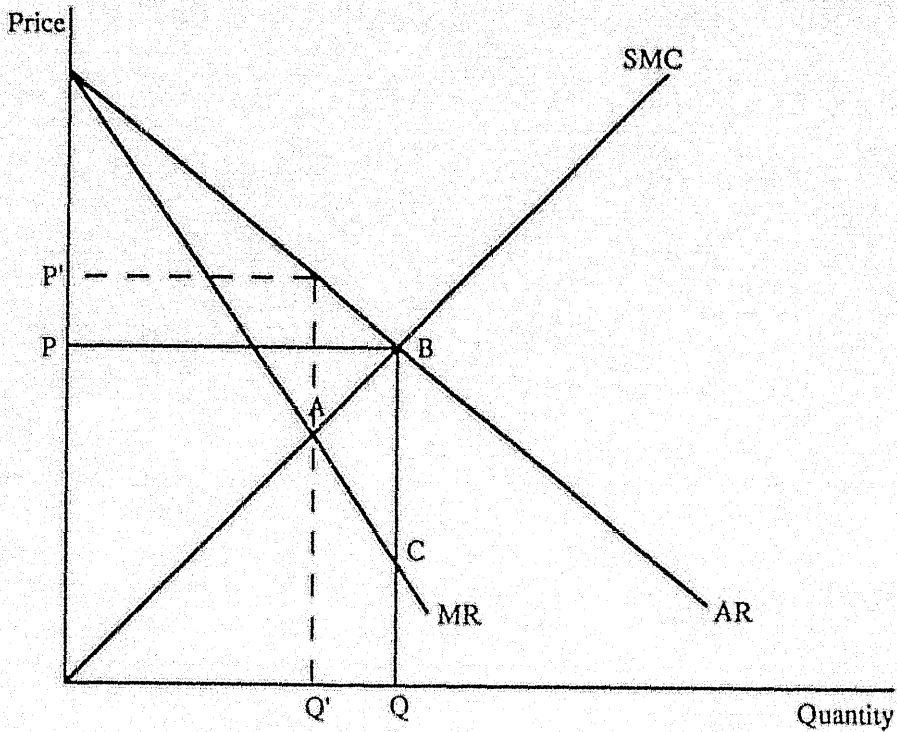


Figure 1: The economic loss from unrestricted exports of wool.

The size of the welfare loss depends on the price elasticity of demand for Australia's wool by the rest of the world (ROW) and on Australia's elasticity of supply of wool. The less elastic is ROW demand, the greater the economic loss to Australia from its super-optimal wool exports. The reason for this is that the less elastic is demand the larger is the gap between average revenue, on which decisions on how much to export are made, and marginal revenue to Australia from exports of wool. The size of the welfare loss increases with increasing domestic elasticity of supply of wool: greater responsiveness of supply adds to the surplus production occurring with any given distortionary gap between price and marginal revenue for wool. There is much uncertainty about the values of the price elasticity of demand and supply

for Australia's wool exports. For a summary of many of the estimates see Chisholm *et.al.* (1993). To give an indication of the possible national economic losses from exporting Q rather than Q', it may be noted that if the elasticity of demand for Australia's wool exports was between -0.5 and -2, and the elasticity of supply between 0.5 and 1.5, the annual loss to Australia with 1992-93 prices and quantities would range from \$0.18 billion to \$0.99 billion. With prices and quantities for earlier, more prosperous years, Australia's annual loss from unrestricted exports would have been higher than the loss with 1992-93 prices and quantities.

Ways of Restricting Exports

It would be possible to use price or non-price measures to restrict wool exports to Q'. An export tax would be a price measure while export quotas would be a non-price measure. The Commonwealth Government has power under the Constitution to introduce taxes or quotas on exports. Alternatively, under the assumption that all wool is exported, action by the state governments collectively to impose quotas on wool production or wool marketings would be equivalent to a quota on wool exports. In principle, and assuming no shifts in supply and demand, any of these approaches could be used to reduce wool exports efficiently from Q to Q'.

Another approach to reducing wool exports was used in 1990 - 91 in an attempt to sustain the reserve price scheme. That was a flock reduction scheme, subsidised by the wool industry from a levy on woolgrowers to fund "market support" activities (Australian Wool Corporation 1991). The aim of this scheme, developed by the AWC, was to humanely kill 20 million sheep, at a maximum budget cost to the wool industry of \$20 million. The scheme operated until the suspension of the reserve price scheme in February 1991, by which time 10.6 million sheep had been killed.³ A sheep slaughter program, because it singles out one woolgrowing input, hence increasing the costs of wool production, could not be expected to reduce wool exports in an efficient manner.⁴

The "optimal export tax", which would reduce wool exports to Q', is equal to the gap between price and marginal revenue, measured at Q'. This gap depends on the price elasticity of demand for Australia's wool exports. On the assumptions made, the optimal rate of export

tax is equal to $\frac{1}{\eta}$, where η is the price elasticity of demand for Australia's exports of wool at Q' (Graaff 1949; Corden 1974). It is easier to state this relationship than it is to use it to determine the optimal export tax for wool. There are at least three difficulties in applying the formula.

First, there are *many* price elasticities of demand for Australia's exports of wool, each corresponding to a different length of run. If for simplicity it is assumed that there are just two, a "short-run" elasticity and a "long-run" elasticity, *which* is relevant in calculating the optimal export tax? One view is that the relevant elasticity is an average of the short-run and long-run elasticities, with the long-run elasticity receiving less weight because the time period to which it applies is more distant. In effect the long-run elasticity of demand needs to be discounted (Repetto 1972).

The second difficulty in determining the optimal export tax is that there is much *uncertainty* about the size of the elasticity of demand, defined for any length of run, for Australia's exports of wool. Moreover, there is conflicting evidence that an elasticity for a specified adjustment period varies with the state of the wool market. For example, Dalton and Taylor (1975) found that the short-run elasticity of demand was higher at times of high wool prices than when wool prices were low, while Campbell, Gardiner and Haszler (1980) found the opposite.

The third difficulty is that, even with good estimates of the price elasticity of demand for actual market conditions in the estimation period, these estimates could have significant limitations for accurate determination of the optimal export tax. One reason for this is that the estimated elasticities of demand relate to demand under actual prices and quantities, such as the price-quantity equilibrium (PQ in Figure 1), rather than the equilibrium *with the optimal export tax in place*, $P'Q'$, which is relevant. Another reason is that the present price elasticity of demand might be different at any given price than in the estimating period. It was stated in the Wool Industry Review Committee (1993), for example, that the price elasticity of demand for Australia's wool exports had increased recently due to an increase in the share of wool going to price responsive markets such as China, and to technical developments making competing fibres closer substitutes for wool.

The difficulties outlined above are difficulties of *implementing* an optimal export tax for wool. They are not arguments against the *concept* of an export tax.

The effects of imposing the optimal export tax are shown in Figure 2. The optimal export tax is $P' - P''$ per unit of wool. The tax is equal to the excess of price over marginal revenue at the optimal level of exports, Q' . The export tax raises the export supply curve for wool by the amount of the tax — assumed in Figure 2 to be a constant percentage of the supply price. The loss in national welfare incurred with unrestricted exports, equal to area ABC, is eliminated.⁵ *Woolgrowers*, however, experience a welfare loss from imposition of the export tax. The loss is equal to area PBAP'', the difference in producer surplus with free trade in wool and with exports restricted to Q' by the optimal export tax.

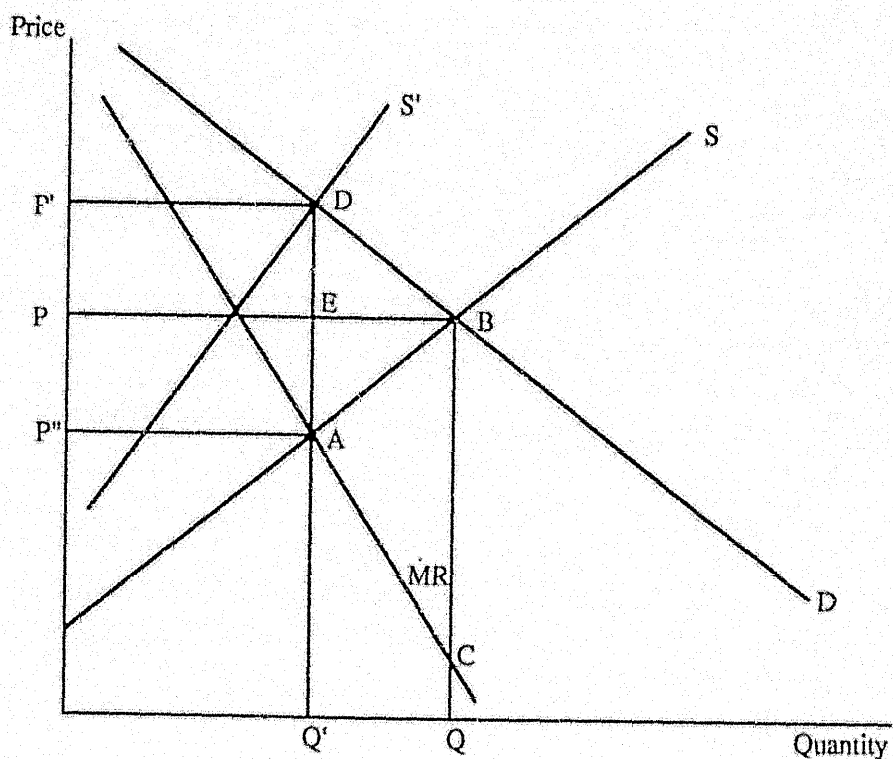


Figure 2: Effects of imposing an optimal tax on exports of wool.

One of the Garnaut Committee's 'powerful arguments' against restricting production or exports even if there were a terms of trade case for doing so was: "There would be a great practical problem in centrally determining the 'optimal level' of production" (p.56). This is an odd argument to advance if the terms of trade case for restricting exports is granted. It is analogous to opposing action to reduce pollution on the basis that it is hard to work out what reduction in pollution confers the largest social benefit. If exports of wool — or production of pollution — are greater than the social optimum, social welfare is maximised by reducing wool exports — or pollution — to the optimal level. But even if the reductions, in wool exports or pollution, proceed somewhat further than is optimal, social welfare will be greater than if no action were taken to reduce them. The idea that *nothing* should be done about a known excess of something because of uncertainty about the size of the *optimal* reduction appears to be a perfectionist approach inappropriate to a world in which what is sought are welfare improvements, not optimisation.

Many would view it as unfair to make woolgrowers worse off through a policy that increased national welfare by removing super-optimal exports of wool. Woolgrowers could benefit from imposition of the optimal export tax if sufficient of the revenue raised by the tax were returned to them. The return of export tax proceeds to woolgrowers would need to occur in a lump-sum fashion or growers would face an incentive to increase wool production, offsetting the effects of the tax. The most obvious way to decouple redistributions from current production would be to base them on woolgrowers' production in the past — for example, payments could be based on the average value of wool produced in the three years prior to the introduction of the export tax. The likelihood that pressure would emerge over time to update the base period used for redistributing tax revenue to woolgrowers — threatening the destruction of the lump-sum characteristic of the compensation — could be reduced by announcing when the tax was imposed that the compensation payments would be phased out over, say, seven years.

Alternatively, the risk of losing the lump sum characteristic of the redistribution could be removed, at a significant one-off cost to the federal budget, by paying in one year the capitalised stream of estimated annual payments to woolgrowers. There is, however, a moral

hazard problem with up-front compensation: compared with a series of annual payments, it would create an incentive for woolgrowers to lobby for removal of the export tax. This suggests that there is a trade-off between making compensation in a way that minimises the pressure to depart from a lump-sum arrangement and minimising the likelihood that the export tax itself will be overthrown.

Although the economic case for restricting exports is a long-term one, independent of the presence of the wool stockpile, the existence of a stockpile-related levy on wool production — currently $4\frac{1}{2}$ per cent — means that a de facto export tax, and the institutional mechanism for a higher tax, is already in place. Moreover, the application of proceeds from the stockpile levy to reducing the stockpile debt — while not qualifying as genuine lump-sum redistribution — would appear to have some attraction in political economy terms (Bardsley 1993; Edwards 1993).

There is another consideration that is relevant in assessing the economics of export taxes. Export taxes, like soundly formulated pollution taxes, raise revenue while improving efficiency. They therefore make it possible for governments to reduce other taxes that generate efficiency costs, while raising a given amount of revenue. The scope for reducing other taxes, and the deadweight losses to which they give rise, depends on the amount of revenue raised by export taxes and the proportion of this returned as compensation to those paying it.

In principle, as already noted, wool exports could be restricted to Q' using an efficient system of quotas. This would eliminate the welfare loss from excessive exports. The effect on wool producers would be very different from that of an export tax. Producers would receive the price P', compared with a net price of P'' with the optimal export tax — and a price of P with unrestricted trade. As with producers of pollution, producers of wool would prefer that production be reduced to the optimal level by means of a quota than by the use of a tax — assuming that tax revenue were not returned to producers. Compared with unrestricted trade, wool producers' annual gain from export quotas is equal to area P'DEP minus area EBA. ROW consumers lose surplus equal to area P'DBP. From a global view the welfare loss from an efficient export quota, as with the export tax, is equal to area DBA.

There are, however, reasons for thinking that quotas would not be as efficient as an export tax in reducing wool exports under conditions of shifting demand and supply. This is elaborated upon below.

Further Issues

In this section some additional matters that have been raised in relation to restricting Australia's exports of wool are recognised and considered briefly. These matters are: differentiating between wool types on the basis of demand characteristics in imposing restrictions on exports; differentiating between segments of the wool industry on the basis of production characteristics in restricting exports; the effects of restricting wool exports on the responsiveness of the wool industry to changing conditions; the implications for the restriction of wool exports if there is less than perfectly elastic foreign demand for some exports *other* than wool; and foreign policy issues.

The price elasticity of demand by ROW for Australia's wool exports could differ between classes. Suppose, to simplify, that wool is made up of "fine" wool and "coarse" wool. Recalling the formula for the price elasticity of demand for Australia's exports by the ROW, the elasticity of ROW demand for Australia's exports of the two categories of wool could differ because of differences between the two wool types in the elasticity of demand in the ROW or because of differences in their elasticities of supply in the ROW. If differences in price elasticities of demand for exports existed across wool types there would be a case for applying differential restrictions to different classes of wool exports. While the existence of such differences would complicate the introduction of efficient export taxes for wool, they would not support the status quo of using an export tax of zero on both (all) wool types.⁶

If exports of wool were restricted, would it be sensible to restrict wool from some regions or farm types more than others? We abstract here from the likely existence of an interaction between region and the issue discussed immediately above — wool type — which could justify differential restrictions on exports because of differences in elasticities of export demand. It may appear that wool production should be restricted more in areas where farmers have attractive alternative uses for their resources — such as wheat or beef production — and

less in areas where profitable substitutes are absent. This is not so. Firms with attractive alternatives to woolgrowing will face higher marginal cost curves for wool production, *ceteris paribus*, reflecting higher marginal opportunity costs, than firms with no alternatives. For efficiency it is necessary to create the incentives for firms with high opportunity costs and those with low opportunity costs to restrict production to the level where marginal national revenue equals marginal costs.

The Wool Industry Review Committee (1993) claimed that "any control on supply is likely to reduce the speed at which the industry reacts to changes" (p.56). This claim appears to be incorrect in the case of an *ad valorem* export tax: market measures that reduced or removed divergences between price and marginal social cost (or price and marginal national revenue) would *improve* incentives for adjusting efficiently to changes in supply and demand. It is true that restricting wool exports with *quotas* would be likely to reduce the response in wool exports caused by an increase in wool prices: policy delays and uncertainty would retard adjustment even if the size of the quota was increased in response to a stronger wool market.⁷ However, there seems to be no reason for *downward* adjustments in wool exports to be retarded by quotas, so long as there was no penalty for producers exporting less than their quota.

What are the consequences for the optimal restriction of wool exports if Australia possesses some influence on world prices of *other* tradeable items? As noted previously, there are implications only if policies to restrict optimally trade in items other than wool are absent. Then it is necessary to take account of losses to Australia that result because taxing wool exports causes resources to shift into the production of other export commodities, reducing their world prices. It can be expected that the reduction in the optimal export tax for wool on account of this general equilibrium consideration will be relatively small. This is because overall other rural export commodities face much more price elastic foreign demand than wool does, and because a part of the resources released from wool would move not into other export items but into the production of importable items.⁸

The likelihood of foreign responses to a policy of restricting Australia's exports of wool, and the consequences of any responses, would need to be assessed. However, it is

relevant that export taxes are not outlawed under the GATT as are the export subsidies which are widely used overseas.

Conclusion

Notwithstanding argument to the contrary in the Garnaut Report, the evidence on the price elasticity of demand for Australia's exports of wool suggests the potential for economic gains from restricting wool exports. Reductions in recent years in assistance for the wheat industry and for manufacturing industries have reduced the indirect taxing of woolgrowing and, *ceteris paribus*, have increased the case for directly restricting exports of wool. An *ad valorem* export tax appears to be the most efficient way to restrict wool exports. There are, however, difficulties in determining the optimal degree of restriction and the optimal rate of tax. These would need to be researched, as would foreign policy implications. On the assumption that it would be judged fair to return a substantial part of export tax proceeds to woolgrowers, the attractiveness of an export tax would depend on the feasibility of making satisfactory lump-sum type redistributions to the wool industry.

The economic case for restricting wool exports exists independently of the presence of the wool stockpile. However, while the stockpile-related debt exists, increasing the stockpile levy above its current level of $4\frac{1}{2}$ per cent would be an administratively easy way of imposing a *de facto* export tax. Since the proceeds of the levy are hypothecated for reducing the wool debt, it could reasonably be claimed that they were being used for the benefit of the wool industry.

1. Brigden *et al.* were more concerned about falls in the price of wheat than of wool. While not expressing a view on the relative price elasticities of demand for exports of these two commodities, they considered that wheat production would have been substantially greater and wool production little greater under conditions of free trade.
2. When allowance is made for possible benefits to woolgrowers from a reduction in price risk, there could be a gain from the operation of a buffer stock/reserve price scheme even if the price elasticity of demand in the selling period is not higher than in the buying period (Hinchy and Fisher 1988).
3. By February 1991 the AWC had also developed and prepared to implement a system of wool marketing quotas intended to limit shorn wool offered for export sale in 1991-92 to 750 kt. Plans for this scheme were also discontinued with the suspension of the reserve price scheme.
4. If the objective were to *increase* wool exports, it is possible that subsidising a single input could be more efficient than subsidising production/exports when allowance is made for the dead-weight losses involved in raising the revenue to pay the subsidy. (See Parish and McLaren 1982.)
5. From a *global* perspective there is a welfare loss from restricting exports. In Figure 2 the global welfare loss is equal to the welfare loss to domestic producers (area PBAP") plus welfare loss to ROW consumers (area P'DBP) minus gain in tax revenue to Australia (area P'DAP"). This gives a net world welfare loss equal to area DBA.
6. We abstract here from the tax for wool research and promotion, the stockpile tax, and indirect taxation of wool via assistance for other industries.
7. The responsiveness of wool exports to a price rise would be somewhat greater if there was an automatic expansion in quota as the price of wool increased.
8. Australia is generally considered to be a price taker in world markets for items that it imports. To the extent that Australia does possess unexploited influence over prices for importables, this works to *increase* the optimal export tax for wool.

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