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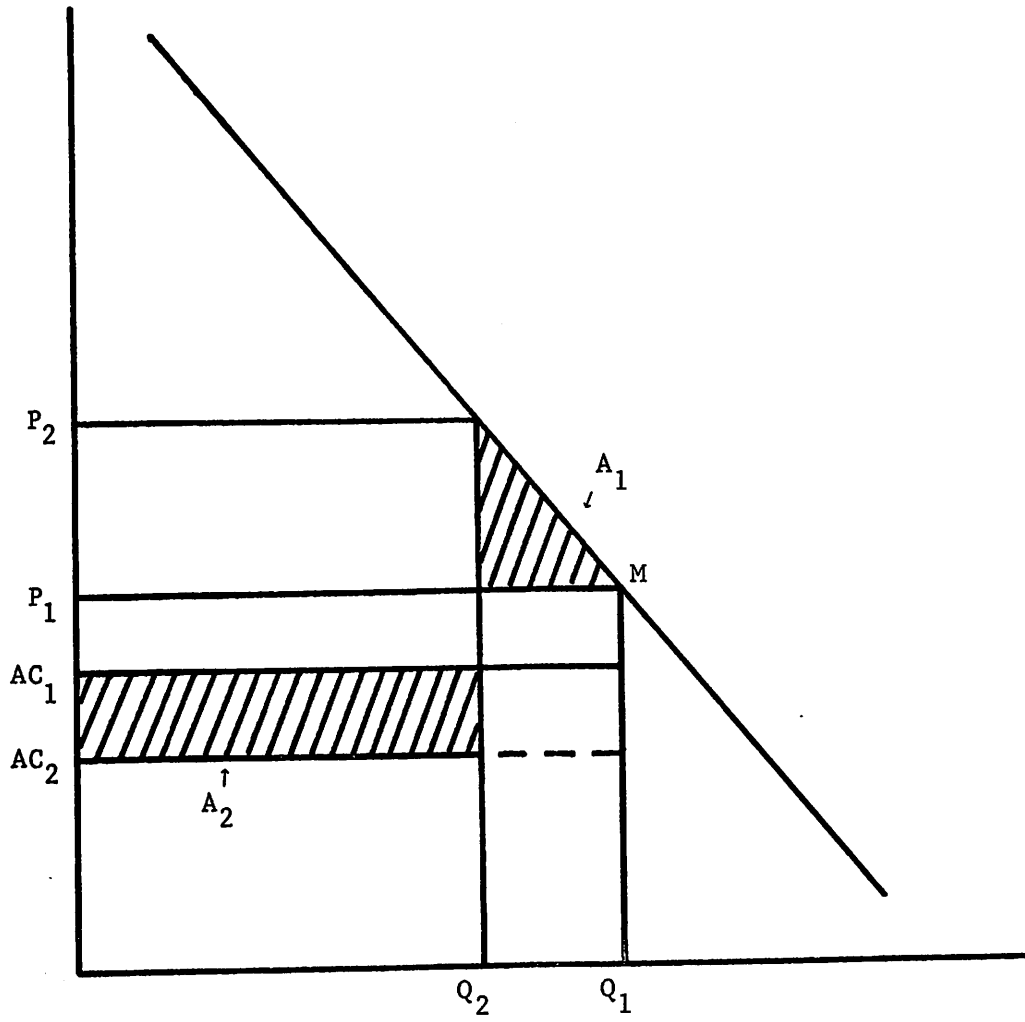
MERGER POLICY AND TRADE POLICY  
IN AN OPEN ECONOMY

Williamson has demonstrated in his path-breaking article that under certain plausible conditions some mergers might lead to an improvement in social welfare because gains to society due to economies of scale could hypothetically more than compensate consumers for the higher prices and diminished consumer's surplus resulting from increased monopoly power.<sup>1</sup> Furthermore, the trade literature abounds with discussions of economies of scale and trade policy.<sup>2</sup> This paper extends Williamson's model for small open economies by exploring the possibility that mergers leading to economies of scale in an industry might be even more beneficial for an open economy than they would be for a closed economy. First, Williamson's model is briefly summarized; next it is extended to situations involving mergers in economies facing international competition with and without tariffs; finally, it is extended to open economies in which import quotas are held by foreigners. A concluding section discusses possible policy issues arising from the analysis.

Williamson's "Naive" Model in Which Merging Firms  
Have Prior Monopoly Power

The framework for this analysis can best be summarized in Figure 1. There are several firms in the industry originally producing output  $Q_1$ , and selling the output at price  $P_1$ . The average costs for these firms of producing output  $Q_1$  are  $AC_1$ . The firms have some monopoly power, in that  $P_1$  is greater than  $AC_1$ , but they may not be able to perfectly collude, either tacitly or explicitly, so that  $P_1$  is not a joint profit maximizing price for these firms. It is expected that as a result of mergers these firms

Figure 1



will gain additional monopoly power. Their post-merger price will be  $P_2$  and their post-merger output will be  $Q_2$ . The merger has permitted them, though, to exploit economies of scale so that the average cost of producing  $Q_2$  is  $AC_2$ , which is less than  $AC_1$ . It can be argued, with the aid of numerous assumptions,<sup>3</sup> that the merger will be socially beneficial if the shaded rectangle,  $A_2$ , is of greater area than the shaded triangle,  $A_1$ . It is readily apparent that if the tariff on the output in question is so high that it would be prohibitive for all imports even at price  $P_2$ , then there is little to add to Williamson's analysis. The one possible exception is that it appears that many small, open economies have many industries in which there are more unexploited economies of scale to be gained by merging firms than there would be in U.S. industries.<sup>4</sup> In these cases, the social saving resulting from the merger would be larger than it would be from a similar merger in a larger economy. Consequently, Williamson's analysis should provide an even stronger defence for many mergers in these smaller economies.

#### Merger Policy and Constraining Tariffs

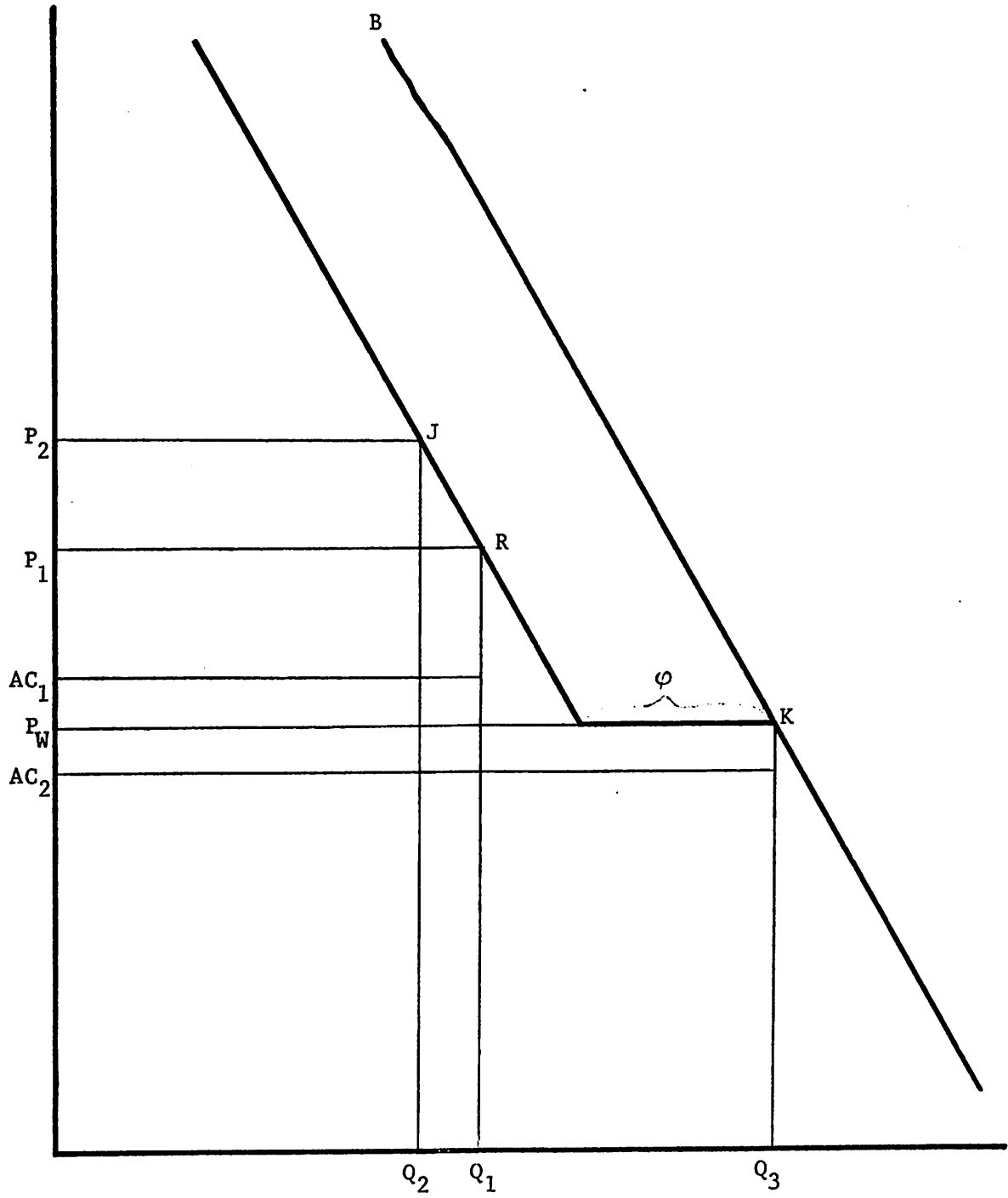
Suppose the tariff were such that it was prohibitive to imports before the merger took place, but low enough that it constrained the post-merger monopoly power of the firms so that they could not raise the market price all the way up to  $P_2$ . A constraining tariff of this type has exactly the same effect as a smaller increase in the market price of the output in Williamson's model. For example, if  $P_2$  is 30 percent greater than  $P_1$  but the tariff constrained the post-merger firm to only a 10 percent price increase, the loss in consumer's surplus will be smaller than it otherwise would be with no offsetting reduction in rectangle  $A_2$ . The situation here is no different

from Williamson's numerical examples, using a 10 percent price increase resulting from the merger. Because mergers resulting in only 10 percent price increases rather than 30 percent price increases can have the loss of consumer's surplus offset with smaller cost reductions due to economies of scale, mergers in industries in which there is a constraining tariff will be even more likely to generate domestic gain. Of course, if the tariff constrains the pre-merger firms so that price  $P_1$  is constrained by the tariff, there would be no possibility for price increases following the merger, and hence no loss in consumer's surplus resulting from the merger. In this last case, there is no reason to prohibit the merger just as there is no reason to prohibit mergers between firms producing goods for which there is no tariff. Finally, it should be pointed out that if as a result of the merger, economies of scale can be gained to the extent that the country can become an exporter rather than an importer of the good in question, the gains to the economy from permitting the merger to take place will be even larger than those predicted by the model.

#### Merger Policy and Import Quotas

Suppose there is no tariff on the good in question, and that in the absence of imports, the domestic firms would face demand curve B in Figure 2. If domestic non-producers or foreign producers hold import licences allowing them to import amount  $\phi$ , then the demand curve facing the pre-merger firms will be shifted to the left by the amount  $\phi$  for all prices above the world price,  $P_W$ , as indicated in Figure 2. If the pre-merger and post-merger prices and unit costs, respectively, are  $P_1, AC_1$  and  $P_2, AC_2$ , Williamson's analysis can be applied in a straightforward fashion unless the post-merger costs,  $AC_2$ , are sufficiently low that the post-merger firm finds it more

Figure 2



profitable to produce output  $Q_3$  and charge the world price to its domestic consumers. Roughly speaking, this possibility exists if  $AC_2$  is near the marginal costs of production by foreigners, if  $P_W - AC_2$  is approximately equal to the transportation costs of shipping the good from the foreign country to this country, and if transportation costs are large relative to the costs of production. To determine the likelihood of this possibility one must consider the conditions under which the area of rectangle  $AC_2K$  divided by the area of rectangle  $AC_2J$  is greater than one, or the conditions under which

$$\frac{(P_W - AC_2) Q_3}{(P_2 - AC_2) Q_2} > 1$$

Using the following relationships,

$$Q_2 = Q_1 \left( 1 - \eta \frac{\Delta P}{P_1} \right)$$

$$Q_3 = \varphi + Q_1 + Q_1 \eta \left( 1 - \frac{P_W}{P_1} \right)$$

or

$$Q_3 = \varphi + Q_1 + Q_1 \eta \left( 1 - \frac{1 + \frac{P_W - AC_2}{AC_2}}{P_1/AC_2} \right)$$

and

$$P_2 - AC_2 = AC_2 \left( \frac{P_1}{AC_2} \left( 1 + \frac{\Delta P}{P_1} \right) - 1 \right)$$

the decision criterion becomes



$$(1) \quad \frac{\left( \frac{P_W - AC_2}{AC_2} \right) \left[ \frac{\phi}{Q_1} + 1 + \eta \left( 1 - \frac{1 + \frac{P_W - AC_2}{AC_2}}{P_1/AC_2} \right) \right]}{\left[ \frac{P_1}{AC_2} \left( 1 + \frac{\Delta P}{P_1} \right) - 1 \right] \left( 1 - \eta \frac{\Delta P}{P_1} \right)}$$

where

$\left( \frac{P_W - AC_2}{AC_2} \right)$  is the percentage by which post-merger costs are expected to be below the world price. Again, if  $AC_2$  is approximately equal to the marginal costs of production in foreign countries, this term is approximately equal to the percentage that per unit transportation costs are of the production costs of imports.

$\frac{\phi}{Q_1}$  is the ratio of permitted imports to pre-merger domestic production.

$\frac{P_1}{AC_2}$  is the ratio of the pre-merger price to post-merger unit costs, or approximately the proportion by which the domestic pre-merger price is elevated above the marginal costs of production for foreigners.

$\eta$  is the price elasticity of demand estimated at price  $P_1$ .  

$$\eta = - \frac{\Delta Q}{\Delta P} \frac{P_1}{Q_1} .$$

$\frac{\Delta P}{P_1}$  is the percentage by which the post-merger firm might be expected to increase the price.  $\Delta P = P_2 - P_1$  .

Because this expression has five different variables in it, it does not readily lend itself to discussion without simulation using various ranges of values for each of the variables. These calculations were carried out, and Tables 1 through 4 report the minimum values of  $P_W/AC_2$  for which the post-merger firm would expand its output to  $Q_3$  and charge the world price,  $P_W$ . It is apparent from these tables that the merger-induced cost reductions necessary for this expansion will be lower for lower values of  $\Delta P/P_1$  and for higher values of  $\varphi/Q_1$ . Furthermore, if  $1 - (P_W/AC_2)$  is approximately equal to the proportion of the world price accounted for by transportation costs, these transportation costs must be a fairly large fraction of  $P_1/AC_2$ . For policy-making purposes, government officials would be able either to use criterion (1) directly based on their own estimates of the values of the variables appearing in that inequality, or to go directly to the relevant section of Tables 1 through 4 to determine whether or not the post-merger firm would be likely to expand its production and charge a lower domestic price. If it is expected that the post-merger firm would expand its production, a social gain from merger would be expected in that the domestic price would be lowered, domestic output would be increased, and the unit costs of production would be reduced.

#### Combining Merger Policy and Trade Policy

This analysis has indicated that regardless of the type of protection provided for domestic producers, the lower is the level of this protection, either in the form of lower tariff rates or higher import allowances, the more likely are mergers to generate net social gains for a small open economy. This result suggests that if it is politically not feasible just to reduce tariffs to provide an incentive for industrial rationalization in

TABLE 1

Minimum Values of  $P_W/AC_2$  for Which the Post-Merger Firm Would Expand Its Output to  $Q_3$  and Charge  $P_W$ ,  $\eta = 0.5$

$\phi/Q_1$	$P_1/AC_2$	$\Delta P/P_1$					
		.05	.10	.15	.20	.25	.30
.20	1.10	-	-	-	-	-	-
	1.15	-	-	-	-	-	-
	1.20	-	-	-	-	-	-
	1.25	-	-	-	-	-	-
	1.30	-	-	-	-	-	-
	1.35	-	-	-	-	-	-
.40	1.10	-	-	-	-	-	-
	1.15	1.14	-	-	-	-	-
	1.20	1.19	-	-	-	-	-
	1.25	1.23	-	-	-	-	-
	1.30	1.27	-	-	-	-	-
	1.35	1.29	-	-	-	-	-
.60	1.10	-	-	-	-	-	-
	1.15	1.13	-	-	-	-	-
	1.20	1.16	-	-	-	-	-
	1.25	1.19	1.22	-	-	-	-
	1.30	1.22	1.25	1.29	-	-	-
	1.35	1.25	1.28	1.32	-	-	-
.80	1.10	1.08	-	-	-	-	-
	1.15	1.11	1.14	-	-	-	-
	1.20	1.14	1.17	-	-	-	-
	1.25	1.17	1.20	1.23	-	-	-
	1.30	1.20	1.23	1.25	1.28	-	-
	1.35	1.22	1.25	1.28	1.31	1.33	-
1.00	1.10	1.07	-	-	-	-	-
	1.15	1.10	1.13	1.15	-	-	-
	1.20	1.13	1.15	1.18	-	-	-
	1.25	1.15	1.18	1.20	1.23	-	-
	1.30	1.17	1.20	1.23	1.25	1.27	-
	1.35	1.20	1.23	1.25	1.28	1.30	1.32

Code: - indicates there were no values of  $P_W/AC_2 < P_1/AC_2$  satisfying the criterion.

TABLE 2

Minimum Values of  $P_W/AC_2$  for Which the Post-Merger Firm Would Expand Its Output to  $Q_3$  and Charge  $P_W$ ,  $\eta = 1.0$

$\phi/Q_1$	$P_1/AC_2$	$\Delta P/P_1$					
		.05	.10	.15	.20	.25	.30
.20	1.10	-	-	-	-	-	-
	1.15	-	-	-	-	-	-
	1.20	-	-	-	-	-	-
	1.25	1.25	-	-	-	-	-
	1.30	1.29	-	-	-	-	-
	1.35	1.33	-	-	-	-	-
.40	1.10	-	-	-	-	-	-
	1.15	1.14	-	-	-	-	-
	1.20	1.17	-	-	-	-	-
	1.25	1.21	1.24	-	-	-	-
	1.30	1.24	1.27	-	-	-	-
	1.35	1.27	1.31	1.33	-	-	-
.60	1.10	1.09	-	-	-	-	-
	1.15	1.12	1.15	-	-	-	-
	1.20	1.15	1.18	-	-	-	-
	1.25	1.18	1.21	1.23	1.25	-	-
	1.30	1.21	1.23	1.26	1.28	1.29	-
	1.35	1.24	1.27	1.29	1.31	1.32	1.33
.80	1.10	1.08	-	-	-	-	-
	1.15	1.11	1.13	-	-	-	-
	1.20	1.13	1.16	1.18	-	-	-
	1.25	1.16	1.19	1.20	1.22	1.23	1.24
	1.30	1.19	1.21	1.23	1.25	1.26	1.27
	1.35	1.21	1.23	1.25	1.27	1.28	1.29
1.00	1.10	1.07	1.09	-	-	-	-
	1.15	1.10	1.12	1.14	-	-	-
	1.20	1.12	1.14	1.16	1.17	1.19	1.20
	1.25	1.15	1.17	1.18	1.20	1.21	1.22
	1.30	1.17	1.19	1.21	1.22	1.23	1.24
	1.35	1.19	1.21	1.23	1.24	1.25	1.26

Code: - indicates there were no values of  $P_W/AC_2 < P_1/AC_2$  satisfying the criterion.

TABLE 3

Minimum Values of  $P_W/AC_2$  for Which the Post-Merger Firm Would Expand Its Output to  $Q_3$  and Charge  $P_W$ ,  $\eta = 1.5$

$\phi/Q_1$	$P_1/AC_2$	$\Delta P/P_1$					
		.05	.10	.15	.20	.25	.30
.20	1.10	-	-	-	-	-	-
	1.15	-	-	-	-	-	x
	1.20	-	-	-	-	-	x
	1.25	1.24	-	-	-	-	x
	1.30	1.28	1.30	-	-	x	x
	1.35	1.31	1.33	-	-	x	x
.40	1.10	-	-	-	-	-	-
	1.15	1.14	-	-	-	-	x
	1.20	1.17	1.19	-	-	-	x
	1.25	1.20	1.22	1.24	1.25	-	x
	1.30	1.23	1.25	1.27	1.28	x	x
	1.35	1.26	1.28	1.29	1.30	x	x
.60	1.10	1.09	-	-	-	-	-
	1.15	1.12	1.14	-	-	-	x
	1.20	1.15	1.17	1.18	1.19	-	x
	1.25	1.17	1.19	1.21	1.21	1.22	x
	1.30	1.20	1.22	1.23	1.23	x	x
	1.35	1.22	1.24	1.25	1.26	x	x
.80	1.10	1.08	1.10	-	-	-	-
	1.15	1.11	1.13	1.14	1.15	1.15	x
	1.20	1.13	1.15	1.16	1.17	1.17	x
	1.25	1.15	1.17	1.18	1.19	1.19	x
	1.30	1.17	1.19	1.20	1.21	x	x
	1.35	1.20	1.21	1.22	1.22	x	x
1.00	1.10	1.06	1.09	1.10	-	-	-
	1.15	1.09	1.11	1.12	1.13	1.14	x
	1.20	1.12	1.13	1.14	1.15	1.15	x
	1.25	1.14	1.15	1.16	1.17	1.17	x
	1.30	1.16	1.17	1.18	1.18	x	x
	1.35	1.18	1.19	1.20	1.20	x	x

Code: - indicates there were no values of  $P_W/AC_2 < P_1/AC_2$  satisfying the criterion.

x indicates that for the given conditions, it would be unprofitable for a pure monopolist to increase prices this much.

TABLE 4

Minimum Values of  $P_W/AC_2$  for Which the Post-Merger Firm Would  
Expand Its Output to  $Q_3$  and Charge  $P_W$ ,  $\eta = 2.0$

$\phi/Q_1$	$P_1/AC_2$	$\Delta P/P_1$					
		.05	.10	.15	.20	.25	.30
.20	1.10	-	-	-	-	x	x
	1.15	-	-	-	-	x	x
	1.20	1.19	-	-	x	x	x
	1.25	1.23	1.25	-	x	x	x
	1.30	1.26	1.28	1.28	x	x	x
	1.35	1.29	1.31	x	x	x	x
.40	1.10	1.10	-	-	-	x	x
	1.15	1.13	-	-	-	x	x
	1.20	1.16	1.18	1.19	x	x	x
	1.25	1.19	1.20	1.21	x	x	x
	1.30	1.22	1.23	1.23	x	x	x
	1.35	1.24	1.25	x	x	x	x
.60	1.10	1.09	-	-	-	x	x
	1.15	1.11	1.13	1.14	1.14	x	x
	1.20	1.14	1.16	1.16	x	x	x
	1.25	1.16	1.18	1.18	x	x	x
	1.30	1.19	1.20	1.20	x	x	x
	1.35	1.21	1.22	x	x	x	x
.80	1.10	1.07	1.09	-	-	x	x
	1.15	1.10	1.11	1.12	1.13	x	x
	1.20	1.12	1.14	1.14	x	x	x
	1.25	1.14	1.15	1.16	x	x	x
	1.30	1.16	1.17	1.17	x	x	x
	1.35	1.18	1.19	x	x	x	x
1.00	1.10	1.06	1.08	1.09	1.10	x	x
	1.15	1.09	1.10	1.11	1.11	x	x
	1.20	1.11	1.12	1.13	x	x	x
	1.25	1.13	1.14	1.14	x	x	x
	1.30	1.15	1.16	1.16	x	x	x
	1.35	1.17	1.17	x	x	x	x

Code: - indicates there were no values of  $P_W/AC_2 < P_1/AC_2$  satisfying the criterion.

x indicates that for the given conditions, it would be unprofitable for a pure monopolist to increase prices this much.

these economies, it might at least be appealing to combine merger policy and trade policy for the same end. Government officials, if given the necessary authority, might be willing to permit mergers to take place if at the same time the protection of domestic industries can be reduced. For example, the tariff could be reduced so that in Figure 1 the post-merger price would be  $P_1$  or even lower, and yet the firms would find it advantageous to merge since the area of rectangle  $AC_2M$  would be greater than the area of rectangle  $AC_1M$ . Alternatively, the amount of imports permitted could be increased so that in Figure 2 the area of rectangle  $AC_2K$  while perhaps less than the area of rectangle  $AC_2J$  with the current value of  $\varphi$  would be greater than what the area of rectangle  $AC_2J$  and the area of rectangle  $AC_1R$  would be if  $\varphi$  were increased at the same time. In either case the firms would find the merger profitable, yet the loss of consumer's surplus could be reduced or eliminated.

One problem with these policy possibilities is that they represent unilateral protection reductions by the small open economy. It is possible that as a result of the merger the economy could be a net exporter of this good if other countries would similarly reduce their levels of protection. Consequently, this economy may wish to negotiate bilateral reductions in the levels of production protection. The government officials may see it in their own economy's benefit to permit a merger and reduce the level of protection, but they may also see that it would be possible for them to have an even greater increase in social welfare if simultaneously they could negotiate a reduction in the level of protection in other countries. Coordinating the timing and the bargaining strengths of all parties involved may prove to be at best a difficult task for these officials, but it seems plausible that in some cases the officials may wish to apparently reduce social welfare by

prohibiting some mergers in order to use protection reduction in these industries as a bargaining tool for foreign protection reduction in other industries.



Footnotes

<sup>1</sup>O. E. Williamson, "Economies as an Anti-Trust Defence: The Welfare Trade-offs," A.E.R. (3/68), pp. 18-36, as amended and reprinted in C. K. Rowley, Readings in Industrial Economics (vol. II), Macmillan, 1972.

<sup>2</sup>See H. C. Eastman and S. Stykolt, The Tariff and Competition in Canada, Macmillan, 1967.

<sup>3</sup>The number and nature of these assumptions are quite heroic. Williamson (op. cit.) extends his discussion to include the effects of increased monopoly power on technical progress, organization slack, and income distribution. He also mentions the problems of second-best considerations and general equilibrium effects. Applying this model also necessitates skirting the issue of the meaning of consumer's surplus (see E. Silberberg, "Duality and the Many Consumer's Surpluses," A.E.R. (12/72), pp. 942-52).

<sup>4</sup>See F. M. Scherer, "The Determinants of Industrial Plant Sizes in Six Nations," R.E. Stat. (5/73), pp. 135-45.