

THE ANALYSIS OF EFFICIENCIES IN *SUPERIOR PROPANE*: CORRECT CRITERION INCORRECTLY APPLIED

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Introduction

In the Winter 1999-2000 issue (Vol. 19, No.4) of this publication, Michael Trebilcock and Ralph Winter reviewed the state of the efficiency defence in the assessment of proposed mergers in Canada prior to the decision of the Competition Tribunal in *The Commissioner of Competition v. Superior Propane Inc.*¹ In this commentary, we discuss the analysis of efficiencies in the majority decision in *Superior Propane*. We suggest that the criterion for the efficiency defence set out in *Superior Propane* has economic support and adds substantial certainty to merger policy in Canada, but that the criterion was applied incorrectly in the evidence submitted in the case.

Section 96 of the *Competition Act* states that the Tribunal will allow a proposed merger to proceed even if the merger leads to a substantial lessening of competition providing the efficiency gains uniquely attributable to the merger offset and are greater than any lessening of competition. In spite of the treatment of efficiencies in merger cases before the Tribunal, and the publication of *Merger Enforcement Guidelines* (“MEGs”) by the Competition Bureau, the interpretation of section 96 and the general role of efficiencies in merger review in Canada were in an uncertain state prior to *Superior Propane*. The MEGs (section 5.5) state that in trading off efficiencies and lessening of competition the Bureau would not challenge a merger if the merger led to an increase in total surplus, i.e. consumer surplus plus seller profits.² The MEGs’ justification for the use of the total surplus criterion, without regard to distribution of gains between buyers and sellers, is that “[w]hen a dollar is transferred from a buyer to a seller, it cannot be determined *a priori* who is more deserving, or in whose hands it has a greater value”.³ The Tribunal’s *obiter dictum* in *Canada (Director of Investigation and Research) v. Hillsdown Holdings (Canada) Ltd.*⁴ questioned the neutrality of transfers between buyers and sellers and left the law uncertain as to the balancing test in the application of section 96. Howard Wetston, the Director of Investigation and Research at the time of *Hillsdown*, reassured the business community that in enforcing the law, the Bureau would continue to apply the approach adopted in the MEGs.⁵ More recently, however, the Bureau has proposed a two-stage test that departs from the simple total surplus standard and which is quite confusing (Trebilcock and Winter, at 110-111). A senior Bureau official has also recently stated that in cases where a merger creates a substantial lessening of competition but would pass under the total surplus standard, the Bureau “feels that it is more appropriate for the Tribunal to determine whether the merger increases aggregate welfare or not.”⁶

The Theory of the Total Surplus Criterion in *Superior Propane*

Superior Propane, if it is upheld on appeal, provides a categorical end to the uncertainty in the criteria for balancing efficiencies and competition-lessening effects of a merger. The decision endorses essentially without qualification the total surplus criterion. Issues of income redistribution do not matter in merger

assessment under *Superior Propane*: a dollar received by individuals as shareholders counts as much as a dollar received by individuals as consumers. This endorsement of total surplus by the Tribunal was not qualified in spite of evidence by an expert witness (Professor Peter Townley) that the redistribution of income resulting from the merger would likely be regressive, i.e. from less wealthy individuals to more wealthy individuals. Professor Townley had offered an approach in which the members of the Tribunal were “invited to use their individual judgment and discretion to evaluate whether the gains to shareholders are more or less important to society than the losses of surplus imposed on consumers by the exercise of market power” (431). The Tribunal’s endorsement of the total surplus standard and efficiency as an objective of merger policy is strongly phrased: “[E]fficiency was Parliament’s paramount objective in passing the merger provisions of the Act and it intended the efficiency exception in subsection 96(1) to be given effect. Accordingly, the Tribunal is not prepared to adopt a standard that frustrates the attainment of that objective.” (437)

The endorsement of the total surplus standard, which stands in sharp contrast to both the Tribunal’s *obiter dictum* in *Hillsdown* and the recent backtracking by the Bureau on the standard, is justified in *Superior Propane* on the following grounds. First, in the Tribunal’s reading of the *Competition Act*, “distributional concerns do not fall within the ambit of the merger provisions of the Act” (432). Second, “merger review must be predictable. Adopting Professor Townley’s approach would result in decisions that vary from case to case depending on the views of the sitting members of the Tribunal regarding the groups affected by the mergers” (433). Third, the evidence showed that the transfer from buyers to sellers resulting from the merger was much larger than the deadweight loss.⁷ As a consequence “a standard that includes the transfer as an effect under subsection 96(1) would effectively result in the unavailability of the section 96 defence” (434). Fourth, government instruments such as specific tax and other social policy measures are more effective than merger policy as ways of meeting distributional objectives (438). Finally, the Tribunal cites the MEGs’ support of the total surplus standard. While noting that it is not bound by these guidelines, the Tribunal “recognizes that they contain a substantial degree of economic expertise” and agrees with the MEGs’ observation cited above that when a dollar is transferred from a buyer to a seller, it cannot be determined *a priori* who is more deserving, or in whose hands it has a greater value (439).

The purely legal arguments for total surplus as a criterion to be read directly into section 96 of the *Competition Act* are less than persuasive. Just as the *Superior Propane* Tribunal could state “If Parliament had intended that transfers from consumers to shareholders be considered, it would no doubt have clearly stated this intent in the Act” (432), the *Hillsdown* Tribunal was able to state “If only allocative efficiency or the deadweight loss to the Canadian economy was intended by Parliament to be weighted in the balance then one would have thought that the section would have been drafted to specifically so provide”.⁸ Section 96 of the Act is ambiguous.

It is obviously within the mandate of the Tribunal to provide an interpretation of the statute, however, and the economic arguments that the Tribunal draws upon to support its interpretation are persuasive. Professor Townley’s approach, submitted in evidence on behalf of the Commissioner, invites the Tribunal to apply welfare weights based largely or exclusively on the regressivity of the transfer from consumers to shareholders (a “welfare-weights” approach). Are consumers of the products produced by the merging firms among the less wealthy members of society, and if so to what extent should the transfer be regarded as a negative outcome of the merger? In Professor Townley’s approach, the negative outcome would be

incorporated in “balancing weights” or welfare weights attached to surplus accruing to individuals of different wealth levels. The Tribunal’s decision to reject this approach has merit. If one were to incorporate redistributive effects in merger analysis, then it would be necessary to consider not just the wealth of consumers but also the wealth of the shareholders of the merging firms. The income redistributive effect of a transfer from one group of individuals to another depends on the wealth levels of both groups. If redistributive effects were consistently accounted for, a merger that was unacceptable when wealthy Canadian families closely held the merging firms would suddenly become acceptable if a teachers’ pension fund bought the shares. The incentives for share ownership by wealthy and less wealthy individuals would then be affected, the impact of merger policy on these incentives would become an issue for concern, and merger analysis could become hopelessly complex.

Furthermore, carrying the welfare-weights approach to its full conclusion means that mergers such as the IntraWest acquisition of Whistler Mountain (which combined the adjacent Blackcomb and Whistler mountain ski areas) could be accepted in spite of the prediction of negative cost efficiencies and a positive deadweight loss because the merger produced a favourable redistribution of wealth from very wealthy consumers (on average) to less wealthy shareholders. A welfare-weights approach results in acceptance of some transactions with overall negative net efficiencies, including the deadweight loss, if the distribution of wealth is improved with the transactions. Sections 92 and 96 of the Act do not provide for decisions involving both a lessening of competition and negative efficiencies; therefore this example shows that these sections are not fully consistent with a welfare weights approach to merger policy.

The Application of the Total Surplus Criterion in *Superior Propane*

Deadweight Loss Calculations

The application of a total surplus standard to decide whether a merger increases welfare reduces to a comparison of the total efficiencies that are realized with a merger against the deadweight loss caused by the merger if the merger lessens competition, causing prices to rise. From the evidence submitted in the case, the Tribunal arrived at estimates of total efficiencies from the merger of approximately \$29 million (annualized, for a period of ten years) and a deadweight loss associated with the merger of approximately \$3 million (383, 455). The Tribunal’s estimates of the deadweight loss rest on the evidence submitted by Professor Michael Ward on behalf of the Commissioner (455, 458).

Professor Ward provides estimates of the individual demand elasticities (or price-responsiveness) for the merging parties in his evidence and from these simulates or predicts the price increases and deadweight loss that would result from the merger. The average predicted price increase across subsectors of the propane market is approximately 9% (453, 457). According to Professor Ward, prior to the merger, Superior and ICG each exercised market power: the estimated elasticity of demand facing the individual firms was between -1.9 and -3.9 (or approximately -3).⁹

An individual-firm demand elasticity of -3 in the pre-merger market implies that pre-merger prices are already 50% higher than marginal cost. A profit-maximizing firm sets price according to the following formula (called the Lerner relationship):

$$\frac{P - c}{P} = \frac{1}{e}$$

where P is price, c is cost and e is the (absolute value of the) firm's own demand elasticity.¹⁰ An estimate that e is 3 is *ipso facto* an estimate that P exceeds c by 50%.

One source of market power in the pre-merger market according to Professor Ward's evidence is the incorporation by each of the two major firms of the price response by its rival to changes in its own price. Professor Ward estimates that Superior responded to price increases by ICG by matching each one percent price increase with about a two-thirds of a percentage price increase. (Professor Ward assumes in his evidence that the response by ICG to Superior's price changes is symmetric.)¹¹ If zero market power were exercised in the pre-merger market, in contrast to Professor Ward's evidence, then prices would approximate marginal cost and each firm would be a "price-taker" rather than responding to price increases of its rivals.

Professor Ward's deadweight loss estimates are based on Figure 1, which is produced from his evidence¹². In this figure, the downward-sloping demand curve represents consumers' reservation prices or willingness to pay for the next unit of a product. The reservation price is higher at lower quantities of the product. Referring to the figure, Professor Ward associates a price increase from P¹ to P² with a deadweight loss equal to the darkly shaded triangle and a transfer from consumers to shareholders equal to the lightly shaded rectangle. The Tribunal essentially adopts Professor Ward's estimates of the deadweight loss.

Figure 1 is an incorrect depiction of the deadweight loss resulting from a merger-induced price increase from P¹ to P² when P¹ exceeds marginal cost (i.e. when there is pre-merger market power), a condition recognized in Professor Ward's evidence. Deadweight loss is measured by a triangle bounded by the demand curve, price, and marginal cost. When P¹ exceeds marginal cost, a deadweight loss, depicted by the triangle DWL¹ in Figure 2, already exists in the pre-merger market. That is, relative to the hypothetical world where price equals unit cost (denoted by c in the diagram), the pre-merger market is characterized by a loss in total surplus equal to DWL¹. The deadweight loss associated with the merger is the increase in the size of the deadweight loss triangle above marginal cost as the market moves from P¹ to P². This increase is depicted in Figure 2 as the difference in the two triangles bordered by the demand curve and marginal cost, a trapezoid-shaped area. The correct merger-related deadweight loss so calculated exceeds the area of the triangular area adopted in Professor Ward's evidence (labeled "Ward's DWL" in Figure 2) by the area of the rectangle underneath this triangle (labeled "missing DWL").¹³

For a market elasticity of demand of -1.5 (the value on which the Tribunal focuses in its reading of Professor Ward's evidence), individual firm demand elasticities of -3, and a price increase of 9%, the actual deadweight loss that follows from Professor Ward's estimates is approximately 8.5 times the value that he reports.¹⁴

The magnitude of this error is clearly large. More importantly, the correction brings the difference between the estimate of deadweight loss implied by the Commissioner's expert evidence and the Tribunal's estimate of efficiencies well within the range of estimation error that is imposed by the

limitations of data and econometric evidence in the case. While the Tribunal notes that the Commissioner did attempt to provide additional estimates of deadweight loss, the Commissioner did so based on information put forward only in final argument. The Commissioner did not address this correct total surplus test in properly submitted evidence. Because of this, the Tribunal excluded the revised estimates (451).

As the Tribunal noted (434), citing Trebilcock and Winter, estimates of “deadweight loss triangles” tend to be small relative to even modest efficiency gains. Deadweight loss triangles measure the surplus loss of a given price increase when one starts from a price equal to marginal cost. As we find here, however, the deadweight loss from a given price increase when one starts from a pre-merger price exceeding marginal cost can be very large.

It may be helpful to elaborate on the simple economics of why pre-merger market power makes such a difference, without reference to triangles, rectangles or trapezoids. Consider, for example, a market in which 100 consumers each purchase one unit of the product in the pre-merger market. Suppose that price is initially equal to a marginal cost of \$10, then increases by 10% to \$11. A loss in total surplus, or deadweight loss, arises with the departure from the market of consumers whose willingness to pay is between \$10 and \$11. Suppose that the size of this departing group is 10, or 10% of initial purchasers.¹⁵ The loss in total surplus associated with each of these consumers is equal to the difference between the consumer’s willingness to pay and the marginal cost. This loss is on average only 50 cents for each departing consumer, for a total loss in surplus of about \$5 or only 0.5% of initial revenue. The key to the small size of the deadweight loss is that the consumers departing from the market are those whose value for the product was only slightly above the cost of producing the product. Total gains from trade in a market (total surplus) is the difference between the social value of the product (the aggregate of consumers’ value for the product) and the social cost of producing the product. Where the consumers discouraged from purchasing by a price increase are those whose value is only slightly above cost, the loss in total surplus associated with the price increase will be small.

Now consider a second example. Marginal cost is still \$10; however, the initial price is \$20. The percentage price increase is still 10% (now from \$20 to \$22); continue to assume that there are initially 100 consumers and that 10 of these are discouraged from buying by the price increase. In this second example, the average departing consumer will value the product at \$21. The loss in total surplus represented by the average departing consumer is the difference in this value and marginal cost of \$10, which is \$11. This is a large number. As a consequence of the initial gap between price and marginal cost, the departing consumers are no longer consumers whose value for the product is only marginally above the cost of production. As a result, each of the departing consumers represents the loss of substantial gains to trade. The total loss of surplus in this second example is \$100 or 5.0% of initial revenue, 10 times the percentage loss found in the first example.

It is useful as well to address a question that may be raised in the minds of some readers. Are we suggesting that a merger to a given post-merger price, or a merger of a given market to monopoly, involves a small deadweight loss when the market is initially competitive but a large deadweight loss when market power is exercised pre-merger? We may appear to be suggesting that “pre-merger market power raises the deadweight loss associated with a merger to monopoly in a given market”. Yet this

could not be true, since the monopolization of a market that is already part way along the path towards monopoly pricing clearly cannot involve greater social loss than the monopolization of a market with initially competitive pricing.

The resolution to the apparent paradox is in the phrasing of the question. Monopolization of a market - with given demand and costs - always involves greater deadweight loss if the market is initially competitive than if market power is already being exercised. However, the deadweight loss associated with a given price increase will tend to be larger when there is pre-merger market power than when there is not. The effect on deadweight loss of pre-merger market power, in other words, depends on what is being held constant. The price increase of about 9% in the *Superior Propane* merger estimated by Professor Ward involves a much greater calculated deadweight loss when this calculation correctly incorporates Professor Ward's own estimate of pre-merger market power. On the other hand, the fact of pre-merger market power (assuming, for our purposes, that it is a fact) reduces the deadweight loss resulting from the merger.¹⁶

Efficiency Calculations

We move now to the other side of the efficiencies / deadweight loss comparison. The Tribunal and the Commissioner err on this side of the comparison as well in their calculations of the cost savings associated with the merger. Cost savings can be categorized into savings in fixed costs and savings in variable costs. The savings in variable costs must be applied to the post-merger output quantity (Q^2 in Figure 2), not the pre-merger quantity (Q^1). The Tribunal adjusts downwards the respondents' claims for efficiencies (380) for various reasons, but these reasons do not include a reduction in volume sold as a result of a price increase. In its trade-off analysis, however, the Tribunal assumes price increases in the range of 7.0% to 11.0% in the various segments of the propane market (453) and adopts the Commissioner's assumed elasticity of demand of -1.5 (455, 458, 463). The volume decrease implied by a demand elasticity of -1.5 and a price increase of approximately 9% is -13.5% . The Tribunal's analysis, in other words, assumes approximately this decrease in volume. To the extent that the respondents' claimed cost savings (for example in categories such as reductions in the size of delivery fleet, the number of drivers and propane supply (see 380)) depend upon volume, the claimed cost savings should have been reduced further in both the Tribunal's estimates and the Commissioner's submissions.

Conclusions

Superior Propane both clarifies and relaxes the restrictions imposed by Canadian competition law on mergers that generate efficiencies, notwithstanding the limitations on the efficiency defence of pre-merger market power. As discussed, the efficiency defence following *Hillsdown* and recent statements from the Competition Bureau rested on shaky ground. *Superior Propane* explicitly allows mergers that lead to substantial lessening of competition providing the mergers generate sufficient efficiencies to meet the total surplus test – and, as the Tribunal recognizes, relatively small cost efficiencies may be enough to offset a substantial lessening of competition. Prior to *Superior Propane*, competition lawyers would have properly advised clients not to pursue mergers that involved an obvious and substantial lessening of competition. After *Superior Propane*, such advice is too conservative for mergers involving significant efficiencies.

Will *Superior Propane* open the floodgates for mergers in Canada? The number of contentious mergers brought forward may well increase, but as this paper shows the now-expanded efficiencies defence is still limited by the correct incorporation of pre-merger market power in merger analysis. More significantly, even a substantial increase in the percentage of contentious mergers will not represent a flood of new mergers in Canada. In a recent period in Canada, less than 2% of mergers raised an issue under the *Competition Act*.¹⁷ The overwhelming majority of mergers appear driven by legitimate business concerns such as efficiencies and product development, not by a desire for market power.

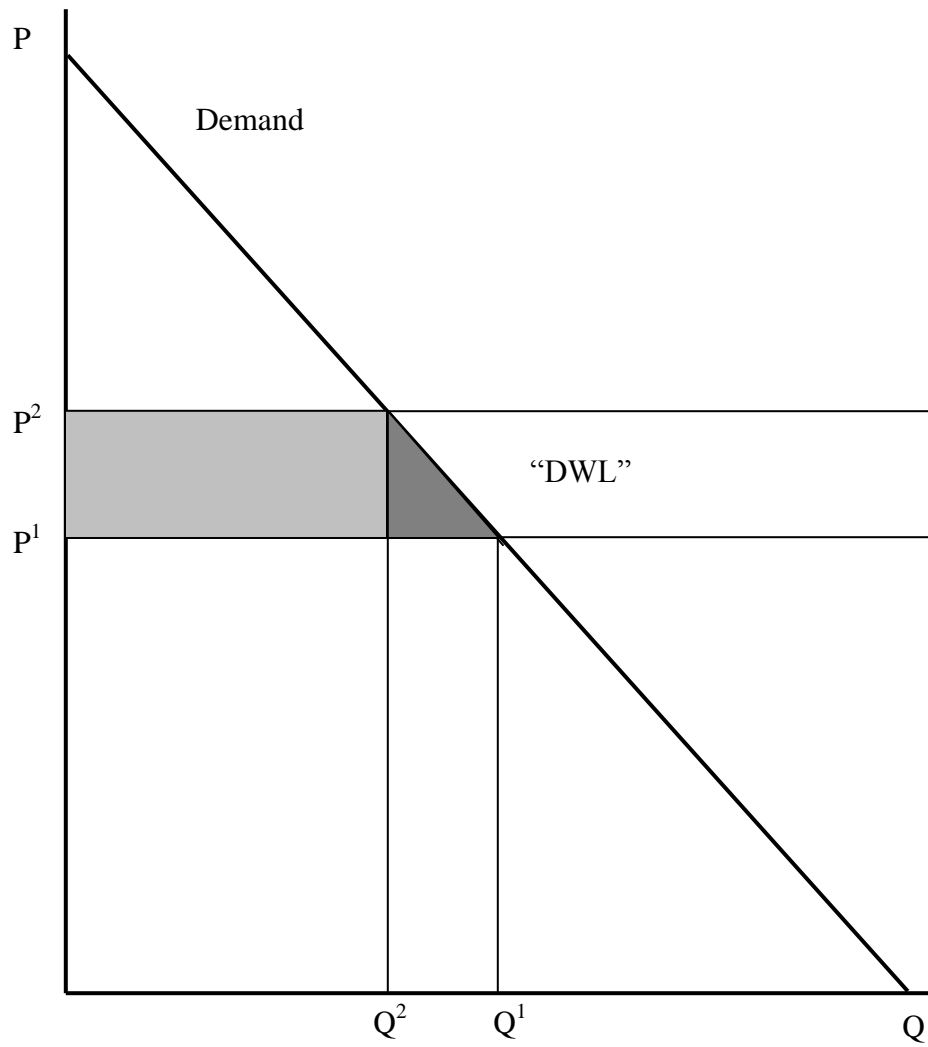


Figure 1: Professor Ward's Estimation of Deadweight Loss as Price Increases from P^1 to P^2

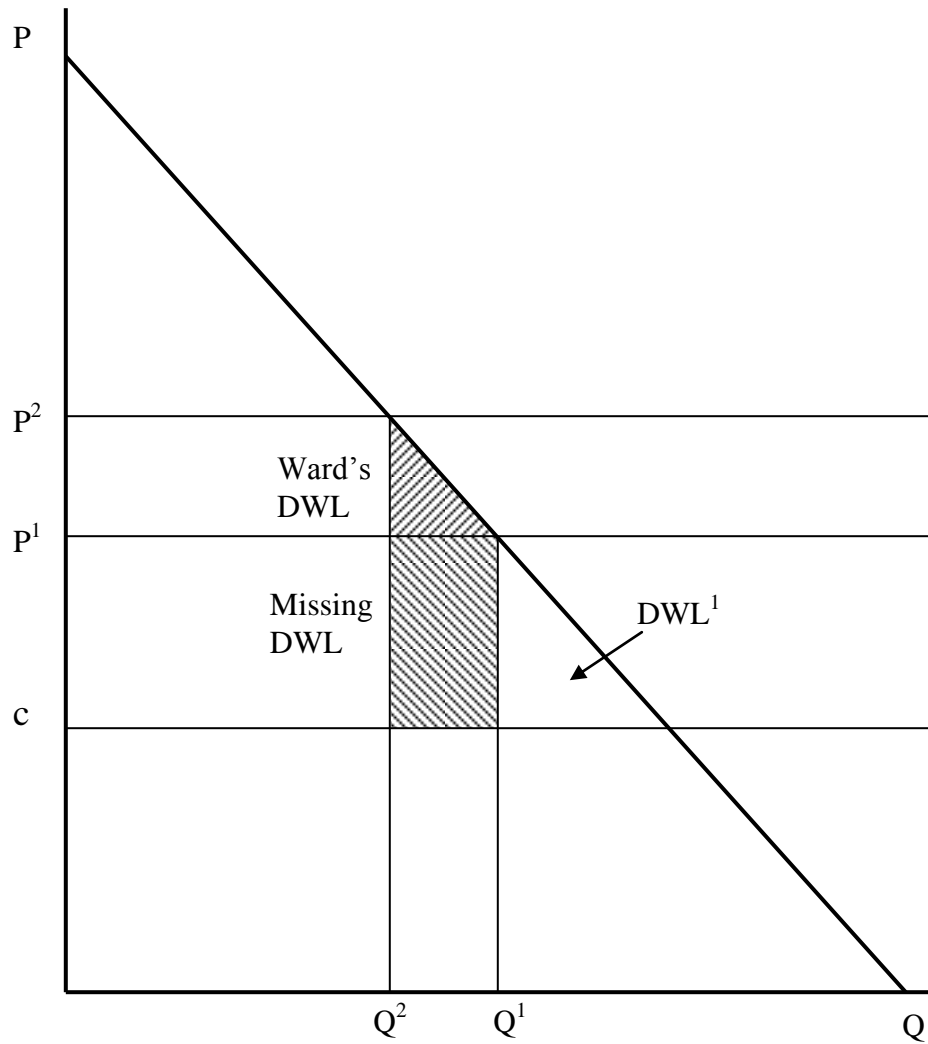


Figure 2: Correct Estimation of Deadweight Loss as Price Increases from P^1 to P^2

Notes

¹ 2000 Comp. Trib. 15 [hereinafter *Superior Propane*. Numbers in parentheses refer to paragraph numbers in the decision.]

² The surplus gained by a consumer from purchasing a unit of a product is the excess of the consumer's value of the product over the price paid. For example, if a consumer would pay at a maximum \$10 for a unit of a product, but is able to purchase the unit at \$7, the consumer earns a surplus of \$3. "Consumer surplus" is the sum of such surpluses across consumers and represents the dollar value of the consumers' gains from trade in the market. Adding seller profits yields the total surplus, or total gains to trade in the market.

³ MEGs, footnote 57.

⁴ (1992) 41 C.P.R. (3d) 289 [hereinafter *Hillsdown*].

⁵ Mr. Wetston stated that he was "of the view that, from an enforcement perspective, it is preferable not to depart at this time from the approach adopted in the *Merger Enforcement Guidelines*," Howard Wetston, "Developments and Emerging Challenges in Canadian Competition Law," Speech at the Fordham Corporate Law Institute, New York, October 22, 1992, at 9.

⁶ Gwilym Allen, speech to conference attendees at "Meet the Competition Bureau", Toronto, May 3, 1999, published at <http://strategis.ic.gc.ca/SSG/ct01548e.html> (date accessed: February 7, 2000), at 5.

⁷ The "deadweight loss" associated with a price above marginal cost is the loss in total surplus in the market relative to the case where price equals marginal cost. In other words, the deadweight loss associated with a price increase is that portion of the additional expenditure by buyers that does not represent simply a transfer to sellers. A merger that increases price will increase the deadweight loss in a market to the extent that demand is elastic (responsive to price).

⁸ *Hillsdown*, Section VI B.

⁹ Evidence of Professor Michael Ward, at 29. An individual-firm elasticity of demand of -3 means that a 1% price increase results in a 3% decline in quantity purchased from the firm. A market elasticity of demand of say -1.5, means that if prices by all firms in a market rose by 1% the market quantity purchased would fall by 1.5%.

¹⁰ Note that the relevant demand elasticity is the individual-firm elasticity of demand, not the market elasticity of demand.

¹¹ Evidence of Professor Ward, at 26 and 27.

¹² Evidence of Professor Ward, at 33.

¹³ The impact of pre-merger market power on deadweight loss in merger analysis is well understood in the economics literature. For a particularly clear exposition, see Donald G. McFetridge, "Prospects for the Efficiency Defence," 1996 *Canadian Business Journal* 26 (1996) at 321-357.

¹⁴ The following approximate calculations support the figure of 8.5. Refer to Figure 2. With the market demand elasticity of -1.5, we have $Q^2 = Q^1 [1 - 1.5(.09)]$. The area of the triangle marked "Ward's DWL" is then given by $(1/2)(P^2 - P^1)(Q^1 - Q^2) = (1/2)(.09P^1)(.135Q^1) = .006 P^1 Q^1$, or 0.6% of initial sales, consistent with the value reported in Table 8 (p.34) of Professor Ward's evidence. The area of the rectangle underneath "Ward's DWL" is $(P^1 - c)(Q^1 - Q^2) = .33P^1 * .135Q^1 = 0.045 P^1 Q^1$. Adding the two areas yields a merger-related deadweight loss of $0.051P^1 Q^1$, or 5.1% of initial sales. This is 8.5 times 0.6% of initial sales.

¹⁵ Equivalently, suppose that the elasticity of demand is -1.0.

¹⁶ We emphasize that we are commenting on the internal logical consistency of the evidence filed on behalf of the Commissioner and the aspects of the Tribunal's decision that follow this evidence. In particular, we do not comment here on the validity of Professor Ward's estimates of pre-merger market power. Note that since the respondents did not allege pre-merger market power, none of our comments applies to their evidence.

¹⁷ Between 1986 and 1994, the Competition Bureau examined roughly 22% of publicly reported mergers and only about 1.6% of reported mergers raised an issue under the *Competition Act*. (Donald G. McFetridge, "Merger Enforcement under the *Competition Act*: The First Ten Years," *Review of Industrial Organization*, Vol. 13, Nos. 1-2 (April 1998) 25-56. The statistics are to the end of the 1993-1994 budget year and exclude the half year for 1986.)