THE RETAIL MARKET AS A COMMONS: THE IMPORTANCE OF TRANSACTIONS COSTS

by

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The Retail Market as an Open Access Commons: The Role of Transaction Costs

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ABSTRACT

This study analyzes the retail market as a commons, and identifies transaction costs as the prime ingredient of that market. Retailers and the sales personnel that they employ operate only because they are able to reduce the cost of transactions between consumers and producers. The traditional economic model of supply and demand assumes away the effects of transaction costs. As a result, the complex behaviour of retail markets analyzed in this study is not captured in the traditional model.

The major differences in prediction between the retail market model developed in this study and the traditional model are concerned with: the mechanics of how the open access equilibrium is achieved; the range of feasible price/volume combinations (it is more restricted in the retail market model than in the traditional model); the behaviour of monopolists; and, the effects of taxation and public sector spending on the private sector (in the retail market model, public sector spending is an essential part of generating an efficient private sector).

This study observes that individuals employed in the retail sector tend to receive much lower returns to their effort than individuals employed in other sectors of the economy. The study indicates that low returns to resources employed in retail markets are due to market failures in other sectors of the economy. Specifically, the open access commons nature of retail markets makes them, for the most part, nearly perfectly competitive. As a result, retail markets tend to act as a "sink", attracting labour and other inputs displaced from other sectors of the economy by barriers, other inefficiencies, and new applications of technology.

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I. INTRODUCTION

In 1977 over a third of the domestic product generated by the Canadian private sector, excluding agriculture, was attributable to the retail sales and service subsector.[1] This subsector is not an isolated segment or pocket of the economy. Its importance to the economy is greatly magnified because it acts as a "layer" over the rest of the economy, through which, ultimately, most non-government goods and services must pass before they are of benefit to the consumer. However, most traditional models of markets either ignore this subsector or make assumptions (such as perfect markets without transaction costs) that deny its existence.

If retail markets behaved as other markets do, there would be little harm in the above failing. However, retail markets exist to reduce the cost of transacting the movement of goods from the producer to where the ultimate consumer wants them, and the transfer of money from the ultimate consumer back to the producer.

This study will demonstrate that the behaviour of consumers, retailers, salesmen and manufacturers in the retail market can be characterized by modeling the retail market as a commons. Initially the behaviour in retail markets is characterized, in this study, in terms of a fixed retail price model. One of the interesting findings, in that model, is that the output of a profit maximizing monopolist can, in many instances, generate a higher social surplus than the output at the open access equilibrium. This study does not, however, hold that retail prices are fixed - the use of fixed retail prices is only a step towards developing an understanding of a model in which prices are completely variable. The variable price retail market model was developed by applying a continuum of retail prices to the behavioural equations defined in the fixed price retail market model. In an

open access (competitive) market retailers are, by definition, unable to stop the total sales volume from expanding to a point where rising transaction costs erode away all (economic) profits. In the variable price retail market model, the retail price is a variable controlled by retailers and, in most market structures, is set so as to maximize their net income. As a result of the above two effects, the open access equilibrium in a retail market occurs at the retail price/sales volume combination where the retailer profits are maximized at zero. A profit maximizing monopolist retailer will operate at the price/volume combination that generates a global maximum in the retailer profits. This model also provides some interesting insights into the behaviour of monopolists who are responding to constraints other than short-run profit maximization.

Having defined the variable price retail market model, this study uses that model to examine:

- the importance of public sector spending on the formation and maintenance of an efficient private sector,
- the social cost of extracting a surplus from the private sector to pay for defense, mega-projects, or "graft",
- the effect of the form of taxation on the private sector, especially on goods that involve externalities, and
- the reasons why the return to effort of individuals employed in retail tends to be much lower than that of individuals employed in many other occupations.

The last of the above considerations is particularly important, if we are concerned about the future. The retail sales and service sector of the economy is providing an increasing proportion of new jobs (Figures A-1 and A-1a, in Appendix A) and for most people employment in sales and service industries is rarely a career path of choice (Burstiner, 1976; Swinyard, 1981.)[2]

II. SALES AS A VOCATION

According to the British Columbia Provincial "Sales of Goods Act" (1973),

> "a contract of sale of goods is a contract whereby the seller transfers or agrees to transfer the property (the legal interest) in goods (things) to the buyer for a money consideration called the 'price'."

An expansion of this definition to include services would make it a good definition of a sales transaction.

Retail selling can be defined as a process of the retailer convincing consumers that they can satisfy their wants through exchanging money for the goods or services being offered for sale.

Salesmen vary from independent agents paid commissions, to employees paid an hourly wage or a monthly salary. This study concerns itself primarily with the case where salesmen are compensated entirely through commissions. However, in section III. E, p.47, the model is extended to incorporate cases where the sales force is paid partially or wholly through a wage.

Organizations involved in commissioned sales (such as those of life insurance, real estate, or automobiles) during the training process[4] frequently promote the philosophy that the only limit to an individual's income, in commissioned sales, is the amount and the quality of effort that the individual applies to the process of selling (Girard, 1977; Schapiro, 1975; Newton, 1975; Confederation Life Association, 1970; Bettger, 1972; Turner and Pearson, 1965, Wall, 1947).

That maxim of sales management is, however, in conflict with the following observations paraphrased from the comments of several seasoned sales professionals.[5]

- In the long-run, individuals in commissioned sales tend to experience average returns to effort (labour and other resources) that are lower than the average returns received by individuals employed in "non-sales or service" occupations.

- The prosperity of individual salesmen is not directly related to how well the product is selling. Specifically, a few salesmen sharing a relatively barren market may, on average, earn a "good living" from a reasonable amount of effort, whereas, in a large "booming" market with many salesmen, the earnings of the average salesman may be relatively small.

- The first salesmen in any market (as defined by product and geographical frontiers) tend to do very well. As the market matures, the average income of salesmen tends to first decline (in some instances precipitously) and then stabilize at a lower level.

- Turnover among salesmen is usually very high (e.g., in spite of increased sophistication in the selection and the training of life insurance salesmen, the expected "half-life" of employment for salesmen hired and trained by a life insurance company has remained unchanged for 50 years at approximately 26 months - that is, of 100 individuals hired, after 26 months 50 will still be employed and after 52 months 25 will still be employed).

The above observations make it clear that while commissioned sales is a vocation of much promise, it is also one of few lasting successes.

III. MODELLING THE RETAIL MARKET AS A COMMONS

A market is a gathering of people for the purpose of buying and selling goods. When that market is free—uncontrolled—it is a commons, where all individuals have equal rights within, and access to the market (Dales, 1979, Carrol, et. al., 1979; Copes, 1984; Gordon and Stegemann, 1985; Copes, 1985). Economists, since the time of Adam Smith (circa 1776), have lauded the merits of free and open access markets. The dark cloud to that silver lining is a phenomenon Hardin (1977) called "the tragedy of the commons".

The tragedy of the commons is well documented in fisheries (Gordon, 1954; Scott, 1955; Schaefer, 1957; Turvey, 1964; Copes, 1970), in advertising (Mansfield, 1975; Lambin, 1976; Scherer, 1980), and in open range cattle herding Muhsam, 1977; Hardin, 1977; Anderson and Hill, 1975). In applying this phenomenon to advertising, Mansfield (1975, p.37) noted that,

> "sometimes advertising expenditures only have the effect of raising the costs of the entire industry, since one firm's advertising campaign causes other firms to increase their advertising. The total market for the industry's product may not increase in response to the increased advertising, and the effects on the sales of individual firms may be small, since the effects of the advertising may cancel out. However, once every firm has increased its advertising expenditures, no single firm can reduce them to their former size without losing sales."

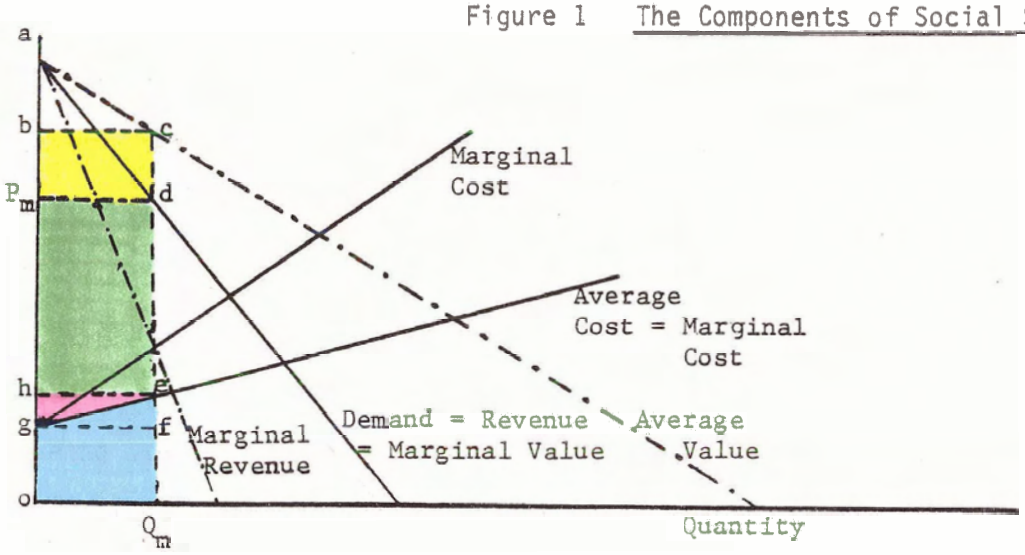
Scherer (1980, pp. 387-389) likened the above process to the "Prisoners' Dilemma Game" where a rivalrous market structure and a lack of information (about the current and future actions of rivals) tend to force individual sellers to adopt strategies that, in total, impoverish all sellers. Muhsam (1976, p.36) also noted that "the tragedy of the commons" is a variation of the "prisoners' Dilemma Game"; an

> "individual herdsman is able to make a profit by adding a head of cattle to his herd only if all the other herdsmen do not do so. If they also add to their herds our individual herdsman can only decrease his loss by adding to his herd. It would therefore be to the advantage of the individual herdsman to convince all the others not to add any cattle to their herds, and to do so only himself. ... Each individual herdsman who wishes to optimize his strategy will add a head of cattle to his herd, and this leads necessarily [to over-grazing and] to disaster for the community as a whole."

As noted above, a non-cooperative solution to the Prisoners' Dilemma Game is clearly injurious to the producers in the case of a pasture or fishery commons. However, in retail markets consumer well-being must be considered along with the well-being of the other participants.

The traditional method of measuring consumer well-being utilizes the concept of consumer surplus. Stigler (1966, p.78) defined consumer surplus as "the amount over and above the price actually paid that a man would be willing to pay for a given amount of commodity rather than go without it." As such, consumer surplus is an effective measure of consumer well-being - just as the profits (higher than normal returns) accruing to the owners of companies and the surpluses accruing to the owners of the other factors of production are a measure of producer well-being. In a market economy a "Pareto-optimal situation" is achieved when the sum of those surpluses (the social surplus) is maximized.[6] Figure 1 illustrates, in very simple terms, the components of social surplus in the traditional model of supply and demand. In that figure, the social surplus is maximized at the point where demand equals the average private cost (i.e., marginal social cost).[7] At that point the market rent equals zero.[8] In Figure 1, a profit maximizing monopolist would set the retail price at P_m and would sell Q_m units. At that point the market rent is maximized. The monopoly case was selected for illustration because all three types of rents/surplus are present. At the perfect competitive equilibrium there are no market rents.

Figure 1 The Components of Social Surplus



KEY:	AREA BOUNDED BY:
Consumer Surplus,[9]	"a d P_m" or "b c d P_m"
Market Rents,	"P_m d e h"
Surplus to Factors of Production,	"h e g"
Social Cost of Production,	"g e Q_m o"

- assuming constant returns to scale but increasing factor prices.

The concept of consumer surplus is not without its detractors. Lancaster (1979) has a competing model of consumer preferences based on an extension of Platonism (Quinton, 1973, pp.257-259). In that model, goods are viewed as being collections of characteristics or attributes, each of which contributes to, or detracts from, an individual's consumption objectives. For each consumer there exist "ideal bundles of characteristics" that provide maximum utility—to the extent that the characteristics of the goods actually acquired and consumed differ from the ideal bundle, then

utility is diminished.[10] Lancaster's model provides considerable insight into the effects on consumers of changes in the price or other specifications of goods. However, Lancaster's model does not overcome the problem of aggregation, also, inherent in consumer surplus (i.e., the math in both models is tractable only if all consumers are assumed to have identical preferences). Also, the measure of consumer well-being generated by Lancaster's model is not readily comparable to the measures of producer well-being used in this study (see p.6). While there are other problems with consumer surplus (see Dixit and Weller, 1979), it is the best measure of consumer well-being currently available.

(A) The Market Participants and their Behaviour

This paper assumed that the retail market being modelled is a discrete unit (i.e., this is a partial equilibrium analysis) and that all participants within that market can be classified as one of the following:

> Consumers - who have a downward sloping linear demand curve for goods and services,
>
> Manufacturers - who are perfectly competitive and supply goods (f.o.b. point of origin) at a constant marginal cost of production. This results in a perfectly elastic wholesale supply curve for goods,
>
> Salesmen - who supply sales effort in the form of effort and other resources and are paid a commission on the dollar value of the goods that they sell, or,
>
> Retailers - who are the owners of the retail firms (see Alchian and Demsetz, 1972). Retailers provide inputs to the sales process in the form of a place of business and the sales administration. In return for supplying those inputs they have all rights to the residual income (profits) of the retail firm.

Decisions within the retail market are made within a web of interacting constraints. This paper describes the behaviour of consumers, develops an analytical framework for the retail market from that beahviour, and then

describes the behaviour of the other market participants in terms of that framework. The value of the model presented in this paper should be judged on the "cutting edge" of Ockham's Razor.[11] That dictum justly cautions that before a complexity is added to a model it should not only be empirically supportable but should also add significantly to the explanatory power of the model (Flew, 1971, pp.183 and 413).

A(i). Consumers

In many models of consumer behaviour the retail price of a produce is assumed to equal its marginal social value (i.e., the retail price is assumed to equal the marginal value of the product to the marginal consumer). When the traditional assumption of a linear downward sloping demand curve is added to the above assumption the result is, that this paper calls, the "frictionless" demand curve:

(1) $R = \frac{a-P}{b}$

R = quantity demanded is the consumers' cost of acquiring the product is only the retail price.

a = intercept of the frictionless demand curve.

P = retail price of the product.

-1/b = the slope of the frictionless demand curve (dR/dP).

The above traditional demand curve does not consider the transaction costs incurred by the consumer. Those costs can be thought of as the resources, other than the retail price, expended by the consumer in the process of acquiring a product. The costs of those other resources are important—in the decision to purchase a product, consumers consider not only the retail price but also the other costs of acquisition. As a result,

the consumer effective demand for a product Q is usually significantly less than the frictionless demand for that product R.

(2) $Q = \frac{a-P-[CATr]}{b}$

(2a) $P = a - bQ - [CATr]$

(2b) $[CATr] = a - bQ - P$

[CATr] = the average transaction cost absorbed by consumers, per unit of product acquired.

When the right hand side of equation (2a) is substituted into equation (1), p.9, the result is:

(3) $Q = R - \frac{[CATr]}{b}$

Consumer transaction costs include the costs incurred by consumers to become informed about the qualities of the good(s) available and the cost of going to and from the location where the good is available. This study assumes that the consumer average transaction cost is a declining function of the sales effort applied per unit of product bought:

(4) $[CATr] =$ the minimum of $[\beta Q/E, i]$

E = sales effort applied to the market by retailers. A unit of E can be thought of as one standardized salesman day, including all support effort provided by the retailer (e.g., office space, supervision, and clerical services).

β = the value of [CATr] when one unit of effort is applied per unit of product bought ($E/Q = 1.\overline{00}$). Consumers are assumed to face the same standardized transaction costs. The parameter β shifts to reflect any changes in the standardized transaction costs faced by consumers. Therefore, β can be thought of as the consumer intrinsic transaction cost.

i = consumer average transaction cost when consumers buy the product directly from the manufacturers.

Given the assumption (p.9) that consumers are rational, the retail price P cannot exceed the cost to the consumers of acquiring the product directly from the manufacturers. The retail price of a product is:

(5) $P = G + M$

(5a) $P = G + M \leq G + i$

G = the price at which the manufacturers supply the product - f.o.b. their warehouse.

M = the retailer markup.

In this study, i is assumed to be very large (i.e., $i \simeq \infty$). Therefore, the constraint in equation (5a) is assumed away and:

(4a) $[CATr] = \beta Q/E$

The functional form of equation (4a) implicitly assumes that additional sales effort E is always of value to consumers. Appendix I discusses what happens when, after a given level of sales effort, additional sales effort is a "bad". Equations (4) and (4a) assume that consumers react to the average sales effort per unit sold (E/Q). Implicit in that assumption is an assumption that the consumer average transaction cost [CATr] is the transaction cost that any consumer faces when acquiring any unit of the product. It could be argued that consumers could reduce their [CATr] by acquiring more than one unit of product at a time. However, stockpiling itself involves storage costs, shrinkage, and may increase the consumer uncertainty at the time of purchase (i.e., by committing them, at that time, to what they will consume in the future. If the consumer's tastes change there may be a loss).

Where such problems are not sufficient to deter multiple purchases then, the "product" can be redefined to be the optimal multiple purchase (e.g., a carton of cigarettes, a case of beer, a dozen eggs). Where there is more than an optimal purchase (e.g., a "six-pack of beer" vs a "case of beer") the market can be assumed to have been split into separate markets, each of which has one "product".

Consumer demand as a function of sales effort can be defined by substituting the right hand side of equation (4a), p.10, into equation (2), p.10, to generate:

$$(6) \quad Q = \frac{a-P}{\beta/E + b}$$

Which can be rearranged to:

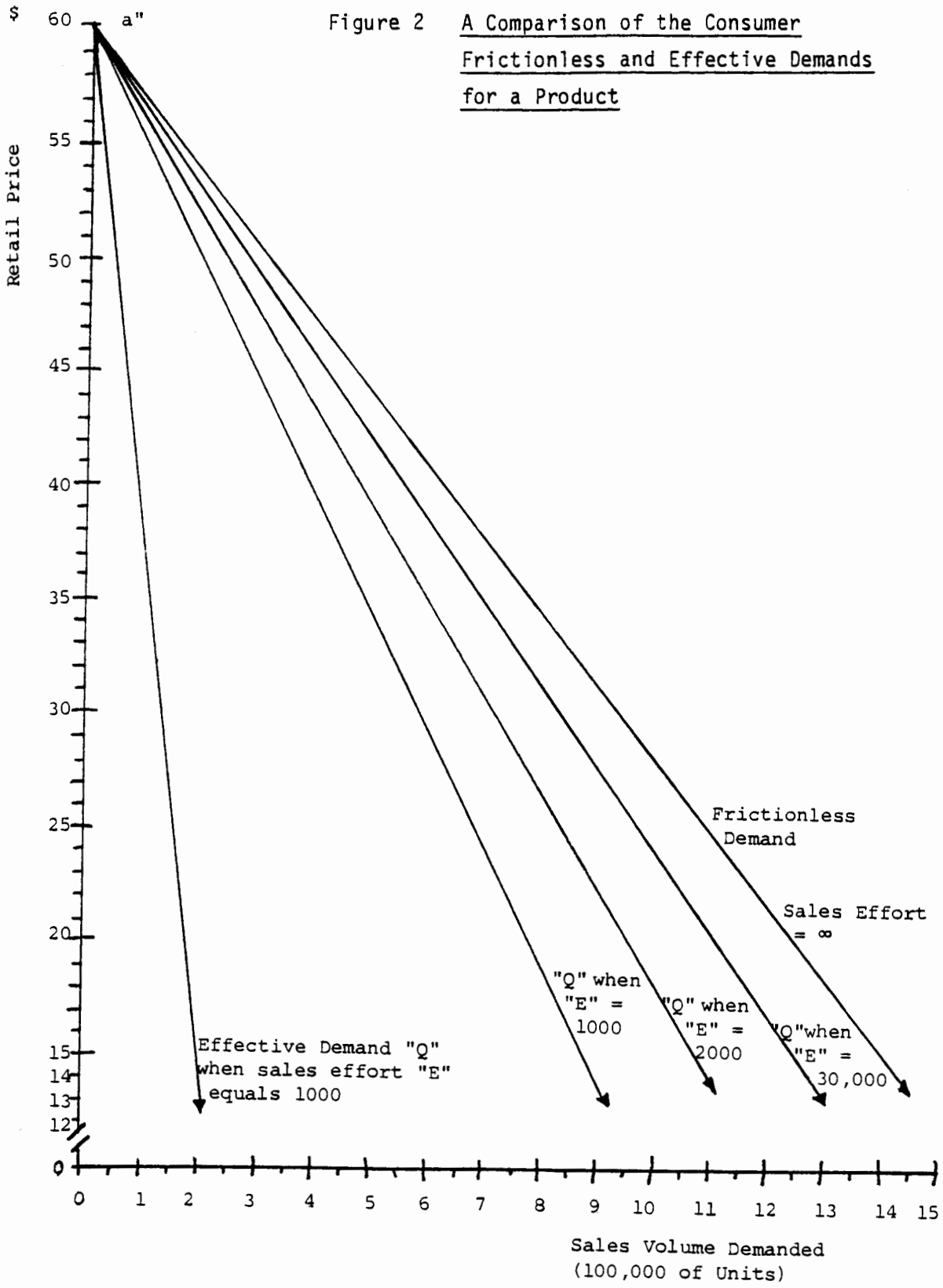
$$(6a) \quad P = a - Q(\beta/E + b)$$

$$(6b) \quad E = \frac{\beta}{\frac{a-P}{Q} - b}$$

$$(6c) \quad E/Q = \frac{\beta}{a-P-Qb} = \frac{\beta}{[CATr]} \text{ ; see equation (2b), p.10.}$$

Equation (6) is the consumer effective demand for the retail product. It is illustrated, along with the consumer frictionless demand, in Figure 2, p.13. If retailers provide an infinite amount of sales effort $\underline{E}$ then, as shown in Figure 2, the effective demand equals the frictionless demand. As the total amount of retailer provided effort $\underline{E}$ is reduced then, for any given sales volume $\underline{Q}$, the average amount of retail effort $\underline{E/Q}$ declines and the average transaction cost absorbed by consumers $\underline{[CATr]}$ increases (see equation (4a), p.11). Therefore, as the total amount of retailer effort is reduced the effective demand curve rotates around the frictionless demand intercept $\underline{a}$, towards the origin and away from the frictionless demand curve. As shown in Figure 2a, p.15, the difference between the frictionless demand curve and

Figure 2 A Comparison of the Consumer Frictionless and Effective Demands for a Product



the effective demand curve (at any given sales volume Q) is [CATr].

In Figure 2a, p.15, the area under the frictionless demand curve, between the origin and the sales volume Q, is the social value of the product. That social value can be accounted for by consumer surplus, consumer transaction costs, and retail revenue. In Figure 2a, the retail revenue is illustrated by the block at the bottom of the graph, the consumer transaction costs are illustrated by the next block up, and the triangle under the frictionless demand curve defines the consumer surplus.

The frictionless demand curve is assumed to be linear. It is also the marginal social value curve. Therefore, the average value curve is:

(7) $V = a - .5Qb$

When equation (7) is multiplied by Q and then from that product the consumer transaction cost and the retail revenue are deducted the result is the consumer surplus:

(8a) $[CS] = (a-.5Qb)Q - (a-P-bQ) - PQ$

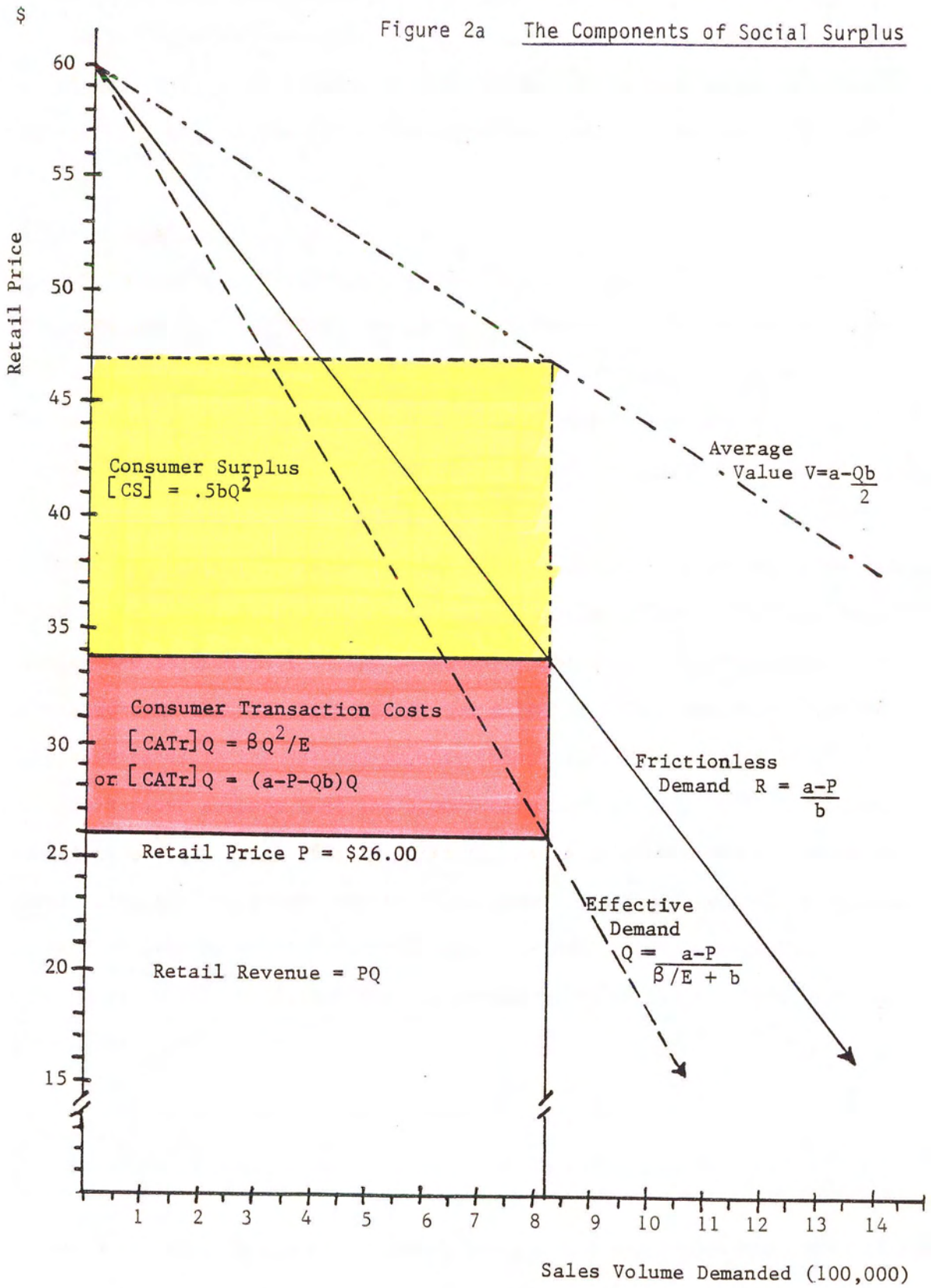
(8) $[CS] = .5bQ^2$

A(ii). Manufacturers

Manufacturers are assumed to have a supply function that is perfectly elastic with respect to price, p.8. As a result, the cost of goods sold "G" incurred by retailers is constant throughout the relevant range of sales volume.

If the local retail market is small, relative to the wholesale market, then the above assumption is reasonable. However, if that assumption is violated, only minor modifications are needed to adjust the model for an

Figure 2a The Components of Social Surplus



upward or downward sloping manufacturer's supply curve.

In the numerical examples "G" is assumed to equal $13.00 per unit sold.

Transaction costs between the retailers and the manufacturers are incorporated into the selling administrative costs of the retailers, p.26.

A(iii). Salesmen

In this paper, salesmen are assumed to sell sales effort "E" to retailers and in return they are paid a commission "c" on the dollar value of the goods that they sell. The effects of the salesmen being paid an hourly wage instead of a commission are discussed in Appendix H.

Salesmen and other potential employers value the time that the salesmen spend in the selling process. The objective function of the individual salesman is to optimize the trade-off between the utility derived from the sales income and the opportunity cost of the sales effort. The opportunity cost of the sales effort to the salesman is the net utility that could be generated from the next best use of the salesman's time and other resources that he expends in the selling process (Mansfield, 1975, pp.162-163).

This paper assumes that the opportunity cost of sales effort is constant over the relevant range of sales effort. While this assumption is probably unrealistic for any given individual salesman, it is likely to be a reasonable "first-approximation" for the aggregate labour supply behaviour.

Equation (6), p.12, defines the productivity of sales effort, for any given retail price:

$$(6) \quad Q = \frac{a - P}{\beta/E + b}$$

Figure 3 illustrates the relationship between the frictionless demand "R" and the productivity of sales effort, at several retail prices. In the model

being developed in this study, consumer (effective) demand Q is a function not only of the retail price P but also of the average transaction cost [CATr]. At any given retail price P the consumers who place the highest value on the product are willing to incur the highest transaction costs [CATr] to obtain the product. The marginal social value of the product (a - bQ) declines as the sales volume Q is increased. Increases in sales volume, when the retail price is fixed, can only be obtained by increasing the sales effort E per unit sold E/Q to decrease [CATr] (equation (2), p.10). Based on equation (4a), p.11, as [CATr] declines, it takes progressively more effort per unit sold to generate further decreases in [CATr]. It is this effect that produces the relationship between sales effort E, retail price P, and sales volume Q depicted in Figure 3. The frictionless demand curve defines the consumer demand, at any given retail price, if [CATr] equals zero. Equation (4a), p.11, shows that it would take an infinite amount of sales effort to reduce [CATr] to zero - accordingly, the sales effort per unit E/Q and the total sales effort E approach infinity as the sales volume Q approaches the frictionless demand R, at any given retail price P.

In the above process, from the perspective of consumers, as salesmen provide more effort per unit sold (to attract more customers) the surplus enjoyed by the intra-marginal consumers (the consumer surplus - equation (8), p.14) increases. However, from the perspective of salesmen (equation (6), p.12), the "quality of demand" (as measured by the ease of closing the average sale) deteriorates as the sales volume increases. Another way of describing this effect is to note that when either or both of the following are true, salesmen must provide the same level of service to all customers:

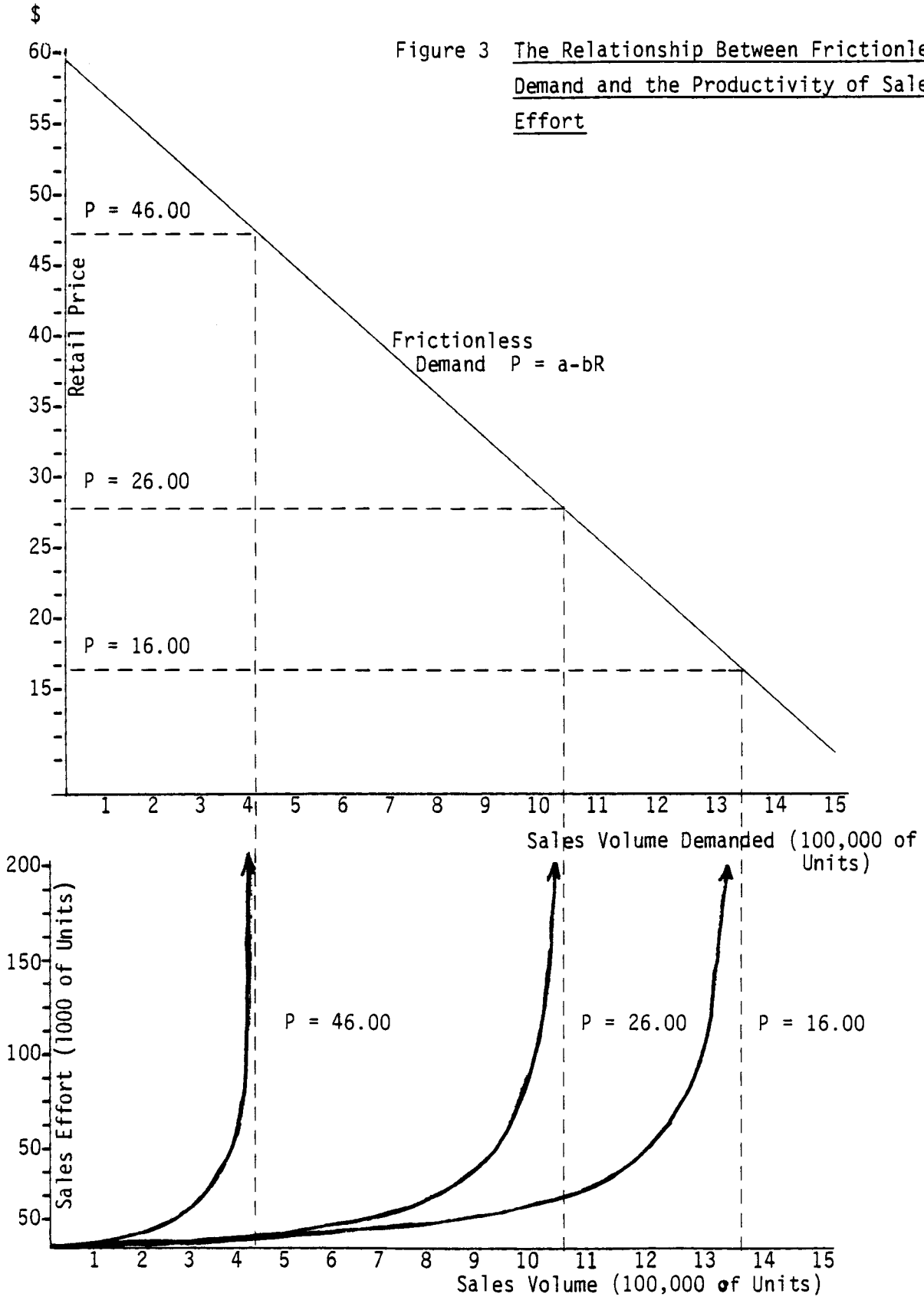


Figure 3 The Relationship Between Frictionless Demand and the Productivity of Sales Effort

- The salesman cannot identify where any individual is on the frictionless demand curve, and/or,

- The market is open access. As a result the opportunity cost to a consumer of not buying from a given salesman is the cost of going to another salesman (that cost is assumed to approach zero).

In the above situation(s) additional sales effort diminishes the productivity of all units of sales effort and not merely the productivity of the marginal unit of sales effort. This study will later show that in an open access retail market, with completely variable retail prices and given the assumptions implicit in equations (4a), p.11, and (20), p.31, consumers are able to fully internalize all costs of retail effort. However, from the perspective of salesmen, the effects of additional sales effort, on the productivity of all sales effort, fall within Mansfield's definition of an external diseconomy - (Mansfield, 1975, p.451) "an action taken by an economic unit that results in uncompensated costs to others." As noted on p.30, when retail prices $\underline{P}$ are fixed, consumers do not internalize the cost of sales effort. Figure 4 illustrates the revenue and cost of effort functions perceived by salesmen in a fixed price retail market. This study does not, in the final analysis, hold that retail prices are fixed - the use of fixed retail prices is only a step towards developing an understanding of a model in which retail prices are completely variable.

The sales effort to sales volume relationship depicted in Figure 3 is inverted and multiplied by the commission per unit to produce the salesmen total gross income curve in Figure 4. The cost per unit of sales effort, incurred by the salesmen, is assumed to be linear with respect to sales effort.

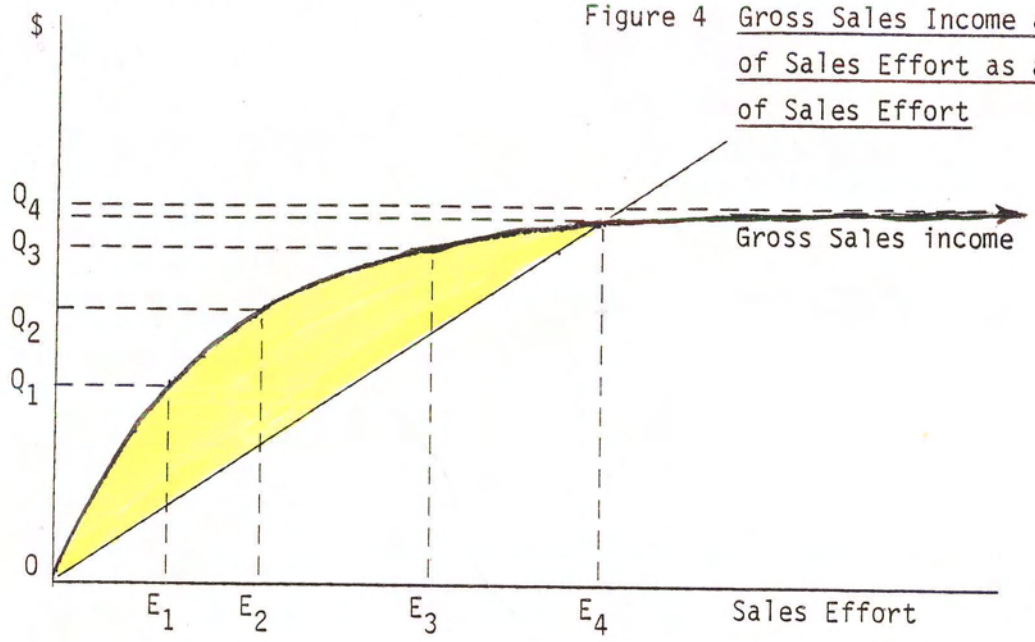
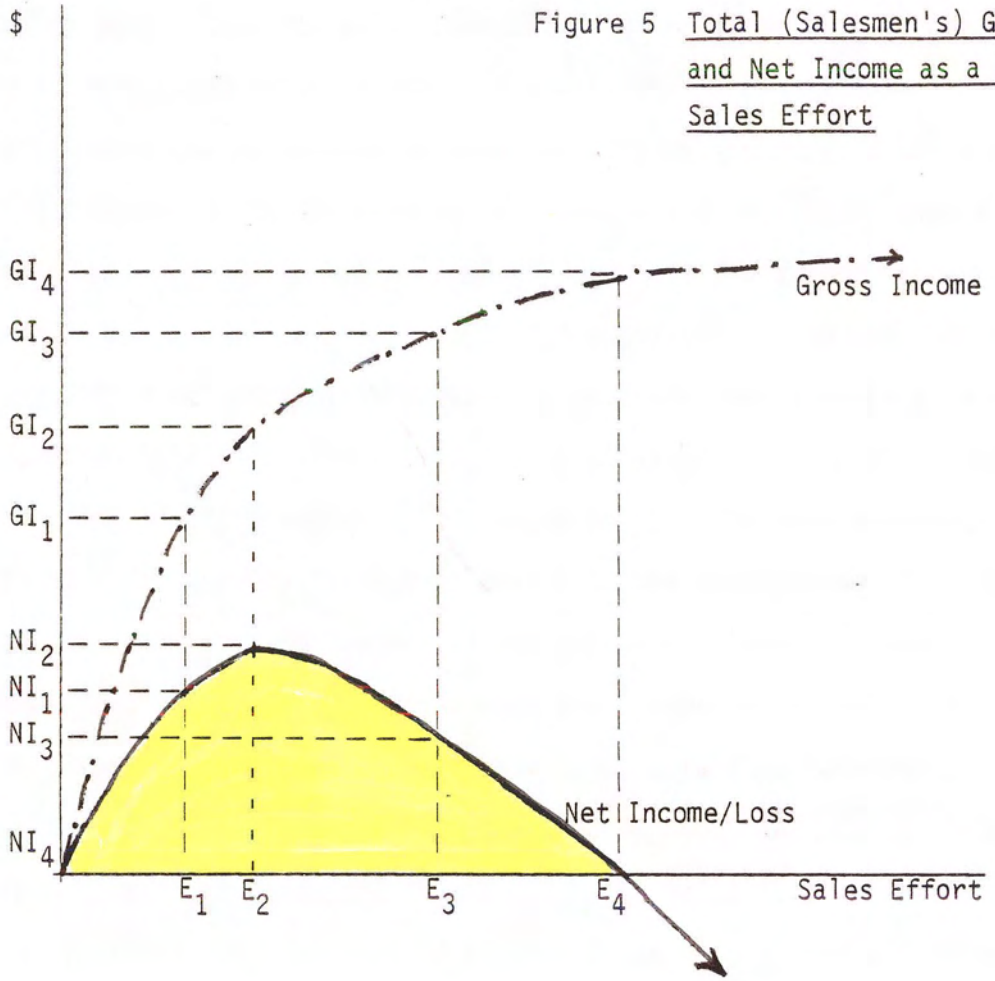


Figure 4 Gross Sales Income and Cost of Sales Effort as a Function of Sales Effort

In Figure 4, as sales effort is increased from nil to E_2 the total net income of salesmen (gross income less the cost of effort) increases. However, as the sales effort is increased past E_2 the total net sales income falls. This decrease occurs because, as sales effort is increased, the additional effort captures fewer and fewer new sales and (instead) progressively takes sales that would have accrued to units of sales effort already committed to the market. At E_4, all surplus that might have accrued to salesmen has been dissipated and the total net income of the salesmen (return after all opportunity costs) is nil. Figure 5 isolates the effect of increased sales effort on the total net income of salesmen.

Figure 5 Total (Salesmen's) Gross Income and Net Income as a Function of Sales Effort



In Figure 5, at all levels of sales effort less than E_4, the return to salesmen is in excess of their opportunity costs. As sales effort increases, the net return to salesmen increases until, at E_2, it reaches a maximum. Further increases in sales effort, past E_2, results in costs increasing faster than revenues (see Figure 4, p.20) and the net returns decline until, at E_4, all of the surplus accruing to the salesmen is eroded. Beyond E_4, sales effort leaves the market because the salesmen value the resources expended to generate sales effort more than they value the gross income generated. Therefore, E_4 will tend to be a stable equilibrium for the

supply of sales labour in an open access equilibrium market and E_2 is the sales effort supplied by an association of salesmen with monopoly power.

The purpose of the relatively simple and restricted model presented to this point was to develop an understanding of the model's basic principles and mechanics. In the real world, retailers (see p.8) manage both the commission $\underline{cP}$ and the retail price $\underline{P}$. However, a system with two control variables is difficult to analyze and understand. The analysis further simplified at this point by assuming that the retail price $\underline{P}$ is fixed; also, salesmen take $\underline{P}$ and the commission $\underline{cP}$ as given and vary the effort that they provide $\underline{E}$ in response to changes in $\underline{cP}$. The restrictive assumption of fixed retail prices is made to assist in the development of an understanding of the "non-price behaviour" of the market participants (see p.8). On p.51 that understanding is combined with the "price behaviour" of the market participants to generate a variable price retail market model.

The model depicted in Figures 3 and 4, pp.18 and 20, is restated below in mathematical terms and in the following pages it is transformed from the sales/effort relationships of Figures 3 and 4 to a more traditional price/output perspective. The open access sales effort supply equilibrium, p.21 is expressed in mathematical terms by equations (9) through (11).

(9) Gross $Y_s = cPQ$

(10) Net $Y_s = cPQ - eE$

(6) $Q = \frac{a-P}{\beta/E + b}$

Y_s = income of salesmen.
cP = commission, per unit sold.
e = opportunity cost to salesmen of generating sales effort $\underline{E}$.

When the right hand side of equation (6), p.12, is substituted into equation (10) the result is:

(10a) Net $Y_s = \frac{cP(a-P)}{\beta/E + b} - eE$

The open access sales effort equilibrium, as a function of the commission per unit sold $\underline{cP}$, can now be defined by setting equation (10a) equal to zero (see p.21) and restating the result to define sales effort:

(11) $E = \frac{1}{b}[cP(a-P)/e - \beta]$ E = sales effort provided by salesmen in an open access retail factor market.

When an association of salesmen has monopoly power, they are assumed to supply sales effort so as to maximize their net return (i.e., sales effort E_2 in Figure 5, p.21). That supply of effort can be defined by taking the derivative of equation (10a) with respect to sales effort $\underline{E}$, setting that derivative equal to zero, and restating the result to define the sales effort:

(10b) $\frac{d(\text{Net } Y_s)}{d\ E} = \frac{cP(a-P)\beta}{(bE + \beta)^2} - e$

(11a) $E = \frac{\beta}{b}[\sqrt{\frac{cP}{e\beta}(a-P)} - 1]$ E = sales effort that maximizes the net income of salesmen, for any given $\underline{P}$ and $\underline{cP}$.

The foregoing system of equations describes the effort supply behaviour of salesmen in terms of income. Transforming that system of equations into the more traditional "price to quantity" context allows the behaviour of salesmen to be related to the actions of other market participants (see p.8). The following sales production curve was developed by substituting the right hand side of equation (11) into equation (6), p.12:

(12) $Q = \frac{a-P}{b}[1 - \frac{e\beta}{cP(a-P)}]$

the sales production curve can also be thought of as a derived supply of sales curve (to an open access retail market). Specifically, the salesmen supply sales effort to retailers, which converts consumer demand for a product R (see equation (1), p.9), into sales of that product. It is the sales and not the sales effort that the retailers value. It should also be noted that if the commission cP, in equation (12), does not equal or exceed $e\beta/(a-P)$ there will be no sales.

Figure 6, p.25, performs the above transformation graphically by starting with the sales volume to effort relationship (equation (6), p.12) in quadrant III and relating it to the effort to commission relationship (equation (11a), p.23) in quadrant IV to generate the derived sales supply curve (equation (12), p.23) in quadrant I. Equation (12) is illustrated in Figure 7, p.29, by the curve labeled "supply of sales".

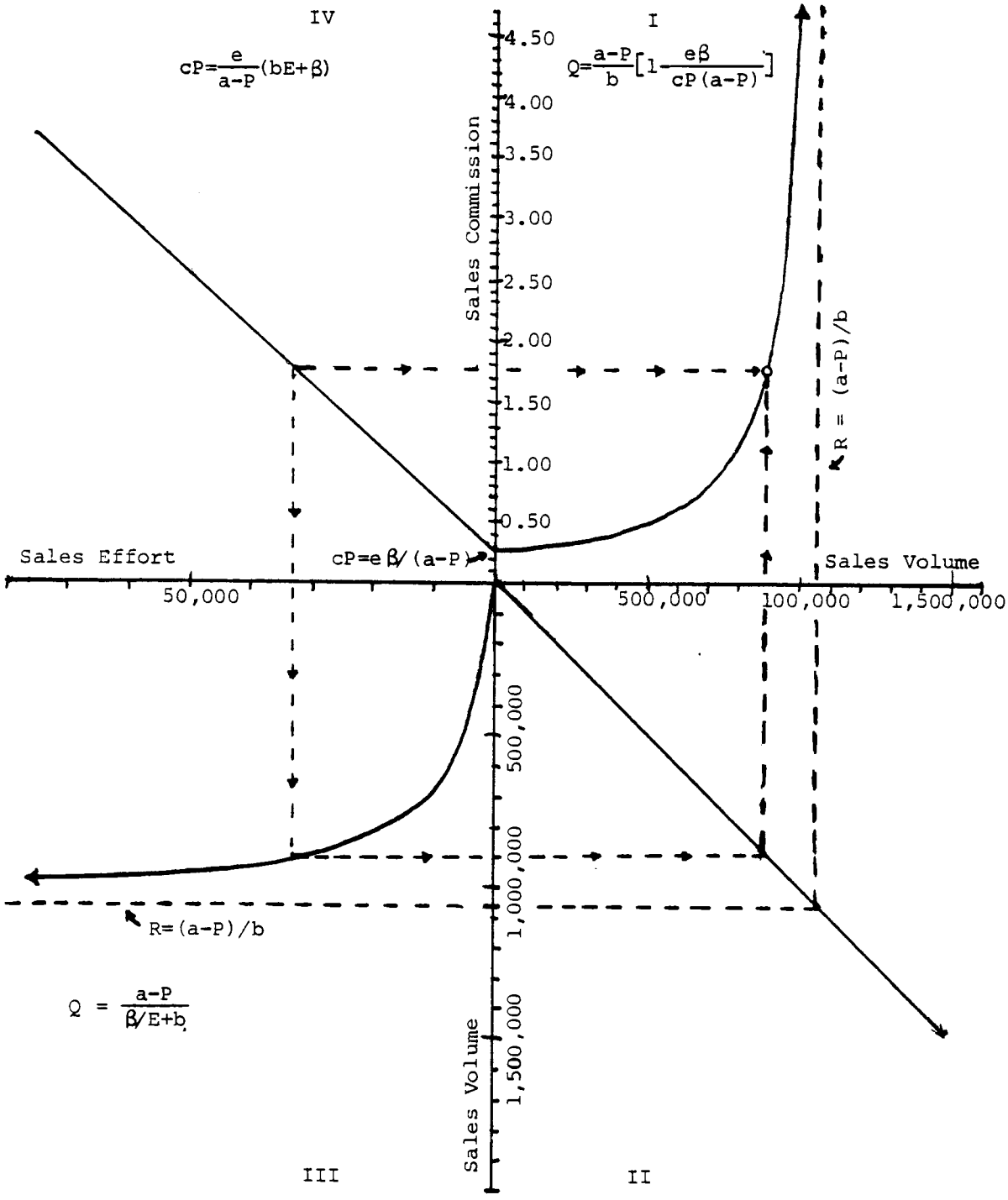
When the supply of sales effort, of a salesman monopoly (equation (11a), p.23), is transformed into a "price to quantity" context, the result can be thought of as the marginal supply of sales. That transformation was accomplished by substituting the right hand side of equation (11a), p.23, into equation (6), p.12, to generate:

$$(13) \quad Q = \frac{a-P}{b}\left[1 - \sqrt{\frac{e\beta}{cP(a-P)}}\right]$$

Equation (13) is illustrated in Figure 10, p.45.

In Appendix E, it is shown that most retail markets fall into the category of an open access commons. Therefore, in most retail markets, equation (12), p.23, defines the salesman supply of sales curve.

Figure 6 Transformation of Sales Effort Equilibrium Conditions into a Derived Supply of Sales Curve



A(iv). Retailers

Retailers act as "middlemen". They buy products from manufacturers and buy sales effort from salesmen. Those inputs plus other inputs are combined and resold as a *retail package* to consumers. In the real world, retailers manage a host of variables. However, to make the analysis tractable, this paper assumes that retailers actively control only two variables - the retail price and the commission paid to salesmen. As discussed on p.22, in this initial analysis the retail price is assumed to be fixed. Once the behaviour of the retail market participants has been established in this "fixed price retail market model" the effects of allowing retailers to vary the retail price will be examined (see p.51).

Retail markets tend to be characterized by an absence of effective barriers to entry. Retailers in such markets tend to operate in an open access commons. The nature of such markets has already been discussed extensively, with regard to salesmen, in the previous section. Therefore, at this point, all that will be added to that discussion is that, like the salesmen that he employes, an individual retailer's net earnings are a function, not only of the effort applied by that retailer but also, the effort applied by all retailers in the same market. As the amount of sales effort increases, in an open access retail market, an increasing portion of that effort is applied not to serve the consumers but in a struggle to reach each consumer first and complete the sale before a competitor completes it. The shape of equation (4a), p.11, reflects this effect.

Retailers, to acquire revenues, must *capture* sales and in that process they incur three basic types of costs. The first two types of costs, the cost of goods sold $\underline{G}$, p.16, and the per unit sold commission $\underline{cP}$ paid to salesmen, pp.16-23, have already been discussed. The remaining costs fall

into a broad category that this paper calls *selling coordination* or administration costs. In the simplified world being portrayed in this model, the selling coordination costs fall into one of two categories—one that varies directly with sales volume $\underline{qQ}$ and the other that varies directly with the effort applied by salesmen $\underline{kE}$.

The following equations describe the return to retailers:

(14) Gross $Y_r = PQ$

(15) Net $Y_r = Q(P-G-cP-q) - kE$

Y_r = income of retailers.

q = increase in the selling coordination costs due to an additional unit of product being sold.

k = increase in the selling coordination costs due to an additional unit of sales effort being applied.

On p.24 it was noted that retailers value the sales volume generated by sales effort, rather than the sales effort itself. The retailer net income as a function of sales volume $\underline{Q}$ can be defined by substituting the right hand side of equation (6b), p.12, into equation (15) to generate:

(15a) Net $Y_r = Q[P - G - cP - q - \frac{k\beta}{a-P-Qb}]$

In an open access commons retail market, when there are market rents available to retailers the resulting super normal returns induce more effort - either through the entry of additional retailers or through the expansion of existing operations.[8] Retailers, to expand the sales effort committed to them, increase the commission $\underline{cP}$. This process continues until all of the retail profits are eroded. Therefore, the retailer open access demand for sales can be defined by setting equation (15a), p.27,

equal to zero and rearranging it to define the sales volume.

$$(16)\quad Q = \frac{a-P}{b}\left[1 - \frac{k\beta}{(a-P)(P-G-q-c^*P)}\right]$$

c^*P = the maximum commission that retailers would be willing to pay to salesmen (per unit sold). When it is paid, the retail costs are just covered and there are no retailer profits.

Equation (16) can be thought of as the derived demand for sales. It is illustrated in Figure 7, p.29, by the curve labeled "sales demand".

A retailer monopolist is assumed to demand sales only to the point where the retail profits are maximized. That sales volume can be found by differentiating equation (15a) with respect to sales volume $\underline{Q}$, setting that differential equal to zero and reorganizing the result to define the sales volume:

$$(15b)\quad \frac{d(\text{Net } Y_r)}{d\,Q} = P - G - cP - q - \frac{k\beta(a-P)}{(a-P-Qb^2} = -0-$$

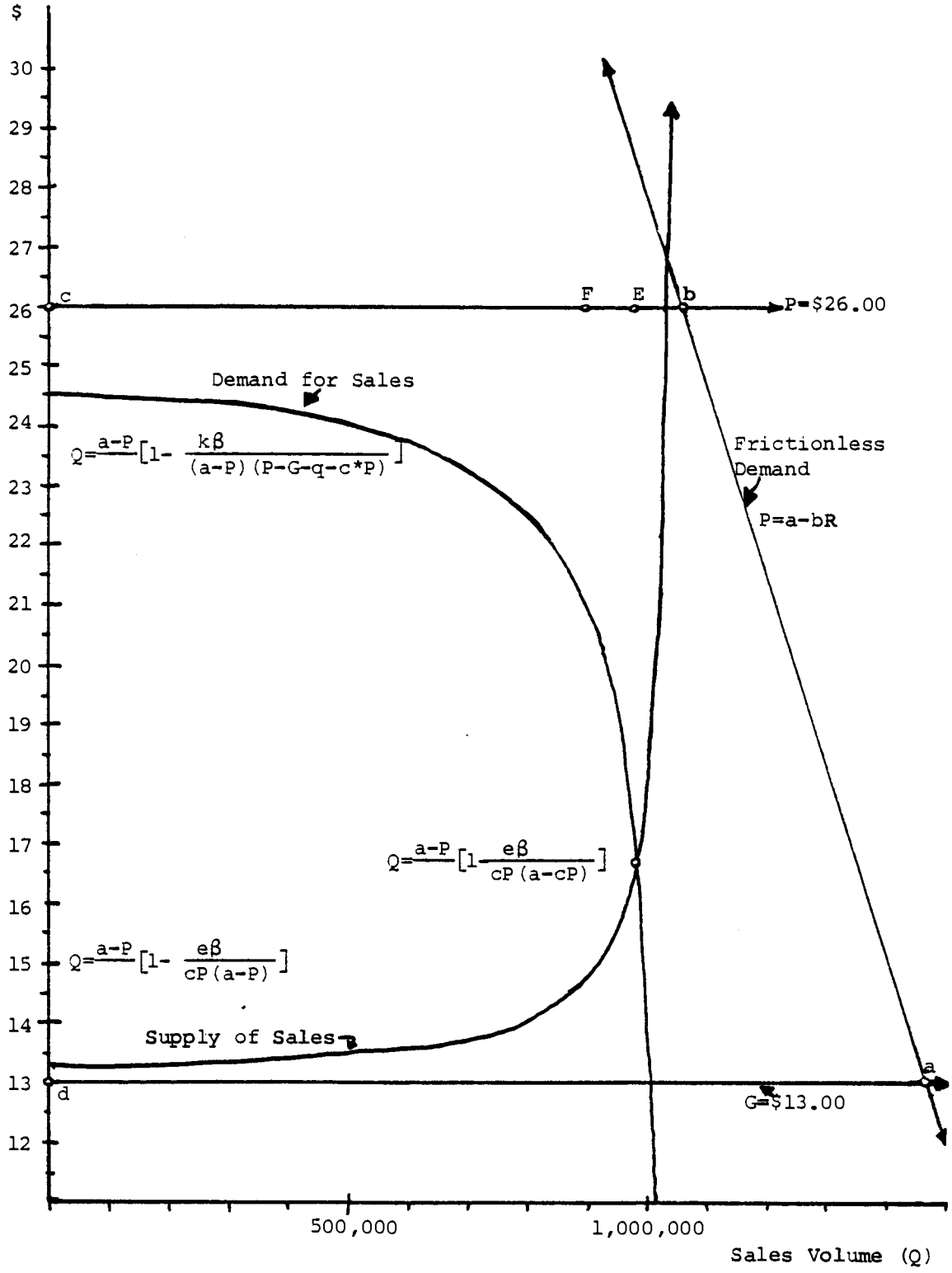
so

$$(16a)\quad Q = \frac{a-P}{b}\left[1 - \sqrt{\frac{k\beta}{(a-P)(P-G-q-c^*P)}}\right]$$

c^*P = the commission that maximizes the net income of retailers, for any given $\underline{Q}$ and $\underline{P}$.

If equation (16) can be thought of as the demand for sales, then equation (16a) can be thought of as the marginal demand for sales. Equation (16a) is illustrated in Figure 9, p.40, by the curve labeled "marginal demand".

Figure 7 The (Derived) Market in Retail Open Access Equilibrium



In Appendix E, this study shows that most retail markets fall into the category of an open access commons. Therefore, in most retail markets, equation (16), p.28, will define the retailer demand for sales, produced by the salesmen.

$$(16)\quad Q = \frac{a-P}{b}\left[1 - \frac{k\beta}{(a-P)(P-G-q-c^*P)}\right]$$

B. Equilibrium in a Fixed Price Open Access Retail Market

Consumers choose which retailer to buy from on the basis of the retail price and the retail services rendered (retail effort). The assumptions of a fixed retail price (pp.19 and 22) and of a uniform amount of retail service provided, per unit sold (E/Q; p.19) mean that, at this point in the model development, the equilibrium in the open access retail market is defined by the equilibrium in the retail factor market.

The above equilibrium occurs at the intersection of equations (12), p.23, and (16), p.28 (i.e., the derived supply of sales curve and the desired demand for sales curve). When both of those equations are reorganized to define the commission the results are:

$$(12b)\quad cP = \frac{e\beta}{a-P-Qb}\ ;\quad \text{also } cP = eE/Q = e\beta/[CATr]$$

and

$$(16b)\quad c^*P = P - G - q - \frac{k\beta}{a-P-Qb}\ ;\ \text{also } c^*P = P-G-q-kE/Q$$

When the right hand sides of equations (12b) and (16b) are set equal and the result is reorganized to define sales volume, then:

$$(17)\quad Q = \frac{a-P}{b}\left[1 - \frac{\beta(e+k)}{(a-P)(P-G-q)}\right]$$

which can be reorganized to:

(18) $P = G + q + \frac{\beta(e+k)}{a-P-Qb}$

The derived supply and demand functions for sales volume (equations (12), p.23, and (16), p.28, respectively) are illustrated in Figure 7, p.29. The equilibrium at the intersection of those functions (equations (17) and 18), above) is shown at point E, in Figure 7. The commission at the open access equilibrium can be defined by setting the right hand sides of equations (12), p.23, and (16), p.28, equal and reorganizing the result to:

(19) $cP = c^*P = \frac{P-G-q}{1+k/e}$

As noted on p.30, the term cP can be replaced with $e\beta/[CATr]$. When that substitution is made into equation (19), the result can be reorganized to:

(19a) $[CATr] = \frac{\beta(e+k)}{P-G-q}$

The retail effort applied to the market at the open access equilibrium can be defined by substituting the right hand side of equation (19) into equation (11), p.23, to produce:

(20) $E = \frac{1}{b}[(a-P)(P-G-q)/(e+k) - \beta]$

At the open access equilibrium, equation (19a) defines the consumer average transaction cost. The corresponding retailer cost is defined by equations (22) through (22c), which were developed in the following process. The retail price of a product is defined by equation (5), p.11.

(5) $P = G + M$

The retailer markup $\underline{M}$ can be defined as:

(21) $M = q + (e+k)E/Q + (\text{Net } Y_4 + \text{Net } Y_s)/Q$

The first two terms in equation (21) represent the opportunity cost of all retail factors, therefore, when the retail factor market is in equilibrium:

(22) $M_\infty = q + (e+k)E/Q$ $\quad M_\infty$ = the retail markup in an open access retail market when the retail factor market is in equilibrium.

Various forms of $\underline{M_\infty}$ will be used extensively, later, in this study. The following formulations for $\underline{M_\infty}$ are made with that purpose in mind. When equation (6b), p.12, is substituted into equation (22) the result is:

(22a) $M_\infty = q + \frac{\beta(e+k)}{a-P-Qb}$

When the left hand side of equation (6), p.12 is substituted into equation (22), the result is:

(22b) $M_\infty = q + \frac{e+k}{a-P}[\beta + bE]$

When the left hand side of equation (20), p.31, is substituted into equation (22b), the result is:

(22c) $M_\infty = q + \frac{1}{b}[(a-P)(P-G-q) - \beta(e+k)]$

The traditional model of supply and demand would have predicted an

equilibrium at point b in Figure 7, p.29. Table 1, p.50, compares the values of the endogenous variables at points E and b. If the retail market model described in this study is appropriate then point b in Figure 7, is not attainable. In empirical studies using the traditional model, the demand curve would be identified as passing through point E. That experience would generate few problems if a condition of *ceteris paribus* is maintained. However, if the retail market model, described in this paper, is appropriate and if there are substantial shifts in its parameters, then the expedient definition of the demand curve in the empirical application of the traditional model will likely result in substantial errors in prediction, in understanding, and in policy. Instead of attributing such errors to the use of an inappropriate model, individuals using the traditional model would likely attribute such errors to either:

- uncertainty in the parameters defined for the traditional model, or
- unexplained shifts in either the demand curve or the supply curve.

B(i). Comparative Statics of the Fixed Price Open Access Retail Market Model - Equation (17), p.30

1. The retail price P is assumed, in this part of the study, to be a parameter. Therefore, P is assumed to not vary with changes in the other parameters.

$$(17)\quad Q = \frac{a-P}{b}\left[1 - \frac{\beta(e+k)}{(a-P)(P-G-q)}\right]$$

The retail market model will be contrasted with the fixed price traditional model illustrated in Figure 8, p.35.

2. $\frac{d\,Q}{d(G+q)} = \frac{-\beta(e+k)}{b(P-G-q)^2} < -0- \quad ; \quad P > G + q$

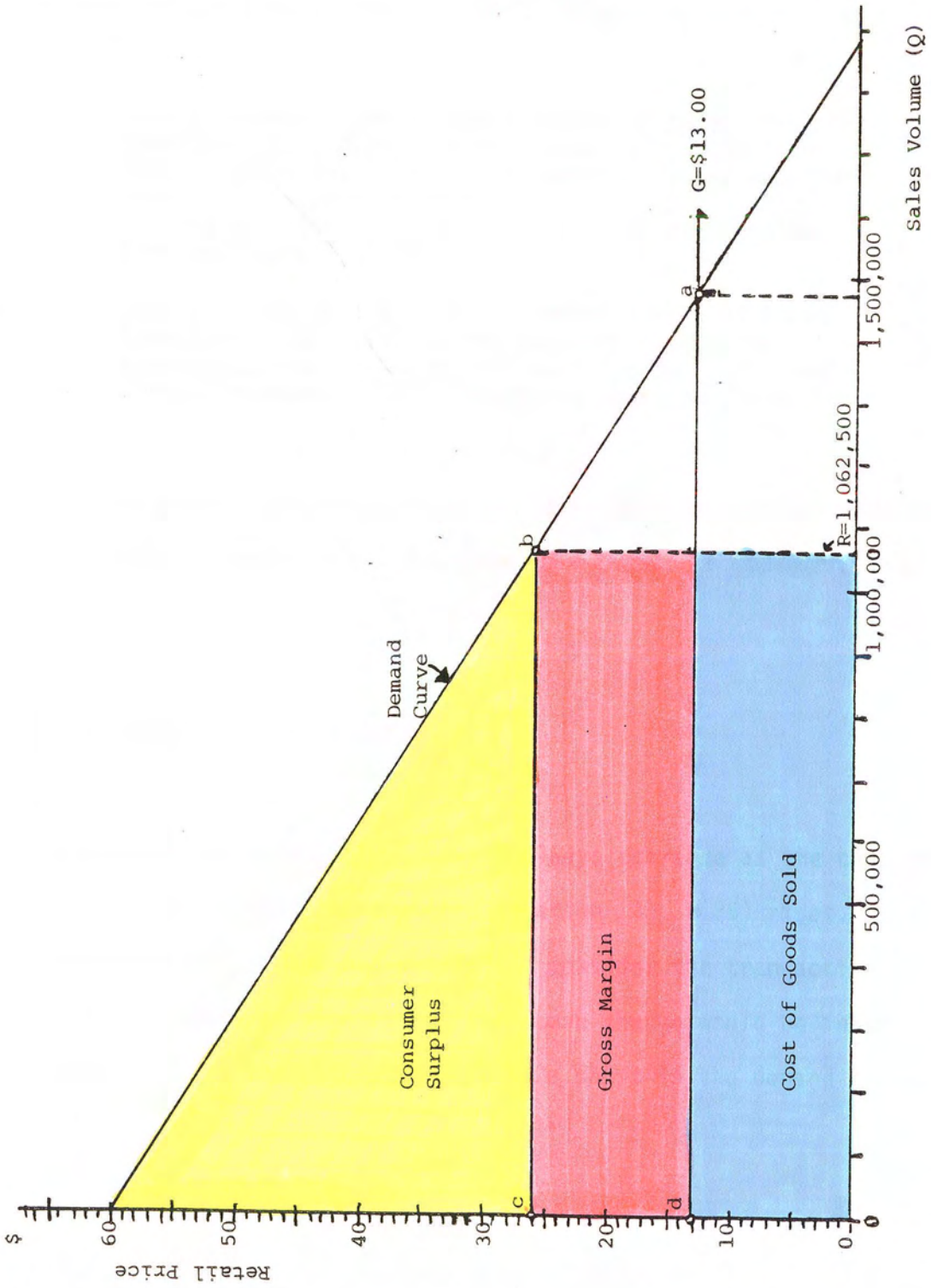
The equilibrium sales volume Q will always decrease with any increase in either the manufacturing supply price G or the volume related selling administration costs q. An individual analyzing this situation using a fixed price traditional model (i.e., the traditional model within a fixed retail price) would note that the retail price had not changed and would incorrectly attribute the change in sales volume to a change in consumer tastes (i.e., a shift in a or in -1/b).

3. $\frac{d\,Q}{d(-1/b)} = a - P - \frac{\beta(e+k)}{P-G-q} > -0- \quad ; \quad P > G + Q$

The equilibrium sales volume Q will always increase with an increase in the slope of the demand curve (i.e., as the slope -1/b increases it approaches zero). The fixed price traditional model would correctly interpret this change as an upward rotation in the demand curve and it would correctly estimate the direction of the change in sales volume. However, the magnitude of that change would be overestimated. Specifically:

> In the fixed price traditional model the open access equilibrium sales volume is defined as:
>
> $Q = (a-P)/b$
>
> and
>
> $\frac{d\,Q}{d(-1/b)} = a - P > -0-$
>
> However,
>
> $a-P > a-P-\beta(e+k)/P-G-q) \quad ; \quad P > G + q$
>
> Equation (19a), p.31, shows that the difference between the two differentials equals [CATr].

Figure 8 Traditional Supply and Demand Functions



4. $\frac{d\,Q}{d(e+k)} = \frac{-\beta}{b(P-G-q)} < -0- \quad ; \quad P > G + q$

The equilibrium sales volume Q will always decrease when there is an increase in the cost of retail effort (e+k).

- When e increases the salesman supply of sales curve (equation (13), p.24) shifts upward (e.g., the intercept, when Q=-0-, is $cP + G = G+e\beta/[a-P]$) and rotates upward. This results in equation (13), p.24, intersecting equation (16), p.28, at a lower sales volume Q — see Figure 7, p.29.

- When k increases the retailer demand for sales curve (equation (16), p.28) shifts downward (e.g., the intercept, when Q=-0-, is $c*P + G = P-q-k\beta/[a-P]$) and rotates downward. This results in equation (16), p.28, intersecting equation (13), p.24, at a lower sales volume Q — see Figure 7, p.29.

The fixed price traditional model would incorrectly attribute either of the above changes in sales volume to a change in consumer tastes.

5. $\frac{d\,Q}{d\,\beta} = \frac{-(e+k)}{b(P-G-q)} < -0- \quad ; \quad P > G + q$

The equilibrium sales volume Q will always decrease as the consumer intrinsic transaction cost β (see equation (4), p.36) rises. The traditional model does not explicitly consider the transaction costs of consumers. Therefore, the above change would be interpreted, in the traditional model, as a shift in the demand curve.

6. $\frac{dQ}{da} = 1/b > -0-$

The equilibrium sales volume Q will always increase when there is an increase in the intercept of the demand curve. The traditional model would correctly interpret this change as a shift in the demand curve.

7. $\frac{dQ}{dP} = \frac{1}{b}\left[\frac{\beta(e+k)}{(P-G-q)^2} - 1\right] \rightleftharpoons -0- \quad ; \quad P > G + q$

The value of the above differential is dependent on the value of P. Specifically, when:

$$P > G + q + \sqrt{\beta(e+k)} \quad ; \quad \text{then } \frac{dQ}{dP} < -0- \text{ ,}$$

$$P < G + q + \sqrt{\beta(e+k)} \quad ; \quad \text{then } \frac{dQ}{dP} > -0- \text{ , and}$$

the retail sales volume is maximized when:

(23) $P = G + q + \sqrt{\beta(e+k)}$

In the traditional model, an increase in the retail price always results in a decrease in sales volume (e.g., $Q = (a-P)/b$; $dQ/dP = -1/b < -0-$). Section G discusses in detail the reasons for the equivocal price effect in the retail market model.

C. Output of a Profit Maximizing Monopolist

When an individual owns and controls the access to a retail market, the power of that monopolist to extract rents is greatly enhanced by the commons nature of retail markets. The other parties in the retail markets are, from their perspective, still operating in an open access commons. Therefore, the monopolist maximizes his/her profits by maximizing and appropriating the total market rent.[8] In this model the manufacturers are assumed to face constant economies of scale and to have a supply curve that is infinitely elastic with respect to price (see p.14). Under those circumstances the market rent is defined, in the retail market model, as the sales volume Q times the difference between the maximum commission that retailers are willing to pay c*P and the minimum commission that salesmen are willing to accept cP.

After maximizing the market rent, the monopolist will appropriate it by manipulating the commission cP or the price at which the retailer acquires the product.

- When the Monopolist is a Retailer he/she will maximize his/her net income, as defined by equation (15), p.27. The following equation takes into consideration that the salesmen supply sales effort based on an open access factor market.

$$(15c) \quad \text{Net } Y_r = Q\left[P - G - q - \frac{\beta(e+k)}{a-P-Qb}\right]$$

The output selected by a profit maximizing retailer monopolist, in a fixed price retail market, can be defined by differentiating equation (15c) with respect to the sales volume Q, setting that differential equal

to zero, and rearranging the result to define Q.

$$(24a)\quad \frac{d(\text{Net } Y_r)}{d\,Q} = P - G - q - \frac{\beta(e+k)(a-P)}{(a-P-Qb)^2}$$

$$(24)\quad Q^* = \frac{a-P}{}\left[1 - \sqrt{\frac{\beta(e+k)}{(a-P)(P-G-q)}}\right]$$

The commission cP that the retailer monopolist will select, to extract all of the market rent, can be defined by substituting the right hand side of equation (24) into equation (13), p.24, and rearranging the result to produce:

$$(25)\quad c^*_r P = e\sqrt{\frac{\beta(P-G-q)}{(a-P)(e+k)}} - 1$$

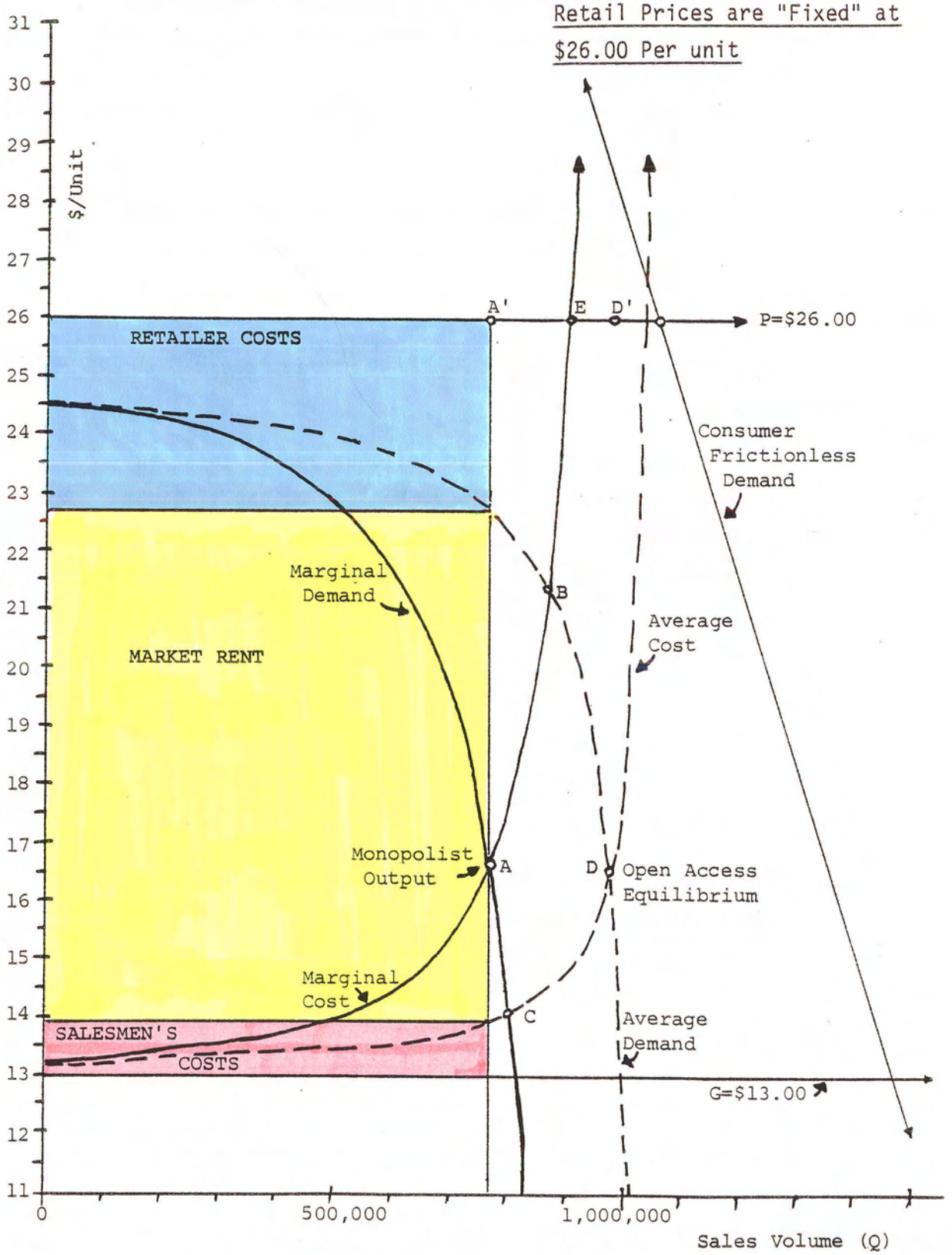
The level of sales effort demanded by the monopolist retailer can be defined by substituting the right hand side of equation (25) into equation (11), p.23, to produce:

$$(26)\quad E^* = \frac{B}{b}\sqrt{\left[\frac{(P-G-q)(a-P)}{\beta(e+k)}\right.} - 1]$$

- When the Monopolist is a Salesmen's Association it will maximize the total net income of its members, as defined by equation (10a), p.22.

$$(10a)\quad \text{Net } Y_s = \frac{cP(a-P)}{\beta/E + b} - eE$$

Figure 9 The (Derived) Market in Retail — Monopolist's Equilibrium, When Retail Prices are "Fixed" at $26.00 Per unit



The monopoly power of the salesmen's association in the factor market enables it to force the retailers to pay the maximum commission c*P, defined in the following rearrangement of equation (16), p.28:

$$(16b)\quad c^*P = P - G - q - \frac{k\beta}{a-P-Qb}$$

When the right hand sides of equations (16b) and (6), p.12, are substituted into equation (10a) the result is:

$$(10c)\quad \text{Net } Y_s = \frac{(a-P-)(P-G-q)}{\beta/E + b} - (e+k)E$$

The sales effort supplied by a salesmen's association monopoly can be defined by differentiating equation (10c) with respect to E, setting that differential equal to zero, and rearranging it to define the retail effort.

$$(26a)\quad \frac{d(\text{Net } Y_s)}{d\,E} = \frac{\beta(a-P)(P-G-q)}{(bE + \beta)^2} - (e+k)$$

$$(26)\quad E' = \left[\frac{\beta}{b}\sqrt{\frac{(P-G-q)(a-P)}{\beta(e+k)}} - 1\right]$$

The sales volume that the salesmen's association will generate can be defined by substituting the right hand side of equation (26) into equation (6), p.12, to produce:

$$(24)\quad Q' = \frac{a-P}{b}\left[1 - \frac{\beta(e+k)}{(a-P)(P-G-q)}\right]$$

The commission that the salesmen's association monopoly will generate can be defined by substituting the right hand side of equation (26) into equation (6), p.12, to produce:

$$(27)\quad C_s'P = P - G - q - k\sqrt{\frac{\beta(P-G-q)}{(a-P)(e+k)}}$$

The foregoing pages show that the only difference in the market behaviour between a retailer monopolist and a salesmen's association monopoly is in the choice of commission cP.

- In the Case of a Bilateral Salesman-Retailer Monopoly (Mansfield, 1975, pp. 284-285) the allocation of the monopoly profits is dependent on the relative power of each of the players.

- When a Manufacturer is the Monopolist he/she will seek to maximize the market rent, by operating at the volume defined by equation (24), and will appropriate it by increasing the wholesale price.

- A Consumer Association Acting as a Monopoly does not have to take any action – the consumer surplus is maximized at the open access equilibrium. When the social optimum is different from the open access equilibrium (p.47) the consumer association will operate at the social optimum and appropriate the market rents through licensing or other fees.

In Table 1, p.50, the social surplus at the monopoly output is 5.95 percent greater than it is at the open access equilibrium. That extraordinary result occurs because of the assumption of a fixed retail price. The monopo-

list cannot generate profits by varying the retail price and, at this point in the study, is restricted to limiting the amount of effort E that is applied to the retail market. Figure 10, p.45, illustrates that when the retail price is fixed at $26.00 the loss in consumer surplus is more than offset by the market rent gain to the monopolist. Figure 11, p.46 shows that the above result is retail price specific and that it is reversed at low retail prices. The loss in the consumer surplus was defined by the following equation:

$$(29)\quad [\Delta CS] = \frac{(a-P)^2}{2b}\left(\left[1-\sqrt{\frac{\beta(e+k)}{(a-P)(P-G-q)}}\right]^2-\left[1-\frac{\beta(e+k)}{(a-P)(P-G-q)}\right]^2\right)$$

Equation (29) was developed by the following process. Equation (8), p.14, defines the consumer surplus:

$$(8)\quad [CS] = .5bQ^2$$

When the right hand side of equation (17), p.30, is substituted into equation (8) the result defines the open access consumer surplus:

$$(8b)\quad [CS_\infty] = \frac{(a-P)^2}{2b}\left[1-\frac{\beta(e+k)}{(a-P)(P-G-q)}\right]^2$$

When the right hand side of equation (24), p.38, is substituted into equation (8) the result defines the consumer surplus at the profit maximizing monopoly output:

$$(8c)\quad [CS_o] = \frac{(a-P)^2}{2b}\left[1-\sqrt{\frac{\beta(e+k)}{(a-P)(P-G-q)}}\right]^2$$

Equation (29) is generated by subtracting equation (8b) from equation (8c).

In the traditional model a profit maximizing monopolist operates at the sales volume where the marginal revenue equals the marginal cost:

$$Q_{monopoly} = \frac{a-G-q}{2b}; Q_{competitive} = \frac{a-G-q}{b}$$

$$P_{monopoly} = a-Qb = \frac{a+G+q}{2}; P_{competitive} = G + q$$

However, in a fixed price traditional model a monopolist cannot manipulate the retail price and the monopoly power is irrelevant. In the retail market model a monopolist can manipulate both the retail price (P) and the amount of retail effort per unit sold (E/Q). In the fixed price retail market model the monopolist maximizes profits by reducing the retail effort per unit, from the open access level. That reduces the sales volume and the consumer surplus.

D. Producer Surplus

In Figure 7, p.29, at the open access equilibrium (point E) all market rents have been eroded. However, in most markets some salesmen are "more profitable" than others and some salesmen are "more prosperous" than others. Empirically then, retail markets are not without rents.

As discussed in Appendix G, this study holds that the above rents are due to relative and often temporary efficiencies. Specifically, not all units of effort are equal in their quality and/or in their cost. However, to the extent that a market is efficient and without barriers, such differences tend to be equalized over time (Scherer, 1980, p.292).

An important inference arising from the analysis in Appendix G is that when a retail market is in equilibrium the only source of economic profits is in relative efficiency. Therefore, if one life insurance firm doubles

Figure 10 Comparison of Consumer Loss and Monopolist Gain, When P = $20.00

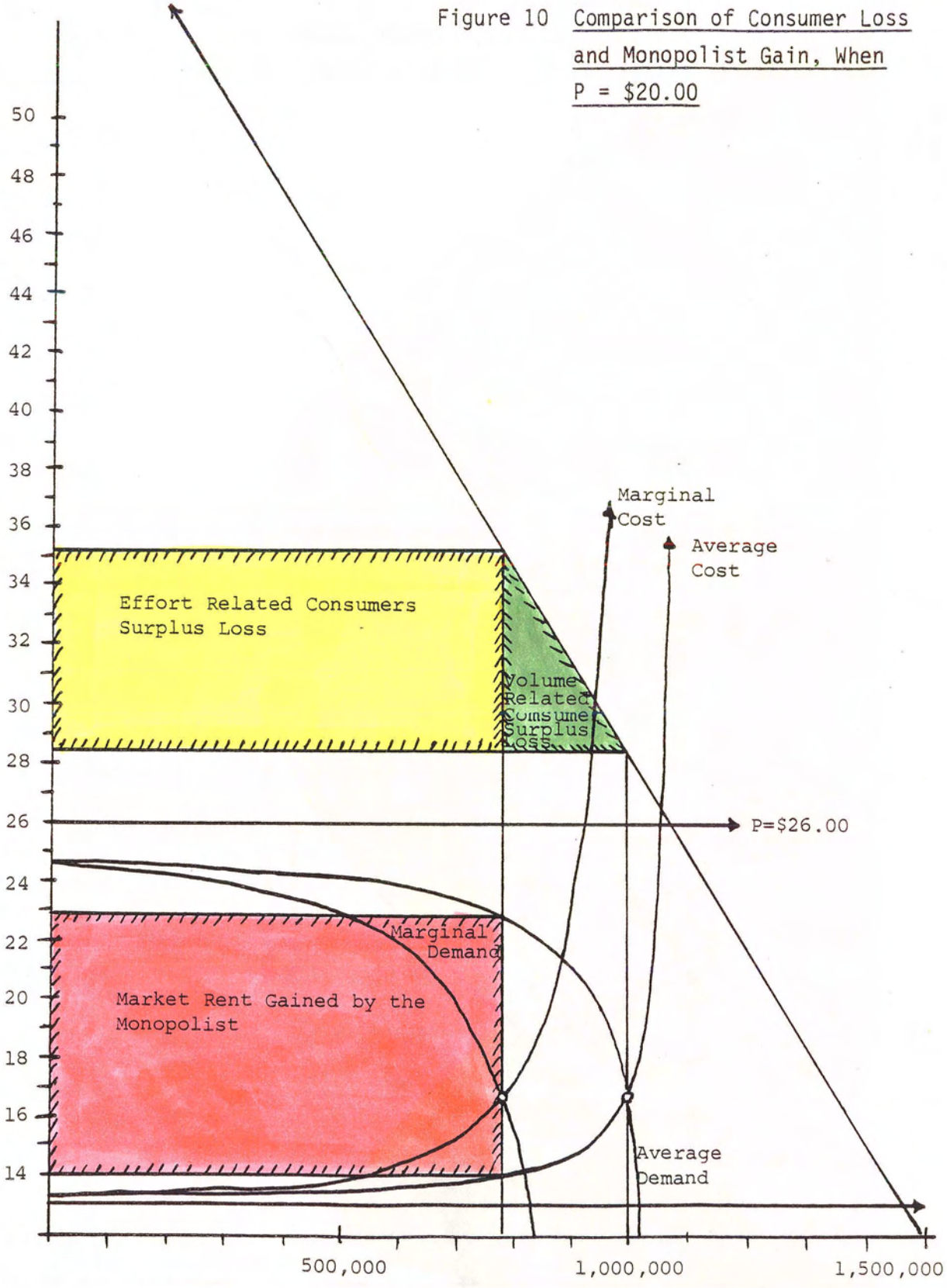
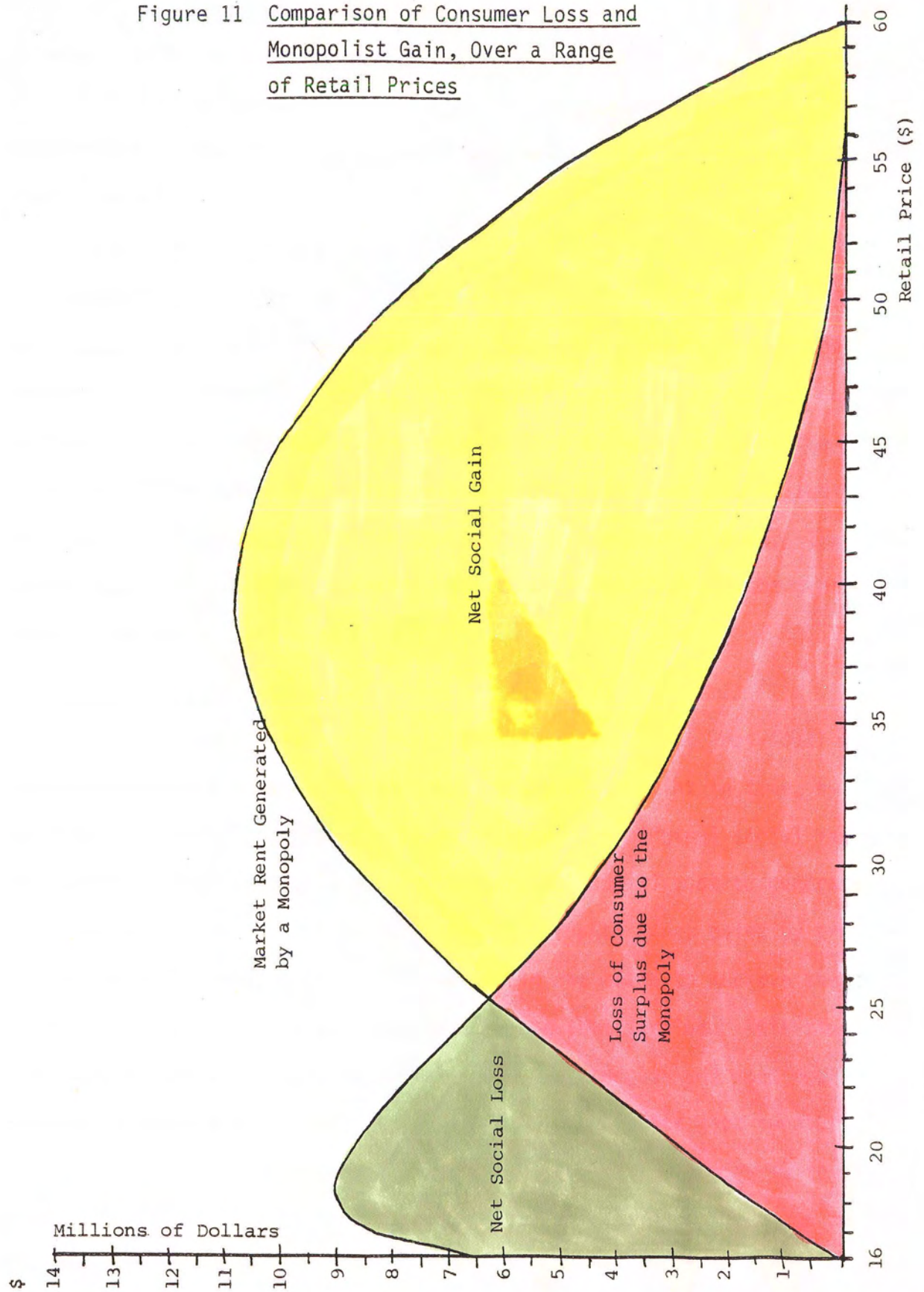


Figure 11 Comparison of Consumer Loss and Monopolist Gain, Over a Range of Retail Prices



the efficiency of its salesmen (e.g., through training) it may be able to generate and appropriate a substantial surplus. However, if all the life insurance firms in a market double the efficiency of their salesmen, the equilibrium sales volume increases but there is no relative advantage and the returns to the firms and to their salesmen should, in equilibrium, remain normal.

E. Salesmen Paid an Hourly Wage

Appendix H incorporates an hourly wage into the model and shows that the open access equilibrium and the monopoly outputs are unaffected by the presence or the absence of wages. That result occurs because wages paid to salesmen, in place of commissions, tend to have an equal but opposite effect on the salesmen's required return (e less the hourly wage) and the retailer's selling administration costs (k plus the hourly wage). The open access equilibrium and the monopoly output are a function of (among other things) the sum of those two costs.

F. The Socially Optimal Output

If society were ruled by a *Philosopher King* then that individual could maximize the value attained by society, at any given point in time, by operating the retail markets at the point where the marginal social value (the retail price) of a sale equals the marginal social cost to generate it. After maximizing the social surplus, the *Philosopher King*, being by profession an expert in what ends to achieve and in the means to achieve them (Flew, 1971, p.99), would know how to allocate that surplus. This study concentrates on the techniques of maximizing social surplus and does not presume to address the normative issue of how to allocate that surplus.

Given the linear downward sloping (frictionless) demand curve in this study (equation (1), p.9) the average social value of a product can be defined as:

(30) $V/Q = a - .5bQ$

The total average social cost of the retailed product consists of the product cost (G, p.14), the cost of the retail factors (M_∞, p.32) and the consumer average transaction cost ($\beta Q/E$, p.11).

(31) $[TASC] = G + M_\infty + (\beta Q)/E$

The net social value of a product is:

(32) $[NSV] = (V/Q - [TASC])q$

When the right hand sides of equations (30) and (31) are substituted into equation (32) the result is:

(32a) $[NSV] = [a - .5bQ - G - M_\infty - (\beta Q)/E]Q$

When the right hand sides of equations (6), p.12, and (22a), p.32, are substituted into equation (32a) the result is:

$$(32b)\quad [NSV] = \frac{(P-G-q)(a-P)}{\beta/E + b} + \frac{.5b(a-P)^2}{(\beta/E + b)^2} - (e+k)E$$

which can be reorganized to:

$$(32c)\quad [NSV] = \frac{.5b(a-P)^2}{(\beta/E + b)^2} + \frac{(P-G-q)(a-P)}{\beta/E + b} - (e+k)E$$

The first term in equation (32c) represents the consumer surplus and the sum of the last two terms is the retail profit.

$$(33)\quad \frac{d[NSV]}{d\,E} = \frac{\beta b(a-P)^2}{E^2(\beta/E+b)^3} + \frac{\beta(P-G\ q)(a-P)}{E^2(\beta/E+b)^2} - (e+k)$$

When equation (33) is set equal to zero and reorganized the result is:

$$(33a)\quad E = \frac{a-P}{b}\sqrt{\frac{\beta}{e+k}\left[\frac{P-G-q}{a-P} + 1/\left(1+\frac{\beta}{Eb}\right)\right]} - \beta/b$$

In Figure 7, p.29, point F represents the socially optimal output for the model when the retail price P is set equal to $26.00. It was generated by using equation (33a) to define the socially optimal sales effort E. That effort was then substituted into equation (6), p.12, to generate the sales volume at point E.

In Figure 7, when the retail price equals $26.00, the socially optimal retail effort is different from the retail effort that generates the minimum social cost.

$$(34)\quad \frac{d[TASC]}{d\,E} = \frac{d\,[CATr]}{d\,E} - \frac{dM_{\infty}}{dE} = \frac{(e+k)b}{a-P} - \frac{(a-P)b}{(1+Eb/\beta)^2}$$

$$(34a)\quad E = \frac{a-P}{b}\sqrt{\beta/(e+k)} - \beta/b$$

The difference in solutions between equations (33a) and (34a), when the retail price P equals $26.00, indicates that the optimum at point E, in Figure 7, p.29, is not the global optimum (i.e., welfare can be improved by changing the retail price). At the global optimum equations (33a) and (34a) should be equal. Therefore, the retail effort at the global equilibrium can be defined by setting the right hand sides of equations (33) and (34a) equal:

Table 1 Comparison of the Market Outcomes When Various Groups Act as a Monopolist

Group or Individual Acting as a Simple Monopolist[16].	RETAILER	SALESMEN	CONSUMERS or Open Access	SOCIAL IDEAL
- Retail price per unit	$26.00	$26.00	$26.00	$26.00
- Sales volume (units) (Q)	772,141	772,141	983,151	904,382
- Effort (E)	15,697.04	15,697.04	73,136.67	33,761.91
- Commission per unit (cP)	$.9758	$9.8418	$3.5707	$1.79191 to $7.86955
Retailer:				
- Revenues(PQ)	$20,075,666	$20,075,666	$25,561,926	$23,513,932
- Less: Cost of Goods Sold (GQ)	10,037,833	10,037,833	12,780,963	11,756,966
Selling Coordination				
[(q+cP)Q]	1,371,168	8,216,976	4,297,058	2,344,077 *
kE	1,820,857	1,820,857	8,483,905	3,916,382
- Net (Economic) profit	$ 6,845,808	$ -0-	$ -0-	$ 5,496,507 *
Salesmen:				
- Gross income (cPQ)	$ 753,455	$ 7,599,261	$ 3,510,537	$ 1,620,572 *
- Cost of effort (eE)	753,455	753,455	3,510,537	1,620,572
	$ -0-	$ 6,845,808	$ -0-	$ -0-
Consumer Surplus:				
- Gross Q[a-P-.5bQ]	$16,713,566	$16,713,566	$17,961,760	$17,622,479
- Less: Cost of Effort Q[a-P-bQ]	7,174,339	7,174,339	2,496,386	4,575,971
- Net	$ 9,539,227	$ 9,539,227	$15,465,374	$13,086,509
TOTAL SOCIAL SURPLUS	$16,385,035	$16,385,035	$15,465,374	$18,583,016

*Assumes that cP = $1.79191.

$$(35)\quad E = \frac{\beta}{b}\left[\frac{a-P}{P-G-q} - 1\right]$$

However, the retail price P, in equation (35) is not equal to $26.00. When the right hand side of equation (34a) is substituted into equation (35) the result is equation (23), p.36:

$$(23)\quad P = G + q + \sqrt{\beta(e+k)}$$

When the right hand side of equation (23) is substituted into equation (35) the result is:

$$(35a)\quad E = \frac{\beta}{b}\left[\frac{a-G-q}{\sqrt{\beta(e+k)}} - 2\right]$$

When the parameter values in Appendix F are substituted into equations (23) and (35a) the results are $19.36577 and 37,191.87 units respectively. When those values are substituted into equation (6), p.12, the result is 1,095,889 units of product.

The next section describes the mechanics of how the above social global optimum is attained in an open access retail market, when retail prices are variables.

G. A Variable Price Retail Market Model[12]

In the analysis prior to this point retail effort E is the only control variable. It is controlled directly by salesmen and indirectly by retailers—through setting a commission. In the variable price retail market model the role of the retail price P is changed from that of a parameter to that of a

control variable. Individual retailers are assumed to initiate changes in retail prices, consumers and salesmen are assumed to respond passively to those changes, and the manufacturer supply price G is assumed to be unaffected by the retail price or by changes in the retail price.

G(i). Equilibrium in a Variable Price Open Access Retail Market

Section B of this study, pp.30-33, showed that (at any given retail price P) in an open access retail market more retail effort E is applied to the market until the (economic) profits of both retailers and salesmen are zero. Therefore, in open access retail markets, the factor market will move toward the equilibrium defined by equations (17), (18), (19), and (20), pp.30-31. Equation (17) can be thought of as the *open access supply* and is illustrated in Figure 12, p.57, by a curve so labeled. If retailers operate in the price/volume space to the right of that curve they will incur losses; if they operate in the price/volume space to the left of it they earn profits, which attract more retail effort and increase the sales volume.

$$(17)\quad Q = \frac{a-P}{b}\left[1 - \frac{\beta(e+k)}{(a-P)(P-G-q)}\right]$$

In the variable price retail market model retailers can manipulate the retail market through the dimension of retail price as well as through the dimension of retail effort. As a result, the fixed price retail market model equilibrium conditions of:

- Net Y_s = -0- , and
- Net Y_r = -0-,

while necessary, are not sufficient to generate an equilibrium. In the variable price retail market model there is a further condition for equilibrium of:

$$\bullet \quad \frac{d(\text{Net } Y_r)}{d\ P} = -0-$$

In equation (15c), p.38, the retailer income is expressed in terms of retail price $\underline{P}$ and sales volume $\underline{Q}$.

$$(15d) \quad \text{Net } Y_r = Q\left[P - G - q - \frac{\beta(e+k)}{a-P-Qb}\right]$$

At any given sales volume $\underline{Q}$:

$$(36) \quad \frac{d(\text{Net } Y_r)}{d\ P} = 1 - \frac{\beta(e+k)}{(a-P-Qb)^2}$$

When the right hand side of equation (36) is set equal to zero and reorganized the result is:

$$(37) \quad P = a - Qb - \sqrt{\beta(e+k)} \quad ; \quad Q = \frac{a-P-\sqrt{\beta(e+k)}}{b}$$

Equation (37) is illustrated in Figure 12, p.57, by the line labeled *social demand curve*. It is so labeled, because along that function (at any given sales volume $\underline{Q}$) not only are the retailer profits maximized, but also (as will be shown on p.64) the average transaction cost ([CATr] + M_∞) is at a minimum and the social surplus is at a maximum. The retail effort at any given point on the social demand curve is defined by equation (38), which

was developed by substituting the right hand side of equation (37) into equation (6b), p.12.

$$(38) \quad E = Q\sqrt{\beta/(e+k)}$$

The commission required to generate the retail effort $\underline{E}$ along the social demand curve can be defined by substituting the right hand side of equation (37) into equation (10), p.22, setting the result equal to zero, reorganizing that result to define $\underline{cP}$, and substituting in the right hand side of equation (38) to produce:

$$(39) \quad cP = eE/Q = e\sqrt{\beta/(e+k)}$$

The variable price open access equilibrium will form at the intersection of the *open access retail supply curve* and the *social demand curve*. When the right hand side of equation (37) is substituted into equation (17), p.30, the result is:

$$(40) \quad Q = \frac{1}{b}\left[a - G - q - 2\sqrt{\beta(e+k)}\right]$$

When the right hand side of equation (40) is substituted into equation (37) the result is equation (23), pp.36 and 51.

$$(23) \quad P = G + q = \sqrt{\beta(e+k)}$$

When the right hand side of equation (40) is substituted into equation (38) the result is equation (35a), p.51.

$$(35a)\quad E = \frac{\beta}{b}\left[\frac{a-G-q}{\sqrt{\beta(e+k)}} - 2\right]$$

The variable price open access retail market equilibrium is defined by equations (40), (23), and (35a).[12] That equilibrium is illustrated in Figure 12, p.57, by point C.

On p.37, item 7 defined the differential of the *open access retail supply curve* (equation (17), pp.30, 33, and 52) with respect to the retail price:

$$\frac{dQ}{dP} = \frac{1}{b}\left[\frac{\beta(e+k)}{(P-G-q)^2} - 1\right] \rightleftharpoons -0-$$

That differential confirms that when the retail price is defined according to equation (23), pp.36 and 51, the sales volume is at a maximum; when the price is lower an increase in the retail price increases the sales volume and when it is higher an increase in retail price decreases the sales volume.

The curvature of the *open access retail supply curve* can be determined by the following second order differential of equation (17).

$$\frac{d^2Q}{dP^2} = -2\beta(e+k) \div (P-G-q)^3 \quad < -0-$$

The above second order differential is negative, therefore, the open access retail supply curve is strictly concave—as it is shown in Figure 12, p.57.

G(ii). Comparative Statics of the Variable Price Open Access Retail Market

(40) $Q = \frac{1}{b}\left[a - G - q - 2\sqrt{\beta(e+k)}\right]$;

(23) $P = G + q + \sqrt{\beta(e+k)}$; (35a) $E = \frac{\beta}{b}\left[\frac{a-G-q}{\sqrt{\beta(e+k)}} - 2\right]$

1. When either G or q is increased:

$$\frac{d\,Q}{d(G+q)} = -1/b < -0- \quad ;$$

$$\frac{d\,P}{d(G+q)} = 1.\overline{00} \quad ; \quad \frac{d\,E}{d(G+q)} = -\frac{1}{b}\sqrt{\frac{\beta}{e+k}} < -0-$$

the equilibrium sales volume Q and retail effort E will always decrease and the retail price P will always increase by the same (absolute) amount as the change in G or in q. The traditional model of supply and demand would correctly interpret this change as a shift in the open access retail supply curve (equation (17), pp.30 and 52).

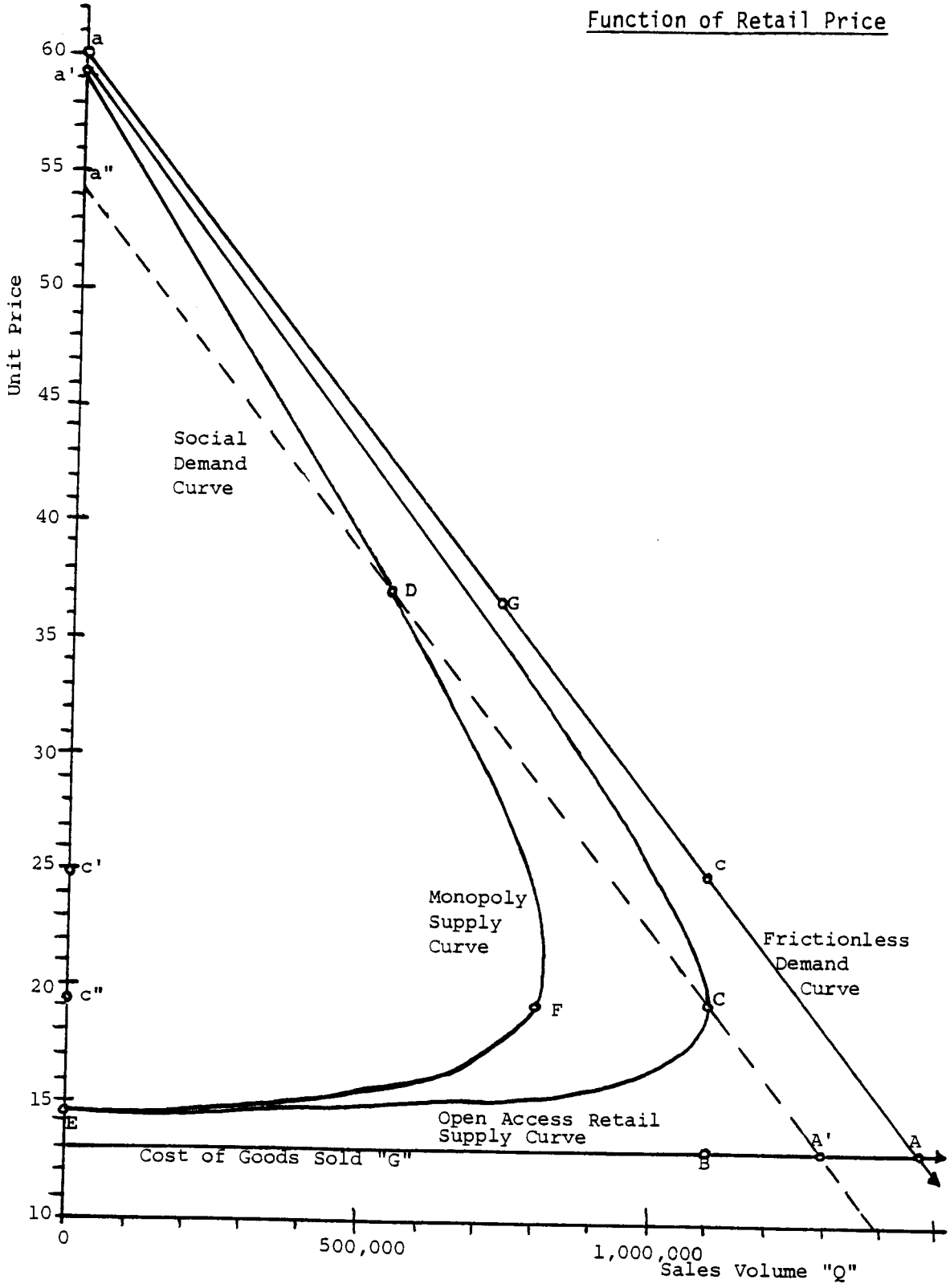
2. When the slope of the demand curve -1/b is increased:

$$\frac{d\,Q}{d(-1/b)} = \left[a-G-q-2\sqrt{\beta(e+k)}\right] > -0- \quad ;$$

$$\frac{d\,P}{d(-1/b)} = -0- \quad ; \quad \frac{d\,E}{d(-1/b)} = \left[a-G-q\right)\sqrt{\frac{\beta}{e+k}} - 2\beta] \gtrless -0-$$

the equilibrium sales volume increases, there is no effect on the equilibrium retail price, and the effect on the retail effort is indeterminant (please note that an increase in a negative slope causes that

Figure 12 Retail Sales Volume as a Function of Retail Price



slope to approach zero). The traditional model, in dealing with a change in $-1/b$, would consider only the rotation in the demand curve and would miss the effect on the *open access retail supply curve* (equation (17), pp.30 and 52). In the retail market model, as specified in this study, the shift in the open access retail supply curve, caused by a change in $-1/b$, is equal but opposite to the effect on price of the rotation of the frictionless demand curve (the social demand curve, equation (37), p.53, is parallel to the frictionless demand curve, equation (1), p.9). The problem of the traditional model overestimating the effect of a change in $-1/b$ was also noted in the analysis of the fixed price model, p.34..

3. When either e or k is increased:

$$\frac{d\,Q}{d(e+k)} = -\frac{1}{b}\sqrt{\frac{\beta}{e+k}} < -0- \quad ;$$

$$\frac{d\,P}{d(e+k)} = .5\sqrt{\frac{\beta}{e+k}} > -0- \quad ; \quad \frac{d\,E}{d(e+k)} = \frac{-(a-G-q)}{b(e+k)}\sqrt{\frac{\beta}{e+k}} \quad <-0-$$

the equilibrium sales volume Q and retail effort E will always decrease and the equilibrium retail price P will always increase. The traditional model in dealing with a change in e and/or k would consider the shift in the retail supply curve (equation (17), pp.30 and 52) but would miss the shift in the social demand curve (equation (37), p.53).

4. When β is increased:

$$\frac{d\,Q}{d\,\beta} = \frac{-1}{2b}\sqrt{\frac{e+k}{\beta}} < -0-$$

$$\frac{d\,P}{d\,\beta} = .5\sqrt{(e+k)/\beta} \;>-0-\; ; \quad \frac{d\,E}{d\,\beta} = \frac{a-G-q}{2b\sqrt{\beta(e+k)}} - 2 \gtrless -0-$$

the equilibrium sales volume Q will always decrease, the equilibrium retail price P will always increase, and the effect on the equilibrium retail effort E is indeterminant. The traditional model does not consider the transaction costs of consumers. Based on the theory of that model there should be no changes in the equilibrium price/volume combination. In the retail market model an increase in β shifts the social demand curve (equation (37), p.53) downward and shifts the open access supply curve (equation (17), pp.30 and 52) to the left.

5. When a is increased:

$$\frac{d\,Q}{d\,a} = 1/b \;>-0-$$

$$\frac{d\,P}{d\,a} = -0- \; ; \quad \frac{d\,E}{d\,a} = \frac{a-G-q}{b}\sqrt{\frac{\beta}{e+k}} \;>-0-$$

the equilibrium sales volume Q and retail effort E will always increase. The traditional model would correctly interpret this change as a shift in the frictionless demand curve (equation (1), p.9) but would miss the effects on the social demand curve (equation (37), p.53). In the retail market model an increase in a causes an upward shift in the frictionless demand curve, an upward shift in the social demand curve, and a shift to the right in the open access supply curve.

Among the more interesting effects in the variable price open access retail market model specified in this study are:

- A shift, with respect to the equilibrium retail price, in the open access retail supply curve (equation (17), pp.30 and 52) caused by a change to e or k or β are mitigated by a shift in the social demand curve (equation (37), p.53).

- A shift in, or a rotation of the social demand curve (equation (37), p.53) caused by a change to $-1/b$ or a is completely offset by a shift in the open access retail supply curve (equation (17), pp.30 and 52).

Given the above effects, retail prices are more stable, with respect to changes in consumer demand and/or changes in the cost of effort (e.g., changes in a, $-1/b$, β, e, and k), than in the traditional model.

G(iii). Output of a Profit Maximizing Monopolist

In the retail market model the sales volume is a function of retail effort as well as retail price (see p.12). The traditional model is a special case of the retail market model, where consumers are assumed to incur no transaction costs (i.e., the parameter β is assumed to equal zero).

	Retail Market Model	;	Traditional Model
(6)	$Q = \frac{a-P}{\beta/E + b}$	;	$Q = \frac{a - P}{b}$
(6a)	$P = a - Q(\beta/E + b)$	;	$P = a - Qb$
(6b)	$E = \frac{\beta}{a - P - Qb}$	;	$E = -0-$

In the traditional model (where a monopolist is assumed to manipulate

only the retail price) a profit maximizing monopolist chooses the retail price $\underline{P}$ that results in the sales volume $\underline{Q}$ where the marginal revenue equals the marginal cost.

$$\frac{d(PQ)}{d\,Q} = a - 2Qb \quad ; \quad a - 2Qb = G + q \quad ; \quad a - \frac{2(a-P)b}{b} = G + q$$

so: $$Q_{monopoly} = \frac{a-G-q}{2b} \text{ and } P_{monopoly} = \frac{a-G-q}{2}$$

In the traditional model, the second of the following two conditions of profit maximization is irrelevant (it is automatically satisfied when the first condition is satisfied) because the sales volume varies only with the retail price.

$$\frac{d(\text{Net } Y_r)}{d\,P} = -0- \quad \text{and} \quad \frac{d(\text{Net } Y_r)}{d\,Q} = -0-$$

In the retail market model, the sales volume varies with both the retail price $\underline{P}$ and with the average retail effort per unit sold ($\underline{E/Q}$). As a result the second condition of profit maximization is relevant. At any given retail price it is met by equation (24), p.41:

$$(24) \quad Q' = \frac{a-P}{b}\left[1 - \sqrt{\frac{\beta(e+k)}{(a-P)(P-G-q)}}\right]$$

Equation (24) can be thought of as the *monopoly supply curve* and it is illustrated in Figure 12, p.57, by a curve so labelled. The first constraint is met, per p.53, by equation (37), the social demand curve.

$$(37)\quad P = a - Qb - \sqrt{\beta(e+k)} \quad ; \quad Q = \frac{a-P-\sqrt{\beta(e+k)}}{b}$$

The short-run profits of the retailer monopolist will be maximized at the intersection of the *monopoly supply curve* and the *social demand curve*. When the right hand side of equation (37) is substituted into equation (24) the result is:

$$(41)\quad Q = \frac{1}{2b}\left[a - G - q \quad 2\sqrt{\beta(e+k)}\right]$$

which is one half of the sales volume at the open access equilibrium (equation (40), p.54). In the traditional model the sales output of a profit maximizing monopolist is also one half of the competitive output (see p.60). Further comparisons between the retail market model and the traditional model are made on pp.56-60 and on pp.73-76.

When the right hand side of equation (41) is substituted into equation (37) the result is:

$$(42)\quad P = .5(a+G+q)$$

When the right hand side of equation (41) is substituted into equation (38), p.54, the result is:

$$(43)\quad E = \frac{\beta}{b}\left[\frac{a - G - q}{2\sqrt{\beta(e+k)}} - 1\right]$$

The short-run profit maximizing price/volume combination is defined by equations (41), (42), and (43). It is illustrated in Figure 12, p.57, by point D.

As noted on pp.37-44, the only difference between a monopoly run by a retailer and one run by a salesman is in the choice of the commission rate. A retailer monopolist will use equation (39), p.54, to set the commission;

$$(39) \quad cP = e\sqrt{\beta/(e+k)}$$

Whereas a salesman monopolist will use the commission to extract all of the market rent.[8] The commission used by a salesman monopolist can be defined by substituting the right hand sides of equations (41) and (42) into equation (16a), p.28, to produce:

$$(44) \quad cP = .5(a-G-q) - k\sqrt{\beta/(e+k)}$$

In the case of a bilateral salesman-retailer monopoly the commission will be set somewhere between the amounts defined by equations (39) and (44). The exact amount will depend on the relative power of each party.

A manufacturer monopolist will capture the market rents by setting the wholesale price at some amount $\underline{G^*}$ which is above the manufacturer's cost of $\underline{G}$.

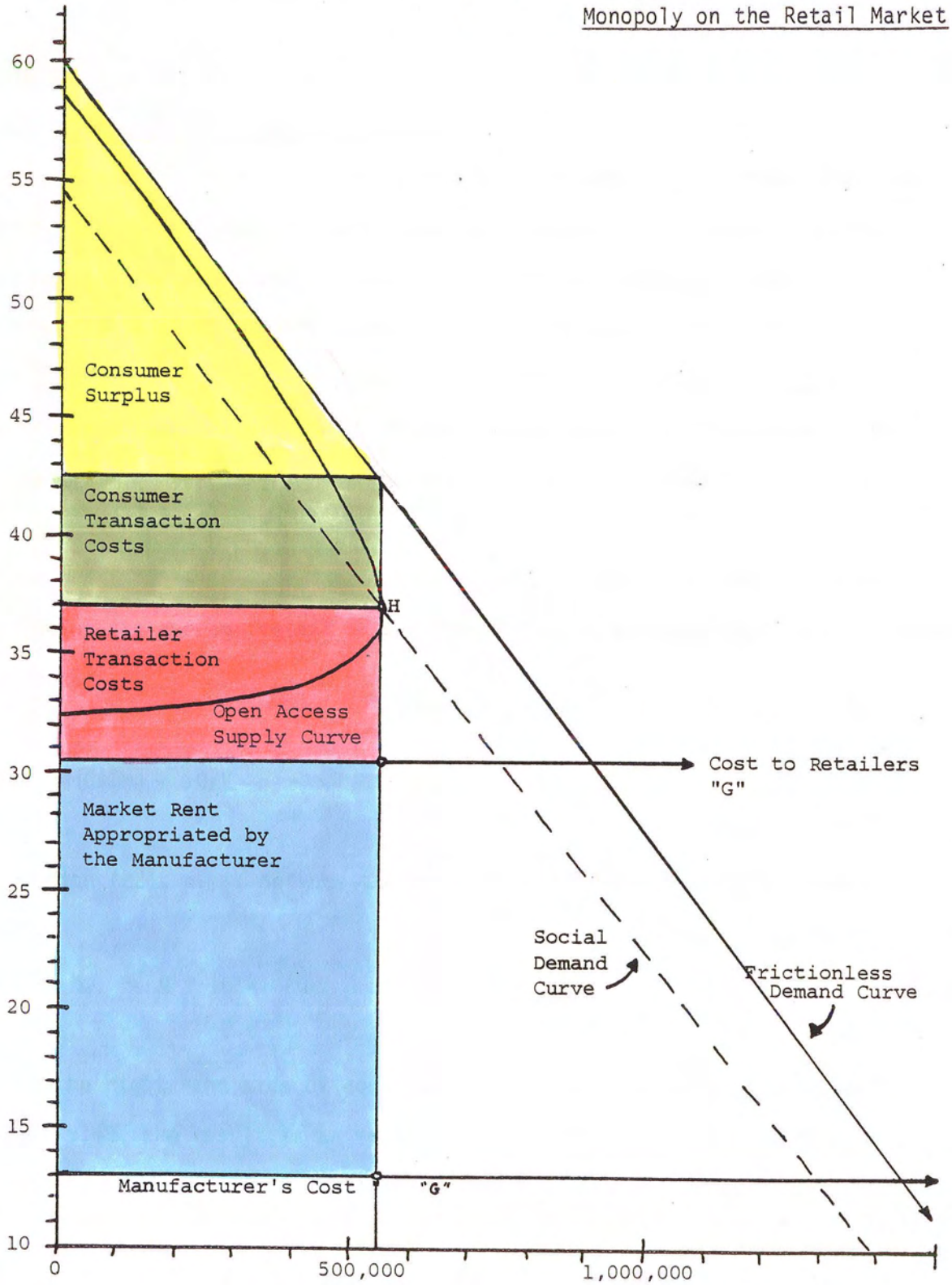
$$(45) \quad G^* = P - M$$

When the right hand sides of equations (22b), p.32, (43), p.62, and (42), p.62, are substituted into equation (45) the result is:

$$(45a) \quad G^* = .5(a+G=q) - [\, q+\sqrt{\beta(e+k)} \,]$$

The first term in equation (45a) is the retail price at point $\underline{H}$ in Figure 13,

Figure 13 Effect of a Manufacturer Monopoly on the Retail Market



p.64, and the sum of the last two terms is the retailer average transaction cost.

G(iv). The Socially Optimal Output

The social surplus, at any given sales volume, is maximized when the average delivered cost of that given sales volume is minimized. As with any production process, that minimum occurs when the marginal products of the inputs, divided by their respective costs, are equal. Equation (4a), pp.10-11, implicitly assumes that retail effort per unit sold (E/Q) and consumer effort per unit sold are substitute inputs to the process of moving goods from manufacturers to consumers. The arduous task of defining the marginal product of consumer effort was avoided by using equation (4a), p.11. That equation can be thought of as the cost to consumers (and to society) of reducing the average retail effort per unit sold and substituting in consumer effort:

(4a) $[CATr] = \beta Q/E$

Equation (22), p.32, defines the cost to society of the retail market:

(22) $M_{\infty} = q + (e+k)E/Q$

When the right hand side of equation (22) is substituted into equation (31), p.48, the result is an equation that defines the total average social cost of a product in terms of retail effort and sales volume.

(31b) $[TASC] = G + q + (e+k)\frac{E}{Q} + \frac{\beta}{E/Q}$

When equation (31b) is differentiated with respect to the average retail effort the result is:

$$(38a)\quad \frac{d[TASC]}{d(E/Q)} = \frac{d\,M_{\infty}}{d(E/Q)} + \frac{d[CATr]}{d(E/Q)} = e+k - \frac{\beta}{(E/Q)^2}$$

The retail effort along the social demand curve can be defined by setting equation (38a) equal to zero and reorganizing the result to:

$$(38)\quad E = Q\sqrt{\beta/(e+k)}$$

When the right hand side of equation (38) is substituted into equation (6), p.12, the result is equation (37), p.53, which defines the social demand curve.

$$(37)\quad P = a - Qb - \sqrt{\beta(e+k)} \quad ; \quad Q = \frac{a-P-\sqrt{\beta(e+k)}}{b}$$

Therefore, the most efficient combination of retailer and consumer effort, at any given sales volume, occurs along the social demand curve. The question of what price/volume combination along the social demand curve is socially optimal was answered by the following line of reasoning. The retail sales volume $\underline{Q}$ is maximized by equation (23), pp.36 and 51.

$$(23)\quad P = G + Q = \sqrt{\beta(e+k)}$$

On p.54, equation (23) was found to identify the retail price at the open access equilibrium (point $\underline{C}$, in Figure 12, p.57). According to equation (8), p.14, maximizing the sales volume $\underline{Q}$ maximizes the consumer surplus.

(8) $[CS] = .5bQ^2$

However, maximizing the consumer surplus is no guaranty of maximizing the net social value. When the right hand side of equation (38), pp.54 and 66 is substituted into equation (32c), p.48, the net social value, at any given point on the social demand curve is defined in terms of the retail price and the sales volume:

$$(32d)\ [NSV] = Q\left[\frac{.5bQ(a-P)^2}{(\sqrt{\beta(e+k)} + Qb)^2} + \frac{(P-G-q)(a-P)}{\sqrt{\beta(e+k)} + Qb} - \sqrt{\beta(e+k)}\ \right]$$

When the right hand side of equation (37), pp.53 and 62, is substituted into equation (32d) the net social value, at any given point on the social demand curve is defined in terms of the sales volume $\underline{Q}$:

$$(32e)\ [NSV] = .5bQ^2 + [a-Qb-\sqrt{\beta(e+k)}]Q - [G+q+\sqrt{\beta(e+k)}\ ]Q$$

The first term in equation (32e) represents the consumer surplus (equation (8), p.14), the sum of the next three terms is the retail price (equation (37), pp.53 and 62), and the sum of the last three terms is the average cost incurred by the retailer (equation (23), p.51). Equation (32e) can be restated in a simplified form:

$$(32e)\ [NSV] = [a - G - q - 2\sqrt{\beta(e+k)}\ ]Q - .5bQ^2$$

$$(32f)\ \frac{d[NVS]}{d\ Q} = a - G - q - 2\sqrt{\beta(e+k)} - Qb$$

When the right hand side of equation (32f) is set equal to zero and reorgan-

ized the result is equation (40), p.54, the variable price open access equilibrium retail price (point C in Figure 12, p.57).

$$(40)\quad Q = \frac{1}{b}\left[a - G - q - 2\sqrt{\beta(e+k)}\right]$$

Therefore, the open access equilibrium is the socially optimal price/volume combination. However, that finding is dependent on the assumption implicit in equation (4a), p.11,

$$(4a)\quad [CATr] = \beta Q/E$$

that the consumer average transaction cost is a function of the average retail effort E/Q. If the consumer average transaction cost was a function of total retail effort E (e.g., of the form in equation (4b), below),

$$(4b)\quad [CATr]^{o} = \zeta E^{-1/\delta}$$

then consumers would not internalize all of the cost of the retail effort. As a result the price/volume combination at the open access equilibrium (see Figure 12, p.57) would be to the right of the socially optimal combination.

While the relationship between the consumer average transaction cost and some types of retail effort (such as advertising) may be of the form defined in equation (4b), this study holds that, for the most part, equation (4a) is the most appropriate relationship. The detailed analysis and implications of the relationship depicted in equation (4b) are left for future studies.

G(v). Monopolies with Objectives other than Short-run Profit Maximization

A monopolist with a primary objective other than short-run profit maximization is not as predictable as the more traditional and simple profit maximizing monopolist. It is, however, possible to predict that, in terms of the Figure 12, p.57, price/volume space, a rational monopolist will not operate:

- in the area to the right of the *open access retail supply curve* (equation (17), p.52), where the retailer would incur a net loss (p.52), or,
- in the area to the left of the *monopoly supply curve* (equation (24), p.61) because movement to the left of the monopoly supply curve decreases both the consumer surplus and the profits accruing to the monopolist, or,
- in the area to the right of the *social demand curve* (equation (37), pp.53 and 62), where the consumers would rather have lower retail prices than have the additional retail effort E provided by the higher retail prices.

The primary concern of the monopolist will dictate what price/volume combination will be selected from the above viable price/volume space. For example:

- An unregulated monopoly that risks having its customers appeal to the government for relief will tend to operate at price/volume combinations along the social demand curve, somewhere between points D and C (see Figure 12, p.57). The greater the risk of government intervention the closer that the price/volume combination will be to point C.
- A regulated monopoly that faces price controls and review by government will tend to operate at point F, where it can claim to be providing the product at the open access (competitive) price.

  Point F is defined by equations (23), p.51, and (46), p.70. Equation (46) was developed by substituting the right hand side of equation (23) into equation (24), p.61, the monopoly supply curve.

$$(23)\quad P = G + q + \sqrt{\beta(e+k)}$$

$$(46)\quad Q = \frac{1}{b}\left[a - G - q - \sqrt{\beta(e+k)}\left(1 + \sqrt{(a-G-q)\left(\frac{1}{\beta(e+k)}\right)^{.5} - 1}\right)\right]$$

- A monopoly whose return on capital is regulated may operate at:
  - the open access equilibrium (point C where its costs are maximized, or,
  - some other point in the viable price/volume space (defined on p.69) and then syphon-off the market rents through (related) unregulated company.

The following comments by Scherer make the concept of a monopolist who does not maximize short-run profits more viable:

> "Clear and blatant exploitation of monopoly power leads to a bad press, which most business managers prefer to avoid. ... Persistently high prices and profits may also provoke direct government intervention in the form of price controls or anti-trust proceedings. The desire to maintain a favourable public image and fear of government intervention undoubtedly induce some companies to avoid squeezing all they can out of a monopolistic market position." Scherer, 1980, p.264.

If the monopolist controls the supply of a product but cannot control all of the potential distribution channels, then "arbitragers" will prevent him/her from operating at a price/volume combination that is below the social demand curve. At all price/volume combinations below the social demand curve the marginal cost of retailer effort is less than the relative marginal cost of consumer effort (see p.66). That inequality allows "arbitragers" to buy the product from the monopolist, add retail effort to it, and resell it to the consumers at the price indicated by the social demand curve.

There are several ways that the monopolist can deal with the foregoing

peculiar form of arbitrage:

- withdraw from the retail market and become a wholesaler,
- obtain an exclusive government enforced license to distribute the produce,
- operate at a price/volume combination on the social demand curve, or,
- secure the channels of distribution through the use of a product guaranty (of significant value) that is invalidated by any resale of the product.

Table 2 (pp.72-73b) Comparision of Market Variables at Various Price-Volume Combinations, Illustrated in Figures 12 and 13

Point	
A	Traditional perfect competition output.
G	Traditional profit maximizing output for a monopoly.
C	Open access (perfect competition) output.
D	Profit maximizing output for a monopoly.
D'.	Monopoly output when the manufacturer is the monopolist.
F	Monopoly output that maximizes the monopolist's profits when the retail price P is constrained to the open access equilibrium level.

Table 2 Comparison of Market Variables at Various Price-Volume Combinations

Output Point	A	G	C
Comments	Not Attainable	Not Attainable	Open Access
Retail Price	$13.00000	$36.50000	$19.36577
Volume Q	1,468,750	734,375	1,095,889
Effort E	???	???	37,191.87
Commission cP	???	???	$ 1.62901
Retailer/Salesmen:			
- Revenue PQ	$19,093,750	$26,804,688	$21,222,928
- Less: GQ or G*Q	$???	$???	$14,246,687
qQ	???	???	876,719
(e+k)E	???	???	4,314,257
Total Cost	$19,093,750	$ 9,546,875	$21,222,873
- Profit	$ -0-	$17,257,813	$ 55
Wholesaler:			
- Revenues G*Q	$ -0-	$ -0-	$ -0-
- Less GQ	-0-	-0-	-0-
qQ	-0-	-0-	-0-
- Profit	$ -0-	$ -0-	$ -0-
Consumer Surplus			
- Gross	$???	$???	$25,315,025
- Less: Transaction Cost	???	???	6,099,462
- Net	$34,515,625	$ 8,628,906	$19,215,563
SOCIAL SURPLUS	$34,515,625	$25,886,719	$19,215,563

??? Not given by the model

Table 2 Continued.

D	H	F
Profit Maximizing	Manufacturer Monopolist	Price Controlled Monopoly
$36.90000	$36.90000	$19,36577
547,945	547,945	799,862
18,595.94	18,595,94	10,046.45
$ 1.62901 to 19.16324	$ 1,62901	$ .602891
$20,219,337	$20,219,337	$15,489,943
7,123,344	16,731,244	15,489,943
438,360	438,360	639.890
3,049,733	3,049,733	1,647,618
$10,611,437	$20,219,337	$12,685,714
$ 9,607,900	$ -0-	$ 2,804,229
$ -0-	$16,731,244	$ -0-
-0-	7,123,344	-0-
-0-	-0-	-0-
$ -0-	$ 9,607,900	$ -0-
$ 7,853,655	$ 7,853,655	$22,265,309
3,049,677	3,049,677	12,028,841
$ 4,803,978	$ 4,803,978	$10,236,468
$14,411,978	$14,411,978	$13,040,697

H. Comparison of the Traditional Supply and Demand Model to the Retail Market Model

If the (variable price) retail market model, presented in this study, is appropriate and if the transaction costs considered in that model are significant, what are the implications for the model of supply and demand that is traditionally used in rudimentary microeconomic analysis?

- The traditional model of supply and demand is a special case of of the retail market model. If the parameter β equals zero, then the consumer average transaction cost (equation (4a), p.11) equals zero and the retail market model resolves down to the traditional model. A similar result can be obtained by setting the cost of retail effort equal to zero (i.e., (e+k) = -0-). However, the second situation also involves the illogical outcome of an infinite amount of retail effort being applied.
- As indicated in Figures 12, p.57, and 13, p.64, and in Table 2, pp.73-73b, a number of conclusions from the two models are similar:
    a) The consumer surplus and the social surplus are maximized at the open access (perfect competition) equilibrium.

       In the retail market model, the above conclusion is dependent on the assumption implicit in equation (4a), p.11, that the consumer average transaction cost is a function of average retail effort rather than total retail effort (see p.68).

    b) The profit maximizing monopolist chooses a price/volume combination based on information from his/her marginal cost curve (equation (24), p.61) and his/her marginal revenue curve (equation (37), p.62).

    c) The sales volume at the profit maximizing monopoly output is one half of the sales volume at the open access equilibrium. A necessary condition to generate this conclusion is a linear downward sloping demand curve. Both the traditional model and the retail market model (as presented in this study) are assumed to have linear downward sloping demand functions.

- There are, however, many substantial differences between the two models:

  a) In the traditional model, retailers supply the product based on the industry marginal cost curve.

     In the retail market model, a monopolist retailer supplies the product based on the industry marginal cost curve but retailers in an open access market, supply the product based on the industry average cost curve. This last conclusion is counter intuitive until the commons nature of retail markets is remembered.

  b) In the traditional model the demand curve and the supply curve are assumed to be independent. That independence is a necessary condition for the use of *revealed preference theory* (Stigler, 1966, pp.68-70; Silverberg, 1978, pp.324-342; Green, 1979, pp.121-128; Henderson and Quandt, 1980, pp.45-48) or *derived theory* (Stigler, 1966, pp.242-244; Friedman, 1976, pp.153-165; Henderson and Quandt, 1980, pp.80-83) to empirically define demand curves.

     The assumed independence of the demand and supply curves in the theory of the traditional model, also, means that shifts in any demand or supply parameters tend to result in changes in the equilibrium retail price.

     In the retail market model the frictionless demand curve is assumed to be independent of the supply function. However, the social demand function (equation (37), p.53) and the retail supply function (equation (17), p.52, or (24), p.61) are interdependent and both curves are dependent on the frictionless demand curve (equation (1), p.9). The open access equilibrium occurs at the intersection of the social demand curve and the open access retail supply curve. Therefore, the use of revealed preference theory or derived demand theory to define demand curves is only appropriate if the retail market model is not appropriate, or if the transaction costs considered in the retail market model are not significant, or if all parameters related to retail or consumer effort ($\underline{\beta}$, $\underline{e}$, or $\underline{k}$) are constant.

     The interdependence of the social demand curve and the open access retail supply curve, in the retail market model, results in there being little or no change in equilibrium retail price after shifts in the demand-supply parameters ($\underline{a}$, $\underline{-1/b}$, $\underline{\beta}$, $\underline{e}$, or $\underline{k}$). This conclusion may be of some import in antitrust actions.

c) The open access equilibrium and the monopoly profit maximizing output defined by the traditional model (points A and G in Figure 12, p.57 and in Table 2, pp.73a-73b) are unattainable, according to the retail market model.

In empirical applications, individuals using the traditional model expediently define demand "as a locus of points, each of which shows the maximum quantity of the commodity that will be purchased, ... per unit time at a particular price" (Friedman, 1976, p.13). The demand curve defined above is, in terms of the retail market model, the social demand (equation (37), p.53) which is not independent of the supply curve. As long as the parameters in the supply curve (β, e, and k) remain constant, the above expedience allows the traditional model to function empirically despite its theoretical deficiencies.

d) In the traditional model, the marginal social value of a product is (when the market is in equilibrium) always equal to the retail price of the product. Also, the long-run supply curve is usually assumed to be the marginal cost of producing the product.

In the retail market model, the marginal social value of a product, at any given sales volume, is defined by the frictionless demand curve. When the retail price is on the open access retail supply curve the marginal social value of a product is, also, equal to the retail price plus the consumer average transaction cost. Further, the retail price (when it is on the open access retail supply curve) can be subdivided into the wholesale price of the product plus the retail transaction cost (equation (22a), p.32).

e) The traditional model fails to note that a profit maximizing monopolist compounds the social injury of high prices by also reducing the retail effort provided to customers.

f) The traditional model provides few insights into the behaviour of monopolists who do not maximize short-run profits.

The retail market model delineates the options available to a rational monopolist who does not maximize short-run profits. The behaviour and strategies of such monopolies (within the area bounded by the retail market model, p.69) are dependent on the nature and the risk of government intervention.

> The behaviour of monopolists is also dependent on the nature of their monopoly power. Monopoly power has two basic forms — control over the distribution network and/or control over the product source. Where a monopolist does not control all channels of product distribution, a non-transferable guaranty is one means of securing the distribution network from predation by arbitragers (i.e., a transferable guaranty may increase a retailer's sales productivity by reducing the moral hazard faced by the consumer - Akerlof, 1970 - but a non-transferable guaranty also reduces the resale market for a product, pp.68-69).

In summary, the elegant simplicity of the traditional supply and demand model has made it an exceptionally powerful and durable tool of microeconomic analysis. However, the simplifying assumptions in that model make it better suited to the relatively simple environments of the primary and the manufacturing sectors of the economy. The more complex environments of the retail sales and service sectors tend to confound the traditional model and, as a result, many of the policy implications arising from that model may be perverse. It is the contention of this study that the variable price retail market model can cope with the complex retail sales and service environments better than the traditional model. Appendix E examines the applicability of the variable price retail market model to retail markets.

IV. GOVERNMENT INTERVENTION

In the previous section, pp.68 and 73a, it was noted that *ceteris paribus*, the social surplus is maximized in a retail market at the open access equilibrium. However, all things are not equal — the government draws taxes from and provides services to retail markets.

The infrastructure (transportation, communication systems, monetary systems, power facilities, know-how, and other public services) is the foundation of a nation's economy. The better and more complete that it is, the more effective will be the nation in carrying on its economic activity. The elements of the infrastructure tend to have public good characteristics.[13] Therefore, in the absence of government involvement, a nation will tend to under-invest in generating and maintaining its infrastructure.

Another function of government is to provide and enforce laws and regulations that limit public "bads". In particular, the government seeks to set and enforce limits on antisocial behaviour in various commons. For example:

- Maximum limits on air, water, and noise polution.
- Minimum health and education standards.
- Limits on the rights of owners of private property (e.g., try setting-up a piggery in a residential area).
- A legal system, that includes codified laws, enforcement agencies, and courts, to minimize the cost of resolving disputes.
- Standard units of weights and measures.
- Minimum quality and safety standards for goods and services.

Each of the above standards provide little or no benefit to an individual complying with them; the benefit comes from having all or most individuals in society comply with them. In situations where consumers have difficulty in ascertaining the quality of a good (e.g., specialized knowledge may be required) manufacturers and retailers of high quality goods should welcome

regulation and quality standards. Akerlof, in his paper "The Market for Lemons", noted:

> "There may be potential buyers of good quality products and there may be potential sellers of such products in the appropriate price range; however, the presence of people who wish to pawn bad wares as good wares tends to drive out the legitimate business. .... the important skill of the merchant is identifying the quality of merchandise; .... the amount of entrepreneurial time per unit output is greater, the greater are the quality variations." (Akerlof, 1970, pp.495-496).

Therefore, the government, by providing infrastructure as well as enforced laws, regulations, and standards, may substantially reduce manufacturing and transaction costs.

One of the primary functions of government is to extract a sufficient surplus from the private sector to fund an appropriate level of investment in and maintenance of public goods and services. Abraham Lincoln noted in his last public address (Washington, April 11, 1865) that:

> "If you once forfeit the confidence of your fellow citizens, you can never regain their respect and esteem. It is true that you may fool all the people some of the time; you can even fool some of the people all the time; but you can't fool all of the people all the time." (Bartlett, 1951, p.457).

Therefore, a democratic government that wishes to remain in power must carefully balance the marginal value of the public goods and services provided with the marginal value of the resources extracted from the private sector.

A. Effects of a Tax that is Spent to Provide the Retail Market with Infrastructure and Regulatory Services

In the introduction to this section, pp.78-79, it was clearly shown that efficiency in the private sector is dependent on an effective public sector. A complete modelling of that process would be unreasonably complex. The following illustration of the dependence of the private sector on the public

was made relatively simple and clear by several assumptions:

a) The retail market provides a single uniform good and conforms to the variable price retail market model, under conditions of open access.

b) The government provides only infrastructure and regulatory services.

c) The government budget is balanced (e.g., there is no public sector deficit or surplus).

d) As the government collects taxes γQ and commits those resources to providing more infrastructure and regulatory services, the transaction costs in the retail market decline. That relationship is captured in the following equations, that convert the parameters β, e, k, and G (see Appendix F for the values those parameters are assumed to take, in the numerical example, when $\gamma = 1.00$) into the variables β^o, e^o, k^o, and G^o.

(47) $B^o = B\gamma^{-\phi}$

(48) $(e^o + k^o) = (e+k)\gamma^{-\psi}$

γ = tax per unit sold.

ϕ is a slope parameter = .75.

ψ is a slope parameter = .25.

The parameter q is, for simplicity of exposition, assumed to be unaffected by government expenditures.

(49) $G^o = g + \gamma$

g = the manufactured cost of the product; g = 12.00.

Implicit in equations (47) and (48) are the assumptions:

- that in the absence of public sector spending retail transactions become infinitely costly, and,
- that public sector spending proceeds from the most valued services to less valued services.

In Appendix E, p.121, it is shown that the majority of North American retail markets tend toward the open access equilibrium. In the previous section, p.54, the open access equilibrium was identified by the following

equations:

$$(40)\quad Q = \frac{1}{b}\left[a - G - q - 2\sqrt{\beta(e+k)}\right]$$

$$(23)\quad P = G + q + \sqrt{\beta(e+k)}$$

$$(35a)\quad E = \frac{\beta}{b}\left[\frac{a-G-q}{\sqrt{\beta(e+k)}} - 2\right]$$

Implicit in the previous section and in the above equations is the assumption that the government collected and spent revenues of \$1.00 per unit of product sold in the private sector. As such, $\underline{\beta}$, $\underline{e}$, $\underline{k}$, and $\underline{G}$ are parameters (See Appendix F for the values assigned to those parameters in the numeric example). In this section, $\underline{\gamma}$ is a tax variable controlled by the government and the parameters $\underline{\beta}$, $\underline{e}$, $\underline{k}$, and $\underline{G}$ in equations (40), (23), and (35a) must be replaced with the corresponding variables.

$$(40a)\quad Q = \frac{1}{b}\left[a - G^{o} - q - 2\sqrt{\beta(e^{o}+k^{o})}\right]$$

$$(23a)\quad P = G^{o} + q + \sqrt{\beta^{o}(e^{o} + k^{o})}$$

$$(35b)\quad E = \frac{\beta^{o}}{b}\left[\frac{a-G^{o}-q}{\sqrt{\beta^{o}(e^{o}+ k^{o})}} - 2\right]$$

When the right hand side of equations (47), (48), and (49) are substituted into the above equations the results are:

$$(40b)\quad Q = \frac{1}{b}\left[a - g - \gamma - q - 2\sqrt{\beta(e+k)^{\gamma-\phi-\psi}}\right]$$

$$(23b)\quad P = g + \gamma + q + \sqrt{\beta(e+k)^{\gamma-\phi-\psi}}$$

$$(35c)\quad E = \frac{\beta\gamma^{-\phi}}{b}\left[\frac{a-g-\gamma-q}{\sqrt{\beta(e+k)^{\gamma-\phi-\psi}}} - 2\right]$$

When the assumed values for $\underline{\phi}$ and $\underline{\psi}$ (.75 and .25, respectively) are substituted into equations (40b), (23b), and (35c) the results are:

$$(40c)\quad Q = \frac{1}{b}\left[a - g - \gamma - q - 2\sqrt{\beta(e+k)/\gamma}\ \right]$$

$$(23c)\quad P = g + \gamma + q + \sqrt{\beta(e+k)/\gamma}$$

$$(35d)\quad E = \frac{\beta}{b\gamma^{.75}}\left[(a-g-\gamma-q)\sqrt{\frac{\gamma}{\beta(e+k)}} - 2\ \right]$$

At the open access equilibrium the social surplus is at a maximum, p.68. That equilibrium, also, occurs on the open access supply curve, p.54, where the (economic) profits of retailers and salesmen equal zero. Therefore, at the open access equilibrium the consumer surplus is the social surplus. In the open access equilibrium of the previous section, pp.52-55, $\underline{\gamma}$ was assumed to be \$1.00, a private sector sales volume $\underline{Q}$ of 1,095,889 units was generated, the consumer surplus (per equation (8), p.14) equalled \$19,215,563, and the government collected and spent taxes $\underline{\gamma Q}$ of \$1,095,889.

$$(8)\quad [CS] = .5bQ^2$$

The socially optimal $\underline{\gamma}$ can be identified by setting the differential of equation (40c), with respect to $\underline{\gamma}$ equal to zero and reorganizing the result to define $\underline{\gamma}$.

$$(40c)\quad Q = \frac{1}{b}\left[a - g - \gamma - q - 2\sqrt{\beta(e+k)/\gamma}\ \right]$$

$$(50)\quad \frac{dQ}{d\gamma} = \frac{1}{b}\left[\sqrt{\beta(e+k)/\gamma^3} - 1\right]$$

(51) $\gamma^* = \sqrt[3]{\beta(e+k)}$ γ^* = the optimal tax per unit sold in the retail market.

The above calculation of γ^* is based on the assumption that the retail markets are isolated from each other. In the real world much of the infrastructure and regulation arising from government spending is of a public good nature. That is, the infrastructure and regulation developed for, and applied to a given market is of benefit to many other markets. Therefore, in a real world analysis of government spending, a "public good market" for infrastructure and regulation would have to be derived from information taken from each of the markets benefited by that spending (see Mansfield, 1975, pp.497-498).

The model developed in this section of the study extrapolates from the beneficial effects of the government sector on the private sector (see pp.78-79) to an implicit assumption that in a state of *anarchy* (the absence of all government intervention) the private sector collapses (i.e., substitute zero for γ in equations (40c), (23c) or (35d), p.82). Government provided infrastructure and regulation is an integral part of developing and maintaining an efficient private sector. In the simplified world depicted by the model in this paper, it was possible to develop an explicit solution for the question, how much government is good government?

Another approach to defining the optimal tax is to meet the conditions of cost minimization. On p.65 the total average social cost of a product was defined as:

(31b) $[TASC] = G + q + (e+k)\frac{E}{Q} + \beta\frac{Q}{E}$

The assumption of an open access market means that equations (40) and (35a), p.81, can be substituted into equation (31a) to produce:

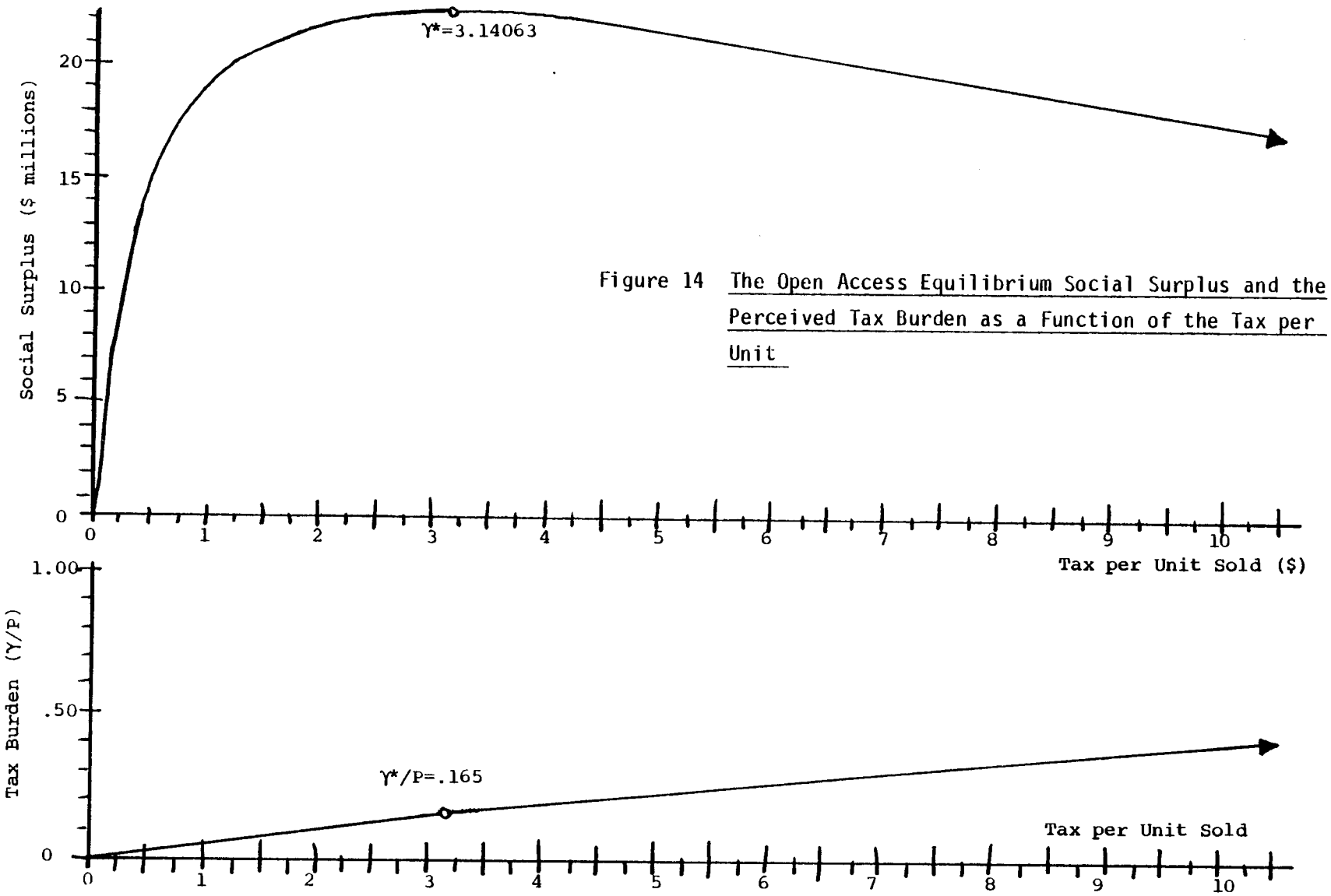


Figure 14 The Open Access Equilibrium Social Surplus and the Perceived Tax Burden as a Function of the Tax per Unit

(31b) $[TASC] = G + q + 2\sqrt{\beta(e+k)}$

The inclusion of taxes and a public sector in the model means that equation (31b) should be modified by substituting the right hand sides of equations (47), (48), and (49), p.80, to produce:

(31c) $[TASC] = g + \gamma + q + 2\sqrt{\beta(e+k)\gamma^{-\phi}} - \psi$

As noted on p.82, the parameters $\underline{\phi}$ and $\underline{\psi}$ are assumed to sum to 1.00 and can be ignored. Equation (31c) can be reorganized to:

(31d) $[TASC] = g + q + \sqrt{\beta(e+k)} + \sqrt{\beta(e+k)\gamma} + \gamma$

where the sum of the first three terms equals the open access equilibrium retail price, the fourth term equals the consumer average transaction cost, and the last term equals the tax per unit sold. When equation (31d) is differentiated with respect to $\underline{\gamma}$ the result is:

(52) $$\frac{d[TASC]}{d\gamma} = \frac{d(g+M_\infty)}{d\gamma} + \frac{d[CATr]}{d\gamma} + \frac{d\gamma}{d\gamma}$$

Retail effort and consumer effort are substitutes. Therefore, the first two terms in equation (52) are equal at the social optimum. Public sector spending (per unit sold) is assumed to be a substitute for combined retail and consumer efforts. Therefore, at the social optimum, the last term in equation (52) is equal to the negative of the sum of the first two terms. This proposition was verified by the following process - at the open access equilibrium:

$G^{\circ} + M_{\infty} = g+q+\sqrt{\beta(e+k)} + \gamma$ (see equation (23), p. 12)

When the right hand side of equation (49), p. 80, is substituted into the above equation the result is:

$$g+M_{\infty} = g + q + \sqrt{\beta(e+k)/\gamma}$$

and:

$$\frac{d(g\ M_{\infty})}{d\ \gamma} = \frac{-\sqrt{\beta(e+k)}}{2\gamma^{1.5}}$$

The consumer transaction cost at the open access equilibrium can be defined by substituting the right hand side of equation (38), p. 54, into equation (4a), p. 11.

(4a) $[CATr] = \beta^{\circ}Q/E$

(4b) $[CATr] = \sqrt{\beta^{2}(e^{\circ}+k^{\circ})}$

When the right hand side of equation (47), p. 80, is substituted into equation (4b), then:

(4c) $[CATr] = \sqrt{\beta(e+k)/\gamma}$

and:

$$\frac{d[CATr]}{d\ \gamma} = \frac{-\sqrt{\beta(e+k)}}{2\gamma^{1.5}}$$

Equation (52) can now be stated as:

$$(52a)\quad \frac{d\ TASC}{d\ \gamma} = \frac{-\sqrt{\beta(e+k)}}{2\gamma^{1.5}} - \frac{\sqrt{\beta(e+k)}}{2\gamma^{1.5}} + 1.00$$

When the right hand side of equation (51), p.83, is substituted into equation (52a) the result is:

$$(52b)\quad \frac{d\ TASC}{d\ \gamma} = -0.50 - 0.50 + 1.00 = -0-$$

which verifies the proposition on p.85.

Figure 14, p.83, shows the open access equilibrium social surplus (equations (40c) and (8), p.82) and the perceived tax burden γ/P as function of the tax γ. At the open access equilibrium formed when the tax γ equals the socially optimal γ^* of \$3.14063 per unit sold, the social surplus is \$22,229,800 and the perceived tax burden is 16.5 percent.

B. Extracting a Surplus from a Retail Market

Not all taxes extracted from a retail market are applied to providing that market with infrastructure or regulation. Governments also use taxes to "milk" a surplus from markets, in order to fund government goods and services. It is well accepted in economics that many goods and services provided by the government are of a public good nature:

> "Such goods can be enjoyed by one person without reducing the enjoyment they give others. .... It is important to note that the market mechanism will not work properly for a public good. ... because excluding those who do not pay reduces their satisfaction and does not increase the satisfaction of others. Thus although the market mechanism can be applied, it is not optimal to do so. .... Moreover, it frequently is impossible to prevent someone from consuming a public good whether or not he pays for it. .... Thus,

> in many cases, the market mechanism simply is not applicable." (Mansfield, 1975, pp.497-498).

Other government expenditures may involve investment in projects that are too large or too risky for the private sector. The government, by collecting taxes and diverting resources to provide such goods and services can substantially increase the wealth and well-being of the nation. However, as noted on p.78, a rational government should seek to balance the marginal value of such goods and projects with the marginal cost of the resources committed to them.

In order to isolate that cost, this section of the study separates taxes into two parts. The tax committed to providing the retail sector with infrastructure is identified as $\underline{\gamma}$. The tax used to extract as surplus from the retail market (to be applied to providing goods and services outside of the retail market) is identified as $\underline{\alpha}$. Equations (40c), (23c), and (35d) should now be written as:

$$(40d)\quad Q = \frac{1}{b}\left[a - \alpha - \gamma - g - q - 2\sqrt{\beta(e+k)/\gamma}\ \right]$$

$$(23d)\quad P = \alpha + \gamma + g + q + \sqrt{\beta(e+k)/\gamma}$$

$$(35d)\quad E = \frac{\beta}{b\gamma^{.75}}\left[(a-\gamma-\alpha-g-q)\ \frac{\sqrt{\gamma}}{\gamma(e+k)}\ 2\right]$$

When the differential of equation (40d) with respect to $\underline{\gamma}$ is set equal to zero, the result can be reorganized to equation (51), p.83. What this means is that the definition of the optimal tax $\underline{\gamma}$ is independent of the choice of the sur-tax $\underline{\alpha}$. However, the sur-tax clearly raises the retail

price (i.e., for equation (23d), $\frac{dP}{d\alpha} > -0-$ and reduces the equilibrium sales volume (i.e., for equation (40d), $\frac{dQ}{d\alpha} < -0-$. Therefore, extracting a surplus from a retail market is not without costs (i.e., the reduction in equilibrium sales volume reduces consumer surplus - equation (8), p.14).

A goal of Pareto optimality would require that the government obtain a marginal return from the use of the extracted surplus that is at least equal to the marginal cost imposed on the consumers in the retail market from which it was extracted. When the right hand side of equation (40d) is substituted into equation (8), p.14, the result is:

$$(8a) \quad [CS] = \frac{.5}{b}\left[a - \alpha - \gamma - g - q - 2\frac{\sqrt{(e+k)}}{\alpha}\right]^2$$

In deciding how much surplus to extract from a retail market the government needs to know the value that the consumers/voters place on the last dollar extracted from the market. That marginal value is defined by equation (53).

$$(53) \quad \frac{d[CS]}{d(\alpha Q)} = \frac{d[CS]}{d\alpha} \quad \frac{d\alpha}{dQ}$$

$$(54) \quad \frac{d\,CS}{d\,\alpha} = \frac{1}{b}\left[a - \alpha - \gamma - g - q - 2\frac{\sqrt{\beta(e+k)}}{\gamma}\right]$$

$$(55) \quad \frac{d(\alpha Q)}{d\,\alpha} = \frac{1}{b}\left[a - 2\,\alpha - \gamma - g - q - 2\sqrt{\beta(e+k)/\gamma}\right]$$

When the right hand sides of equations (54) and (55) are substituted into equation (53), the result is:

$$(53a) \quad \frac{d[CS]}{d(\alpha Q)} = \frac{1}{1 - \alpha/\left[a-\alpha-\gamma-g-q-2\sqrt{\frac{\beta(e+k)}{\gamma}}\right]}$$

Equation (55a) measures the marginal cost of extracting a surplus (αQ) from a retail market. It is illustrated in Figure 15, p.90, by the curve labeled required return on extracted surplus. Equations (40d), (23d), and (36e) were used to develop Table C-1 in Appendix C, which compares selected market variables when α is set at various levels and γ is set at one of two levels.

The government, for one reason or another, might decide to extract the maximum surplus possible from a retail market. The extracted surplus curve in Figure 15, p.91, shows that at a certain point increasing the sur-tax α to raise more revenue becomes counter productive. The sur-tax α^*, that maximizes the surplus extracted from the retail market can be identified by setting equation (55), p.89, equal to zero and reorganizing the result to:

$$(56) \quad \alpha^* = \frac{a-\gamma-g-q}{2} - \sqrt{\beta(e+k)/\gamma}$$

C. The Form of Taxation or Other Funding

The importance of an effective public sector to the development and maintenance of an efficient private sector was discussed on pp.77-78. A model incorporating that relationship was then demonstrated on pp.78-83. Where the social return on public sector investment is high enough, pp.83-87 showed that it may be socially optimal for the government to extract a surplus from the private sector to fund that investment. Both of the above forms of government expenditure need to be funded by some form of taxes or borrowing.

A tax per unit sold has been used to this point in this section of the study. In a changing world with many retail markets, that type of tax is likely to be difficult to calculate and to administer. Other forms of taxation are:

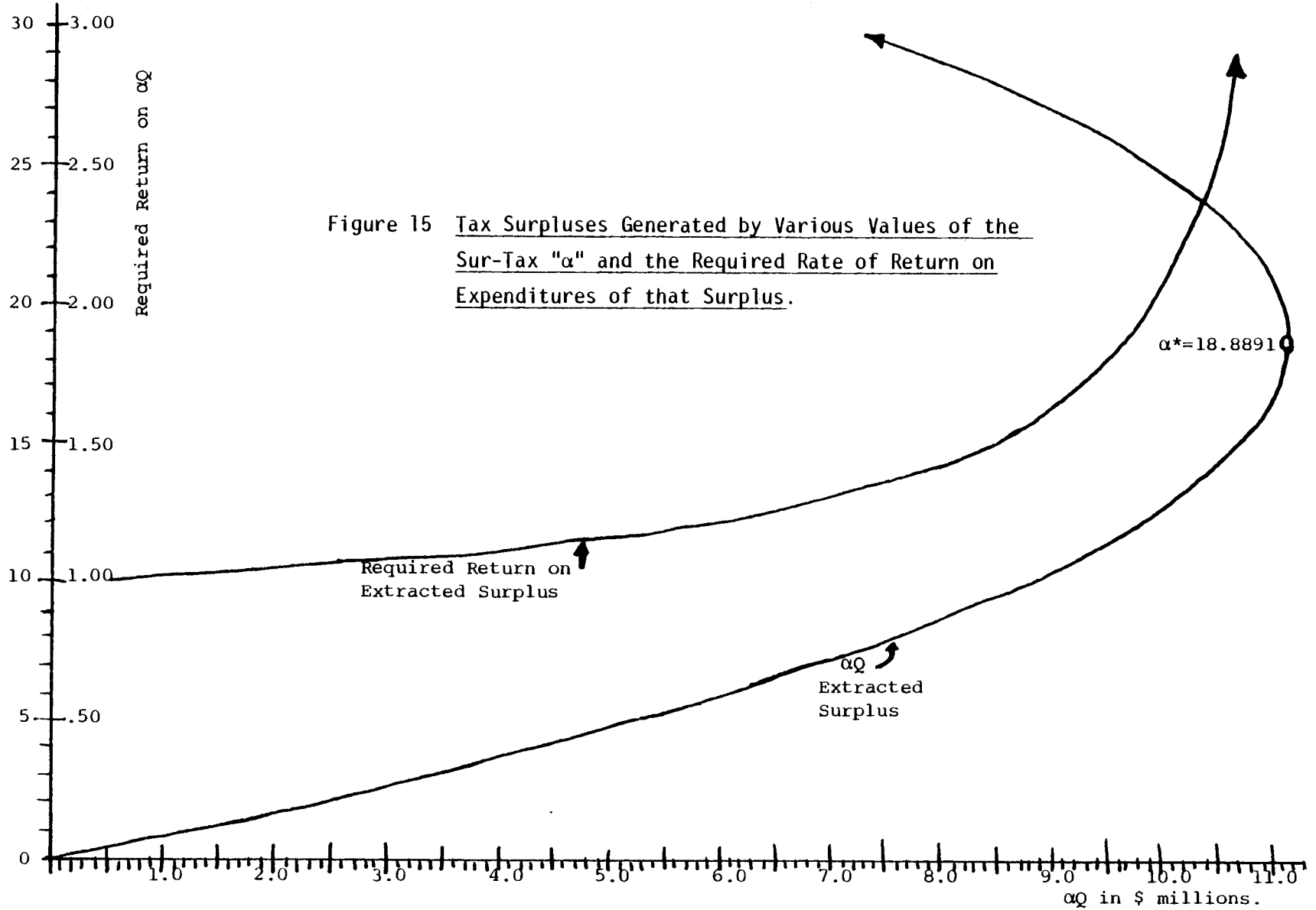


Figure 15 Tax Surpluses Generated by Various Values of the Sur-Tax "α" and the Required Rate of Return on Expenditures of that Surplus.

- A tax or a levy on labour - personal income taxes, unemployment insurance "premiums", government pension plan contributions, and workers' compensation "premiums" fall into this category.

  This form of taxation raises the private cost of retail and production labour. In terms of the (partial equilibrium) retail market model developed in this study, an increase in the private cost of labour results in increases in the parameters e, k, q, G, and to some degree in β. On pp.56-60 it was shown that:

$$\frac{d\,Q}{d(e+k)} < -0- \quad ; \quad \frac{d\,Q}{d(G+q)} < -0- \quad ; \quad \frac{d\,Q}{d\,\beta} < -0-$$

$$\frac{d\,P}{d(e+k)} > -0- \quad ; \quad \frac{d\,P}{d(G+q)} = 1.00 \quad ; \quad \frac{d\,P}{d\,\beta} > -0-$$

$$\frac{d\,E}{d(e+k)} < -0- \quad ; \quad \frac{d\,E}{d(G+q)} < -0- \quad ; \quad \frac{d\,E}{d\,\beta} \gtrless -0-$$

  In this partial equilibrium analysis the effects of a tax on the cost of labour tend to be understated because of the following macro-concern. When the private cost of labour is higher than the social cost (the private cost is the social cost plus the effect of the tax) the market becomes distorted as individuals try to reduce their private cost by substituting capital and consumer effort for the (now more costly) retail and production labour. In our society, the resulting additional unemployment tends to increase the tax burden and concentrates it on the remaining workers. That raises the rate of taxation on labour and makes further substitution of inputs possible.

- A tax or levy on capital - property taxes, asset valuation taxes, and some forms of licenses fall into this category.

  This form of taxation raises the private cost of retail and production capital. The resulting market distortion in the use of capital will likely parallel the problems noted with the taxation of labour.

  A sales tax on the retail price - (also known as a value added tax) eliminate the socially suboptimal substitution of capital for labour (or vice versa).

  The problem with this form of tax is that the tax is on the retail price. As shown in equations (5) and (22), p.32, the retail effort per unit sold times its opportunity cost is part of the retail price. As a result, consumers can avoid a portion of the sales tax by substituting their own effort in place of the more socially efficient retail effort.

- A tax on profits - It is the search for super-normal returns by the participants in a competitive market that results in that market becoming efficient, in the long-run. Taxing away the short-run profits generated by a temporary disequilibrium might slow the response to that disequilibrium and, thereby, prolong it. Also, super-normal returns are (at best) difficult to define in a practical sense.

The tax per unit sold appears to allow the government the most flexibility in setting optimal tax rates in each market, and, given that those rates are optimal, does not result in a misallocation of resources. However, the costs of setting and administering those optimal rates may be prohibitive. If so, a value added tax (with exclusion and variations) also offers some flexibility and does not appear to be as damaging to the economy as the remaining forms of taxation.

Governments frequently choose to generate funds by borrowing rather than through taxation. The macro considerations in the money market are legion. As a result a partial equilibrium analysis is both difficult and tenuous. When the government or industry increases the net borrowings from consumers, the consumers are being asked to surrender current period consumption. As a result, the frictionless demand curve should shift downward (a decrease in the parameter a) and also rotate downward (a decrease in the slope -1/b). On pp.56-60 it was shown that:

(i) $\frac{dQ}{da} > -0-$ (ii) $\frac{d\ Q}{d(-1/b)} > -0-$

(iii) $\frac{dP}{da} = -0-$ (iv) $\frac{d\ P}{d(-1/b)} = -0-$

(v) $\frac{dE}{da} > -0-$ (iv) $\frac{d\ E}{d(-1/b)} \rightleftharpoons -0-$

It should be possible, with a more detailed model, to develop a *cost of borrowing map* that would be similar in form to the *map* in Figure 15, p.91.

V. RETURNS TO SALESMEN

The relatively low wages observed in retail sales and services (see Figure A-1, Appendix A) has resulted in many employers and potential employees of that subsector believing that retail sales and service jobs are the last refuge, prior to social assistance, of low quality or otherwise disadvantaged workers (Burstiner, 1976; Swinyard, 1981). The extent of such beliefs and the vehemence with which they are put forward make it apparent that, for most people, employment in retail sales and service industries is rarely a career path of choice.[2]

There is nothing apparant in the retail market model that explains the relatively low wages observed in retail sales and service jobs. However, the open access commons nature of the retail sales and service sector causes it to act as a "buffer" to forces generated by structural problems elsewhere in the economy. Specifically, the sector tends to "soak-up" individuals unable to gain entry to, or displaced (by technology) from preferred jobs in other industries.[3]

A major weakness in the analysis to this point is that there is no measure of the well-being of salesmen. The retail market model in this paper assumes (as does the traditional model) that the opportunity cost of an input represents its value to society. Therefore, it is implicitly assumed that as long as the salesmen are covering their opportunity costs they should be satisfied. That proposition is reasonable, if the labour market is in long-run equilibrium. However, when there has been a shock to the labour market (e.g., a population bubble—such as the "baby boom", or the displacement of labour by advances in applied technology) the *short-run opportunity costs* of salesmen's effort may rise above or fall below the *long-run opportunity costs*. As a result, *short-run quasi-rents* may be generated (it should be

remembered that short-run adjustments can in some cases last for the better part of an individual's working life). Equation (57) defines the quasi-rent associated with salesmen. It was developed by multiplying the sales effort E by the difference between the long-run and the short-run opportunity costs of sales effort.

(57) $\xi + (e_1-e_o)E$

ξ = the quasi-rent received by salesmen.

e_1 = the long-run opportunity cost to salesmen of generating sales effort.

e_o = the short-run opportunity cost to salesmen of generating sales effort.

When the right hand side of equation (35a), p.55, is substituted into equation (57) the result is:

(58) $$\xi = \frac{(e_1-e_o)\beta}{b}\left[\frac{a-G-q}{\sqrt{\beta(e_o+k)}} - 2\right]$$

When $e_1 < e_o$, salesmen benefit from quasi-rent, at the expense of the other market participants. When $e_1 > e_o$, the other market participants benefit from quasi-rent, at the expense of salesmen. In an open access retail market quasi-rents tend to accumulate in the consumer surplus. Equation (8), p.14, defines the consumer surplus at any given sales volume.

(8) $[CS] = .5bQ^2$

When the right hand side of equation (40), p.54 is substituted into equation (8) the result defines the consumer surplus at the open access equilibrium.

$$(8b)\quad [CS] = \frac{[a-G-q-2\sqrt{\beta(e_o+k)}\,]^2}{2b}$$

The effect on consumer surplus of a change in the salesman opportunity cost is:

$$(59)\quad \frac{d[CS]}{d\,e_o} = \frac{-\beta}{b}\left[\frac{a-G-Q}{\sqrt{\beta(e_o+K)}} - 2\right] = \frac{-\beta E}{b} \;<\text{-}0\text{-}$$ (see equation (35a), p.55.)

The quasi-rent associated with the same change is defined by differentiating equation (58), p.96, with respect to the salesman opportunity cost.

$$(60)\quad \frac{d\xi}{de_o} = \frac{\beta}{b}\left[2 - \frac{a-G-q}{\sqrt{\beta(e_o+k)}}\left(\frac{e_o+k+e_1+k}{2\,e_o+k}\right)\right] \rightleftharpoons \text{-}0\text{-}$$

When equation (60) is set equal to zero the result can be reorganized to:

$$(61)\quad e_o^* = \frac{(a-G-q)(e_o+k\;+\;e_1+k)}{4\sqrt{\beta(e_o+k)}} - k$$

When: $e_o < e^*$, then

$$\frac{d\,\xi}{de_1} \;>\text{-}0\text{-}$$

e_o^* = the short-run opportunity cost to salesmen, that maximizes the quasi-rent that they receive.

When: $e_o > e^*$, then

$$\frac{d\,\xi}{de_1} \;<\text{-}0\text{-}$$

When parameter values are taken from the numeric example in this paper (from the section prior to the discussion of the role of governments in the market) e_o^* has a value of \$850.31565. At that short-run opportunity cost the

salesmen (who are assumed to have a long-run opportunity cost of $48.00) accrue $6,723,218 in quasi-rents. This is substantially less than the market rent that a profit maximizing monopolist would acquire (e.g., $9,607,900 in Table 2, p.73b). The difference occurs because the monopolist is able to extract all of the market rent (e.g., see point A in Figure 9, p.40), whereas the quasi-rent is attributable to the salesmen and is maximized at the intersection of the salesman) marginal cost curve and the (retailers) average demand curve (e.g., point B in Figure 9, p.40).

The effect on the social surplus of a change in the short-run opportunity cost can be defined by adding equations (59) and (60), p.97, together to produce:

$$(62)\quad \frac{d[NSV]}{d\,e_o} = \frac{\beta}{b}\left[4 - \frac{(a-G-q)(e_1-e_o)}{2(e_o+k)\ (e_o+k)}\right] \rightleftharpoons \text{-0-}$$

Equation (62) indicates that the social surplus is maximized when the short-run and the long-run opportunity costs of the salesmen are equal (i.e., $e_1 = e_o$). Implicit in the above observation is a proposition frequently invoked in traditional economic models—that in the long-run, inputs in a free market tend toward the most socially optimal use. A disequality between e_1 and e_o results in a non-Pareto optimal situation (e.g., the benefits that accrue to one group in the market, as a result of that inequality, are less than the losses that are absorbed by another group). This is a short-run phenomenon. However, as noted on p.96, a short-run adjustment can last a long time, relative to the lifetime of those who are caught in it.

A. Barriers to Entry

If individuals are "trapped" in the retail sales and service sector by the actions of a "free and impartial market" then little could or should be said about their plight, from an economic point of view. The existence of barriers to entry gives lie to the above proposition and raises the following moral issues:

- Is meaningful employment a right or a privilege?
- What rights are conferred by tenure of position?
- Should one group of citizens have the right to deny another citizen or group of citizens access to employment?
- What responsibilities and privileges should accompany the above rights?

However, the above issues pale to insignificance when it is noted that, in our society, employment is the primary means by which most Canadians contribute to the wealth of the nation and most individuals define themselves in terms of their vocation (Herr and Cramer, 1977, pp.57-59). Also, wages from employment are the primary means by which Canadians share in what is created (e.g., in 1977 employee compensation represented 74 percent of the $161.8 billion earned by Canadian factors — labour, capital, and resources (Lipsey, Sparks and Steiner, 1979, p.324). This point is further supported by Stigler (1966, p.257): "labour is the most important productive service - it receives four-fifths or more of total income even in an economy as well stocked with capital as the United States."

When desirable employment is scarce, the effect of barriers to entry is to split society into two groups - those who are gainfully employed and those who are either unemployed or are under-employed. Under those conditions the presence of barriers and the special interest groups that they protect tend

to destabilize society by giving lie to the perception that the misery of unemployment, or under-employment, is fairly metted out by an impartial and free market. Therefore, individuals "trapped by circumstance" in retail sales and service jobs may suffer the twin injustices of being under-paid for their abilities while seeing less able labour, in protected parts of the labour market, being over-paid.

Even though barriers to employment can be shown to be economically inefficient (Scherer, 1980, p.11), great care should be taken in pursuing a policy of reducing those barriers because:

- not all barriers are artificial - though many are enhanced artificially,
- some barriers provide a means of monitoring and guarantying the quality of products or services in situations where information costs preclude consumers from efficiently making such assessments (see Appendix D), and,
- barriers are often a reflection of the political or the social power of those being protected. Therefore, the "strength and height" of a barrier may be a better indicator of the cost to eliminate it than of the social benefits derived from eliminating it.

In summary, the presence of barriers to employment aggrevates any shock to the labour market and extends the period of readjustment.[3]

B. Technology

Over the past 180 years, due to on-going technological innovation, almost all inputs in our society have tended to become less scarce and less costly - in an economic sense, if not in a physical sense (Simon, 1981).[14] Therefore, over time, our society is able to generate greater wealth at lesser cost.

While this increasing efficiency is considered laudable by consumers, it is understandable that the owners of inputs might view it with apprehension - especially if the increased demand for the end product fails to offset the declining per unit (of end product) requirement for those inputs. It might be argued that the resulting unemployment is a short-run phenomenon and that a free market will adjust in the long-run to correct the problem. However, it is worth noting that the "short-run" dislocations of the first industrial revolution lasted several life times.

New applications of technology tend to be justified to managers in terms of manpower or other costly resources "saved". The wide spread success of such applications of technology and the resulting dislocation to the economy, through those individuals displaced, underscores the need for effective and expeditious government action to counteract the short-run effects of advances in applied technology. Specifically, under a *laisez-faire* policy, the following process tends to occur:

a) Wide spread advances in applied technology reduce the demand for labour in many areas of the economy.

b) The individuals still employed in the affected industries unite, as do those in other attractive positions, to errect barriers (e.g., unions, associations, professional bodies, and "old boy" networks) against competition from those who are displaced or are new entrants to the labour market.

   The process in a) is likely accelerated if the individuals behind the barriers use the temporary monopoly power generated by the barriers to increase their wages.

c) As the dislocation increases in severity the barriers around the desirable enclaves of employment are strengthened and increasing numbers of the displaced are forced into the sales and service sector open access commons.

d) The increased supply of labour in the sales and service commons and the decreased opportunities for alternative employment tend to decrease the renumeration demanded by (and paid to) those trapped in the sales and service subsector, pp.22-23).

   The individuals in that subsector who are not willing to accept the lower remuneration are now more willing to commit resources to escape that commons. That, in turn, forces the individuals in the protected labour enclaves to increase their protective barriers. Therefore, as the economic dislocation increases in severity, the resources expended in the socially non-productive conflict between those erecting barriers and those assailing barriers increases.

e) In the very-long-run, the opportunities arising from the advances in applied technology are fully exploited, all inputs (including labour) earn their long-run opportunity cost, and no extra-ordinary action on the part of government is required to generate a Pareto optimal market outcome.

Markets will, in the very-long-run, "sort themselves out" after widespread advances in applied technology. However, the short-run effects on wages and employment can be distressing. Employment is to most Canadians more than the provision of the input labour—it is the primary means by which they contribute to, and share in the wealth of the nation. The nature of Canadian governments indicates that Canadians, as a people, assume that the economy should exist to serve the needs of the people and have discounted the concept that people exist, as inputs, to serve the economy. It is difficult to assess the government efforts to ameliorate the short-run impact of advances in applied technology on employment. However, as noted throughout this section (pp.100-103), increases in unemployment, due to structural problems elsewhere in the economy, tends to depress the wages and increase the numbers employed in the open access areas of the economy—such as retail sales and services. Therefore, increases in the number of individuals

employed in retail sales and services may indicate that problems elsewhere in the economy may be increasing rather than improving.

VI. CONCLUSIONS

While a career in commissioned sales is a vocation of much promise, it is also one of few lasting successes. This paper, in trying to explain this phenomenon, models the retail market as a commons. In that model reatilers (and the salesmen that they employ) exist only because they are able to reduce the cost of transactions between buyers (consumers) and suppliers (manufacturers). Thus, while transaction costs are assumed to be irrelevant in the traditional neoclassical model of the market, those costs are the prime moving force in the retail market model developed in this paper.

The traditional model, by assuming away the effects of transaction costs, produces a model of market behaviour that is elegant in its simplicity. However, that simplicity does not capture the complex behaviour observed in retail sales and service markets. The model in this paper does deal with much of that behaviour and, as a result, provides a useful tool for analyzing and predicting behaviour in retail markets.

While many of the predictions of the retail market model, developed in this paper, parallel those of the traditional model, the following exceptions are particularly noteworthy. In the retail market model:

- The sales volumes at the open access (competitive) equilibrium and at the profit maximizing monopoly output are significantly smaller than the corresponding volumes in the traditional model.
- Elements of the demand curve, the manufacturers' supply curve, and the trasaction costs (of both retailers and consumers) combine to form, what this paper calls, the "social demand curve". It is that compound function and not the demand curve that is revealed when "revealed preference theory" is used to empirically develop a demand curve.

- Taxes (e.g., sales taxes, excise taxes, income tax, property tax) can initiate consumer avoidance behaviour that is damaging to the economy:
  - In the retail market model developed in this paper, the avoidance behaviour to the excise tax did not involve the substitution of inputs and, as a result, was the least damaging to the economy.
  - Given the social importance of employment (as the primary means by which Canadians contribute to and share in the wealth of the nation), taxes on the input labour appear to be a particularly perverse method of generating tax revenue.
- Public sector spending affects transaction costs and through that effect, it is essential to the generation and maintenance of an efficient private sector.

Another conclusion of the retail market model in this paper, is that retail markets tend toward efficiency and toward the full utilization of all available resources. Specifically:

- As an open access commons, the retail market readily absorbs new entrants to the labour market as well as labour "freed" by advances in applied technology.
- The opportunities of salesmen to work in other sectors of the economy will define the returns to the effort of those salesmen. As in any efficient market, a surplus of available labour will cause the returns to salesmen to fall, until the market is cleared.
- If advances in applied technology and entry barriers reduce the opportunities for alternative employment, the open access retail sales and service commons becomes crowded and the returns to the effort of the salesmen fall.

- The existence of employment entry barriers gives lie to the perception that the misery of unemployment or under-employment is fairly meted out by an impartial and free market. As a result, individuals who are "trapped by circumstance" in retail may suffer the injustice of being underpaid for their abilities, while other less able but "protected" labour is overpaid.

This study was initiated to determine why the return to the effort of individuals in retail sales and services tends to be so poor. The retail commons appears to operate as a near perfect market and the cause of the observed problem does not appear to reside on the retail sector. The open access nature of the retail commons results in it acting as a "catch-basin" for the effects of inefficiencies elsewhere in the economy. Until those problems (outside of retail) are resolved, careers in retail sales will continue to be a vocation that promises much, but delivers few lasting successes.

APPENDIX A

EXAMINATION OF STRUCTURAL CHANGES IN THE CANADIAN PRIVATE SECTOR 1957 to 1982

"In describing a nation's economic structure, it is usual to classify economic activities into three broadly defined groups or sectors:

1. The primary sector: includes agriculture, forestry, fishing and hunting, and mining, including oil and gas wells.

2. The secondary sector: includes manufacturing, construction and utilities in the transportation, communication and energy fields.

3. The tertiary sector: includes wholesale and retail trade, finance, insurance and real estate, community, business, and personal services and public administration."

(Green, 1980, p.3).

This traditional classification scheme tends to mask an ongoing major structural change in the Canadian private sector. In order to highlight this process the industries (per the Standard Industrial Classification system but minus primary agriculture and the government sector) were reorganized into the following subgroups:[1]

I. CREATION AND TRANSFORMATION OF PHYSICAL WEALTH.

- This is the fountainhead of all wealth, where the raw materials, in the form of earth, water, energy, and air, are acquired and transformed by labour and capital into things valued by society.

- Included in this subsector are the "primary" and "secondary" industries of forestry, mining and manufacturing, and construction.

II. MOVEMENT AND COORDINATION OF GOODS BETWEEN INTERMEDIATE USERS.

- This subsector acts as a link between participants in subsectors I and II. It provides those individuals with the services of transportation, storage, coordination, and advice (e.g., accounting, legal and engineering services).

- The industries of transportation, communication, and utilities, as well as trade-wholesaling and services are incorporated into this subsector.

III. SALES AND SERVICES TO END USERS.

- This subsector is primarily involved in making services and the finished goods available to consumers.

- This subsector includes the industries of Trade-retailing, financial institutes, insurance and real estate, and services to customers.

The graphs and tables on the following pages utilize the above subsector categories and are based on data from Statistics Canada - Publications 72-002, 61-213, and 61-516. Those graphs and tables make the following quarter century (1957 to 1982) trend apparent.

1. Figure A-1, shows that of the 1,538,200 (net) new private sector jobs created;

   6.6 percent were in subsector I,

   32.3 percent were in subsector II, and,

   61.1 percent were in subsector III.

2. Figure A-1a, indicates that while subsector I was still the largest employer in 1982, its relative importance in providing employment opportunity has continually and substantially declined since 1957. Subsector II has had a modest increase in relative importance, as an employer, and subsector III has had a dramatic increase in its relative importance as an employer.

3. Figure A-1b, illustrates the changes in the relative average weekly earnings, per individual, for each of the three subsectors.

The weekly earnings reported for subsector III are historically lower than the private sector average. Over the 25 years examined (Table A-1, shows that) the disparity has increased substantially, indicating a decline in the relative earning power and/or an increase in the amount of part time employment in that subsector.

4. Figure A-1c, indicates that the distribution of earning power, among private sector employees, is likely becoming increasingly skewed to the right (i.e., more employees in the lower wage categories than there are in the higher wage categories and over time the ratio of lower to higher is increasing).

5. Table A-2, shows that the highest growth of employment has been in the sales and service subsector. The growth in real domestic product per employee (RDP) was low in that subsector, even when the effects of "services to end users" are excluded. The Table also indicates that the increase in the number of individuals employed in industries providing services to consumers was greater than the increase in value paid by society for those services.

TABLE A-1: Increasing Disparity, Between Subsectors, in Average REAL WAGES (DECEMBER 1982 DOLLARS).

Subsector I.	1957	1982
- Total Employed (1000s)	1,727.2	1,829.1
- Average Weekly Wage	$273.37	$464.10
Subsector II.		
- Total Employed (1000s)	646.4	1,143.5
- Average Weekly Wage	$275.24	$466.57
Subsector III.		
- Total Employed (1000s)	557.0	1,496.3
- Average Weekly Wage	$195.39	$272.61
- As a percent of I.	71.0%	58.7%
- As a percent of II.	71.5	58.4
- As a percent of (I+II).	71.3	58.6

TABLE A-2: Growth in Real Domestic Product for Each Subsector of the (Non-Agricultural) Private Sector.

Subsector (1962 to 1977)	I Creation	II Transport. and Coord.	III Sales and Service			
			All	Sales	Services	Financial Institutes
Increase in Constant Dollar Real Domestic Product.	100.9 %	60.$\overline{0}$ %	122.4 %	129.5 %	112.7 %	176.9 %
Increase in the Individuals Employed,	17.5 %	68.8 %	78.2 %	45.2 %	298.1 %	109.5 %
- compounded p.a.	1.08 %	3.55 %	4.82 %	2.52%	9.65 %	5.05 %
Increase in the Real Domestic Product per Individual Employed,	71.0 %	54.1 %	32.9 %	58.0 %	(46.6) %	32.2 %
- compounded p.a.	3.64 %	2.92 %	1.91 %	3.09%	(4.09)%	1.88 %
Increase in the Average Real Wage,	57.4 %	46.7 %	32.7 %	30.9 %	43.4 %	48.8 %
- compounded p.a.	3.07 %	2.59 %	1.90 %	1.81%	2.42 %	2.68 %
Increase in Real Domestic Product per Unit of Real Wage,	8.6 %	5.$\overline{0}$ %	.15 %	20.7 %	(59.6) %	(11.2) %
- compounded p.a.	.55 %	.33 %	.01 %	1.26%	(5.86)%	(.79)%

Figure A-1 Net New Private Sector Jobs Created in Each Subsector, Over Five, Five-Year Periods and Over the 25-Year Period from 1957 to 1982.

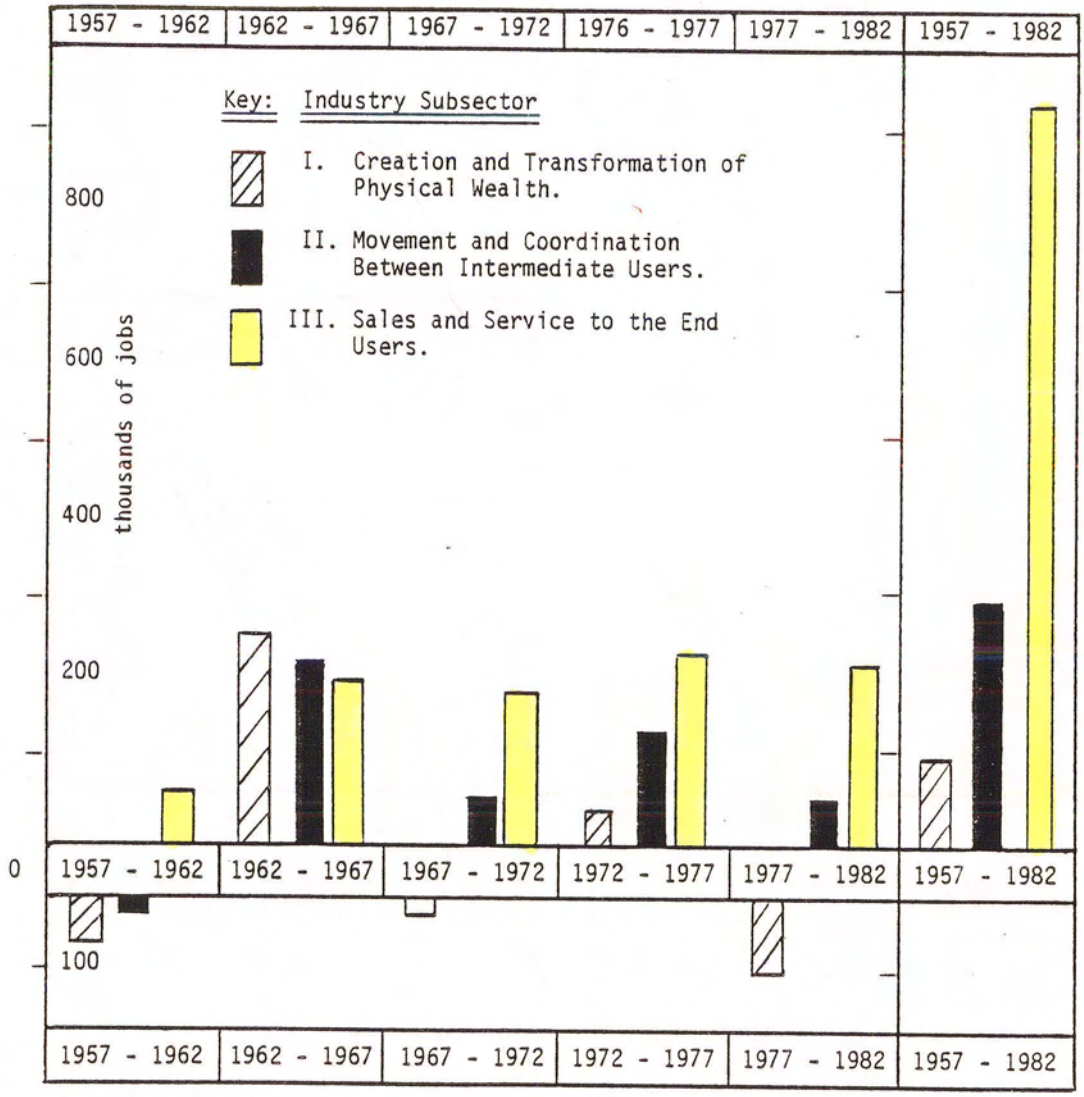


Figure A-1a Subsector Employment as a Percent of Private Sector Employment.

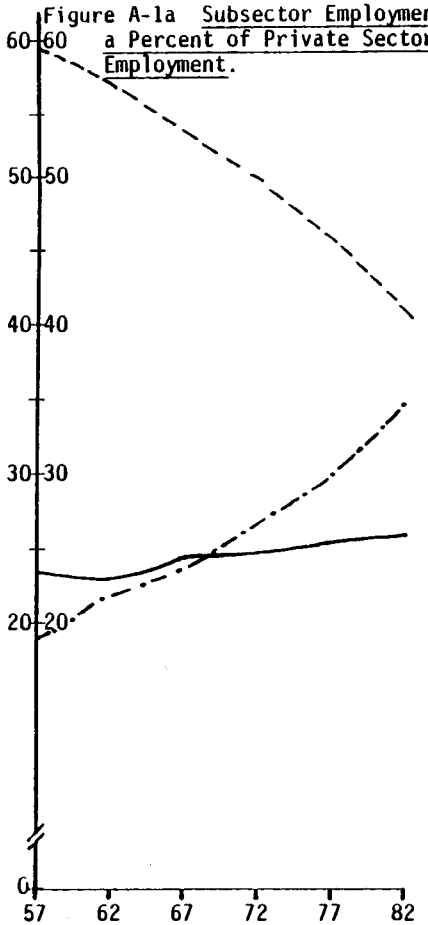


Figure A-1b Subsector Average Earnings as a Percent of Average Private Sector Earnings.

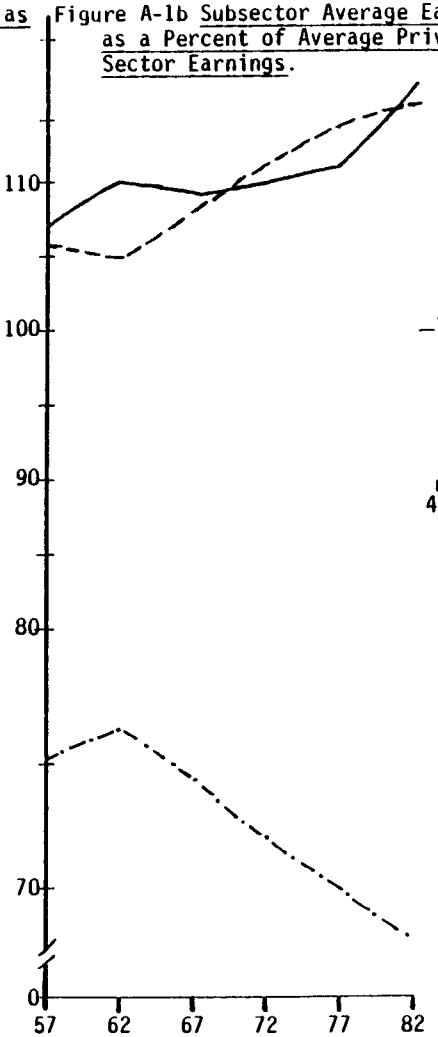
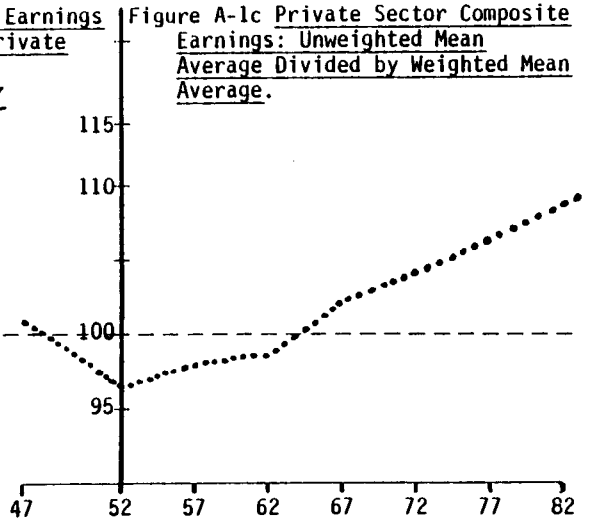


Figure A-1c Private Sector Composite Earnings: Unweighted Mean Average Divided by Weighted Mean Average.



Key:	Industry Subsector
- - - -	I.
———	II.
- · - ·	III.
·····	Total Private Sector

APPENDIX B

REVIEW OF SEVERAL CHANGES IN THE NATURE OF CANADA'S LABOUR FORCE

The graphs on the following pages were derived from data in Statistics Canada, Publications 91-001, 91-201, and 13-207, the Dominion Bureau of Statistics - Publications 13-512 and 13-534, and the Canada Year Book. They illustrate the changing male and female involvement in the Canadian labour force (all sectors except women keeping house) during the quarter century 1957 to 1982. In particular:

- Figure B-1 and B-1a, show that net migration into Canada and the maturing "baby boom" caused the labour force to increase by 95.5 percent.

- Figure B-1 indicates that the female component of the labour force has increased from 23.9 percent, of the 1957 labour force, to 41.5 percent, of the labour force in 1982.

  During that same period, the male labour force participation rate fell slightly from the 1957 rate of 82.3 percent of all males over the age of 14 years to the 1982 rate of 75.0 percent.

  The dramatic increase in the female labour force participation rate (from 25.8 percent in 1957 to 51.2 percent in 1982) parallels the increase in the proportion of the labour force that is female.

- Figures B-1b through B-1g, illustrate that the (historical) massive disparity between male and female wages has moderated only slightly, between 1957 and 1981.

  After age 25 female wages, unlike male wages, do not appear to be affected by age.

- In Figure B-1f it is interesting to note that working males over 64 years of age were paid relatively better in 1981 than they were in 1957 and 1967.

- Figure B-1a shows that the female component of the labour force has increased by 239.8 percent and the male component increased by 50.2 percent.

Figure B-1 Male and Female Labour Force Involvement

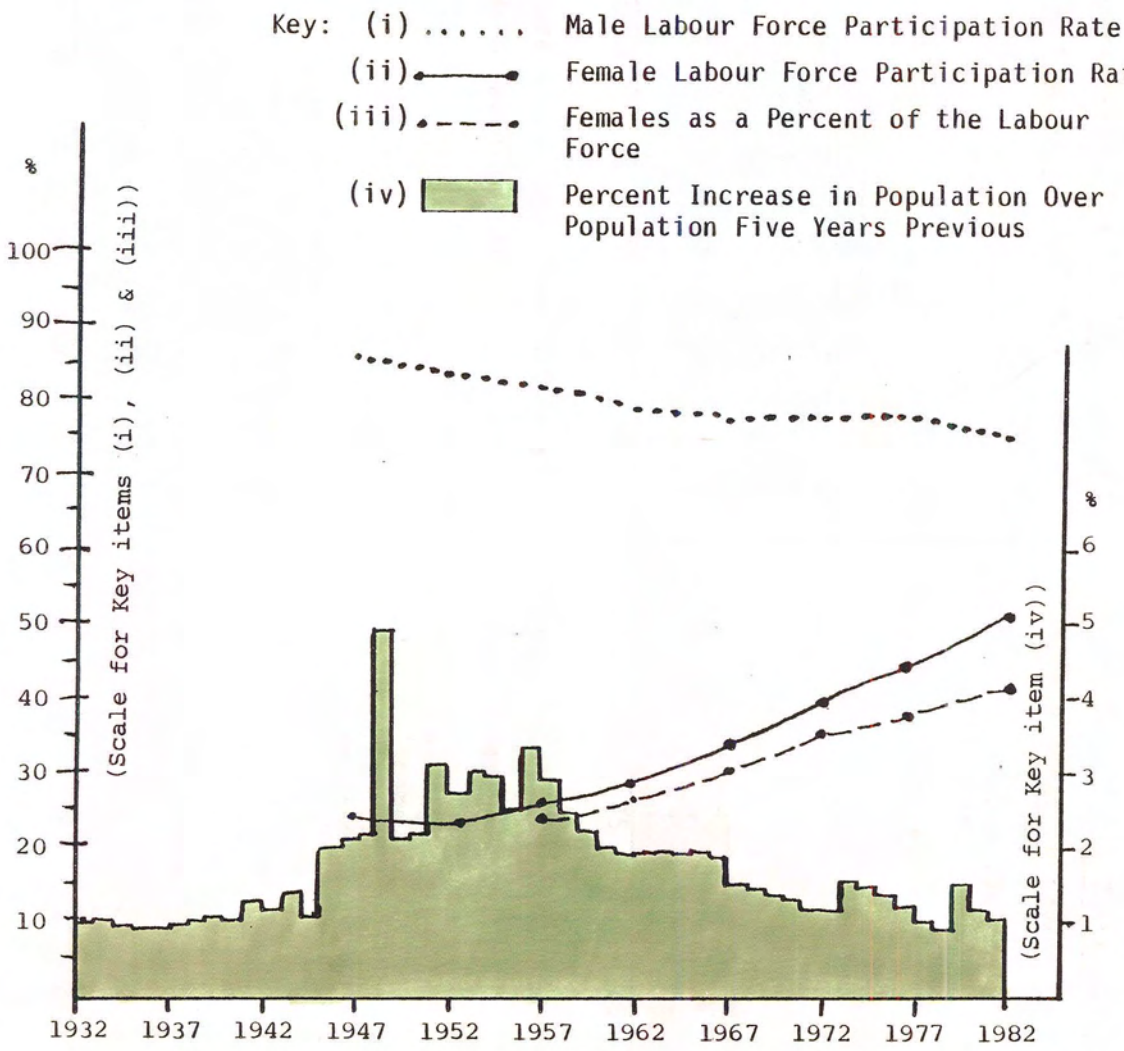


Figure B-1a (1957-1982)

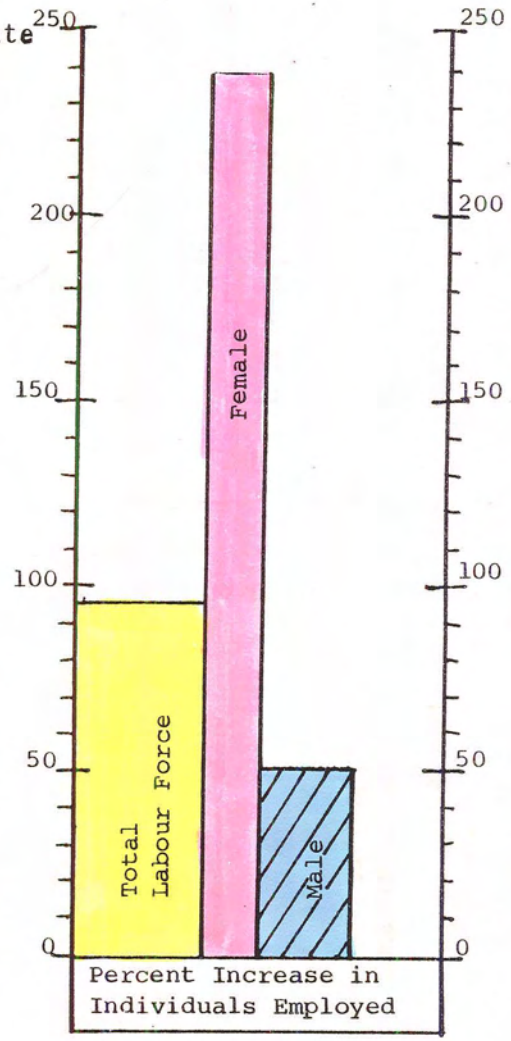


Figure B-1b Age Distribution of Male Wages in 1957.

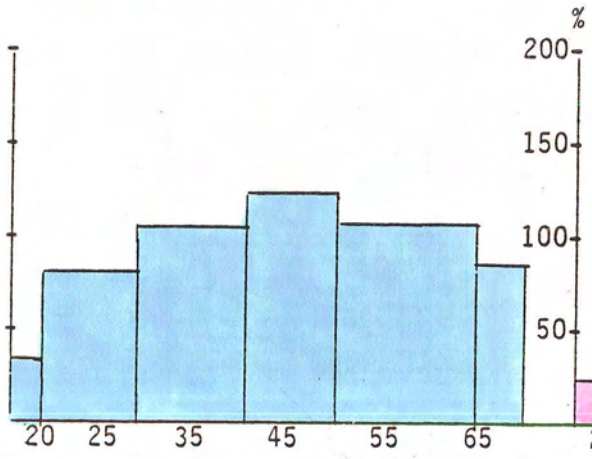


Figure B-1c Age Distribution of Female Wages in 1957.

100% = Average 1957 Male Income.
= $13,498 in December 1982 Dollars.

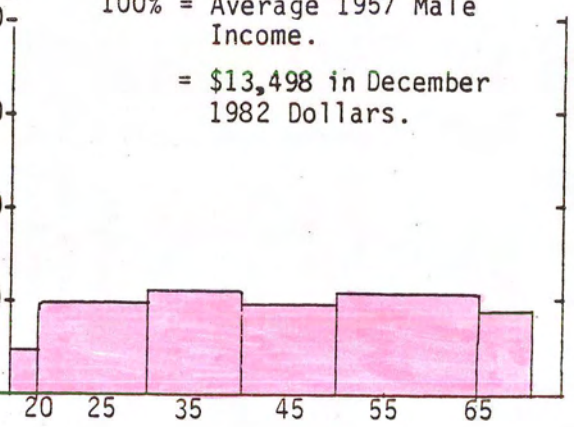


Figure B-1d Age Distribution of Male Wages in 1967.

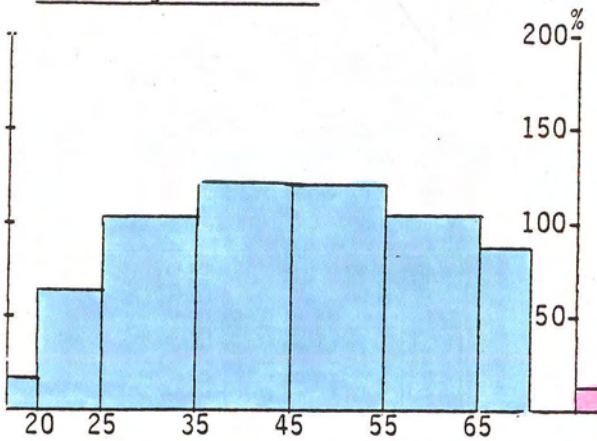


Figure B-1e Age Distribution of Female Wages in 1967.

100% = Average 1967 Male Income.
= $18,034.

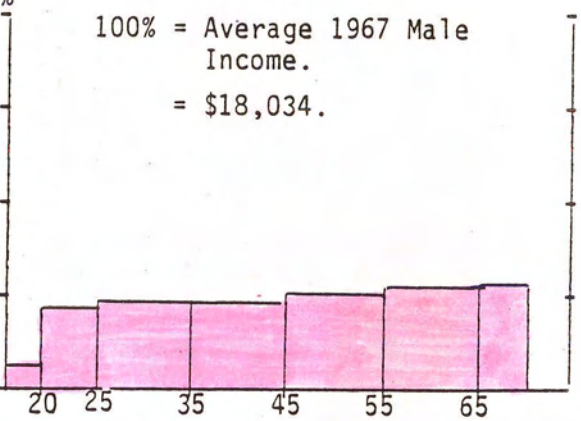


Figure B-1f Age Distribution of Male Wages in 1981.

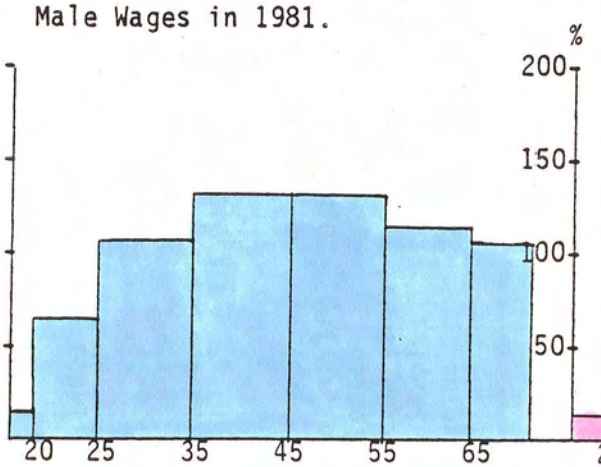


Figure B-1g Age Distribution of Female Wages in 1981.

100% = Average 1981 Male Income.
= $23,117.

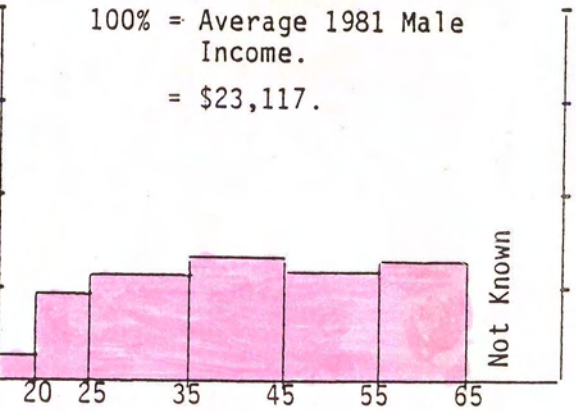


Table C-1 Comparison of Selected Market Variables When "γ" is Set at Various Levels and When "α" is at One of Two Levels.

A) γ = 3.14063	γ= 1.00	2.50	5	10	18.88206	20	25
Retail Price "P"	20.08126	21.58126	24.08126	29.08126	37.97032	39.08126	44.08126
Sales Volume "Q"	1,149,316	1,102,441	1,024,316	868,066	590,283	555,566	399,316
Sales Effort "E"	29,299.93	28,104.92	26,113.26	22,129.92	15,048.29	14,163,24	10,179.91
[CATr]	3.1406	3.1406	3.1406	3.1406	3.1406	3.1406	3.1406
M_∞ - q	3.1406	3.1406	3.1406	3.1406	3.1406	3.1406	3.1406
Consumers Surplus	21,134,836	19,446,019	16,787,572	12,056,617	5,574,944	4,939,457	2,551,252
Tax burden $(\alpha+\gamma)/P$	20.62%	26.14%	33.80%	44.08%	58.02%	59.21%	63.84%
Taxes Collected	4,758,892	6,219,462	8,338,578	11,406,934	13,003,752	12,856,147	11,237,004
Government Services	3,609,576	3,462,359	3,216,998	2,726,274	1,853,860	1,744,827	1,254,104
Extracted Surplus	1,149,316	2,756,103	5,121,580	8,680,660	11,149,892	11,111,320	9,982,900
Social Surplus	22,284,152	22,202,122	21,909,152	20,737,277	16,724,836	16,049,777	12,534,152

B) γ = 2.50	γ= 1.00	2.50	5	10	18.88906	20	25
Retail Price "P"	19.82010	21.32010	23.82010	28.81010	37.70916	38.82010	43.82010
Sales Volume "Q"	1,145,618	1,098,744	1,020,619	864,369	586,586	551,869	395,619
Sales Effort "E"	30,918.78	29,654.64	27,546.08	23,328.97	15,831.70	14,894.71	10,677.59
[CATr]	3.5201	3.5201	3.5201	3.5201	3.5201	3.5201	3.5201
M_∞= q	3.5201	3.5201	3.5201	3.5201	3.5201	3.5201	3.5201
Consumers Surplus	20,999,050	19,315,814	16,666,610	11,954,140	5,505,330	4,872,950	2,504,230
Tax burden $(\alpha+\gamma)/P$	20.89%	26.46%	34.18%	45.60%	58.42%	59.61%	64.22%
Taxes Collected	4,743,580	6,197,608	8,308,482	11,358,353	12,922,307	12,770,596	11,132,968
Government Services	3,597,962	3,450,748	3,205,387	2,714,663	1,842,250	1,733,216	1,242,493
Extracted Surplus	1,145,618	2,746,860	5,103,095	8,643,690	11,080,057	11,037,380	9,890,475
Social Surplus	22,144,668	22,062,674	21,769,705	20,597,830	16,585,387	15,910,330	12,394,705
Loss on:							
Consumer Surplus	135,786	130,205	120,962	102,477	69,614	65,507	47,022
Extracted Surplus	3,678	9,243	18,485	36,970	69,835	73,940	92,425
Total	139,484	139,448	139,447	139.447	139,449	139,447	139,447

APPENDIX D

REVIEW OF PROFESSIONAL LICENSING AND ITS EFFECTS ON COMPETITION

The following extract from the conclusions reached by Muzondo and Pazderka (1979) provide an excellent summary of the reasons for, and the effects of professional licensing.

> "Three main types of theoretical arguments are typically advanced as a justification for professional licensing. One is based on the disparity in the amount of information possessed by buyers and sellers of professional services. Another stems from the existence of externalities in transactions involving the provision of some professional services. The third is based on the view that some professional services are a merit good.
>
> The problem of information is inherent in the very definition of a profession: one of its essential components refers to the possession of a specialized complex body of knowledge and ability to apply certain skills and techniques on the part of the professional. The client, by contrast, generally has only a limited capability to evaluate which type, quality and quantity of service offered by competing practitioners are appropriate to his needs. The institution of professional licensing is viewed as a device for reducing uncertainty faced by consumers. By restricting the practice of a profession to individuals approved by licensing authorities, the state purports to guarantee certain minimum standards of practice and to reduce the welfare loss due to consumer ignorance.
>
> The externality argument derives from the observation that the client's choice of an incompetent practitioner may have unfavourable consequences not only for the client, but also for society as a whole. An individual client, however, makes his choice on the basis of his private cost alone. Licensing purports to reduce these social costs by restricting the client's choice only to practitioners who are judged 'competent'.
>
> Economic theory suggests that the implementation of licensing restrictions is bound to have a number of consequences detrimental to social welfare. In this study, we group these consequences into three categories. The first is a reduction of supply of professional services. It results from the fact that licensing excludes a certain number of individuals from practicing who would have entered

the market if the profession were not licensed and restricts the mobility of practitioners between jurisdictions. The second is the development of collusive pricing patterns. It is facilitated by the ability of professional bodies to control entry into the profession and to influence the behaviour of licensed practitioners. The third is the suppression of advertising which in other markets facilitates entry of new practitioners and undermines collusive pricing. All three types of licensing restrictions are particularly prominent in the self regulating professions."

APPENDIX E

APPLICABILITY OF THE RETAIL MARKET MODEL TO RETAIL MARKETS

Buzzell, Nourse, Mathews, and Levitt noted, in their book "Marketing - a contemporary analysis" that,

> "Retailing institutions buy merchandise from manufacturers and other suppliers and resell to ultimate consumers. The difference between the purchase and resale prices is called gross margin or gross profit."
>
> "From its gross margin, the retail institution must pay operating expenses. Some of these are essentially fixed in amount for a given type of operation [of level of effort] while others vary more or less directly with sales volume. The net profits remaining after payment of operating costs are typically small in relation to sales. On average, net profits for retailers in the United States in the late 1960s amounted to 2 to 3 percent of sales."
>
> "Retail gross margins represent the total 'price' to the economy of performing retailing functions. As long as the retailing system is reasonably competitive, the price of retailing will tend to be set at a level equal to its cost, plus a normal rate of return on the capital invested in the system. On the whole, retailing in the United States and Canada has been quite competitive." (1972, pp.235 and, table 21-1 on 559).

The following observations indicate that while the above quote is essentially accurate it is also an oversimplification of the retail market:

- The (Canadian) National Retail Merchants Association's report on the financial and operating results of department and specialty store (1980, p.5) showed that,
  - 13 of the 36 reporting department store companies had assets over $100 million, sales (on average) were 1.35 times assets in 1980 (1.43 times in 1979), and the average return on assets was 3.1 percent in 1980 (4.5 percent in 1979)

- department store companies with assets over $100 million had an average return on their assets of 5.6 percent in 1980 (7.6 percent in 1979) whereas department store companies with assets between $5 million and $10 million had an average return on their assets of 8/10s of one percent in 1980 (1.4 percent in 1979).

- The following table was extracted and adapted from the Department of Consumer and Corporate Affairs report on concentration in the manufacturing industires of Canada (1971, table 11-1, p.14):

Table E-1 Relative Corporate Size in the Retail Trade Sector (in 1965).

Corporate Assets	$100 mil.	5 mil. 100 mil.	5 mil.	Total Sector
• Firms (#)	7	60	23,932	23,999
• % of Sector				
- firms	.03	.25	99.72	
- assets	18.4	19.7	61.9	
- sales	16.8	14.9	68.3	
• Profits/Assets(%)	7.49	7.64	$5.6\overline{0}$	

Table E-1 indicates that in the 1965 Canadian retail trade industry, 38.1 percent of the total assets and 31.7 percent of the total sales were attributable to less than 28/100s of the total retail trade corporations. Scherer (1980, p.46) indices that in the 1972 wholesale and retail trade industry in the United States, 21.7 percent of the assets in that sector were attributable to just over 1/100 of one percent of the corporations in that sector.

The above statistics raise an image of the retail trade industry as having a "few well fed elephants dancing amongst a field of starving chickens." This view is reinforced when it is noted that (per the National

Retail Merchants Association report) the larger Canadian retail firms tended to be more profitable than the smaller firms (i.e., a 7.57 percent profit, on assets, vrs. 5.6 percent) and that while some of the retail firms may be national in scope, most retail "outlets" tend to serve only local markets.

Therefore, given the above observations, it is reasonable to assume that while most subsections of the retail trade industry are highly atomistic, some subsections, in some regions, are likely highly concentrated.

Conventional price theory predicts that the more highly concentrated that an industry is, the more likely it is that the sellers will recognize their interdependence and cooperate to hold prices above the competitive level. However, the observed differential between the average profits of the very large and the small firms—in retail—while significant, does not reflect the full potential for market rent, implied by the profit maximizing monopoly position illustrated in Figure 12, p.56, and described in Table 2, pp.72-73b.

Bain (1951, pp.1-41) noted that "recognized interdependence" among sellers is a necessary but not sufficient condition for prices to be held above the competitive norm. Specifically, he said,

> "Each of the few large established sellers— whether they act collectively or singly—will appraise the condition of entry and, anticipating that entry may occur if price exceeds a given level, will regulate his price policies accordingly." .... "the condition of entry may [therefore] be evaluated by the extent to which established sellers can persistently raise their prices above a competitive level without attracting new firms to enter the industry." (pp.4 and 5)

In summary then,

- the approach and assumptions of the model presented in this paper appear to be basically compatible with the real world,
- the vast majority of the subsections in the "retail trade mosaic"—even the ones involving highly concentrated markets—are likely operating at, or near, their open access equilibrium output, and

- monopoly pricing does not appear to be a significant problem in the retail trade industry. The (economic) profits observed in that industry are either a short term phenomenon or are due to relative advantages (see Appendix G) and have a longer - but still finite duration.

The economic trends described in Appendix A are consistent with the model presented in this paper and with the above conclusions. Table A-1, in Appendix A, showed that in Canada — for the period 1962 to 1977 — the real domestic product, generated per unit of deflated wage,

- rose by 20.7 percent for sales (retail trade, insurance, and real estate), and

- fell by 59.6 percent for services (to the end user).

Ingene, in his study of "Labor Productivity in Retailing", concluded that,

> "The percentage of the total consumer budget that goes to pay for marketing activities is large and increasing (Bucklin, 1978). A major reason for this is that productivity growth in marketing has tended to be lower than in other sectors of the economy (Barger 1955, p.44). .... Thus, it is important to know the determinants of productivity .... If these concepts can be shown to change the rate of productivity, it may be possible to program productivity improvements in marketing. Such a scenario would be fortunate, since marketers would then receive credit for contributing to an improved standard of living for all Americans." (1982, p.88).

Ingene's approach and conclusions, when compared to the trends illustrated in Appendix A, are too simplistic. During the period 1962 to 1977, an increase in real wealth increased aggregate demand. This outward shift in the demand curve combined with increased education (both of the consumer and of salesmen) and improvements in technology to substantially increase the effective productivity of salesmen (equation (6), p.12). During that same period the "baby boom" matured and started looking for jobs. That factor, combined with the increased participation of women in the labour force (Appendix B), the strengthening of entry barriers in many occupations

(pp.99-103), and the open access common property nature of sales tended to dampen the increases in the opportunity costs of salesmen. However, as shown on pp.44-47, the increased productivity of the salesmen was not translated into a long run increase in the profitability of retailers. If all of the increased productivity of salesmen was not translated into wages, or more sales personnel being hired, or higher profits for retailers, then the only other application is higher expenditures, by the retailers, on selling administration and support services. That conclusion supports a major prediction of the model in this paper — that retailers in an open access market will continue to apply increasing amounts of sales effort and support services until all rents are dissipated. Under such circumstances, productivity improvements in marketing contribute little towards an improved standard of living.

The impressive decrease of 59.6 percent, in the real domestic product generated by each unit of real wage paid in the service (to consumers) sector, involves a fact pattern — similar to but — more complex than the one surrounding sales. Specific complexities include,

- an increase in the female participation rate in the labour force from under 30 percent to over 45 percent (Appendix B, Figure B-2). This likely resulted in a substantial further increase in
  - the demand for services related to housekeeping, and,
  - the supply of semi-skilled or unskilled labour, especially part time and non-mobile labour,
- increases in the minimum wage and in social security/welfare measures. The impact of such measures would likely be large since (with a few notable exceptions) most individuals employed in this subsector have few skills and tend to be paid at the lower end of the wage scale,
- in services, economies of scale are often exhausted by extremely small units,
- an increased presence of franchising in the service subsector,

- an increase in the use of part time employees - in order to escape having to pay benefits, and
- an increase in the use of employees who are too young to be covered by the minimum wage legislation.

Due to the above complexities, it is not reasonable to make conclusions (without further research) about the applicability of the model in this paper, to the subsector that retails services to consumers.

APPENDIX F

VALUES THAT HAVE BEEN (FOR ILLUSTRATIVE PURPOSES) ARBITRARILY APPLIED TO THE MODEL PARAMETERS AND TO THOSE VARIABLES THAT ARE FIXED AT VARIOUS POINTS IN THE DISCUSSION

Parameter

a =	The maximum value of P	= $60.00 per unit.
b =	The slope of the frictionless demand curve: b = f(population, tastes, wealth, and distribution of wealth). The slope "b" is assumed to be constant throughout most of this paper. The effects of varying "b" were examined on pp.56-58.	= .000032 per unit.
G =	The unit cost of goods sold, to the retailer, or to the wholesaler (if there is a wholesale market).	= $13.00 per unit.
β =	The consumer intrinsic transaction costs. [CATr] is equal to it when E/Q is equal to $1.\overline{00}$.	= $34/180 per unit.
e =	The unit cost of sales effort to salesmen (e.g., the cost of one man day).	= $48.00 per unit of effort.
q =	The increase in the selling administration costs due to an additional unit being sold.	= $.80 per unit sold.
k =	The increase in the selling administration costs due to an additional unit of sales effort being applied.	= $116.00 per unit of effort.

Variables

P =	The retail price. On pp.22-51	= $26.00 per unit sold.
	On pp.51-103	= Variable.

The retail price was initially fixed in order to make it easier to define the non-price behaviour of the market participants.

APPENDIX G

THE EFFECTS OF ALLOWING UNITS OF SALES EFFORT TO VARY IN QUALITY AND IN COST

It is assumed, in this study, that all units of retail effort generate the same number of sales and have the same opportunity cost (see p.10). That assumption allowed the retail market model to abstract from the complexities of retail markets to highlight the essential forces within such markets.

When the above assumption is relaxed the basic form of the retail market model is still preserved. However, it becomes necessary to think of the effort of the salesmen and the retailers in terms of it being *marginal* or *intramarginal*. Developing an operating definition of marginal and intramarginal retail effort is difficult. "High quality" sales effort, by definition, generates a high sales volume per unit of sales effort, however, the opportunity costs associated with that effort may be so high as to erode or even supplant its relative advantage in generating sales. The concepts marginal sales effort and intramarginal sales effort should be thought of in terms of cost effectiveness in generating sales.

Among the many factors that determine the cost effectiveness of sales effort are:

- The salesman's inventory of skills (e.g., some individuals, due to a combination of inherent and acquired traits, are better at selling than other individuals).
- The availability of alternative employment — opportunity costs.
- The reputation and/or characteristics of the brand of the product being sold.
- The quality and quantity of support provided to the salesman by the retailer.

A stable retail market will have as many (derived) supply of sales curves as there are salesmen. However, only two of the curves are relevant to a general analysis of the retail market:

a) The Market Supply Curve - This curve is based on the parameters $\underline{e}$ and $\underline{\beta}$ of the marginal sales effort. It defines the maximum sales that will be generated by salesmen, at each commission (per unit) and also determines the total commission income received by all salesmen.

b) The Social Supply Curve - This curve is based on the average value of the parameters $\underline{e}$ and $\underline{\beta}$ of all the salesmen in the market. This curve defines the average cost of sales effort.

Both of the above curves are depicted in Figure G-1, p. 129.

Among the many factors that determine the cost effectiveness of retailers are:

- The efficiency in administering sales and in providing support to their salesmen. Any economies of scale and/or location are incorporated into this factor.
- The reputation and/or characteristics of the brand of the product being sold.
- Pecuniary gains accruing from the ability, due to market share, to discriminate against manufacturers and other suppliers.

In an open access situation, efficient retail firms tend to expand their application of sales effort. That results in marginal firms being pushed out of the market and what were previously (relatively) efficient firms becoming marginal. That process continues until the efficient firms have attained their optimal long-run potential and the market stabilizes. A stable retail market will have as many (derived) demands for sales curves as there are retail firms. However, only two of the curves are relevant to a general analysis of the market:

a) The Market Demand Curve - This curve is based on the parameters $\underline{\beta}$, $\underline{k}$, and $\underline{q}$ of the marginal retailer. It determines the maximum sales "demanded."

b) The Social Demand Curve - This curve is based on the average value of the parameters β, k, and q of all retail firms in the market. It determines the averaged net income of the retail firms prior to the commissions being paid.

It is likely that a synergism exists between the cost effectiveness of salesmen and that of retailers. In an efficient labour market, marginal salesmen will likely end-up selling for marginal retailers; feedback effects then reinforce the inefficiencies of both groups.

In Figure G-1, the market demand and supply curves were generated by using the parameter values in Appendix F; the social demand and supply curves were generated by substituting the following parameter values:

β - from 34/180 to 34/270

e - from 48 to 24

k - from 116 to 58

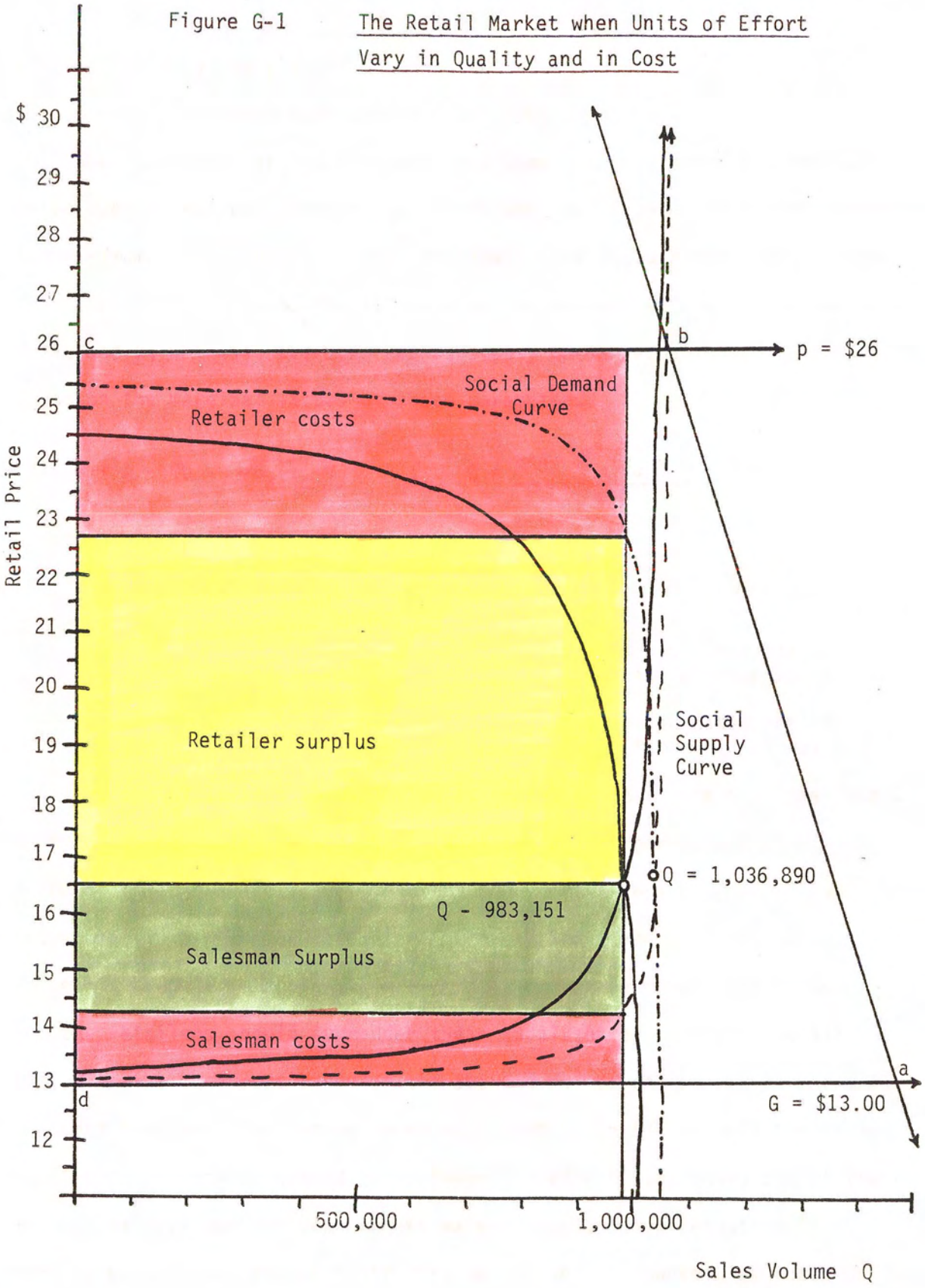
q - from 0.80 to 0.40

The equilibrium output, in Figure G-1, is determined by the intersection of the market supply curve and the market demand curve. The sales volume at the open access equilibrium, when the price is fixed at $26.00, remains unchanged from the Figure 7, p. 29, volume of 983,151 units. At that volume of sales, all market rents (i.e. those rents associated with the "richness of the market" and not directly attributable to characteristics of the retailers or the salesmen) are eroded. However, the amount of effort required to produce those sales (48,757.78 units of effort, per equation (6a), p. 12, when β = 34/270) is less than, and costs less than the effort (73,136.67 units of effort, per equation (6a), p. 12) when β = 34/180. As a result, there is:

° A Retailer Surplus of $6, 049,000

[116(73,136.67) + .4(983,151) - 58(48,757.78)]

Figure G-1 The Retail Market when Units of Effort Vary in Quality and in Cost



° A Salesman Surplus of $2,340,000

[48(73,136.67) - 24(48,757.78)]

° A Social Surplus of $23,854,000

[15,465,000 + 6,049,000 + 2,340,000]

When the retailer and salesman surpluses are considered the variable price open access equilibrium, pp. 52-55 and pp. 65-68, no longer generates the maximum social surplus. That problem occurs because the social demand curve (equation (37), p. 66) is based on the average values of the parameters $\underline{\beta}$, $\underline{e}$, and $\underline{k}$; whereas, the open access supply curve (equation (17), p. 52) is based on the marginal values of those parameters.

$$(37)\quad P + a - Qb - \sqrt{\beta_a(e_a+k_a)} \quad ; \quad Q = \frac{a-P-\sqrt{\beta_a(e_a+k_a)}}{b}$$

$$(17)\quad Q = \frac{(a-P)}{b}\left[1 - \frac{\beta_m(e_m+k_m)}{(a-P)\ (P-G-q_m)}\right]$$

a = a subscript that indicates that a parameter is at its average value.

m = a subscript that indicates that a parameter is at its marginal value.

The social surplus is maximized at (point A, in Figure G-2) the intersection of the social demand curve (when the effort parameters $\underline{\beta}$, $\underline{e}$, and $\underline{k}$ are at their average values) and the open access social supply curve (equation (17), when the parameters $\underline{\beta}$, $\underline{e}$, $\underline{k}$, and $\underline{q}$ are at their average values). However, there is no economic or moral reason why the salesmen and the retailers should surrender their surpluses by supplying retail effort to the consumers based on the average values of the effort parameters. A second best solution can be found at (point B, in Figure G-2) the intersection of the social demand curve (when the effort parameters are at their average values) and the open access market supply curve (equation (17), when $\underline{\beta}$, $\underline{e}$, $\underline{k}$, and $\underline{q}$ are at their marginal values). However, as noted on

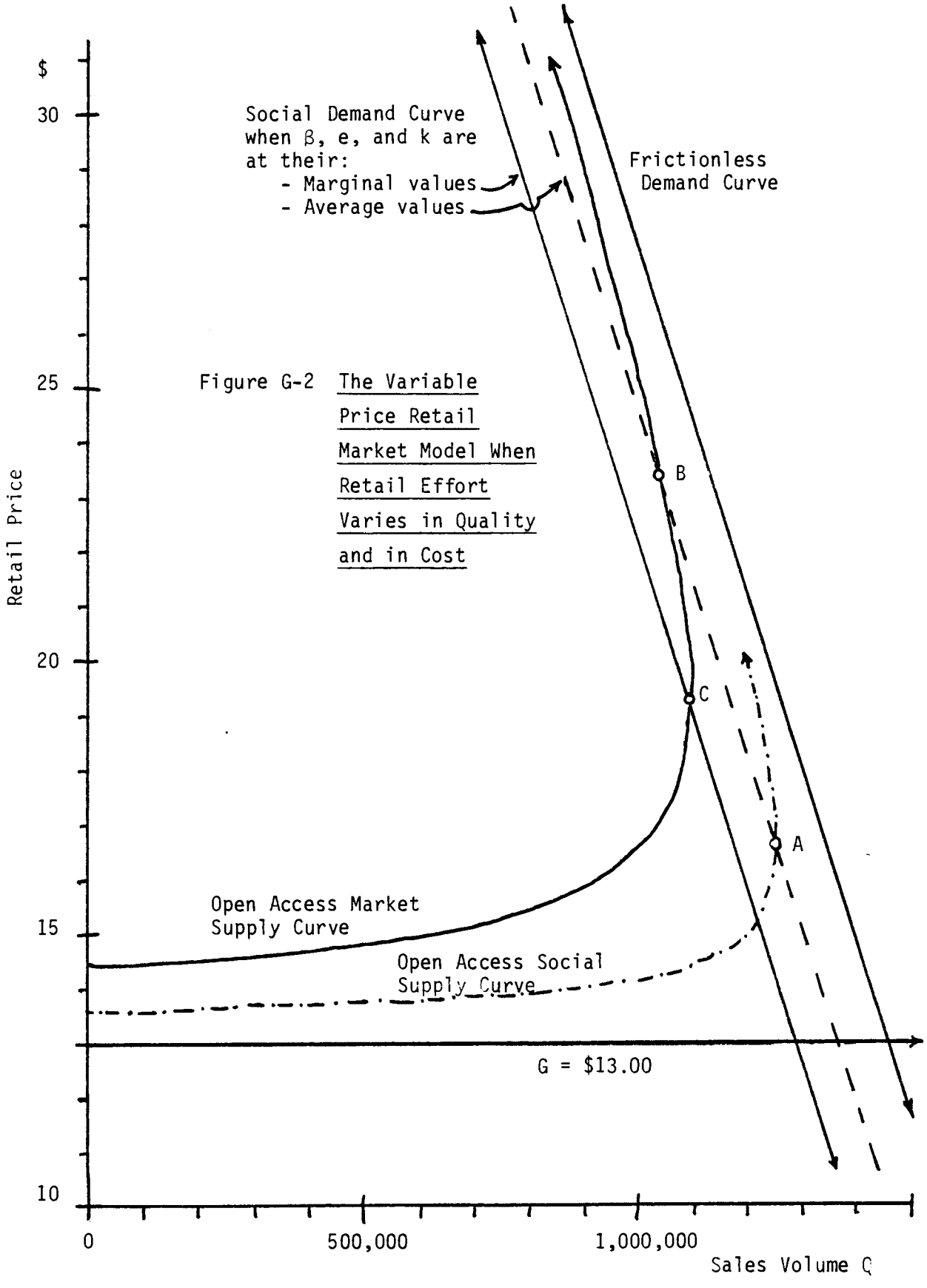


Figure G-2 The Variable Price Retail Market Model When Retail Effort Varies in Quality and in Cost

pp. 52-55, the market will naturally gravitate to point C the open access equilibrium. At the above points, in Figure G-2:

	A	B	C
Retail Price	$16.61340	$23.44019	$19.36577
Sales Volume	1,255,413	1,042,075	1,095,889
Retail Effort$_m$	N/A	61,254.75	37,191.87
Retail Effort$_a$	49,197.06	40,836.50	24,794.51

Surpluses:	A	B	C
Consumer	$25,217,000	$17,374,725	$19,215,563
Salesman & Retailer	-0-	7,114,016	4,504,672
Social	$25,217,000	$24,488,741	$23,720,235

The failure of the retail market to attain the socially ideal price/volume combination is not necessarily evidence of a market failure. While the retailer and seller surpluses may be substantial in the short-run, as Scherer noted:

> "...a properly formulated dynamic theory indicates that one should indeed expect to see especially profitable firms' returns decline unless entry barriers are sufficiently high to warrent entry deterrent or exclusionary pricing strategy." (Scherer, 1980, p. 292).

Retailer and seller surpluses appear to arise for the most part from *relative* rather than *absolute* efficiencies. Therefore, overtime, it is reasonable to expect that as the marginal retailers and sellers are driven from the market (by entrants or by expansion of the operations of more efficient incumbents),

- the difference between the "market and social curves will decline,
- the equilibrium volume of sales will increase,

- the retailer and seller surpluses will likely decline, and

- the consumer surplus will increase.

P. Copes, in his article "Factor Rents, Sole Ownership and the Optimal level of Fisheries Exploitation" (1972), provided an in depth discussion of the "resource management effect" of employing effort that is not of a constant quality and cost.

APPENDIX H

THE EFFECTS OF PAYING SALESMEN BY A COMBINATION OF COMMISSION AND WAGE

Throughout this paper, the model being presented has assumed that salesmen are paid by commissions only. In the real world salesmen are often paid an hourly wage or by a combination of wages and commission.

Wages "w," paid to salesmen on a per unit of effort basis, can be viewed as a reduction of the opportunity cost of the salesman going on commission "e" and an increase in the selling administration cost "k" incurred by the retailer. This approach causes only slight changes in the form of the equation of the model and no changes in the results of the model.

i) Open Access Retail Market

Equation (12b), p.30, becomes:

$$(12d)\quad cP = \frac{\beta\,(e - w)}{(a-P)\left(1 - \frac{Qb}{a-P}\right)}$$

Equation (16b), p. 30, becomes:

$$(16e)\quad c^*P = P - G - q - \frac{\beta\,(k + w)}{(a-P)\left(1 - \frac{Qb}{a-P}\right)}$$

The open access supply curve (equation (17), p. 30) was defined by setting equations (12b) and (16b) equal and then solving for "Q." The open access supply curve when there is a wage is defined by setting equations (12d) and (16e) equal and solving for "Q."

$$(17c)\quad Q = \frac{a-P}{b}\left(1 - \frac{\beta(e+k+w-w)}{(a-P)(P-G-q)}\right)$$

In equation (17c) the reduction in the opportunity cost of the salesman going on commission generated by the wages, is off-set by the increase in the retailer selling administration cost—the net result is equation (17), p.52, which is the open access supply curve when salesmen are paid only by commissions.

ii) Monopoly Retail Market

Equation (13), p.24 becomes:

$$(12e) \quad cP = \frac{\beta(e - w)}{(a-P)(1 - \frac{Qb}{a-P})^2}$$

Equation (16a), p.28, becomes:

$$(16f) \quad c^*P = P - G - q - \frac{\beta(k - w)}{(a-P)(1 - \frac{Qb}{a-P})^2}$$

The profit maximizing monopolist supply curve, when salesmen are paid wages, can be defined by setting equations (12e) and (16f) equal and solving for "Q".

$$(24a) \quad Q = \frac{a-P}{b}\left(1 - \sqrt{\frac{\beta(e+k+w-w)}{(a-P)(P-G-q)}}\right)$$

In equation (24a) the reduction in the opportunity cost of the salesman going on commission generated by the wages is off-set by the increase in the retailer selling administration costs—the net result is equation (24), p.42, which is monopoly supply curve.

It should not be surprising that the open access equilibrium and the (profit maximizing) monopoly sales volumes are unchanged by the introduction of wages. In a perfect labour market the introduction of wages should only change the name applied to the compensation paid to salesmen and should not

change its nature or amount per unit of effort (i.e., the compensation paid to salesmen and should not change its nature or amount — specifically, the salesmen should still demand the same compensation per unit of effort and the retailers should, in return, still demand the same productivity.

In the less than perfect market described in Appendix G, the introduction of wages should also have little effect, as long as those wages accurately reflect the productivity of those being paid. Where the compensation plan for salesmen in some, but not all, markets consists of a "flat-rate" per unit of time wage, those markets should be less attractive to highly productive and aggressive salesmen than markets that pay commissions.

APPENDIX I

THE EFFECTS OF ALLOWING ADDITIONAL SALES EFFORT TO BECOME A "BAD" AFTER A GIVEN AMOUNT OF SALES EFFORT.

The assumption, used throughout the body of this report, that additional sales effort always generates additional value (p.11) is not particularly realistic. As sales effort increases, the information directed at potential customers tends to become less informative and more competitive (see the Mansfield quote on p.5 of this report). In its broadest sense, information has been defined as that which, when communicated, adds to the knowledge or intelligence of the recipiant (Johnson, Newell and Vergin, 1974, p.259). Information is therefore a flow of new understanding adding to the pool of one's knowledge or understanding of the empirical world. Individuals appear to have a limited capacity to assimilate and integrate information into their knowledge set (Streufert, Suedfeld, and Driver, 1965; Schroder, Driver, and Streufert, 1967; Driver and Streufert, 1969; Revsine, 1973; Driver and Mock, 1975; Duncan, 1980). As a result, more information is not always better than a lesser amount especially when there are competing and conflicting messages in the mass of what is being communicated to potential buyers.

The information processing costs associated with a retail market likely increases proportionally with total retail effort "E" and exponentially with the effort per unit sold "E/Q".

(69) $[IC] = E(\frac{\delta E}{Q})^{\zeta}$; "δ" and "ζ" define the shape of equation (69). As the total information in the environment (from all sources other than the retail market under consideration) increases, it is likely that both "ζ" and "δ" increase. However, for simplicity of exposition, "ζ" and "δ" are assumed to be parameters, with the values:

(69a) $\frac{[IC]}{Q} = \delta\zeta(\frac{E}{Q})^{\zeta+1}$

$$\zeta = 2$$

$$\delta = 80$$

In an open access retail market, equation (20), p.31, can be substituted into equation (5), p.11, to produce:

(18a) $P_{\infty} = G + q + \frac{(e+k)E}{Q}$ $\quad P_{\infty}$ = open access retail price

Which can be reorganized to:

(17a) $Q_{\infty} = \frac{(e+k)E}{P-G-q}$

and:

(21d) $E_{\infty} = \frac{Q(P-G-q)}{(e+k)}$

i) Information Costs are Internalized in the Retail Market

In an imperfect world with imperfect knowledge the consumer transaction costs increase as the number of alternatives in a retail market and the signals from that market increase. This is especially true when the signals from the market contain competing and conflicting messages. When equation (69a) is added to equation (4a), p.11, the resulting equation:

(4b) $[CATr] = \frac{\beta Q}{E} + \delta^{\zeta} \left(\frac{E}{Q}\right)^{\zeta+1}$

internalizes all of the information processing costs as part of the consumer transaction cost. When equation (4b) is substituted into equation (2a), p.10, the result is:

(7a) $P = a - bQ - \frac{\beta Q}{E} - \delta^{\zeta} \left(\frac{E}{Q}\right)^{\zeta+1}$

When equation (21d), p.138, is substituted into equation (2b), p.10, the result is:

$$(18b)\quad P_{\infty} = a - bQ - \frac{\beta(e+k)}{(P-G-q)} - \delta^{\zeta}\left[\frac{P-G-q}{e+k}\right]^{\zeta+1}$$

which can be reorganized to:

$$(17b)\quad Q = \frac{1}{b}\left(a - P - \frac{\beta(e+k)}{(P-G-q)} - \delta^{\zeta}\left[\frac{P-G-q}{e+k}\right]^{\zeta+1}\right)$$

Equation (17b) is illustrated in Figure I-1 by the curve labeled "Open Access Supply Curve".

As noted on pp.53 and 65, the optimal sales effort, for any given sales volume "Q", occurs where the total transaction costs "[TrC]" are minimized. The total transaction costs are defined by multiplying the sum of equations (4b), p.138, and (20), p.31, by the sales volume "Q".

$$(35b)\quad [TrC] = Q\left[\frac{\beta Q}{E} + \delta^{\zeta}\left(\frac{E}{Q}\right)^{\zeta+1} + q + \frac{(e+k)E}{Q}\right]$$

$$(35c)\quad \frac{d[TrC]}{dE} = Q\left[-\frac{\beta Q}{E^2} + (\zeta+1)\frac{(E)^{\zeta}}{Q^{\zeta+1}} + \frac{(e+k)}{Q}\right]$$

When equation (35c) is set equal to zero and reorganized the result is:

$$(35d)\quad E^* = \frac{Q}{\delta}\sqrt{\frac{1}{(\zeta+1)}\left[\beta\left(\frac{Q}{E}\right)^{2} - e + k\right]}\ ;\quad E < Q\sqrt{\frac{\beta}{e+k)}}$$

Given that "$\zeta=2$" and "$\delta=80$", p.138, when E* is substituted into equation (4b), p.138, "[CATr]" will always equal \$6.335274 and "(e+k)E*/Q" will always equal \$5.037175. Therefore, when information processing costs are internal-

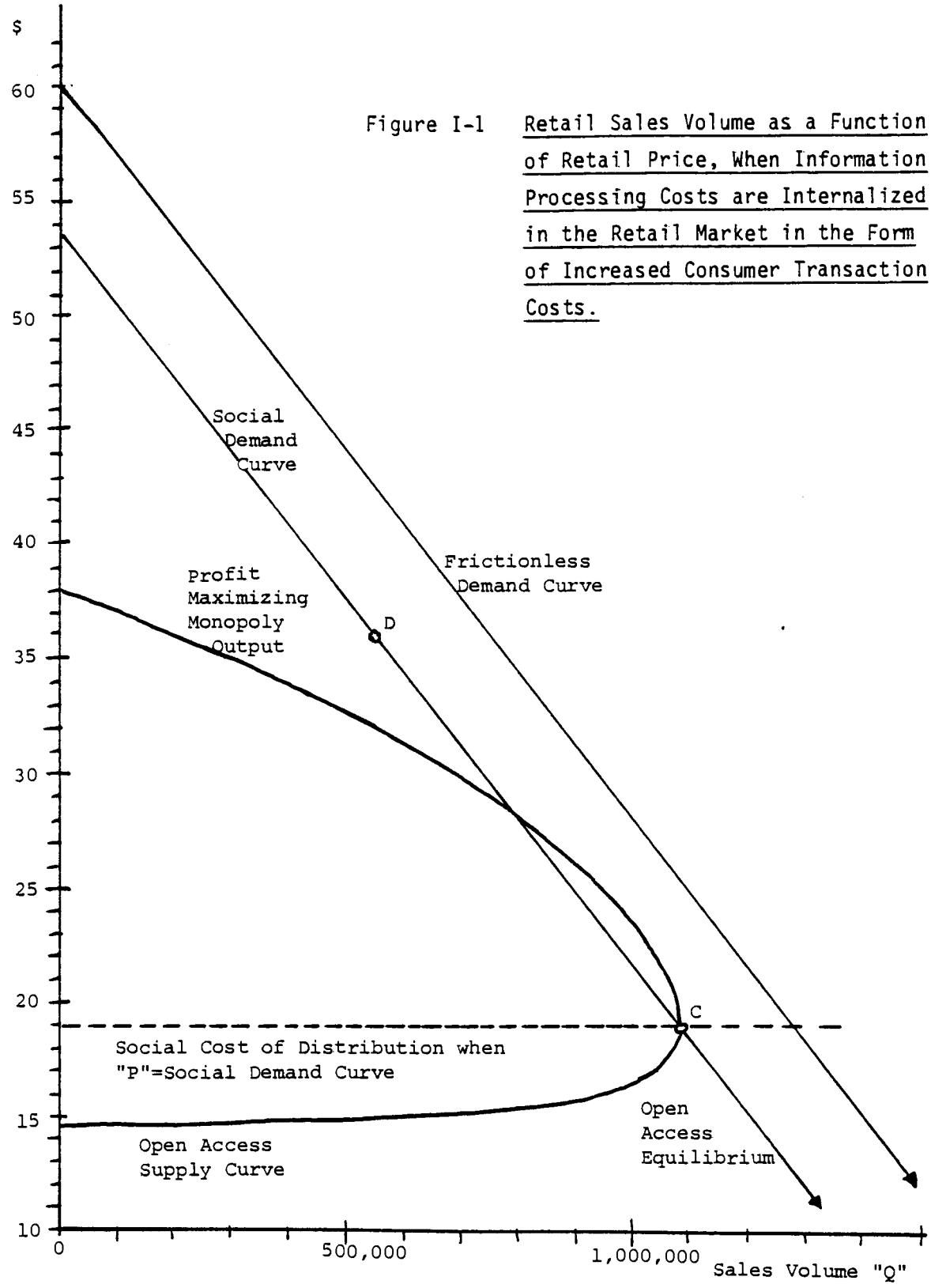


Figure I-1 Retail Sales Volume as a Function of Retail Price, When Information Processing Costs are Internalized in the Retail Market in the Form of Increased Consumer Transaction Costs.

ized as part of the consumer transaction costs, the retail effort that results in "$\frac{d[CATr]}{dE} = \frac{dM}{dE}$" is less than the retail effort that results in "[CATr] = (e+k)E/Q". This occurs because "$\frac{d[CATr]}{dE} = \frac{d[CATr]}{dE} + \frac{dM}{dE}$" and "$\frac{d[CATr]}{dE}$" is negative over range of sales effort "E" but becomes positive beyond that range. As noted previously, given that "ζ=2" and "δ=80", then:

(70) $(e+k)E^*/Q = 5.037175$

which can be reorganized to:

(70a) $E^* = 5.037175Q/(e+k)$; when $\zeta = 2$ and $\delta = 80$.

When equation (70a) is substituted into equation (7a), p.138, the result is:

(7b) $P^* = a - bQ - \frac{\beta(e+k)}{5.037175} - 80^2 \left(\frac{5.037175}{e+k}\right)^3$

Equation (7b) is illustrated in Figure I-1 by the curve labeled "Social Demand Curve". When equation (70) is substituted into equation (18a) the result is:

(18b) $P = G + M = G + q + 5.037175 = \$18.83718$

Equation (18b) is illustrated in Figure I-1 by the dashed line labeled "Social Cost of Distributed Good When 'P' = the Social Demand Curve".

The social surplus is maximized in the form of consumer surplus at the open access equilibrium (assuming constant transaction costs; however, pp.78-87 show that the assumption of constant transaction cost is not realistic).

When the social demand curve (equation (7b) above) multiplied by the sales volume "Q" is differentiated with respect to "Q" the result is:

$$(7c)\quad \frac{dP^{*}Q}{d\,Q} = a = 2Qb - \frac{\beta(e+k)}{5.037175} - 8Q^{2}\left(\frac{5.037175}{e+k}\right)^{3}$$

When equation (7c) is set equal to equation (18b) the result is:

$$(71)\quad Q = \frac{1}{2b}\,a - \frac{\beta(e+k)}{5.037175} - 8Q^{2}\left(\frac{5.037175}{e+k}\right)^{3} - G - q - 5.037175$$

$$(71)\quad Q = 544{,}180$$

Equation (71) is illustrated in Figure I-1 by point D. The sales volume at point D is exactly one-half of the sales volume at point C, the open access equilibrium.

ii) Information Processing Costs are External to the Retail Market

Signals (e.g., advertising) generated by a retail market are of no interest to individuals who have already bought the product, or who are otherwise not interested in it. However, such individuals still absorb a cost in receiving, processing and discarding those messages.

In some instances (e.g., advertising on radio, on television, in magazines, and in newspapers), part of the signal cost (paid by the sender) finances (in whole or in part) a service desired by the received. In such instances the information processing costs are fully internalized in the market for that service and the receiver can reduce or eliminate the signals by reducing or eliminating "matrix" service.

In other instances (e.g., sales over the telephone or door to door and advertising through "junk mail", billboards, pamphlets affixed to car windshields, and neon signs) the individuals receiving, processing, and discarding the messages in the signals are not compensated for their costs and the senders of the signals do not incorporate those costs in their decision processes. As with other forms of environmental pollution, some form of government intervention is desirable to correct the above market failure. Where that market failure can be associated with the use of a specific signal channel then the use of that channel by retailers to send signals should be taxed. For example, a per call tax applied against retailers who sell over the telephone should reduce the use of that channel. The taxes collected should (in theory) reduce the tax load in other areas and compensate (in part) those who are imposed upon by the use of the telephone, by retailers, as a signal channel. The exact amount to set as the tax is difficult to specify because, while it is clear that many signals generated in retail markets impose external costs, it is difficult to specify and define a function for those costs. Also, on pp.137-138 it was noted that the total information load in the environment substantially influences the cost of processing signals. Therefore, rationalizing the flow of signals from a given market, when assuming *ceteris paribus*, is quite different from rationalizing the flow of signals from that market, if the signal flows from all markets are rationalized.

APPENDIX J

THE IMPORTANCE OF RETAIL MARKETS

The following observations—summarized from other parts of this paper—illustrate the importance of the sales and service sector to Canadian society:

- In 1977, 37.5 percent of the private sector real domestic product was attributed to the sales and services subsector, as was 29.7 percent of the private sector employment (agriculture and firms under 20 employees were excluded from the analysis).
- During the economic downturn in 1982, the sales and service subsector provided 33.4 percent of the private sector employment.
- The sales and service subsector generated 55.8 percent of the net new jobs created, by the private sector, during the period 1962 to 1982. The 55.8 percent can be further broken down into,

- Sales (retail trade, insurance and real estate)	23.2%
- Services (to consumers)	23.6
- Financial Institutions	9.0
	55.8%

The above observations are not unique to North American society. Mazzoni noted that:

> "One of the patterns most clearly established by economists is that during the course of economic development the decline in the share of employment in agriculture is accompanied by increases in those of employment in services and industry, with the difference between the latter tending to become positive and to grow as development continues." (1981, p.87)....

> ".... between 1951 and 1970 the rates of increase in industry and services were virtually the same, whereas between 1970 and 1977 the increase in employment in services was accompanied by a decrease in industrial employment." (1981, p.91.)

When Mazzoni's statistics on Italy (1981, pp.90, 92, 93 and 95) are rearranged into a format comparable with the one used in this paper, then the following may be observed:

- In 1977, 37.6 percent of the Italian private sector (agriculture and government excluded) constant price "value" was added in the sales and service subsector (see the definition of subsector III, in Appendix A);
- In 1977, the sales and service (sub)sector provided 40.8 percent of the non-agricultural private employment and 30.0 percent of the total employment in the Italian economy; and,
- The sales and service (sub)sector generated 98.1 percent of the net new jobs created by the (non-agricultural) private sector, during the period 1970 to 1977.

  That 98.1 percent can be further broken down into,

  - Distributional Services . . . . 37.7 %
  - Miscellaneous Services. 14.6
  - Credit. 49.8

    98.1 %

The sales and service subsector should be visualized as a layer covering and affecting the rest of the private sector domestic economy and not as an isolated segment or pocket of the economy. This point can be further emphasized by noting that the value of manufactured goods is disputable until they are either received by the end user or a clear channel of distribution has been opened between the manufacturer and the end user (Greer, 1970; Revsine, 1973).

FOOTNOTES

Ref.P.

1. Due to limitations of the data provided in Statistics Canada publication 72-002, only employees of firms with 20 or more employees were included in this study (see Appendix A). The subsector classifications used in this study are defined in Appendix A. p.1

2. The statement on p.2 that "for most people, employment in sales and service industries is rarely a career path of choice" is applicable primarily to those industries that are relatively open access (i.e., entry and exit, for both labour and capital, are relatively costless). See, also, Figure A-1b in Appendix A. p.2

   Some groups providing services (e.g., dentists, optometrists, veterinarians, and doctors) have created a professional image as part of the process of erecting substantial barriers to entry (Muzondo and Pazerka, 1979).[3] The cost to individuals, of surmounting those barriers, creates a hostage (i.e., the asset created is often highly specific to the profession). That hostage allows (those who control) the professional body to enforce *professional conduct* including in many instances cartel pricing (see Appendix D). Therefore, to the extent that a sales or service industry is successful in creating a *professional barrier* and in generating rents, for individuals behind those barriers, it becomes attractive as a career path.

3. Vocational barriers, regardless of the social costs or benefits, create property rights by fencing off a portion of the labour market that was previously freely accessible to all. p.100 p.146

   Each successful enclosure of a portion of the job market, by artificial barriers, increases the crowding and the distress of the remaining *common pool labour market*. This distress results in individuals being more willing to commit resources to escape that commons. Thus, as the opportunities for those in the common labour pool shrink, the *professional enclaves* must erect higher barriers and society expends an increasing amount of resources in the socially non-productive conflict between those erecting barriers and those assailing barriers.

4. This observation is based on various sales presentations, seminars and courses: p.3

   - Amway Presentation to potential sales representatives.
   - Sales Giants sales presentation.

Ref.P.

- Dare to be Great seminar.
- Life Underwriters Association training course.
- Sales Marketing Executives's Course.

5. The comments on p.4 were paraphrased from comments made by: p.4

   - Mr. H. Astren, Regional Retail Distributor for British Columbia, Electronic Scales International.
   - Mr. J. Bosch, Department Manager, Simpsons Sears Ltd., eight years experience in selling paint and wall coverings.
   - Mr. G. Sutherland, Lecturer at Langara Community College (Socio-Geography); Honours graduate of the Sales Marketing Executive's Course.
   - Mr. T. Wright, Regional Superintendent, Western Canada, for Confederation Life Association, Marketing Division; graduate of LUATC and LCU; now retired.

6. A Pareto-optimal situation occurs when it is impossible to make some households better off without simultaneously making others worse off. p.6

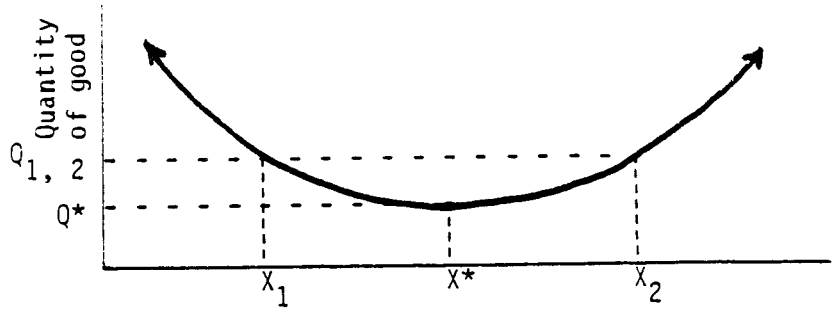
7. Social surplus is defined here as the sum of the consumer surplus and any economic rents accruing to the owners of the labour, capital, and resource inputs. It is, therefore, the value that society places on a good or service less the cost of the inputs expended to produce, transport, and distribute it. p.6

8. As noted by Copes (1985, pp.229-230), the "various concepts of rent overlap." Copes dealt with one aspect of that overlap by introducing the concept of *market rent*. The definition of market rent used by Copes is differentiated from monopoly profits. In the terminology of this study, the monopolist owns the rent generated by the market (the market rent). A profit maximizing monopolist will, therefore, maximize the market rent - where the market rent is defined as the rent that is directly attributable to the nature of the market (monopoly, oligopoly, government regulated) and that are appropriable by the suppliers of a good (in this study the manufacturer, the salesmen, the retailers) or by the government. As such, the concept of market rent excludes the (realized) consumer surplus and the producer surplus. Producer surplus is excluded because (as discussed in Appendix G), it is due to the unique attributes of individual salesmen and/or retailers and is not directly attributable to the nature of the market. p.6 p.27 p.38 p.63

Ref.P.

9. In Figure 1, p.7, the average value curve converts consumer surplus from a triangle to a rectangle (i.e., the area of the triangle "a,P_m,d" equals the area of the rectangle "g, c,d,P_m"). p.6

10. If goods X_1 and X_2 have the same distance in specification differences from the most preferred good X* then if either good X_1 or X_2 is produced, instead of good X*, the consumer will require the same amount of compensation to attain the level of utility that he would have had if a fixed amount of X* had been given to him (Lancaster, 1979, p.45). p.8



11. William Ockham's (c.1280-1349) dictum "Multiplicity ought not be posited without necessity" has become known as *Ockham's Razor* (Encyclopaedia Britanica, 1967, Vol. 16, p.858). p.9

12. The traditional supply and demand model is a special case of the retail market model, where $\underline{\beta}$ is assumed to equal zero (i.e., no consumer transaction costs). A comparison of the retail market model with its special case (the traditional model) is made on pp.56-60 and on pp.74-77. p.51 p.55

13. See Mansfield, 1975, pp.497-498, for a description of public goods. p.78

14. Charcoal was required for the smelting of metal prior to the use of coal for that purpose. p.100

"Simple calculations may be made which demonstrate how limited must be the volume of industrial output where the productivity of the land imposes a limit on the expansion of production. For example, it requires the growth of timber from 40,000 hectares (100,000 acres) of woodland to supply charcoal sufficient to make 10,000 tons of pig iron. Even a level of iron production which today would be thought of as very modest would have denuded the forests of Europe in a few decades. And one must not forget that wood was wanted also for naval spars, for beer barrels, for cart wheels, for furniture, for fencing, for a thousand and one other uses, which all increased the pressure on limited resources." (Wrigley, 1976, p.57.)

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