

LIMITATIONS OF THE TRAVEL-COST  
TECHNIQUE: IMPLICATIONS FOR OUTDOOR  
RECREATION POLICY

THE INDUSTRIAL GROWTH OF METROPOLITAN  
TORONTO BETWEEN 1949 AND 1958:  
ANALYSIS AND OBSERVATIONS

LIMITATIONS OF THE TRAVEL-COST TECHNIQUE:  
IMPLICATIONS FOR OUTDOOR RECREATION POLICY

by

WAYNE EDWARD DICKINSON

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APPROVAL

Name: Wayne Edward Dickinson  
Degree: Master of Arts  
Title of Extended Essay: Limitations of the Travel-Cost Technique:  
Implications for Outdoor Recreation Policy.

Examining Committee:

Chairman: E.J. Hickin

---

G.P.F. Steed  
Senior Supervisor

---

T. O'Riordan

---

R.C. Brown

---

S. Sydneysmith  
External Examiner  
Assistant Professor  
Simon Fraser University, Burnaby

Date Approved:

ABSTRACT

This paper discusses some limitations of the travel-cost technique and their implications for outdoor recreation planning policy. Traditional demand analysis has been criticized for its evaluation of outdoor recreation demand on the basis of the aesthetic characteristics attributed to outdoor recreation and through historical precedent which have fostered the institutional and technical limitations that are responsible for the absence of a market mechanism. In the absence of a market mechanism economists have employed the travel-cost technique whereby the travel and on-site costs of recreationists are used as surrogate for the willingness to pay for outdoor recreation. The technique is criticized on the following premises. The meaning of attendance figures is questioned since the technique assumes that participation is a valid indication of demand. Attendance figures do not necessarily reflect the needs of the total population. In addition they indicate a deterministic interaction form analogous to a gravity model which is neither representative of the dynamic qualities of demand nor indicative of the reasons for the generation of demand.

Is attendance representative of the recreationists' willingness to pay for outdoor recreation? If so, is willingness to pay the relevant measure of economic values for outdoor recreation? Since income inequality exists and the associated costs of travel

to recreation areas is a function of distance, then the evaluation of recreation demand based upon willingness to pay is indicative of a bias towards the more privileged income groups. Utility theory suggests that the marginal utility of income increases when income is low since each incremental expenditure represents a larger portion of their disposable income. This raises the question of the propriety of existing recreation policy.

The travel-cost technique underestimates demand at a site since the demands and the needs of the total population are not ascertained. It is suggested that user preference and satisfaction studies conducted through interview and/or questionnaire surveys may complement traditional demand analysis. Evidence suggests that lower income groups indicate a demand for outdoor recreation pursuits when the opportunity for participation is afforded. Since the pattern of outdoor recreation is interpreted in terms of socio-economic criteria whereby "equal opportunity" for participation is ultimately based upon collective affluence, it is suggested that increased attention should be devoted to the provision of urban parks within and/or nearby metropolitan areas.

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In North America, present recreation policy tends to emphasize the provision of recreation facilities for the metropolitan hinterland while ignoring the intrametropolitan areas. In Canada, the majority of resources available for outdoor recreation have been allocated for the provision and maintenance of Provincial and National parks which are often geographically dispersed from the major metropolitan centres. Constitutionally, in the past the Provincial and Federal governments have not developed policies which lead to the provision of recreation facilities in the metropolitan areas. In the United States, there are indications of increasing concern for providing outdoor recreation facilities in the metropolitan areas. The Bureau of Outdoor Recreation is currently evaluating the objectives of recreation planners before embarking on a multi-million dollar, five year urban recreation program.<sup>1</sup> This is consistent with the objectives of the Outdoor Recreation Resources Review Commission (ORRRC) which concluded that outdoor recreation policy should reflect a proper balance between the needs of the metropolitan population and the resources of the metropolitan recreation region.<sup>2</sup> Yet, "Our knowledge of recreation demand patterns appears to be roughly in inverse relation to distance away from the centre of urban areas."<sup>3</sup>

This paper discusses several limitations of the travel-cost technique and their implications for outdoor recreation planning policy. Two recognized limitations which are implicitly accepted in this paper are: (1) the technique is best suited for the evaluation of demand for

the more remote recreation areas as apposed to those areas located closer to the population centres; (2) the technique is demand-orientated and neglects questions on the geographic supply of recreation sites. The model evaluates the demand for alternative sites. The fact that the model tends to justify more expenditures in the periphery than in the metropolitan areas exaggerates rather than reduces the distortion inherent in site availability. The intent of this paper is to illustrate that the technique in certain circumstances can contribute to a misallocation of recreation resources, a finding which has important implications for public recreation policy.

The inequities associated with over emphasis upon recreation resources outside metroplitan areas are illustrated by several considerations. First, it has been established that family income is a major determinant for participation in recreation.<sup>4</sup> Cicchetti states;

"When the more affluent leave the central city for the suburbs, those who are taking their place generally do not possess sufficient resources to transport themselves to the recreation areas which are being pushed further away by sprawling development in the suburbs."<sup>5</sup>

Secondly, the ORRRC found that approximately 80% of all vacation travel was made by automobile with air travel the next highest.<sup>6</sup> It is noteworthy that vacation travel by bus was the least used mode. This is an indication of a bias against the non-mobile lower income groups since lack of ownership or possession of an automobile precludes

travel to the more remote recreation areas. A further reason underlying the inequities associated with the provision of outdoor recreation facilities resides in the disparity between the growth in the demand for outdoor recreation and the limited supply of recreation facilities available close by those areas where demand is highest.

## II LIMITATIONS OF DEMAND ANALYSIS

### A. Intangible Nature of Outdoor Recreation

Before discussing the travel-cost technique and the criticisms thereof, the limitations of traditional demand analysis for the evaluation of outdoor recreation demand will be discussed. It is generally recognized that the evaluation of demand for outdoor recreation is a prerequisite for recreation planning and policy. However, traditional demand analysis has generated considerable criticism. It is argued that outdoor recreation has basically aesthetic characteristics. The problem of evaluating what Marshall would call personal, internal, and non-material goods-- in this case outdoor recreation -- becomes conceptually and empirically diffuse.<sup>7</sup> This does not necessarily imply that evaluation is beyond the capabilities of economic analysis because it is generally recognized that the determination of demand for outdoor recreation is a necessary requirement for several reasons.<sup>8</sup> Firstly, the determination of recreation demand is necessary for the comparison of competing resources. The allocation of scarce resources

necessitates the identification and computation of benefits for application in benefit-cost analysis. Secondly, knowledge of demand is needed in marginal analysis for evaluating the capacity of a recreational area. Lastly, resource managers may require demand schedules for assessing pricing strategies necessary for the regulation of users and for the financing of the services provided.

The recognition that outdoor recreation is imbued with aesthetic characteristics permeated by highly personal values substantiates the intangible nature of outdoor recreation. Thus, critics of economic analysis maintain that the subjective and spiritual values are beyond empirical analysis. The implications are noteworthy. First, the contention that the intangible nature of recreation values are beyond measurement assumes that these values (apart from the absence of a market mechanism) are immeasurable in financial terms. Too often the demand for outdoor recreation is not treated as a dynamic concept with the result that several aspects of demand may be neglected from valuation.

1. Option Demand<sup>9</sup> is defined as demand elicited from marginal or non-consumers of outdoor recreation who anticipate potential use for themselves or future generations or who appreciate the existence of the resource as a sentimental basis of value. Option demand is most critical where the use of the resource is irreversible.

2. Opportunity Effect<sup>10</sup> pertains to the unanticipated increase in demand resulting from;

(a) increased opportunities for participation in outdoor recreation;

(b) impact from technology in substitutable form of recreational activities;

(c) "learning by doing" which refers to the relationship between past and future use as reflected in the knowledge and/or the development and inheritance of skills. This is particularly true for the more activity-orientated types of outdoor recreation.

However, economists argue that the 'intangibles' are reflected by what people are willing to forego to obtain them. The problem becomes a matter of evaluating the "intensity of wants" reflected through each individuals normative value system with the ultimate objective of finding a common yardstick."<sup>11</sup> Furthermore, it is argued that no activity or product is priceless and in no sense does outdoor recreation possess the innate criterion for such assessment. To impute an infinite price on the basis of the diffuse characteristics of a commodity is illogical. Since demand is essentially a reflection of consumer choice among scarce resources, the selection or purchase of commodity X necessitates that Y articles must be given up. Each additional unit of expenditure in time or money is traded off between the incremental net social gain for recreation and its alternatives.

B. Absence of a Market Mechanism

The major obstacle in the assessment of recreation demand is attributed to the absence of a market mechanism which is a culmination of institutional and technical conditions.<sup>12</sup> Through historical accident, the existing institutional framework has been responsible for fostering the traditional attitudes which permeate

public opinion and public outdoor recreation-policy. Subsequently, outdoor recreation is considered a "free" commodity which tends to have become the inalienable right of each individual with the proviso that pricing outdoor recreation is considered unacceptable. In addition, the technical limitations of a pricing mechanism are significant. In many cases, "pricing" is impractical for the imposition and regulation of user fees due to the interrelationship of activities which may occur in a recreation area. Alternatively, the collection of user fees may be too costly in terms of administration and/or enforcement costs.

Therefore, the major disputes concerning the applicability of economic analysis to outdoor recreation resides in the intangible nature of outdoor recreation and its lack of expression through a market mechanism. Hence, it appears that within the foreseeable future recreation benefits and the derived resource values will be assessed within a non-market framework.<sup>13</sup>

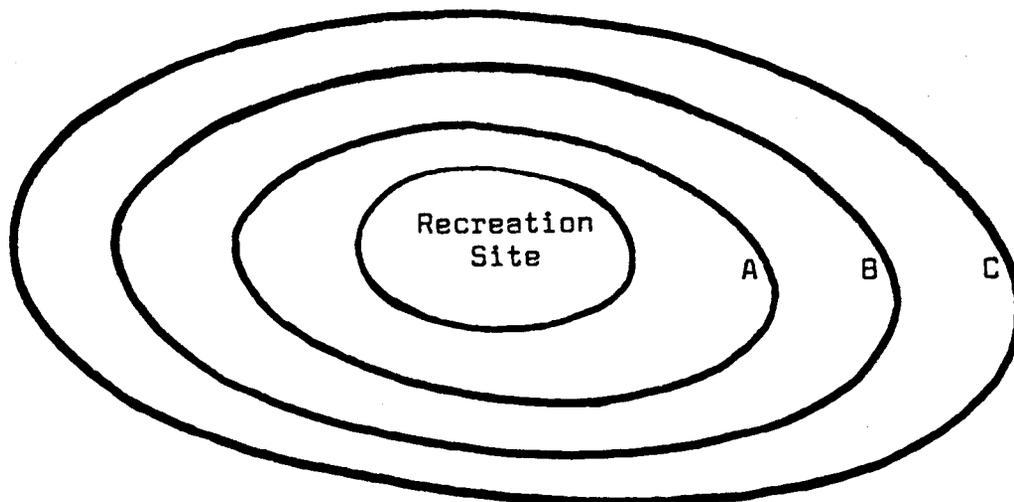
### III THE TRAVEL-COST TECHNIQUE

In the absence of a market mechanism, economists have attempted to estimate the demand for outdoor recreation based upon the recreationists' willingness to pay if the services were marketed in the usual manner. This paper is specifically concerned with the travel-cost technique which utilizes the travel and on-site costs of recreationists as a surrogate for the willingness to pay for outdoor recreation. The technique involves stratifying the total population, in terms of all recreationists who travelled to the recreation site, according to distance zones. On this basis

Clawson maintains that the evaluation of outdoor recreation must proceed in two stages; the demand for the total recreation experience and the demand for the recreation opportunity per se.<sup>14</sup>

The demand for the total recreation experience is derived for a recreation area if the data includes the number of visitors from different use zones, the total population within each use zone, and the average costs for visitors travelling from each use zone. Figure I simply illustrates the stratification of the total population of visitors according to use zones. In reality, of course, the population and consequently the use zones are refined by variables such as income, family size, alternative recreational areas, percent of households with automobile available, etc.<sup>15</sup>

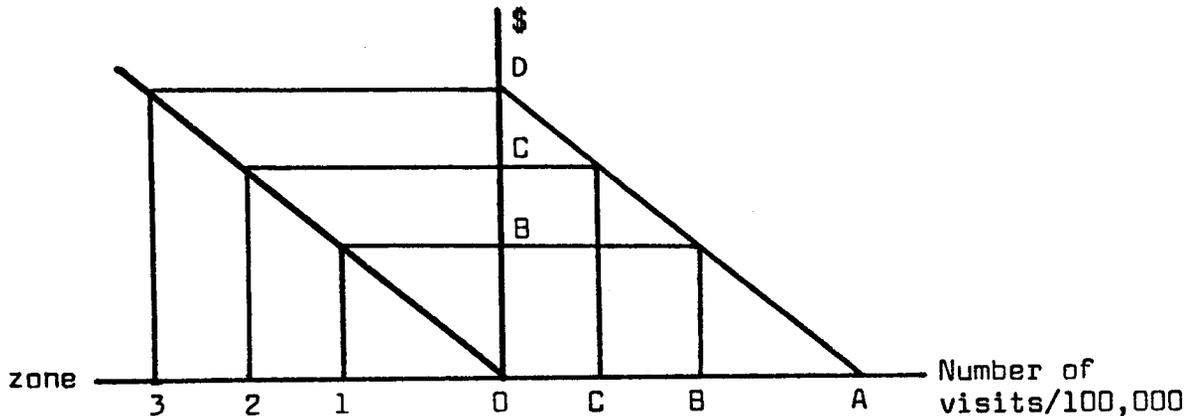
Figure I. Stratification of Total Population of Recreationists According to User Zones.



The evaluation of demand is computed by multiplying the participation rate (per 100,000 population) by the average (travel plus on-site costs) per recreationist for each user zone. By plotting the number of visitors per hundred thousand population

against the average costs for each zone a demand curve similar to DA (figure II) is ascribed. It is assumed that a demand curve has been derived since the curve indicates the recreationists' willingness to pay each cost.<sup>16</sup>

Figure II. Estimating the Demand Curve for Recreationists.<sup>17</sup>



An increase in the associated costs of travel accounts for a reciprocal decrease in demand. From Figure II, where the travel costs per mile are assumed constant, the imposition of a toll upon zone 0 residents equivalent to the travel costs incurred by visitors from zone 1 (OB) would result in a decrease in attendance from OA to OB. This hypothesis is based on the following assumptions;<sup>18</sup>

- (1) The population from which recreationists are drawn have similar characteristics and preferences. (ie. equal incomes and tastes).
- (2) A toll or fee is regarded in equivalent terms to the cost of travel.
- (3) The costs of travel are incurred solely for the purpose of gaining access to the recreation site.
- (4) All populations face the same alternatives to the recreational opportunity under consideration.
- (5) Recreationists in all areas are assumed to have the same marginal preferences for the site. It is also assumed that these marginal preferences remain unchanged.

Extrapolation from existing attendance figures allows an evaluation of demand to be made for each user zone. Consequently, the demand curve for the whole recreation experience is generated by substituting the associated travel costs as a surrogate for willingness to pay based on the observed behavior of recreationists to a specific area.

The evaluation of demand for a recreation resource is computed by hypothesizing various entrance fees and assuming predictable behavior. It is assumed that the recreationist will consume until the price paid equals the extra utility received from the acquisition of a marginal unit. Willingness to pay is determined by the use of questionnaire or interview surveys. The value of these survey methods, however, are questionable since they are susceptible to overbidding or underbidding practices. Recreationists may overbid if they fear the recreational area is jeopardized by competing resource demands. Alternatively, underbidding often results if the recreationists fear that a user fee will be imposed for the use of a recreation site. Whatever the weaknesses of the methodology employed, the implications for a decision making framework are important. The estimation of demand for recreation resources is important in terms of permitting the value of the resource to be associated with respect to alternative uses, the effects of changes in income or leisure time, and particularly for estimating the effects on consumer benefits through increased investment in recreation resources.

#### IV CRITICISMS OF THE TRAVEL-COST TECHNIQUE

##### A. The Meaning of Attendance Figures

In the absence of a market mechanism, attendance figures have become an important variable for the traditional demand models; they constitute the basis for the estimation of present and future projections in demand.<sup>19</sup> Since the travel-cost technique measures benefits based upon approximations to actual attendance figures, they are assumed a valid indication of demand. Attendance figures, however, do not necessarily reflect the needs of a population nor is attendance representative of the dynamic qualities of demand. In addition, it is accepted that forecasting is risky in the best of circumstances. This is certainly the case for outdoor recreation where projections involve long range extrapolations based upon insufficient socio-economic and demographic data compounded with a background of rather meagre past experience.<sup>20</sup>

Apart from indicating the demand for a form of activity, the empirical meaning of participation is vague. For instance, what constitutes an activity day - duration of stay or the nature of the activity? To interpret attendance in terms of time or "duration of stay" may convey some indication of the qualitative aspect of the recreation experience. Attendance, however, does not indicate the inter-personal differences which may effect the duration of stay. For example, how are the experiences of a recreationist who spends two weeks at a site compared with a recreationist who spends seven weekends at the same site? No comparative indication of the quality of the experience is given for either recreationist.

Attendance figures may also be interpreted in terms of total attendance. This too, is a misconception, since the participation rate or regularity of attendance, is distinct from attendance which refers to the proportion of the total population who are actively engaged in outdoor recreation at a particular site. It is noteworthy that each activity generates different types of demand, with some activities generating high participation rates which include a small segment of the population.<sup>21</sup>

Furthermore, the model assumes a deterministic interaction form which is analogous to the gravity model. For the gravity model, the interaction potential is defined as a function of the population potential, the attractiveness of the recreation area, and the distance from the metropolitan centre(s). The gravity model is of the form;<sup>22</sup>

$$I_{ij} = G \frac{P_i A_j}{TD_{ij}^b}$$

where  $G$  = gravitational constant.

$I_{ij}$  = interaction between  $i$  and  $j$ .

$P_i$  = population at origin  $i$ .

$A_j$  = participation rate at destination  $j$ .

$TD_{ij}$  = minimum time distance between  $i$  and  $j$ .

$b$  = exponent.

The relationships described are far more complex than the explanation offered by the gravity model. In the case of two closely situated parks - where one tends to dominate the other in popularity - a reliance upon attendance figures does not explain the reasons for the site's demand or attractiveness.<sup>23</sup> Consequently,

the explanation may deviate from reality since no insight is given into the generation of demand.

Attendance figures do not explain the reasons why demand is generated nor does it provide the basis for evaluating the impact of intervening opportunities for complementary and substitutable activities. For regional parks, which cater to day and weekend recreation trips, Mercer found that 25% of the visitors attended by chance.<sup>24</sup> In several cases, 47 - 51% of the visitors had not planned to visit the site prior to setting out. In addition, Mercer found that people want change and variety with the opportunity to visit numerous sites.<sup>25</sup> Therefore, attendance is significantly influenced by the interrelationship between demand and the availability of supply of recreational areas.<sup>26</sup> Thus, given the prevailing conditions, a reliance upon attendance figures as an indication of "...so called demand is not demand at all."<sup>27</sup>

#### B. Income Inequity

The model described above assumes a given distribution of income for the total population within each user zone. From the total population, it is further assumed that the recreationists have similar characteristics and preferences which are reflected by traditional economic analysis of recreation demand where attendance figures are considered to be indicative of the consumer's willingness to pay for outdoor recreation. Whether willingness to pay should be the relevant measure of the economic values for outdoor recreation is disputed.<sup>28</sup> Nevertheless, economists justify

such an evaluation on the basis that;

"We are only searching for a relative value; the relative values of all goods are affected equally by our limited ability to pay."<sup>29</sup>

Since income inequality exists but is not acknowledged, and outdoor recreation is accepted as a public consumption good, the evaluation of recreation demand based on willingness to pay is indicative of a bias towards the more privileged income groups. Present projections are based upon the preferences of those recreationists who are already being served.<sup>30</sup> Thus the preferences of the nonusers are not necessarily indicated due to their absence from the intermediate and resource-orientated recreation areas.

Willingness to pay is conditional upon the following assumptions;<sup>31</sup>

- (1) All associated costs have been incurred.
- (2) Willingness to pay must be enforced by ability to pay.
- (3) Willingness to pay is conditional upon the assumption that the marginal utility of money is constant throughout the cumulative quantity consumed.

The Outdoor Recreation Resources Review Commission (ORRRC) found that participation rates rise with increments in income up to the \$7,500 - \$10,000 income group and then taper off.<sup>32</sup> Although there are indications that consumers are willing to sacrifice an increasing portion of their disposable income for outdoor recreation this willingness is a function of consumer income. Since the associated travel costs (price) of visiting the more specialized recreation

areas are highly correlated with the distance travelled, the impact of this cost is felt primarily by the low income groups.

A major paper by Seckler hypothesizes that the present rationing of outdoor recreation is primarily attributed to the existing distribution of income in society.<sup>33</sup>

"Our major concern is with the uses of economic science...and the danger that economics may seem to imply policy prescriptions which are not an integral part of that theory nor necessarily in the public interest."<sup>34</sup>

Economists traditionally argue that the relevant measure of recreation value is determined by the consumers' willingness to pay irrespective of the income inequality existing in our society. Seckler questions whether the consumers' willingness to pay is or should be the measure of economic values on the basis of economic science. Seckler disputes the alleged equality between the statistical demand curve and the marginal utility curve and concludes that demand curves, "... reflect the diminishing marginal utility of income."<sup>35</sup> If correct, this implies that the rationing function attributed to the associated travel costs (price) for visiting the more remote intermediate and resource-orientated recreation areas will fall almost exclusively on the low income groups. This raises the question of propriety of present recreation policy in a dichotomous market structure (market and nonmarket framework).

Seckler distinguishes between actual and proper compensation by stating that the difference between the area under the marginal utility curve (proper compensation) and the demand curve (actual compensation) indicates the differences in the marginal utility

of income for those persons concerned.<sup>36</sup> Proper compensation equals actual compensation only when demand equals marginal utility. The rationale for this appraisal originates from neo-classical utility theory where it is assumed that each consumer rationally allocates his expenditures such that the marginal utility for each commodity purchased is equivalent to the marginal utility indicated by its price. The relationship between income and utility is expressed as;

$$P_x \times m = MU_x \quad \text{where; } P_x = \text{price of the commodity.}$$
$$m = \text{marginal utility of money.}$$
$$MU_x = \text{marginal utility of the commodity.}$$

Consequently, each consumer dollar is measured in terms of the marginal utility of income that must be sacrificed. Consumer equilibrium is attained when the consumer optimizes his budget such that the utility derived from the last dollar spent on each commodity is equal. This is expressed as;

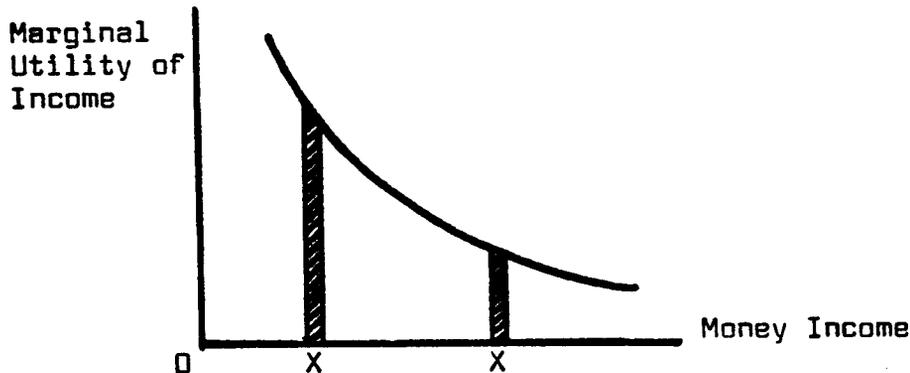
$$\frac{MU_a}{P_a} = \frac{MU_b}{P_b} = \frac{MU_c}{P_c} = \dots = \frac{MU_n}{P_n}$$

Then, the ratio of marginal utility to price is equivalent for all commodities purchased by each consumer.

Alternatively, if it is assumed that all consumers have the same potential for enjoying recreation then the same diminishing marginal utility curve applies to all recreationists. For example, consider the case where two recreationists A and B have travelled the same distance to visit a recreation area. If A has a higher

income than B., utility theory preposes that B enjoys the recreational facility more than A since B must sacrifice a greater portion of his disposable income. Given equal expenditure (x), Figure III illustrates that the marginal utility of income yields

Figure III: Impact of Income Inequity on Public Welfare



more utility when income is low than if it were high. As Seckler states, "... poor people will sell out cheap because their marginal utility of income is high."<sup>37</sup>

### C. The Importance of Time

In addition to the purely monetary considerations affecting recreation demand, time is considered an important variable. In fact, the lack of leisure time is considered a major constraint in recreation demand. It is contended that in our society the poor and the old age pensioners are the only segments of the population who truly belong to a leisure class.<sup>38</sup> Such exhortations, however, can be refuted on the basis that persons existing on subsistence incomes are preoccupied with day to day existence which permits little time for more superfluous pursuits. The opportunity costs of time are significant determinant of the potential to engage in outdoor recreation. For the recreationist, the opportunity

costs of time are calculated on the basis of travel time and time spent at the resource. As expected, these costs increase with distance which again highlights the impact of income inequality upon recreation demand. Scott concludes,

"... we would expect that among observed visitors, those from nearby zones will be dominated by people of low income, making short visits, while as the distance travel increases, observed incomes will rise and the proportion of self-employed, professional and independent-income receivers will rise."<sup>39</sup>

Income has a double influence on the length of stay since high income earners may attempt to save on travel time by visiting longer or they may make frequent visits of shorter duration by travelling by expensive, fast forms of transportation.<sup>40</sup> The position of lower income earners - hourly wage and salaried workers - is less enviable since the opportunity afforded for travel is limited by income opportunity costs. Hence, their visitation to the more remote recreation areas is limited to week-ends and/or holidays.

#### V. IMPLICATIONS FOR RECREATION POLICY

It is the author's contention that recreation policy recognizes income inequity without providing adequate compensation for the low income groups.

"Certain classes of recreationists or certain kinds of recreation, may be slighted by market processes because some users are at a financial disadvantage. If we decide that some market results are wrong for this reason, then all markets are wrong and the entire schedule of prices must be reshuffled. Fortunately, most kinds of outdoor recreation attract a clientele whose ability to pay is not lacking; for others, they can be isolated and treated."<sup>41</sup>

This statement has several connotations. First, it is suggested that the demands and needs of the total population for outdoor recreation are reflected by the more privileged income groups. Secondly, it is implied that the lower income groups can and will receive some form of compensation. The implications of these statements will be examined in the context of existing recreation policy.

Outdoor recreation policy based upon the demands and characteristics of the using populations does not necessarily reflect the needs of the total population. Traditional demand analysis has tended to ignore the demands and needs of the non-users of outdoor recreation with the result that the total outdoor recreation demand is underestimated. Given this limitation, user preference and satisfaction studies may complement demand analysis since they provide a theoretical basis for determining the preferences of the users and non-users of outdoor recreation facilities.<sup>42</sup> However, attempts to ascertain preferences for outdoor recreation through interview or questionnaire surveys are not without criticism. As Scott maintains, "Ask a hypothetical question and you get a hypothetical answer."<sup>43</sup> The reliability of respondents is often questioned since opportunities are not always compatible with individual preferences or needs. It is equally important to identify differences in socio-economic and behavioral parameters to determine the impact varying value systems have on subjective evaluations. Ultimately, the basic underlying question becomes one of determining whether recreationists really know what they want.

It is noteworthy that the demands for many forms of outdoor recreation are increasing for lower income groups. For example, boating in the United States has increased dramatically for the middle and upper-lower income classes.<sup>44</sup> This increase in demand is primarily attributed to the increased financial opportunities and the increased supply of facilities. On this basis, it can be assumed that if the lower income groups are given the opportunity to participate in outdoor recreation then the demand becomes self-evident. The danger in this interpretation resides in the assumption that the opportunity will be provided. It is all very well to state; "An increase in the standard of living will result in a larger variety of leisure pursuits by all;"<sup>45</sup> but such optimism must be evaluated in terms of historical fact. Despite projections for continued growth in GNP the redistribution of wealth in society is unlikely to fundamentally change. As long as the present structure of society is retained, outdoor recreation patterns will be interpreted in terms of the same socio-economic criteria.<sup>46</sup>

If we assume that a goal of recreation policy is "equal opportunity" for participation in public recreation facilities, then the question becomes, "can proper compensation be determined and allocated accordingly?" A weakness of demand analysis, however resides in its treatment of equity as a residual problem. Seckler argues:

"... it is implicit in the arguments of the market groups that enough could be "saved" through the greater "efficiency" of the market in recreation to "compensate" those who would be unable to pay for the use of these facilities for their losses."<sup>47</sup>

The fact is, the implicit suggestions of economists advocating compensation for those who are unable to pay have not been heeded. If the compensation test is applied and pareto optimality is to be achieved, then some people will be made better off without anyone being made worse off.

Within the context of the present socio-economic framework, it is apparent that the equity problem pertaining to public outdoor recreation is partially exacerbated by the the maldistribution of recreation areas in relation to population centres. Therefore, it is suggested that re-evaluation of the objectives and priorities of recreation policy is required in order to achieve a more equitable distribution of recreation facilities. One proposal suggests that the provision of urban parks may offset the maldistribution of recreation areas located in the periphery. A system of parks provided within and/or nearby metropolitan centres may provide one way of satisfying a greater proportion of the recreation demands of the total population. Further, a network of outdoor recreational facilities could regulate demand along capacity guidelines by filtering off the less specialized recreational pursuits within the regional parks. Opposition to this proposal, however, originates from two sources. First, the cost for providing regional parks within or near to metropolitan areas is often prohibitive. A comparison between the incremental benefits and the incremental costs can be a major deterrent. Secondly, the political realities associated with such a proposal dictate that it has been more politically expedient in the past to provide and

maintain the more remote recreation areas.

## VI. CONCLUSION

In conclusion, the preceding discussion asserts that the travel-cost technique underestimates demand since attendance is indicative of only those recreationists who are willing to pay. Acceptance of recreation demand based upon willingness to pay is interpreted as tacit approval for the exclusion principle to be applied to a public good. The model in particular and demand in general are further criticized on the basis that there is a lack of understanding involving the relationship between the demands for outdoor recreation and the supply of recreation areas. The use of questionnaire and or interview surveys to complement demand analysis identifies the interpersonal preferences of users and nonusers (total recreation demand) of outdoor recreation facilities. Therefore, deviation from traditional demand analysis - such as preference studies - will contribute to a decision making framework.

It is the author's contention that the equity problem is exacerbated by the existing maldistribution of recreation facilities. The travel-cost technique exaggerates this distortion since it tends to justify more expenditures in the periphery than in the metropolitan centres. To date, the attention of public policy and recreation research has been primarily focused upon the more specialized recreation areas and activities to the detriment of less privileged income groups residing in urban environments. It

is conceivable that many "potential" recreationists have become isolated within their urban environments without a reasonable means for expressing their demands for outdoor recreation. One proposal suggests that this social location problem can be partially remedied through the provision of urban parks.

FOOTNOTES

1 Charles J. Cicchetti, "Some Economic Issues in Planning Urban Recreational Facilities", Land Economics, Vol. 47, No. 1, Feb., 1971, P. 14.

2 ORRRC Study Report Number 21, Characteristics of Outdoor Recreational Behavior of Metropolitan Residents, United States Government Printing Office, Washington D.C., P. 42.

3 David Mercer, "Recreational Behavior and Regional Park Planning", Australian Parks, May, 1970, P. 15.

4 Cicchetti, op. cit., P. 21.

5 Ibid., P. 14.

6 H.D. Sessoms, "An Analysis of Selected Variables Affecting Outdoor Recreation Patterns", Social Forces, Vol. 42, No. 1, 1963, P. 113.

7 Robert K. Davis, "Recreation Planning as an Economic Problem." Natural Resources Journal, Vol. 3, No. 2, 1963, P. 242.

8 R.J. Daiute, "Methods for the Determination of the Demand for Outdoor Recreation", Land Economics, Vol. 42, No. 3, 1966, P. 336.

9 Paul Davidson, F.G. Adams and Joseph Seneca, The Social Value of Water Recreational Facilities Resulting from an Improvement in Water Quality: The Delaware Estuary, "in Water Research, (ed.) Allen W. Kneese and Stephen C. Smith, John Hopkins Press, Baltimore, 1965, Pp. 184-6 and John V. Krutilla, Conservation Reconsidered, Resources for the Future, Reprint Number 67, Washington, D.C., 1967, P. 780. These articles comment upon the extent or the value of "option demand" as a function of the degree of irreversibility of the resource in question. A more specific example can be found in Anthony D. Scott, "The Valuation of Game Resources: Some Theoretical Aspects," Canadian Fisheries Reports, Report Number 4, Ottawa, Department of Fisheries, 1965, P. 42, Scott comments upon the value of wildlife resources which have a "state" value as well as a "use" value. Therefore, in terms of recreation demand unvisited or unexploited resources are not necessarily worthless but have some intrinsic value associated with the uniqueness of the resource.

10 Paul Davidson, et al., loc. cit.

11 M. Clawson and Jack L. Knetsch, "Outdoor Recreation Research: Some Concepts and Suggested Areas of Study," Natural Resources Journal, Vol. 3, No. 2, 1963, P. 257, and Robert Davis, "Recreation Planning as an Economic Problem," Natural Resources Journal, Vol. 3

No. 2, 1963, P. 241. These authors contend that the intangibles associated with recreation are reflected by what people are willing to pay. In this sense, outdoor recreation is not considered unlike other goods and services. Leonard Merewitz, "Recreational Benefits of Water Resource Development", Water Resources Research, Vol. 2, No. 4, 1966, Pp. 625-6. Merewitz emphasizes that not all recreation benefits are intangible and consequently some benefits can be measured in money terms. The problem becomes one of incorporating these intangible benefits within the overall evaluation of demand.

12 E. Boyd Wennergren, "Valuing Non-Market Priced Recreational Resources", Land Economics, Vol. 40, No. 3, 1964, P. 304; Merewitz, op. cit., P. 626; J.L. Knetsch and Robert K. Davis, "Comparison of Methods for Recreation Evaluation", in Water Research, editors Allen V. Kneese and Stephen C. Smith, John Hopkins Press, Baltimore, 1965, P. 126.

13 Frederic O. Sargent, "A Resource Economist Views a National Area", Journal of Soil and Water Conservation, Jan. - Feb., 1969, P. 9. Sargent maintains that the orthodox and Resource economists evaluate scarcity in different ways. The orthodox economist evaluates scarcity through the market mechanism whereas the resource economist bases scarcity upon scientific evaluation with the determination of the use of resources through the political process.

14 Marion Clawson, Methods of Measuring the Demand for and Value of Outdoor Recreation, Resources for the Future, Reprint Number 10, Washington, 1959, P. 13.

15 Merewitz, op. cit., P. 627.

16 Scott, op. cit., P. 28.

17 Loc. cit.

18 Peter Pearse, "A New Approach to the Evaluation of Non-Priced Recreational Resources", Land Economics, Vol. 44, No. 1, 1968, Pp. 89 - 90.

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20 Marion Clawson, R. Bumell Held, Charles H. Stoddard, Land for the Future, John Hopkins Press, Baltimore, 1960, P.185.

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22 Jack B. Ellis and Carlton S. Van Doren, "A Comparative Evaluation of Gravity and System Theory Models for Statewide Recreational Traffic Flows", Journal of Regional Science, Vol. 6, No. 2, 1966, P. 58.

23 Brian Thompson, "Recreational Travel; A Review and Pilot Study", Traffic Quarterly, Vol. 21, 1967, P. 540.

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26 ORRRC Study Report Number 20, Participation in Outdoor Recreation: Factors Affecting Demand Among American Adults, Government Printing Office, Washington, D.C., P. 8; Jack L. Knetsch, "Assessing the Demand for Outdoor Recreation", Journal of Leisure Research, Vol. 1, No. 1, 1969, P. 86.

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28 David W. Seckler, "On the Uses and Abuses of Economic Science in Evaluating Public Outdoor Recreation", Land Economics, Vol. 42, No. 3, 1966, P. 489.

29 Davis, Op. Cit., P. 242.

30 Merewitz, op. cit., P. 639.

31 Ibid., P. 626-7.

32 ORRRC Study Report Number 20, op. cit., P. 27.

33 Seckler, op. cit., P. 488.

34 Ibid., P. 485.

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36 Ibid., P. 492.

37 Loc. cit.

38 Brian Rodgers, "Leisure and Recreation", Urban Studies, Vol. 6, No. 3, 1969, P. 369-70.

39 Scott, op. cit., P. 33

40 Ibid., P. 35.

41 Davis, loc. cit.

42 Leslie M. Reid, "Utilizing User Preferences in Predicting Outdoor Recreation Demand", Recreation Research, National Recreation and Park Association, New York, 1966, P. 90.

43 Scott, op. cit., P. 37.

44 Sessoms, op. cit., P. 114.

45 Ibid., P. 115.

46 Rodgers, op. cit., P. 382. Rodgers questions whether society will retain its present structure, or an facsimile thereof, for the next twenty-five years. He suggests significant alterations in our society which amount to (nothing less than) political and structural change in our national economy.

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THE INDUSTRIAL GROWTH OF METROPOLITAN TORONTO  
BETWEEN 1949 AND 1958: ANALYSIS AND OBSERVATIONS

by

WAYNE EDWARD DICKINSON

B.A., University of British Columbia, 1966

AN EXTENDED ESSAY SUBMITTED IN PARTIAL FULFILMENT  
OF THE REQUIREMENTS FOR THE DEGREE OF  
MASTER OF ARTS  
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FEBRUARY 1973

APPROVAL

Name: Wayne Edward Dickinson

Degree: Master of Arts

Title of Extended Essay: The Industrial Growth of Metropolitan  
Toronto Between 1949 and 1958: Analysis  
and Observations.

Examining Committee:

Chairman: E. J. Hickin

---

G. P. F. Steed  
Senior Supervisor

✓ T. O'Riordan

---

R. C. Brown

---

S. Sydneysmith  
External Examiner  
Assistant Professor  
Simon Fraser University, Burnaby

Date Approved: \_\_\_\_\_

ABSTRACT

The purpose of this paper is to examine the pattern of structural change for manufacturing industries located in Metropolitan Toronto between 1949 and 1958. By combining Stilwell's modified shift-share technique and an industrial classification procedure we can identify the industries which most significantly affected Toronto's industrial structure and outline their respective locational factors. Shift share is a non-statistical standardization technique not a regional growth model. As such, it does not explain the causes of regional growth. It provides an orderly and descriptive procedure for disaggregating the varying growth rates of a region's industrial sectors. Employment growth was disaggregated into three components; regional share, proportionality shift, and differential shift. The industrial classification procedure categorizes industries according to stage of resource input and type of market. Industries are classified as either first stage, second stage, or indirect resource users that produce for non-final or final markets. The component shifts of the major shift industries are interpreted in terms of the input-output characteristics associated with their industrial grouping.

Toronto's industrial growth was generally attributed to a favourable mix of fast-growth industries. The differential shift proved to be less significant. However, it appears that the iron and steel, transportation equipment, and tobacco products industries,

in particular, benefitted from favourable access characteristics. Major employment gains occurred in those industries which were resource users of indirect significance producing for non-final markets. Particularly large shifts were experienced by the metal fabricating industries which includes; fabricated metal products, machinery (except electrical), electrical machinery, and transportation equipment industries. As intermediate fabrication industries, they possess strong intra-industry relationships on the input and the output side of the market. The shift components suggest that agglomeration factors and accessibility to regional and national markets proved to be the significant location factors. It was concluded that Toronto's industrial profile became increasingly specialized in higher levels of fabrication industries.

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## I. INTRODUCTION

This paper analyzes the general pattern of structural change for manufacturing industries in Metropolitan Toronto during the period 1949 to 1958, a decade of considerable growth.<sup>1</sup> The main intent of this paper is to identify those industries which contributed most to the changing metropolitan structure and make a broad assessment of their locational pressures. The analysis, however, is limited by the relatively short period of inquiry resulting in some difficulty in differentiating between alteration and fluctuation in employment. Therefore, further insight into those observations regarding the nature of industrial change in Toronto were provided by examining the findings of Duncan and Leiberson who studied the manufacturing growth of major metropolitan centres in the United States between 1900 and 1960.<sup>2</sup>

The methodology employed relies primarily upon a synthesis of the shift-share technique as modified by F. J. B. Stilwell and an industrial classification procedure. Shift-share relates shifts in the industrial composition of the region against a weighted set of national parameters. The industrial classification procedure, an acknowledged short-hand method based on the input-output characteristics of a region's industrial profile, categorizes each industry according to stage of resource use and type of market. By combining the shift-share technique and this industrial classification procedure we can identify the industries which most significantly affected Toronto's industrial structure and outline their respective locational factors. This paper examines whether the direction of regional industrial change was orientated

towards increased specialization or towards a filling in of the industrial base through a reduction of deficits for particular industries.

## II. METHODOLOGICAL CONSIDERATIONS

### A. The Shift-Share Technique

Regional industrial growth is a complex process which is the culmination of many forces. Shift-share is a non-statistical standardization technique frequently used in the analysis of regional growth. As a framework for analysis, shift-share is limited to the description of the general pattern of regional change for a designated period of enquiry based upon a unit of measurement such as employment data. The technique is not a model of regional growth. Rather, it is;

"...a useful way of making an initial analysis of regional growth, it is not an end in itself. Its purpose is more that of a framework for further analysis".<sup>3</sup>

It is a comparative-static technique which is incapable of explaining the causes of regional growth.<sup>4</sup> Nevertheless, it provides a descriptive and orderly procedure for disaggregating the varying growth rates of a region's industrial sector or sectors (vertical analysis) or the sectoral performance of a region or group of regions (horizontal analysis).

This paper is concerned with the vertical analysis of Metropolitan Toronto's manufacturing industries. Manufacturing employment growth is disaggregated into three components; regional share (national growth) component, proportionality shift (industry mix), and the differential shift (competitive component).

The regional share component (R) relates regional growth to the national growth rate. Regional share indicates the rate at which the regional industrial sector would have grown assuming

a regional growth rate equivalent to the growth of total manufacturing in the nation.

The proportionality shift (P) or industry mix component identifies that portion of regional growth which can be attributed to the region's share of national growth or declining industries. It is a structural component which partially indicates the incremental growth attributed to the region's specialization in nationally fast-growth or declining industries. It has been suggested that a favourable industry mix (positive sign) will provide employment growth by virtue of the region's specialization in national fast-growth industries. Conversely, an unfavourable industry mix (negative sign) is attributed to the region's specialization in nationally static or declining industries.

The differential shift (D), or competitive component, compares the incremental growth attributed to each industry in the region with respect to its national counterpart. A positive sign suggests that the regional industry grew faster than its comparative growth rate at the national level. It has been assumed that a positive differential shift indicates that the region has gained some measure of advantage (i.e. external economies, market orientation, cheap labour supply, etc.) vis-a-vis the nation. A negative sign suggests the exact opposite.

The interpretation of the shift components involves many difficulties. First, as Perloff et al point out, the potential for regional growth does not reside solely on the basis that a region contains growth industries.<sup>5</sup> It is possible that a region

may grow if it contains the growing parts of a generally declining industry. Alternatively, a region may grow if it attains a greater share of a nationally declining industry. This is a question of level of disaggregation.

A second limitation is attributed to the interdependence between the proportionality and differential shifts.<sup>6</sup> Stilwell asserts that the effects of inter-industry linkages and secondary multiplier effects will underestimate the industry mix component. In other words, the size of the differential shift is partially a function of the region's industry mix. A region's growth or decline cannot be interpreted simply in terms of the magnitude and direction of the industry mix and competitive components. Stilwell proposes that this limitation can be partially remedied if the proportionality shift is regarded, "...as a minimum estimate of the effect on employment growth of industrial mix."<sup>7</sup> This proposal is limited, however, to cases where the differential shift is large relative to the proportionality shift. The proportionality shift is assumed the primary contributor to a region's growth differentials only when the proportionality shift is large relative to the differential shift.

A further difficulty involves the interpretation of the differential shift. As a residual component remaining after the regional share and the proportionality shifts have been isolated the forces responsible for this component are not readily identified. Stilwell argues:

"...by reflecting such a diversity of effects, the differential shift ceases to be of any value in the identification of factors responsible for regional growth differentials."<sup>8</sup>

The differential component requires a different type of analysis.

Perloff et al point out:

"The differential effect arises out of the fact that some regions gain, over time, a differential advantage (vis-a-vis other regions) in their access to important markets and inputs for each of one or more specific activities. An understanding of this effect involves an understanding of regional input-output relationships for specific activities and sources of their changing form. One must become deeply involved in location analysis."<sup>9</sup>

Another criticism is that the shift components are not invariant with disaggregation. The fineness of the industrial classification will affect the relative magnitude of the proportionality and differential shifts. With finer levels of disaggregation the differential component will converge towards zero. Consequently, the appropriate level of disaggregation depends on the intended use of the information organized by the shift-share technique.<sup>10</sup>

A further source of criticism is that changes in industrial structure which may occur within the period of enquiry are ignored. In order to evaluate the change in industrial composition which occurred during the period of enquiry, Stilwell has modified the shift-share technique by altering the base of analysis. He introduces the reversed proportionality shift (RP) which indicates the net shift calculated from the region's industrial structure at the final year of enquiry.<sup>11</sup> In this way, the standardization procedure is reversed.

The proportionality modification shift (PM) indicates the net shift in industrial composition which occurred during the period of enquiry. It is computed simply as the difference between the reversed proportionality and the proportionality shifts. The identification of the proportionality modification shift removes the net shift in industrial composition which was formerly contained within the differential shift. In addition, Stilwell states that the component has the following properties:<sup>12</sup>

- (1) It serves as an indication of the region's adaptation of its industrial mix relative to the nation.
- (2) It will always be zero for the nation as a whole.
- (3) It permits the industrial sectors to be classified with greater precision.

A positive proportionality modification shift indicates a favourable modification of industrial structure within the region. It indicates that the region's industrial structure has improved through specialization in faster growing employment industries or by decreasing specialization in slower growing or declining employment industries at the national level. Conversely, a negative shift indicates an unfavourable modification of industrial mix for the period of enquiry where the region is specializing in national slower growth or declining industries or diminishing its specialization in national growth industries.

The residual differential shift (RD) is simply the difference between the differential shift and the proportionality modification shift. As such, it possesses the same characteristics as the earlier differential shift.

The methodology for computing the shift share components is indicated in Table I.

Table I. Methodology for Computing Shift-Share Components.

<u>Methodology</u>	<u>Employment</u> <u>1949 - 1958</u>		<u>Percentage</u> <u>Change</u>
Total Manufacturing	a	b	W
Industry X(i) (National)	c	d	X
Industry X(i) (Regional)	e	f	Y

1. (R) Regional Share =  $e(b/a) - e$  or  $W.e$
2. (P) Proportionality Shift =  $e(d/c - b/a)$  or  $e(X-W)$
3. (D) Differential Shift =  $F - e(d/c)$  or  $e(Y-W)$
4. (RP) Reversed Proportionality Shift =  $f(a/b-c/d)$
5. (PM) Proportionality Modification Shift =  $RP-P$
6. (RD) Residual Differential Shift =  $D-PM$

---

Shift share analysis conceptualizes regional growth in terms of a national standard. Deviance from this benchmark is systematically identified by the technique in terms of the proportionality and differential shifts. The summation of these components comprises the net shift (NS) which describes the total change attributed to the region. Since Stilwell's modified shift-share technique has described additional components the net shift can be expressed as follows;

$$NS = P + D$$

$$\text{However; } P = RP - PM$$

$$D = PM + RD$$

Therefore;

$$\begin{aligned} NS &= RP + RD \\ &= P + PM + RD \end{aligned}$$

The total shift (TS) is obtained by combining the net shift and the regional share component. It is expressed as:

$$\begin{aligned} TS &= R + P + PM + RD \\ &= R + NS \end{aligned}$$

The total shift indicates the actual growth experienced by the region.

#### B. Industry Classification Procedure

This comparative analysis of Metropolitan Toronto's manufacturing industries is based on eighty-nine three digit (S.I.C.) industries. These industries are categorized according to stage of resource use and type of market.<sup>13</sup> Although the classification is rudimentary it does provide an additional method for the comparison and interpretation of the shift-share components. Hence, an attempt is made to synthesize the growth components computed from shift-share analysis within the framework of this additional industrial classification system.

This analysis is concerned with three stages of resource inputs for manufacturing industries. The "first stage resource users" are distinguished by their relatively high degree of dependence on raw material inputs. These are processing industries which include among others; various food packing and processing, tobacco and products, and various non-metallic metal products

industries. The "second stage resource users" are primarily dependent upon the outputs of the first stage resource users. Industries included within this classification are; textile products, clothing products, chemical products, non-ferrous metal products, furniture, and bakery products industries. Lastly, the "resource users of indirect significance " group refers to industries which are indirectly dependent upon the output from resource extractors or first stage resource users. The major industries included within this category are: metal fabrication, electrical apparatus, printing and publishing, transportation equipment, and miscellaneous manufacturing industries. The "second stage" and "indirect users" of resources are labelled fabricating industries since they depend predominantly upon processed or semi-fabricated inputs.

Industries may also be categorized according to market orientation. In this analysis, the output market for each industry is allocated between non-final and final consumption. It is realized that the distinction between the two is arbitrary since the term "market" can vary significantly between industries. Nevertheless, the distinction is made on the following criteria. An industry is defined as producing for the final market if a minimum of fifty per cent of the output is consumed and/or invested in consumer durable products. Alternatively, an industry that produces less than fifty percent of its output for final demand is defined as producing for a non-final market. At this stage it is assumed that the Canadian industries are sufficiently similar

in their input-output patterns that the schema of Duncan et al. can be followed.

The industrial classification system based upon stage of resource used and type of market classifies the manufacturing industries according to the following categories:

<u>Resource Use</u>	<u>Type of Market</u>	
	<u>Non-Final</u>	<u>Final</u>
First Stage	1NF	1F
Second Stage	2NF	2F
Indirect Significance	XNF	XF

In this way, each industry is categorized within a sixfold industrial classification system.

### III. ANALYSIS AND OBSERVATIONS

#### A. Discussion of the Shift-Share Components in terms of the Major Locational Characteristics.

Toronto has occasionally been referred to as, "...the biggest boom town in the Northern Hemisphere."<sup>14</sup> The growth of new industry has been of such magnitude that it prompted at least one editor to comment;

"What officials of the Department of Planning and Development (Province of Ontario) and indeed citizens generally should be considering is whether we can hope to build a healthy economy in Ontario if Toronto continues to attract almost half of the new industries, including a great many of the larger ones."<sup>15</sup>

Between 1949 and 1958, the manufacturing industries in Metropolitan Toronto experienced an 11.8% growth rate compared to a 10.1% increase for Canadian manufacturing as a whole. The total increment of 20,529 jobs in Toronto industries represents 17.3% of the net increase for Canadian manufacturing employment.

In 1949, 61% of the manufacturing employment in Toronto was concentrated in five industries; iron and steel, food and beverages, clothing products, printing and publishing, and electrical apparatus. Within the following decade the proportion of the regional labour force employed in these industries barely changed. (Table II) Nevertheless, between 1949 and 1958, significant employment shifts occurred within this group. The iron and steel industry experienced a substantial 27.9% increase (7325 employees) which represented 46.3% of the industry's national growth rate. Conversely, the 19.1% decline experienced by the apparel industries (-4557 employees) represented 50.2% of the decline of its national counterpart.

DISTRIBUTION OF TORONTO AND CANADIAN MANUFACTURING EMPLOYMENT

BY MANUFACTURING GROUPS: 1949-1958

MANUFACTURING GROUPS	<u>1949</u>			REGIONAL CONTRIB. TO NATIONAL EMPLOYMENT	<u>1958</u>			REGIONAL CONTRIB. TO NATIONAL EMPLOYMENT		
	<u>TORONTO</u>	<u>% OF REGION EMPLOYMENT</u>	<u>CANADA</u>		<u>% OF REGION EMPLOYMENT</u>	<u>CANADA</u>	<u>% OF CANADA EMPLOYMENT</u>			
FOOD & BEVERAGES	25551	13.99	170024	14.51	15.02	28483	13.94	190445	14.76	14.95
TOBACCO & PROD.	201	.11	10686	.91	1.88	551	.27	10319	.80	5.33
RUBBER GOODS	6016	3.29	20729	1.76	29.02	4906	2.40	19943	1.54	24.60
LEATHER PROD.	3997	2.19	34900	2.97	11.45	3140	1.54	30151	2.33	10.41
TEXTILE PROD.	5771	3.16	77773	6.64	7.42	5632	2.76	63472	4.92	8.87
CLOTHING PROD.	23833	13.04	117752	10.05	20.23	19276	9.44	108676	8.42	17.73
WOOD PRODUCTS	6592	3.06	121632	10.38	5.41	7833	3.83	120922	9.38	6.47
PAPER PRODUCTS	8180	4.48	76471	6.52	10.69	10373	5.08	92935	7.20	11.16
PRINTING & PUBL.	19055	10.43	61834	5.27	30.81	22196	10.87	72221	5.60	30.73
IRON & STEEL	26250	14.37	163622	13.97	16.04	33575	16.44	179440	13.91	18.71
TRANSPORTATION	6330	3.47	104750	8.94	6.04	9700	4.75	125976	9.76	7.69
NON-FERROUS METAL	8337	4.56	44698	3.81	18.65	8164	4.00	51301	3.97	15.91
ELECTR. APPARATUS	16806	9.20	55916	4.77	30.05	19421	9.51	74944	5.81	25.91
NON-METALL. MIN.	2856	1.56	28139	2.40	10.14	4470	2.19	40838	3.16	10.94
PETROLEUM PROD.	2299	1.26	14552	1.24	15.79	2501	1.22	17427	1.35	14.35
CHEMICAL PROD.	10273	5.62	41328	3.52	24.85	11300	5.53	54570	4.23	20.70
MISC. INDUSTRIES	<u>10367</u>	<u>5.67</u>	<u>26401</u>	<u>2.25</u>	<u>39.26</u>	<u>12732</u>	<u>6.23</u>	<u>36002</u>	<u>2.79</u>	<u>35.36</u>
TOTAL MANUFACTURING	182714	100.00	1171207	100.00	15.60	204253	100.00	1289602	100.00	15.83

TABLE II

## Source:

- a. Canada, Dominion Bureau of Statistics, The Manufacturing Industries of Canada, 1949 and 1958, Section G, Geographical Distribution.
- b. \_\_\_\_\_, The Manufacturing Industries of Canada, 1949 and 1958, Section A, Summary for Canada.
- c. Appendix, Pp. 42 to 53.

TABLE III  
COMPARISON OF TORONTO AND CANADIAN MANUFACTURING EMPLOYMENT GROWTH RATES  
BY MANUFACTURING GROUPS: 1949-1958

	<u>TORONTO</u>		<u>CANADA</u>		REGIONAL GROWTH AS A PERCENT OF THE NATIONAL GROWTH RATE 1÷3=5*
	EMPLOYMENT GROWTH 1	PERCENT CHANGE 2	EMPLOYMENT GROWTH 3	PERCENT CHANGE 4	
FOOD & BEVERAGES	2932	11.48	20421	12.01	14.36
TOBACCO PRODUCTS	350	174.13	- 367	- 3.43	- 95.36
RUBBER GOODS	-1110	-18.45	- 786	- 3.79	141.22
LEATHER PRODUCTS	- 857	-21.44	-4749	-13.61	18.04
TEXTILE PRODUCTS	- 139	- 2.41	<b>-14301</b>	-18.39	.97
CLOTHING PRODUCTS	-4557	-19.12	-9076	- 7.70	50.20
WOOD PRODUCTS	1241	18.83	- 710	- .58	-174.78
PAPER PRODUCTS	2193	26.81	16464	21.52	13.31
PRINTING & PUBLISHING	3141	16.48	10387	16.79	30.23
IRON & STEEL	7325	27.90	15818	9.66	46.30
TRANSPORTATION	3370	53.24	21226	20.26	15.87
NON-FERROUS METALS	- 173	- 2.08	6603	14.77	- 2.62
ELECTRICAL APPARATUS	2615	15.56	19028	34.03	13.74
NON-METALLIC MINERALS	1614	56.51	12699	45.13	12.70
PETROLEUM PRODUCTS	202	8.79	2875	19.76	7.02
CHEMICAL PRODUCTS	1027	10.00	13242	32.04	7.75
MISCELLANEOUS INDUSTRIES	<u>2365</u>	<u>22.81</u>	<u>9601</u>	<u>36.37</u>	<u>24.63</u>
TOTAL, MANUFACTURING	21539	11.78	118395	10.11	18.19

\*Positive sign indicates that the regional employment change was in the same direction as the national trend. A negative sign indicates that the regional employment change was opposite to the national trend.

TABLE III

Source: See TABLE II

TABLE IV

SUMMARY OF SHIFT-SHARE ANALYSIS FOR TORONTO MANUFACTURING GROUPS

	<u>R</u>	<u>P</u>	<u>PM</u>	<u>RD</u>	<u>NS</u>	<u>TS</u>
FOOD & BEVERAGES	2583	623	- 59	- 214	350	2933
TOBACCO & PRODUCTS	20	- 27	- 63	420	330	350
RUBBER GOODS	608	- 836	192	-1074	-1718	-1110
LEATHER PRODUCTS	404	- 948	165	- 478	-1261	- 857
TEXTILE PRODUCTS	584	-1645	-141	1063	- 723	- 139
CLOTHING	2410	-4245	866	-3588	6967	-4557
WOOD PRODUCTS	666	- 990	867	698	575	1241
PAPER PRODUCTS	827	933	- 47	1307	2193	3020
PRINTING & PUBLISHING	1926	1273	-117	58	1214	3140
IRON & STEEL	2654	205	13	4452	4670	7324
TRANSPORTATION EQ.	640	643	45	2043	2731	3371
NON-FERROUS METAL	843	-1236	82	138	-1016	- 173
ELECTRICAL APPARATUS	1699	4020	-872	-2232	916	2615
NON-METALLIC MINERALS	289	1046	- 33	313	1326	1615
PETROLEUM PRODUCTS	232	222	- 98	- 154	- 30	202
CHEMICAL PRODUCTS	1039	2253	-536	-1727	- 10	1029
MISCELLANEOUS MANUFACTURING	<u>1048</u>	<u>2722</u>	<u>-495</u>	<u>- 910</u>	<u>-1317</u>	<u>2365</u>
TOTAL	18472	4013	-231	115	3897	22369

Source: See Table II

Employment growth in Metropolitan Toronto was primarily explained by the proportionality shift (Table III). This suggests that Toronto's industrial growth was generally attributable to a favourable mix of growth industries. Further, growth of the iron and steel, transportation equipment, and the tobacco products industries were explained by the differential shift, suggesting that these industries grew faster than their comparative growth rates at the national level. It is implied that these industries gained some measure of regional advantage in terms of access to important inputs or market outlets.

These were the major components of Toronto's industrial growth at the 2 digit S.I.C. level. To analyze regional structural change, however, it is preferable to examine the internal structure of manufacturing industries at the 3 digit S.I.C. level. In the following sections the identification of the growth differentials (proportionality and differential shifts) and an outline of the locational characteristics is conducted within the context of the industrial classification scheme mentioned earlier.

### 1. First Stage Resource Using Industries

Between 1949 and 1958, approximately 15% of Toronto's industrial growth occurred in the first stage resource using industries. Although the first stage, non-final and final market industries experienced growth rates of 25.9% and 17.8% respectively, they did not play a major role in the region's industrial growth. Only a limited number of industries experienced substantial employment gains.

The growth of the first stage, non-final market category was dominated by the concrete products and the pulp and paper industries. The employment gains by these industries were largely explained by the proportionality shift, an indication that the region benefitted from a favourable industrial mix in 1949. The large proportionality shifts for these industries suggest that the high income elasticities of demand for their products may have contributed to their regional growth. The fact that the concrete products industry is closely associated with the prosperity of the construction industry during this period while the demand for paper increased dramatically at the end of World War II, partially confirms this assumption.

The first stage, final market category consists of food processing industries. Employment gains for this resource - market category were largely explained by the residual differential component, suggesting that this group benefitted from favourable access characteristics. The large differential shifts for the butter and cheese, fruit and vegetable preparations, and tobacco

TABLE V

EMPLOYMENT GROWTH FOR METROPOLITAN TORONTO, 1949 TO 1958; ACCORDING TO SHIFT-SHARE COMPONENTS, DEFINED BY STAGE OF RESOURCE USE AND TYPE OF MARKET.

<u>FIRST STAGE, NON-FINAL MARKET CATEGORY</u>	<u>TOTAL SHIFT</u>	<u>PROPORTION- ALITY SHIFT</u>	<u>PROPORTIONAL- ITY MODIFICA- TION SHIFT</u>	<u>RESIDUAL DIFFEREN- TIAL SHIFT</u>	<u>NET SHIFT</u>
	(TS)	(P)	(PM)	(RD)	(NS)
PULP & PAPER MILLS	327	149	- 8	70	211
CLAY PRODUCTS	24	20	- 4	- 39	- 23
CONCRETE PRODUCTS	792	839	-133	26	732
ALL OTHER NON-MET.	198	- 45	- 18	222	159
FEEDS, STOCK, POULTRY	- 63	79	- 27	-172	-120
STONE PRODUCTS	- 88	- 28	8	-124	-144
MISC. NON-MET. PROD.	-164	- 7	5	-188	-190
	<u>1026</u>	<u>1007</u>	<u>-177</u>	<u>-205</u>	<u>625</u>
<u>FIRST STAGE, FINAL MARKET CATEGORY</u>	<u>(TS)</u>	<u>(P)</u>	<u>(PM)</u>	<u>(RD)</u>	<u>(NS)</u>
BREWERIES	47	-165	- 2	109	- 58
BUTTER AND CHEESE	517	-314	- 80	727	333
FRUIT & VEGET. PREP.	559	- 27	- 6	473	440
MISC. FOOD PREP.	260	39	- 3	25	61
SAUSAGE & CASINGS	189	133	6	37	176
SLAUGHTERING & MEAT	437	714	-147	-619	- 52
TOBACCO & PRODUCTS	350	- 27	- 63	420	330
WINES	- 21	- 25	4	- 14	- 35
ALL OTHER FOOD IND.	- 92	- 3	112	-330	-221
	<u>2246</u>	<u>325</u>	<u>-179</u>	<u>828</u>	<u>974</u>

<u>SECOND STAGE, NON-FINAL MARKET CATEGORY</u>	<u>(TS)</u>	<u>(P)</u>	<u>(PM)</u>	<u>(RD)</u>	<u>(NS)</u>
PRODUCTS OF PETROLEUM & COAL	202	222	- 98	-154	- 30
MISCELLANEOUS TEXTILES	219	181	- 24	- 29	128
BOXES & BAGS	811	778	-121	-241	416
MISC. PAPER GOODS	1055	-156	- 24	918	738
BRASS & COPPER PRODUCTS	13	-347	18	89	-240
INKS	137	198	- 44	- 75	79
MISC. CHEMICAL PRODUCTS	312	406	- 90	- 68	248
PAINTS, VARNISHES & LACQUERS	397	-125	- 8	345	212
ALL OTHER CHEMICALS	398	585	-130	-237	218
WOOLEN YARN	- 118	-322	- 34	157	-199
ALL OTHER TEXTILE PRODUCTS	- 240	-1216	- 80	643	-653
MISC. WOOD PRODUCTS	- 86	-164	10	8	-146
SASH, DOOR, PLANING MILLS	- 14	-122	11	- 12	-123
ALL OTHER WOOD INDUSTRIES	- 13	-230	- 10	130	-110
CASTINGS, IRON	- 817	-598	188	-624	-1034
ALUMINUM PRODUCTS	- 97	56	- 14	-311	-269
WHITE METAL ALLOYS	- 46	-360	- 23	206	-177
	<u>2113</u>	<u>-1214</u>	<u>-473</u>	<u>745</u>	<u>-942</u>

SECOND STAGE, FINAL MARKET CATEGORY

	<u>(TS)</u>	<u>(P)</u>	<u>(PM)</u>	<u>(RD)</u>	<u>(NS)</u>
BREAD AND PRODUCTS	1027	113	4	353	462
CHILDREN'S CLOTHING	241	- 37	295	- 95	163
CORSETS	125	53	- 6	- 16	31
FURNITURE	1354	273	11	669	953
TOILET PREPARATIONS	174	230	- 47	- 89	94
CONFECTIONARY PRODUCTS	- 678	- 648	127	- 582	-1103
CARBONATED BEVERAGES	- 27	- 166	12	10	- 144
BISCUITS	- 223	- 359	40	- 69	- 388
MEN'S FACTORY	- 513	-1380	91	82	-1207
WOMEN'S FACTORY	-2020	-1623	408	-1552	-2767
FUR GOODS	- 706	- 854	105	- 147	- 896
HATS AND CAPS	- 205	- 279	37	- 78	- 320
MISCELLANEOUS CLOTHING	- 477	171	- 80	- 689	- 598
HOSIERY	- 333	- 321	73	- 182	- 430
KNITTED GOODS	- 669	- 771	125	- 291	- 937
SOAPS, WASHING COMPOUNDS	- 103	- 79	15	- 70	- 134
	<u>-3033</u>	<u>-5677</u>	<u>1202</u>	<u>-2746</u>	<u>-7221</u>

<u>INDIRECT, NON-FINAL MARKET CATEGORY</u>	<u>(TS)</u>	<u>(P)</u>	<u>(PM)</u>	<u>(RD)</u>	<u>(NS)</u>
LITHOGRAPHING	349	- 23	- 1	232	208
PRINTING AND BOOKBINDING	1808	772	- 52	295	1015
PRINTING AND PUBLISHING	959	395	- 39	- 41	315
PUBLISHING, PERIODICALS	85	187	- 42	- 184	- 39
TRADE COMPOSITION	244	163	- 1	49	211
BOILERS, TANKS, PLATEWORK	132	232	- 46	- 299	- 113
BRIDGE BUILDING, STRUCTURAL	2411	872	189	1255	2316
HARDWARE, TOOLS, CUTLERY	283	- 3	0	23	20
MACHINE SHOPS	26	56	- 11	- 110	- 65
MACHINERY, HOUSEHOLD, OFFICE	1677	- 393	-324	2163	1446
MACHINERY, INDUSTRIAL	1319	-1117	-151	1859	591
MISC. IRON AND STEEL PRODUCTS	990	890	- 82	81	889
SHEET METAL PRODUCTS	679	299	- 32	- 69	198
WIRE AND WIRE GOODS	378	61	30	253	344
ALL OTHER TRANSPORTATION EQUIPMENT	4071	431	304	3026	3761
MISC. NON-FERROUS PRODUCTS	242	307	- 65	- 56	186
MISC. ELECTRICAL PRODUCTS	809	852	-144	- 376	332
TELECOMMUNICATION EQUIPMENT	3150	3953	-922	- 149	2882
GLASS & GLASS PRODUCTS	852	148	185	458	791
INSTRUMENTS AND RELATED PRODUCTS	1133	2406	-470	-1081	855
SIGNS, ELECTRIC, NEON, AND OTHER	566	464	- 4	76	536
RUBBER GOODS	-1110	- 836	192	-1074	-1718
ALL OTHER LEATHER	- 65	- 241	100	- 1	- 142
ENGRAVING, STEREOTYPING	- 304	- 286	57	- 154	- 383
MOTOR VEHICLE PARTS	- 701	- 287	85	- 829	-1031
BATTERIES	- 622	- 114	57	- 707	- 764
MACHINERY, HEAVY ELECTRICAL	- 274	- 377	62	- 495	- 810
MEDICINAL, PHARMACEUTICAL	- 288	- 132	32	- 421	- 521
	<u>18799</u>	<u>8679</u>	<u>-1093</u>	<u>3724</u>	<u>11310</u>

<u>INDIRECT, FINAL MARKET CATEGORY</u>	<u>(TS)</u>	<u>(P)</u>	<u>(PM)</u>	<u>(RD)</u>	<u>(NS)</u>
MUSICAL INSTRUMENTS	141	41	1	63	105
TOYS AND GAMES	596	360	8	147	515
HEATING, COOKING APPARATUS	1047	- 182	- 90	1151	879
REFRIGERATORS, VACUUMS, APPLIANCES	- 448	150	- 51	- 822	- 723
FOOTWEAR, LEATHER	- 86	- 314	15	53	- 246
MISC. LEATHER GOODS	- 706	- 487	173	- 558	- 872
JEWELLERY AND SILVERWARE	- 285	- 776	- 33	292	- 517
FOUNTAIN PENS, PENCILS	- 224	- 108	40	- 220	- 288
LAMPS, ELECTRIC, LAMP SHADES	- 54	3	- 1	- 115	- 113
PLASTIC PRODUCTS	- 350	1002	-615	- 885	- 498
SPORTING GOODS	- 121	- 27	7	- 186	- 206
ALL OTHER MISCELLANEOUS INDUSTRIES	- 253	- 485	51	- 26	- 460
	<u>- 743</u>	<u>- 823</u>	<u>-495</u>	<u>-1106</u>	<u>-2424</u>

## Source:

- a. Canada, Dominion Bureau of Statistics, The Manufacturing Industries of Canada, 1949 and 1958, Section G, Geographical Distribution.
- b. \_\_\_\_\_, The Manufacturing Industries of Canada, 1949 and 1958, Section A, Summary for Canada.
- c. Appendix, Pp. 42 to 53.

products industries in particular, alludes to the importance of favourable accessibility to agricultural inputs and final markets. The input-output characteristics of food processors are such that they are neither resource-orientated nor market-orientated. The spatial source of these agricultural inputs tends to be influenced by problems of perishability and weight-loss incurred in processing. Market accessibility cannot be underestimated since a major portion of the final output for the food processing industries are destined for final markets. The high association between population and manufacturing employment in the food and beverages industry substantiates the importance of market accessibility.<sup>16</sup>

## 2. Second Stage Resource Using Industries

The 7% growth rate experienced by the second stage, non-final market group was primarily the result of the regional performance of specialized industries. Despite a total shift of 2113 employees, total growth attributable to the region (net shift) was negative at -942 employees. The negative net shift indicates that the employment losses experienced in the declining sectors, as indicated by the proportionality shift, outweighed the upward differential shifts in the industry group. The negative proportionality shift suggests that Toronto's second stage, non-final market industries largely consisted of an unfavourable mix of nationally declining or slow growth industries in 1949, and as indicated by the negative proportionality modification shift, continued to deteriorate between 1949 and 1958. Nevertheless, significant employment gains occurred in the miscellaneous paper goods, boxes and bags, and various sectors of the chemical industry.

The second stage, non-final market industries assemble and manufacture products for intermediate markets within the region. The input-output characteristics of these industries tend to emphasize their intra-industry absorption, reflecting access to intermediate inputs and manufacturing markets. The positive differential shift tends to emphasize the importance of these access characteristics. Moreover, the agglomeration of manufacturing activities in Metropolitan Toronto and its environs appears to offer a partial explanation for the specialization of this industry group.

The employment shifts of this resource-market group were largely explained by the proportionality shift. The characteristics of these industries suggest that income elasticity of demand and sector substitution were important factors contributing to their regional performance. The high income elasticity of demand for products produced by the boxes and bags and the catch all group of chemical industries may have contributed to their positive proportionality shifts. On the other hand, the low income elasticity of demand for products of the textile and iron castings industries appears to explain their negative proportionality shifts. Sector substitution resulting from technological advancements - new fabrication techniques, materials, and products - probably contributed to the decline of the iron castings and wood products industries while having the opposite effect upon the chemical industry.

The 7% decline experienced by the second stage, final market industries resulted in the second largest shift (-3033 employees) in regional employment. These losses were mainly attributable to the decline of the apparel industry. The negative proportionality shift suggests that the region suffered from specialization in a nationally declining industry. The fact that most sectors of the apparel industry declined faster in the region than in the nation resulted in : (a) a positive proportionality modification shift which indicates an improvement in the region's industrial mix by virtue of its declining share of a nationally declining industry; and (b) a negative differential shift which suggests

that the access characteristics associated with Toronto deteriorated during the period of enquiry. The interpretation of the location factors outlined by the shift components is assumed analogous to the apparel industry in the United States, where the apparel industry had a mixed orientation. The external economies provided by major fashion centres tended to have a polarizing effect whereas the trend toward lower wage areas resulted in a process of decentralization for certain sectors of this industry.<sup>17</sup> The latter usually occurs in the least style conscious sectors of the apparel industry (i.e. men's and boys' clothing) which are more readily adaptable to standardized production. However, the specific causes of the employment shifts and the locational factors associated with the apparel industries in Canada remains an area for further research.

### 3. Resource Users of Indirect Significance

The indirect non-final market industries played a dominant role in Toronto's industrial growth. The 25.2% increase in employment totalled 18,799 employees, of which, a net shift of 11,310 employees was attributable to regional growth. In 1958, approximately 50% of Toronto's manufacturing labour force was employed in this industry group. Table V illustrates that this group accounted for the largest number of industries, total employment, and absolute employment gains.

The major employment shifts occurred in the metal products industries which includes; fabricated metal products, machinery (except electrical), electrical machinery, and transportation equipment industries. In 1958, they accounted for approximately 25% of the total manufacturing employment in Toronto. Individually, they were among the fastest growth industries in terms of absolute and percentage growth. Thus the analysis of the shift components and general identification of the general locational characteristics for these industries should provide useful insights into the basis for much of Toronto's growth in this period.

The metal products industries may be orientated towards access to both material inputs and markets although they are probably not dominated by either.<sup>18</sup> They are termed intermediate industries, and as such, they possess strong intra-industry relationships on the input and output side of the market. It appears that accessibility to inputs is less important in the explanation of employment shifts in relation to other factors.

"they find their best location orientation within an agglomerated complex of activities (a) because of the important intra-industry ties, (b) because of the important external economies that attend clustering and specialization in an urban complex, and (c) because these are often industries for which internal scale economies are important, and which are orientated more to national markets than to regional markets."<sup>19</sup>

It is suggested that agglomeration factors were a major locational factor for the following metal product industries: all other transportation equipment; machinery, household and office; wire and wire goods; hardware, tools and cutlery; and industrial machinery. The importance of the residual differential shift in employment growth and the increased concentration of these industries in Toronto suggests that internal scale economies and favourable access to agglomeration economies were important location factors.

Market accessibility is also an important locational factor. Concentration in a large regional market with superior over-all access to national and sub-national markets is deemed advantageous.<sup>20</sup> In 1954, it was estimated that approximately 44% of Canada's purchasing power was concentrated within a hundred mile radius of Toronto.<sup>21</sup> Toronto was the geographic distribution centre for eastern and western Canada and the eastern and midwestern United States (six states are located immediately south of the border).

Agglomeration economies, however, are not a necessary locational equivalent for the structural metal products industries. The absence of primary iron and steel industries in Toronto precludes their orientation towards resource inputs. These industries tend to be market-orientated. The positive proportion-

ality shift suggests that a high income elasticity of demand for their products contributed to their regional growth. The most notable employment gain occurred in the structural bridge building industry, a result largely attributable to the residual differential component (1255 employees). This suggests that the regional growth of the structural bridge building industry was closely associated with expansion in the construction industry.

Changes in the significance of agglomeration economies tend to be characteristic of the electrical apparatus industry. In the earliest development stages of this industry sector the importance of research and development necessitates the availability of highly skilled workers, subcontractors capable of providing specialized services, and communication between suppliers and manufacturers.

"Uncertainty in techniques tends to attract them towards metropolitan areas where they can best operate on a 'hand to mouth' basis, relying upon the flexible space, labor and contracting arrangements available in such areas. Uncertainty of demand precludes extensive advertising and attracts firms to their largest potential local markets."<sup>22</sup>

However, as demand increases and technology becomes more stabilized dependence upon external economies weakens. New industries tend to be fast-growth industries; with the most innovative firms experiencing the fastest growth. As production becomes increasingly standardized - with larger economies of scale - the locational requirements for the industry shift towards intermediate locations between inputs and markets.

Significant employment gains were experienced by the telecommunication equipment industry. Although the industry's regional growth was largely explained by a favourable industrial mix in 1949; there were indications that certain sectors of the industry were gaining maturity as evidenced by negative proportionality and differential shifts.

Substantial employment gains were also experienced by the printing and publishing industry. The industry displayed remarkable stability since approximately 30% of the national employment remained concentrated in Metropolitan Toronto between 1949 and 1958. This is noteworthy since the industry is subject to erratic fluctuations in employment.<sup>23</sup> During the period of enquiry two discernible trends occurred in the printing and publishing industry in Toronto. The commercial printing industry (lithographing, printing and bookbinding, and trade composition) became increasingly specialized whereas the publishing and the printing and publishing sectors became less concentrated in Metropolitan Toronto. The decline in regional specialization experienced by the latter industries appears to be explained by the negative residual differential component suggesting that the regional advantages associated with Toronto may have deteriorated during the period of enquiry. Nevertheless, the employment gains experienced by the printing and publishing industry as a whole were largely explained by the proportionality shift which suggests that these industries generally benefitted from a favourable industrial mix in 1949.

The indirect, final market category experienced the smallest total shift in employment. Employment losses totalled 792 employees, a 4.4% decline between 1949 and 1958. The decrease in the mean level of industry specialization suggests that this group experienced an outward shift in regional employment. Negative proportionality and differential components explain these employment losses. However, analysis of the forces behind the employment shifts remains a topic for further research.

Generalization regarding the characteristics of this resource-market category are difficult to determine since the group is comprised of a heterogenous collection of consumer products industries ranging from toys and games to major household appliances. Nevertheless, several observations are warranted. The abundance of local specialties in this group suggests that Metropolitan Toronto tends to attract new consumer products industries. The influx of new industries can result in substantial employment gains since new consumer products industries experience faster growth in their development stages. These industries are further characterized by standardization resulting from technological maturity. The process of standardization permits industrial decentralization in order to locate closer to growing market areas. The preceding comments suggest that the negative shifts in employment were attributable to a combination of factors including superior access characteristics and gains in labour productivity.

### B. General Pattern of Structural Change

A comparison of Toronto manufacturing employment according to resource-market categories for 1949 and 1958 is summarized in Table VI. The most dramatic employment gains occurred in the indirect resource using industries producing for non-final markets. The 25.2% growth rate for the indirect, non-final market category resulted in employment gains of 18,920 employees (approximately 92% of the total increase for Toronto manufacturing) during the period of enquiry. The share of regional employment in this group increased from 41.2% in 1949 to 46.3% in 1958. Employment shifts for the remaining industry categories were small in comparison.

TABLE VI. Comparison of Toronto Manufacturing Employment, 1949-1958, According to Industry Classifications defined by Stage of Resource Use and Type of Market.

Industry Category	Total Industries	1949	1958	Total Change	Percent Change
		Employment (Relative %)	Employment (Relative %)		
1NF	7	3956 ( 2.17)	4982 ( 2.45)	1026	25.93
1F	9	12573 ( 6.88)	14819 ( 7.29)	2246	17.86
2NF	17	30210 (16.54)	32323 (15.90)	2113	7.00
2F	16	43518 (23.88)	40485 (19.92)	-3033	- 6.97
XNF	28	75197 (41.16)	94117 (46.31)	18920	25.16
XF	12	17235 ( 9.43)	16492 ( 8.12)	- 743	- 4.37
<b>TOTAL</b>	<b>89</b>	<b>182689(100.00)</b>	<b>203218(100.00)</b>	<b>20539</b>	<b>11.78</b>

Source: See Table II

Relatively large percentage gains were experienced by the first stage, non-final and final market categories. A less substantial

7.0% increase was recorded by the second stage, non-final category. However, the second stage, final and indirect, final market categories suffered employment losses of 7.0% and 4.4% respectively.

Consideration of the level of industry specialization provides further insight into Toronto's industrial structure. The location quotient is the criterion used here for determining industry specialization. Industries with location quotients greater than or equal to 1.50 are arbitrarily defined as "specialized industries". Conversely, industries with location quotients less than 1.50 are defined as "non-specialized industries".

TABLE VII. Level of Industry Specialization according to Resource-Market Categories for 1949 and 1958.

Industry Category	1949				1958			
	Specialized Industries		Total Industries		Specialized Industries		Total Industries	
	Industry Mean Total	L.Q.	Industry Mean Total	L.Q.	Industry Mean Total	L.Q.	Industry Mean Total	L.Q.
1NF	2	1.67	7	.99	-	-	7	.61
1F	3	2.93	9	.93	-	-	9	.91
2NF	8	2.35	17	1.46	9	1.67	17	1.44
2F	8	2.26	16	1.65	7	2.27	16	1.54
XNF	17	2.49	28	1.85	16	2.32	28	1.76
XF	10	2.65	12	2.34	10	2.24	12	2.02
TOTAL	48	2.48	89	1.54	42	2.43	89	1.38

Source: See Table II

The level of industry specialization remained relatively stable despite a slight decline from 1.54 in 1949 to 1.38 in 1958.

Examination of Table VII reveals that the number of specialized industries for resource-market category tends to increase with higher levels of fabrication. Local specialties in the indirect resource using categories accounted for approximately one-half of Toronto's specialized industries. Further, local specialties in the first stage resource using categories disappeared between 1949 and 1958. A comparison of the level of industry specialization (i.e. number of specialized industries and mean location quotients for resource-market category) between 1949 and 1958 suggests that the local specialties were less prominent in the industrial structure of Metropolitan Toronto.

A comparison between employment shifts for the specialized and non-specialized categories by resource-market category illustrates the important role local specialties played in Toronto's industrial growth (Table VIII). The specialized industries experienced larger absolute and percentage employment

Table VIII. Comparison of Employment Shifts for Specialized and Non-Specialized Industries between 1949 and 1958; According to Resource-Market Categories\*

Industry Category	SPECIALIZED INDUSTRIES		NON-SPECIALIZED INDUSTRIES		TOTAL	
	Total Shift	Percentage Change	Total Shift	Percentage Change	Total Shift	Percentage Change
1NF	--	--	1026	25.93	1026	25.93
1F	--	--	2246	17.86	2246	17.86
2NF	2371	14.23	- 258	- 1.83	2113	7.00
2F	- 2080	-14.42	- 953	- 3.28	- 3003	- 6.97
XNF	11801	23.72	7219	28.38	18920	25.16
XF	- 307	- 2.16	- 436	-14.32	- 743	- 4.37
TOTAL	11685	12.30	8844	10.09	20539	11.78

Source: See Table II

\* Level of industry specialization defined according to 1958 location quotients.

gains than the non-specialized industries. Employment gains for the specialized industries occurred in nontraditional industries (second stage, non-final and indirect, non-final market industries) whereas the non-specialized industries experienced gains in the processing industries (first stage, non-final and final market industries) in addition to the indirect, non-final market industries. Examination of Table VIII reveals that some measure of industrial diversification occurred with the decline of the second stage, final market category and the growth of the processing industries. These losses did not appear to be distinctive since the apparel industries were declining nationally. On the other hand, the impact of the processing industries upon Toronto's industrial structure proved insignificant in comparison to the growth of the indirect, non-final market industries.

An appraisal of the employment shifts reveals that the largest gains were generally attributable to the construction and fabrication industries. The significant employment gains experienced by machinery, household and office; all other transportation equipment; industrial machinery; and telecommunication equipment industries emphasize the newness of many of the local specialties in the indirect, non-final market category in general and the newness of certain industries in this category conveys the general character of industrial growth in Toronto between 1949 and 1958.

Reference to the findings of Duncan and Leiberson concerning the nature of industrial change in major metropolitan centres in the United States tends to reaffirm these observations pertaining

to the industrial growth of Toronto. Two noteworthy observations are: (a) the ranking of centres according to level of industry specialization - as indicated by the location quotient - suggested a degree of stability for manufacturing as a whole, and (b) a certain continuity in the character of local industries according to resource use and type of market.<sup>24</sup> By analogy, this suggests that severe fluctuation in manufacturing employment and/or disruption in the characteristics associated with most industries in this period were generally absent from manufacturing as a whole. Further, Duncan and Leiberson ascertained that manufacturing growth in metropolitan centres may result from increasing their share of more traditional lines of manufacture and by capturing new lines of manufacture. The latter was concluded to be the more significant.

"An emphasis on the location of activities new in the national economy rather than on the redistribution of ongoing activities seems appropriate for understanding shifts over time in the relative sizes of established centres and the entry of new centres into the ranks of established centres."<sup>25</sup>

This appears to be the case for Metropolitan Toronto which captured a disproportionate share of new manufacturing activities in the indirect, non-final market category.

#### IV. CONCLUSION

The first stage of the analysis, using the shift-share technique, determined that Toronto's industrial growth was largely explained by the proportionality shift. The region generally benefitted from a favourable mix of fast-growth industries. The residual differential component proved less important in the explanation of regional industrial growth. Significant differential shifts did occur, however, in structural bridge building; machinery, household and office; industrial machinery; all other transportation equipment; heating, cooking apparatus; and miscellaneous paper goods, suggesting that these industries benefitted from favourable access characteristics.

The second stage of the analysis categorized industries according to resource use and type of market. It provided a method for identifying the general characteristics associated with those industries included in each resource-market group. It was concluded that the indirect, non-final market category played a dominant role in Toronto's industrial growth whereas substantial employment losses were experienced in the second stage, final market category. The remaining resource-market categories experienced less substantial employment shifts.

Toronto's manufacturing labour force became increasingly concentrated in the indirect, non-final market group. Their strong regional growth appeared to be explained by favourable proportionality and differential shifts suggesting the importance of agglomeration economies and accessibility to growing regional

and national markets. The major employment shifts occurred in the metal products industries. As intermediate industries they possess strong intra-industry relationships; subsequently, the gains explained by the differential shifts tend to emphasize the demands necessitated by intra-industry absorption.

Employment shifts for the remaining industry categories had less overall impact upon Toronto's industrial structure. Employment gains experienced by the processing industries (first stage, non-final and final market categories) resulted in some measure of regional diversification. For these industries, accessibility to regional markets appeared to be the major locational factor. The employment losses experienced by the consumer products industries (second stage, final and indirect, final market categories) were more significant. The major losses occurred in the second stage, final market category were primarily attributable to the decline of the apparel industry. However, since the apparel industry was a nationally declining industry, the losses were not distinctive but resulted in a relative improvement in the region's industrial mix.

In conclusion, Toronto's industrial profile became increasingly specialized in higher levels of fabrication industries. The concentration of employment in the indirect, non-final market category in general combined with significant gains for the "new" industries appears to characterize the industrial growth of Metropolitan Toronto during the period 1949 to 1958.

NOTES TO APPENDIX A AND B

The breakdown of Metropolitan Toronto and Canadian manufacturing employment (1949 and 1958) for industries at the two digit and three digit Standard Industrial Classification (S.I.C.) levels, was obtained from the Dominion Bureau of Statistics (DBS). Since the shift-share components are invariant for different levels of aggregation it was necessary to compute each component for all manufacturing groups (2 digit S.I.C. level) and industries (3 digit S.I.C. level).

Shift-share analyzes regional growth for a designated period of enquiry by examining the regional growth rates in comparison to a weighted set of national industries. The analysis is based upon a comparison of similar aggregates such that the national benchmark (Canada) must correspond to the regional mix of industries (Toronto). The national industries not located in Toronto during 1949 to 1958 are identified:

- Fish and Processing
- Sugar Refining
- Gloves and Mittens (fabric)
- Veneer and Plywood
- Primary Iron and Steel
- Non-ferrous Metal, Smelting and Refining
- Gypsum Products
- Lime
- Salt
- Miscellaneous Products from Petroleum and Coal

The absence of these industries from Metropolitan Toronto necessitated their exclusion from the appropriate manufacturing groups at the national level.

Further, it was arbitrarily decided that industries which employed less than 500 employees in 1949 to 1958 would be grouped within the "all other industries" sector within a respective manufacturing group unless otherwise specified. Therefore, the designated "catch-all" industrial sectors includes industries in addition to those originally specified by D.B.S. at the regional and national levels. For Appendix A and B, the following industries are included within each designated industry:

- A. Milk pasteurizing; Concentrated Products.
- B. Animal oils and fats; Breakfast foods; Cheese (processed); Distilled liquors; Feed and chopping mills; Macaroni and Spaghetti; Flour products.
- C. Belting; Boots and Shoes; Tanneries; Gloves and mittens.
- D. Automobile accessories (fabric); Bags (cotton & jute); Canvas products; Carpets, Mats and Rugs; Dyeing, finishing of textiles; Oilcloth, Embroidery; Laces, tapes, and bindings; Miscellaneous wool goods; Linoleum and other fabrics; Woolen cloth; Cotton yarn; Mix cotton goods; Synthetic textiles and silk; Narrow fabrics; Cordage, rope and twine.
- E. Clothing contractors (men's and women's); Fur dressing and dyeing; Oiled and waterproofed clothing.
- F. Boxes and baskets; Coffins and caskets; Sawmills; Woodenware; Beekeepers' and poultrymen's supplies; Excelsiors, cooperage; Lasts, trees, and shoe findings; Hardwood, flooring; Woodturning.
- G. Roofing paper.
- H. Agriculture implements; Machine tools.
- I. Railroad and rolling stock equipment; Aircraft and parts; Bicycles and parts; Boat building; Motor Vehicles; Shipbuilding; Miscellaneous Transportation equipment.
- J. Clay products from imported clays; Abrasives, artificial; Asbestos products; Sand-lime brick.

- K. Acids, alkalies, and salts; Adhesives; Gases, compressed; Polishes and dressings; Vegetable oil mills; Fertilizers; Primary plastics; Coal tar distillation.
- L. Clocks, watches; Ophthalmic goods; Orthopedic and surgical appliances.
- M. Artificial flowers and feathers; Brooms, brushes, and maps; Buttons; Hair goods; Ice, manufactured; Pipes and other sinker's supplies; Stamps; Stencils (rubber and metal); Statuary art goods and novelties; Typewriter supplies; Umbrellas; Candles; Misc. products.

APPENDIX A

	<u>METROPOLITAN TORONTO MANUFACTURING EMPLOYMENT</u>		<u>NATIONAL PERCENTAGE CHANGE</u>	<u>REGIONAL PERCENTAGE CHANGE</u>	<u>LOCATION QUOTIENTS</u>	
	<u>1949</u>	<u>1958</u>			<u>1949</u>	<u>1958</u>
FOOD & BEVERAGES						
Biscuits	1628	1405	-11.93	-13.70	1.56	1.51
Bread & Products	5590	6617	-12.14	18.37	1.12	1.17
Breweries	1037	1084	- 5.83	4.53	.76	.84
Butter & Cheese	1825	2342	- 7.12	28.33	.51	.70
Confectionery	4206	3528	- 5.30	-16.72	2.61	2.29
Dairy Products <sup>A</sup>	35	1035	1149.60	2857.14	.04	.58
Feeds, Stock, Poultry	561	498	24.25	-11.23	.66	.47
Fruit & Vegetable Prep.	1169	1728	7.84	47.82	.49	.67
Misc. Food Preparations	1968	2228	12.08	13.21	1.44	1.45
Sausage & Casings	134	323	109.04	141.04	1.16	1.25
Slaughtering & Meat	4830	5267	24.90	9.05	1.50	1.29
Carbonated Beverages	1159	1132	- 4.24	- 2.33	.95	.94
Wines	137	116	- 8.39	-15.33	1.75	1.25
All Other Industries <sup>B</sup>	<u>1272</u>	<u>1180</u>	<u>4.55</u>	<u>- 7.23</u>	<u>.60</u>	<u>.50</u>
TOTAL	25551	28483	12.01	11.48	.94	.99
TOBACCO & PRODUCTS	201	551	- 3.43	174.13	.13	.28
RUBBER GOODS	6016	4906	- 3.79	-18.45	1.94	1.27

	METROPOLITAN TORONTO MANUFACTURING EMPLOYMENT		NATIONAL PERCENTAGE CHANGE	REGIONAL PERCENTAGE CHANGE	LOCATION QUOTIENTS	
	<u>1949</u>	<u>1958</u>			<u>1949</u>	<u>1958</u>
LEATHER PRODUCTS						
Footwear, Leather	1586	1500	- 9.69	- 5.42	.45	.47
Misc. Leather Goods	1649	943	-19.42	-42.81	2.00	1.53
All Other Industries <sup>C</sup>	<u>762</u>	<u>697</u>	<u>-21.48</u>	<u>- 8.53</u>	<u>.67</u>	<u>.72</u>
TOTAL	3997	3140	-13.61	-21.44	.85	.48
TEXTILE PRODUCTS						
Misc. Textiles	899	1118	30.21	24.36	1.96	1.80
Woollen Yarn	808	690	-29.79	-14.60	1.48	1.57
All Other Industries <sup>D</sup>	<u>4064</u>	<u>3824</u>	<u>-19.82</u>	<u>- 5.97</u>	<u>.36</u>	<u>.42</u>
TOTAL	5771	5632	-18.82	- 2.41	.59	.40
CLOTHING						
Children's	786	1027	52.29	30.66	.97	.83
Men's Factory	6867	6354	- 9.99	- 7.47	1.32	1.34
Women's Factory	7390	5370	-11.85	-27.33	1.62	1.31
Corsets	933	1058	15.76	13.40	1.75	1.64
Fur Goods	1875	1169	-35.43	-37.65	1.78	1.72
Hats & Caps	1136	931	-14.43	-18.05	1.55	1.45
Misc. Clothing <sup>E</sup>	1235	758	23.63	-38.62	1.38	.72
Hosiery	962	629	-23.25	-34.62	.54	.44
Knitted Goods (other)	<u>2649</u>	<u>1980</u>	<u>-18.99</u>	<u>-25.25</u>	<u>1.12</u>	<u>2.05</u>
TOTAL	23833	19276	- 7.70	-19.12	1.42	.88

	<u>METROPOLITAN TORONTO MANUFACTURING EMPLOYMENT</u>		<u>NATIONAL PERCENTAGE CHANGE</u>	<u>REGIONAL PERCENTAGE CHANGE</u>	<u>LOCATION QUOTIENTS</u>	
	<u>1949</u>	<u>1958</u>			<u>1949</u>	<u>1958</u>
WOOD PRODUCTS						
Furniture	3967	5321	16.98	34.13	.94	1.06
Misc. Wood Products	590	504	-17.63	-14.58	.86	.85
Sash, Door, Planing Mills	1080	1066	- 1.18	- 1.30	.38	.37
All Other Industries <sup>F</sup>	<u>955</u>	<u>942</u>	<u>-13.98</u>	<u>- 1.30</u>	<u>.09</u>	<u>.10</u>
TOTAL	6592	7833	- .58	18.83	.38	.36
PAPER PRODUCTS						
Boxes & Bags	3905	4716	30.03	20.77	1.97	1.79
Misc. Paper Goods <sup>G</sup>	3131	4186	4.87	33.70	1.72	2.14
Pulp & Paper Mills	<u>1144</u>	<u>1471</u>	<u>23.12</u>	<u>28.58</u>	<u>.13</u>	<u>.14</u>
TOTAL	8180	10373	21.52	26.81	.56	.73
PRINTING & PUBLISHING						
Engraving, Stereotyping	1904	1600	- 4.89	-15.97	2.88	2.51
Lithographing	1389	1738	8.47	25.13	2.30	2.57
Printing, Bookbinding	7851	9659	19.94	23.03	2.28	2.31
Printing, Publishing	6371	7330	16.31	15.05	1.55	1.51
Publishing, Periodicals	1220	1305	25.47	6.97	1.69	1.40
Trade Composition	<u>320</u>	<u>564</u>	<u>61.11</u>	<u>76.25</u>	<u>3.40</u>	<u>3.37</u>
TOTAL	19055	22196	16.79	16.48	1.69	1.93

	<u>METROPOLITAN TORONTO MANUFACTURING EMPLOYMENT</u>		<u>NATIONAL PERCENTAGE CHANGE</u>	<u>REGIONAL PERCENTAGE CHANGE</u>	<u>LOCATION QUOTIENTS</u>	
	<u>1949</u>	<u>1958</u>			<u>1949</u>	<u>1958</u>
<b>IRON &amp; STEEL PRODUCTS</b>						
Boilers, Tanks, Platework	2426	2558	19.67	5.44	2.35	2.04
Bridge Building, Structural	937	2548	103.20	257.31	.83	1.10
Castings, Iron	2148	1331	-17.75	-38.04	.75	.56
Hardware, Tools, Cutlery	2599	2882	9.99	10.89	1.36	1.35
Heating, Cooking, Apparatus	1661	2708	- .85	63.03	1.21	1.97
Machine Shops	905	931	16.29	2.87	.96	.83
Machinery, Household, Office	2282	3959	- 7.12	73.49	1.58	2.92
Machinery, Industrial <sup>H</sup>	7199	8518	- 5.41	18.32	1.23	1.52
Misc. Iron & Steel Products	997	1987	99.43	99.30	1.25	1.22
Sheet Metal Products	4756	5435	16.40	14.28	1.85	1.79
Wire & Wire Goods	<u>340</u>	<u>718</u>	<u>27.93</u>	<u>111.18</u>	<u>.29</u>	<u>.49</u>
TOTAL	26250	33575	10.89	27.90	1.13	1.34
<b>TRANSPORTATION EQUIPMENT</b>						
Motor Vehicle Parts	3263	2562	1.31	-21.48	1.17	.89
All Other Equipment <sup>I</sup>	<u>3067</u>	<u>7138</u>	<u>24.18</u>	<u>132.74</u>	<u>.22</u>	<u>.41</u>
TOTAL	6330	9700	20.26	53.24	.38	.60

	<u>METROPOLITAN TORONTO MANUFACTURING EMPLOYMENT</u>		<u>NATIONAL PERCENTAGE CHANGE</u>	<u>REGIONAL PERCENTAGE CHANGE</u>	<u>LOCATION QUOTIENTS</u>	
	<u>1949</u>	<u>1958</u>			<u>1949</u>	<u>1958</u>
<b>NON-FERROUS METAL PROD.</b>						
Aluminum Products	1704	1607	-13.37	- 5.69	1.86	1.55
Brass & Copper Products	2496	2509	- 3.78	.52	1.70	1.76
Jewellery & Silverware	2287	2002	-23.80	-12.46	2.36	2.65
Misc. Non-ferrous Products	549	791	66.03	44.08	5.00	4.33
White Metal Alloys	<u>1301</u>	<u>1255</u>	<u>-17.59</u>	<u>- 3.54</u>	<u>2.45</u>	<u>2.77</u>
TOTAL	8337	8164	- 4.72	- 2.08	2.19	1.72
<b>ELECTRICAL APPARATUS</b>						
Batteries	1409	787	2.01	-44.14	4.27	2.38
Machinery, Heavy Elect.	5304	5030	3.00	- 5.17	1.75	1.58
Misc. Electrical Products	4719	5528	28.17	17.14	1.54	1.39
Refrig., Vacuums, Appliances	2726	2278	15.61	-16.43	2.40	1.71
Telecommunication Equipment	<u>2648</u>	<u>5798</u>	<u>159.41</u>	<u>118.96</u>	<u>2.32</u>	<u>1.91</u>
TOTAL	16806	19421	34.03	15.56	1.44	1.86
<b>NON-METALLIC MINERAL PROD.</b>						
Clay Prod. (Domestic)	465	489	14.31	5.16	.81	.73
Concrete Products	592	1384	151.96	133.78	.61	.57
Glass & Glass Products	605	1457	34.59	140.83	.72	1.16
Stone Products	553	465	- 5.89	-15.91	1.67	1.35
All Other Industries <sup>J</sup>	387	585	- 1.49	51.15	.38	.58
Misc. Non-Metallic Products	<u>254</u>	<u>90</u>	<u>7.48</u>	<u>-64.57</u>	<u>1.56</u>	<u>.44</u>
TOTAL	2856	4470	46.72	56.51	.49	.95

	<u>METROPOLITAN TORONTO MANUFACTURING EMPLOYMENT</u>		<u>NATIONAL PERCENTAGE CHANGE</u>	<u>REGIONAL PERCENTAGE CHANGE</u>	<u>LOCATION QUOTIENTS</u>	
	<u>1949</u>	<u>1958</u>			<u>1949</u>	<u>1958</u>
PRODUCTS OF PETROLEUM & COAL	2299	2501	19.76	8.79	.84	.92
CHEMICALS & ALLIED PROD.						
Inks	580	717	44.18	23.62	5.17	4.38
Medicinal, Pharmaceuticals	2308	2020	4.41	-12.48	1.26	1.58
Misc. Chemical Products	638	950	73.70	48.90	.58	.48
Paints, Varnishes, Lacquer	1834	2231	3.30	21.65	1.96	2.27
Soaps, Washing Compounds	2342	2239	6.74	- 4.40	4.13	3.67
Toilet Preparations	793	967	39.13	21.94	3.07	2.61
All Other Industries <sup>K</sup>	<u>1778</u>	<u>2176</u>	<u>43.03</u>	<u>22.38</u>	<u>.79</u>	<u>.66</u>
TOTAL	10273	11300	32.04	10.00	1.21	1.47
MISC. MANUFACTURING						
Fountain Pens, Pencils	636	412	- 6.80	-35.22	3.00	2.22
Instruments & Related Prod. <sup>L</sup>	2743	4807	97.84	41.31	3.75	3.22
Lamps, Electric, Lamp Shades	578	524	10.67	- 9.34	3.56	2.89
Musical Instruments	359	500	21.44	39.28	2.00	2.18
Plastic Products	1459	1100	78.77	-23.99	3.20	1.35
Signs, Elec., Neon & Other	298	864	165.74	189.93	1.45	1.50
Sporting Goods	845	724	6.91	-14.32	2.71	2.06
Toys & Games	800	1396	55.11	74.50	3.67	3.50
All Other Misc. Industries <sup>M</sup>	<u>2649</u>	<u>2396</u>	<u>- 8.19</u>	<u>- 9.55</u>	<u>1.56</u>	<u>1.71</u>
TOTAL	10367	12732	36.37	22.81	1.85	2.59

APPENDIX B

	<u>TS</u>	<u>R</u>	<u>P</u>	<u>PM</u>	<u>RD</u>	<u>NS</u>
FOOD & BEVERAGES						
Biscuits	-223	165	-359	40	- 69	- 388
Bread & Products	1027	565	113	- 4	353	452
Breweries	47	105	-165	- 2	109	- 58
Butter & Cheese	517	185	-314	- 80	727	333
Confectionery	-678	425	-648	127	-582	-1103
Dairy Products <sup>A</sup>	1000	4	116	548	332	996
Feeds, Stock, Poultry	- 63	57	79	- 27	172	- 120
Fruit & Vegetable Preparation	559	112	- 27	- 6	473	440
Misc. Food Preparations	260	199	39	- 3	25	61
Sausage & Casings	189	14	133	6	37	176
Slaughtering & Meat	437	488	714	-147	-619	- 52
Carbonated Beverages	- 27	117	-166	12	10	- 144
Wines	- 21	14	- 25	4	- 14	- 35
All Other Industries <sup>B</sup>	<u>- 92</u>	<u>129</u>	<u>- 3</u>	<u>112</u>	<u>-330</u>	<u>- 221</u>
TOTAL	2932	2583	623	- 59	-214	350
TOBACCO & PRODUCTS	350	20	- 27	- 63	420	330
RUBBER GOODS	-1110	608	-836	192	-1074	-1718

	<u>TS</u>	<u>R</u>	<u>P</u>	<u>PM</u>	<u>RD</u>	<u>NS</u>
LEATHER PRODUCTS						
Footwear, Leather	- 86	160	-314	15	53	- 246
Misc. Leather Goods	-706	167	-487	173	-558	- 872
All Other Industries <sup>C</sup>	<u>- 65</u>	<u>77</u>	<u>-241</u>	<u>100</u>	<u>- 1</u>	<u>- 142</u>
TOTAL	-857	404	-948	165	-478	-1261
TEXTILE PRODUCTS						
Misc. Textiles	219	91	181	- 24	- 29	128
Woollen Yarn	-118	82	-322	- 34	157	- 199
All Other Industries <sup>D</sup>	<u>-240</u>	<u>411</u>	<u>-1216</u>	<u>- 80</u>	<u>643</u>	<u>- 653</u>
TOTAL	-139	584	-1645	-141	1063	- 723
CLOTHING						
Children's	241	80	- 37	295	- 95	163
Men's Factory	-513	694	-1380	91	82	-1207
Women's Factory	-2020	747	-1623	408	-1552	-2767
Corsets	125	94	53	- 6	- 16	31
Fur Goods	-706	190	-854	105	-147	- 896
Hats & Caps	-205	115	-279	37	- 78	- 320
Misc. Clothing <sup>E</sup>	-477	128	171	- 80	-689	- 598
Hosiery	-333	97	-321	73	-182	- 430
Knitted Goods (other)	<u>-667</u>	<u>268</u>	<u>-771</u>	<u>125</u>	<u>-291</u>	<u>- 937</u>
TOTAL	-4557	2410	-4245	866	-3588	-6967

	<u>TS</u>	<u>R</u>	<u>P</u>	<u>PM</u>	<u>RD</u>	<u>NS</u>
WOOD PRODUCTS						
Furniture	1354	401	273	11	669	953
Misc. Wood Products	- 86	60	-164	10	8	- 146
Sash, Door, Planing Mills	- 14	109	-122	11	- 12	- 123
All Other Industries <sup>F</sup>	<u>- 13</u>	<u>97</u>	<u>-230</u>	<u>- 10</u>	<u>130</u>	<u>- 110</u>
TOTAL	1241	666	-990	867	698	575
PAPER PRODUCTS						
Boxes & Bags	811	395	778	-121	-241	416
Misc. Paper Goods <sup>G</sup>	1055	317	-156	- 24	918	738
Pulp & Paper Mills	<u>327</u>	<u>116</u>	<u>149</u>	<u>- 8</u>	<u>70</u>	<u>211</u>
TOTAL	2193	827	933	- 47	1307	2193
PRINTING & PUBLISHING						
Engraving, Stereotyping	-304	192	-286	57	-154	- 383
Lithographing	349	140	- 23	- 1	232	208
Printing, Bookbinding	1808	794	772	- 52	295	1015
Printing, Publishing	959	644	395	- 39	- 41	315
Publishing, Periodicals	85	123	187	- 42	-184	- 39
Trade Composition	<u>244</u>	<u>32</u>	<u>163</u>	<u>- 1</u>	<u>49</u>	<u>211</u>
TOTAL	3141	1926	1273	-117	58	1214

	<u>TS</u>	<u>R</u>	<u>P</u>	<u>PM</u>	<u>RD</u>	<u>NS</u>
IRON & STEEL PRODUCTS						
Boilers, Tanks, Platework	132	245	232	- 46	-299	- 113
Bridge Building, Structural	2411	94	872	189	1255	2316
Castings, Iron	-817	217	-598	188	-624	-1034
Hardware, Tools, Cutlery	283	263	- 3	0	23	20
Heating, Cooking, Apparatus	1047	168	-182	- 90	1151	879
Machine Shops	26	92	56	- 11	-110	- 65
Machinery, Household, Office	1677	231	-393	-324	2163	1446
Machinery, Industrial <sup>H</sup>	1319	728	-1117	-151	1859	591
Misc. Iron & Steel Products	990	101	890	- 82	81	889
Sheet Metal Products	679	481	299	- 32	- 69	198
Wire & Wire Goods	<u>378</u>	<u>34</u>	<u>61</u>	<u>30</u>	<u>253</u>	<u>344</u>
TOTAL	7325	2654	205	13	4452	4670
TRANSPORTATION EQUIPMENT						
Motor Vehicle Parts	-701	330	-287	85	-829	-1031
All Other Equipment <sup>I</sup>	<u>4071</u>	<u>310</u>	<u>431</u>	<u>304</u>	<u>3026</u>	<u>3761</u>
TOTAL	3370	640	643	45	2043	2731
NON-FERROUS METAL PRODUCTS						
Aluminum Products	- 97	172	56	- 14	-311	- 269
Brass & Copper Products	13	252	-347	18	89	- 240
Jewellery & Silverware	-285	231	-776	- 33	292	- 517
Misc. Non-ferrous Products	242	56	307	- 65	- 56	186
White Metal Alloys	<u>- 46</u>	<u>132</u>	<u>-360</u>	<u>- 23</u>	<u>206</u>	<u>- 177</u>
TOTAL	-173	843	-1236	82	138	-1016

	<u>TS</u>	<u>R</u>	<u>P</u>	<u>PM</u>	<u>RD</u>	<u>NS</u>
ELECTRICAL APPARATUS						
Batteries	-622	142	-114	57	-707	- 764
Machinery, Heavy Electrical	-274	536	-377	62	-495	- 810
Misc. Electrical Products	809	477	852	-144	-376	332
Refrig., Vacuums, Appliances	-448	276	150	- 51	-822	- 723
Telecommunications Equipment	<u>3150</u>	<u>268</u>	<u>3953</u>	<u>-922</u>	<u>-149</u>	<u>2882</u>
TOTAL	2615	1699	4020	-872	-2232	916
NON-METALLIC MINERAL PRODUCTS						
Clay Products (Domestic)	24	47	20	- 4	- 39	- 23
Concrete Products	792	60	839	-133	26	732
Glass & Glass Products	852	61	148	185	458	791
Stone Products	- 88	56	- 28	8	-124	- 144
All Other Industries <sup>J</sup>	198	39	- 45	- 18	222	159
Misc. Non-Metallic Products	<u>-164</u>	<u>26</u>	<u>- 7</u>	<u>5</u>	<u>-188</u>	<u>- 190</u>
TOTAL	1614	289	1046	- 33	313	1326
PRODUCTS OF PETROLEUM & COAL	202	232	222	- 98	-154	- 30
CHEMICALS & ALLIED PRODUCTS						
Inks	137	59	198	- 44	- 75	79
Medicinal, Pharmaceuticals	-288	233	-132	32	-421	- 521
Miscellaneous Chemical Products	312	65	406	- 90	- 68	248
Paints, Varnishes, Lacquer	397	185	-125	- 8	345	212
Soaps, Washing Compounds	-103	237	- 79	15	- 70	- 134
Toilet Preparations	174	80	230	- 47	- 89	94
All Other Industries <sup>K</sup>	<u>398</u>	<u>180</u>	<u>585</u>	<u>-130</u>	<u>-237</u>	<u>218</u>
TOTAL	1027	1039	2253	-536	-1727	- 10

	<u>TS</u>	<u>R</u>	<u>P</u>	<u>PM</u>	<u>RD</u>	<u>NS</u>
MISCELLANEOUS MANUFACTURING						
Fountain Pens, Pencils	-224	64	-108	40	-220	- 288
Instruments & Related Products <sup>L</sup>	1133	277	2406	-470	-1081	855
Lamps, Electric, Lamp Shades	- 54	58	3	- 1	-115	- 113
Musical Instruments	141	36	41	1	63	105
Plastic Products	-350	148	1002	-615	-885	- 498
Signs, Electric, Neon & Other	566	30	464	- 4	76	536
Sporting Goods	-121	85	- 27	7	-186	- 206
Toys & Games	596	81	360	8	147	515
All Other Misc. Industries <sup>M</sup>	<u>-253</u>	<u>268</u>	<u>-485</u>	<u>51</u>	<u>- 26</u>	<u>- 460</u>
TOTAL	2365	1048	2722	-495	-910	1317

FOOTNOTES

1. Refers to Greater Toronto which includes Toronto (city proper) plus the following municipalities: Etibicoke township; Forest Hill, Seaside, Long Beach, Mimico, New Toronto, Scarborough, Swansea, Weston, York township, East York township, and North York township.
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14. Everett Martin, newspaper article in the Christian Science Monitor, Sept. 10, 1958.
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