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SHOPPING CENTRE GROWTH AND THE DECLINE OF THE CENTRAL BUSINESS DISTRICT IN AN URBAN SYSTEM

A Case Study of the Ottawa-Hull Census Metropolitan Area.

Thesis submitted to the School of Graduate Studies of the University of Ottawa in partial fulfillment of the requirements for the degree of Master of Arts in Geography.

by

Joseph B. Lendvay-Zwickl

1977

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CHAPTER I

INTRODUCTION

1.1. The Problem Defined

The hypothesis of this study is that the diffusion of suburban shopping centres in an urban system diminishes the regional retailing strength of the Central Business District. The study focuses on the Ottawa-Hull area and attempts to test the hypothesis through the behaviour of selected retailing "functions" within a fourteen year temporal framework. The term "function" is used in a limited manner in this study and refers only to types of "shopping goods" outlets.[1]

1.2. The Study Area

The Ottawa-Hull area (i.e. the urbanized portion of the Ottawa-Hull Census Metropolitan Area or CMA) was selected for this study as it appeared to lend itself to hypothesis testing for the following reasons: 1) the area experienced a rapid population growth within the last two decades mostly as a direct result of federal government expansion, 2) as a sequel to the population growth, large scale suburbanization of population occured, 3) the area experienced an impressively rapid

1. R.M. Northam defines "shopping goods" outlets as those "retail outlets in which 1) there is usually comparative shopping involved, 2) the individual purchase is of relatively high value, and 3) the purchase is made infrequently": in R.M. Northam, Urban Geography, John Wiley & Sons, Inc., Toronto, 1975, p. 114.

shopping centre diffusion from one centre in 1955 to thirty-four centres by 1974, 4) shopping goods sales in the Central Business District (CBD) have been declining not only as a percentage of total CMA shopping goods sales but also in absolute value. (Hammer et al., 1969). Two other factors, although technically not contributing to the study, may be cited as influencing the selection of the Ottawa-Hull CMA: 1) retailing patterns of the area have not been studied extensively, 2) the author's familiarity with the study area.

1.2.1. The Choice of Spatial Units Within the Study Area

The basic spatial unit of observation for the purpose of this study is the single store and is defined as an establishment that is primarily engaged in buying commodities for resale to the general public for personal or household consumption.[2] Since neither the sizes nor the frontages of stores were available for the early years of the study period, only the function and location of these outlets were considered. To accurately determine the effects of shopping centre diffusion upon the retailing strength of the CBD, the various types of stores considered needed to be identified according to a general location pattern indicating whether their association was with the CBD, suburban shopping centres or other form of retail location which for this study is classed as a "strip retail". These groupings in turn require a definition and delimitation of the CBD and definition of both suburban

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2. Statistics Canada, (Dominion Bureau of Statistics), "Standard Industrial Classification Manual", Ottawa, 1970.

shopping centres and "strip retail". See Appendix A for clarification of boundary selection and Map 1 for outline of area in question.

1.2.2. The CBD

In 1937, Malcolm Proudfoot was perhaps the first to recognize the hierarchy of business centres within a city and identified the CBD as the highest order in his classification of retail structure.[3] Because of its change and dynamic qualities, J. Vance described the CBD in the following manner:[4]

> *"In the past we have called it the central business district but that term is hardly adequate today. There is "central business" all over the city at the same time that there is only one "downtown"."*

Vance disassociates "downtown" from the centrality required by retail functions and his statement is based on the belief that the "downtown" is much more than the CBD which is its subset. This study must focus on and identify this CBD subset which has been simply but adequately defined by R.E. Murphy:[5]

> *"Within the city, the CBD, as the central place of the highest order, functions at the highest level among these business areas. It is able to offer goods and services superior to those of any business area of lesser order."*

While the CBD can be generally recognized within the study area, imposing realistic boundaries around it poses several problems.

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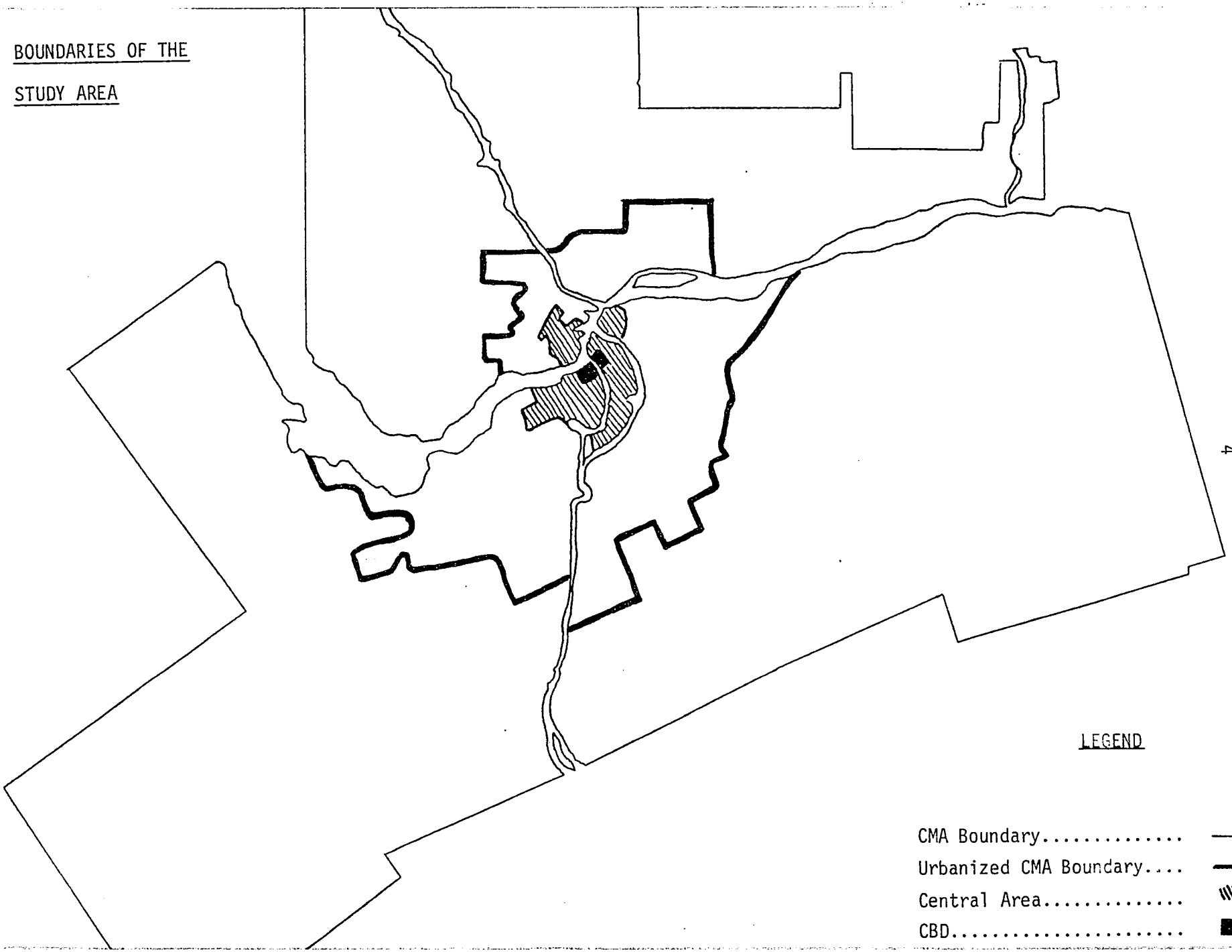
3. Proudfoot, M.G., "City Retail Structure", Economic Geography, No. 13, 1937, pp. 425-428.
4. Vance, J.E., "Focus on Downtown" in Bourne, L.S.(ed), Internal Structure of the City, Oxford University Press, 1971, pp. 119-120.
5. Murphy, R.E., The Central Business District, Aldine-Atherton, Inc., Chicago, 1972, p. 7.

BOUNDARIES OF THE

STUDY AREA



The Ottawa-Hull CBD has been delimited in almost as many ways as there are studies on the subject. In most cases delimitation appears to have been achieved on a somewhat subjective basis, conforming more to the requirements of a particular study than to either established techniques or empirical data. Some studies considered the CBDs of Ottawa and Hull as an entity while others considered them as separate units performing similar functions. It is the author's contention that neither representation is truly valid. Firstly, the two business districts are separated by the Ottawa River and are approximately one mile apart. Secondly, empirical observation suggests that the business district of Hull is a relatively weak retail node and is far from fulfilling a regional function. This is exemplified by the results of a survey undertaken by W.A. Smith and Company Limited in 1972 which showed that about 25% (of total dollar value) of all shopping goods purchases made by Hull area residents occured in the Ottawa CBD. Clearly the CBD of Ottawa-Hull is on the Ontario side of the river.

Instead of utilizing one of the many techniques available to delimit the CBD, the local government's conception of the CBD was adopted for this study for the following reasons: 1) as the study extends over a period of fourteen years, a) delimitation would be almost impossible for the early years due to inaccurate and unavailable data, b) the dynamic character of the CBD would involve several delimitations yielding different boundaries for different time periods which would

necessarily impose severe restrictions on comparison with other subsets of the retail structure, 2) delimitation can only yield an approximate boundary, 3) part of the data base utilized in this study directly pertained to the CBD as recognized by the local authorities.

Therefore, the boundaries of the CBD for the purpose of this study are as follows: King Edward Street on the east, St. Patrick and Wellington on the north, MacKenzie, Commissioner and Bronson on the west and Gloucester and Laurier East on the south. A detailed map of the area is presented in Map 2.

1.2.3. Suburban Shopping Centres

Statistics Canada defines shopping centres as:[6]

> *"A group of stores which are planned, developed and designed as a unit, containing a minimum of five retail establishments (or four retail establishments and a restaurant) in operation during any part of the current year. The centre must have a minimum of 20,000 square feet of usable parking area adjacent to it, and the parking facilities must be free of charge to customers. For shopping centres with paved parking areas of 20,000-50,000 square feet, the ratio of parking area to gross floor area must be 1.5 to one or better. The merchandising development must contain either a grocery and combination store (i.e. a grocery store with sales of fresh meat accounting for 20.0% to 40.0% of total sales), a department store or a chain variety store. While a shopping centre is usually designed as a single project, all establishments do not necessarily have to be leased from a single (private or collective) ownership. A retail establishment may own the building and the land on which it is situated and still be fully integrated with the centre. A shopping centre usually bears a name and, as a rule, matters of common interests to the tenants, such as children's playgrounds, community activites, parking, etc., originate from one authority.*

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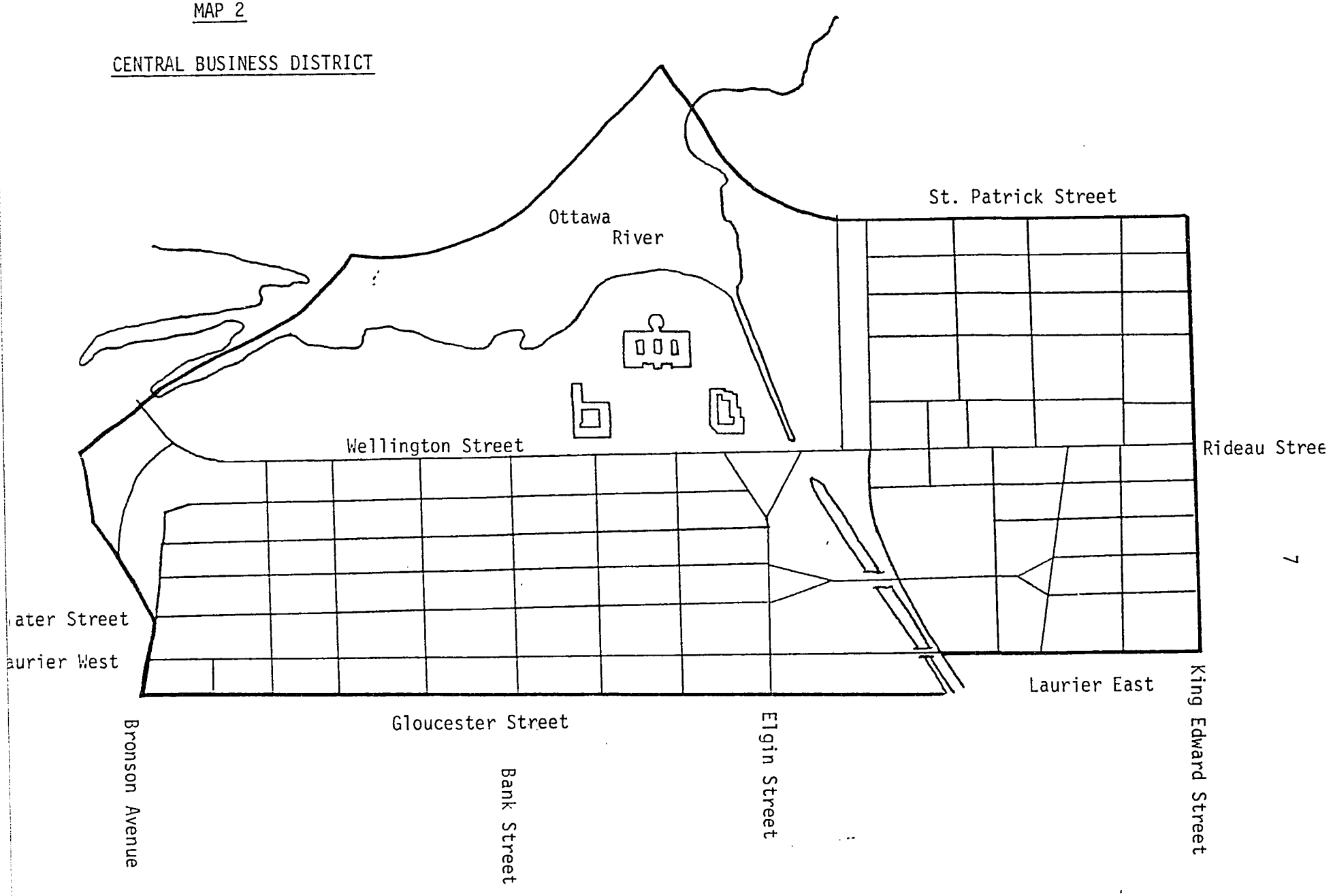
6. Statistics Canada, Merchandising and Services Division, Shopping Centres in Canada, Research Paper No. 1, 5-3413-502, August, 1976, Appendix A.

MAP 2

CENTRAL BUSINESS DISTRICT



This definition is inadequate for this study for at least two reasons: 1) insistance that for a centre to be considered, it must contain a minimum of five units and 2) insistance that certain parking criteria be satisfied. This study will consider centres that are less than five units since a number of them exist within the urban CMA; their impact upon the CBD may be just as effective as that of centres containing five or more units but which may have smaller trade areas. Furthermore, the above parking criteria are irrelevant for the purpose of this study. Whether a centre has sufficient or insufficient parking space in accordance with predetermined criteria or whether a centre charges or does not charge for customer parking has little or no direct bearing upon the impact of that centre upon the CBD.

For the purpose of this study, therefore, a shopping centre is defined as:

> A group of stores which are planned, developed and designed as a unit, containing a minimum of three retail establishments in operation during any part of a given year. The merchandising development must contain either a grocery store and combination store, a department store or a variety store. Furthermore, the centre must be located within the urban CMA but outside the CBD.

1.2.4. Strip Retail

For the purpose of this study, a strip retail is considered to be any retail establishment that is not located in a suburban shopping centre or in the CBD as defined previously. It is recognized that specialized shopping areas, various retail ribbons as well as store

clusters that do not qualify under shopping centre definitions are grouped into this category, however, it was done so purposefully. The study emphasis is on CBD and shopping centre retailing and an overall grouping of "strip retail" was found to adequately satisfy the requirements for hypothesis testing.

1.3. The Study Time Frame

The study time frame selected was from 1961 to 1974 inclusive. This period was chosen specifically for the following reasons: 1) a rapid increase in suburban shopping centre development was noted, 2) a rapid increase in the CMA population together with an increase in the CBD employment occured, 3) data were found to be inadequate and unreliable prior to 1961.

1.4. Data Selection, Sources and Problems

1.4.1. Shopping Goods Outlets

Limitations of data availability allowed the selection of only thirteen functions for this study. These functions are listed below:

1) Department Stores (including full-line, junior and discount)
2) Men's Wear Outlets[7]
3) Women's Apparel Outlets (including fashion and maternity)
4) Children's Wear Outlets

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7. Includes boy's wear also.

5) Shoe Stores
6) Furrier Outlets
7) Furniture Stores (including lighting)
8) Gift Shops
9) Bookstores
10) Jewellery Stores
11) Leather Goods Outlets (including luggage)
12) Sporting Goods Stores
13) Toys and Hobbies Outlets

The number and location of establishments of each function for each year of the study period was determined through the "Yellow Pages" of Bell Canada Telephone Directories and the City Directories. Considerable cross tabulation was required for each establishment to assure their selection only once and under the proper function. For example, a department store may be listed under women's apparel if it happened to specialize in ladies' fashions. The primary source of data was the Yellow Pages. City Directories were found to be incomplete and unreliable and were used only as reference.

1.4.2. Population[8]

1.4.2.1. Population of the Ottawa-Hull CMA

While the trade area population of Ottawa-Hull would have been prefered over the CMA population, the impracticality if not the

8. Use of these "Populations" will be fully discussed in Chapter II.

impossibility of such an exercise over time precluded its determination. The CMA population was therefore accepted as its reasonable alternative. CMA population figures were obtained from Statistics Canada for the years of the study period and were adjusted to conform with the 1971 CMA census boundary which was used as the study base for all years. All population figures are tabled in Appendix B. (See Appendix B for clarification of assumptions on the usage of population parameters.)

1.4.2.2. Population of the Ottawa-Hull Central Area

The Ottawa-Hull Central Area was delimited in accordance with the techniques used by McLemore, Aass and Keilhofer[9] through the age of the housing stock (pre-1946) surrounding the urban core. This method allowed the use of census tracts to determine the Central Area population. (See Map 1)

1.4.2.3. CBD Employment

CBD employment figures were available only for the years of 1961, 1964, 1966, 1969, 1971 and 1974.[10] Employment figures for the intervening years were determined by straight line interpolation.

1.5. Analytical Methodology

1.5.1. Nearest Neighbour Analysis

Nearest neighbour analysis is a quantitative technique that "measures the degree of departure of an observed spatial distribution from a

9. McLemore, R., Aass, C., & Keilhofer, P., The Changing Canadian Inner City, Ministry of State, Urban Affairs Canada, Urban Paper No. A-75-3, Ottawa, 1975.

10. Larry Smith and Company Inc., Economic Prospects of the National Capital Region, Ottawa, Canada, 1963, Prepared for the National Capital Commission; Hammer, Greene, Siler and Assoc., Ottawa Central Area Study, 1969, and unpublished data from the City of Ottawa Planning Department, 1971 and 1974.

random theoretical distribution."[11] The ratio (R) of the observed distribution ($r_{obs.}$) to the theoretical or expected distribution ($r_{exp.}$) indicates the type of spatial pattern. The mathematical expression of this relationship may be written as:

$$R = \frac{r_{obs.}}{r_{exp.}}$$

where $r_{obs.} = \frac{\sum_{i=1}^{n} r_i}{N}$ where each r_i is the straight line distance between any observed point "i" to its nearest neighbour and "N" is the total number of observed points.

and $r_{exp.} = \frac{1}{2\sqrt{p}}$ where "p" is the number of observed points divided by the total area of observation. $r_{exp.}$ therefore, is the expected mean distance "to a nearest neighbour in an infinitely large random distribution of density "p"."[12]

The value of R may vary between zero and 2.1491 where zero would indicate maximum clustering or aggregation of observed points and 2.1491 would signify a hexagonal pattern where each point would be equidistant from six other points.[13] If the value of R is unity, then the observed distribution would be random.

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11. Yeates, M., An Introduction to Quantitative Analysis in Human Geography, McGraw-Hill, Inc., Toronto, 1974, p.33.
12. Ibid., p.34
13. Getis, A., Temporal Land Use Pattern Analysis with the Use of Nearest Neighbor and Quadrat Methods, Michigan State University, Discussion Paper No. 1., July, 1963.

1.5.1.1. Associated Problems of Application

Nearest neighbour analysis is a mechanically simple if tedious tool for the investigation of spatial distributions. A basic problem that has been recognized and one which may considerably influence the derived R values is the size of the area under investigation. As the size of the study area is increased, everything else being equal, it is evident that the corresponding R values will reflect a tendency towards clustering.[14] For this reason Leslie King (1962) placed little significance on the value of R=1.000 as a divider between clustered and regular spacing. Arthur Getis (1963) also recognized the problem and emphasized the selection of "meaningful study areas where spatial bias is minimized".[15] Getis, in his study of grocery stores, minimized the problem of spatial bias by the use of sampling in an area which was smaller than the study area. Using this method, he was able to compare R values of grocery store spacings in an urban area through six different time periods. If sampling is not used (i.e. a sampling area is not required), it is important that the study area not be altered if R value comparisons are to be meaningful between time periods. While spatial bias may not be minimized, the R values will provide a "continuous scale along which progressive changes in locational pattern"[16] will be identified.

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14. Getis, A., p. 4.
15. Ibid., p. 5.
16. Haggett, P., Locational Analysis in Human Geography, London: Edward Arnold (Publishers) Ltd., 1969, p. 232.

1.5.2. Simple Linear Regression Analysis

Simple linear regression analysis is a statistical method whereby the existence of a linear relationship between one dependent and one independent variable may be determined. (Yeates, 1974). The method requires that a relationship be set up between one dependent and one independent variable in such a manner that the sum of the squares of the distances between the "fitted" Ordinary Least Squares (OLS) line and the observation points is a minimum.[17] The OLS line is represented by the equation $Y = a + bX + e$ where Y is the dependent variable, X is the independent variable, "a" and "b" are constant parameters known as regression coefficients and "e" is the error term. (Wonnacott and Wonnacott, 1972). The value of "a" determines the elevation of the regression line along the ordinate when X=0. The value of "b" is the slope of the line and determines the average change in the dependent variable when the independent variable changes one unit.

The measure of the closeness of the fit of the line to the points is derived through the correlation procedure. The correlation coefficient "r" measures the strength of the relationship between the variables and thus provides an estimate of the closeness of alignment of the observed points to the regression line. The coefficient of determination, "r^2" gives a more meaningful interpretation of

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17. Beals, R.E., Statistics for Economists; An Introduction, Rand McNally College Publishing Co., 1972, p.217.

the strength of the relationship than "r" since it gives the percentage of changes of the dependent variable that are "explained" by changes in the independent variable. The value of "r^2" may vary between 0 and 1, where 0 signifies no relationship between the variables and 1 signifies a perfect relationship.

1.5.2.1. Associated Problems of Application

Once the regression line has been derived, it may be of interest to know how closely this line approximates the "true" regression line. Tests of significance are then performed on the regression coefficients "a" and "b" to determine whether or not these values could have occurred by chance. These tests are valid, however, only if the regression line is estimated through a sample and inferences are to be made about the "true" population from the sample population. If the parent population is used to determine the regression line, then clearly the coefficients do not require to be subjected to significance tests as they are now the "true" coefficients.[18]

Often, statistical inference has been confused with statistical description and tests of significance were methodically applied where complete parent population data were available. D.R. Meyer, however, clearly defines the source of this frequent confusion:[19]

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18. Gould, P.,"Is Statistix Inferens the Geographical Name for a Wild Goose?", in Economic Geography, Vol. 46, No. 2., June 1970, pp. 441-442.

19. Meyer, D.R., "Geographical Population Data: Statistical Description not Statistical Inference", in The Professional Geographer, Vol. XXIV, No. 1, February, 1972, p. 27.

"Finally, neglect of the question of scale in geography seems to underlie problems of distinguishing between sample and population. The scale of a study consists of its level of analysis or degree of generalization. Without a rigorous specification of these elements there is no basis for a sound definition of the geographic population. Therefore the distinction between sample and population is obscure at best. In fact, as Harvey has observed, geographers have spent little time specifying their geographic populations. Confusion over the definition of populations probably underlies the confusion over the use of inferential procedures in geography."

A common problem that frequently arises in the application of regression analysis to time series data is serial autocorrelation of the error terms. The problem occurs when the errors are not independent but an error in one period is dependent upon or related to the error in the previous period or periods. As with the tests of significance of regression coefficients, serial autocorrelation becomes a problem only when sampling is used to estimate the regression line and the behaviour of the true or parent population is to be infered from the sample. If the regression analysis is to be viewed as a probability model requiring statistical inference to determine the nature of the parent population, then four basic assumptions must be met to validate the results of the hypothesized relationship.[20] If on the other hand, parent population data are already available, regression analysis may be used as a statistical descriptive tool to formulate a relationship between variables. The rigorous assumptions required for statistical inference may be dropped and the problem of serial autocorrelation eliminated.

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20. These assumptions may be found in any statistical textbook; eg. Beals, R.E., Statistics for Economists, 1972; Wonnacott and Wonnacott, Econometrics, John Wiley and Sons, Inc., Toronto, 1970.

CHAPTER II

CONCEPTUAL FRAMEWORK

2.1. Overview of Functional Hierarchy of Business Centres in an Urban System

2.1.1. Historical Background

At least three distinct yet overlapping stages of evolution of city commercial structure have been identified.[1] The first stage was the pre-1890 era when almost all retail activity was concentrated in the CBD and its immediate vicinity. Exceptions were the corner grocery store and selected service outlets that catered to the local population which was within walking distance of these outlets.

The second stage was characterized by the evolution of outlying business centres at the intersections of mass public transit systems. This stage was a result of advances in transportation technology, specifically the introduction of the street car and the street railway systems.

The third and latest stage in the evolution of city commercial structure began in the late 1930's. Increased personal mobility through the private automobile, coupled with increased purchasing power, modern suburban residential developments, changes in merchandising techniques, changes in personal tastes, increased utilization of zoning in

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1. Vance J., "Emerging Patterns of Commercial Structure in American Cities", in Norborg, K., ed., I.G.U. Symposium in Urban Geography, Lund 1960, (Lund, Gleerup, 1962) p. 485.

development control and increased urbanization of rural populations, were responsible for the rise and success of planned suburban shopping centres, specialized commercial areas and highway oriented ribbons. Increased functional and spatial specialization of retail activities[2] and an increased interdependence between functional and spatial specialization were also results of the above forces.

2.1.2. Presently Perceived Structure

Our most recent concepts of city commercial structure, have, as their roots, the hierarchy of business areas proposed by Malcolm Proudfoot in the late 1930's.[4] Proudfoot recognized five levels in the retail structure which in order of importance were as follows:

1) Central Business District
2) Outlying business centres
3) Principal business thoroughfare
4) Neighborhood business street
5) Isolated store cluster

This hierarchy reflects not only the level of evolution of city retail structure but also the level of evolution of transportation technology at the time.

Presently perceived commercial structure is mainly attributable to the works of B.J.L. Berry, who in his studies of the retail patterns

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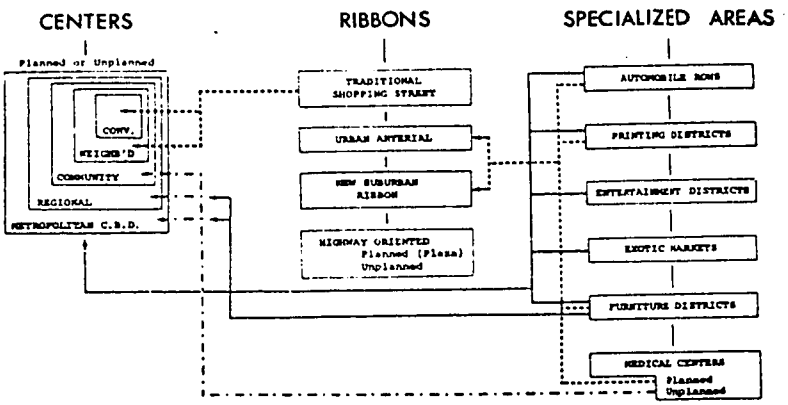
2. Ibid., p. 493
3. Holton, R.H., "Scale, Specialization and Costs in Retailing"(Paper, School of Business, University of California, Berkeley, 1960)
4. Proudfoot, M., "City Retail Structure", pp. 425-428

of Chicago in 1963 recognized a more complex organization of business arrangements than previously realized. Figure 2.1. exhibits Berry's conceptualization.

FIGURE 2.1.

TYPOLOGY OF BUSINESS AREAS



Source: Berry, B.J.L., "Commercial Structure and Commercial Blight". Chicago: Department of Geography Research Paper No. 85, University of Chicago, 1963.

While figure 2.1. reflects more the typology of business areas in a city than their hierarchy, it is evident that a hierarchy exists at least in the various types of planned and unplanned centres. The determination of a universally applicable hierarchy (such as the one established for shopping centres) in ribbon and specialized area developments is a difficult task not only because the sizes, forms and types of ribbons and specialized areas vary greatly from city to city but also because it is difficult to determine their trade areas.

The lines and arrows in figure 2.1. indicate the likely occurrence of similar functions within the typology. For example, a function found on a "traditional shopping street" may also occur in convenience and neighborhood shopping centres. Berry identified four main business groupings as follows: 1) Hierarchy of business centres with the metropolitan CBD leading the hierarchy followed by regional, community, neighborhood and convenience "shopping centres"; 2) Highway-oriented ribbons performing highway oriented functions such as hotels, motels and service stations; 3) Urban arterial commercial developments composed of functions usually associated with "special single-purpose trips". The functions require a certain degree of access to a large segment of the population and often have large space demands for storage, show or service. Berry cites furniture and appliance stores, automobile repair shops, lumber yards and the like as examples of the types of establishments usually expected to locate here; 4) Specialized functional areas generally composed of establishments performing similar functions such as automobile dealerships in automobile rows or related functions such as doctors' offices, medical labs, pharmacies and dental clinics in special medical districts.

It is evident that the hierarchy of business types is not clear. Only business "centres" exhibit an identifiable hierarchy. The complexity of urban retail structure was compounded even more by the findings of Boal and Johnson in their study of commercial ribbons.[5] Their

5. Boal, F.W., and Johnson, D.B., "The Functions of Retail and Service Establishments on Commercial Ribbons", in Bourne, L.S., ed., Internal Structure of the City, Oxford University Press, 1971, pp. 368-379.

findings indicated that ribbon establishments exhibit various degrees of "functional overlap" and each establishment caters to a combination of "passing traffic and nearby residential, industrial and shopping areas".[6] The classification of establishments on ribbons as hierarchic or highway oriented becomes an oversimplification.

A true business hierarchy, if one exists at all, is yet to be found. As Berry noted:[7]

> "....*conventional classification of business types breaks down within the metropolis. One cannot speak simply of an automobile repair garage, but must consider explicitly the range of repair services provided. This range increases, as does the specialization of shops in different parts of the range, as city size increases. This is equally true for most kinds of business. Within the metropolis, scales of business establishments and the multiple shades of specializations of each must be recognized....*"

Vance noted that this complexity of the urban retail structure is a phenomenon dating back to the late 1930's.

One of the effects of this still evolving commercial structure is the decline of the retailing activities in the CBD. This decline is caused by the siphoning effect of shoppers by new commercial developments, especially suburban shopping centres.[8] Vance summarized the result of this siphoning effect on the CBD as follows:

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6. Ibid., p. 379
7. Berry, B.J.L., Geography of Market Centres and Retail Distribution, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1967, pp. 46-47.
8. Berry, B.J.L., and Horton, F.E., Geographic Perspectives on Urban Systems, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1970, pp. 472-473
9. Vance, J., Ibid., p. 497

"....the central business district is changing from mass selling to specialization....its importance today for the metropolis as a whole, is that of specialty area, ...the CBD has become the mass seller to the inner part of the metropolis, the specialty seller to the entire city, and the office area for the region. In turn, the regional integrated centre has become the mass seller to the individual suburb alone, with no other important function" within the field of retailing.

2.2. Shopping Centre Diffusion

2.2.1. Historical Developments

Shopping centres are an American innovation of the twentieth century. While the Roland Park Shop Center built in Baltimore in 1907 is generally recognized as the first shopping centre, the Country Club Plaza near Kansas City, built in 1923, was "...the first of its kind to be situated away from a mass-transportation transfer or terminal point and to cater to automobile traffic."[10] A number of shopping centres were built in the 1930's and their success has been attributed to four retailing innovations: 1) self-service principle, 2) increase in store size, 3) development of chain stores, 4) establishment of department store branches in the suburbs.[11] The depression of the 1930's followed by the Second World War handicapped rapid shopping centre adoption and it was not until the late 1940's that accelerated developments of planned shopping centres occured.[12] The first planned regional shopping centre was developed in Raleigh,

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10. Feinberg, S., "What Makes Shopping Centres Tick", Fairchild Publications, New York, 1960, p. 3.

11. Cohen, Y.S., "Diffusion of an Innovation in the Urban System; the Spread of Planned Regional Shopping Centres in the United States, 1949-1968", University of Chicago, Dept. of Geography, Research Paper No. 140, 1972, p. 28 and Statistics Canada, "Shopping Centres in Canada", Research Paper No. 1, August, 1976, p.7.

12. Cohen, Y.S. Ibid., p. 28.

North Carolina, in 1949; all previous shopping centre developments were relatively small in size and catered only to a small segment of an urban population.[13]

The Park Royal Shopping Centre in Vancouver was the first centre to open in Canada in 1950.[14] Between 1950 and 1956, 64 shopping centres were built in Canada. By 1973, 664 shopping centres were recognized by Statistics Canada and by 1976 the number was well over seven hundred.[15]

This very high rate of growth of shopping centres in Canada was the result of economic and social changes in the country which have precipitated a "ripe" condition for shopping centre adoption. Immediately after the war, Canada experienced a rapid increase in population. Between 1946 and 1951 a 14% increase was registered. Between 1951 and 1973 the population increased from about 14,000,000 to just over 22,000,000, or roughly 58%.[16] The overall population growth, however, was only partly responsible for shopping centre adoption and diffusion in Canada. More significant were the changes in the rural-urban settlement patterns. In 1951, just one year after the opening of the first Canadian shopping centre, approximately 57% of the country's population was urban and 43% was rural. By 1971, this pattern changed to about 76% urban and 24% rural.[17]

Much of the growth in urban populations occurred in the metropolitan areas. As Statistics Canada verified:[18]

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13. Ibid., p. 29
14. Statistics Canada, Ibid., p. 8
15. Statistics Canada, "Shopping Centres in Canada," Series 63-214 annual.
16. Statistics Canada, "Historical Populations", Series 92-702.
17. Statistics Canada, "Shopping Centres in Canada", p. 9

> *"A large percentage of the growth in urban settlement has occurred in the areas surrounding the core cities of Canada's metropolitan areas. Since 1951, the rate of growth in the fringe areas has consistently exceeded that of the core cities by a wide margin. ...the number of suburban dwellers in seventeen metropolitan areas increased by 89.5% between 1951 and 1961, while population in the cities proper rose only 21.1% during the same period. This pattern of growth continued during the 1960's; suburban population in the major Canadian cities grew by 53.5% while dwellers in the city core rose in number by only 17.2%."*

Other important factors such as increased personal mobility through the private car and increased personal incomes also played a significant role in the success story of shopping centre developments in Canada. These factors were touched upon in the beginning of this chapter (Section 2.1.1.) and are part of a complex series of events and innovations that shaped not only shopping centre diffusion patterns and retailing shifts in the market place but also our way of life.

2.2.2. Impact of Shopping Centre Diffusion

M.S. Moyer summarized his recent article on Canadian shopping centres as follows:[19]

> *"...if the significance of an institutional innovation is measured by the speed and success with which it occupies a large place in its environment, then the shopping centre is probably the most significant retailing institution to appear in Canada in half a century."*

Retail sales in Canadian shopping centres have consistently increased since

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18. Statistics Canada, "Shopping Centres in Canada", p. 9.

19. Moyer, M.S., "Shopping Centres in Canada: Their Impact, Anatomy, and Evolution", in The Business Quarterly, Summer 1973, Vol. 38, No. 2., p. 30.

the opening of the first centre. Table 2.1. below illustrates this increase between 1956 and 1973.

TABLE 2.1.

Retail Sales in Canadian Shopping Centres

(in millions of dollars)

1956	1957	1958	1959	1960	1961	1962	1963	1964
233.8	359.6	461.0	617.3	781.6	975.9	1150.0	1315.7	1560.0
1965	1966	1967	1968	1969	1970	1971	1972	1973
1831.9	2100.0	2552.0	2873.2	3320.6	3866.3	N/A	5466.7	6736.5

Source: Statistics Canada, "Shopping Centres in Canada", p. 37.

The force of the impact of shopping centres upon the Canadian retailing scene is even more exemplified when the percent of total retail sales realized in shopping centres is examined. Furthermore, if those trades that seldom occur in shopping centres (motor vehicle dealers, fuel dealers, lumber and building material outlets etc.,) are not considered, the shopping centres' percentage share of the market looks even more "dramatic" as shown in Table 2.2. below:

TABLE 2.2.

Retail Sales in Shopping Centres as a Percent of Total Retail Sales
(Shopping Centres' Percent Share Excluding Seldom Occuring Trades)

1956	1957	1958	1959	1960	1961	1962	1963	1964
1.8	2.6	3.2	4.0	5.0	6.2	6.9	7.4	8.2
(2.3)	(3.4)	(4.1)	(5.2)	(6.3)	(7.8)	(8.7)	(9.5)	(10.4)

1965	1966	1967	1968	1969	1970	1971	1972	1973
8.8	9.5	10.8	11.4	12.3	14.0	N/A	16.0	17.6
(11.4)	(12.1)	(13.7)	(14.4)	(15.4)	(17.0)	(N/A)	(20.2)	(22.4)

Source: Statistics Canada, "Shopping Centres in Canada", p. 37.

The above tables, however only show the impact of shopping centres upon Canadian retailing as a whole. On the provincial level, shopping centres clearly attained a higher degree of market penetration in the "richer" provinces (Ontario, British Columbia, Alberta) as shown in Figure 2.2.. These three provinces also have higher than average purchasing power, population growth and urban concentration.[20]

The greatest impact of shopping centres, as one may expect, is at the metropolitan level. Here occur the greatest concentration of populations and purchasing power and it has been at this level that the greatest population growth has taken place. Table 2.3. clearly shows the degree of metropolitan penetration of shopping centres.

TABLE 2.3.

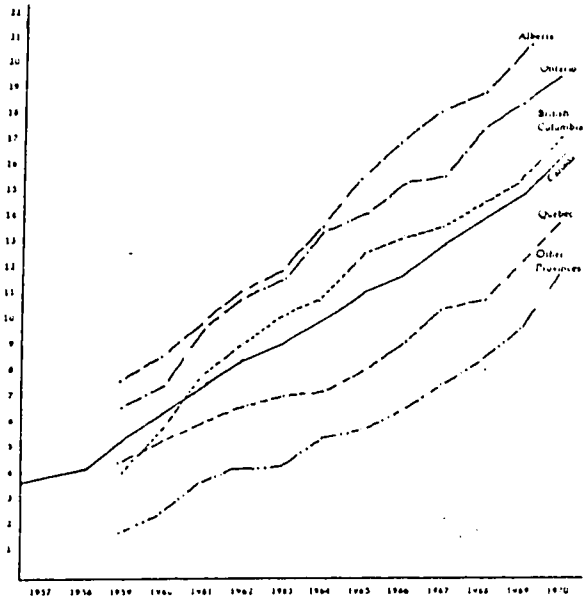
Shopping Centres in Metropolitan Areas, 1973

Metro Area	No. of Centres	Percentage Distribution	
		Shopping Centres	Sales
All Shopping Centres	664	100.0	100.0
Metropolitan Areas	502	75.6	79.9

20. Moyer, M.S., p. 24.

FIGURE 2.2.

SHOPPING CENTER SALES
AS A PERCENTAGE OF TOTAL RETAIL SALES
CANADA AND SELECTED PROVINCES 1957 - 1970



Source: Moyer, M.S., "Shopping Centres in Canada: their Impact, Anatomy and Evolution", in The Business Quarterly, Summer 1973, Vol. 38, No. 2., p. 25.

Table 2.3. (cont'd)

Metro Area	No. of Centres	Percentage Distribution	
		Shopping Centres	Sales
Toronto (Ont.)	132	19.9	21.2
Montreal (Que.)	100	15.1	13.6
Vancouver (B.C.)	45	6.8	7.4
Calgary (Alta.)	31	4.7	4.4
Edmonton (Alta.)	27	4.1	4.6
Ottawa-Hull (Ont.-Que.)	23	3.5	5.2
Quebec (Que.)	22	3.3	3.8
Winnipeg (Man.)	20	3.0	3.4
Hamilton (Ont.)	15	2.3	2.6
Kitchener (Ont.)	14	2.1	2.1
London (Ont.)	12	1.8	1.8
St. Catharines (Ont.)	11	1.7	1.9
Regina (Sask.)	9	1.4	1.0
Victoria (B.C.)	9	1.4	1.6
Saskatoon (Sask.)	8	1.2	0.6
Windsor (Ont.)	8	1.2	1.8
Halifax (N.S.)	6	0.9	1.3
Thunder Bay (Ont.)	6	0.9	1.0
Saint John (N.B.)	4	0.6	0.7

Source: Statistics Canada, "Shopping Centres in Canada", 1973, Catalogue 63-214, Annual.

Of the 664 shopping centres across Canada in 1973, 502 or 75.6% were located in metropolitan areas. Nearly 80% of all shopping centre sales occurred at this level. Toronto and Montreal, Canada's two largest metropolitan areas, had 35.0% of all shopping centres and 34.8% of all shopping centre sales in 1973. Clearly, shopping centres have permeated suburbia especially in the large metropolitan areas. Considering their locational preferences (i.e. in metropolitan areas) and the fact that they account for approximately one seventh of the total retail sales in the country, their impact upon other forms and areas of retailing is

inevitably considerable.

Shopping centres by most sources are classified as either neighborhood, community or regional in type. The classifications may vary considerably between sources as various methods may be utilized to measure their relative positions in the marketplace.[21] All classifications are based upon subjective decisions and invariably areas of overlap may exist between types of centres. The classification is a useful tool for research and its limitations should be recognized. Each type of centre performs a different function. Neighborhood centres, the smallest of the three types, are generally made up of convenience stores, i.e. stores that sell convenience goods. These goods are "considered as daily or weekly requirements for the average family, such as food, drugs and limited-line department store merchandise".[22] Community centres usually provide the same types of convenience goods outlets as the smaller neighborhood centres but in addition provide a "wider range of facilities for the sale of 'shopping goods', such as apparel and furniture."[23] Junior department stores are usually their major tenants. Regional centres provide "variety and depth of 'shopping goods' comparable to a central business district, including general merchandise,

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21. Homer Hoyt for example, classified shopping centres into four categories based upon store area and principal tenant: see Hoyt, H., "Classification and Significant Characteristics of Shopping Centres", in The Appraisal Journal, April, 1958, p. 216; Statistics Canada classified shopping centres into three groups and based the classification upon the number of outlets found in a centre as follows: Neighborhood - having 5-15 retail establishments; Community - having 16-30 retail establishments; Regional - having more than 30 retail establishemnts.

22. Statistics Canada, "Shopping Centres in Canada", p. 20.

23. Cohen, Y.S., pp. 29-30

apparel and home furnishings, as well as a variety of services"[24] that are also found in convenience and neighborhood centres. At least one, usually two and sometimes three full-line department stores anchor these centres.

While all three types of shopping centres may be expected to have certain negative impacts upon CBDs, it is the regional centre that poses the greatest threat to CBD retail vitality. Competition from this type of centre is severe not only because of its size and strength of shopping goods stores but also because of its generally excellent location which it rigorously demands for its success.

Of the three types of centres, it has been the regional one that grew the fastest since the late 1950's. This growth is exhibited through the percentage distribution of shopping centre sales in Canada in Figure 2.3. The high growth rate of shopping centres, especially regional ones, combined with their preferred locations in metropolitan areas strongly suggests the decline of retailing activities in CBDs.

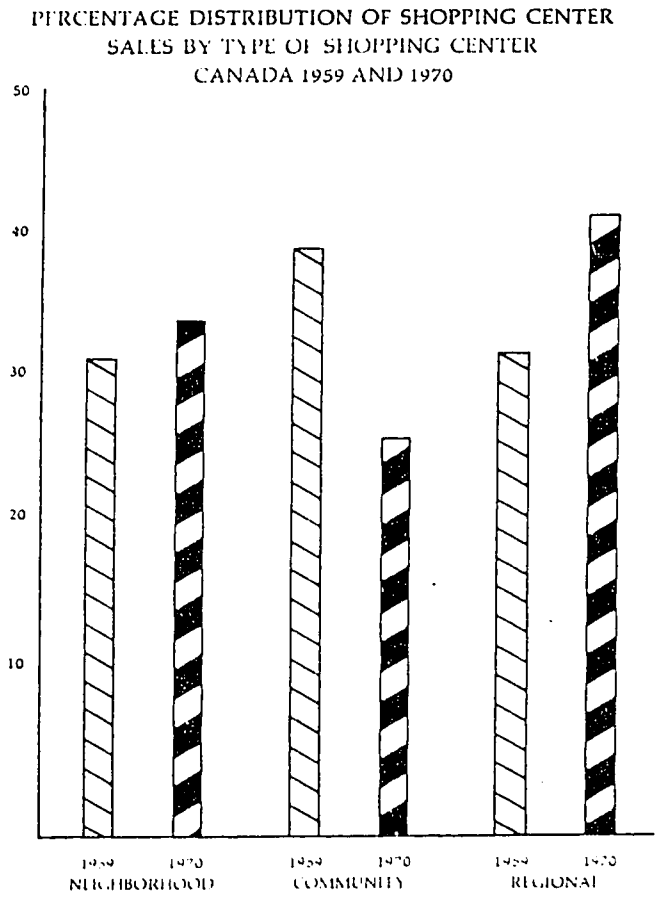
2.3. Decline of Retailing Activities in the CBD

Central Place Theory implies that one of the functions of the CBD is to support the surrounding population with goods and services. Therefore, it would seem reasonable to assume that as the surrounding population increases, there would be a corresponding increase in retailing activities in the CBD.[25] While the population of most

24. Cohen, Y.S., p. 30

25. Briggs, R., "A Model to Relate the Size of the Central Business District to the Population of a City", in Geographical Analysis, No. 3, 1974, p. 267

FIGURE 2.3.



Source: Moyer, M.S., "Shopping Centres in Canada: their Impact, Anatomy and Evolution", p. 27.

North American cities are increasing, studies have shown that retailing activities in the CBDs of most of these cities are on the decline.

The decline of retailing activities in CBDs is the result of the same forces that shaped the present complex commercial structure of our cities. Both statistical evidence and empirical observation suggest that planned suburban shopping centres are the main direct cause of this decline. This cause-effect relationship, however, is only one of many. A number of studies have focused on other cause-effect relationships that either directly or indirectly affected CBD retailing activities.

Judith Friedman investigated the variations in retail activities in the CBD among large U.S. cities for 1954 and 1967.[26] She argued that since retail activity in the CBD is part of a complex of downtown activities, "the degree to which the city develops and maintains its downtown area and hence this complex of activities reflects the degree to which its economy includes establishments which require a central location". [27] Friedman's study was based on the hypothesis that CBD retail activity was indirectly affected by the city's age, population and relative isolation from other centres. The hypothesis was tested through linear regression analysis and the findings validated the assumptions. Friedman concluded the following:[28]

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26. Friedman, J.J., "Variations in the Level of Central Business District Retail Activity Among Large U.S. Cities: 1954 and 1967", in Land Economics, No. 3, 1973, pp. 326-335.

27. Ibid., p. 326

28. Ibid.,p. 328.

1) Older cities, especially those that became large early in their evolution, had a "headstart" in attracting central activities to their CBDs thereby possibly giving these CBDs a "continuing advantage" over other centres.

2) The larger the city population, the greater the CBD retailing activity. Population size, however, has become less important to CBD retail sales as competition from new shopping centres and/or decreased accessibility with increasing city size counteracts the effect of increased numbers of potential CBD customers.

3) The more isolated a city, the greater the city's hinterland and hence conditions are more conducive to the development of downtown activities such as offices, hotels etc., which in turn increase retailing activities in the CBD.

Conversely, the findings reflect that cities that do not exhibit these advantages likely have a low level of CBD retailing activity.

G.C. Kottis approached essentially the same problem in a similar manner. The main hypothesis of his study was that the percent of SMSA (Standard Metropolitan Statistical Area) retail sales realized in the CBD was a function of the industry mix of the area, the population size and growth rate, the percent of the population of the area living in the central city, the ratio of median family income in central city over median family income in SMSA and the interaction between size of SMSA and growth.[29]

Statistical evidence supported only part of his hypothesis and it was concluded that "the percentage of SMSA retail sales realized in the CBD is favourably affected by the percent of the population of the SMSA living in the central city while it is unfavourably influenced

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29. Kottis, G.C., and Kottis, A., "A Statistical Exploration of Some Factors Responsible for Decline of the Central Business District", in Land Economics, No. 48, 1972, p. 169.

by a fast growth rate of SMSA population, by the population size of the area, and by the percentage of total employment in the SMSA associated with manufacturing". [30]

Central city population has a positive effect on CBD retail sales because of proximity and accessibility. It follows, therefore, that the greater the central city population, the greater the CBD retail sales. Both a fast growth rate of SMSA population and a large SMSA population tend to disperse the population which in turn has a negative effect on CBD retail sales. A large manufacturing sector , usually requiring a skilled labour force which is seldom available in the central city, also tends to disperse the population thereby negatively affecting CBD retail sales.

Boyce and Clark related the amount and the percentage of SMSA retail sales in the CBD to the size of the metropolis, the centrality of the CBD, the shape of the metropolis, the amount of planned shopping centre development and the amount of office space in the CBD.[31] They utilized regression analysis to determine the relationship between CBD retail sales and the independent variables for three periods (1948, 1954 and 1958) and used 79 U.S. cities as their sample. Their findings revealed that all five variables influenced CBD retail sales when examined individually but only three of the variables appeared significant (size, shape and office space) when all give variables were

30. Ibid., pp. 172 and 173.

31. Boyce, R.R. and Clark, W.A., "Selected Spatial Variables and Central Business District Retail Sales", in Papers and Proceedings, Regional Science Association, 11, 1963, p. 168.

examined through multiple regression.[32]

The most significant variable to influence CBD retail sales was found to be the population of the SMSA. As the population increased, CBD sales also increased. More noteworthy was the manner of this increase. As the SMSA population grew, expected CBD sales increased at a decreasing rate over the three time periods and the larger the SMSA population was observed to be, the more pronounced was the CBD loss.[33]

Using the same methodology, time periods and SMSAs as Boyce and Clark, L. Russwurm extended the above study by examining the "GAFE" retail group (General Merchandise, Apparel, Furniture and Eating-Drinking Places).[34] He selected this group because it exhibited a strong linear relationship with the SMSA populations and because it accounted for between 60% and 75% of the total retail sales in the CBD.[35] Russwurm's findings, while similar to those of Boyce and Clark, revealed that the "GAFE" group of merchandise provides a better measure of the retail sales position of individual CBD's.[36]

In a somewhat different light, J. Casparis examined metropolitan retail structure and its relation to various socio-economic characteristics of 82 SMSAs in the U.S. between 1948 and 1958.[37] Casparis looked

32. Ibid., p. 197.

33. Ibid., p. 172-173

34. Russwurm, L.G., "The Central Business District Retail Sales Mix, 1948-1958." in Annals, Association of American Geographers, No. 54, 1964, p. 524.

35. Ibid., p. 527.

36. Ibid., p. 536.

37. Casparis, J.,"Metropolitan Retail Structure and Its Relation to Population", in Land Economics, Vol. 18, No. 2., 1967,pp. 212-218.

at three different areas of a metropolis; the CBD, the city excluding the CBD and the SMSA excluding the city which he called the "ring". Expanding Russwurm's GAFE group to include food and drug outlets, he correlated the percent changes in the proportion of SMSA sales in the CBD, the city and the ring from 1948 to 1958 with the percent changes of 24 population characteristics in the SMSA, the city and the ring.[38] Casparis also observed that while absolute CBD retail sales increased as the SMSA populations increased, the percentage of SMSA retail sales in the CBD was an inverse of the size of the SMSA. His results further indicated that 1) Percent of SMSA sales in the CBD declined in all six types of outlets observed, city sales fluctuated and ring sales increased consistently; 2) The decline of the percent of SMSA retail sales in the CBD was not only correlated with the SMSA population growth, but also significantly correlated with changes in the socio-economic characteristics of the SMSA population.[39] As part of his summary, Casparis concluded that "The CBD which was once the centre of retail dominance in the city has become one of many retail centres in the metropolitan community."[40]

As a summary of these studies, the most important common element to influence CBD retail activity levels is population. While not all metropolitan CBDs exhibit absolute decline of retail sales, most

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38. Ibid., pp. 214-215.
39. Ibid., pp. 215 and 216.
40. Casparis, J., p. 216 and 218.

characteristically show a percentage decline of their share of the metropolitan retail cauldron. Although the basic cause appears to be the suburbanization of populations it can only be an indirect factor. The loss of CBD retail activity is the direct consequence of the availability of alternate sources of shopping experience particularly in the suburbs. More specifically, the innovation and the diffusion (especially since the 1950s) of planned shopping centres which transformed retail relationships in the city,[41] has to be given the "credit" for the decline of CBD retail vitality.

2.4. Perspectives on Retailing in the Ottawa CBD and Suburban Shopping Centres

2.4.1. The CBD

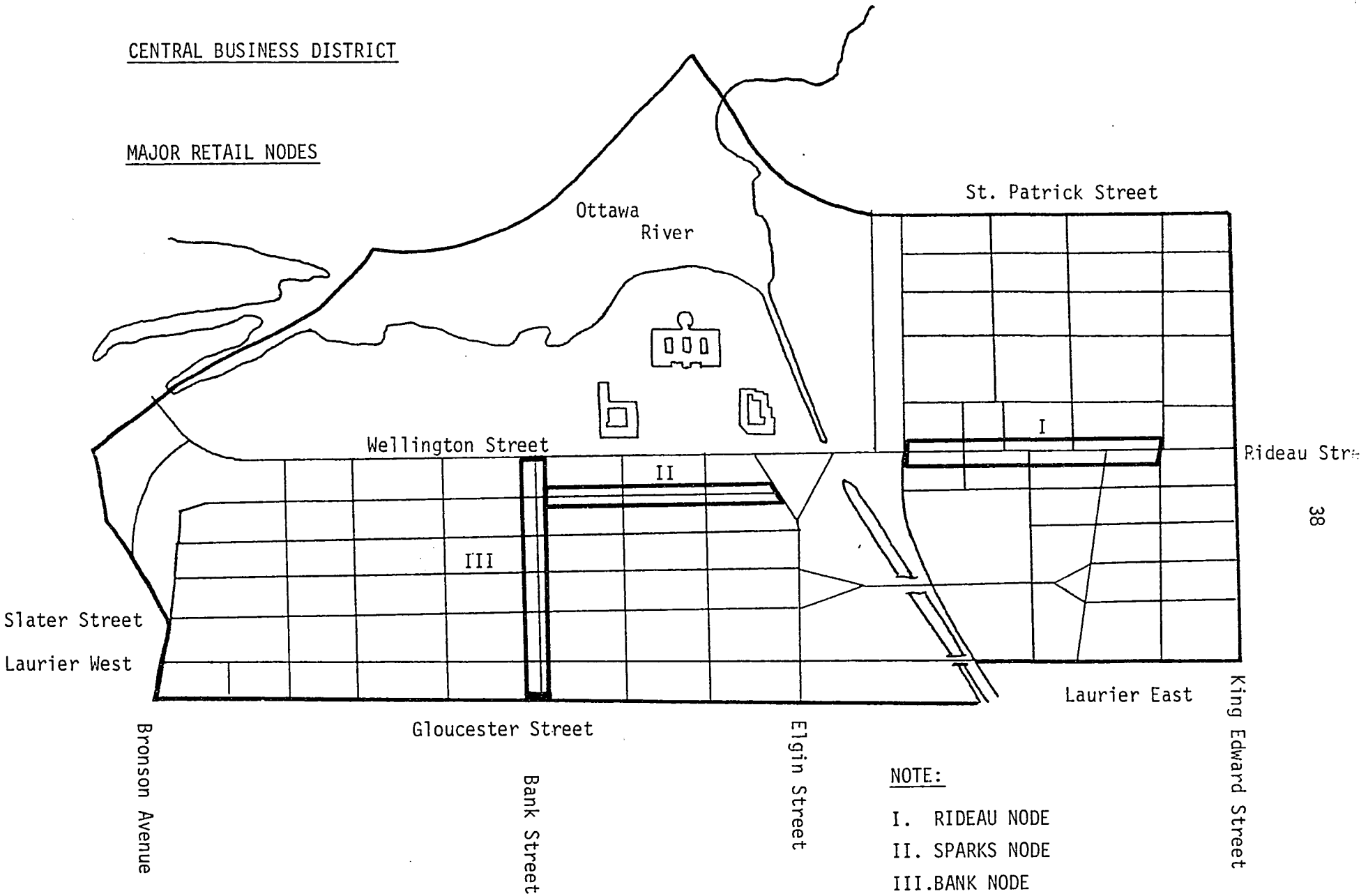
Traditionally, the Ottawa CBD has consisted of two nodes; the Rideau Street node on the east side of the Rideau Canal and the Sparks Street-Bank Street node on the west. (See Map 3.). The two nodes, however, may be considered to function as one unit under the CBD heading. In 1974, the total combined shopping goods space in the CBD was estimated to slightly exceed 1,300,000 sq.ft.[42] Total department store space was 675,600 sq.ft. of which 87% was located in the Rideau node.[43] Other shopping goods space amounted to 637,000 sq.ft. and the split between the two nodes was almost 50:50.[44] While the Sparks-Bank node appears to

41. Berry, B.J.L., and Cohen, Y.S., "Decentralization of Commerce and Industry: The Restructuring of Metropolitan America", in The Urbanization of the Suburbs, Ed. by Berry and Cohen, 1974, p.451.
42. Hatfield Research Company, 1975.
43. Walter Smith and Company Limited, 1972.
44. Hammer et al, 1969.

MAP 3

CENTRAL BUSINESS DISTRICT

MAJOR RETAIL NODES



NOTE:

I. RIDEAU NODE
II. SPARKS NODE
III. BANK NODE

be the weaker of the two, it is this area that has a strong alignment of specialty shops.

Although historical figures for the CBD were not readily available, sufficient information was secured to show the trends within at least part of the study period. In 1961, the shopping goods sales in the CBD totaled just over $106 million. This figure dropped slightly to $105 million by 1966 and further decreased to $103 million by 1968.[45]

2.4.2. Suburban Shopping Centres

The first shopping centre to open in Ottawa was the Westgate Shopping Centre on Carling Avenue in 1955. By 1961, eleven suburban centres were in existence in the urban CMA. These centres contained about 250 outlets offering approximately 1,300,000 sq.ft. of shopping space. (See Map 4.). By 1974, there were 34 shopping centres within this same area with nearly 790 outlets and totaling somewhat over 4,600,000 sq.ft.[46] In 1961, about 15% of all shopping centre outlets were shopping goods outlets; this increased to 35% by 1974.[47] In 1961, not one of the eleven shopping centres was enclosed. By 1974, however, twelve of the 34 centres offered enclosed, climate-controlled shopping convenience. (See Appendix C)

The above statistics indicate the increasing market share captured by shopping centres. Furthermore, the CBD sales of shopping

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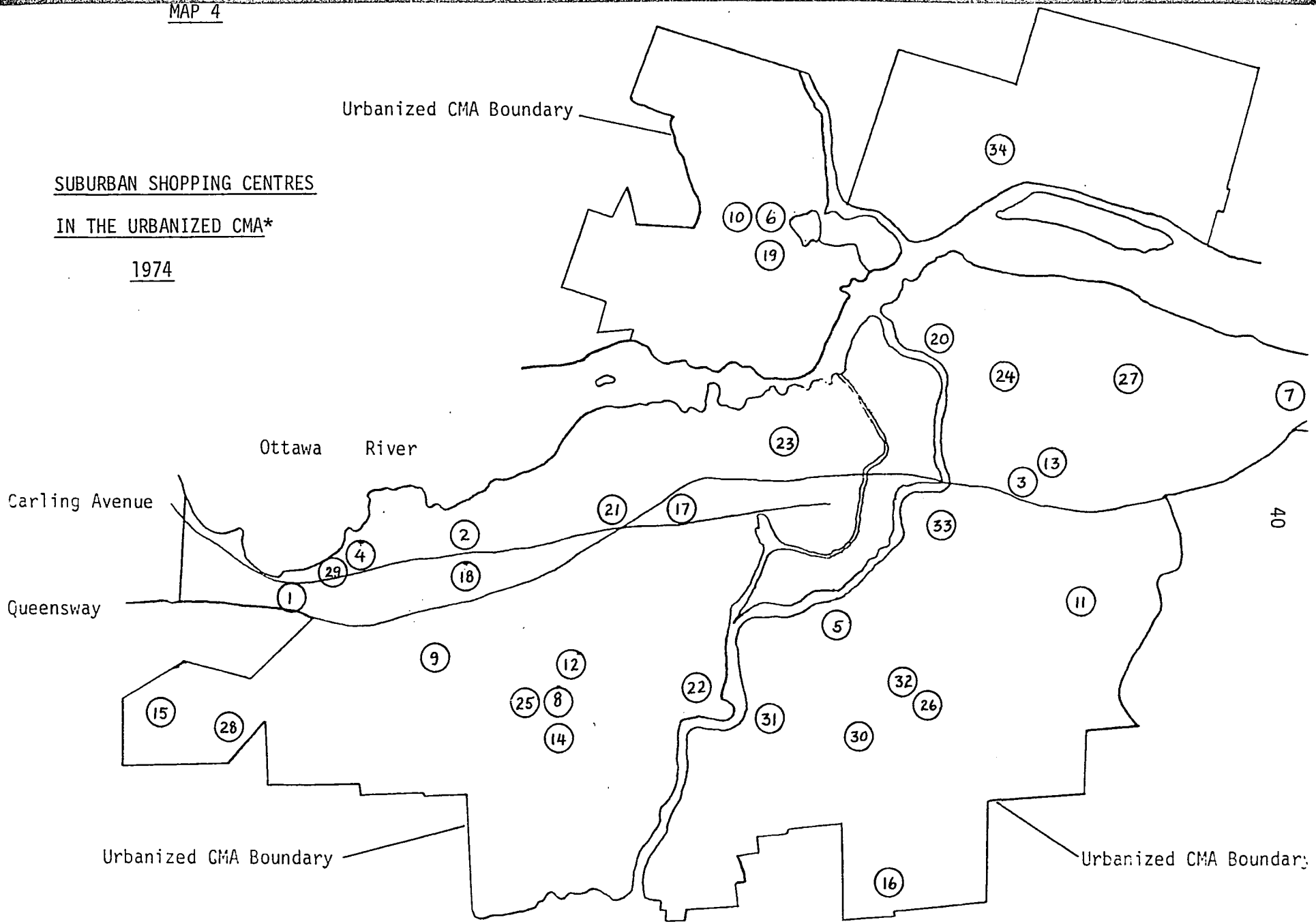
45. Ibid.
46. City of Ottawa, Unpublished Data, 1975.
47. Ibid.

MAP 4



* identification of numbers may be found in Appendix C.

goods as a percentage of total shopping goods sales in the CMA declined considerably from 59% to 43% to 38% for 1961, 1966 and 1968 respectively.[48] It is evident that retail activity in the CBD is on the decline, in terms of loss of market share to the shopping centres.

2.5. Study Objectives, Organization and Application of Methodolgy

2.5.1. Study Objectives

The basic aim of this study is to examine the relationships between selected functions in shopping centres and similar functions in the CBD for the purpose of determining and evaluating the expected loss of CBD retail activity as a result of suburban shopping centre developments. Part of the hypothesis has already been demonstrated. It has been shown that CBDs in general and the Ottawa CBD in particular, have been losing their share of the metropolitan retail market not just through convenience goods outlets but more significantly through the higher order shopping goods outlets. Questions that have not been answered yet are: Which functions have declined in the CBD? How and why have these functions declined? Did these functions increase in suburban shopping centres and if so, how and why? These are the main questions the following chapters will attempt to answer.

The objectives of this study, therefore, may be summarized as follows:

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48. Hammer et al, 1969.

1) To determine, analyse and evaluate significant changes in the regional retailing "strength" of the CBD through the locational behaviour of selected retailing functions between 1961 and 1974.

2) To determine and analyse the effects of shopping centre diffusion on CBD retailing "strength" through the relationships between selected population variables and the number of establishments of selected functions in the CBD and in suburban shopping centres.

2.5.2. Organization and Application of Methodology

Chapters III and IV utilize the statistical techniques discussed in Chapter I.

In Chapter III, nearest neighbour analysis was used to determine the major changes in the patterns of distribution of the selected thirteen functions between 1961 and 1974. Unfortunately, because the method does not distinguish between signle and multi-clustered patterns, the derived R values for a function between two time periods cannot be used to determine the degree of CBD loss of market share. Multi-clustered patterns can be expected to occur especially for those

functions that are frequently represented by many establishments in one shopping centre.

What kind of information can the nearest neighbor analysis provide? The analysis, because it can provide information on the relative degree of spatial distribution of establishments of a given function can also provide information on the behavioural tendencies of that particular function within the market place.

The methodology was relatively simple; each establishment of each of the thirteen functions was mapped for the two time periods - 1961 and 1974. (See Appendix D) All the distances to the nearest neighbor of each point were measured and tabulated and the R values were determined for the distribution of establishments of each function for the two time periods.

In Chapter IV, simple linear regression analysis was used to derive relationships between the population of the CMA and the number of establishments of the thirteen different functions in the CBD, in shopping centres, in strip retail and in the CMA as a whole between 1961 and 1974 inclusive. (See Appendix E for list of establishments by function and by area) Linear regression analysis was used since no strong curvilinear tendencies appeared in the scattergrams. The regression model itself was selected because it is a simple tool with which a relationship can be derived between variables, given of course, that empirical evidence exists for such a relationship. The relationship between the population of a city and not only the number of

establishments of a function within the city but also within the CBD have been amply demonstrated in geographic literature.[49] It is reasoned therefore, that a similar type of relationship should also exist between the population of a city and the number of establishments of a function in both shopping centres and strip retail. Furthermore, the population size of the central area and the size of CBD work force must also be related to CBD retailing activities. (See Section 2.3., Kottis and Boyce and Clark).

All establishments of a function were considered in this study because it seemed obvious that any establishment not located in the CBD must have a negative effect on it (i.e. the CBD) by virtue of the fact that goods purchased in these establishments will not be purchased in the CBD.

Each of the thirteen functions were examined in the following manner:

1) The total number of establishments in the CBD was regressed on the CMA population. These analyses yielded thirteen estimated regression equations. The sign of the slope 'b' of each equation was noted:
   a) If the slope was negative, (i.e. the number of establishments was declining in the CBD as the CMA population increased) then the number of CBD establishments of

49. Briggs, R., "A Model to Relate the Size of the Central Business District to the Population of a City" in Geographical Analysis, No. 3, 1974, pp. 265-280.; Forbes, J.D., "Central Place Theory-An Analytical Framework for Retail Structure" in Land Economics, Vol. XLIII, No. 1, February, 1972, pp. 15-22; Casparis, J., "Metropolitan Retail Structure and Its Relation to Population", Land Economics, Vol. XVIII, No. 2, May, 1967, pp. 212-218.

that particular function was regressed on the Central Area Population.

b) If the slope was positive, then the number of establishments of that function within the CBD was regressed on the CBD employment.

2) The total number of suburban shopping centre establishments by function was regressed on the CMA population.

3) The total number of establishments in strip retail by function, was regressed on the CMA population.

4) The total number of establishments by function, in the urbanized CMA was regressed on the CMA population.

Finally, Chapter V presents the conclusions.

CHAPTER III

SPATIAL DISTRIBUTION OF ESTABLISHMENTS: 1961 and 1974

3.1. Overview

The thirteen selected functions outlined in Chapter I had a combined total of 512 establishments in the built-up portion of the CMA in 1961. By 1974, this figure increased to 805. The breakdown of these establishments by location is presented in Table 3.1. below:

TABLE 3.1.

Total Number of Establishments of the Thirteen Functions 1961 and 1974

Location	1961	1974	% increase	Average % increase per year
CBD	206	240	16.5%	1.2%
Shopping Centres	41	256	524.4%	37.5%
Strip Retail	265	309	16.6%	1.2%
Total	512	805	57.2%	4.1%

Source: Author's Survey of Establishments

It is evident that establishments of the thirteen functions increased the fastest in shopping centres with an average rate of 37.5% per year; establishments of the same functions only increased an average of 1.2% per year in both the CBD and strip retail.

To determine the spatial distribution of establishments by function so that their "behavioural tendencies" may be observed, nearest neighbour analysis was undertaken on the establishments of each function. The location of each establishment by function was plotted on maps, (See Appendix D), the required measurements and calculations were made and the R values were determined for both 1961 and 1974. The derived R values are presented in Table 3.2. below:

TABLE 3.2.

Derived R Values by Function

FUNCTION	1961	1974
Department Stores	.3942	.7192
Men's Wear	.2390	.3592
Women's Apparel	.2500	.2394
Children's Wear	.5060	.9689
Shoe Stores	.3593	.3395
Furriers	.4079	.4309
Furniture Stores	.4468	.6446
Gift Shops	.2254	.5410
Bookstores	.1518	.4135
Jewellery Stores	.4495	.4427
Leather Goods Stores	.3171	.5713
Sporting Goods Stores	.4997	.5550
Toys & Hobbies	.6269	.7254

Although all the R values are rather low, (i.e. the establishments appear to be highly clustered) it must be recognized that that area of the CMA which was used to derive "$r_{exp.}$" was quite large (91.9 square miles). The low R values are not significant since they are viewed as part of a "continuous scale". Each function will now be discussed in light of the above findings and in combination with the input data which may be found in Appendices D and E.

3.1.1. Department Stores

In 1961 the derived R value of .3942 shows a high degree of clustering of these outlets. The 1974 R value of .7192 indicates a tendency towards a random distribution. Of the 38 department stores in the urbanized CMA in 1961, 16 were in the CBD, 9 were in shopping centres and 13 were in strip retail locations. By 1974, there were only four more of these establishments in the urban CMA (42) but only 9 were in the CBD, 26 were in shopping centres and 7 were in strip retail. The tendency towards a random distribution becomes clear if it is recognized that generally only one or two department stores will locate in a shopping centre. In community and neighborhood centres especially, one department store usually anchors one end of the mall while a food-liner usually anchors the other. As most shopping centres that came into the Ottawa market were community or neighborhood in type, the tendency towards a random distribution of department stores is not surprising.

3.1.2. Men's Wear Outlets

The 1961 R value for these outlets was .2390. This changed to .3592 by 1974 indicating a tendency towards a random distribution. Men's wear establishments are quite similar to those of women's wear in that they too require to cluster together to some degree and thereby take a mutual advantage of their cumulative attraction. The main difference between them (besides the type of merchandise they offer) is that women's wear outlets outnumber men's wear stores in shopping centres almost 2:1.

Given that many of these establishments located in the CBD in 1961 and also given that in 1974 there were 34 shopping centres in the CMA and only 35 men's wear stores in these centres (i.e. many centres only had one men's wear store) the tendency towards a random distribution may be expected.

3.1.3. Women's Apparel Outlets

The derived R values for women's apparel outlets were .2500 and .2394 for 1961 and 1974 respectively and reflect considerable clustering. As the difference between the two values is negligible, it appears that no change has occurred in the pattern of distribution between the two periods. This however, is definitely not the case. It must be re-emphasized that R values that indicate clustering, do not differentiate between single and multiple clusters. Considerable spatial changes have in fact taken place. Like many similar outlets, women's wear stores generally perform better if they are located near one another. Cumulative attraction works in their favour and comparison shopping between outlets is encouraged. The input data in Appendix E reveals that only 7 of these outlets located in shopping centres in 1961 and 61 by 1974. The clustering pattern in 1974 is evidently multiple and is perhaps best exemplified by the Bayshore Centre which hosted 19 such establishments.

3.1.4. Children's Wear Stores

The R values for these establishments were .5060 and .9689 for 1961 and 1974 respectively. The tendency is towards a random distribution. In both 1961 and 1974 there were only 16 such outlets in the urban area of the CMA. The input data from Appendix E indicates that a redistribution of establishment location occurred mainly from strip retail to shopping centres. As usually only one such outlet locates in a shopping centre, the strong tendency towards a random pattern is understandable. This shift towards a random pattern also indicates that these outlets perform better when isolated from one another suggesting the presence of individual non-overlapping trade areas and hence a limited market.

3.1.5. Shoe Stores

The R values for shoe stores were .3593 and .3395 for 1961 and 1974 respectively indicating little or no change in their spatial distribution between the two periods. These outlets, however, had a similar behaviour to women's wear establishments in that they too favour clustering to maximize customer exposure. Input data from Appendix D suggests a strong multi-clustered pattern in 1974.

3.1.6. Furriers

R values for furriers were .4079 and .4309 for 1961 and 1974 respectively. These values show a slight tendency towards a random distribution. Examination of the input data reveals two noteworthy points: 1) at least until 1974, furriers did not locate in shopping

centres within the study area and 2) the number of furriers within the urbanized CMA declined from 34 to 18 from 1961 to 1974. While most furriers were located in or near the CBD (thereby explaining the low R values) their slow decline over the years may explain their tendency towards a random pattern.

3.1.7. Furniture Stores

Furniture store R values increased from .4468 to .6446 between 1961 and 1974. The tendency is clearly towards a random distribution. The change is the result of the decline of these establishments in the CBD, and an increase in both shopping centres and strip retail. With the exception of two outlets in the Bayshore Shopping Centre, no multi-clustered patterns are noticeable from the input data. Their tendency towards dispersion reflects increasing land values in the downtown area, as well as a "catalogue" type retail trend in the newer stores in shopping centres as opposed to the cash-and-carry warehouse type dealerships.

3.1.8 Gift Shops

R values for gift shops were .2254 and .5410 for 1961 and 1974 respectively and indicate a tendency towards randomness. The input data reveals that most gift shops in 1961 were concentrated in and near the CBD. Although the number of these establishments more than doubled in the CBD by 1974, similar outlets in the suburban shopping centres showed an even more "dramatic" increase. While some shopping centres had up to four gift shops in 1974, many centres had only one such outlet. This, together with the fact that many gift shops were located in strip retail,

may explain the randomness tendency. It should be pointed out, however, that since gift shops, unlike most stores, may cater to a wide market by carrying any quality and assortment of merchandise, their behaviour in the market place is difficult to assess.

3.1.9. Bookstores

R values for bookstores changed from .1518 in 1961 to .4135 in 1974, indicating a tendency towards a random distribution. The 1961 R value indicates a high degree of clustering. Most bookstores were located in or near the CBD, clearly taking advantage not only of the central location but also the presence of thousands of office workers. By 1974, the number of these outlets more than doubled in the CBD but also increased considerably on the CBD fringe areas as well as other strip retail locations. Their tendency towards a random pattern may be explained partly by their presence in shopping centres by 1974, and partly by their distribution along major arterials, expecially Bank Street.

3.1.10. Jewellery Stores

R values for jewellery stores were .4495 in 1961 and .4427 in 1974. These establishments, like shoe stores, are similar in behaviour to women's wear outlets and exhibit a multi-clustered pattern not through the R values but rather through the input data.

3.1.11. Leather Goods Stores

The R values for these outlets increased from .3171 to .5713 between 1961 and 1974, showing a tendency towards a random distribution.

This tendency appears to be the result of their gradual location into shopping centres. In 1961, seven of the eight outlets were in or on the fringe of the CBD, indicating their need for a central location accessible equally to all parts of their trade area. From their small numbers and central location, it may be inferred that these outlets have a high threshold requirement before market entrance can be successfully attempted. By 1974, seven of the nineteen establishments were located in shopping centres. While their location in centres reflects a smaller market capture of individual outlets, their presence here allows them to take advantage of a regular flow of potential buyers and perhaps capture some of the market from their CBD located competitors.

3.1.12. Sporting Goods Stores

The R values for sports shops indicate a slight tendency towards a random pattern as they increased from .4997 in 1961 to .5550 in 1974. Examination of the input data shows that most of these outlets were located in strip retail; shopping centres only began to adopt them in 1967 and the number of CBD outlets has not changed significantly between 1961 and 1974. The pattern for both years is quite clustered. The R value of 1961 may be explained by the absence of these outlets from shopping centres, the clustering of many in or just outside the CBD and the spread of most of the remainder along urban arterials such as Wellington Street. The 1974 pattern is quite similar with the exception of their presence in shopping centres. Like children's wear establishments, these outlets appear to favour relative isolation from competing stores

3.1.13 Toy and Hobby Shops

These outlets, like leather goods stores, are quite specialized. R values increased slightly from .6269 in 1961 to .7254 in 1974, indicating a small tendency towards randomness. Input data reveals that much of the increase in the number of these outlets between 1961 and 1974 (7 to 24) occurred in shopping centres which may explain the slight dispersion tendency. On the other hand, some shopping centres in 1974 housed more than one such outlet, thus reflecting a limited multi-clustered pattern which shows up in the relatively low R values.

3.2. Summary of Findings

Nearest neighbour analysis was utilized to determine the major changes in the patterns of distribution of establishments of the thirteen selected functions in the CMA between the beginning and the end of the study period. An associated problem with nearest neighbour analysis, however, is the inability of the derived R values to differentiate between single and multi-clustered spatial patterns. When changes in spatial patterns between two time periods are to be investigated and the derived R values show the existence of a clustered pattern for both periods, the investigator is faced with a decision between not only the presence of a single or a multi-clustered pattern but also the type of change that occurred - i.e. a change from a single cluster to a multi-clustered pattern or vice versa. In such a case, two alternatives may be of some help in deciding the type of pattern. Often taking the second, third or fifth nearest neighbour of a point instead of the first will rectify the problem. Large regional shopping centres, however, will frequently have fifteen or more establishments of a single function and to take the fifteenth nearest neighbour of a point the exercise becomes very complicated and tedious if not ridiculous. The second alternative is to visually examine the plotted points on the map and determine whether the change over time was from a single cluster to a multi-clustered pattern or vice versa, etc.

Realizing the limitations of the R values allows a more realistic comparison between the patterns of distribution of the establishments of a given function over time. Table 3.2. shows the R values of establishments of a function for 1961 and 1974. As the R values are on a "relative scale" it is difficult to say if a given value represents a highly clustered pattern or not. What can be determined is the

relative change in the patterns of distribution in the establishments of functions. Table 3.3. below shows the relative ranking of the establishments of a function for the two time periods according to their degree of clustering.

TABLE 3.3.

Ranking of Establishments According to R Values 1961 and 1974

1961		1974	
Function	R Value	Function	R Value
Bookstores	.1518	Women's Apparel	.2394
Gift Shops	.2254	Shoes	.3395
Men's Wear	.2390	Men's Wear	.3592
Women's Apparel	.2500	Bookstores	.4135
Leather Goods	.3171	Furriers	.4309
Shoes	.3593	Jewellery	.4427
Deparment Stores	.3942	Gift Shops	.5410
Furriers	.4079	Sporting Goods	.5550
Furniture	.4468	Leather Goods	.5713
Jewellery	.4495	Furniture	.6446
Sporting Goods	.4997	Department Stores	.7192
Children's Wear	.5060	Toys and Hobbies	.7254
Toys and Hobbies	.6269	Children's Wear	.9689

It is evident that considerable changes have taken place. Women's apparel, shoe and men's wear establishments which were fourth, sixth and third in their degrees of clustering in 1961, were first, second and third respectively in 1974. These are the outlets that now appear most frequently in shopping centres and exhibit multi-clustered patterns in their spatial distributions. Bookstores, which were the most clustered in 1961, ranked fourth in 1974 and show signs of decentralization

from the CBD. Leather goods, children's wear outlets and gift shops also exhibit similar patterns. Department stores, which in 1961 were for the most part, concentrated in the CBD or were free standing, relatively isolated establishments, decentralized with shopping centres of all types by 1974, and dropped from a seventh to an eleventh ranking in the process. Furniture stores also decentralized but only to a limited degree as they changed from a ninth to a tenth ranking from 1961 to 1974. These outlets have continued the pattern that was already present in 1961 which is evidenced by their already strong presence in strip retail locations. Furriers, jewellery stores, sporting goods outlets and toys and hobby shops all increased their rankings from 1961 to 1974 although not all of them increased in R value.

If the 1961 "overall" R values and range are compared to the 1974 "overall" R values and range, it becomes obvious that the "overall" tendency is towards a pattern of random distribution of establishments. This process of decentralization strongly points towards weakening CBD retail activities.

CHAPTER IV

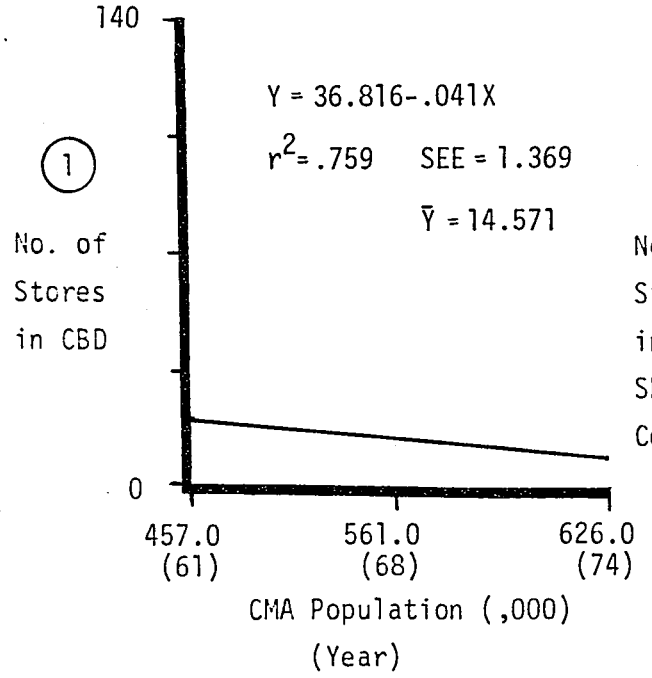
REGRESSION RESULTS AND DISCUSSION

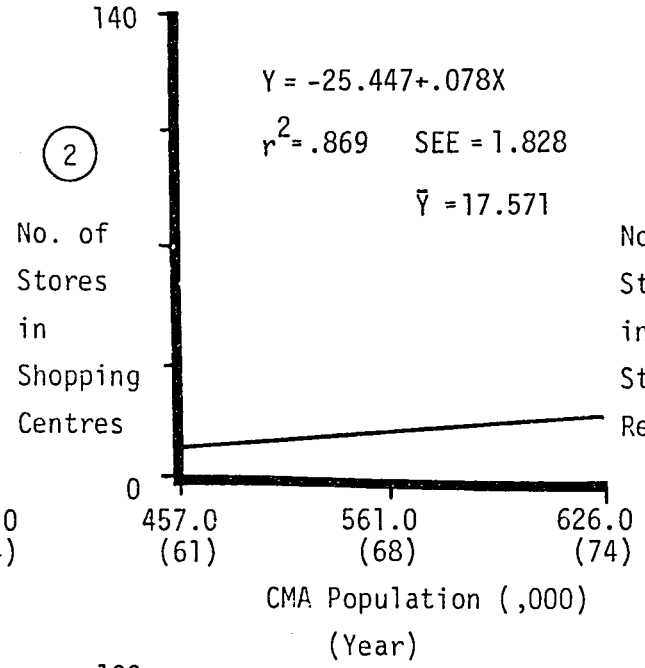
4.1. Overview

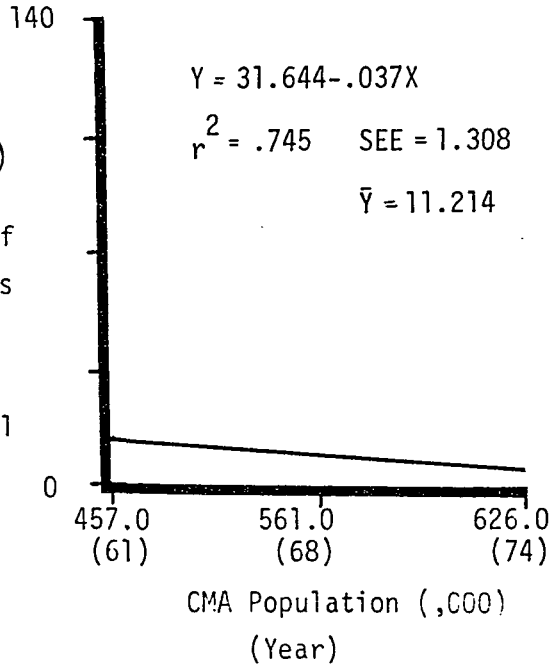
Simple linear regression analysis, like other statistical techniques, does not provide any assurance of the existence of a dependency between variables; empirical observations and deductive reasoning must answer that. What simple linear regression analysis can do, however, is suggest to the researcher through the presence or the absence of statistical dependency, the likely or unlikely existence of a true relationship. When regression analysis is used as a descriptive tool (as in this case) and not as a statistical inferential aid (as in forecasting the probable existence of a relationship between variables), its main purpose is to indicate the degree and type of relationship between the variables within strictly defined parameters that for all practical purposes encompass a "universe". It is with this intent that regression analysis is put to use in this chapter.

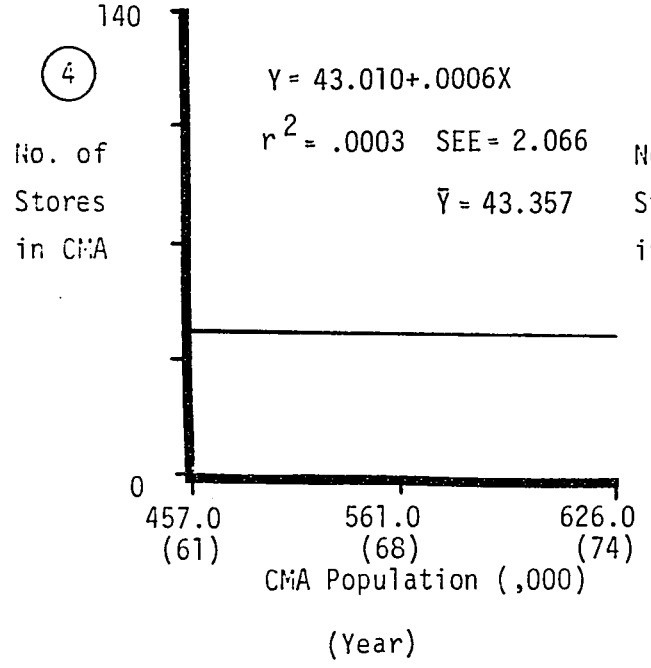
In the following pages the results of the regressions are presented. The thirteen functions are reviewed individually as already discussed in section 2.5.2., the derived equations are presented in both functional and graphical formats and the findings are discussed. The presentation of each regression result includes i) the derived equations, ii) the derived regression lines, iii) the r^2, iv) the standard error of the estimate (SEE), and v) the mean of the dependent variable ($\bar{Y}$) with which the SEE may be compared. With respect to the derived regression lines, it should be noted that the origin of the graphs is not zero on the X-axis.

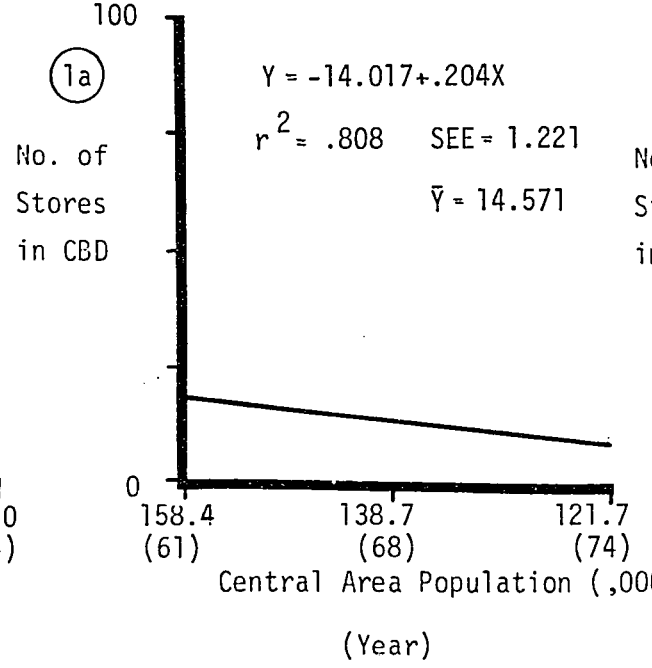
4.1.1. Department Stores

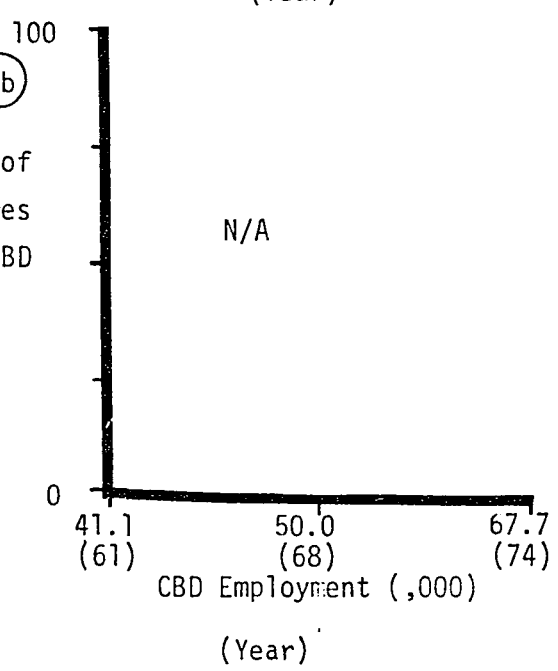

140
0
Y = 36.816-.041X
r2= .759 SEE = 1.369
Ȳ = 14.571
1
No. of Stores in CBD
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -25.447+.078X
r2= .869 SEE = 1.828
Ȳ = 17.571
2
No. of Stores in Shopping Centres
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = 31.644-.037X
r2 = .745 SEE = 1.308
Ȳ = 11.214
3
No. of Stores in Strip Retail
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = 43.010+.0006X
r2 = .0003 SEE = 2.066
Ȳ = 43.357
4
No. of Stores in CMA
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


100
0
Y = -14.017+.204X
r2 = .808 SEE = 1.221
Ȳ = 14.571
1a
No. of Stores in CBD
158.4 (61)
138.7 (68)
121.7 (74)
Central Area Population (,000)
(Year)


100
0
N/A
1b
No. of Stores in CBD
41.1 (61)
50.0 (68)
67.7 (74)
CBD Employment (,000)
(Year)

Department Stores

An examination of the input data on department stores (Appendix E) reveals that the total number of these outlets within the urbanized CMA remained relatively unchanged between 1961 and 1974. What has occurred, however, is a strong realignment of department stores with shopping centres, paralleled by a simultaneous decline of these outlets in the CBD and strip retail locations. Much of this loss of CBD department stores can be attributed to the disappearance of many junior and discount type outlets from the CBD. The strong surge of department stores in shopping centres is not altogether unexpected as there was an even stronger surge in shopping centre development, the success of which (at least for community and regional centres) depends upon department stores acting as "anchors" i.e. - drawing customers to the centres.

Results of regression (1) suggest a moderately strong negative relationship between the CMA population and the number of CBD department stores. The slope of -.041 indicates that as the CMA population increased by 1,000, there was a corresponding decrease of .041 department stores in the CBD. The r^2 (coefficient of determination) is moderately high (.759), indicating that almost 76% of the variation in the dependent variable (department stores in CBD) can be "explained" by the variations in the CMA population. The standard error of estimate (SEE), when compared to the mean of the dependent variable ($\bar{Y}$), is less than 10% and therefore, it may be assumed that the scatter

points is quite closely aligned with the line representing the derived equation.

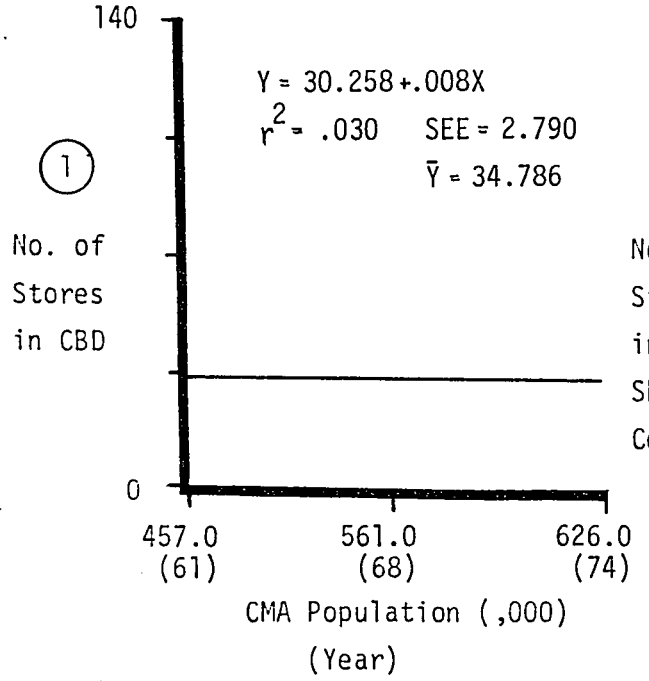
Regression (1a) was undertaken as a result of the negative slope in regression (1) following the methodology explained in Chapter II. The results indicate that a positive relationship exists between the CBD department stores and the central area population. The relationship is positive since both variables are declining. The r^2 is moderately high (.808). Comparison of the coefficients of determination of (1) and (1a) indicates a stronger relationship between the central area population and the CBD department stores than between the latter and the CMA population. This result suggests that many CBD department stores were oriented and dependent upon the local population for their sustenance and were therefore junior or discount type outlets, limited in the lines and quality of merchandise offered.

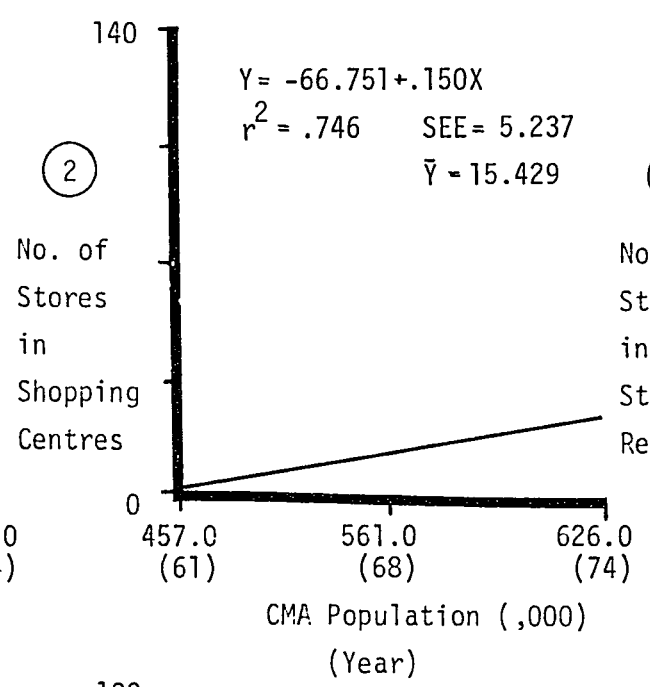
Examination of the regression results of (2) suggests the existence of a strong positive relationship between department stores in shopping centres and the population of the CMA. A moderate slope (.078) and a high r^2 (.869) shows the strength of the relationship. Conversely, the results of regression (3) indicates that department stores in strip retail locations declined as the CMA population increased. The results of (3) and (1) are very similar, consequently the regression lines are almost parallel.

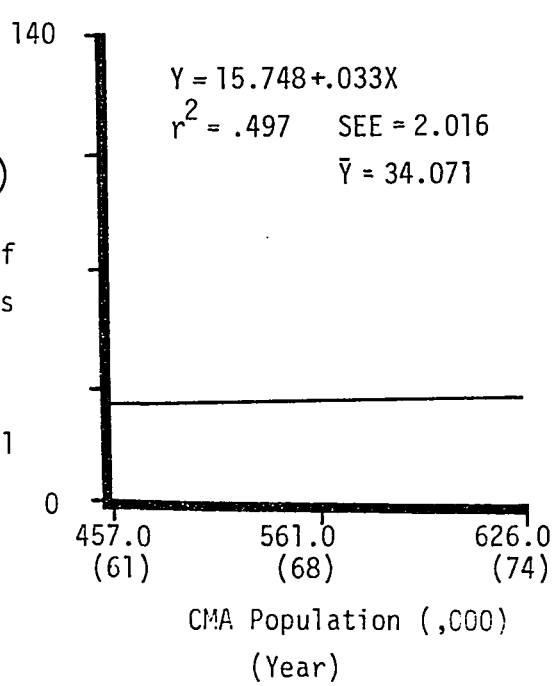
Regressing the total number of department stores in the urbanized CMA on the CMA population in (4) reveals the presence of a slope that

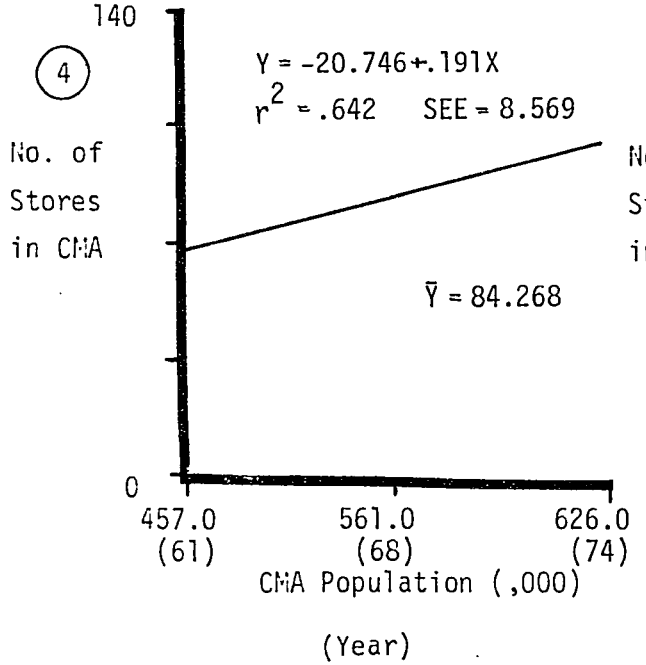
parallels the abscissa. The r^2 is .0003, further indicating the complete lack of relationship between the variables. The consequences of this lack of change in the total number of department stores within the urban CMA reinforces the statement made earlier, that only a realignment of department stores occurred where both the CBD and strip retail registered a net loss and the shopping centres registered a net gain. The reason for this redistribution of department stores appears to be threefold: 1) surge in shopping centre developments; 2) decline of central area population; 3) too high a clustering of especially junior outlets in the CBD in the beginning of the study period causing considerable competition through market shares.

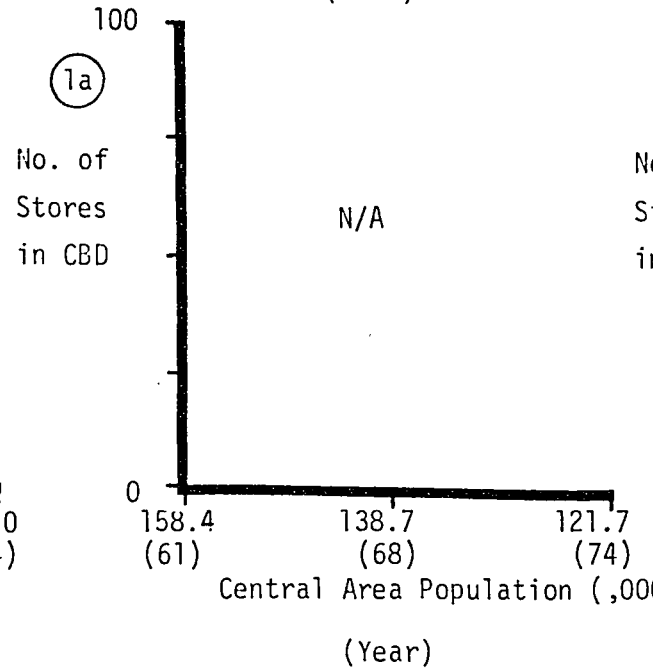
4.1.2. Men's Wear

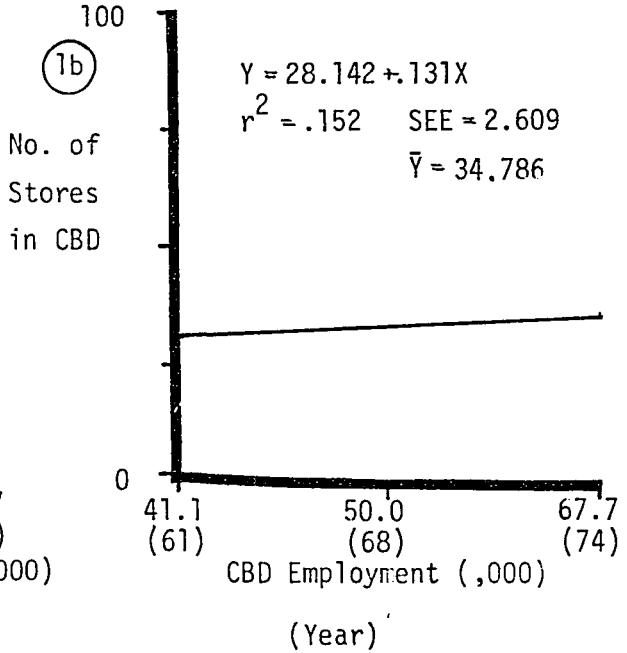

140
0
Y = 30.258 + .008X
r^2 = .030 SEE = 2.790
$\bar{Y}$ = 34.786
1
No. of Stores in CBD
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -66.751 + .150X
r^2 = .746 SEE = 5.237
$\bar{Y}$ = 15.429
2
No. of Stores in Shopping Centres
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = 15.748 + .033X
r^2 = .497 SEE = 2.016
$\bar{Y}$ = 34.071
3
No. of Stores in Strip Retail
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -20.746 + .191X
r^2 = .642 SEE = 8.569
$\bar{Y}$ = 84.268
4
No. of Stores in CMA
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


100
0
1a
No. of Stores in CBD
N/A
158.4 (61)
138.7 (68)
121.7 (74)
Central Area Population (,000)
(Year)


100
0
Y = 28.142 + .131X
r^2 = .152 SEE = 2.609
$\bar{Y}$ = 34.786
1b
No. of Stores in CBD
41.1 (61)
50.0 (68)
67.7 (74)
CBD Employment (,000)
(Year)

Men's and Boys' Wear Outlets

Examination of the input data (Appendix E) reveals that the number of men's and boys' wear outlets in the CBD increased only very slightly over the study period, while shopping centres and strip retail had very strong and moderate increases respectively. The total number of these outlets in the urban CMA increased by 60% between 1961 and 1974.

Although the input data revealed only a slight increase in the number of CBD outlets, the increase was accompanied by irregular fluctuations almost year to year. Partly for this reason, the r^2 in (1) turned out to be insignificant (.030), showing no relation between the dependent variable and the CMA population. Reasons for this trend in the CBD can only be speculative with the data available, however, it is suggested that since many of the men's and boys' outlets are part of local or national chains, one or two outlets in the CBD per chain is sufficient to meet market demands, while new outlets would enter the market with the opening of new shopping centres as suggested by the regression results in (2). Furthermore, the CBD outlets may have become more specialized over time, and although the relationship between the CBD outlets and the CBD employment in (1b) is insignificant (partly because of the irregular fluctuations in the number of CBD outlets) it is suggested that the CBD outlets depend more and more on the continuously increasing CBD employment for their sustenance, and are slowly resigning their dependence on the CMA market.

Results of regressions (2) and (3) reveal that both shopping centre and strip retail outlets are increasing with the CMA population. The slope of the equation representing shopping centre outlets is considerably steeper than that of strip retail outlets (.150 to .033), indicating a significantly faster rate of growth of the former. Included in the strip retail category were also the outlets of the CBDs of Hull and Vanier, the results of which would tend to over-emphasize the true ribbon retail growth.

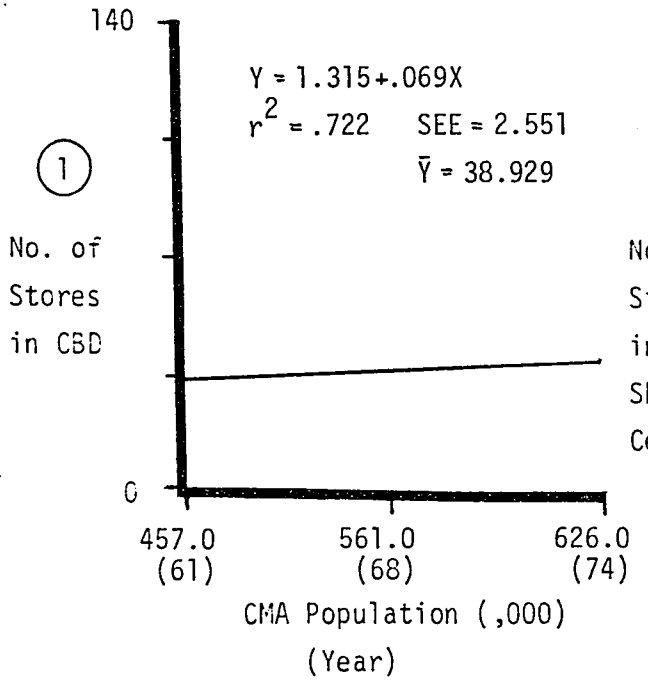
The total number of these outlets in the urban CMA grew at a rate of .191 per 1000 people as shown in the results in (4). The slopes of the derived equations (1), (2) and (3) are additive and their sum is equal to the derived slope of (4). This allowed the calculation of the ratios of the rates of growth of .04:.79:.17:1 for (1), (2), (3) and (4) respectively.

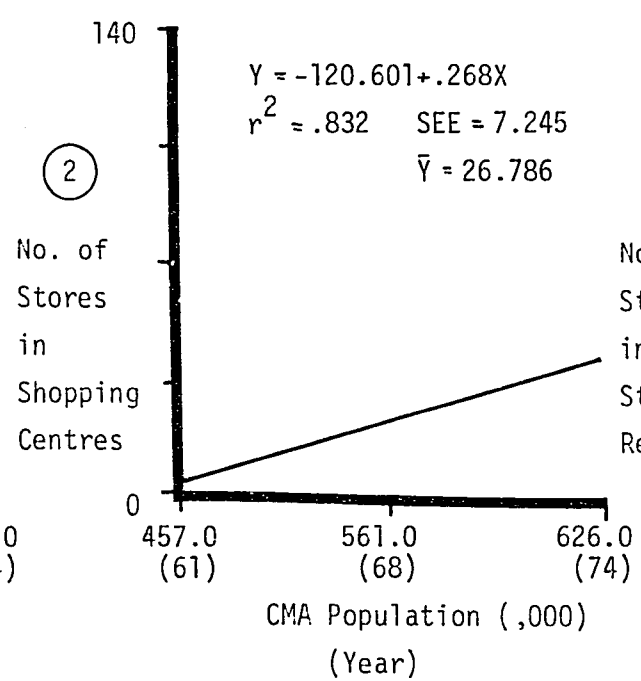
With the exception of the result of (4), only the result of (2) showed a moderately high coefficient of determination, clearly demonstrating the strength of shopping centres. The SEE, when compared to the mean of the dependent variable, is well over 30% indicating that the scatter points are not closely aligned with the regression line.

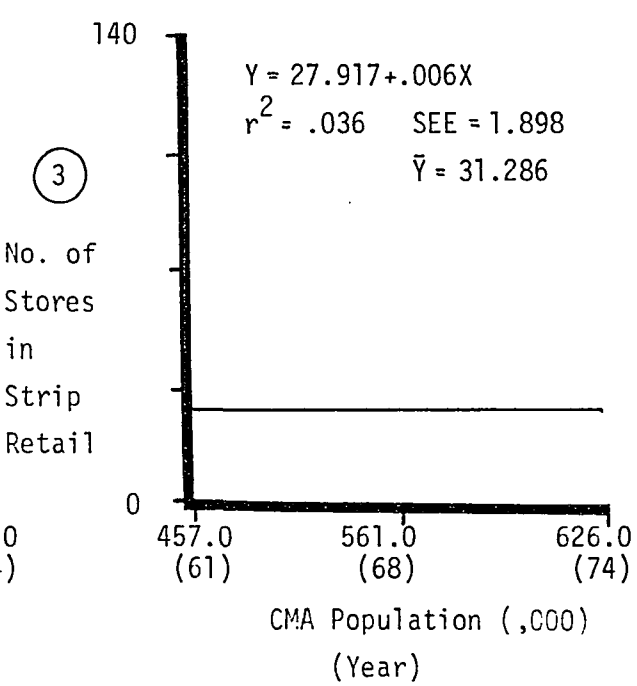
Although the statistical relationships between CBD and CMA population and shopping centre outlets and CMA population is clearly demonstrated by regression results (1) and (2), caution should be exercised in concluding the complete lack of dominance of CBD outlets of the CMA market. As previously pointed out, the only slight increase

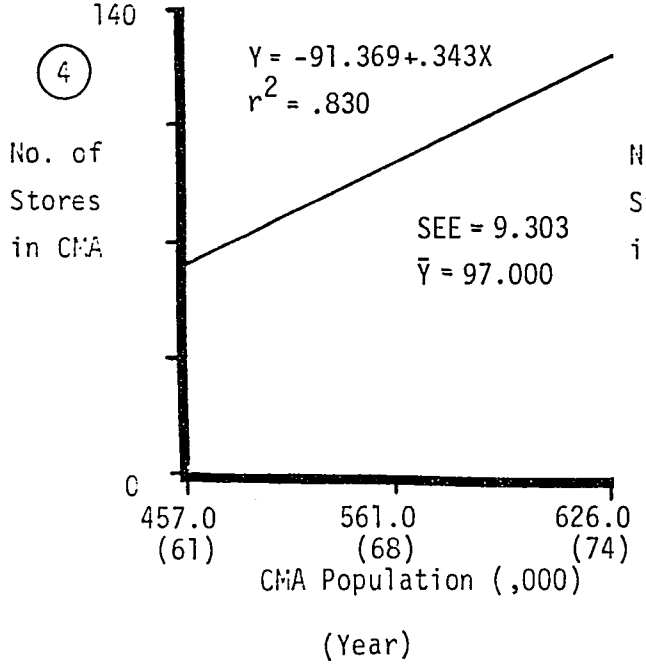
in the number of CBD outlets combined with their irregular fluctuations, may indicate that these outlets have become more specialized. The lack of data on the degree of specialization of CBD outlets over time does not allow specific conclusions about the true strength of these CBD outlets. If the slopes of the derived equations of (1) and (2) are believed to be indicators of the relative strengths of CBD and shopping centre outlets in the urban CMA, then shopping centre outlets, as a group, have or may come to dominate the CMA market. Presently, the CBD is still by far the largest single men's and boys' outlet node in the Ottawa-Hull area. What seems to be occurring within the CMA, as suggested by Berry and Cohen (1974), is a multi-nodalization of retailing activities, with the CBD remaining the dominant node but not necessarily dominating the total CMA market.

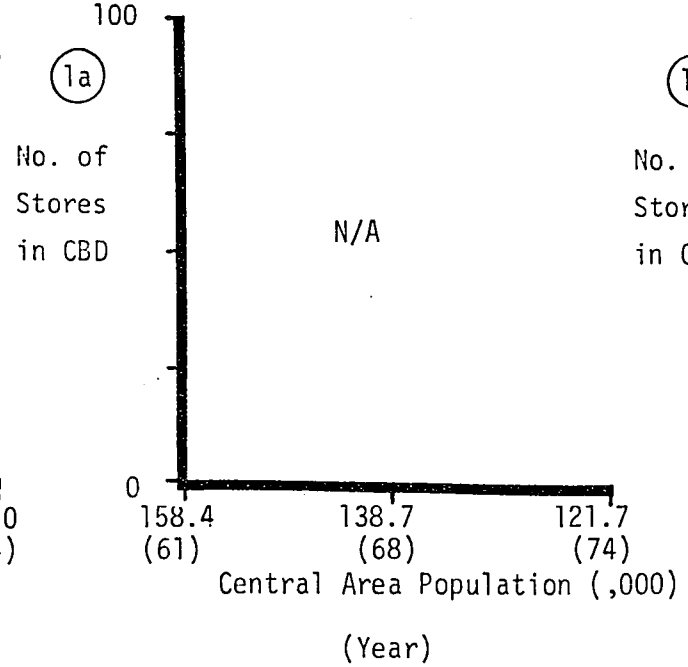
4.1.3. Women's Apparel

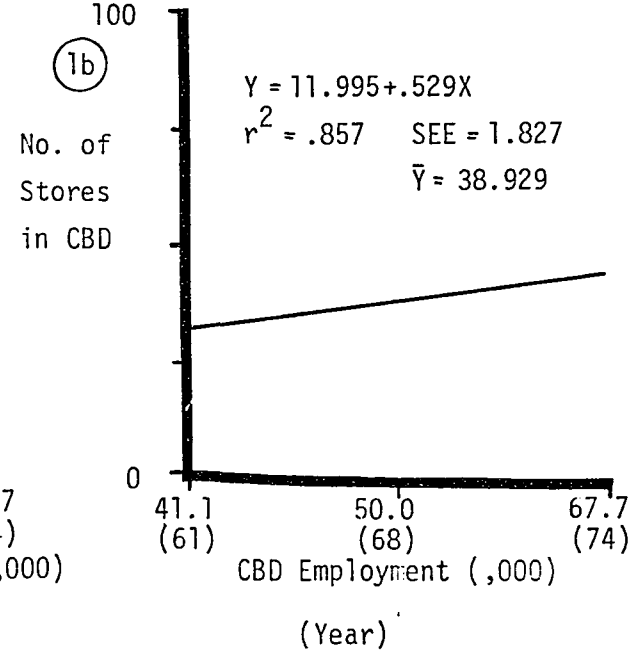

140
0
Y = 1.315+.069X
r^2 = .722 SEE = 2.551
$\bar{Y}$ = 38.929
1
No. of Stores in CBD
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -120.601+.268X
r^2 = .832 SEE = 7.245
$\bar{Y}$ = 26.786
2
No. of Stores in Shopping Centres
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = 27.917+.006X
r^2 = .036 SEE = 1.898
$\bar{Y}$ = 31.286
3
No. of Stores in Strip Retail
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -91.369+.343X
r^2 = .830
SEE = 9.303
$\bar{Y}$ = 97.000
4
No. of Stores in CMA
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


100
0
1a
No. of Stores in CBD
N/A
158.4 (61)
138.7 (68)
121.7 (74)
Central Area Population (,000)
(Year)


100
0
Y = 11.995+.529X
r^2 = .857 SEE = 1.827
$\bar{Y}$ = 38.929
1b
No. of Stores in CBD
41.1 (61)
50.0 (68)
67.7 (74)
CBD Employment (,000)
(Year)

Women's Apparel Outlets

Examination of the input data for women's apparel (Appendix E) reveals that the number of outlets in the CBD increased by 37%, those in shopping centres exhibited a very strong increase of over 770%, the number of strip retail outlets remained relatively static and the total number of outlets in the urbanized CMA nearly doubled over the study period.

Examining the results of the regression of women's apparel outlets in the CBD on the CMA population in (1), reveals a moderately strong positive relationship between the variables. The r^2 of .722 suggests that about 72% of the variation in the dependent variable can be "accounted for" by variations in the independent variable. The slope of the derived equation (.069) suggests that with an increase in a 1000 people in the CMA, there is a corresponding increase of .069 women's apparel outlets in the CBD.

Because the slope of the derived equation in (1) is positive, the number of CBD outlets was regressed on the CBD employment, the results of which are exhibited in (1b). Comparing the coefficients of determination of (1) and (1b) of .722 to .857 respectively, suggests a somewhat greater dependence of these outlets on the CBD employment than on the CMA population. This result may indicate the realignment of women's apparel outlets into nodes within the urban CMA, where the CBD is still by far the largest node, but depends to a greater and greater degree not on the CMA market but rather on the CBD employment for its survival.

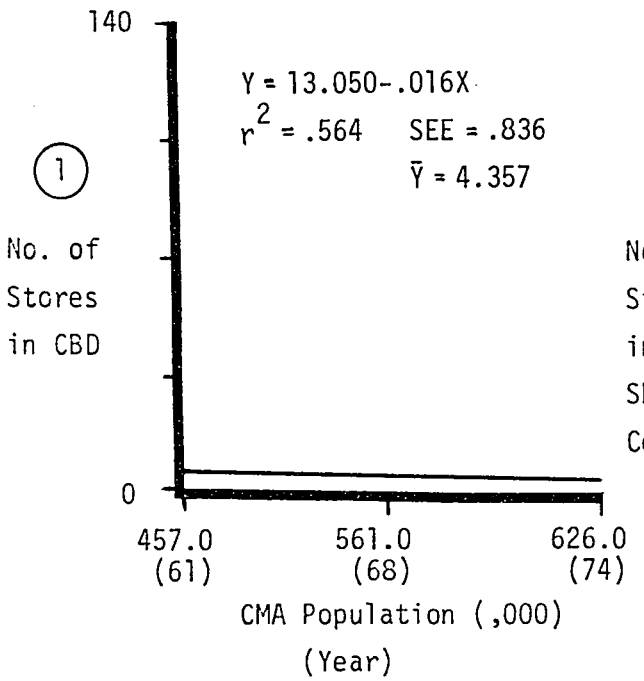
Regressing women's apparel outlets in shopping centres on the CMA population in (2) reveals a strong positive relationship between the variables. Over 80% of the variation in the number of these outlets can be "explained" by variations in the CMA population. Although the slope of the regression line is a steep .268, the SEE when compared to the mean of "$\bar{Y}$" is a high 27% indicating that the scatter points are losely dispersed. This may indicate that the regression line representing the derived equation, may not be the best "fit" to these scatter points.

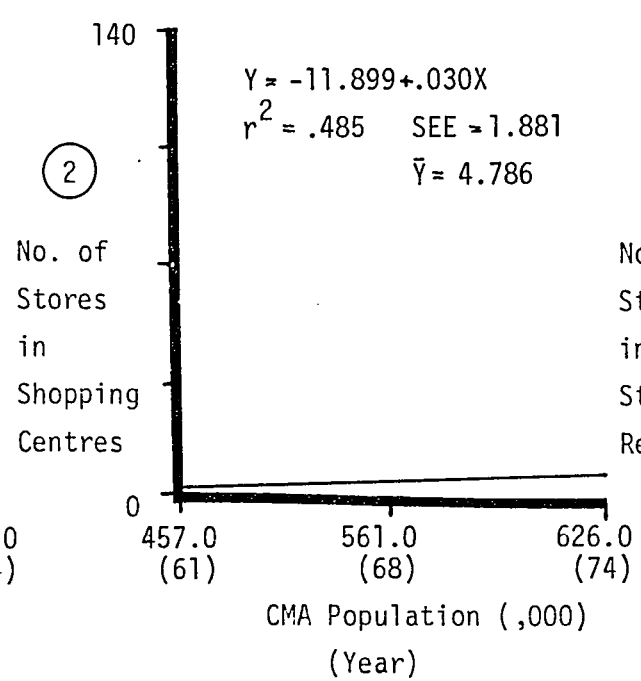
Comparing the slopes of regressions (1) and (2) compares not only their rates of growth, but in effect compares the "gaining momentum" of one over the other, or the popularity of one over the other. A spacious, climate-controlled regional shopping centre offering nineteen women's apparel outlets under one roof, (Bayshore) does have its advantages. Although individual shopping centre outlets may have little effect on the CBD market (hence the number of CBD outlets), their combined effect is likely detrimental. This surge in women's apparel outlets in shopping centres may have caused similar outlets in the CBD to depend on the downtown employment as is suggested in (1b).

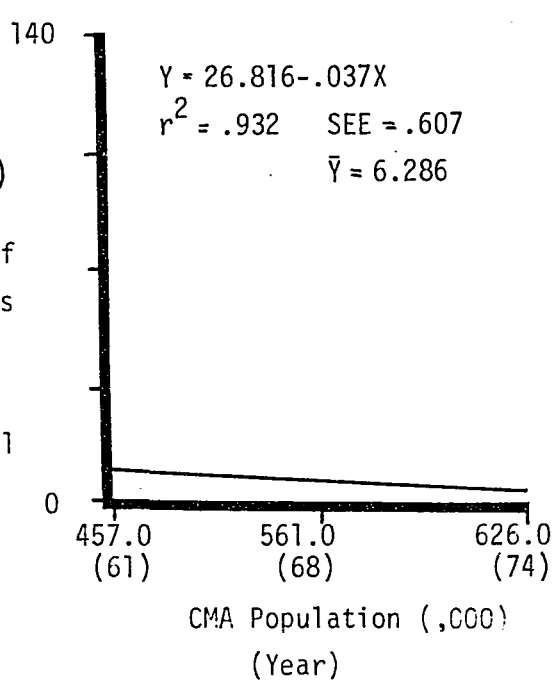
The number of women's apparel outlets in strip retail when regressed on the CMA population showed no relationship between the variables in (3). Review of the input data indicates that this is not unexpected. It should be pointed out, that the CBDs of Hull and Vanier are included in the strip retail category, and their presence likely over-estimates the true strip retail-CMA population relationship.

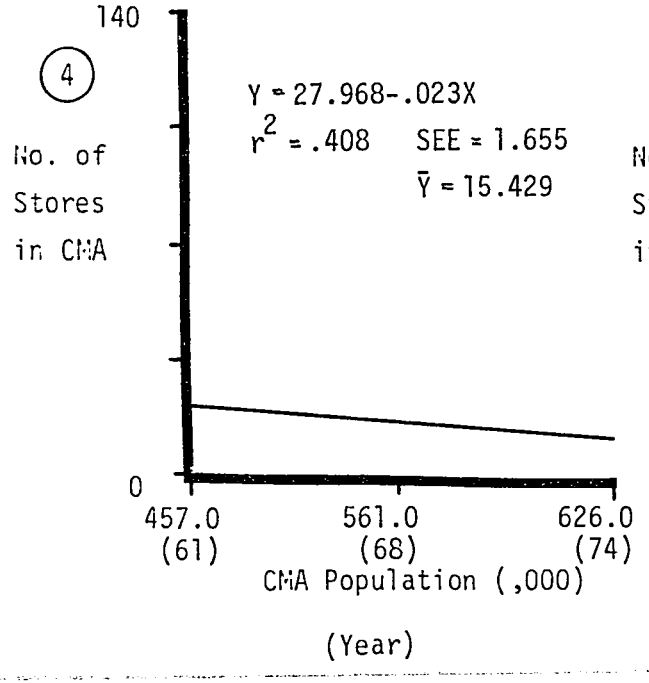
Results of regression (4) show a strong positive relationship between the total number of outlets in the urban CMA and the CMA population. The coefficient of determination of .830 suggests that 83% of the variation in the dependent variable can be attributed to the variations in the CMA population. The slope of .343 shows their high rate of growth over the study period and indicates that the rate of duplication of establishments is approximately one per 2,650 people.

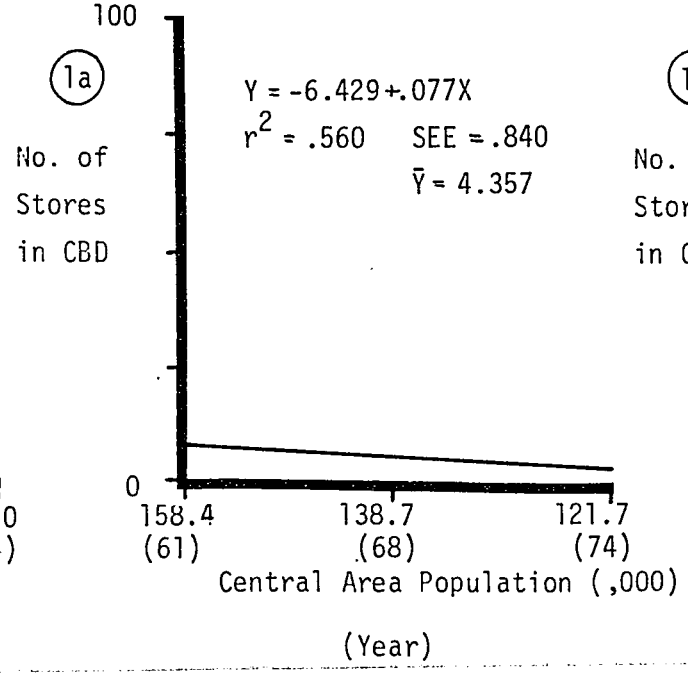
4.1.4. Children's Wear

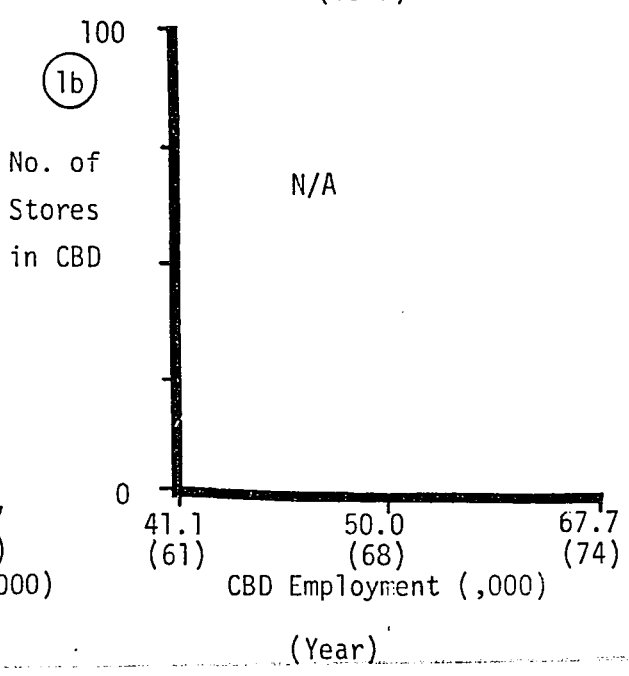

140
0
Y = 13.050-.016X
r² = .564 SEE = .836
Ȳ = 4.357
(1)
No. of Stores in CBD
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -11.899+.030X
r² = .485 SEE = 1.881
Ȳ = 4.786
(2)
No. of Stores in Shopping Centres
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = 26.816-.037X
r² = .932 SEE = .607
Ȳ = 6.286
(3)
No. of Stores in Strip Retail
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = 27.968-.023X
r² = .408 SEE = 1.655
Ȳ = 15.429
(4)
No. of Stores in CMA
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


100
0
Y = -6.429+.077X
r² = .560 SEE = .840
Ȳ = 4.357
(1a)
No. of Stores in CBD
158.4 (61)
138.7 (68)
121.7 (74)
Central Area Population (,000)
(Year)


100
0
(1b)
No. of Stores in CBD
N/A
41.1 (61)
50.0 (68)
67.7 (74)
CBD Employment (,000)
(Year)

Children's Wear Outlets

Examination of the input data for children's wear outlets (Appendix E) reveals that outlets in the CBD and strip retail have declined over the study period, those in shopping centres increased and the total number within the urbanized CMA remained relatively static between 1961 and 1974, showing minor fluctuations every two or three years.

Considering that about 30% of the CMA population is represented by children fourteen years of age and under, it is surprising that so few outlets cater directly to them. On the other hand, it may be argued that because of growth and "wear and tear", style is not of great importance. Quantity appears to be more important than quality, which is readily provided by department stores of all types, especially the junior and discount types.

Examination of the regression results of (1) reveals a negative relationship between CBD outlets and the CMA population. The r^2 of .564 does not indicate a strong relationship between the variables as only about 56% of the variation in the number of CBD outlets is "attributable" to the variations in the independent variable. Similarly, the regression results of (3) indicate a negative relationship between the number of outlets in strip retail and the CMA population, but in this case, the r^2 is a very high .932 showing that these establishments decreased uniformly as the CMA population increased. The high r^2 with the negative slope implies a strong inverse relationship between

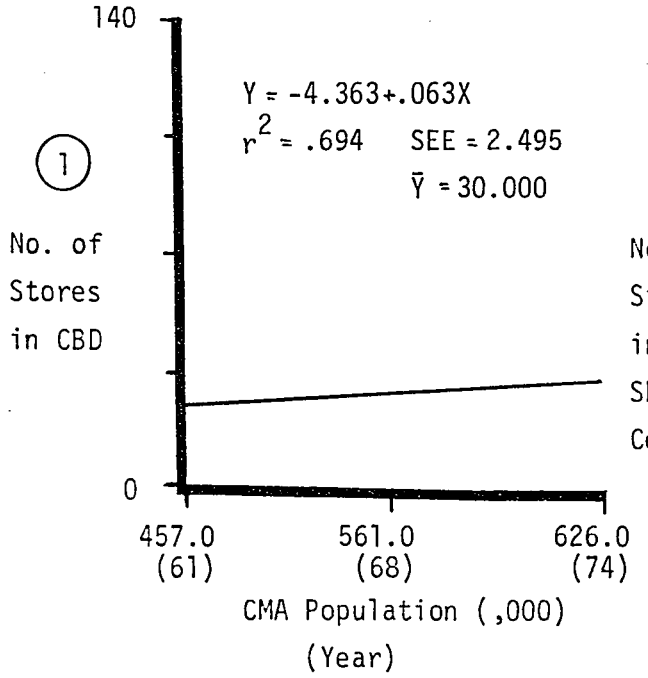
the variables although a true dependence is difficult to justify. Examining the regression results in (2) between the shopping centre outlets and the CMA population, a poor positive relationship may be noted. Although statistically this relationship is weak, it may be postulated that with the growth of shopping centres it became more profitable for many strip retail outlets to relocate into shopping centres and take advantage of the pedestrian traffic flows. As in previous cases, it should be pointed out that the results of regression (3) are not altogether valid because of the inclusion of the CBDs of Hull and Vanier.

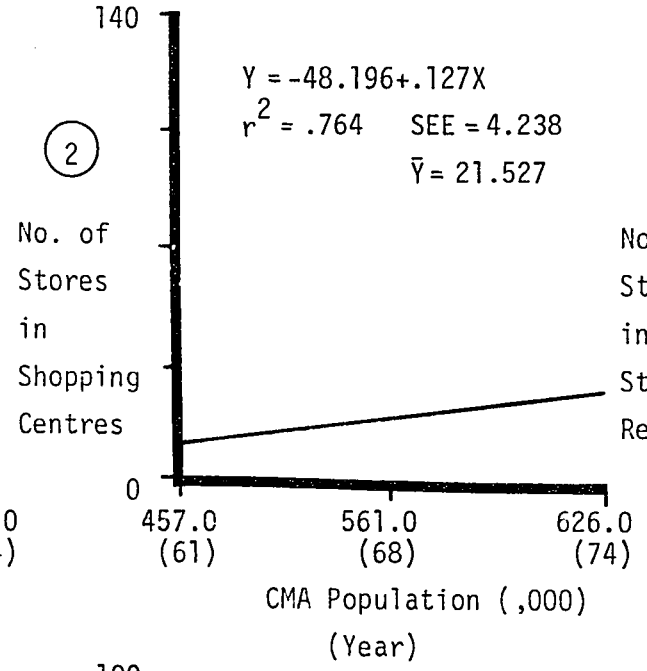
As with department stores, the total number of children's wear outlets remained relatively unchanged through the study period which indicates that only an internal realignment of these outlets occurred. The shift was from the CBD and strip locations to shopping centres. Although the slope of the derived equation in (4) is negative, it is clear that the regression line is almost parallel to the abscissa. Only about 40% of the variation in the number of the urbanized CMA outlets can be "explained" by the variations in the CMA population. Considering again the importance of quantity over quality, which is abundantly provided by junior and discount department stores, it is not surprising that the total number of these outlets did not keep pace with the CMA population.

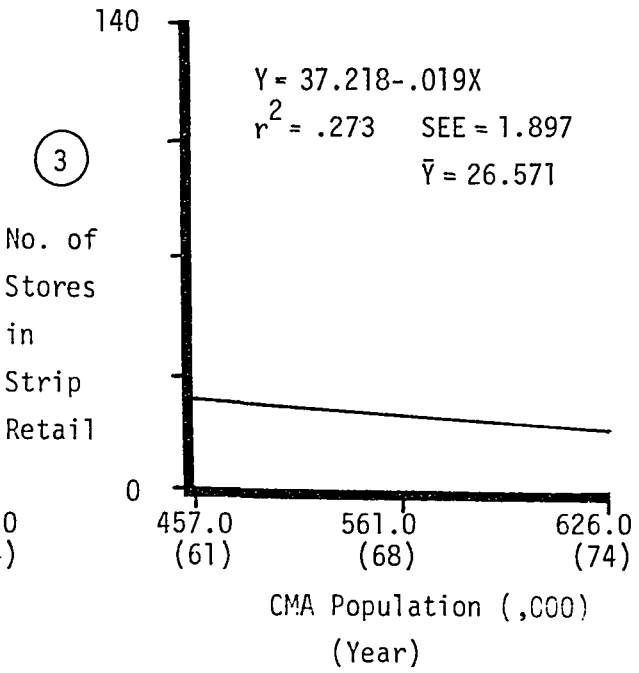
Because of the negative slope in (1), outlets in the CBD was regressed on the population of the central area (1a). The regression

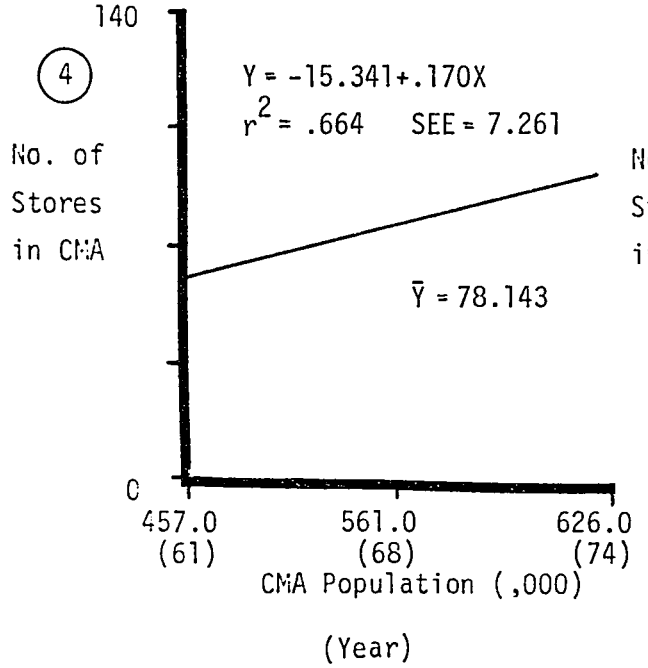
results are similar to those of (1) with the exception of a positive slope which is the result of both variables declining together. These results would tend to suggest that the children's wear outlets in the CBD were dependent upon the population of the central area and as this population declined, the number of CBD outlets declined as a result. The results of (1a)further imply that these CBD outlets did not have regional pull but catered to a limited, relatively local market area.

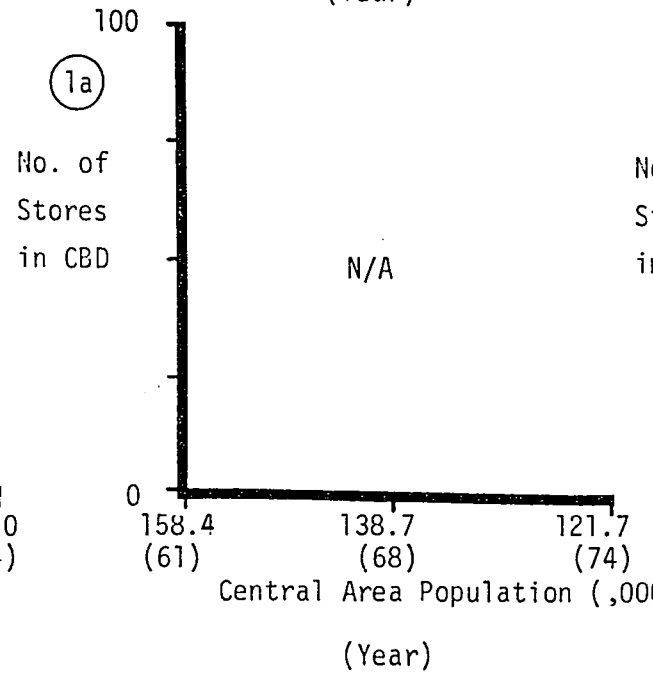
4.1.5. Shoes

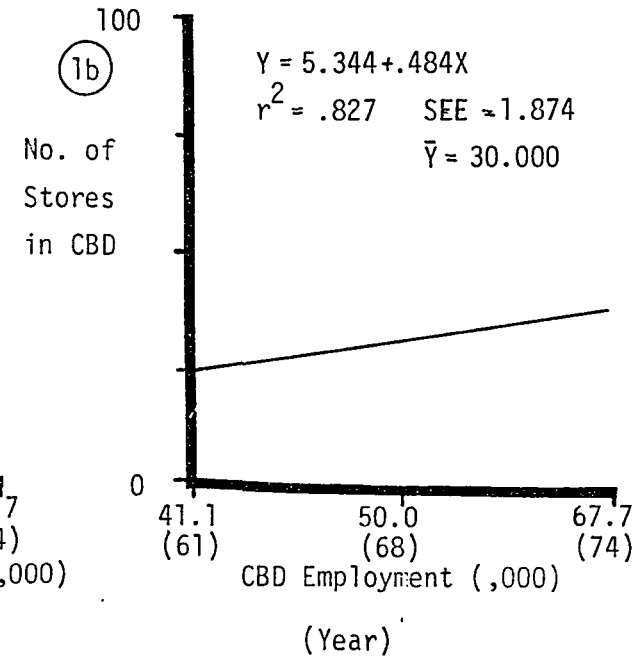

140
0
Y = -4.363+.063X
r² = .694 SEE = 2.495
Ȳ = 30.000
1
No. of Stores in CBD
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -48.196+.127X
r² = .764 SEE = 4.238
Ȳ = 21.527
2
No. of Stores in Shopping Centres
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = 37.218-.019X
r² = .273 SEE = 1.897
Ȳ = 26.571
3
No. of Stores in Strip Retail
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -15.341+.170X
r² = .664 SEE = 7.261
Ȳ = 78.143
4
No. of Stores in CMA
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


100
0
1a
No. of Stores in CBD
N/A
158.4 (61)
138.7 (68)
121.7 (74)
Central Area Population (,000)
(Year)


100
0
Y = 5.344+.484X
r² = .827 SEE = 1.874
Ȳ = 30.000
1b
No. of Stores in CBD
41.1 (61)
50.0 (68)
67.7 (74)
CBD Employment (,000)
(Year)

Shoe Stores

A review of the input data for shoe stores (Appendix E) indicates an increase in the number of these outlets in the CBD, in shopping centres and the urbanized CMA between 1961 and 1974. During this same period, the number of outlets in strip retail declined slightly, but did so in an almost cyclical manner.

Regression results (1) and (1b) reveal a positive relationship between the number of shoe stores in the CBD and both the CMA population and the CBD employment. The results of (1) indicate that about 70% of the variation in the number of shoe stores in the CBD can be "explained" by the variations in the CMA population (r^2= .694). The results of (1b) indicate that over 80% of this variation can be "explained" by the variations in the CBD employment (r^2= .827). This suggests, as in other similar cases, that a certain decline in the regional market share of these CBD outlets has occurred and this decline was paralleled by an increased dependence on a growing local market - the CBD employment.

The number of shoe stores in shopping centres increased at about the same rate as the number of shopping centres, indicating a growing reliance on suburban markets. This is more readily demonstrated by the results of the regression of outlets in shopping centres on the CMA population in (2). A moderately steep slope of .127 and an r^2 of .764 exhibits the type of relationship. The rate of increase of shoe stores in shopping centres is twice that of similar outlets in the CBD, further indicating the decreasing reliance of the CMA population on

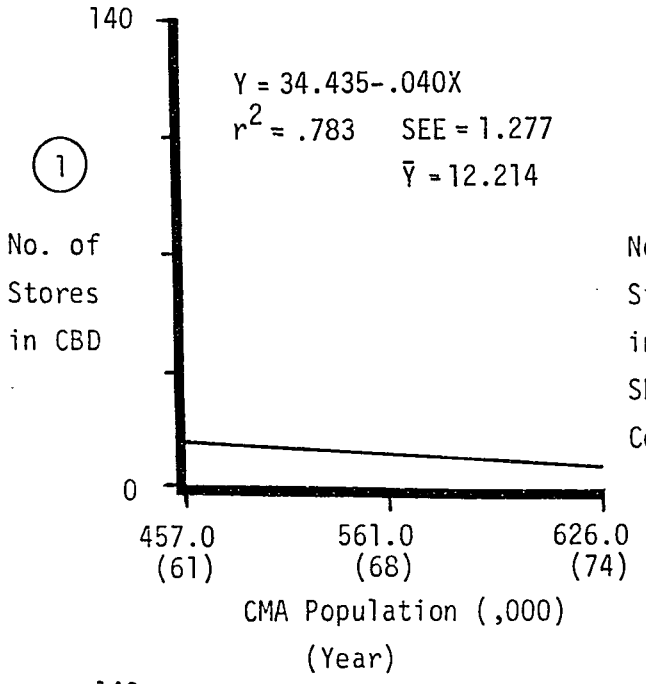
the CBD outlets.

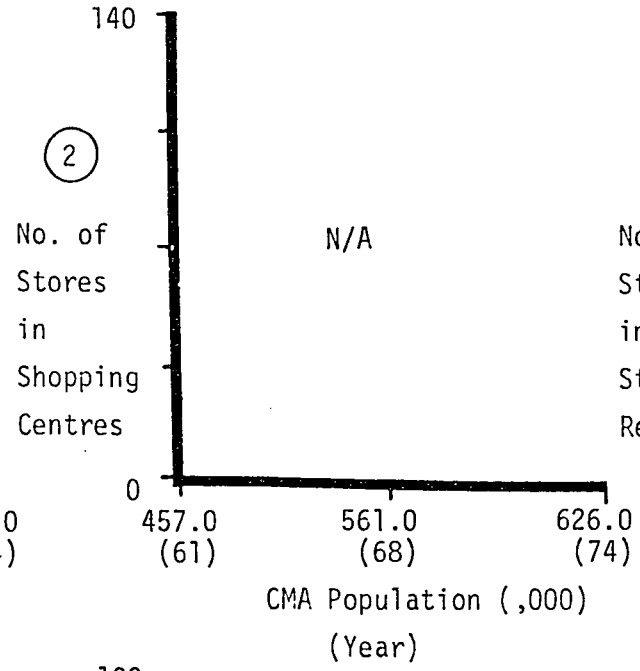
Regressing strip retail outlets on the CMA population in (3) yields a very shallow negative slope and a poor relationship (r^2= .273) and may be the result of the inability of most of these outlets to attract enough customers without clustering with other similar stores. Once again it should be emphasized that the CBDs of Hull and Vanier are part of the strip retail group and therefore the derived equation likely underestimates the "true" relationship.

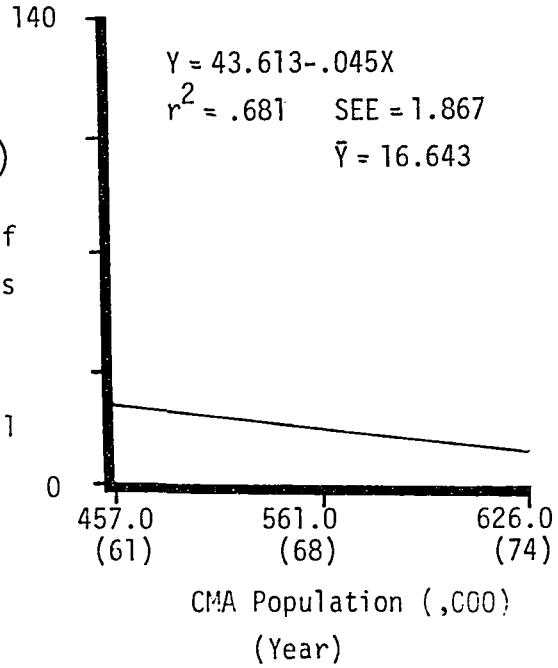
Results of the regression of the number of urbanized CMA outlets on the CMA population in (4) show a steep slope (.170) and a moderate r^2 (.664). The slope indicates that with an increase of about 5,900 people in the CMA there is a corresponding increase of one shoe store, revealing their high rate of duplication.

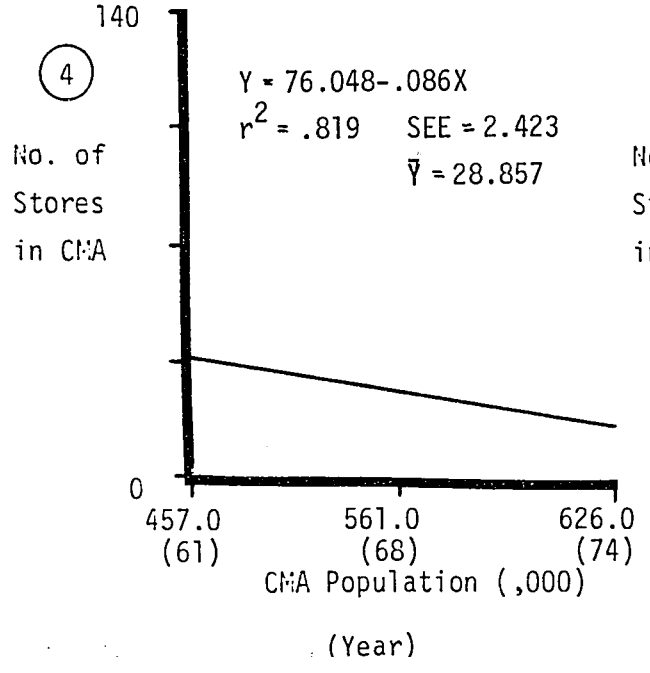
4.1.6. Furriers

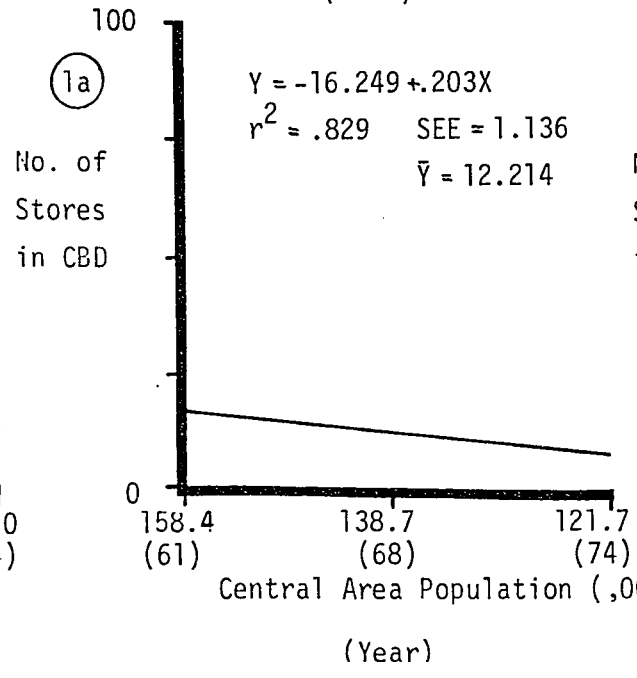
FURRIERS

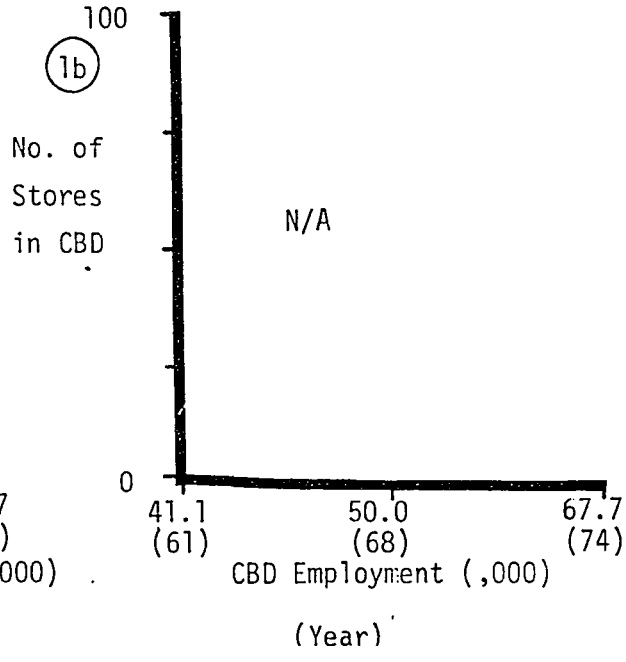

140
Y = 34.435-.040X
r^2 = .783 SEE = 1.277
$\bar{Y}$ = 12.214
1
No. of Stores in CBD
0
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
2
No. of Stores in Shopping Centres
N/A
0
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
Y = 43.613-.045X
r^2 = .681 SEE = 1.867
$\bar{Y}$ = 16.643
3
No. of Stores in Strip Retail
0
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
Y = 76.048-.086X
r^2 = .819 SEE = 2.423
$\bar{Y}$ = 28.857
4
No. of Stores in CMA
0
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


100
Y = -16.249+.203X
r^2 = .829 SEE = 1.136
$\bar{Y}$ = 12.214
1a
No. of Stores in CBD
0
158.4 (61)
138.7 (68)
121.7 (74)
Central Area Population (,000)
(Year)


100
1b
No. of Stores in CBD
N/A
0
41.1 (61)
50.0 (68)
67.7 (74)
CBD Employment (,000)
(Year)

Furrier Outlets

An examination of the input data (Appendix E) reveals that the number of furriers in the CBD, in strip retail and overall in the urbanized CMA declined steadily over the study period. There were no furriers in shopping centres.

The derived regression results in (1), (3), (4) and (1a) indicate through the r^2 that a significant relationship exists between the number of furriers and population. As in previous cases, regression (1a) was undertaken because of the negative slope in (1). The derived slope in regression (1a) is positive as both variables are declining together. Comparison of the coefficients of determination of (1) and (1a) indicates that the decline of CBD outlets is more closely related to the decline of the central area population than the CMA population (ie. the variation in the number of CBD outlets is better explained by the variations in the central area population than the CMA population). Because of the degree of specialization of these outlets, however, this result may be questionable.

The derived negative slopes in (1), (3) and (4) together with the total absence of furriers from shopping centres suggests three possible trends this function may be experiencing: i) as a result of demand, furriers have become more specialized over the study period, forcing the less specialized outlets out of business, thereby causing a negative slope in (1), (3) and (4); ii) furriers have become less

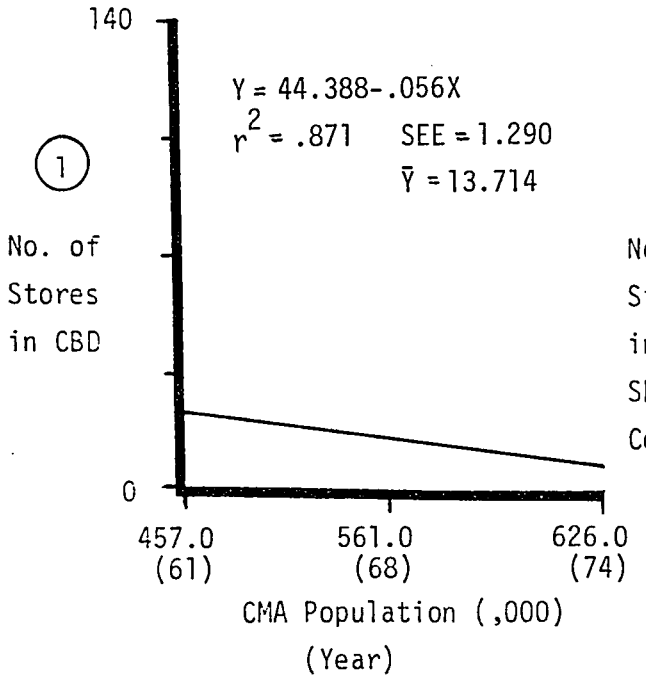
specialized outlets (offering a narrow range of high quality merchandise) were forced to close. This again would cause a decline in the number of these outlets and thus a negative slope in (1), (3) and (4); iii) market threshold has changed within the study time frame as a result of a) changes in fashion, placing less emphasis on fur type merchandise as the "in thing" and/or b) a greater awareness of the need for preservation of species, environmental control and ecological balance, changing people's attitudes and needs, causing an overall decline in furrier outlets, and thus a negative slope in (1), (3) and (4).

It is suspected, that it is the increasing environmental awareness that has caused a decline in the number of these stores, however, determination of the true cause of this decline would require a separate study, and the above is offered not as the result of statistical inference but rather as intuitive reasoning.

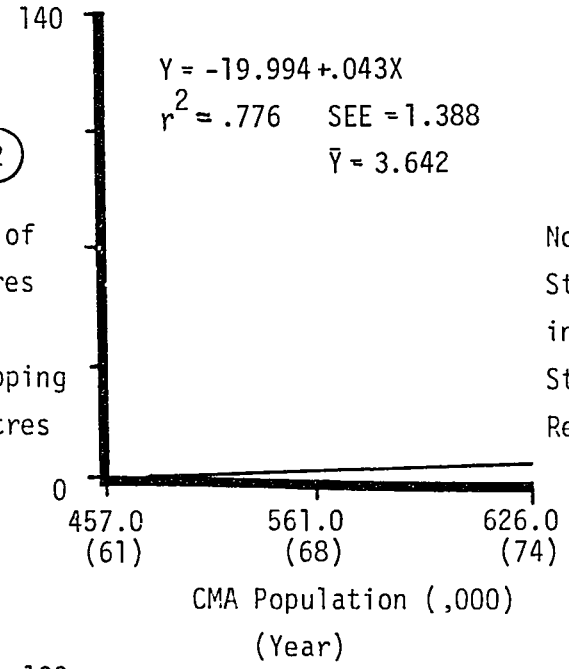
An interesting aspect of these furrier outlets is their total absence from shopping centres. Given that they are highly specialized outlets, catering to selected market, it would not be unreasonable to expect most of these outlets to locate in the CBD. Input data however, suggests that this is not the case. Closer examination of the locations of these outlets reveals that many are clustered around the periphery of the CBD and had the CBD been delimited according to a "more suitable" criterion, many of the outlets now grouped with strip retail, would be considered as part of the CBD. Furthermore, since the Hull and Vanier CBDs are part of the strip retail group, the true

concentration of furriers in CBDs is further exemplified. Most of these furriers are old established outlets, having been in existence for many decades in the same locations. Their absence from shopping centres may imply their high degree of specialization and they would not derive benefit from large traffic flows. Although furrier outlets may be highly specialized, they do not appear to be specialized enough to locate anywhere in the CMA. Their degree of specialization, however, seems to be high enough not to allow them to risk failure by locating in even the largest of the shopping centres.

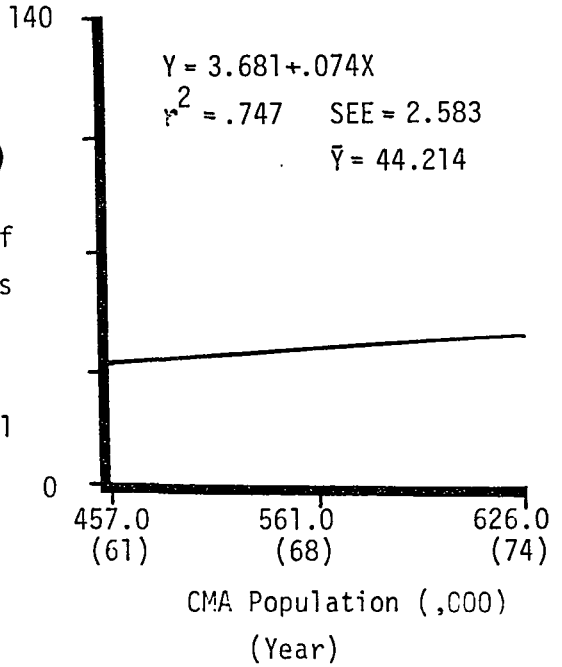
4.1.7. Furniture Stores


140
0
Y = 44.388-.056X
r^2 = .871 SEE = 1.290
$\bar{Y}$ = 13.714
No. of Stores in CBD
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)

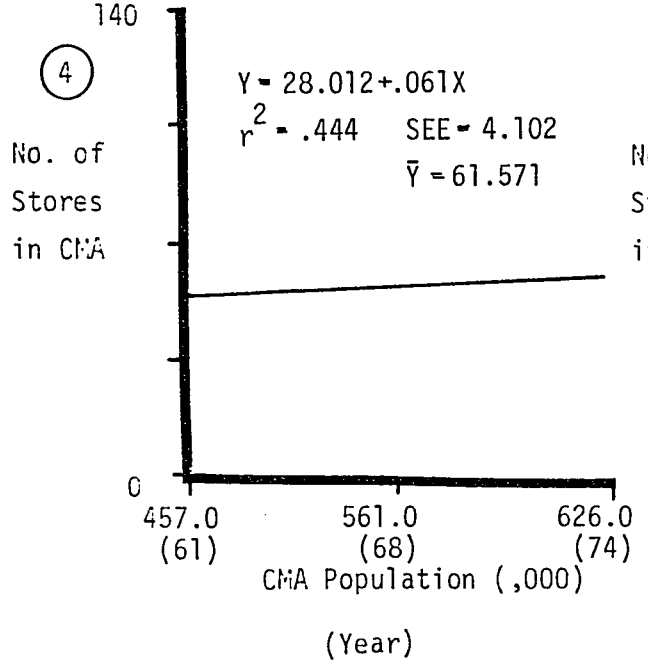
1


140
0
Y = -19.994+.043X
r^2 = .776 SEE = 1.388
$\bar{Y}$ = 3.642
No. of Stores in Shopping Centres
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)

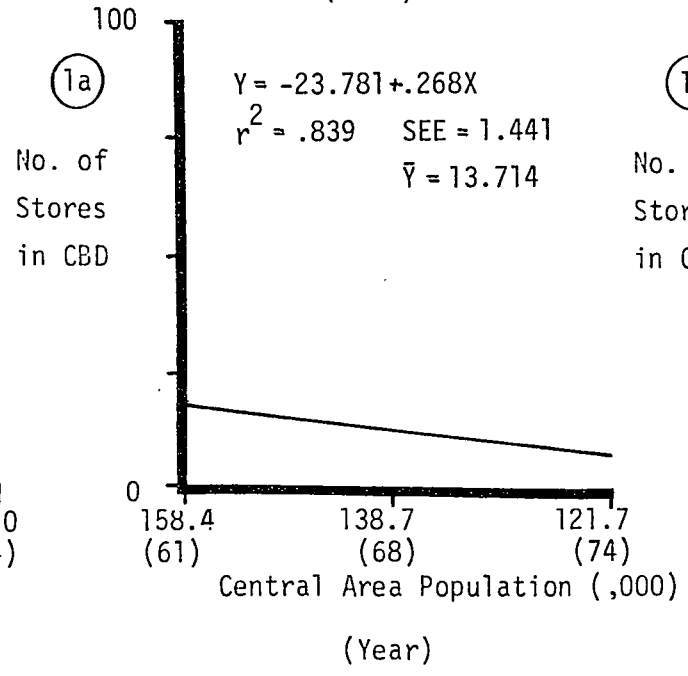
2


140
0
Y = 3.681+.074X
r^2 = .747 SEE = 2.583
$\bar{Y}$ = 44.214
No. of Stores in Strip Retail
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)

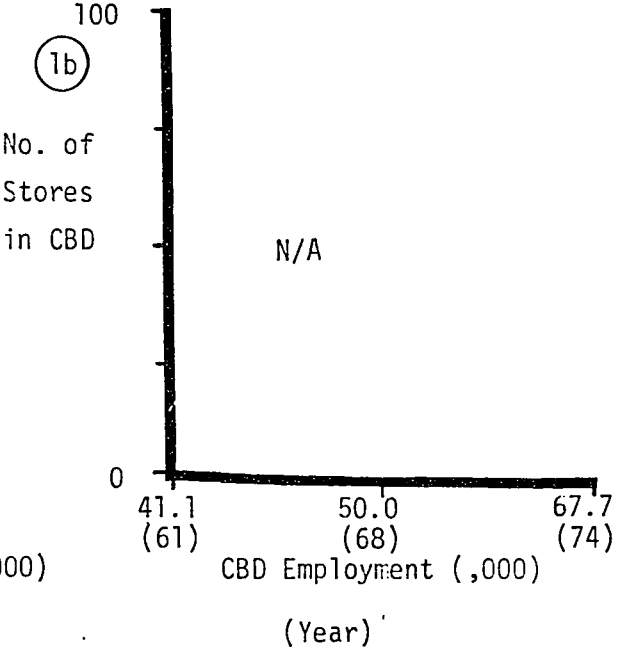
3


140
0
Y = 28.012+.061X
r^2 = .444 SEE = 4.102
$\bar{Y}$ = 61.571
No. of Stores in CMA
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)

4


100
0
Y = -23.781+.268X
r^2 = .839 SEE = 1.441
$\bar{Y}$ = 13.714
No. of Stores in CBD
158.4 (61)
138.7 (68)
121.7 (74)
Central Area Population (,000)
(Year)

1a


100
0
No. of Stores in CBD
N/A
41.1 (61)
50.0 (68)
67.7 (74)
CBD Employment (,000)
(Year)

1b

Furniture Stores

Examination of the input data for furniture stores (Appendix E) reveals a decrease in the number of outlets in the CBD and an increase in the number of similar outlets in shopping centres, strip retail and the urbanized CMA.

Regressing the number of outlets in the CBD on the CMA population in (1) reveals a high degree of statistical association between the variables. The slope is a moderate -.056 and the r^2 is a high .871. These derived results may have been caused by two, possibly simultaneously occurring events: i) as the CMA population increased, many CBD outlets gradually decentralized into the suburbs following the population, ii) because of the increase in the CMA population and/or the increase in public activities (specifically the federal government), demand for CBD land caused land prices and rents to escalate, which in turn forced many of these "space dependent" outlets to seek lower rents outside the CBD. Assuming that events i) and/or ii) have caused this decentralization of furniture outlets from the CBD, it would not be unreasonable to expect the remaining CBD outlets to be highly specialized.

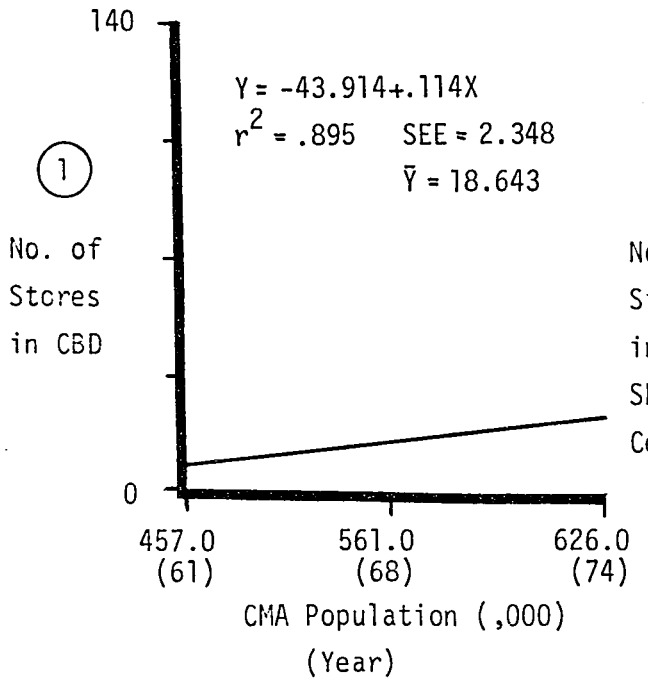
As a result of the negative slope derived in (1), the number of CBD outlets was regressed on the population of the central area in (1a) The derived results indicate that as the population of the central area decreased by 1000, there was a corresponding decrease of .268 furniture outlets. The coefficient of determination is a high .839.

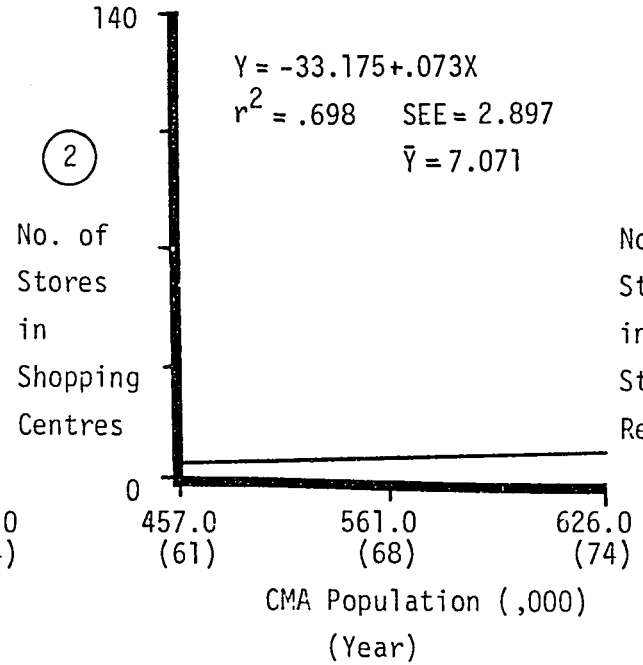
These results tend to support the occurrence of event i) above.

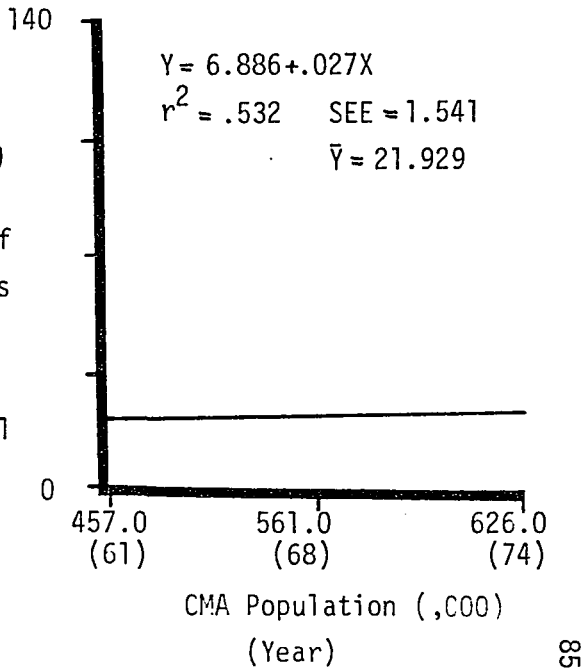
In (2), the number of outlets in shopping centres was regressed on the CMA population. A shallow slope of .043 and a moderate r^2 of .776 were derived. The SEE is almost 40% of the mean of "Y", suggesting that the scatter points are loosely dispersed about the regression line (ie. suggesting a poor "fit"). Nonetheless, the derived equation does indicate the trend of outlets in shopping centres. Because rents in some shopping centres may be as high as rents in the CBD, many furniture outlets are showrooms only, and perform warehousing functions away from the shopping centres. This allows them to take advantage of not only the lower rents but also the "impulse" and "spin-off" shoppers.

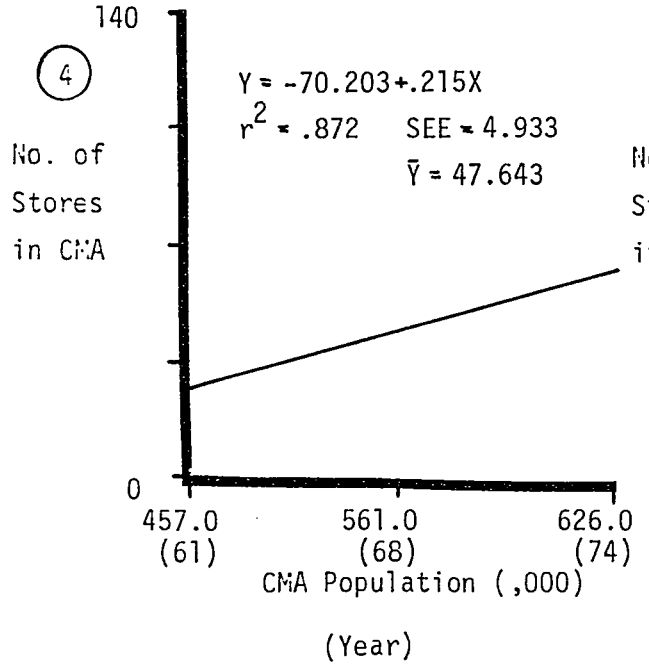
Regressing the number of outlets in strip retail on the CMA population in (3), shows a positive slope of .074 and an r^2 of .747. The concentration and the preference or need of these outlets to be located in strip retail is evident. Regressing the total number of outlets in the urbanized CMA on the CMA population in (4) reveals a slope of .061 and a poor r^2 of .444. Comparison of the derived slopes of (3) and (4) reveals that the strip retail outlets are increasing at a faster rate than the total number of outlets within the urbanized CMA. This is a significant point because it further exemplifies the need of these outlets to locate in strip retail.

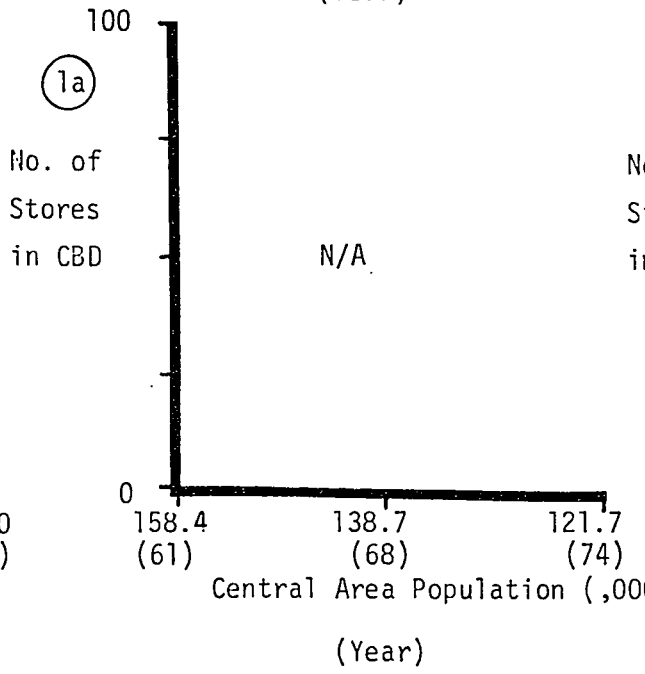
4.1.8. Gift Shops

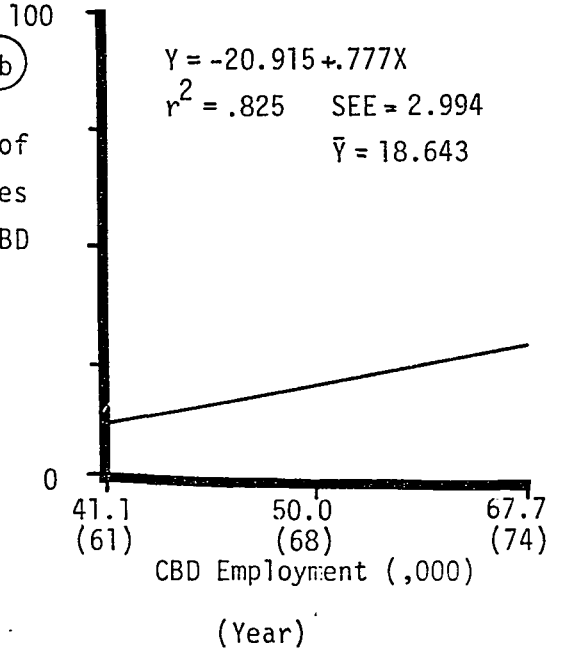

140
0
Y = -43.914+.114X
r^2 = .895 SEE = 2.348
$\bar{Y}$ = 18.643
1
No. of Stores in CBD
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -33.175+.073X
r^2 = .698 SEE = 2.897
$\bar{Y}$ = 7.071
2
No. of Stores in Shopping Centres
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = 6.886+.027X
r^2 = .532 SEE = 1.541
$\bar{Y}$ = 21.929
3
No. of Stores in Strip Retail
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -70.203+.215X
r^2 = .872 SEE = 4.933
$\bar{Y}$ = 47.643
4
No. of Stores in CMA
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


100
0
1a
No. of Stores in CBD
N/A
158.4 (61)
138.7 (68)
121.7 (74)
Central Area Population (,000)
(Year)


100
0
Y = -20.915+.777X
r^2 = .825 SEE = 2.994
$\bar{Y}$ = 18.643
1b
No. of Stores in CBD
41.1 (61)
50.0 (68)
67.7 (74)
CBD Employment (,000)
(Year)

Gift Shops

Examination of the input data (Appendix E) reveals that all four areas under consideration showed an increase in the number of outlets during the study period. The number of outlets in the CBD, in shopping centres, in strip retail and in the urbanized CMA increased 133%, 850%, 30% and 115% respectively over the fourteen year period.

Results of regressions (1) and (1b) suggest a strong positive relationship between the CBD outlets and both the CMA population and the CBD employment respectively. The derived r^2 in (1) is somewhat higher than that derived in (1b). It was expected that the opposite would occur since an increase in the CBD employment would be expected to generate an increased demand for gift shops. This implied greater dependence of CBD outlets on the CMA population, rather than on the CBD employment, may be considered to indicate the "high" degree of specialization of these establishments.

Regressing gift shops in shopping centres on the CMA population in (2) reveals a gentle slope (.073) and a moderate r^2 (.698). Since the total number of these outlets in shopping centres is less than the total number of shopping centres, their degree of specialization likely requires a large population threshold and therefore most of these outlets are drawn only into the larger shopping centres thereby allowing them to take advantage of large pedestrian flows.

Comparing the regression lines of (1) and (2), as well as the slopes of their respective derived equations, it is evident that gift

shops in the CBD increased at a rate of approximately 1.5 times faster than those in shopping centres. The SEE in (2), however, is 2.897 and when compared to the mean of the dependent variable, shows a scatter of points about the regression line of almost 41%. Furthermore, comparing the input data with the derived regression line demonstrates that this derived line does not depict the true relationship.

The number of gift shops in strip retail locations showed only a slight increase over the study period and this is confirmed by the regression results in (3) through a shallow slope of .027. These outlets exhibited only a mediocre correlation with the CMA population, suggesting that their existence is more dependent on a local or other market than on the total CMA population. It should be pointed out again, that the Hull and Vanier CBDs are part of this strip retail group which helps to explain not only the mediocre r^2 but also their significant numbers.

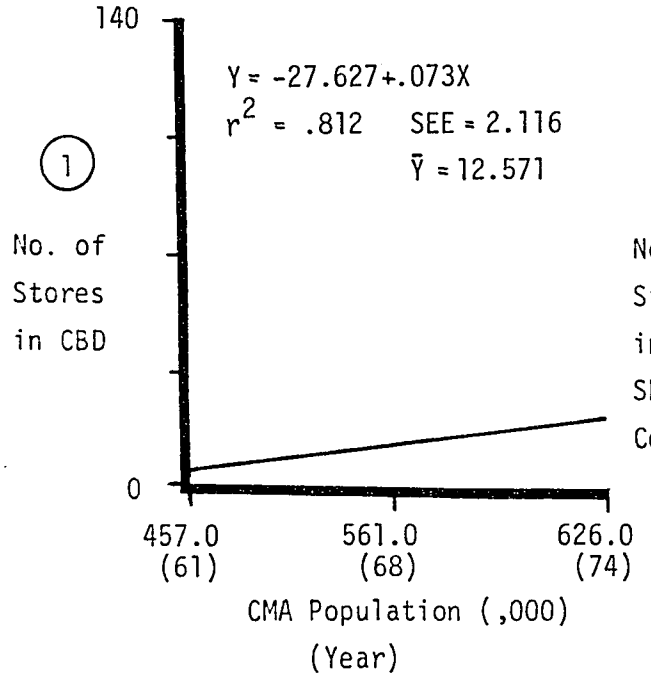
The total number of gift shops in the urbanized CMA, when regressed on the CMA population exhibits a steep slope (.215) and a high r^2 (.872) as shown in (4). These results suggest a strong well developed dependence of gift shops in the urbanized CMA on the CMA population.

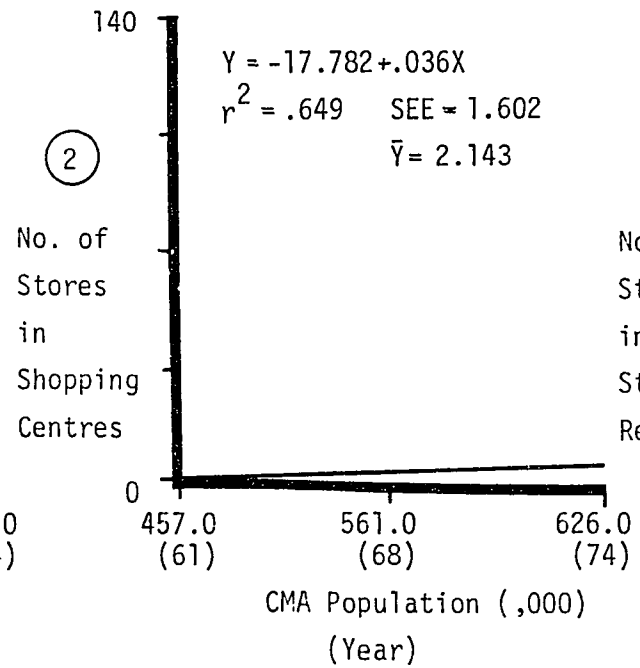
It would not be unreasonable to expect gift shops to be dependent upon tourism to a significant degree. The lack of data on tourist flows into the CMA does not allow substantiation of this hypothesis.

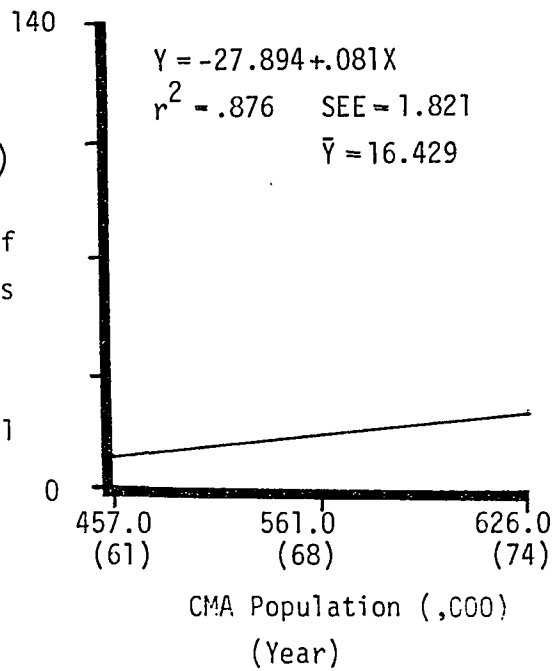
The strength of gift shops in the CBD may not only be the result of CMA population and CBD employment patronage but also that of

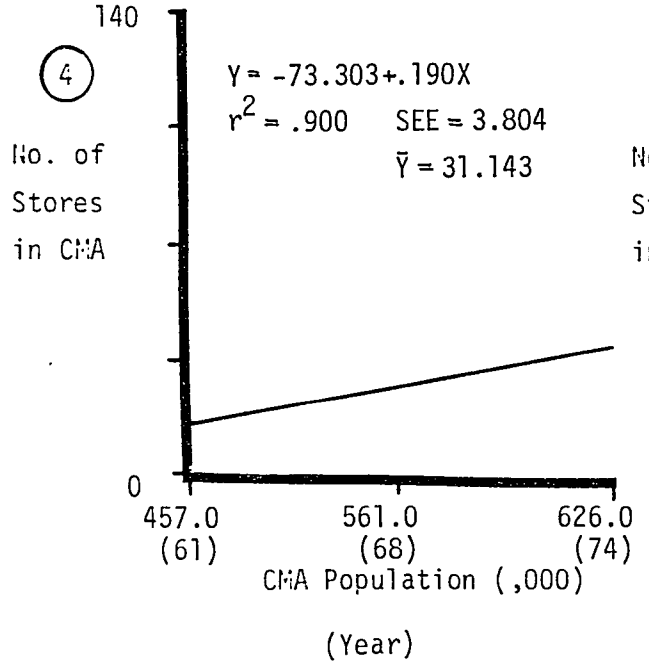
tourism. This again is intuitively suspected and cannot be proved or disproved without adequate information on tourist flows. It is well known however, that tourism is cyclical (peak periods being between June and September). Given its cyclical nature, it would not be unreasonable to assume the existence of a split CBD market such that the gift shops would depend to a significant degree on tourism in the summer and would shift their dependence to the CMA population and the CBD employment in the off-season.

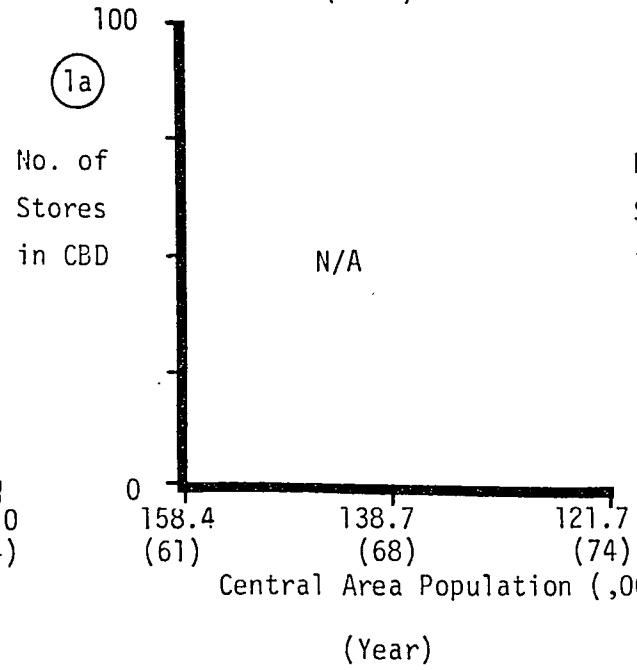
4.1.9. Bookstores

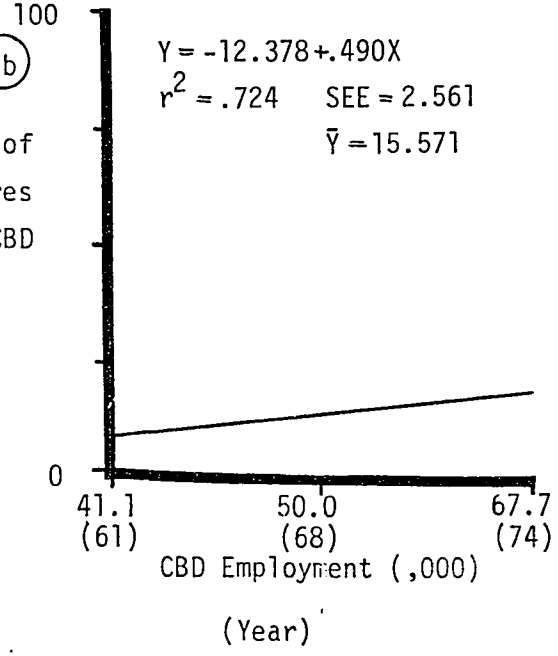

140
0
Y = -27.627+.073X
r² = .812 SEE = 2.116
Ȳ = 12.571
1
No. of Stores in CBD
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -17.782+.036X
r² = .649 SEE = 1.602
Ȳ = 2.143
2
No. of Stores in Shopping Centres
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -27.894+.081X
r² = .876 SEE = 1.821
Ȳ = 16.429
3
No. of Stores in Strip Retail
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -73.303+.190X
r² = .900 SEE = 3.804
Ȳ = 31.143
4
No. of Stores in CMA
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


100
0
1a
No. of Stores in CBD
N/A
158.4 (61)
138.7 (68)
121.7 (74)
Central Area Population (,000)
(Year)


100
0
Y = -12.378+.490X
r² = .724 SEE = 2.561
Ȳ = 15.571
1b
No. of Stores in CBD
41.1 (61)
50.0 (68)
67.7 (74)
CBD Employment (,000)
(Year)

Bookstores

Examination of the input data for bookstores (Appendix E) reveals an increase in the number of outlets in all four areas under consideration over the study period. Until 1966, there were no bookstores in shopping centres within the urbanized CMA. In that year, the first bookstore opened in an Ottawa shopping centre and by 1974 their numbers increased to nine.

Results of the regression of the number of bookstores in the CBD on the CMA population in (1) exhibit a strong positive relationship through a slope of .073 and an r^2 of .812. Because of the positive slope of the derived equation in (1), the number of these outlets in the CBD was regressed on the CBD employment. The results shown in (1b) also indicate a positive relationship, however, the r^2 of .724 is less than that derived in (1) indicating that the variations in the number of CBD outlets is better "explained" by variations in the CMA population than by variations in the CBD employment. This result suggests that the CBD outlets are quite specialized outlets and depend upon the CMA population for their sustenance to a greater degree than upon the CBD employment.

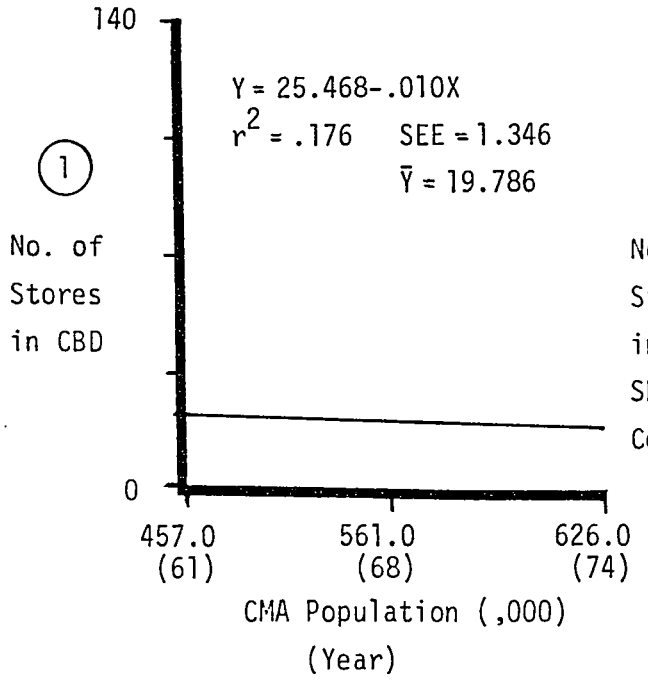
As mentioned above, bookstores in shopping centres within the urbanized CMA only became a reality in 1966. The results of the regression of these outlets on the CMA population in (2) reveals a slope of .036 and a moderate r^2 of .649. Both the late entry of

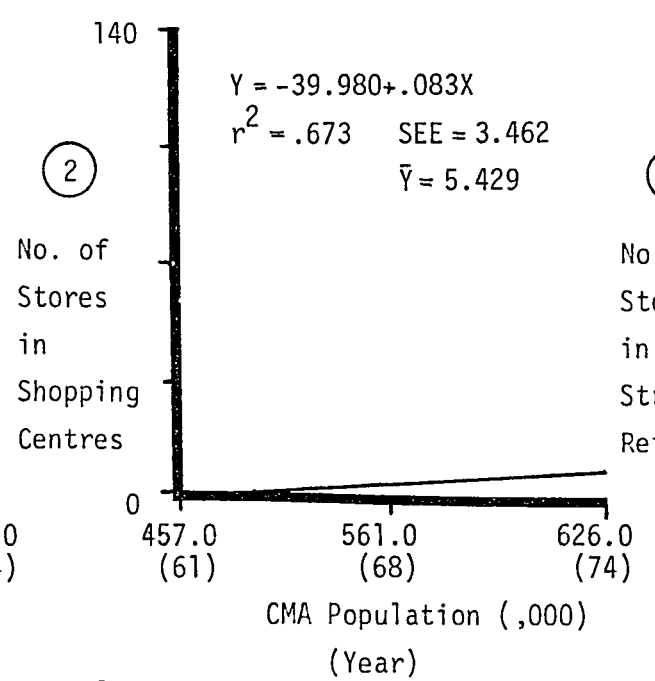
these outlets in shopping centres as well as their slow growth as suggested by the derived slope, indicate their need for a large market. This requirement for a large market may dictate their location only into centres that are regional or well developed community types. The SEE of 1.602, when compared to $\bar{Y}$, is very high, indicating that the scatter points are not closely aligned to the regression line.

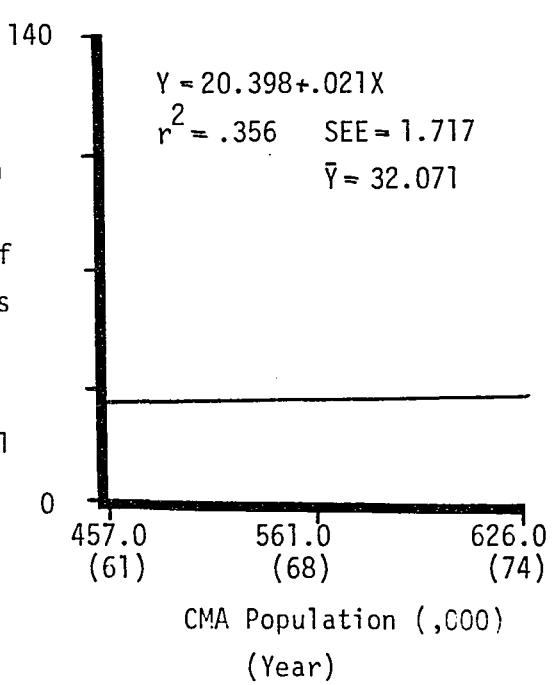
Bookstores in strip retail, when regressed on the CMA population in (3) showed a strong positive relationship through the slope of .081 and the r^2 of .876. Outlets in the strip retail group include outlets in the Hull and Vanier CBDs. Removal of outlets found in these CBDs from the input data and regressing the true strip retail outlets on the CMA population results only in lowering the elevation of the point of intersection of the regression line with the ordinate. The slope of this new line would be approximately the same as in (3) since the number of outlets in these two CBDs remained relatively static over the study period. The high r^2 of .876 suggests the existence of dependence of these outlets on the CMA population. Since many of these outlets are known to be specialized (textbook stores, religious bookstores, etc.), this dependence need not be questioned.

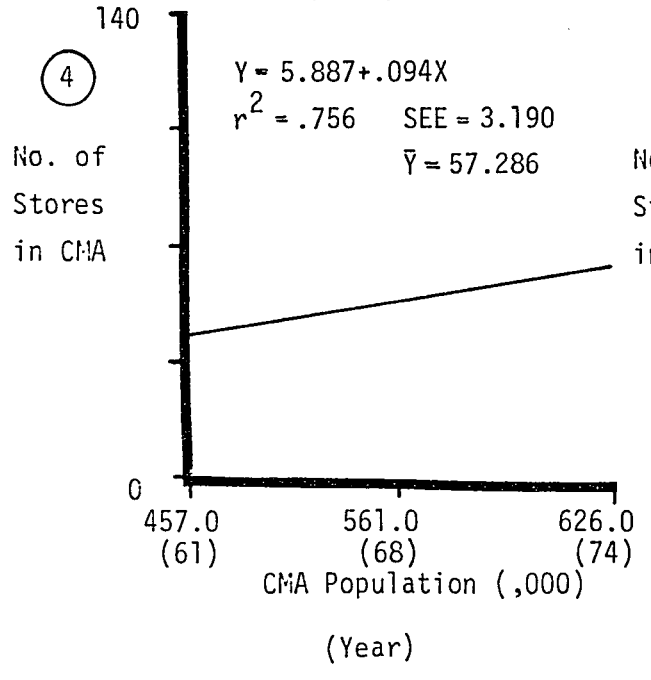
Regressing the outlets in the urbanized CMA on the CMA population in (4), shows a slope of .190 and a high r^2 of .900. This result suggests a high degree of dependence of urbanized CMA outlets on the CMA population. The slope indicates a duplication rate of .190 bookstores in the CMA per 1000 people.

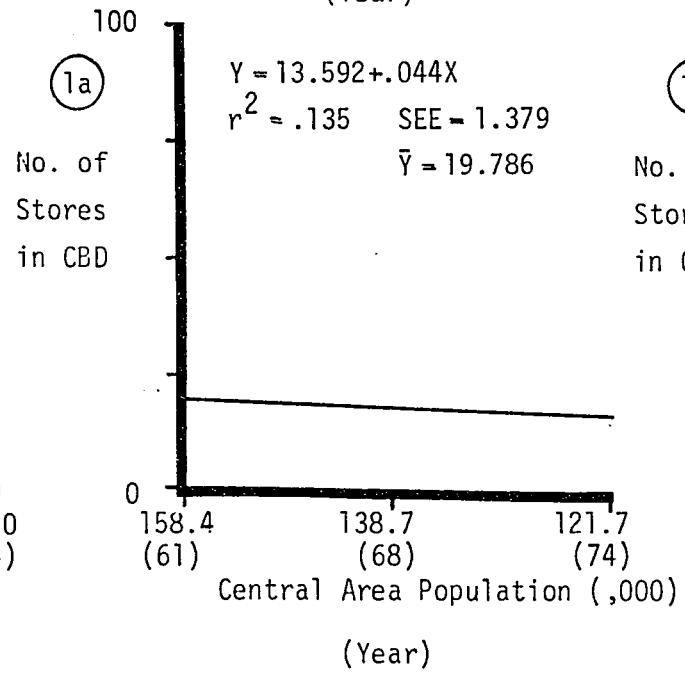
4.1.10. Jewellery Stores

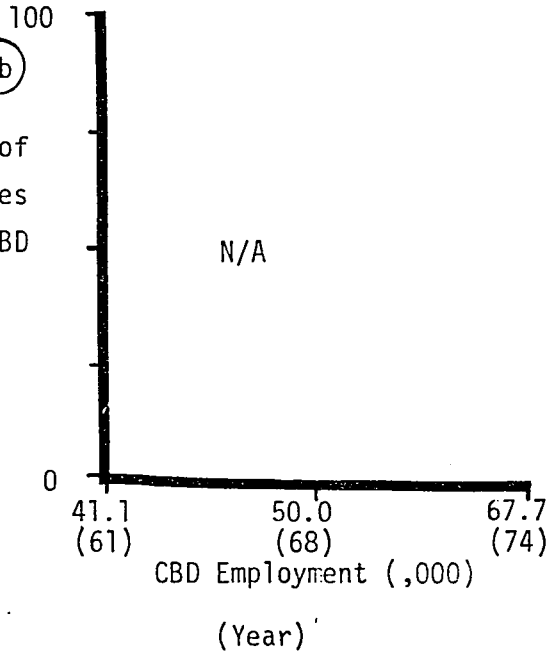

140
0
Y = 25.468-.010X
r^2 = .176 SEE = 1.346
$\bar{Y}$ = 19.786
(1)
No. of Stores in CBD
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -39.980+.083X
r^2 = .673 SEE = 3.462
$\bar{Y}$ = 5.429
(2)
No. of Stores in Shopping Centres
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = 20.398+.021X
r^2 = .356 SEE = 1.717
$\bar{Y}$ = 32.071
(3)
No. of Stores in Strip Retail
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = 5.887+.094X
r^2 = .756 SEE = 3.190
$\bar{Y}$ = 57.286
(4)
No. of Stores in CMA
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


100
0
Y = 13.592+.044X
r^2 = .135 SEE = 1.379
$\bar{Y}$ = 19.786
(1a)
No. of Stores in CBD
158.4 (61)
138.7 (68)
121.7 (74)
Central Area Population (,000)
(Year)

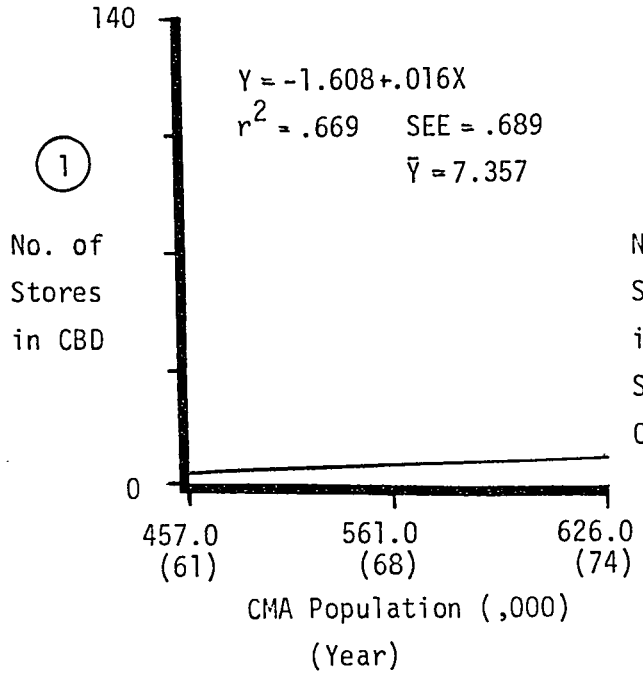

100
0
(1b)
No. of Stores in CBD
N/A
41.1 (61)
50.0 (68)
67.7 (74)
CBD Employment (,000)
(Year)

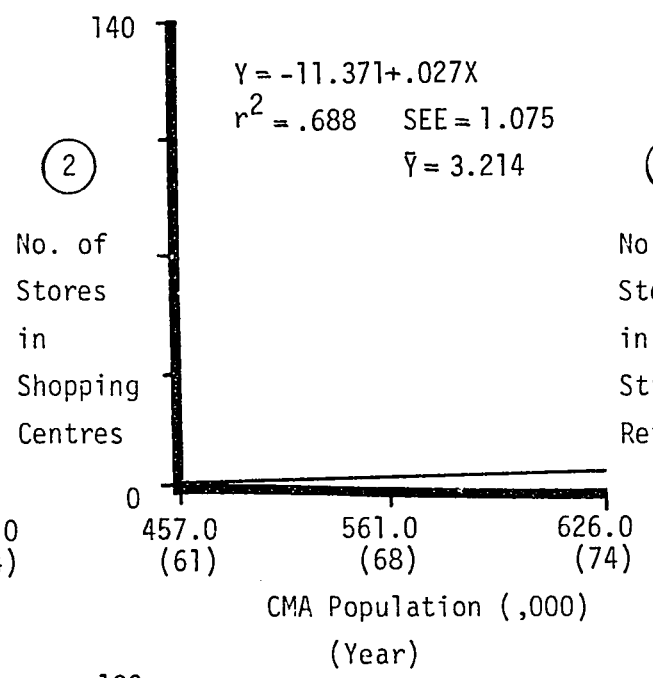
Jewellery Stores

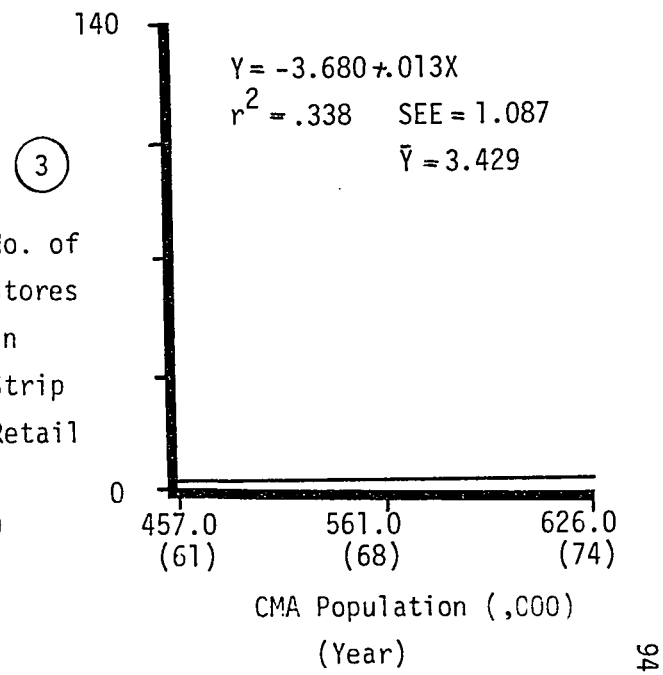
Examination of the input data for jewellery stores (Appendix E) reveals that while outlets in both shopping centres and the urbanized CMA increased over the study period, those in the CBD and strip retail remained relatively static.

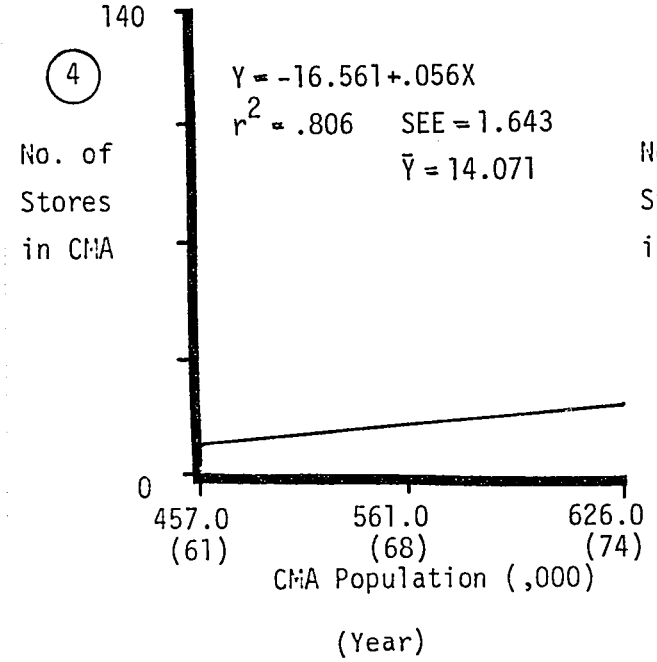
During the data collection phase of this study, it was observed that jewellery stores exhibited a wide range im their degrees of specialization. This range varied from very inexpensive merchandise outlets offering such products as gold colored plastic earings to very expensive, highly specialized outlets offering merchandise that is the product of highly skilled workmanship. While some outlets specialized in the sale of high or low quality products, others offered a wide range in the quality of merchandise. Separation of jewellery stores by the quality of merchandise offered was not possible because of the time element involved. As a result of this wide range in the quality of outlets, (this range is greater than that for any other commodity group under consideration in this study) little if any validity should be attached to the derived regression results.

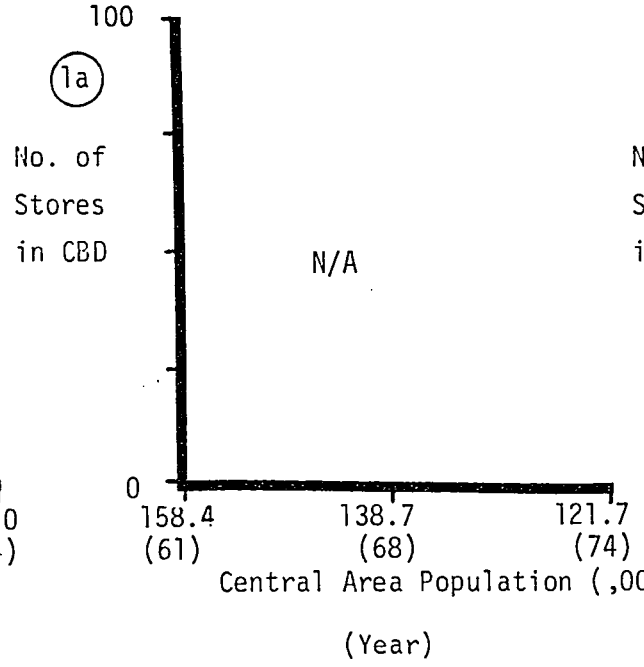
4.1.11. Leather Goods & Luggage

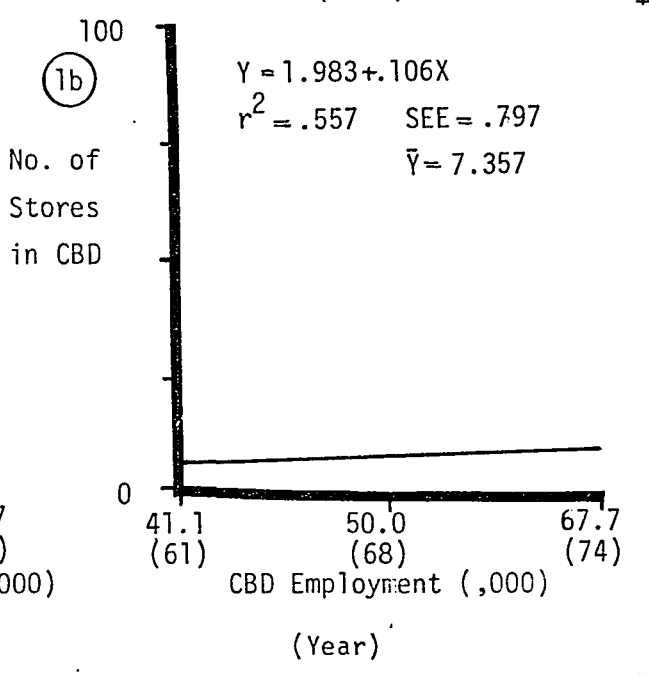

140
0
Y = -1.608+.016X
r² = .669 SEE = .689
Ȳ = 7.357
1
No. of Stores in CBD
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -11.371+.027X
r² = .688 SEE = 1.075
Ȳ = 3.214
2
No. of Stores in Shopping Centres
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -3.680+.013X
r² = .338 SEE = 1.087
Ȳ = 3.429
3
No. of Stores in Strip Retail
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -16.561+.056X
r² = .806 SEE = 1.643
Ȳ = 14.071
4
No. of Stores in CMA
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


100
0
1a
No. of Stores in CBD
N/A
158.4 (61)
138.7 (68)
121.7 (74)
Central Area Population (,000)
(Year)


100
0
Y = 1.983+.106X
r² = .557 SEE = .797
Ȳ = 7.357
1b
No. of Stores in CBD
41.1 (61)
50.0 (68)
67.7 (74)
CBD Employment (,000)
(Year)

Leather Goods and Luggage Outlets

Examination of the input data for leather goods and luggage outlets (Appendix E) reveals an increase in their numbers in all four areas under consideration. Because these outlets are few in number (total number of outlets in the urbanized CMA never exceeded twenty during the study period), it may be assumed that they are highly specialized. It should be noted that at the beginning of the study period, 75% of all the outlets were located in the CBD. By 1974, however, this dominance was reduced to only 42%.

Regressing the number of outlets in the CBD on the CMA population in (1) reveals a slope of .016 and an r^2 of .669. As a result of the positive slope in (1), the CBD outlets were regressed on the CBD employment in (1b). Comparision of the coefficients of determination of (1) and (1b) suggests a greater dependence of these outlets on the CMA population than on the CBD employment (r^2 of .669 and .557 for (1) and (1b) respectively). This result is not unexpected since these outlets appear to be highly specialized.

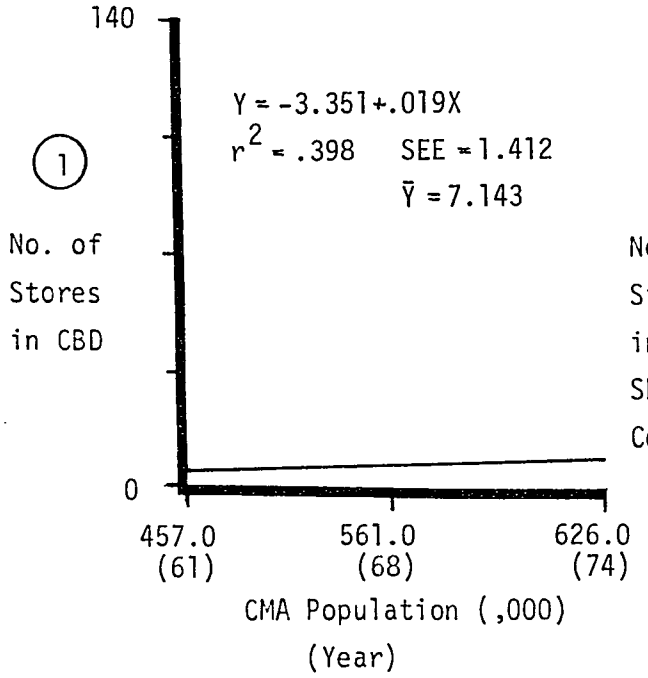
Regressing the number of outlets in shopping centres on the CMA population in (2) reveals a slope that is nearly 1.7 times steeper than that derived in (1), and an r^2 of .688. Although the SEE in relation to $\bar{Y}$ is high, comparison of the input data with the derived regression line shows that the derived equation seems to be a "fair" approximation of the true relationship. Because the slope of (2) is steeper than that derived in (1), it is evident that outlets in

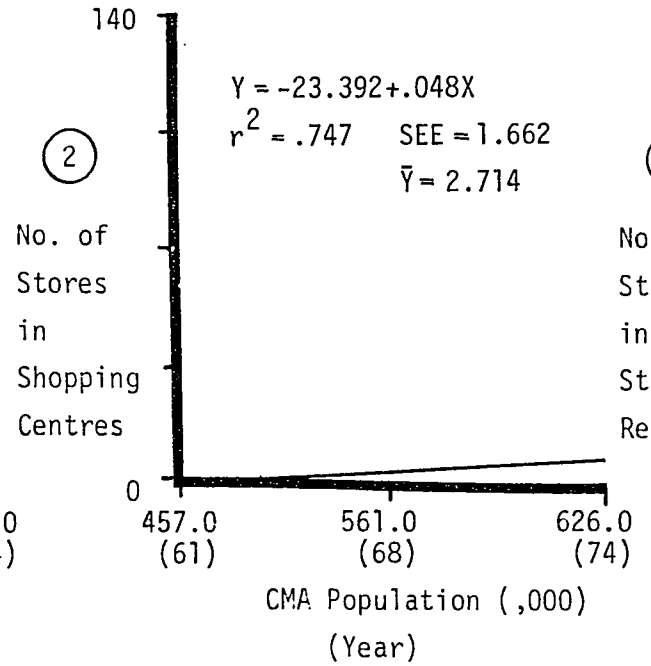
shopping centres are increasing at a faster rate than those in the CBD. Furthermore, the moderate r^2 in (2) indicates that about 69% of the variation in the number of shopping centre outlets can be "attributed" to the variations in the CMA population. If an assumption of a dependence between the two variables is correct, then the CBD outlets may be losing part of their CMA market dominance to shopping centre establishments.

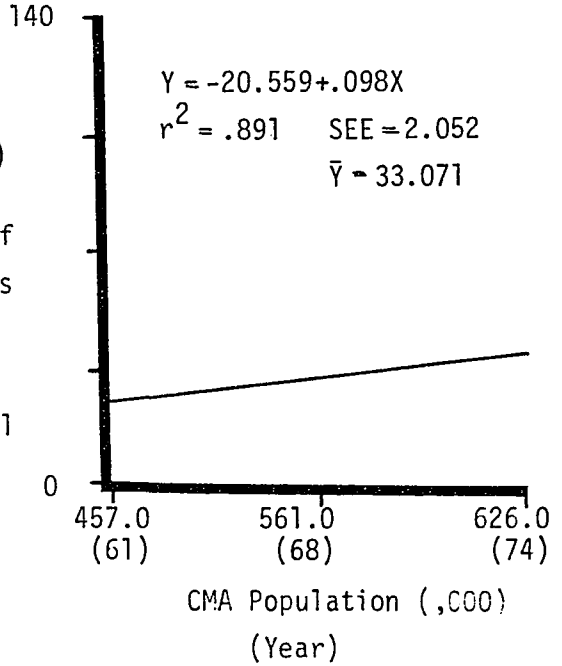
Regressing the number of outlets in strip retail on the CMA population in (3) shows a nearly flat slope (.013) and a poor, if not insignificant relationship through an r^2 of .338. The SEE is nearly 32% when compared to the mean of "$\bar{Y}$", and this poor "fit" is confirmed by comparison of the input data with the derived regression line. The total number of these strip retail outlets never exceeded five during the study period and considering that the Hull and Vanier CBDs are part of the strip retail group, it is likely that no true strip retail/CMA population relationship exists.

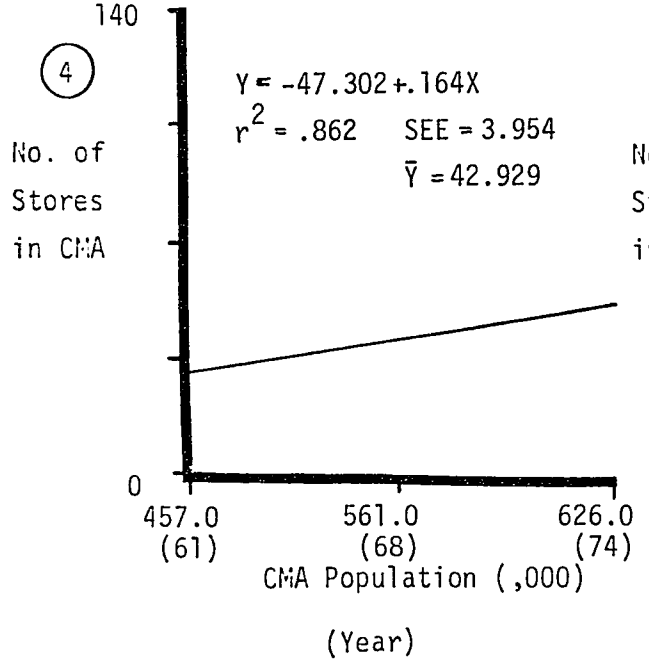
Regressing the number of outlets in the urbanized CMA on the CMA population in (4), reveals a strong positive relationship between the variables. The slope indicates an increase in the number of outlets of .056/1000 population. The r^2 of .806 implies that approximately 80% of the variation in the dependent variable may be "attributed" to variations in the independent variable. Since these outlets exhibit a slow rate of duplication (.056/1000), their high degree of specialization need not be questioned.

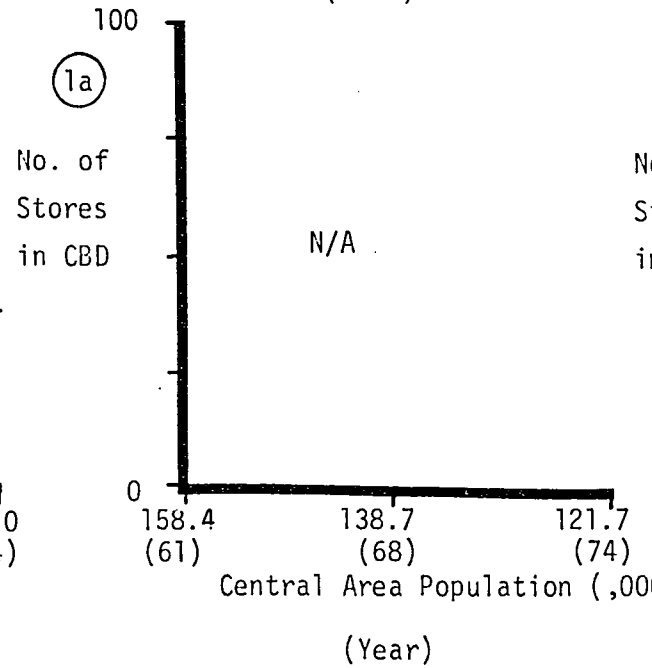
4.1.12. Sporting Goods

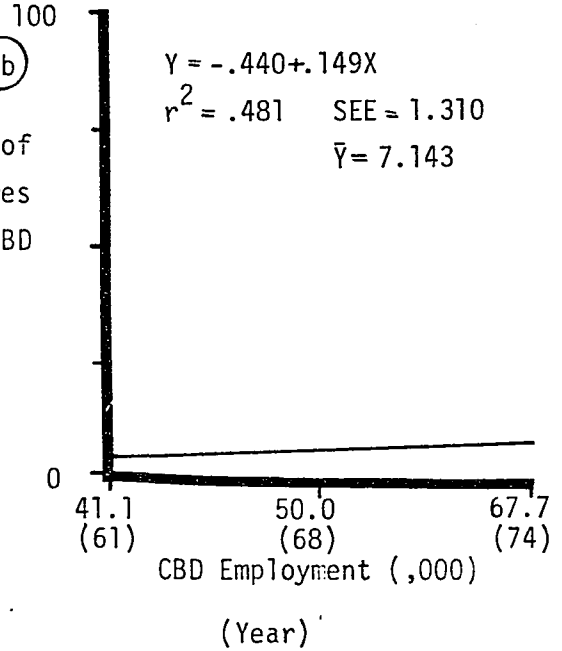

140
0
Y = -3.351+.019X
r^2 = .398 SEE = 1.412
$\bar{Y}$ = 7.143
1
No. of Stores in CBD
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -23.392+.048X
r^2 = .747 SEE = 1.662
$\bar{Y}$ = 2.714
2
No. of Stores in Shopping Centres
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -20.559+.098X
r^2 = .891 SEE = 2.052
$\bar{Y}$ = 33.071
3
No. of Stores in Strip Retail
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -47.302+.164X
r^2 = .862 SEE = 3.954
$\bar{Y}$ = 42.929
4
No. of Stores in CMA
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


100
0
1a
No. of Stores in CBD
N/A
158.4 (61)
138.7 (68)
121.7 (74)
Central Area Population (,000)
(Year)


100
0
Y = -.440+.149X
r^2 = .481 SEE = 1.310
$\bar{Y}$ = 7.143
1b
No. of Stores in CBD
41.1 (61)
50.0 (68)
67.7 (74)
CBD Employment (,000)
(Year)

Sporting Goods Outlets

Examination of the input data for sporting goods outlets (Appendix E) indicates that the number of outlets increased in all four areas under consideration. Prior to 1967, sports shops were not represented in shopping centres.

Examination of the regression results of both (1) and (1b) reveals a poor relationship between the number of CBD outlets and i) the CMA population and ii) the CBD employment respectively. The cause of these poor results is the almost cyclical fluctuations in the number of CBD outlets between 1961 and 1974. Based on the available data, the cause of these fluctuations and consequently the poor regression results can only be speculative. The results of (1) and (1b) nonetheless suggest that these CBD outlets are not dependent on either the CMA population or the CBD employment for their sustenance. Although the degree of specialization of these CBD outlets cannot be determined, it may be reasonable to assume the existence of both a) outlets that are highly specialized and b) non-specialized outlets that serve only local markets. The observed cyclical fluctuations in the number of CBD outlets may be the result of the tendency of i) highly specialized outlets to increase with an increase in the CMA population, and ii) less specialized outlets to respond to not only a decrease in the central area population but also an increase in the CBD employment.

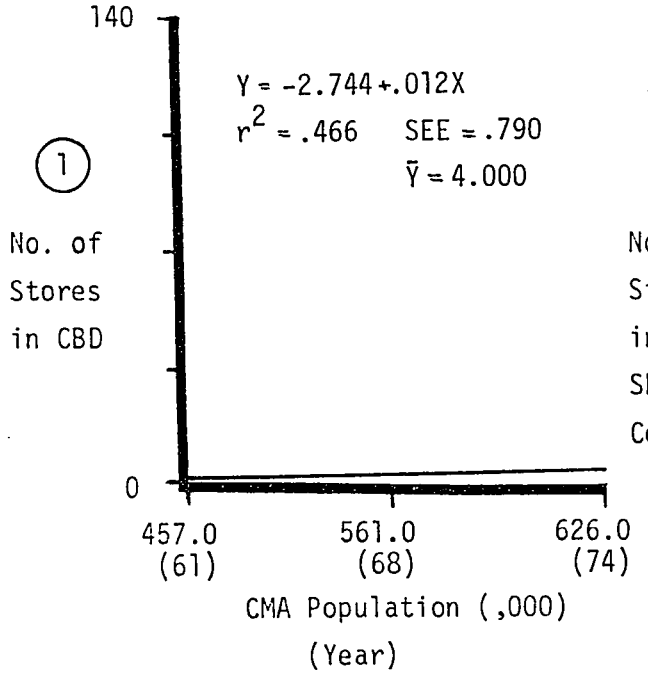
Regressing the number of outlets in shopping centres on the CMA population in (2) shows a slope of .048 and a moderate r^2 of .747.

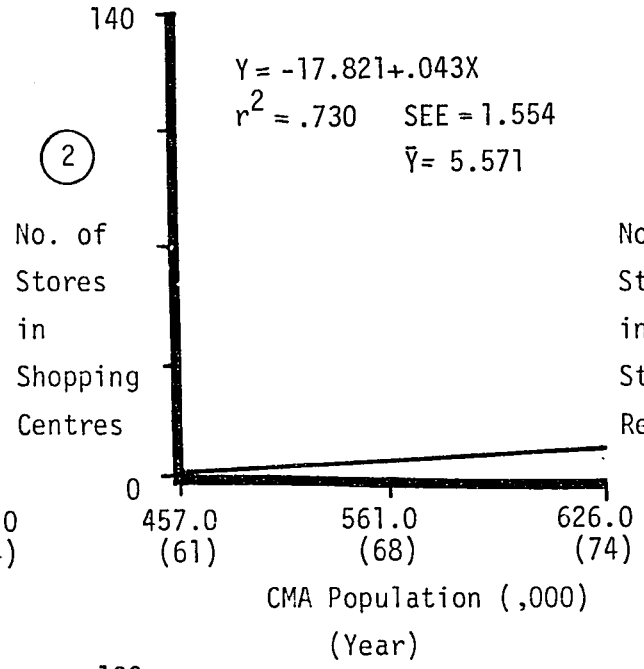
Because the SEE is very high in comparison to $\bar{Y}$, the scatter points are not closely aligned with the regression line. Any inferences made from the derived equation in (2) should take into consideration the effects of the high SEE.

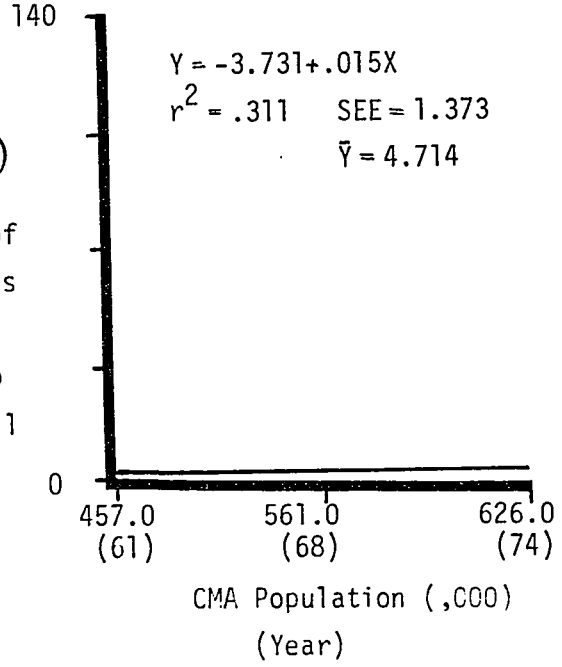
Regressing the number of outlets in strip retail on the CMA population in (3) reveals a strong positive relationship between the variables through a slope of .098 and an r^2 of .891. Regressing the number of outlets in the urbanized CMA on the CMA population in (4) reveals results similar to those derived in (3). In both cases, the derived results suggest a dependence between the outlets and the CMA population. The derived, moderately high slopes in (3) and especially in (4) may well be the result of the public's increasing awareness of the need to be physically fit.

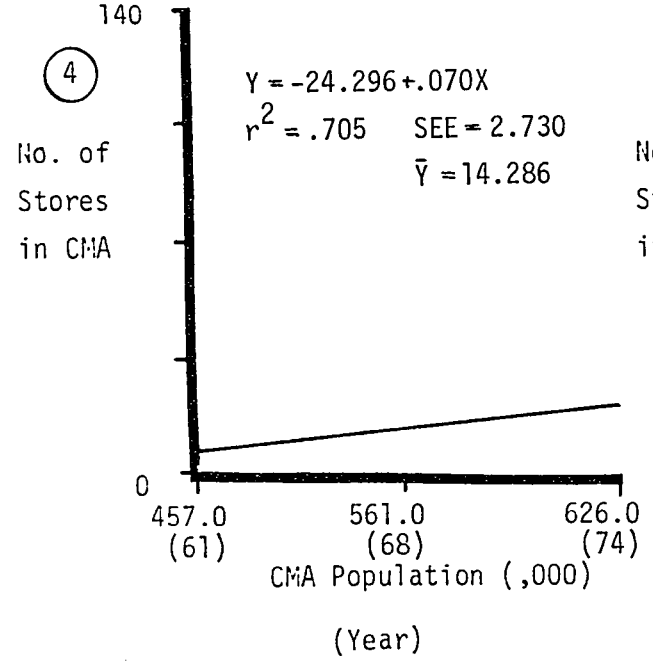
An interesting point to note about sporting goods outlets is their seasonality. Some outlets are highly specialized ski distributers, offering expensive, imported equipment and during the skiing season they may require much of the CMA population to support them. During the off-seasons, however, they may be "ordinary" sports shops offering a wide range of sports equipment but specializing in none. Other outlets may be highly specialized during the spring and summer seasons and become "ordinary" outlets in the fall and winter. The interesting aspect of many of these outlets is their seasonally fluctuating trade areas. It should be noted that many sports shops are "ordinary" outlets throughout the year and survive on local, relatively stable trade areas.

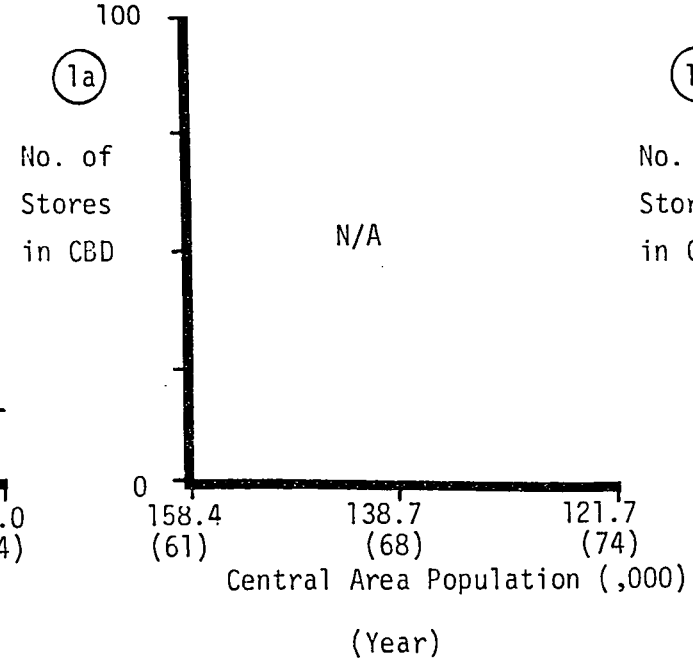
4.1.13. Toys & Hobbies

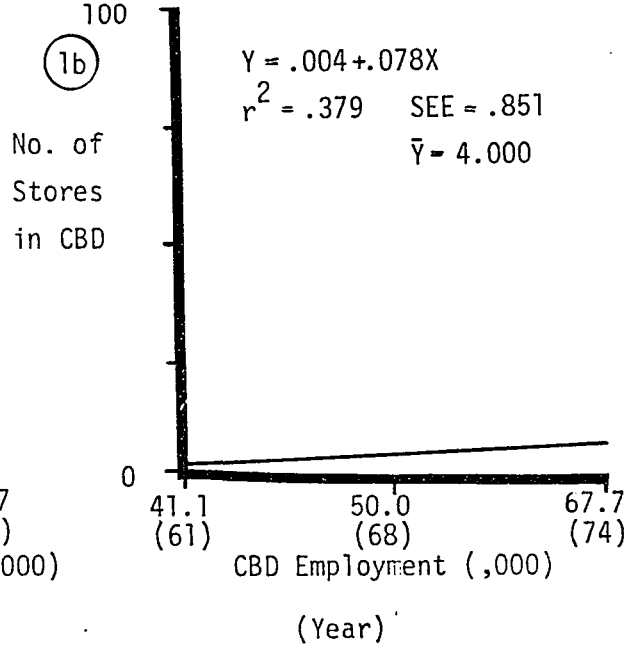

140
0
Y = -2.744+.012X
r^2 = .466 SEE = .790
$\bar{Y}$ = 4.000
(1)
No. of Stores in CBD
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -17.821+.043X
r^2 = .730 SEE = 1.554
$\bar{Y}$ = 5.571
(2)
No. of Stores in Shopping Centres
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -3.731+.015X
r^2 = .311 SEE = 1.373
$\bar{Y}$ = 4.714
(3)
No. of Stores in Strip Retail
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


140
0
Y = -24.296+.070X
r^2 = .705 SEE = 2.730
$\bar{Y}$ = 14.286
(4)
No. of Stores in CMA
457.0 (61)
561.0 (68)
626.0 (74)
CMA Population (,000)
(Year)


100
0
(1a)
No. of Stores in CBD
N/A
158.4 (61)
138.7 (68)
121.7 (74)
Central Area Population (,000)
(Year)


100
0
Y = .004+.078X
r^2 = .379 SEE = .851
$\bar{Y}$ = 4.000
(1b)
No. of Stores in CBD
41.1 (61)
50.0 (68)
67.7 (74)
CBD Employment (,000)
(Year)

Toys and Hobbies

A review of the input data (Appendix E) indicates the degree of specialization of these outlets by their infrequent occurrence in the urbanized CMA. The number of outlets increased in all four areas under consideration, however, their numbers in both CBD and strip retail exhibited almost annual erratic fluctuations. This function is the sum of two sub-groups. The grouping of these sub-groups was necessary because of the difficulties encountered with the clear identification of outlets.

Regressing the number of outlets in the CBD on the CMA population in (1) reveals a very shallow slope and a poor linear relationship between the variables. As a result of the positive slope in (1), the number of CBD outlets was regressed on the CBD employment in (1b), the results of which also indicate a very poor linear relationship. These derived results suggest that the CBD outlets are not dependent (at least not linearly) upon either the CMA population or the CBD employment. Although it is evident that a poor relationship exists between the variables, it is the relationship of the combined sub-groups with the independent variables that is being estimated. The usefulness of these derived equations may be questioned. The number of outlets of the sub-groups may or may not be correlated with the independent variables.

Regressing the number of outlets in shopping centres on the CMA population in (2) shows the combined rate of increase of the two

sub-groups to be .043/1000 people. The r^2 of .730 indicates the existence of a moderate linear relationship between the variables. Although the slope indicates an increase of .043 outlets for each increase of a thousand people in the CMA, which of the sub-groups actually showed an increase is not known. Inferences based on these regression results should be viewed with caution not only because of the lack of proper data on the individual sub-groups, but also because of the high SEE.

Regressing the number of outlets in strip retail on the CMA population in (3) reveals a very shallow slope and a very poor linear relationship between the variables. Caution should again be exercised in the interpretation of the derived regression results for reasons similar to those presented above. It should be pointed out that the slopes of the regression lines of (1), (2) and (3) are not comparable since the distribution of outlets by sub-groups may vary greatly between the CBD, shopping centres and strip retail.

Regressing the number of outlets in the urban CMA on the CMA population in (4) reveals that the total number of outlets of the two sub-groups increase at a rate of .070/1000 people in the CMA. Furthermore, the r^2 of .705 indicates that a moderately strong linear relationship exists between the variables. It is not known which of the sub-groups will gain a new outlet, but it is known that a new outlet will enter the market each time the CMA population increases by 14,000.

It should be emphasized again, that cautious interpretation of results is advised for all five regressions. Inferences based on the results of the regressions may be grossly distorted because of the unknown behaviour of the sub-group outlets.

4.2. Summary of Findings

The use of simple linear regression analysis proved to be a relatively effective descriptive tool with which to establish an indirect relationship between the number of establishments of a function in the CBD and suburban shopping centres. CMA populations for the various years of the study period were used to establish the initial relationships and depending upon the sign of the slope of the derived regression line, more subtle relationships were exaimined between the number of CBD establishments of a function and either the CBD employment or the population of the central area. The degree of dependency between population and the number of establishments was suggested by the derived r^2; most important, however, were the slopes of the regression lines which indicated the rate of increase or decrease of establishments of the various functions in relation to the various population variables. These slopes enabled comparisons between CBD and shopping centre establishments through the common medium of population. Table 4.1. shows the derived slopes of the establishments of the thirteen functions as the number of these establishments in the CBD and in suburban shopping centres were regressed on the CMA population.

Of the thirteen functions examined in the CBD, eight exhibited positive and five exhibited negative slopes. Of the twelve functions examined in shopping centres (furriers were absent from shopping centres, hence the twelve functions) all exhibited positive slopes. Comparing the derived slopes of the various functions in the CBD with those in shopping centres reveals that: i) the number of establishments of two functions (gift shops and bookstores) increased at a greater rate in the CBD than in shopping centres; ii) the number of establishments of the remaining functions (excluding furriers) increased at a greater rate in shopping centres than in CBD. The behaviour

TABLE 4.1.

Derived Slopes of Establishments in the CBD and Shopping Centres

FUNCTION	Slope of Regression Line CBD Establishments on CMA Population	Slope of Regression Line Shopping Centre Establishments on CMA Population
Department Stores	-.041	.078
Men's Wear	.008	.150
Women's Apparel	.069	.268
Children's Wear	-.016	.030
Shoe Stores	.063	.127
Furriers	-.040	N/A
Furniture Stores	-.056	.043
Gift Shops	.114	.073
Bookstores	.073	.036
Jewellery Stores	-.010	.083
Leather Goods & Luggage	.016	.027
Sporting Goods	.019	.048
Toys & Hobbies	.012	.043

of the number of establishments of ten of the thirteen functions in the CBD and in suburban shopping centres over the fourteen year study period clearly upholds the hypothesis.

The establishments of eight functions that exhibited positive slopes in the CBD is not inconsistent with the implications of the central place theory which suggests that as the population of an urban area increases, there should be a corresponding increase in the number of establishments in the CBD. Five of the functions, however, negate this implication as the number of their respective establishments decreased in the CBD.

Whenever the slope of the regression line between the number of establishments of a function in the CBD and the CMA population was negative, the establishments were regressed on the central area population to determine the degree of the relationship, if any. Five functions exhibited such a negative slope and when their establishments were regressed on the central area population, the derived results suggested that the establishments of two of the five functions (department stores and furriers) in the CBD were more dependent upon the local population than upon the CMA population for their existence. (Note that this is not a credible conclusion for furriers as was explained on page 79.)

In a similar manner, whenever the slope of the regression line between the number of establishments of a function in the CBD and the CMA population was positive, the establishments were regressed upon the CBD employment. Eight functions exhibited a positive slope, four of which (men's wear, women's apparel, shoe stores and sporting goods outlets) indicated that their dependence was based more on the CBD employment than on the CMA population.

In Table 4.2. a complete summary of the regression results is presented. While the slopes of the derived equations have already been discussed as they were the most important aspect of the regression results for hypothesis testing, other regression results, although already discussed in some detail by individual functions, are also comparable and may shed further light upon the behaviour of establishments.

The degree of relationship between the number of stores and population is suggested by the r^2. The derived r^2 between the number of stores in the CBD and the CMA population by function is presented in Table 4.2. Comparison of these coefficients of determination by function reveals a considerable range of values and hence a considerable range in the degrees of relationship between these CBD outlets and the CMA population. Eight of the thirteen functions showed a moderate or high r^2 of greater than .600 while five functions revealed an r^2 of less than .600 indicating a weak degree of association between the number of outlets of these functions in the CBD and the CMA population over the fourteen year study period.

The derived coefficients of determination between the number of stores in shopping centres and the CMA population reveal that of the twelve functions considered (only twelve since furriers were not established in shopping centres) eleven exhibited moderate or high r^2 of greater than .600 while only one (children's wear outlets) showed a poor relationship between the variables (.485). These results strongly indicate the existance of a moderate to strong relationship

REGRESSION	FUNCTIONS	Dept. Stores	Men's Wear	Women's App.	Children's	Shoe Stores	Furriers	Furniture	Gift Shops	Bookstores	Jewellery	Leather & Luggage	Sporting Goods	Toys & Hobbies
No. of Stores in CBD vs. CMA Population	r^2	.759	.030	.722	.564	.694	.783	.871	.895	.812	.176	.669	.398	.466
	b	-.041	.008	.069	-.016	.063	-.040	-.056	.114	.073	-.010	.061	.019	.012
	SEE	1.369	2.790	2.551	.836	2.495	1.277	1.290	2.348	2.116	1.346	.689	1.412	.790
	$\bar{Y}$	14.571	34.786	38.929	4.357	30.000	12.214	13.714	18.643	12.571	19.786	7.357	7.143	4.000
No. of Stores in S.C. vs. CMA Population	r^2	.869	.746	.832	.485	.764	N.A.	.776	.698	.649	.673	.688	.747	.730
	b	.078	.150	.268	.030	.127	N.A.	.043	.073	.036	.083	.027	.048	.043
	SEE	1.828	5.237	7.245	1.881	4.238	N.A.	1.388	2.897	1.602	3.462	1.075	1.662	1.554
	$\bar{Y}$	17.571	15.429	26.786	4.786	21.527	N.A.	3.642	7.071	2.143	5.429	3.214	2.714	5.571
No. of Stores in Strip vs. CMA Population	r^2	.745	.497	.036	.932	.273	.681	.747	.532	.876	.356	.338	.891	.311
	b	-.037	.033	.006	-.037	-.019	-.045	.074	.027	.018	.021	.013	.098	.015
	SEE	1.308	2.016	1.898	.607	1.897	1.867	2.583	1.541	1.821	1.717	1.087	2.052	1.373
	$\bar{Y}$	11.214	34.071	31.286	6.286	26.571	16.643	44.214	21.929	16.429	32.071	3.429	33.071	4.714
No. of Stores in CMA vs. CMA Population	r^2	.0003	.642	.830	.408	.664	.819	.444	.872	.900	.756	.806	.862	.705
	b	.0006	.191	.343	-.023	.170	-.086	.061	.215	.190	.094	.056	.164	.070
	SEE	2.066	8.569	9.303	1.655	7.261	2.423	4.102	4.933	3.804	3.190	1.643	3.954	2.730
	$\bar{Y}$	43.357	84.268	97.000	15.429	78.143	28.857	61.571	47.643	31.143	57.286	14.071	42.929	14.286
No. of Stores in CBD vs. Central Area Pop.	r^2	.808	N.A.	N.A.	.560	N.A.	.829	.839	N.A.	N.A.	.135	N.A.	N.A.	N.A.
	b	.204	N.A.	N.A.	.077	N.A.	.203	.268	N.A.	N.A.	.044	N.A.	N.A.	N.A.
	SEE	1.221	N.A.	N.A.	.840	N.A.	1.136	1.441	N.A.	N.A.	1.379	N.A.	N.A.	N.A.
	$\bar{Y}$	14.571	N.A.	N.A.	4.357	N.A.	12.214	13.714	N.A.	N.A.	19.786	N.A.	N.A.	N.A.
No. of Stores in CBD vs. CBD Employment	r^2	N.A.	.152	.857	N.A.	.827	N.A.	N.A.	.825	.724	N.A.	.557	.481	.379
	b	N.A.	.131	.529	N.A.	.484	N.A.	N.A.	.777	.490	N.A.	.106	.149	.078
	SEE	N.A.	2.609	1.827	N.A.	1.874	N.A.	N.A.	2.994	2.561	N.A.	.797	1.310	.851
	$\bar{Y}$	N.A.	34.786	38.929	N.A.	30.000	N.A.	N.A.	18.643	12.571	N.A.	7.357	7.143	4.000

between the number of outlets of functions in shopping centres and the CMA population and indirectly imply the considerable dependence of the former upon the latter.

The derived coefficients of determination between the number of stores in strip retail and the CMA population showed that only six of the thirteen functions exhibited an r^2 of greater than .600. The remaining seven functions showed an r^2 of less than .600 thus signifying a poor relationship between these variables.

When the number of stores in the CMA by function was regressed on the CMA population the derived coefficients of determination implied the existance of a moderate to strong relationship for ten of the thirteen functions ($r^2 \geq .600$) while three functions exhibited a weak relationship.

Finally, the relationships between the number of stores in the CBD and either the central area population or the CBD employment have already been discussed.

For each regression result the SEE may be compared to $\bar{Y}$ to show the degree of scatter of points about the regression line. While these results are not highly significant, they nonetheless reflect the dynamic character of the market place. Interestingly enough, the highest SEE results occured when the number of stores in shopping centres by function was regressed on the CMA population. At the same time the highest r^2 values were also derived in this category, suggesting that the number of outlets by function closely paralleled the fluctuations in the CMA population.

Finally an important conclusion to be made from these regression results is that each function behaves differently. Some functions are clearly more susceptible to changes in population than others. This may reflect the smaller or larger trade areas of their individual outlets, the changes in fashions or buying habits or for that matter a number of other factors such as the development of new population nodes either residential, commercial or industrial, the development of new transit corridors, etc.

CHAPTER V

CONCLUSIONS

Considerable changes have taken place in the retailing structure of the Ottawa-Hull CMA between 1961 and 1974. The entrance and subsequent diffusion of shopping centres in the CMA reshaped the patterns of the distribution of establishments of functions which consequently influenced the behaviour of similar functions in the CBD. Examination of the behaviour of the establishments of the thirteen selected functions reveals not only the spatial changes that have taken place but also the changes in the role of the CBD as the retail focal point of the CMA. Although it is clearly evident that the CBD is still by far the largest retailing node, its percentage share of the total number of establishments of most functions within the CMA has declined.

While the summary of the results of both the nearest neighbor analyses and the linear regression analyses are presented at the end of Chapters III and IV respectively, their implications may be summarized as follows:

1) The regional retailing strength of the CBD has been adversely affected by the continuous developments of suburban shopping centres;

2) Retailing functions in the CBD have been becoming more dependent upon the increasing CBD workforce and less dependent upon both the CMA and the central area populations;

3) The tendency towards an increased multi-nodal retail structure in the CMA is apparent;

4) Functional and spatial specialization of retailing activities is increasing.

While the results of this study strongly imply that the relative power of the CBD has declined, the degree of loss has not been determined. Only the number of establishments of selected functions were examined and their behaviour does not shed direct light upon sales volumes which would be an acceptable indicator of the degree of loss. In fact, the comparison between the number of establishments of a function in the CBD and in suburban shopping centres is only a crude indicator of what has happened. Nonetheless, it is refined enough to allow generalizations about the marketplace. As a consequence, new questions are formulated and broader implications surface.

What is the limiting number of shopping centres in the Ottawa-Hull CMA or for that matter, in any urban system? Will past trends continue until a uniform multi-nodal retail structure evolves and the CBD will be just one of many equals? Many shopping centres, especially the regional ones, offer more than just retailing to the public. They have become community focal points where political rallies and numerous social events are taking place. This is not to say that they are replacing the CBD. As retailing activities are increasingly multi-nodalizing mostly through large shopping centre developments in the suburbs, one may ask if a precedence is not being set for other activities as well: - activities that have thus far generally located in the CBD.

It should be pointed out that this study is a descriptive case study of retailing patterns over a fourteen year period. The derived regression results were not intended for extrapolation purposes. Linear regression analysis was utilized since linear trends were exhibited by the scattergrams of establishments of most functions. Establishments of some functions, however, did not clearly fit a linear pattern (women's apparel establishments in shopping centres); linearity, however, was assumed so that comparisons may be facilitated.

A basic assumption throughout this study was that the thirteen selected functions, all of which represented shopping goods, could provide sufficient evidence through the behaviour of their establishments to determine the loss of the regional retailing strength of the CBD. This study only showed that some loss of the regional retailing strength occured. Many important functions were not considered due to data limitations. Some of these functions are very highly specialized and their few outlets may show no signs of loss of the regional market. The point is that the retailing strength of the CBD, if it is to be measured accurately, should be measured through the behaviour of all the establishments of all functions. Unfortunately, data limitations usually preclude such an exercise.

APPENDICES

APPENDIX A

APPENDIX A

Identification of Urbanized CMA

The identification of establishments was limited to an area that is part of but considerably smaller than the CMA. Map 1 shows not only the boundaries of the CMA but also the boundaries of this limited area. It was reasoned that since retail establishments would usually be expected in built-up areas, only these built-up areas need to be considered for their identification. Some of the CMA communities such as Aylmer, Dechênes, Richmond Village, etc., while definitely identified as built-up areas, were not considered for the identification of establishments due to the limitations imposed by the severe lack of historical data. The total number of establishments in these areas is rather limited, especially is shopping goods outlets, and therefore their exclusion is not considered a serious handicap.

The heavy lines on Map 1 delimit the boundaries of the urbanized CMA within which area the establishments of the selected functions were identified. This area consists of the following census tracts: City of Ottawa, 1-62; Vanier City, 100-104; Rockcliffe Park, 110; Gloucester Twp., 120-123; Nepean Twp., 130-139; City of Hull, 500-511; Pointe Gatineau, 600-602; Gatineau, 610-613. (These census tracts are according to the 1971 Series A, Ottawa-Hull, Catalogue 95-715)

APPENDIX B

APPENDIX B

The observed populations of the CMA as well as those of the Central Area were only available for the three census years of the study period; 1961, 1966 and 1971. Statistics Canada provided inter-census estimates for the other years and these estimates then were assumed to reasonably represent the "true" populations. Fourteen "observations" were required as there were fourteen observations of the various dependent variables.

CBD employment populations were observed for six of the fourteen years of the study period while the other years were estimated through interpolation. These estimates were assumed to be reasonable representatives of the "true" CBD employment and were therefore assumed to be "observations". Here again fourteen observations were required as there were fourteen observations of the various dependent variables (in this case, the establishments of the various functions in the CBD).

APPENDIX B

POPULATION AND EMPLOYMENT VARIABLES (,000)

YEAR	POPULATION OF CMA	POPULATION OF CENTRAL AREA	CBD EMPLOYMENT
1961	457.0	158.4	41.1
1962	470.6	155.6	42.2
1963	484.5	152.7	43.4
1964	498.9	149.9	44.4
1965	513.8	147.1	45.5
1966	529.0	144.3	46.6
1967	547.0	141.5	48.3
1968	561.0	138.7	50.0
1969	574.0	135.9	51.8
1970	590.0	133.1	53.6
1971	603.0	130.1	55.5
1972	613.0	127.3	59.3
1973	619.0	124.5	63.3
1974	626.0	121.7	67.7

APPENDIX C

APPENDIX C

Suburban Shopping Centres in CMA in 1974*	Present in 1961	No. of Units	Floor Space in square feet
1. Bayshore	no	88	502,510
2. Carlingwood	yes	49	449,235
3. St. Laurent	no	73	433,131
4. Lincoln Fields	no	35	239,127
5. Billings Bridge	yes	62	212,955
6. Place Fleur de Lys	no	19	28,710
7. Shoppers City East	yes	20	168,088
8. Meadowlands Mall	no	3	164,400
9. Shoppers City West	yes	18	164,200
10. Place Cartier	no	30	162,790
11. Elmvale	yes	50	133,963
12. Gem	no	11	128,085
13. K-Mart	no	7	121,774
14. K-Mart	no	11	121,660
15. K-Mart	no	3	121,024
16. K-Mart	no	6	120,075
17. Westgate	yes	26	102,892
18. Fairlawn	no	7	100,390
19. Galleries de Hull	no	25	94,160
20. Eastview	yes	10	69,788
21. Hampton Park	yes	20	68,116
22. Rideau View	no	22	61,318
23. Queenston Plaza	no	10	66,030
24. McArthur Plaza	yes	21	59,387
25. City View	yes	18	55,433
26. Vista Centre	no	20	52,061
27. Montreal Plaza	no	10	50,587
28. Lynwood	no	15	45,940
29. Britannia	no	19	42,235
30. Payless	no	9	41,663
31. Riverside Mall	no	13	28,029
32. Alta Bank	no	16	25,290
33. Alta Vista	yes	12	21,663
34. Gallerie Gatineau	no	10 (est.)	20,000 (est.)

* These shopping centres are identified according to location in Map 4; the same identification numbers are used on the map as above.

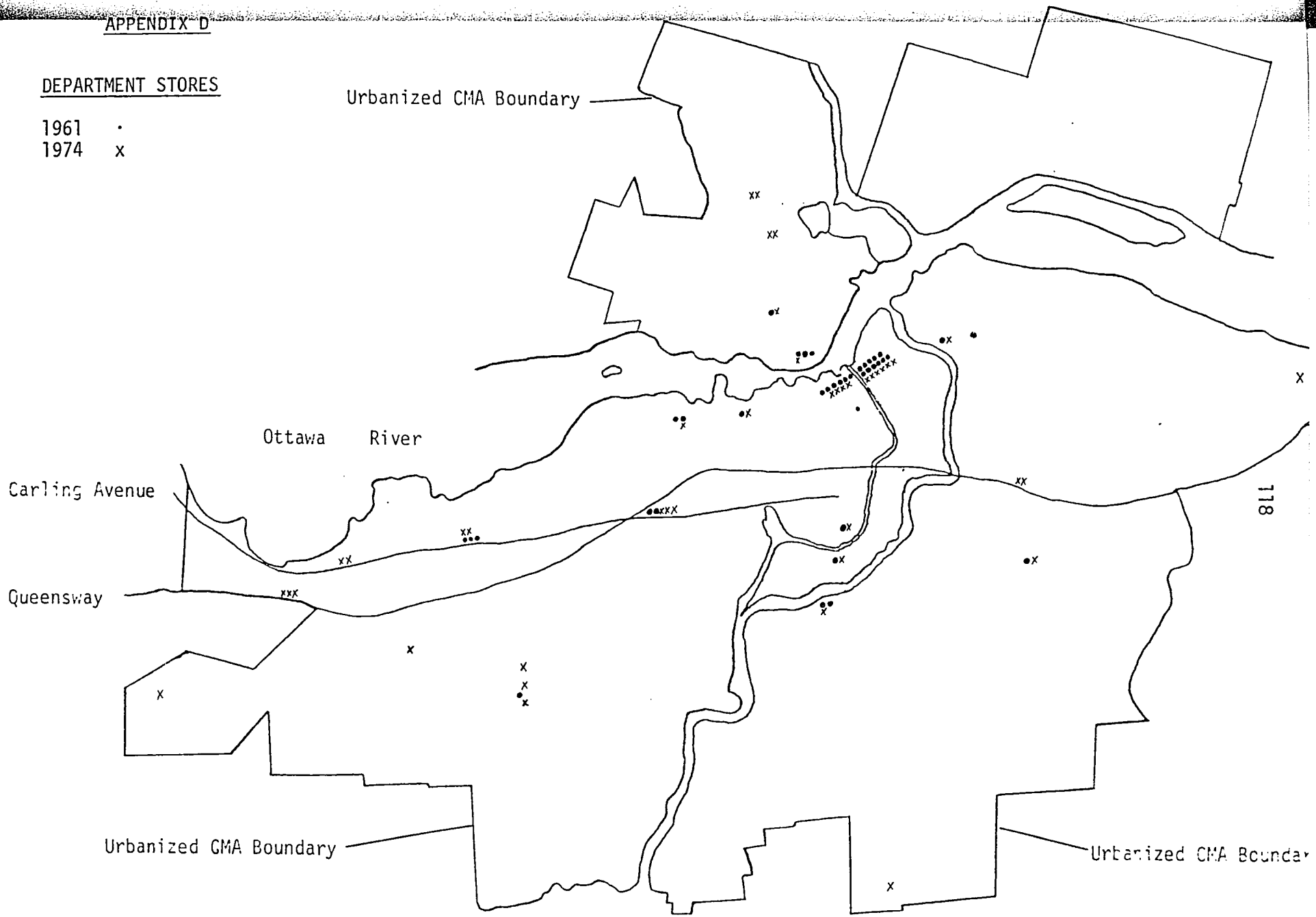
Source: City of Ottawa, Planning Department, Unpublished Data.

APPENDIX D

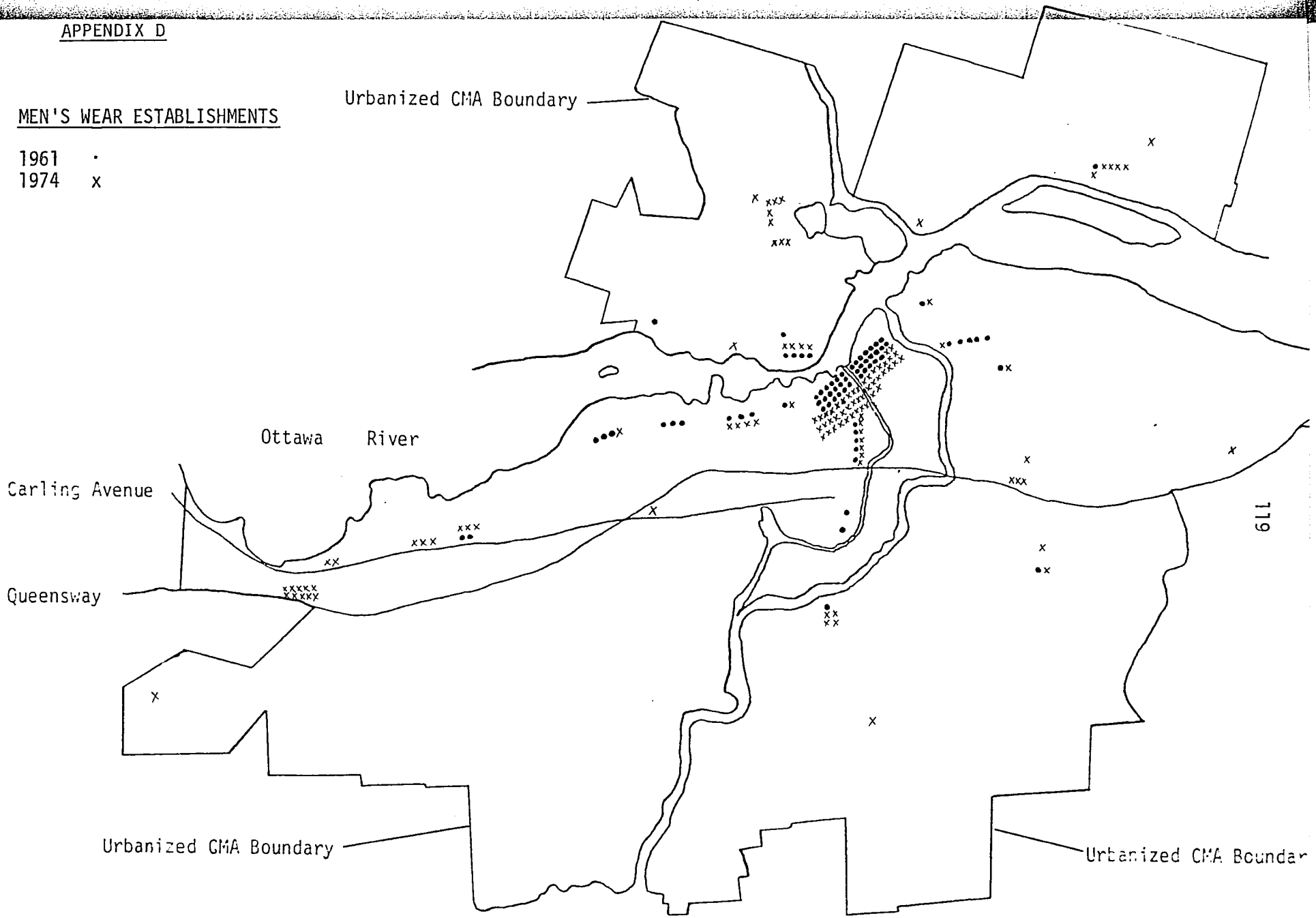
APPENDIX D

DEPARTMENT STORES

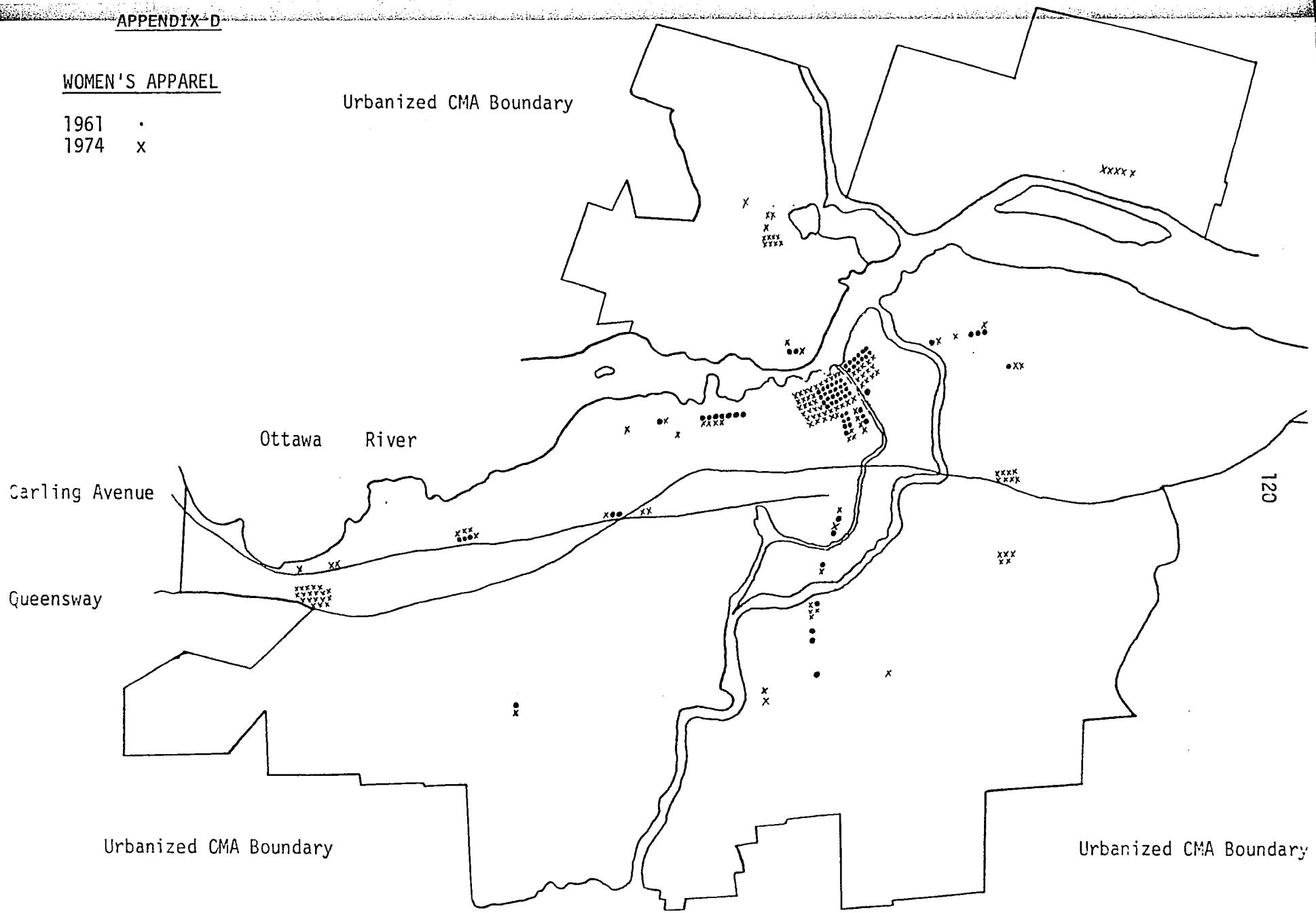
1961 •
1974 x



APPENDIX D


MEN'S WEAR ESTABLISHMENTS
1961 ·
1974 x
Urbanized CMA Boundary
Ottawa River
Carling Avenue
Queensway
Urbanized CMA Boundary
Urbanized CMA Boundar
119

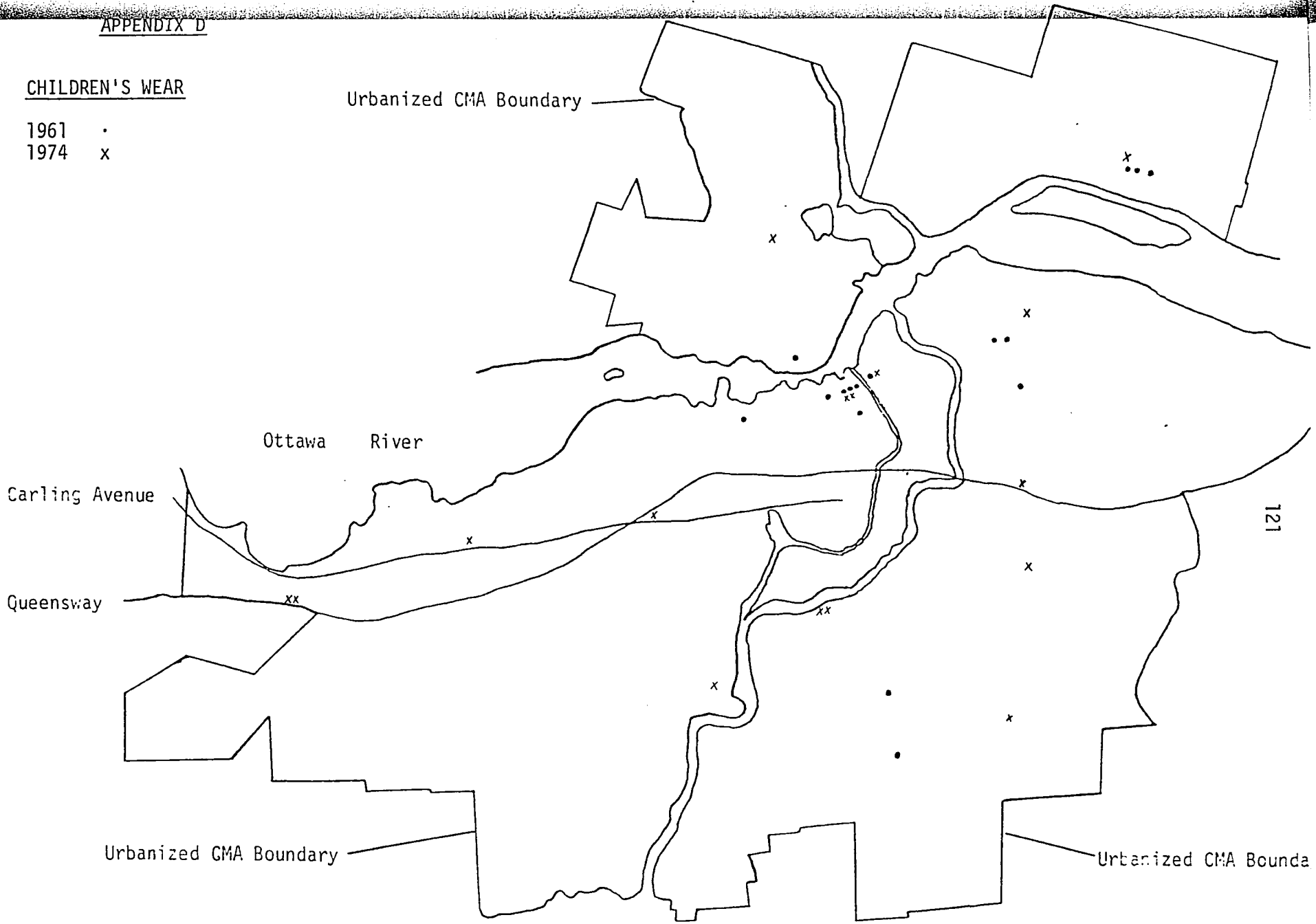
APPENDIX D


WOMEN'S APPAREL
1961 •
1974 x
Urbanized CMA Boundary
Ottawa River
Carling Avenue
Queensway
120
Urbanized CMA Boundary
Urbanized CMA Boundary

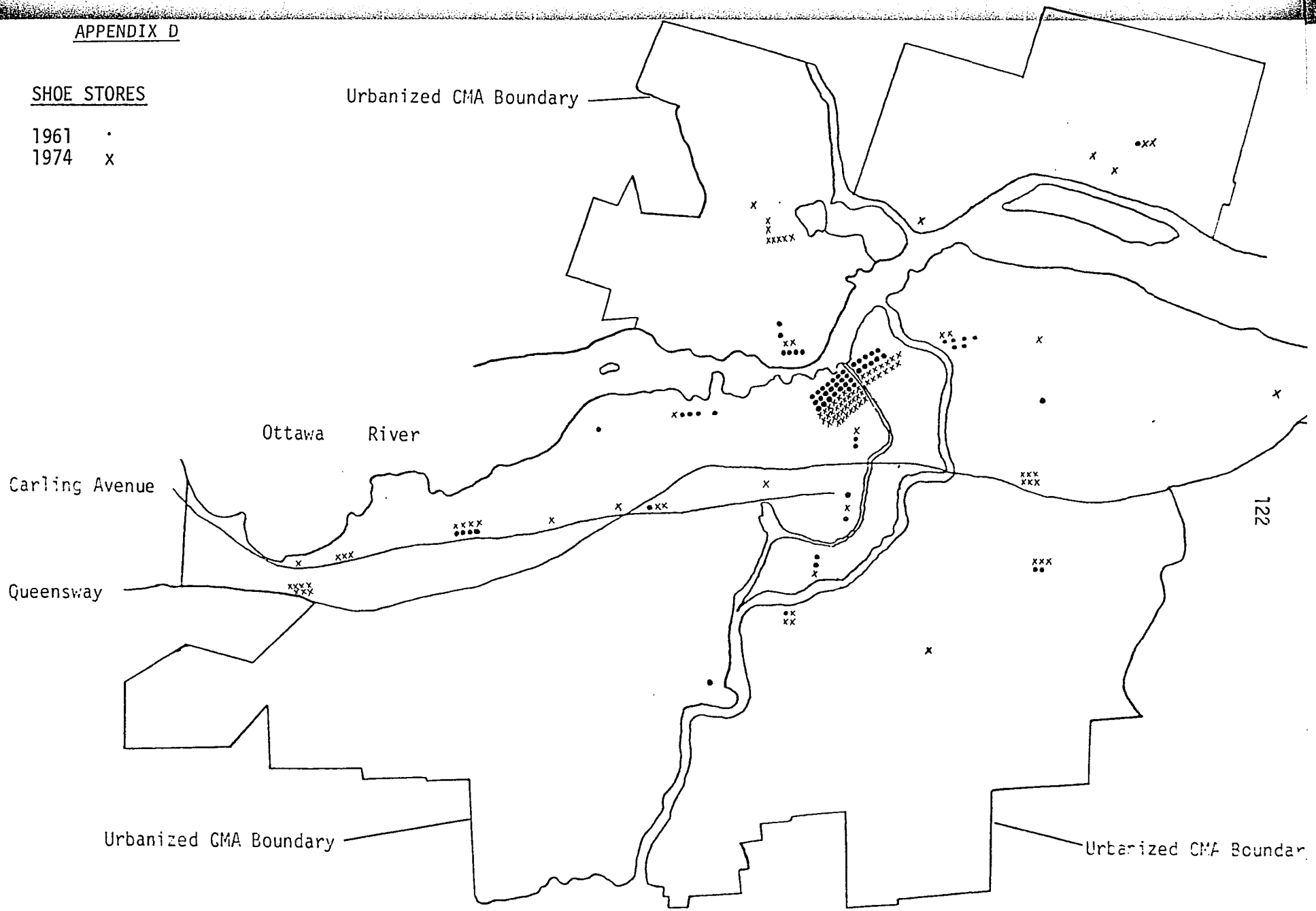
APPENDIX D

CHILDREN'S WEAR

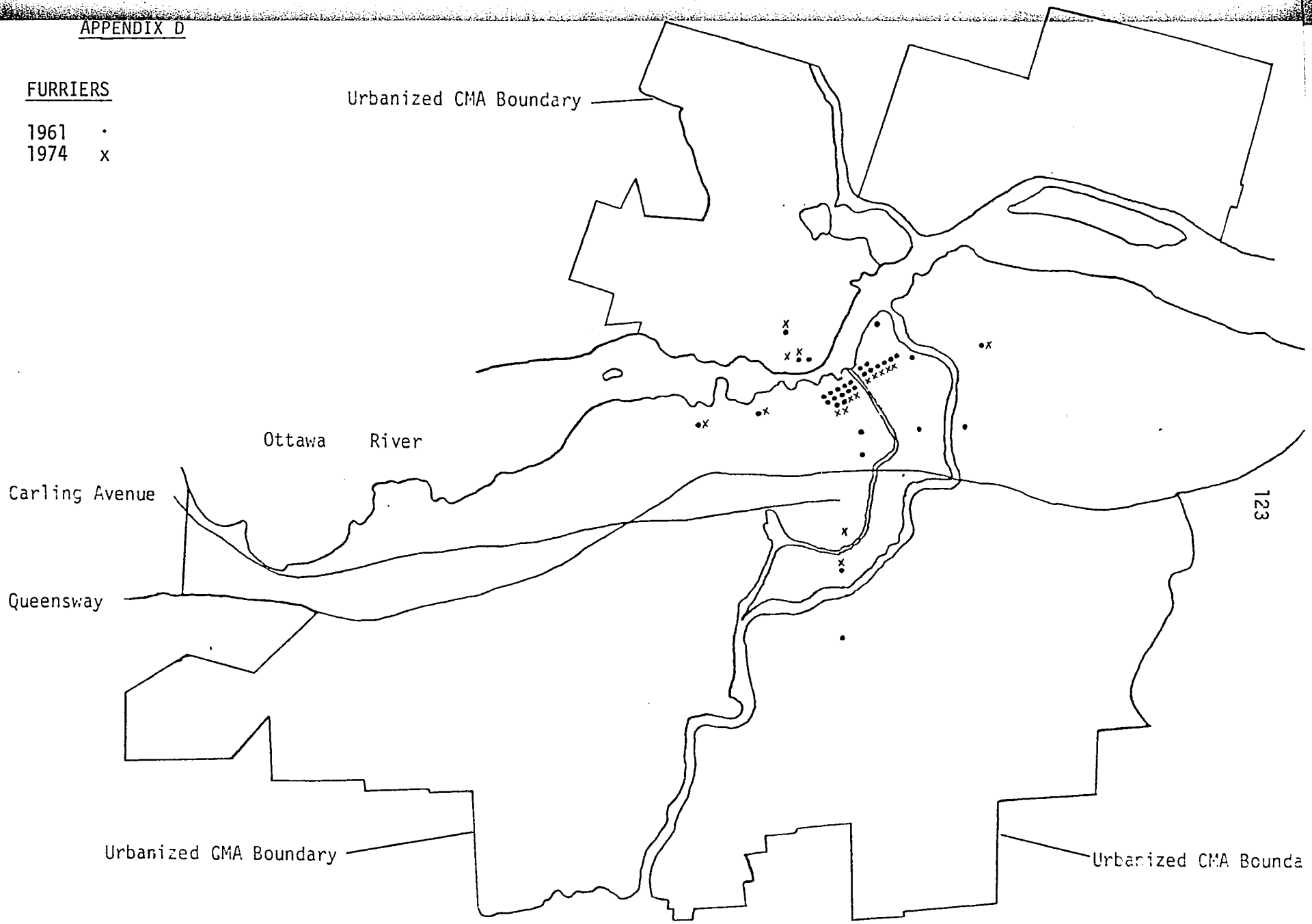
1961 •
1974 x



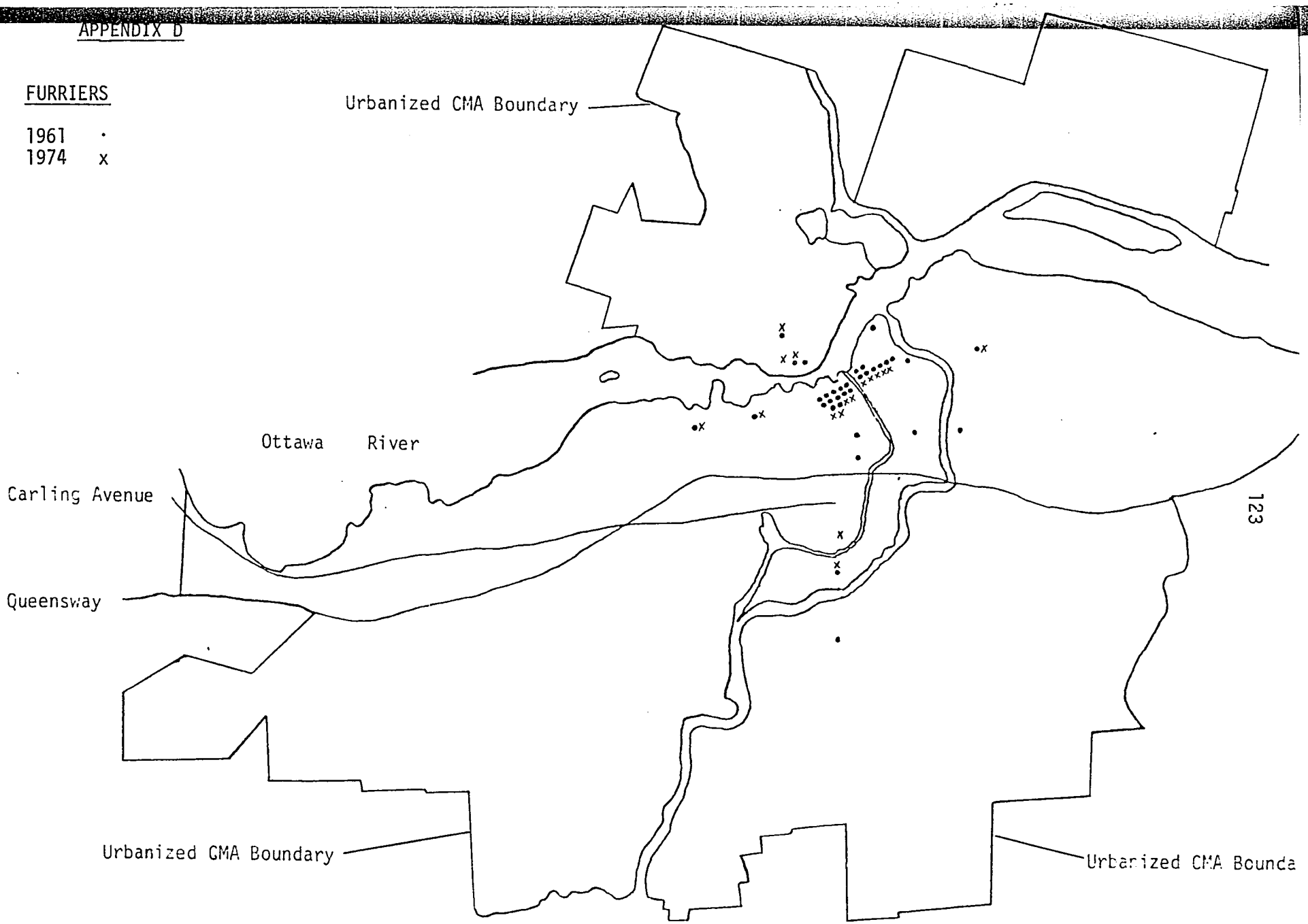
APPENDIX D


SHOE STORES
1961 •
1974 x
Urbanized CMA Boundary
Ottawa River
Carling Avenue
Queensway
Urbanized CMA Boundary
Urbanized CMA Boundary
122

APPENDIX D


FURRIERS
1961 •
1974 x
Urbanized CMA Boundary
Ottawa River
Carling Avenue
Queensway
Urbanized CMA Boundary
Urbanized CMA Bounda
123

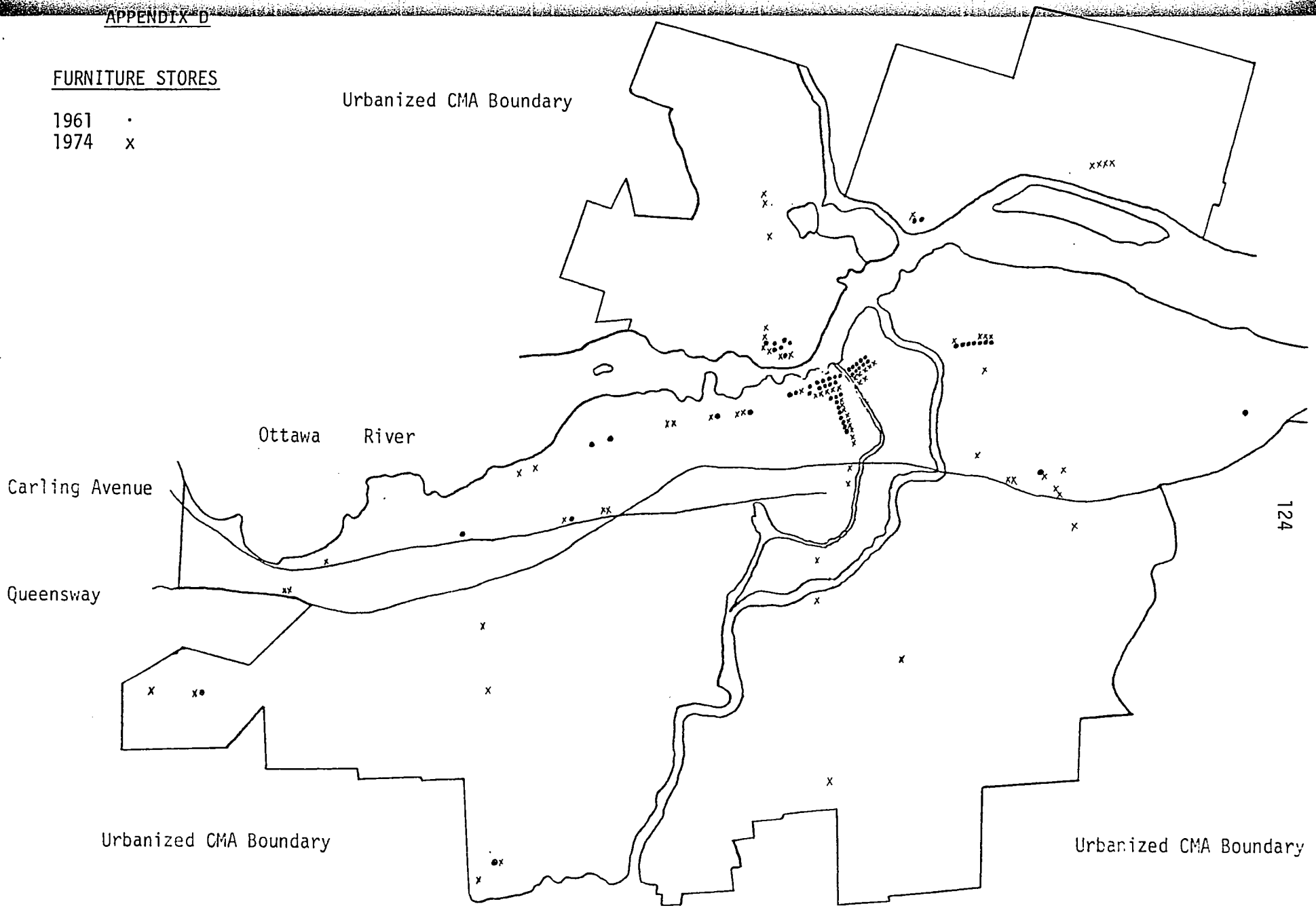
APPENDIX D


FURRIERS
1961 ·
1974 x
Urbanized CMA Boundary
Ottawa River
Carling Avenue
Queensway
Urbanized CMA Boundary
Urbanized CMA Bounda
123

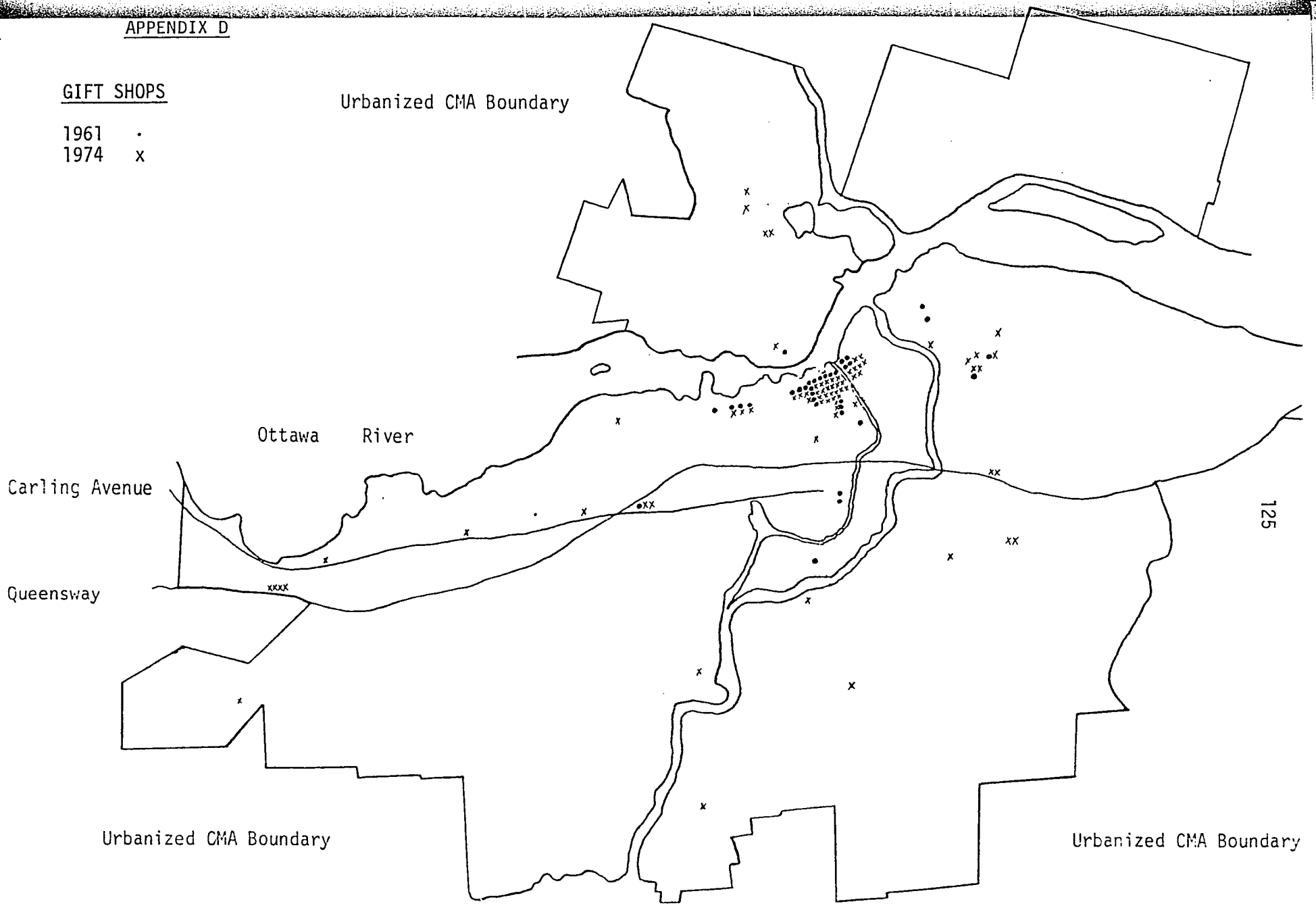
APPENDIX D

FURNITURE STORES

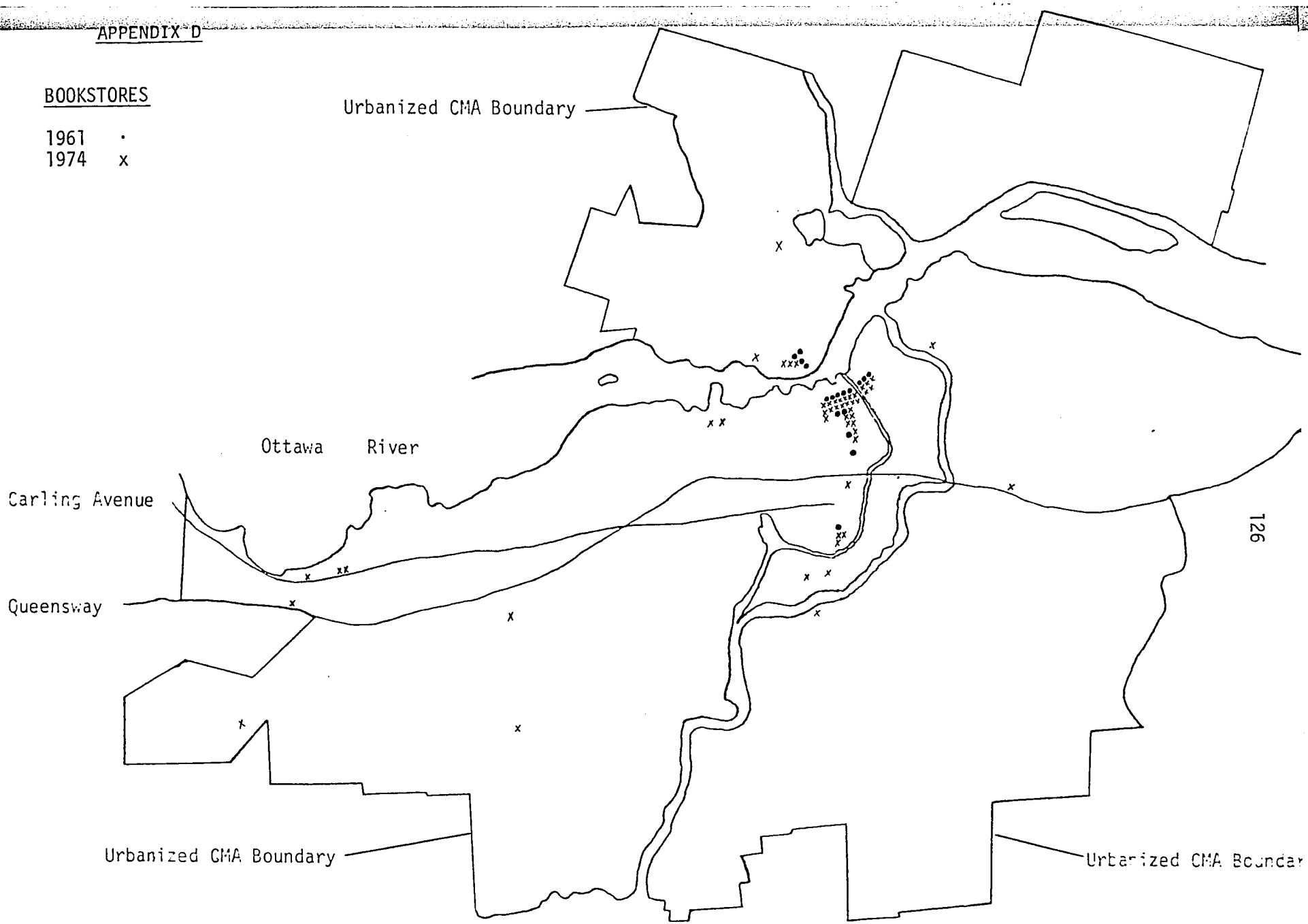
1961 ·
1974 x



APPENDIX D


GIFT SHOPS
1961 ·
1974 x
Urbanized CMA Boundary
Ottawa River
Carling Avenue
Queensway
Urbanized CMA Boundary
Urbanized CMA Boundary

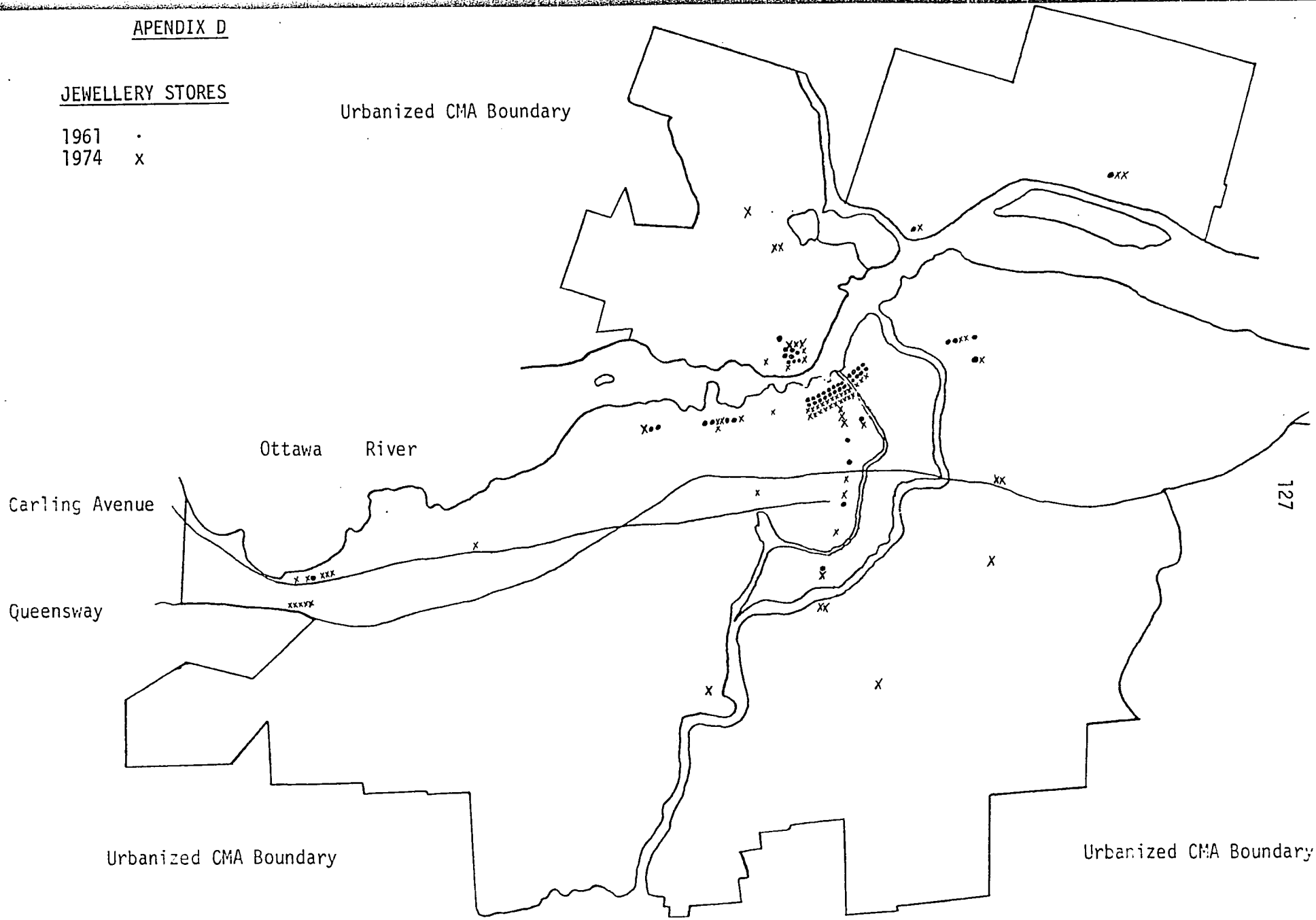
APPENDIX D


BOOKSTORES
1961 •
1974 x
Urbanized CMA Boundary
Ottawa River
Carling Avenue
Queensway
Urbanized CMA Boundary
Urbanized CMA Boundary
126

APENDIX D

JEWELLERY STORES

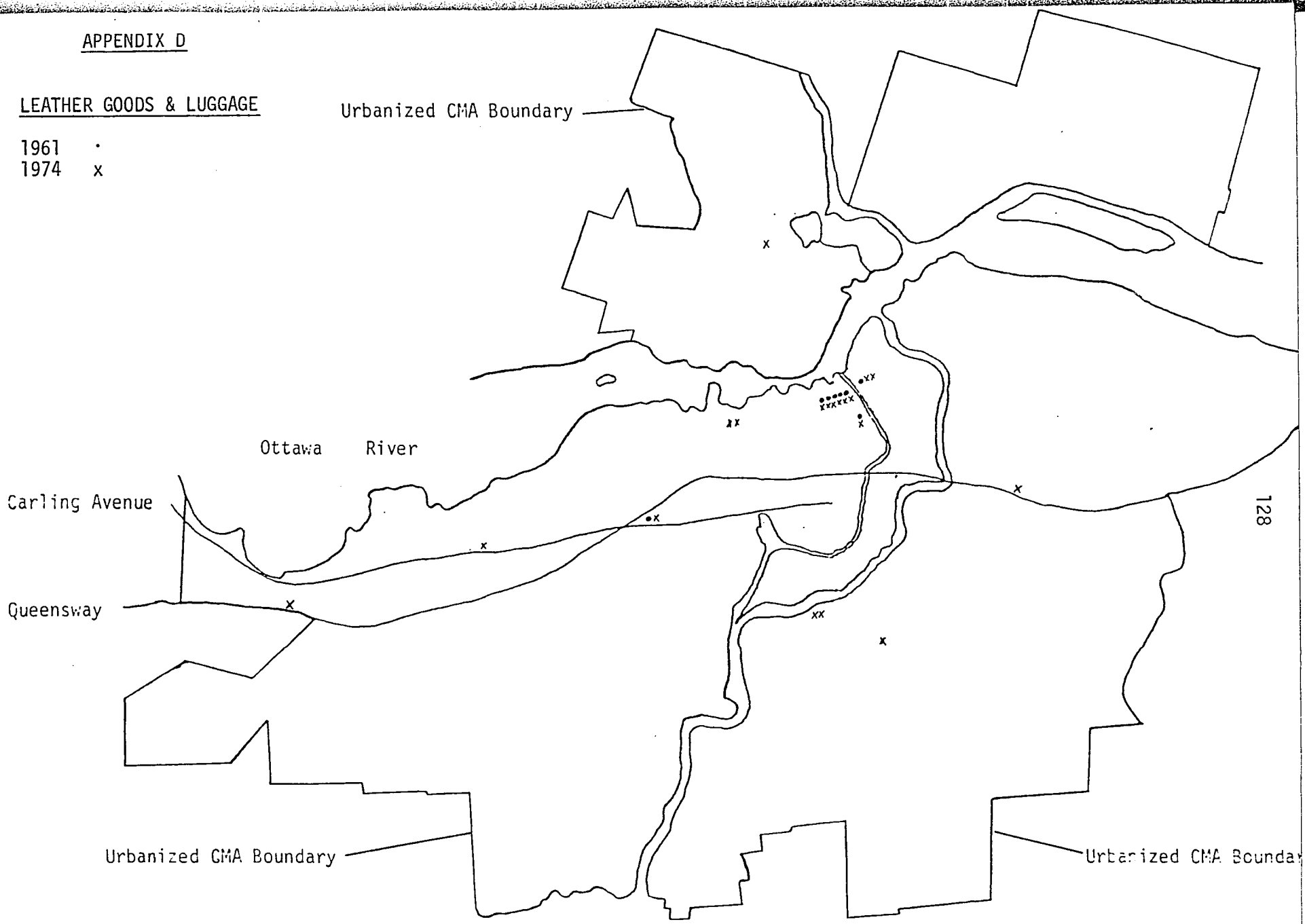
1961 •
1974 x



APPENDIX D

LEATHER GOODS & LUGGAGE

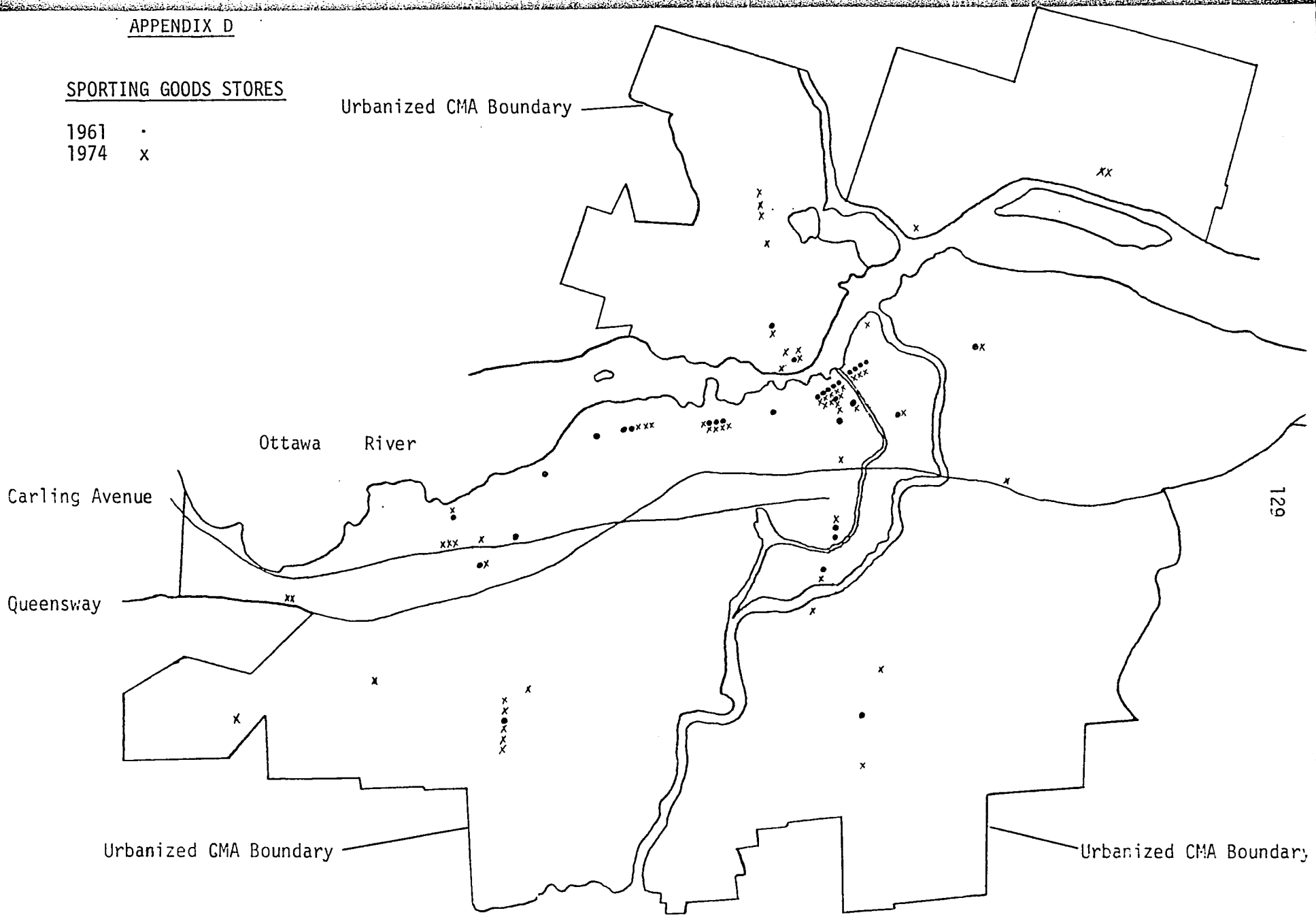
1961 •
1974 x



APPENDIX D

SPORTING GOODS STORES

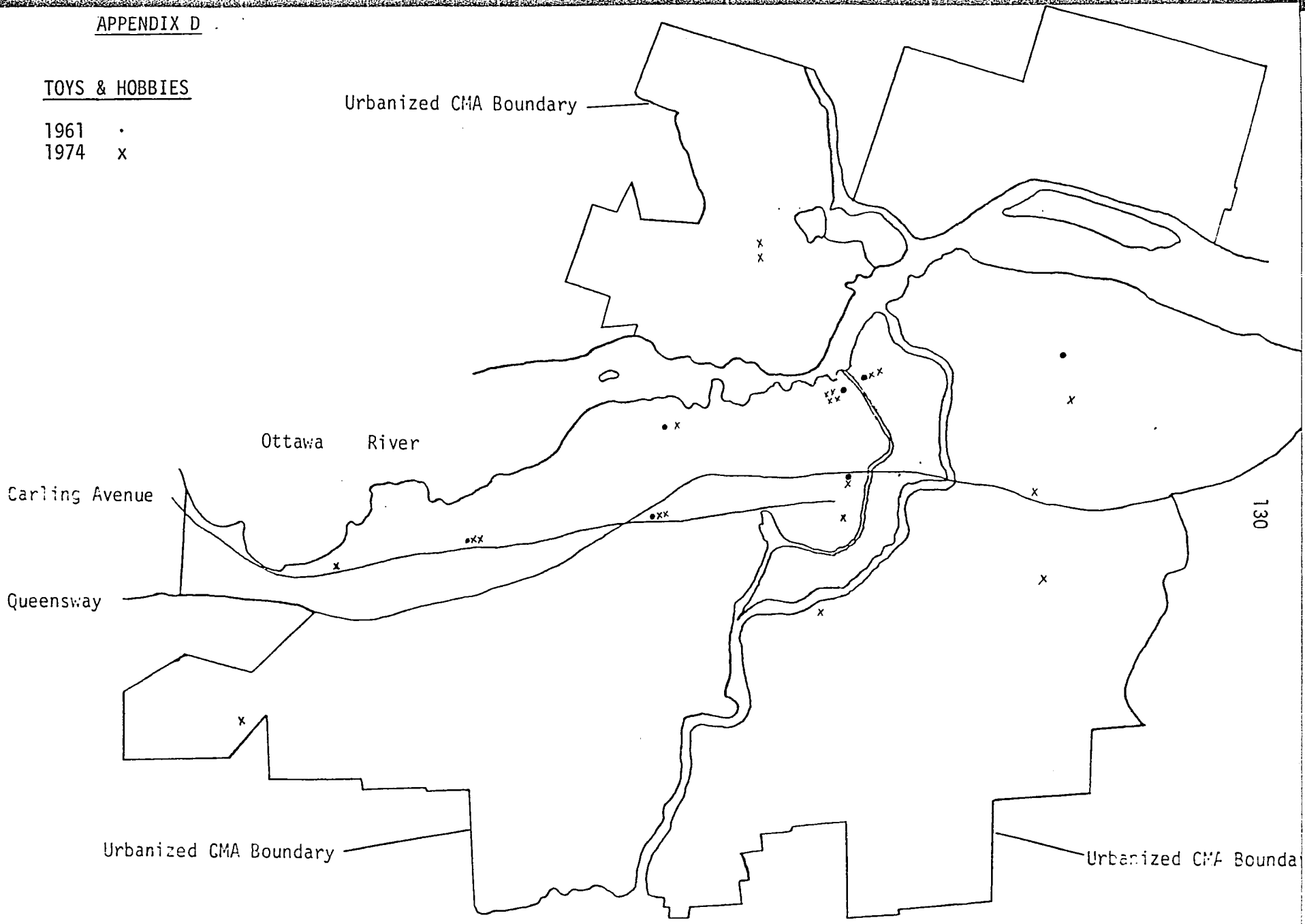
1961 ·
1974 x



APPENDIX D

TOYS & HOBBIES

1961 •
1974 x



APPENDIX E

APPENDIX E

Department Stores

YEAR	IN CBD	IN SHOPPING CENTRES	IN STRIP RETAIL	TOTAL IN CMA
1961	16	9	13	38
1962	17	13	13	43
1963	17	14	14	45
1964	18	15	13	46
1965	16	15	13	44
1966	16	16	13	45
1967	16	16	12	44
1968	16	17	12	45
1969	15	17	12	44
1970	13	19	11	43
1971	12	20	10	42
1972	12	23	7	42
1973	11	26	7	44
1974	9	26	7	42

Men's and Boys' Wear

YEAR	IN CBD	IN SHOPPING CENTRES	IN STRIP RETAIL	TOTAL IN CMA
1961	35	6	30	71
1962	34	8	32	74
1963	34	9	34	77
1964	35	8	33	76
1965	37	8	32	77
1966	36	8	33	77
1967	34	10	34	78
1968	33	10	34	77
1969	30	15	36	81
1970	30	19	33	82
1971	34	19	32	85
1972	38	27	35	100
1973	38	34	39	111
1974	39	35	40	114

APPENDIX E

Women's Apparel

YEAR	IN CBD	IN SHOPPING CENTRES	IN STRIP RETAIL	TOTAL IN CMA
1961	35	7	34	76
1962	35	9	33	77
1963	37	10	30	77
1964	35	14	30	79
1965	36	16	29	81
1966	35	18	29	82
1967	35	26	29	90
1968	36	27	30	93
1969	39	27	31	97
1970	40	30	32	102
1971	45	30	33	108
1972	45	42	34	121
1973	44	58	33	135
1974	48	61	31	140

Children's Wear

YEAR	IN CBD	IN SHOPPING CENTRES	IN STRIP RETAIL	TOTAL IN CMA
1961	4	2	10	16
1962	6	5	9	20
1963	5	4	8	17
1964	6	3	8	17
1965	6	3	8	17
1966	6	3	7	16
1967	4	4	6	14
1968	4	4	6	14
1969	4	3	7	14
1970	3	4	5	12
1971	4	5	4	13
1972	3	7	4	14
1973	3	10	3	16
1974	3	10	3	16

APPENDIX E

Shoes

YEAR	IN CBD	IN SHOPPING CENTRES	IN STRIP RETAIL	TOTAL IN CMA
1961	25	11	31	67
1962	28	17	30	75
1963	26	14	29	69
1964	29	15	25	69
1965	26	18	25	69
1966	27	17	26	70
1967	26	18	26	70
1968	31	18	23	72
1969	29	19	25	73
1970	29	24	27	80
1971	35	25	26	86
1972	34	31	27	92
1973	38	38	26	102
1974	37	37	26	100

Furriers

YEAR	IN CBD	IN SHOPPING CENTRES	IN STRIP RETAIL	TOTAL IN CMA
1961	15	0	19	34
1962	14	0	21	35
1963	15	0	18	33
1964	14	0	19	33
1965	14	0	19	33
1966	14	0	17	31
1967	14	0	18	32
1968	13	0	17	30
1969	12	0	18	30
1970	10	0	18	28
1971	10	0	15	25
1972	10	0	11	21
1973	10	0	11	21
1974	6	0	12	18

APPENDIX E

Furniture

YEAR	IN CBD	IN SHOPPING CENTRES	IN STRIP RETAIL	TOTAL IN CMA
1961	19	1	39	59
1962	20	1	38	59
1963	18	1	37	56
1964	16	2	41	59
1965	15	2	45	62
1966	13	2	44	59
1967	12	2	43	57
1968	15	2	43	60
1969	11	4	45	60
1970	11	5	45	61
1971	11	5	46	62
1972	10	6	46	62
1973	10	8	52	70
1974	11	10	55	76

Gift Shops

YEAR	IN CBD	IN SHOPPING CENTRES	IN STRIP RETAIL	TOTAL IN CMA
1961	12	2	20	34
1962	9	4	20	33
1963	11	4	21	36
1964	14	3	20	37
1965	13	3	20	36
1966	14	3	19	36
1967	14	5	21	40
1968	20	6	25	51
1969	21	8	24	53
1970	26	8	24	58
1971	28	8	22	58
1972	24	10	22	56
1973	27	16	23	66
1974	27	19	26	73

APPENDIX E

Bookstores

YEAR	IN CBD	IN SHOPPING CENTRES	IN STRIP RETAIL	TOTAL IN CMA
1961	8	0	9	17
1962	9	0	13	22
1963	8	0	12	20
1964	7	0	13	20
1965	8	0	13	21
1966	10	1	13	24
1967	12	2	15	29
1968	11	2	14	27
1969	12	3	16	31
1970	17	2	20	39
1971	20	2	21	43
1972	20	3	23	46
1973	17	6	24	47
1974	17	9	24	50

Jewellery

YEAR	IN CBD	IN SHOPPING CENTRES	IN STRIP RETAIL	TOTAL IN CMA
1961	22	0	29	51
1962	21	1	29	51
1963	21	1	31	53
1964	19	1	32	52
1965	19	2	31	52
1966	20	2	32	54
1967	21	4	32	57
1968	20	5	32	57
1969	18	5	36	59
1970	17	5	35	57
1971	18	5	35	58
1972	20	10	32	62
1973	20	15	32	67
1974	21	20	31	72

APPENDIX E

Leather Goods

YEAR	IN CBD	IN SHOPPING CENTRES	IN STRIP RETAIL	TOTAL IN CMA
1961	6	1	1	8
1962	6	2	1	9
1963	6	2	2	10
1964	6	2	4	12
1965	7	2	4	13
1966	7	2	4	13
1967	8	3	4	16
1968	9	3	5	17
1969	7	3	5	15
1970	7	3	4	14
1971	8	3	3	14
1972	9	5	3	17
1973	9	7	4	20
1974	8	7	4	19

Sporting Goods

YEAR	IN CBD	IN SHOPPING CENTRES	IN STRIP RETAIL	TOTAL IN CMA
1961	7	0	27	34
1962	7	0	26	33
1963	6	0	26	32
1964	6	0	26	32
1965	5	0	30	35
1966	5	0	32	37
1967	7	2	31	40
1968	6	3	32	41
1969	6	4	36	46
1970	8	3	37	48
1971	8	4	35	47
1972	11	4	39	54
1973	10	8	43	61
1974	8	10	43	61

APPENDIX E

Toys and Hobbies

YEAR	IN CBD	IN SHOPPING CENTRES	IN STRIP RETAIL	TOTAL IN CMA
1961	2	2	3	7
1962	4	3	3	10
1963	3	3	4	10
1964	3	4	5	12
1965	3	5	4	12
1966	4	5	5	14
1967	6	4	6	16
1968	4	4	4	12
1969	4	5	5	14
1970	4	6	3	13
1971	5	6	3	14
1972	4	9	6	19
1973	5	10	8	23
1974	5	12	7	24

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