

**THE SUBURBANIZATION OF OFFICES**

**A CANADIAN EXAMPLE**

**BY**

**CHRISTINE D. BLAKE**

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## ABSTRACT

The emergence of the office sector as the largest sector in the Canadian economy has attracted increasing amounts of attention in academic literature. Recently, offices have followed the trends of residential, industrial and retail activity and have chosen to locate in the suburbs of metropolitan areas. North York is a typical example of a suburb where the office sector is growing faster than the offices in the metropolitan CBD. This research paper examines the sectoral growth of office employment in the central areas of North York and the City of Toronto. The research concludes that Metropolitan Toronto exhibits the selective decentralization of offices, that is, the suburbanization of low order, routine office functions to the suburbs leaving a CBD dominated by high order, decision-making office functions. The paper also examines the possible physical and social implications of the suburbanization of offices and the associated planning implications.

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## TABLE OF CONTENTS

	Page
ABSTRACT	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF FIGURES	vi
LIST OF TABLES	vii
I INTRODUCTION	1
II REVIEW OF LITERATURE	2
2.1 Introduction	2
2.2 Suburbanization of Offices	4
2.3 Factors Affecting the Decentralization of Offices	6
2.4 Factors Affecting the Location Choice of Offices	8
2.5 Policies Affecting the Decentralization of Offices	11
2.6 Conclusions	13
III METHODOLOGY AND RESULTS	13
3.1 Study Area	13
3.2 Data Source and Characteristics	16
3.3 Methods of Analysis	17
3.4 Data Observations and Results	18
3.4.1 Regional Office Employment Observations	19
3.4.2 Sectoral Office Employment Observations	22
3.5 Conclusions	28
IV DISCUSSION AND INTERPRETATION OF RESULTS	29
4.1 Introduction	29
4.2 Regional Growth	30
4.3 Downtown Offices	32
4.4 Suburban Offices	34
4.5 Factors Affecting the Firm's Decision to Decentralize	37
4.6 Policy Implications	40

TABLE OF CONTENTS (cont.)

	Page
V CONCLUSIONS	44
APPENDIX A	47
APPENDIX B	51
LIST OF REFERENCES	

## LIST OF FIGURES

	Page
3.1 Metropolitan Toronto and Study Area	15
3.2 Regional Office Growth	23

## LIST OF TABLES

	Page
3.1 North York Employment - P.D. 11	20
3.2 Toronto Employment - P.D. 1	21

## I INTRODUCTION

The urban spatial structure in the post industrial city has been characterized by rapid suburbanization. The shift of residential and economic functions from the central city to outlying areas in the city has been well documented, especially the decentralization of industry. More recently, the decentralization of office functions has made its mark on the suburban economy and made it's way in to the academic literature of the last two decades.

Office employment has emerged as the dominant employment sector in many metropolitan centres. The result is a transformation in the skylines and the characters of cities as the white collar revolution took over from the era of blue collar industrial development. The dominance of office towers in the central business districts of many cities is a constant reminder of the extent of office-based employment in the city.

Metropolitan Toronto is the corporate head office capital of Canada and has experienced sustained growth in the office sector since the 1950s (Matthew,1988,p.38). Initially, this development was concentrated mostly in the traditional CBD of the city. However, as residential suburbanization exploded in the 1960s and 1970s, retail and, most recently, office establishments followed the population into the suburbs. Today, suburbs are developing their own



'downtowns', complete with office towers. Although the prosperity of the CBDs may appear to be threatened by the increasing emphasis on suburban office growth, office decentralization has been shown to be a selective process which facilitates the exit of certain types of offices from the CBD leaving other types of offices behind.

The following report investigates this trend of office decentralization by examining the extent of recent growth in the downtown area of Toronto and the central area of North York, a suburban municipality located directly north of the City of Toronto. Growth in specific sectors of office employment is also examined to determine the types of offices which tend to choose suburban locations. The implications of the decentralization of offices is also reviewed as well as the factors which actually affect a firms location decision.

## II REVIEW OF LITERATURE

### 2.1 Introduction

Unlike the decentralization of industry, the decentralization of offices did not attract serious attention until the late 1960s. In Canada, literature on the factors affecting office location within and between cities is scarce except for studies done by, or for, local government planning departments. However, the international

literature includes many studies on the extent of suburban office growth, factors affecting this growth and policies encouraging office growth, both on an intra- and inter-urban scale.

The post World War II period has been characterized by the rapid growth of employment in the service sector of the economy (Stanback,1979,p.1). This growth of services characterized sociologist Daniel Bell's theory of the emergence of the post industrial society (Bell,1976,p.10). The term 'service' has no set definition. The Ontario Ministry of Treasury and Economics (1986,p.4) defines services as "all economic activity other than agriculture, forestry, fishing, hunting and trapping, oil wells, mines and quarries and manufacturing" but other definitions include terms such as "output that is not storable" (Stanback,1979,p.5) and "the tertiary" and "quaternary" sectors (Gottmann,1983,p.65).

The Ontario Ministry of Treasury and Economics (1976,pp.11-13) outlines five reasons for this rapid growth in services in the Ontario economy : 1) the increased demand for intermediate services such as management, 2) the increased demand for social services(health care and education) as a result of the increased affluence in society, 3) the increased demand for consumer services through the increase of disposable income, 4) the more labour intensive nature of services and 5) the competitive and market pressures on manufacturing.

The increasing emphasis on the services has induced the investigation of the economic and spatial effects of this increasingly important sector, on both a national scale and a local scale. Since service employment often takes the form of office employment, that is, all employment that is based behind a desk (Gottman, 1983, p.25), many studies have focused on the characteristics of office employment and office space.

## 2.2 Suburbanization of Offices

Empirical evidence is rapidly accumulating which supports the suburbanization trend in offices. Manners (1974, p.94) identifies an increase in office floor space outside the CBDs of four American SMSAs from 1960 to 1972. In Houston, Minneapolis-St. Paul, Atlanta and Dallas, offices outside the CBD grew to have the majority of office floor space by 1972. Bailly and Fernie (1980, p.3) report the London Office Bureau helped move 2000 firms and 150,000 jobs out of central London area to outlying suburbs and smaller centres between 1963 and 1977. Bateman (1985, p.122) shows the increasing importance of New York suburbs to office development. In 1985, the four suburban areas of New York (Westchester, South-West Connecticut, Northern New Jersey and Long Island) exceeded downtown Manhattan and closely approached the huge Midtown in terms of office floor space.

In the Canadian literature, Hutton and Davis (1984,p.13) report an increase of 128.6% in office floor space in the outer suburban areas of Vancouver from 1977 to 1982. The City of Toronto (1987,p.5) reports that office floor space in the suburbs of Toronto have increased their share of total space from 24% in 1966 to 45% in 1985. Between 1976 and 1985, the rate of growth of office space in suburban areas of Toronto has averaged 228,000 square metres per year, compared with 155,000 square metres per year in the central area of the city. On a regional scale, the value of building permits in the large Canadian centres of Montreal, Toronto, Winnipeg, Edmonton and Vancouver has been modest and that "the largest increases have been in the suburbs of Toronto, Hamilton, and the smaller towns of the Niagara Peninsula, and the Vancouver suburbs" (George et al.,1980,p.74). Further emphasizing the suburbanization of offices in Metropolitan Toronto are the reports of the annual employment survey data by the Metropolitan Planning Department. Out of the total employment in the central area of Toronto, 60.4% is in office employment. This proportion remained the same between 1983 and 1987. Contrasting this is the increase in proportion of total employment in suburban centres in the office category. The most pronounced increase in proportion occurred in North York Centre, a suburban centre directly north of the central area. Here, office employment increased from 62.6% in 1983 to 75.8% of

total employment in North York Centre (Metropolitan Toronto, 1988b,p.2.12).

From this evidence, it is clear that the suburbs of many cities have become increasingly attractive to office development. Suburbanization of office functions is an empirical reality and could have important implications for the spatial distribution of land use and urban morphology of cities in the future.

### 2.3 Factors Affecting the Decentralization of Offices

Manners (1974,p.97) identifies transportation convenience as a reason for suburban office growth. With large labour force in the suburbs, there is a shorter, less congested journey to work for a suburban location. There is better access to intra-urban and intra-regional road systems and better parking facilities. This factor was identified by Hutton and Davis (1984,p.33) as a reason why planned decentralization of offices from Vancouver to outer suburbs failed. The areas proposed for suburban office development did not have adequate transportation linkages and therefore office development did not occur in the magnitude expected.

Another reason for the decentralization of offices is the availability of better educated labour in the suburbs (Manners,1974,p.97; Stanback,1979,p.89; George et al., 1980,p.72). The suburbs have traditionally been an area of

middle to upper class, higher educated residents. Firms find this attractive for the recruitment of executives.

Room for expansion of facilities is another factor often mentioned in the literature (Manners,1974,p.97; George et al., 1980,p.72; Peat et al.,1975,p.22). Often, offices do not have the room to expand in the high density CBDs therefore they tend to locate in suburban areas. This is especially true for rapidly growing medium sized companies and new companies (Manners,1974,p.104). Older, larger established companies have already made substantial investment into downtown locations and find it unprofitable to move. Rapidly expanding companies and new companies find a suburban locale attractive because of room for expansion and the ability of cheaper land to build premises tailored to requirements of the company.

Still another factor which promotes the suburbs as a place for office development is the change in technology used in office transactions (Gottmann,1976,p.75). Through technological innovations such as better telecommunication systems and increased use of the computer, firms have become 'footloose' in terms of their location. A firm does not always have to rely on face-to-face transactions in order to do business and therefore is not tied to a CBD and its services . An office can locate virtually anywhere in the city and still maintain its clients and suppliers. This makes the other benefits of suburban locations all the more

attractive.

These may seem like logical arguments for a firm to choose a suburban location over a downtown location but are these factors really considered by a firm when choosing a location?

#### 2.4 Factors Affecting the Location Choice of Offices

What does an office firm look for when making a location decision? Studies by George et al.(1980) and Peat et al.(1975) use the results of surveys of newly located firms to try to reveal the reasons for downtown or suburban location choices.

George et al.(1980) surveyed sixty-two newly located offices in Atlantic Canada and the New England States. First of all, it is interesting to note that more than half of the firms considered only one location and only ten companies carried out detailed studies of the advantages and disadvantages of the sites. The results of the surveys reveal important aspects of the location decision processes of offices.

The supply of labour, especially executives, was of high importance. The quality of life also figured prominently in the location decision. Educational facilities, housing prices and availability of recreational facilities were all often mentioned by the firms surveyed.

Another important factor entering into the firms decision making procedure was the prestige of the address and the desire to maintain a high profile image.

Although not mentioned by the firms surveyed, we should not conclude that the availability of suitable building land, the level of office rents, the existence of an efficient construction industry and the level of local taxes are not important to a firm. George et al. suggest that firms may have found that all locations considered by the firms were all satisfactorily endowed in these aspects. Also, the fact that these firms did not carry out detailed cost analyses of the locations may suggest that the firms believed operational costs of the firm to be uniform over space. Although this study does not investigate suburban and downtown locational choices, it does emphasize the general factors which firms consider when making choosing a location.

A similar study was done earlier by Peat et al. (1975) in Metropolitan Toronto in preparation for the creation of an Official Plan for the municipality. The group surveyed fifty-four suburban firms and sixty-three downtown firms. The survey found that factors affecting suburban locations were the lower level of traffic and better parking, lower rental rates and lower land costs, ability to build custom designed premises, access to the airport and the amenities such as recreational facilities (especially



golf courses) and indoor shopping malls. It is interesting to note that this survey considered the transportation network to be a negative factor for suburbanization of offices due to inadequate public transit infrastructure.

The factors favouring a downtown location were a prestigious address, amenities such as shopping, hotels and restaurants, high accessibility by public transit, availability of staff due to accessibility and close proximity to support services such as financial, legal accounting and other specialty services.

This study also investigated the factors which lead to the decision to decentralize. These factors were the need for additional space, the expiry of a lease, traffic congestion in the central city, a more pleasant journey to work in the suburbs, the availability of labour and the general suburban environment. An important difference between these two surveys was the nature of the release of information to the authors. The study by Peat et al. used a questionnaire therefore direct specific questions were asked. The survey by George et al. took the form of personal interviews where the executive of the firm in question told the surveyor the factors that influenced their office location choice. This could have produced false information about the Toronto firms location decisions since the researcher may have inferred the wrong factors from the responses on the questionnaire.

Another important difference between these two studies is the break down of firms by office functions. Unlike the study by Peat et al., the study by George et al. did not break down the firms into different office types. Peat et al. were able to classify different office types into ones that were likely or unlikely to decentralize. The propensity to decentralize is "more likely related to the structure of a firm, regardless of their sector of activity" (Peat et al., 1975, p.28). The offices that were most likely to decentralize were newly established or diversifying firms, insurance companies, data processing systems, research and development establishments, regional sales offices and government functions. Offices that are likely to remain in the CBD are financial, legal and accounting offices and large head offices.

## 2.5 Policies Affecting the Decentralization of Offices

Policies encouraging the decentralization of offices have been implemented on both a regional and an urban scale. London had implemented decentralization policies in the 1960s and 1970s. The purpose was to decentralize offices from central London to outer suburbs and other South East Britain towns in order to achieve a more equal distribution of the benefits derived from office development (Bailly and Fernie, 1980, p.2; Alexander, 1979, p.65). This policy was

managed by the Location of Offices Bureau (LOB) through financial incentives and strong persuasion. Unfortunately, these policies were too successful and too many offices left central London, resulting in an inner city deprived of employment opportunities (Bailly and Fernie,p.3). The decentralization policies were abandoned and in their place came inner city revitalization policies in order to increase economic viability of the inner cities through office development.

Similar policies have been enacted in France (Bailly and Fernie,1980,p.2) , Sydney and Perth in Australia (Alexander,1979,p.92,95). Perth's policies were mostly to decentralize offices out of the central city in order to reduce inner city congestion. A similar policy was put in place in Toronto as part of the city's Central Area Plan in order to control the rate of office development within the Central Area and encourage decentralization to other sub-centres of the Metropolitan region. The underlying hope is to alleviate downtown congestion and parking problems (City of Toronto,1986,p.2).

A policy of the Greater Vancouver Regional District has been to establish regional town centres (RTCs) in order to promote a multinucleated metropolitan structure and to promote these areas as employment and residential nodes in order to absorb the regions rapidly growing population (Hutton and Davis,1984,p.5). The attraction of offices to

these RTCs was an integral part of the plan. However, the amount of office development was less than predicted due to the failure to establish the RTCs along previous growth nodes. The new RTCs did not have adequate transportation linkages to the Vancouver central area.

## 2.6 Conclusion

The previous section shows that the growth of offices is an increasingly important issue in academic literature, urban development and in policy planning. The establishment of the service sector as the largest sector in the Canadian economy has definite implications for the urban economy and spatial structure of the city. As office decentralization continues, the impacts of the trend will, surely, become the next extension of this body of literature.

## III METHODOLOGY AND RESULTS

### 3.1 Study Area

Metropolitan Toronto is the major economic centre of Canada. The region contains 9.9% of Canada's population and 10% Canadian employment (Metropolitan Toronto, 1988b, p.1) and has attracted the head offices of 359 out of the 840 largest and most important companies in Canada (Matthew, 1988, p.39).

The Municipality of Metropolitan Toronto consists of six smaller cities : Toronto (the provincial capital), Scarborough, East York, North York, York and Etobicoke. The two areas chosen for this study are two smaller areas within the City of Toronto and the City of North York. The Metropolitan Planning Department has defined these areas as Planning District 1 (PD 1) and Planning District 11 (PD 11), respectively (Fig. 3.1). PD 1, in the City of Toronto, is referred to as the 'Central Area' and contains the financial core and central business district of the entire metropolitan region. PD 11 is the central area of the City of North York and is located to the north of PD 1 on the periphery of Metropolitan Toronto. This area contains a smaller centre designated by the Metropolitan Planning Department as a 'Metropolitan Major Centre' which is rapidly becoming known as North York's CBD.

Office employment is the largest employment sector in Metropolitan Toronto accounting for 16.6% of all Metropolitan employment. The City of Toronto has the largest share of Metropolitan office employment at 56.7%. North York has the second largest share at 21.3% (Metropolitan Toronto, 1988b, p.2.8). PD 1 alone accounts for 44.1% of the entire Metropolitan office employment.

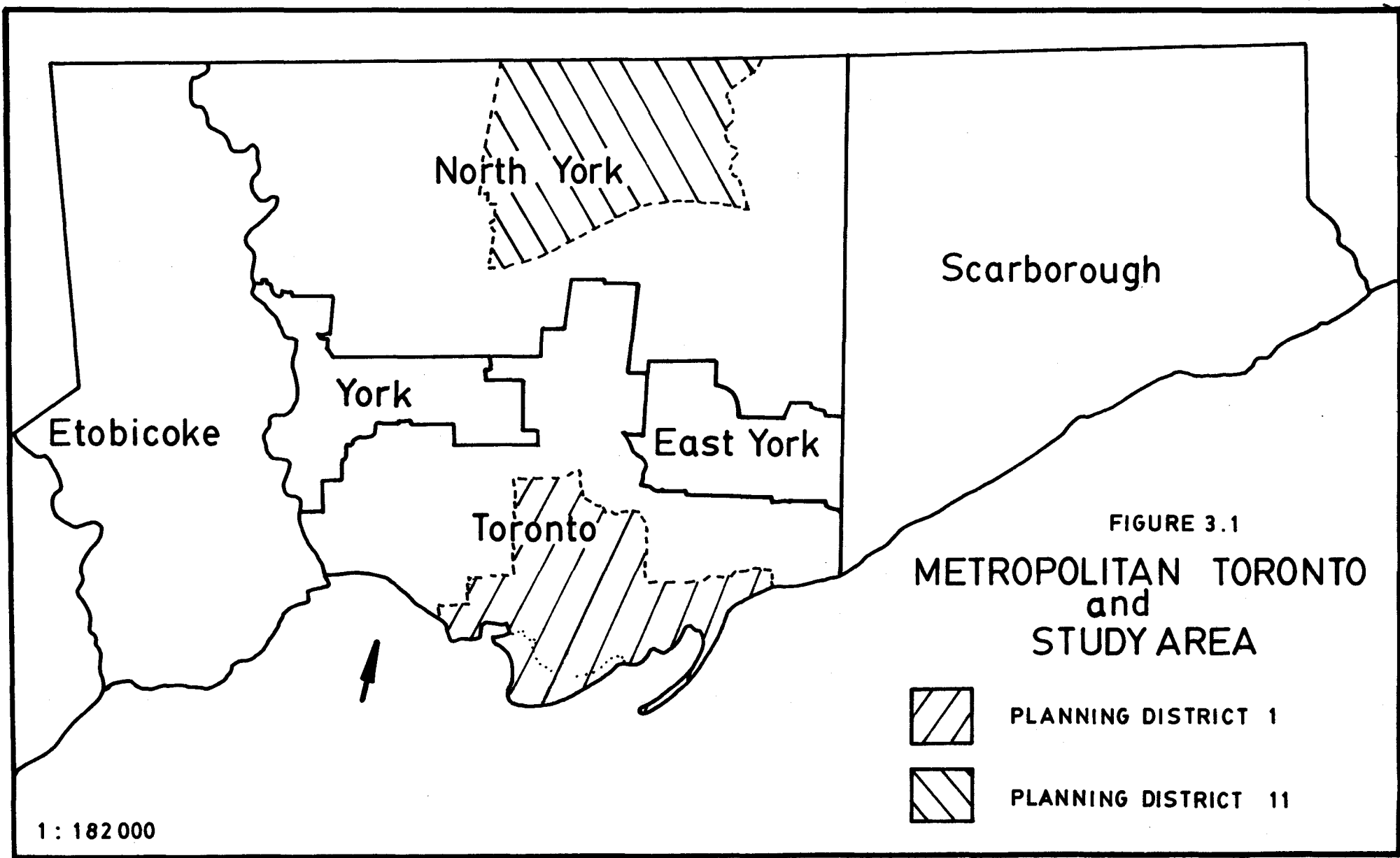




FIGURE 3.1  
**METROPOLITAN TORONTO  
 and  
 STUDY AREA**

-  PLANNING DISTRICT 1
-  PLANNING DISTRICT 11

### 3.2 Data Source and Characteristics

The data used in this study comes from the Metropolitan Toronto Planning Department's Employment, Land Use and Assessment Data Bank (E.L.A.) which is derived each year from the Standard Assessment System of the Ontario Ministry of Revenue. From the E.L.A., a survey listing was produced of all non-residential assessable units in Metropolitan Toronto. The employment update was applied to those assessable units that had at least one of the following characteristics : the unit was surveyed over one year ago, the unit was vacant last year, or a new unit. These units were then visited by surveyors. The only exception was in PD 1 in which every assessable unit was surveyed as part of a special Central Area monitoring program (Metropolitan Toronto, 1988a, p.1.1)

The data collected by the surveyors consists the business name, primary activity code, full time employment, part time employment, length of occupancy, and, if length of occupancy was less than one year, the previous location of the present tenant and the new location of the past tenant. The data for this research consists of total office employment (full time and part time) gathered into seventeen categories of office functions for the years 1983-1987. Metropolitan Toronto is divided into sixteen planning districts. This research uses the office employment data

for PD 1 and PD 11 which have been previously defined. The office categories were devised by the Metropolitan Planning Department (see APPENDIX A).

Some inaccuracy in the data may have occurred due to incorrect classification of offices by surveyors or failure to break down the total employment of multi-function offices into different employment sectors. Because every business is not surveyed in a given year, the survey results are only a close approximation of Metropolitan employment with the exception of PD 1 where the businesses are surveyed every year. Employment figures for businesses that are not surveyed each year are taken from the previous years survey data for that firm. This may cause some inaccuracies in the North York employment figures and, therefore, in the findings of the present research.

### 3.3 Methods of Analysis

The office employment data from the basic planning units within each of the planning districts was reduced from sixty four categories into one of seventeen office categories (APPENDIX A). A series of simple growth rates and percentages were calculated to determine fast and slow growth sectors within each study area for comparison. A two



sample chi-square test was performed on the sectoral data to determine how different the sectoral compositions were between the North York and Toronto area.

### 3.4 Data Observations and Results

The time series data for central North York and downtown Toronto office employment show a definite emphasis on suburban office growth. The growth of office employment in the suburbs is shown as an absolute increase in employment in central North York as well as the relatively high growth rate of office employment in North York as compared to downtown Toronto. However, growth rates of the various sectors of office employment in both regions show wide variations as well as some absolute declines. The data seems to point to a specialization in different office sectors in the different regions. Also, within the time period being examined, fluctuations of office employment growth occurred for several employment sectors in both regions. The following section highlights the notable results for the time series data on office employment in the central Toronto and central North York areas of Metropolitan Toronto.

### 3.4.1 Regional Office Employment Observations

Central North York and downtown Toronto (which will from here on be referred to as 'North York' and 'Toronto') experienced an absolute increase in office employment in the time period 1983-1987 (Table 3.1 and Table 3.2). North York office employment increased from 17612 in 1983 to 23471 in 1987. Toronto office employment increased from 208637 in 1983 to 244274 in 1987. Although Toronto gained approximately six times more office employment than North York in this time period, North York office employment actually grew faster with a growth rate of 33.3% as compared to Toronto's 17.1% growth rate over this period. North York's share of total metropolitan office employment also increased from 3.85% in 1983 to 4.24% in 1987 whereas Toronto's share of total metropolitan office employment decreased during this period from 45.58% in 1983 to 44.10% in 1987 indicating the rising importance of central North York as a centre for office employment. Office employment as a share of metropolitan total employment in both these regions increased during this time period emphasising the increasing importance of office employment in both of these regions and in Metro Toronto.

Within this time period, Toronto experienced a fairly constant growth in office employment (Fig. 3.2). Yearly growth rates averaged around 4.5% except for 1984-85

TABLE 3.1

## NORTH YORK EMPLOYMENT - P.D. 11

CATEGORY*	1983	1984	1985	1986	1987	%GROWTH
1	98	362	0	46	420	328.57
2	715	1417	1172	1064	1688	136.08
3	2190	1656	1726	1457	1352	-38.26
4	978	1057	943	764	1102	12.68
5	2001	2382	2298	2188	3427	71.26
6	339	324	345	309	413	21.83
7	2351	2886	3337	3228	4368	85.79
8	667	515	567	701	729	9.30
9	1	0	5	7	29	2800.00
10	48	753	765	712	729	1418.75
11	271	205	464	342	388	43.17
12	852	866	900	857	1026	20.42
13	295	339	309	413	461	56.27
14	4508	4516	4647	4619	4324	-4.08
15	44	57	108	468	544	1136.36
16	1531	1719	1946	1990	1412	-7.77
17	723	894	947	925	1059	46.47
TOTAL OFFICE	17612	19948	20479	20090	23471	33.27

## PERCENTAGE SHARE OF TOTAL EMPLOYMENT

	1983	1984	1985	1986	1987
1	.56%	1.81%	.00%	.23%	1.79%
2	4.06	7.10	5.72	5.30	7.19
3	12.43	8.30	8.43	7.25	5.76
4	5.55	5.30	4.60	3.80	4.70
5	11.36	11.94	11.22	10.89	14.60
6	1.92	1.62	1.68	1.54	1.76
7	13.35	14.47	16.29	16.07	18.61
8	3.79	2.58	2.77	3.49	3.11
9	.01	.00	.02	.03	.12
10	.27	3.77	3.74	3.54	3.11
11	1.54	1.03	2.27	1.70	1.65
12	4.84	4.34	4.39	4.27	4.37
13	1.67	1.70	1.51	2.06	1.96
14	25.60	22.64	22.69	22.99	18.42
15	.25	.29	.53	2.33	2.32
16	8.69	8.62	9.50	9.91	6.02
17	4.11	4.48	4.62	4.60	4.51
TOTAL	100.00	100.00	100.00	100.00	100.00

\* for category labels, see APPENDIX A

TABLE 3.2

## TORONTO EMPLOYMENT - P.D. 1

CATEGORY*	1983	1984	1985	1986	1987	%GROWTH
1	5068	4989	3798	2829	3554	-29.87
2	7092	6505	5522	5466	3197	-54.92
3	25146	25391	26719	23952	25600	1.81
4	21024	28970	27710	32879	34864	65.83
5	44375	41655	39411	40702	43162	-2.73
6	11438	11863	12677	13185	13611	19.00
7	27253	25394	28930	32265	37904	39.08
8	4176	3488	4090	4502	4836	15.80
9	4226	5241	5642	7273	6529	54.50
10	7719	8794	9545	10294	9929	28.63
11	8386	12316	13373	13734	13151	56.82
12	2203	2351	2537	2325	2478	12.48
13	996	967	708	1317	1342	34.74
14	5664	7434	8171	6716	7653	35.12
15	21421	21294	22290	22521	24274	13.32
16	4414	5140	5687	5865	5295	19.96
17	8036	7905	7228	7604	6895	-14.20
TOTAL OFFICE	208637	219697	224038	233429	244274	17.08

## PERCENTAGE SHARE OF TOTAL EMPLOYMENT

	1983	1984	1985	1986	1987
1	2.43%	2.27%	1.70%	1.21%	1.45%
2	3.40	2.96	2.46	2.34	1.31
3	12.05	11.56	11.93	10.26	10.48
4	10.08	13.19	12.37	14.09	14.27
5	21.27	18.96	17.59	17.44	17.67
6	5.48	5.40	5.66	5.65	5.57
7	13.06	11.56	12.91	13.82	15.52
8	2.00	1.59	1.83	1.93	1.98
9	2.03	2.39	2.52	3.12	2.67
10	3.70	4.00	4.26	4.41	4.06
11	4.02	5.61	5.97	5.88	5.38
12	1.06	1.07	1.13	1.00	1.01
13	.48	.44	.32	.56	.55
14	2.71	3.38	3.65	2.88	3.13
15	10.27	9.69	9.95	9.65	9.94
16	2.12	2.34	2.54	2.51	2.17
17	3.85	3.60	3.23	3.26	2.82
TOTAL	100.00	100.00	100.00	100.00	100.00

\* for category labels, see APPENDIX A

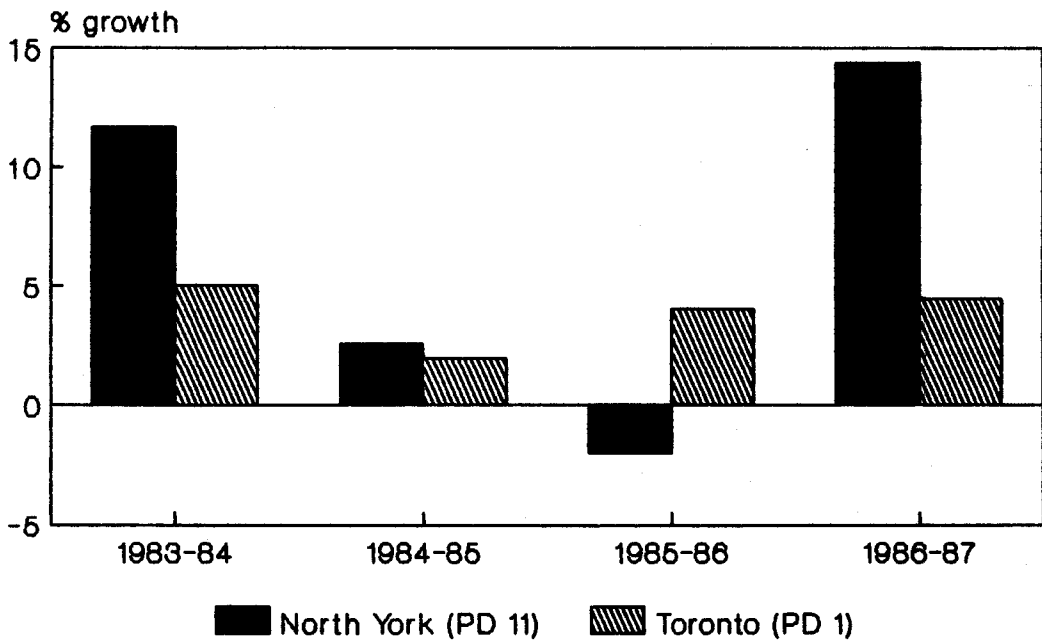
when office employment growth fell to 1.94% . North York experienced a similar fall in office employment growth during this year as well. Office employment growth rates fell from 11.71% in 1983-84 to 2.59% in 1984-85. Unlike Toronto, North York's yearly growth rates fluctuated with a high of 14.41% in 1986-87 and a low of -1.94% in 1985-86 (Fig. 3.2). The low growth rate of 2.59% in 1984-85 as the absolute decline in office employment in 1985-86 could be due to the beginnings of the large redevelopment project of North York's centre. Large blocks of formerly commercial land under construction or blocks of vacant commercial buildings awaiting redevelopment along Yonge Street could account for the temporary decline in office employment. Similarly, the large growth rate in 1986-87 could be due to the opening of several large office complexes which were under construction in the previous years.

#### **3.4.2 Sectoral Office Employment Observations**

A two sample chi square test was done on the data to determine if the office compositions of the two regions were significantly different, that is, to see if the distributions of office employment into the different sectors were different for the two regions. At the 0.05 level of significance, the critical value is 26.30 for 16 degrees of freedom. The calculated test statistics produced

FIGURE 3.2

### Regional Office Growth 1983-1987



values which were much higher than this critical value for every year of the study period (see APPENDIX B). From these results, we can conclude that the two distributions of office employment are significantly different from one another.

#### 1) North York

Large variations exist in the growth of the seventeen sectors of office employment in the period 1983-1987 in both Toronto and North York (see Table 3.1 and Table 3.2). Several sectors in North York experienced very large growth rates. Some sectors experienced huge rates of growth due to the relatively small proportion of regional office employment which were observed at the beginning of the time period. Therefore, although large growth rates were calculated, the actual proportion of regional office employment at the end of the time period was still very small. This is exemplified by radio, T.V. and film , provincial government, and books, periodicals and newspaper office sectors. For example, over the study period, radio, T.V. and film offices grew from 1 employee to 29 employees in North York, an increase of 2800% . The huge growth rate is insignificant because of the small proportion of North York office employment represented by this sector. At the end of the study period, this sector represented only 0.12%

of North York office employment.

Other high growth rates over the study period were, however, notably significant in North York. Manufacturing office employment grew by 136.08% and increased its share of North York office employment from 4.06% to 7.19% over the study period. Investment, insurance and real estate office employment grew by 71.26% and increased their share of the regional office employment from 11.36% to 14.60%. The most notable increase in proportion of total regional office employment was in the category 'other business services'. This sector grew by 85.79% over the study period and increased its share of office employment in North York from 13.35% in 1983 to 18.61% in 1987. 'Other business services' became the largest office employment sector in North York in 1987, just edging out federal and foreign government office employment at 18.42% which, in previous years, was the largest employment sector.

Absolute declines in office employment were notable in only one sector. Transportation, construction and resource production office employment had a growth rate of -38.26% over the study period. This translated into a loss of 838 jobs in this sector and a decline in proportion of office employment from 12.43% to 5.76% by 1987. Federal, foreign, regional and local government office employment also declined but only slightly.

Proportional declines were most pronounced in



transportation, construction and resource production office employment and federal and foreign government employment (as noted above). Although the federal and foreign government sector did not experience a large absolute decline in employment, it dropped its share of employment in North York from 25.6% (originally, the largest office employment sector) to 18.41% over the study period to become the second largest office sector.

#### ii) Toronto

Sectoral growth rates for downtown Toronto do not show the extreme values as they did for North York. This is due the fact that this region is a long established centre for office employment and contains the majority of office employment for the entire metropolitan region. Declines or increases of office employment of the same magnitude as experienced by North York translate into much smaller growth rates in Toronto due to the relatively large size of the office sectors in this region. Also, we do not see changes of the same magnitude in the share of office employment among the various sectors as we do in North York because of the relative sizes of office employment in the two regions.

Toronto experienced absolute declines in office employment in 4 of the seventeen office sectors. The largest decline in employment was in manufacturing offices

where 3895 jobs were lost over the study period. The mining, mineral and oil office employment declined by 1514 employees and association office employment declined by 1141 employees. Although these sectors lost employment, their proportions of total Toronto office employment were small at the beginning and at the end of the study period. For example, although manufacturing office employment had the largest absolute decline, its share of regional office employment was originally quite small (2.43%) and declined to 1.45% by 1987. However, office employment in the investment, insurance and real estate sector had a growth rate of only -2.73% but its proportion of total employment declined from 21.27% to 17.67%. Despite this decline in proportion of total Toronto office employment, the investment, insurance and real estate sector continued to have the largest share of employment in the area.

The largest absolute increase in employment occurred in the banking sector. The banking sector had a growth rate of 65.83%, increasing its level by 13840 employees and increasing its share of office employment from 10.08% to 14.27%. Despite this large absolute increase, the banking sector dropped from the second to the third largest employment sector in Toronto. Another large absolute increase in employment occurred in the 'other business services' sector. This sector had a growth rate of 39.08% over the study period and increased by 10651 employees. The

sector increased its share of Toronto office employment from 13.06% to 15.52% to become the second largest sector. Another increase was observed in the trade and personal services sector. With a growth rate of 56.82%, this sector increased its level by 4783 employees and its share of office employment to 5.38%. Although most sectors increased their employment, their proportions of Toronto office employment did not change significantly.

### 3.5 Conclusions

From the employment data from Toronto and North York, we can see that the two distributions of office employment are very different. There seems to be an emerging regional emphasis on certain office sectors. Over the study period, Toronto experienced a large decline in manufacturing offices and North York manufacturing offices increased significantly. Toronto showed a slight absolute decline in employment and a large decline in the share of investment, insurance and real estate office employment. In North York, this sector increased both by absolute numbers and by share of total office employment. Federal and foreign government office employment, although remaining the largest office sector in North York, is declining as opposed to the increase in this sector in Toronto. Although the associations office sector remains a small share of both

regions total office employment, North York is gaining in this sector and Toronto's share of this sector is declining. Toronto's share of banking employment is both large and increasing. North York's banking sector, although increasing, is still a small share of the regions total office employment. Both Toronto and North York seem to be specializing in the 'other business services' sector.

#### IV DISCUSSION AND INTERPRETATION OF RESULTS

##### 4.1 Introduction

The office sector is widely recognized as the major component of urban growth and development in the post-World War Two period. The results from this study support the findings of previous studies showing a suburbanization trend in offices in metropolitan areas. The sectoral results of this study also support the findings of other studies on the types of offices that tend to choose suburban locations. Informal interviews with a few office firms in downtown Toronto and North York were undertaken and the information received proved to be extremely useful in interpreting the employment data. The information given in the interviews correspond to the results of larger, previous studies on the factors affecting the location decision of offices. The following chapter discusses the findings of this research in

light of previous studies on office suburbanization and location decisions. The implications of office decentralization on Metropolitan Toronto are also examined.

#### 4.2 Regional Growth

The results of this study definitely show a large growth in suburban office employment. Office employment increased by 33.3% in North York whereas in Toronto, the rate of growth was only 17.1% over the study period. Although the growth rates of North York and other suburban areas are larger than the City of Toronto (Metropolitan Toronto, 1988b, p.2,8) and, specifically, larger than the Central Area, this does not indicate an entire exodus from the city to the suburbs. Those types of offices which are locationally dependent upon the amenities that a central location offers will tend to remain in the core and the locationally 'footloose' offices will be the ones who tend to choose suburban locations.

In spite of the increase in importance of suburban areas for office growth, Toronto's CBD still remains the dominant centre for office employment in the region. The Official Plan for Metropolitan Toronto makes a commitment to keep the central area as the pre-eminent business centre for the region and proposes to accommodate a growing residential component. This commitment to a dominant regional CBD is

supported by the level of development taking place in the core during this period. 307,741 m<sup>2</sup> of office floor space was under construction in 1986 with a further 427,239 m<sup>2</sup> approved by council in the same year. This translates into a definite increase of at least 14.1% over the existing floor space of 5,208,463 m<sup>2</sup> with a large proportion of the approved applications going towards the redevelopment of the vacant railway lands adjacent to the financial district (Metropolitan Toronto, 1987, p.14).

Another "fundamental aim of the [Official] Plan is to create a multi centred urban structure" (Metropolitan Toronto, 1983, p.10) through the development of Metropolitan Centres located along rapid transit facilities. The function of these centres is to provide reasonable job alternatives to the Central Area for many suburban residents by combining social and economic opportunities, especially office employment. It is intended that the centres will act as magnets pulling otherwise loosely organized office and service development to easily recognizable and acknowledged growth points. The central area of North York is one of these designated Metropolitan Centres and, as this study indicates, is succeeding in increasing its importance as a centre for office employment.

### 4.3 Downtown Offices

Toronto is the corporate head office capital of Canada and is a significant North American centre in international currency transactions and stock market activities (Matthew, 1988, p.44). The Stock Market and the Customs House were initially established downtown and have drawn related financial, investment, customs and other business services to the area over time to establish the CBD that we see today. The rise of selective decentralization results in certain high order functions, such as the decision making functions of head offices, remaining in the traditional CBD. These high order functions take advantage of the external economies of scale and the high level of accessibility available there.

The downtown locations provide the opportunity for frequent face-to-face contact between associated executives and professionals. In this sense, these high order office functions are locationally tied because of their need for 'spur-of-the-moment' personal communication linkages. Peat et al. (1975) identify the use of business clubs and associations as places where many business transactions take place in a social setting. Many of these prestigious clubs, such as the exclusive Toronto Club, are located downtown and are easily accessible by the executives of the large downtown corporations, again, making the downtown location

of the office beneficial.

Also, with the high concentration of head offices Toronto, national and international business transactions are frequent and out of town executives visiting a CBD office recognize the high profile Bay St. and King St. addresses and associate the addresses with prestige and success. In an interview with the Bay St. firm of CHW International Investment Services Ltd, the president remarked that "a lot of clients from out of town recognize the Bay Street address. It's the Wall Street of Canada." and that "[the company] wouldn't move to the suburbs even if you gave [them] free rent!". The president also added that "moving to the suburbs would be like cutting our own throat". The firm was adamant about their centrality. Being close to all the brokerage houses and the stock exchange was the key to their success.

Even though the investment dealers, insurance and real estate sector was the largest office sector in the downtown area, its employment had declined slightly and its proportion of total area office employment had declined significantly. This is suspected to be due to the separation of various functions within the sectors, especially among real estate and insurance firms. Real estate firms deal with local transactions and are likely to be located closer to their customers. This reason would support both the increase in suburban growth and the



continuing dominance of this sector in the CBD. With Metropolitan Toronto experiencing both rapid suburban and downtown development during this period, it is likely that real estate developers and associated services find it locationally beneficial in both areas. Head offices of real estate development firms may have national or international clients and therefore may also stay in the core to keep the accessibility to investment and related services and take advantage of the high profile area.

The insurance companies are also the types of companies more likely to decentralize because of their standardized product (Matthew, 1988, p.41). This could also account for the slight decline in the investment dealers, insurance and real estate sector in the Central Area in the study. These offices are more likely to take advantage of the ability of telecommunications to overcome the friction of distance to the point where centrality is no longer imperative to them. The investment management divisions may tend to remain in the CBD to maintain close contact with the financial and business worlds.

#### 4.4 Suburban Offices

There is no doubt that the suburbs are becoming increasingly important in terms of office employment. The rapid low density suburban sprawl that occurred in

Metropolitan Toronto in the 1960s was accompanied by scattered office establishments. Since the 1970s, offices have reconcentrated in office parks and most recently in suburban 'downtowns' (Matthew, 1988, p.38). These reconcentration occurred partly under government encouragement and zoning in The Official Plan of Metropolitan Toronto. The City of Toronto's Central Area Plan promotes decentralization of offices through policies which control the rate of office development within the Central Area (City of Toronto, 1986, p.2).

The selective decentralization of offices is related to structural or particular characteristics of the firms, regardless of their sector of activity with a few exceptions (Peat et al., 1975, p.28). One of the sectors which has, generally, been decentralizing has been manufacturing offices. The results of the North York data of this study exemplifies this trend. Industry has been one of the first sectors to decentralize. Production locations have moved from central city areas to peripheral fringe areas to take advantage of available land and transportation networks. Many industrial operations have offices associated with them, either because of necessity for some office workers to be close to a production facility in order to control the process, or because it is convenient for corporations to locate their associated divisions, such as marketing, close to their manufacturing or distribution centres (Peat et

al., 1975).

As discussed above, the standardized product of insurance firms means that they are relatively self sufficient and do not require a large amount of physical interaction with the greater business world except for certain functions of the companies. They are therefore typical suburban offices. In an interview with the manager of the Toronto regional office of Seaboard Life Insurance located in a new office tower in North York, the manager reported that the office was only in contact with the downtown company office about three times a week. The manager also reported that the various offices of Seaboard Life Insurance operate individually of each other and have their own territories. Decentralization of insurance companies is not only seen on an inter-urban scale but also on an intra-urban scale. For example, smaller order cities like Waterloo, London and Winnipeg are the locations of many head offices of major insurance companies in Canada.

The importance of the 'other business sectors' in both the CBD and central North York and the wide variety of businesses included in this sector (see APPENDIX A) suggest certain businesses within this sector would be more likely to locate in the CBD and others more likely in the suburbs. The particular characteristics of these firm would determine where they would be located. For example, services such as management consultants and executive personnel services may

be located in the core where they can take advantage of the high concentration of companies who use these services regularly. Other services may not require regular interaction with the businesses in the CBD and therefore are locationally 'footloose' and may choose suburban locations for other reasons. Also, offices where routine functions such as data processing are being performed, businesses that use mostly clerical workers and businesses that deal directly with consumers are likely to choose suburban locations. Unfortunately, the aggregated data in this study does not allow for specific investigation into the growth rates of the individual sectors of the 'other business services' sector for a detailed analysis of the locations trends of these offices.

#### **4.5 Factors Affecting the Firm's Decision to Decentralize**

Brief Interviews conducted with high level executives of six office firms in Metropolitan Toronto give evidence as to the real motivations for the suburbanization of offices. Five of the firms had just located in the central part of North York within the last year and one was located in the financial core of Toronto and was in the process of relocating to Port Credit, a fringe community of Metropolitan Toronto. The informal interviews revealed many similarities about the factors which affected their

decisions to locate to suburban areas.

The main reason given for the choice of a suburban location was accessibility. The firms were mostly concerned with accessibility for the convenience of their clients. All five North York firms mentioned that the better road and highway access to their offices was important. Many firms had relocated from offices in the CBD of Toronto and remarked on the traffic congestion in the city as a specific reason for choosing the suburban location. The office manager of Structural Dynamics Research Corporation (SDRC), a firm for mechanical computer aided engineering software, reported that "The congestion was awful downtown. Our clients had to drive around a long time before they could find a place to park. They were always complaining". Accessibility for the employees of the firms was mentioned by four of the companies. The owner of Cut Rite Lumber, a lumber distributor located in North York, remarked that "the employees in the office like the subway convenience. They go against the flow of traffic in the subways because [of the suburban location]". As previously mentioned, the firm of CHW International Investments also preferred accessibility. However, CHW valued accessibility to the financial and investment services of the CBD rather than accessibility to their clients.

Also associated with accessibility is the proximity to Pearson International Airport. The firms that mentioned

the airport as being important all had many clients from out of town. SDRC was the only Canadian branch office of it's American parent company and reported that they fly two or three times per week and that their clients were based all across Canada. The owner of Altos Computer Systems, a computer consulting firm, explained that "the access to the 401 [the major artery through Metropolitan Toronto] is great for getting to the airport. Its much quicker than when we were located downtown".

Half of the firms interviewed revealed that the level of rent was not a factor in choosing the suburban location. Key Lake Exploration, a mineral exploration company, reported that "the price per square foot that we are getting is less than on Bay Street but we also have more room, so the total rent is not that much different". Altos Computer Systems also regarded rent as an insignificant factor in their hunt for a new location but they expressed the need for room for expansion as being the key factor for their search.

Also regarding rent as not important was the office manager of the Seaboard Life Insurance Company. This company felt that the general environment of the downtown was depressing for the employees and the clients and decided to choose the suburban North York location. The company stated that "Our office used to be in an area with a lot of transients. Our clients were and staff were constantly

being approached and bothered for money and handouts." This general concern for the environment was expressed by all the firms interviewed. The companies often remarked about the growing prestige of area around North York City Hall named North York Centre. Three of the firms reported that the North York address of their offices was just as well known as their former downtown locations and directions to their new offices did not often have to be given to clients. Five out of the six firms mentioned the increasing amount of shopping, accommodation and recreation facilities in the area. Cut Rite Lumber remarked that "North York Centre is starting to resemble a downtown more and more each day".

Although this survey of suburban firms is a very minute sample of the offices in North York, the results reveal a great deal about the motivation for offices to relocate to suburban locales. Simply looking at the structure of the firm is not sufficient to determine the likelihood of a firm to decentralize.

#### 4.6 Policy Implications

The implications of office suburbanization are found in all aspects of the urban environment. The decentralization of offices may have its effects on everything from transportation planning to the social

geography of the city to the urban environment in general. Politicians and planners must recognize and be able to deal with the inevitable changes which will take place in both the downtown and the suburbs as a result of the expansion of the suburban offices and commercial activity in general.

Office employment in Metropolitan Toronto is expected to increase from the 43.4% of total employment in 1987 to 47.5% by 2001 with a substantial part of the increase predicted to be in suburban areas (Metropolitan Toronto, 1984, p.8). However, with Metropolitan Toronto's commitment to keeping the existing CBD a viable area for office development, policies must deal with improving the downtown environment to continue to attract employment. As we have seen earlier, the downtown environment was a key determinant of office relocation to suburban areas. Policies towards relieving traffic congestion in the downtown should be a large part of improving the downtown environment. Plans for residential and commercial development and redevelopment should also be included in such Central Area policies.

Traffic congestion is not strictly a downtown phenomena. Commuters have had to contend with clogged suburban arteries which are the main access to downtown areas. Suburban municipalities must also have to implement policies for improving the transportation networks within their areas to facilitate the efficient movement of people



to and from the metropolitan sub centres. These policies must deal with improving road networks as well as expanding the capacity of existing public transit facilities and expanding the system.

Associated with the transport infrastructure is the subject of parking. As demand for suburban office space increases, the land available for parking facilities may suffer as the current abundant and inexpensive parking is replaced with office and commercial complexes. The municipalities must recognize the fact that their Metropolitan sub centres may eventually encounter similar problems in their evolution as the CBD has encountered.

Another major implication of suburban office growth could be a changing social composition of the inner city and the suburbs. The CBD has a direct impact on the central neighbourhoods. Selective decentralization promotes a concentration of high order jobs in the CBD making inner city neighbourhoods the choice residential area for middle- and upper-middle income households who seek to work in the elite CBD (Gad,1986,p.25). Similarly, if the suburban municipalities fail to attract this 'elite' employment to the suburbs, the suburban offices may become areas of lower wage employment and a lowering of socioeconomic status may occur in the suburbs. Although Gad's concerns may seem far fetched, the separation of high order and low order office functions within the metropolitan area and the associated

residential patterns could increase the 'ghettoization' of the low income in both the inner city and the suburbs. Municipalities should be aware of the social effects of the types of office jobs being attracted to their areas and include possible social policies on their planning agendas.

## V CONCLUSION

The office sector is a major component of urban growth and development in the post-World War Two period. The dominance of the CBD as the primary area for office employment has been reduced over the last two decades as office parks and traditional office buildings have emerged in the rapidly expanding suburbs of many North American cities, including Metropolitan Toronto.

Growth rates of office employment in Metropolitan Toronto clearly show the emergence of suburban areas, such as central North York, as important areas of office employment. However, even though office employment in the suburban areas is growing much faster than in the CBD of Toronto, the Central Area of Toronto remains the dominant centre for office employment in the region as well as in the country. This suburbanization of offices in Metropolitan Toronto has been encouraged through the policies of the Metropolitan government such as designating certain suburban regions of Metro Toronto as growth centres for activity, especially offices. At the same time, the City of Toronto has ensured the viability of the downtown office community through its plans for continued construction of office space in the financial core itself and in the adjacent areas.

The sectoral study of North York and Toronto offices shows a selective decentralization among various office

types. This emerging distribution of offices points to a trade-off between the respective advantages and disadvantages of the two types of locations. Characteristics of the downtown locations such as prestige, ease of face-to-face contact and accessibility are balanced by drawbacks of the location such as traffic congestion and high rents. Suburban locations may have a pleasing environment, room for expansion and custom built properties and accessibility to the airport but also have rising traffic congestion, lower access to business contacts and a general lack of the variety of amenities available in the downtown. The firms that locate at either location do so because of the relative importance of each characteristic to the individual firm.

The results of this study supports the findings of other research on the sectoral locations of offices. Generally, the high order functions which require frequent face-to-face contact remain in the downtown office community and the lower order functions, those dealing with routine operations, standardized products and local consumers are locationally 'footloose'. These firms do not require a large amount of contact with other firms and tend to take advantage of the suburban locations.

The sectors which seem to be remaining in the traditional downtown locations are banking, the investment dealers, real estate and insurance sectors as well as the

'other business services' sector. Those offices which are emerging in suburban locations are manufacturing offices as well as the investment dealers, real estate and insurance and 'other business services' sectors with the individual firms in the last two sectors being most likely to be smaller independent firms, branch offices or routine operations of larger firms located in the downtown.

The emergence of a suburban office community and the development of suburban downtowns has definite implications for the spatial and social structures of the city. This transformation will certainly not be without problems and may result in another chapter in the story of the changing city.

**APPENDIX A**

OFFICE EMPLOYMENT CATEGORIES

## 1. Mining, Mineral and Oil

- mining and mineral exploration
- integrated oil companies

## 2. Manufacturing

- manufacturing offices

## 3. Transportation, Construction and Resource Production

- transportation operations(airlines,railways, bus, trucking companies, etc.
- travel agencies, airline reservations
- other transportation(shipping and forwarding agencies, brokers, etc.)
- utilities
- construction offices
- resource production offices(farming, fishing, and forestry)

## 4. Banks

- bank and trust company branches
- bank and trust company administrative offices

## 5. Investment Dealers, Insurance and Real Estate

- investment services(investment dealers, mutual funds, exchanges and exchange services)
- financing(consumer and business finance, consumer loans, business finance, mortgage brokers)
- insurance companies(life insurance, general insurance, mixed-life and general)
- other insurance(insurance agencies and insurance adjusters)
- real estate developers
- real estate agents(brokers)

## 6. Law Firms

## 7. Other Business Services

- accountants
- management consultants (placement services, actuarial services, market research, other research)
- advertising agencies
- public relations consultants
- photographers and graphic artists
- personnel services (including theatrical agencies)
- computer services (computer programming, computer consulting, other EDP related offices)
- other business services (investigation services, real estate management, janitorial services, maintenance, other and not specified business services)

## 8. Technical Services

- architects and town planners (including landscape architects)
- engineering consultants (diversified engineering, construction engineering, industrial engineering, mining services, other engineers)
- industrial designers
- other technical services (including interior designers)

## 9. Radio, T.V. and Film

- radio and TV stations
- program producers
- program and film distributors
- film and recording studios

## 10. Books, Periodicals and Newspapers

- book publishers
- periodical publishers
- newspaper publishers
- other radio, TV, motion picture and publishing

## 11. Trade and Personal Services

- retail trade administration (sales representative)
- wholesale trade (import and export) administration
- accommodation, entertainment and food services
- other personal services



- other trade

12. Doctors

- doctors and physicians
- dentists
- opticians and optometrists

13. Other Health Services

- other health service practitioners(chiropractors, physiotherapists)
- laboratories and other related services, radiologists, etc.

14. Federal and Foreign Government

- federal government offices
- post offices
- foreign(embassies, consulates, trade commissioners, etc.)

15. Provincial Government

16. Regional and Local Government

- regional of county government offices
- education board offices

17. Associations

- general civic associations
- business associations
- professional associations
- labour associations, trade unions
- religious organizations and associations
- other offices not classified elsewhere

**APPENDIX B**

CHI-SQUARE TEST FOR TWO SAMPLES AND SEVENTEEN CAT  
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DEGREES OF FREEDOM = 16

OFFICE EMPLOYMENT BY SEVENTEEN CATEGORIES

CATEGORIES

- 1 MINING, MINERAL, OIL
- 2 MANUFACTURING
- 3 TRANSP, CONSTRUCTION, RESOURCE PROD.
- 4 BANK
- 5 INVEST.DEALERS, INSURANCE, REAL ESTATE
- 6 LAW FIRMS
- 7 OTHER BUSINESS SERVICES
- 8 TECHNICAL SERVICES
- 9 RADIO, T.V., FILM
- 10 BOOKS, PERIODICALS, NEWSPAPERS
- 11 TRADE & PERSONAL SERVICES
- 12 DOCTORS
- 13 OTHER HEALTH SERVICES
- 14 FEDERAL & FOREIGN
- 15 PROVINCIAL
- 16 REGIONAL & LOCAL
- 17 ASSOCIATIONS

## CHI SQUARE TEST - 1983

CATEGORY	AREA 1	AREA 2	TOTAL	EXPECTED	FREQUENCIES
	NRTH YRK	TORONTO		NRTH YRK	TORONTO
1	98	5068	5166	402.14	4763.86
2	715	7092	7807	607.72	7199.28
3	2190	25146	27336	2127.93	25208.07
4	978	21024	22002	1712.71	20289.29
5	2001	44375	46376	3610.07	42765.93
6	339	11438	11777	916.76	10860.24
7	2351	27253	29604	2304.48	27299.52
8	667	4176	4843	377.00	4466.00
9	1	4226	4227	329.04	3897.96
10	48	7719	7767	604.61	7162.39
11	271	8386	8657	673.89	7983.11
12	852	2203	3055	237.81	2817.19
13	295	996	1291	100.50	1190.50
14	4508	5664	10172	791.82	9380.18
15	44	21421	21465	1670.91	19794.09
16	1531	4414	5945	462.78	5482.22
17	723	8036	8759	681.83	8077.17
TOTAL	17612	208637	226249		

## CHI-SQUARE COMPUTATION TABLE - 1983 cont.

CATEGORY	AREA	1 OBS	2 FREQ	3 EXP FREQ	(1 - 2)	(1 - 2)**2	3/2
1	1	98	402.14	-304.14	92501.14	230.02	
1	2	5068	4763.86	304.14	92501.14	19.42	
2	1	715	607.72	107.28	11509.00	18.94	
2	2	7092	7199.28	-107.28	11509.00	1.60	
3	1	2190	2127.93	62.07	3852.68	1.81	
3	2	25146	25208.07	-62.07	3852.68	.15	
4	1	978	1712.71	-734.71	539798.78	315.17	
4	2	21024	20289.29	734.71	539798.78	26.61	
5	1	2001	3610.07	-1609.07	2589106.26	717.19	
5	2	44375	42765.93	1609.07	2589106.26	60.54	
6	1	339	916.76	-577.76	333806.62	364.12	
6	2	11438	10860.24	577.76	333806.62	30.74	
7	1	2351	2304.48	46.52	2164.11	.94	
7	2	27253	27299.52	-46.52	2164.11	.08	
8	1	667	377	290	84100.00	223.08	
8	2	4176	4466	-290	84100.00	18.83	
9	1	1	329.04	-328.04	107610.24	327.04	
9	2	4226	3897.96	328.04	107610.24	27.61	
10	1	48	604.61	-556.61	309814.69	512.42	
10	2	7719	7162.39	556.61	309814.69	43.26	
11	1	271	673.89	-402.89	162320.35	240.87	
11	2	8386	7983.11	402.89	162320.35	20.33	
12	1	852	237.81	614.19	377229.36	1586.26	
12	2	2203	2817.19	-614.19	377229.36	133.90	
13	1	295	100.5	194.5	37830.25	376.42	
13	2	996	1190.5	-194.5	37830.25	31.78	
14	1	4508	791.82	3716.18	13809993.79	17440.82	
14	2	5664	9380.18	-3716.18	13809993.79	1472.25	
15	1	44	1670.91	-1626.91	2646836.15	1584.07	
15	2	21421	19794.09	1626.91	2646836.15	133.72	
16	1	1531	462.78	1068.22	1141093.97	2465.74	
16	2	4414	5482.22	-1068.22	1141093.97	208.14	
17	1	723	681.83	41.17	1694.97	2.49	
17	2	8036	8077.17	-41.17	1694.97	.21	
TOTALS		226249	226249	-1.8E-12		28636.56	
						CHI SQUARE VALUE	

## CHI SQUARE TEST - 1984

CATEGORY	AREA 1	AREA 2	TOTAL	EXPECTED	FREQUENCIES
	NRTH YRK	TORONTO		NRTH YRK	TORONTO
1	362	4989	5351	445.42	4905.58
2	1417	6505	7922	659.43	7262.57
3	1656	25391	27047	2251.39	24795.61
4	1057	28970	30027	2499.44	27527.56
5	2382	41655	44037	3665.63	40371.37
6	324	11863	12187	1014.44	11172.56
7	2886	25394	28280	2354.02	25925.98
8	515	3488	4003	333.21	3669.79
9	0	5241	5241	436.26	4804.74
10	753	8794	9547	794.69	8752.31
11	205	12316	12521	1042.25	11478.75
12	866	2351	3217	267.78	2949.22
13	339	967	1306	108.71	1197.29
14	4516	7434	11950	994.72	10955.28
15	57	21294	21351	1777.25	19573.75
16	1719	5140	6859	570.94	6288.06
17	894	7905	8799	732.43	8066.57
TOTAL	19948	219697	239645		

## CHI-SQUARE COMPUTATION TABLE - 1984 cont.

CATEGORY	AREA	1 OBS FREQ	2 EXP FREQ	(1 - 2)	3 (1 - 2)**2	3/2
1	1	362	445.42	-83.42	6958.90	15.62
1	2	4989	4905.58	83.42	6958.90	1.42
2	1	1417	659.43	757.57	573912.30	870.32
2	2	6505	7262.57	-757.57	573912.30	79.02
3	1	1656	2251.39	-595.39	354489.25	157.45
3	2	25391	24795.61	595.39	354489.25	14.30
4	1	1057	2499.44	-1442.44	2080633.15	832.44
4	2	28970	27527.56	1442.44	2080633.15	75.58
5	1	2382	3665.63	-1283.63	1647705.98	449.50
5	2	41655	40371.37	1283.63	1647705.98	40.81
6	1	324	1014.44	-690.44	476707.39	469.92
6	2	11863	11172.56	690.44	476707.39	42.67
7	1	2886	2354.02	531.98	283002.72	120.22
7	2	25394	25925.98	-531.98	283002.72	10.92
8	1	515	333.21	181.79	33047.60	99.18
8	2	3488	3669.79	-181.79	33047.60	9.01
9	1	0	436.26	-436.26	190322.79	436.26
9	2	5241	4804.74	436.26	190322.79	39.61
10	1	753	794.69	-41.69	1738.06	2.19
10	2	8794	8752.31	41.69	1738.06	.20
11	1	205	1042.25	-837.25	700987.56	672.57
11	2	12316	11478.75	837.25	700987.56	61.07
12	1	866	267.78	598.22	357867.17	1336.42
12	2	2351	2949.22	-598.22	357867.17	121.34
13	1	339	108.71	230.29	53033.48	487.84
13	2	967	1197.29	-230.29	53033.48	44.29
14	1	4516	994.72	3521.28	12399412.84	12465.23
14	2	7434	10955.28	-3521.28	12399412.84	1131.82
15	1	57	1777.25	-1720.25	2959260.06	1665.08
15	2	21294	19573.75	1720.25	2959260.06	151.19
16	1	1719	570.94	1148.06	1318041.76	2308.55
16	2	5140	6288.06	-1148.06	1318041.76	209.61
17	1	894	732.43	161.57	26104.86	35.64
17	2	7905	8066.57	-161.57	26104.86	3.24
TOTALS		239645	239645	-2.8E-12		24460.53 CHI SQUARE VALUE

## CHI SQUARE TEST - 1985

CATEGORY	AREA 1		TOTAL	EXPECTED FREQUENCIES	
	NRTH YRK	TORONTO		NRTH YRK	TORONTO
1	0	3798	3798	318.09	3479.91
2	1172	5522	6694	560.64	6133.36
3	1726	26719	28445	2382.35	26062.65
4	943	27710	28653	2399.77	26253.23
5	2298	39411	41709	3493.25	38215.75
6	345	12677	13022	1090.63	11931.37
7	3337	28930	32267	2702.45	29564.55
8	567	4090	4657	390.04	4266.96
9	5	5642	5647	472.95	5174.05
10	765	9545	10310	863.49	9446.51
11	464	13373	13837	1158.89	12678.11
12	900	2537	3437	287.86	3149.14
13	309	708	1017	85.18	931.82
14	4647	8171	12818	1073.54	11744.46
15	108	22290	22398	1875.90	20522.10
16	1946	5687	7633	639.29	6993.71
17	947	7228	8175	684.68	7490.32
TOTAL	20479	224038	244517		



## CHI-SQUARE COMPUTATION TABLE - 1985 cont.

CATEGORY	AREA	1 OBS FREQ	2 EXP FREQ	(1 - 2)	3 (1 - 2)**2	3/2
1	1	0	318.09	-318.09	101181.25	318.09
1	2	3798	3479.91	318.09	101181.25	29.08
2	1	1172	560.64	611.36	373761.05	666.67
2	2	5522	6133.36	-611.36	373761.05	60.94
3	1	1726	2382.35	-656.35	430795.32	180.83
3	2	26719	26062.65	656.35	430795.32	16.53
4	1	943	2399.77	-1456.77	2122178.83	884.33
4	2	27710	26253.23	1456.77	2122178.83	80.83
5	1	2298	3493.25	-1195.25	1428622.56	408.97
5	2	39411	38215.75	1195.25	1428622.56	37.38
6	1	345	1090.63	-745.63	555964.10	509.76
6	2	12677	11931.37	745.63	555964.10	46.60
7	1	3337	2702.63	634.37	402425.30	148.90
7	2	28930	29564.55	-634.55	402653.70	13.62
8	1	567	390.04	176.96	31314.84	80.29
8	2	4090	4266.96	-176.96	31314.84	7.34
9	1	5	472.95	-467.95	218977.20	463.00
9	2	5642	5174.05	467.95	218977.20	42.32
10	1	765	863.49	-98.49	9700.28	11.23
10	2	9545	9446.51	98.49	9700.28	1.03
11	1	464	1158.89	-694.89	482872.11	416.67
11	2	13373	12678.11	694.89	482872.11	38.09
12	1	900	287.86	612.14	374715.38	1301.73
12	2	2537	3149.14	-612.14	374715.38	118.99
13	1	309	85.18	223.82	50095.39	588.11
13	2	708	931.82	-223.82	50095.39	53.76
14	1	4647	1073.54	3573.46	12769616.37	11894.87
14	2	8171	11744.46	-3573.46	12769616.37	1087.29
15	1	108	1875.9	-1767.9	3125470.41	1666.12
15	2	22290	20522.1	1767.9	3125470.41	152.30
16	1	1946	639.29	1306.71	1707491.02	2670.92
16	2	5687	6993.71	-1306.71	1707491.02	244.15
17	1	947	684.68	262.32	68811.78	100.50
17	2	7228	7490.32	-262.32	68811.78	9.19
TOTALS		244517	244517.2	-.18		24350.40
						CHI SQUARE VALUE

## CHI SQUARE TEST - 1986

CATEGORY	AREA 1		TOTAL	EXPECTED FREQUENCIES	
	NRTH YRK	TORONTO		NRTH YRK	TORONTO
1	46	2829	2875	227.83	2647.17
2	1064	5466	6530	517.47	6012.53
3	1457	23952	25409	2013.52	23395.48
4	764	32879	33643	2666.02	30976.98
5	2188	40702	42890	3398.80	39491.20
6	309	13185	13494	1069.33	12424.67
7	3228	32265	35493	2812.63	32680.37
8	701	4502	5203	412.31	4790.69
9	7	7273	7280	576.90	6703.10
10	712	10294	11006	872.17	10133.83
11	342	13734	14076	1115.45	12960.55
12	857	2325	3182	252.16	2929.84
13	413	1317	1730	137.09	1592.91
14	4619	6716	11335	898.24	10436.76
15	468	22521	22989	1821.75	21167.25
16	1990	5865	7855	622.47	7232.53
17	925	7604	8529	675.88	7853.12
TOTAL	20090	233429	253519		

## CHI-SQUARE COMPUTATION TABLE - 1986 cont.

CATEGORY	AREA	1 OBS	2 FREQ	EXP FREQ	(1 - 2)	3 (1 - 2)**2	3/2
1	1	46	227.83	-181.83	33062.15	145.12	
1	2	2829	2647.17	181.83	33062.15	12.49	
2	1	1064	517.47	546.53	298695.04	577.22	
2	2	5466	6012.53	-546.53	298695.04	49.68	
3	1	1457	2013.52	-556.52	309714.51	153.82	
3	2	23952	23395.48	556.52	309714.51	13.24	
4	1	764	2666.02	-1902.02	3617680.08	1356.96	
4	2	32879	30976.98	1902.02	3617680.08	116.79	
5	1	2188	3398.8	-1210.8	1466036.64	431.34	
5	2	40702	39491.2	1210.8	1466036.64	37.12	
6	1	309	1069.33	-760.33	578101.71	540.62	
6	2	13185	12424.67	760.33	578101.71	46.53	
7	1	3228	2812.63	415.37	172532.24	61.34	
7	2	32265	32680.37	-415.37	172532.24	5.28	
8	1	701	412.31	288.69	83341.92	202.13	
8	2	4502	4790.69	-288.69	83341.92	17.40	
9	1	7	576.9	-569.9	324786.01	562.98	
9	2	7273	6703.1	569.9	324786.01	48.45	
10	1	712	872.17	-160.17	25654.43	29.41	
10	2	10294	10133.83	160.17	25654.43	2.53	
11	1	342	1115.45	-773.45	598224.90	536.31	
11	2	13734	12960.55	773.45	598224.90	46.16	
12	1	857	252.16	604.84	365831.43	1450.79	
12	2	2325	2929.84	-604.84	365831.43	124.86	
13	1	413	137.09	275.91	76126.33	555.30	
13	2	1317	1592.91	-275.91	76126.33	47.79	
14	1	4619	898.24	3720.76	13844054.98	15412.42	
14	2	6716	10436.76	-3720.76	13844054.98	1326.47	
15	1	468	1821.75	-1353.75	1832639.06	1005.98	
15	2	22521	21167.25	1353.75	1832639.06	86.58	
16	1	1990	622.47	1367.53	1870138.30	3004.38	
16	2	5865	7232.53	-1367.53	1870138.30	258.57	
17	1	925	675.88	249.12	62060.77	91.82	
17	2	7604	7853.12	-249.12	62060.77	7.90	
TOTALS		253519	253519	5.26E-12		28365.80	
						CHI SQUARE VALUE	

## CHI SQUARE TEST - 1987

CATEGORY	AREA 1		TOTAL	EXPECTED FREQUENCIES	
	NRTH YRK	AREA 2 TORONTO		NRTH YRK	TORONTO
1	420	3554	3974	348.37	3625.63
2	1688	3197	4885	428.23	4456.77
3	1352	25600	26952	2362.66	24589.34
4	1102	34864	35966	3152.84	32813.16
5	3427	43162	46589	4084.07	42504.93
6	413	13611	14024	1229.37	12794.63
7	4368	37904	42272	3705.64	38566.36
8	729	4836	5565	487.84	5077.16
9	29	6529	6558	574.89	5983.11
10	729	9929	10658	934.30	9723.70
11	388	13151	13539	1186.85	12352.15
12	1026	2478	3504	307.17	3196.83
13	461	1342	1803	158.05	1644.95
14	4324	7653	11977	1049.92	10927.08
15	544	24274	24818	2175.59	22642.41
16	1412	5295	6707	587.95	6119.05
17	1059	6895	7954	697.26	7256.74
TOTAL	23471	244274	267745		

## CHI-SQUARE COMPUTATION TABLE - 1987 cont.

CATEGORY	AREA	1 OBS	2 FREQ	EXP FREQ	(1 - 2)	3 (1 - 2)**2	3/2
1	1	420	348.37	71.63	5130.86	4782.49	
1	2	3554	3625.63	-71.63	5130.86	1505.23	
2	1	1688	428.23	1259.77	1587020.45	1586592.22	
2	2	3197	4456.77	-1259.77	1587020.45	1582563.68	
3	1	1352	2362.66	-1010.66	1021433.64	1019070.98	
3	2	25600	24589.34	1010.66	1021433.64	996844.30	
4	1	1102	3152.84	-2050.84	4205944.71	4202791.87	
4	2	34864	32813.16	2050.84	4205944.71	4173131.55	
5	1	3427	4084.07	-657.07	431740.98	427656.91	
5	2	43162	42504.93	657.07	431740.98	389236.05	
6	1	413	1229.37	-816.37	666459.98	665230.61	
6	2	13611	12794.63	816.37	666459.98	653665.35	
7	1	4368	3705.64	662.36	438720.77	435015.13	
7	2	37904	38566.36	-662.36	438720.77	400154.41	
8	1	729	487.84	241.16	58158.15	57670.31	
8	2	4836	5077.16	-241.16	58158.15	53080.99	
9	1	29	574.89	-545.89	297995.89	297421.00	
9	2	6529	5983.11	545.89	297995.89	292012.78	
10	1	729	934.3	-205.3	42148.09	41213.79	
10	2	9929	9723.7	205.3	42148.09	32424.39	
11	1	388	1186.85	-798.85	638161.32	636974.47	
11	2	13151	12352.15	798.85	638161.32	625809.17	
12	1	1026	307.17	718.83	516716.57	516409.40	
12	2	2478	3196.83	-718.83	516716.57	513519.74	
13	1	461	158.05	302.95	91778.70	91620.65	
13	2	1342	1644.95	-302.95	91778.70	90133.75	
14	1	4324	1049.92	3274.08	10719599.85	10718549.93	
14	2	7653	10927.08	-3274.08	10719599.85	10708672.77	
15	1	544	2175.59	-1631.59	2662085.93	2659910.34	
15	2	24274	22642.41	1631.59	2662085.93	2639443.52	
16	1	1412	587.95	824.05	679058.40	678470.45	
16	2	5295	6119.05	-824.05	679058.40	672939.35	
17	1	1059	697.26	361.74	130855.83	130158.57	
17	2	6895	7256.74	-361.74	130855.83	123599.09	
TOTALS		267745	267745	-3.9E-12		48118275.22	
						CHI SQUARE VALUE	

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